Lucent Technologies
Bell Labs Innovations

Access Concentrator 60 and Access Concentrator 120

User's Guide

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Part 68. This equipment complies with Part 68 of the FCC rules. On the back of the AC 60/120 chassis is a label that contains, in addition to other information, the FCC registration number. You must provide this information to the telephone company, if they request it. The FCC requires Lucent Technologies to provide you with the following information:

1. The AC 60/120 systems have digital service interface capabilities using an RJ48C connector. The facility interface codes with which the AC 60/120 systems comply for digital services are as follows: 04DU9-BN, 04DU9-DN, 04DU9-1KN, and 04DU9-1SN. The AC 60/120 systems have loop start interface capabilities using an RJ11C/W connector. The facility interface code with which the AC 60/120 systems comply for service is 02LS2. The service order codes for the AC 60/120 systems are 6.0F for the T1 interface and 9.0Y for the loop start interface.
2. An FCC-compliant telephone network interface jack is built into this equipment and is compatible with interconnections that are Part 68 compliant.
3. If the AC 60/120 system causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service might be required. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe this is necessary.
4. The telephone company might make changes in its facilities, equipment, operations, or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice for you to make necessary modifications to maintain uninterrupted service.
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Ringer Equivalence Number (REN) Notice. The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee that the equipment will operate to the user's satisfaction.

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

Users should ensure for their own protection that the ground connections of the power utility, telephone lines, and internal metallic water pipe system 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.

The Ringer Equivalence Number (REN) 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 REN of all devices does not exceed 5.

The REN for the AC 60/120 systems is 0.7B.

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Acknowledgment

This document was prepared by the Product Publications Development, Lucent Technologies, Middletown, NJ.

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About This Documentation

This section contains information about the following subjects:

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Introduction

This documentation provides the information needed to install and operate the AC 60 and AC 120 systems.

Audience

This document is designed for anyone who needs to install or operate the AC 60/120 systems.

What You Should Know

You should be familiar with:

- asynchronous transfer mode (ATM) technology
- Basic networking technology

Organization of Information

This electronic documentation is arranged in sections. Click on a section title to read about that subject.

System Overview	Provides an overview of the Access Concentrator 60 (AC 60) and Access Concentrator 120 (AC 120) systems.
Installing and Operating the AC 60 and AC 120 Systems	Explains how to install the hardware components and power up the systems.
Configuring the Basic System	Explains how to logon and configure the AC 60/120 systems. This involves: • Setting the system values for your site • Setting values for the primary Stratum 3–4 Module
Configuring the I/O and Server Modules	Describes how to configure the I/O and server modules.
Provisioning Connections and Obtaining Statistics	Describes how to set up permanent virtual circuits (PVC) and how to view statistical data for billing and performance monitoring.
Provisioning Scenarios and Examples	Displays examples for provisioning PVC connections for the AC 60/120 systems.
Upgrading and Backing Up System Software	Describes how to upgrade and back up the AC 60/120 system software.
Pin Configurations for AC 60/120 Modules and Cables	Describes the pinouts on the AC 120 common equipment modules and the AC 60 and AC 120 I/O modules.
Configuring the Terminal Emulator	Explains how to configure the terminal emulator.
SNMP Trap Messages	Describes how to access the Simple Network Management Protocol (SNMP) trap and notification messages. It also describes the messages.
Hardware Physical and Environmental Specifications	Describes the hardware component's physical and environmental specifications.
Parts List	Contains the comcodes for all separately orderable components.

Safety

The information in this section is provided to clarify constraints for the installation and use of the Lucent Technologies Access Concentrator 60 (AC 60) and Access Concentrator 120 (AC 120) systems.

Product Modification or Repair

Do not make any electrical or mechanical modifications to any of the components in the AC 60/120 system. Lucent Technologies is not responsible for the safety or the performance of a modified Lucent Technologies product. Do not remove or attempt to repair the power supply, stratum, CPU, or cooling fan components inside the AC 60 chassis. Do not attempt to repair any failed removable power supply (AC 120), stratum (AC 120), CPU (AC 120), I/O, or server modules. You must return failed components to Lucent Technologies for repair or replacement.

Modification or tampering of AC 60/120 components will result in void of warranty.

Ventilation

Adequate ventilation around the AC 60/120 systems is critical to correct, trouble-free operation. Ensure that the ventilation openings are not blocked in any way.

- The rack mounted AC 120 chassis has no cooling fans. To ensure adequate air flow for an AC 120 system, you must maintain a minimum clearance of 5.1 cm (2 inches) above and below the chassis.
- The tabletop AC 120 has two fans in the rear of the cabinet. You must maintain a minimum of 5.1 cm (2 inches) between the cabinet and any object behind the rear of the cabinet.

  The cooling fans could, depending on the amount of dust in your environment, cause buildup of dust on the modules in the chassis. To prevent module failure due to dust contamination, you must periodically check inside the chassis for dust buildup and remove it.

The AC 60 chassis is housed in an enclosure equipped with a cooling fan in the right side of the unit. You must maintain a minimum distance of 5.1 cm (2 inches) between both sides of the unit and any objects near the sides.

CAUTION:
If you do not provide adequate ventilation, the equipment might overheat and fail.

Equipment failure due to lack of ventilation or heavy dust contamination will result in void of warranty. Refer to *"Installing and Operating the AC 60 and AC 120 Systems" on page 59* for the proper installation procedure.

Electrical Hazards

Ensure that the voltage and frequency of the facility power source match the requirements of the AC 60/120 power supply unit.

Ensure that the power source is properly grounded.

Never push any objects through the openings in the AC 60/120 chassis. Doing so could result in a dangerous electric shock, damage to the equipment, or both. Avoid touching any exposed electrical components.

Electrostatic Discharge

To avoid static electricity damage to the modules in the AC 60/120 systems, always wear an ESD-grounding wrist strap when handling the modules.

Handling the AC 60 and AC 120 Chassis

To prevent personal injury when installing the AC 60/120 chassis in or removing it from an equipment rack cabinet or telco frame, make sure that no modules are inserted in the chassis. Because the AC 120 system weighs about 30 pounds fully populated with modules, it is difficult to safely fasten a fully populated chassis to, or unfasten it from, a rack cabinet or a telco frame without dropping it, which could cause possible injury to you and probable damage to the equipment.

Technical Support

For technical support:

- Business Communications Systems (BCS) customers should call 800 237-0016.
- Network Systems customers should call 800 WE2-CARE (800 932-2273).

1 System Overview

This chapter presents an overview of the Lucent Technologies Access Concentrator 60 (AC 60) and Access Concentrator 120 (AC 120). These asynchronous transfer mode (ATM) access concentrators provide high-capacity, universal connectivity to an ATM wide area network (WAN).

The following aspects of the AC 60/120 systems are discussed:

- Features
- Hardware components
- Architecture, interfaces, and functions
- Features that enable users to customize the systems to suit specific requirements and applications

System Features

The AC 60/120 systems enable service providers and end users at central offices or customer premises to do the following:

- Consolidate voice, video, and data traffic onto a single ATM network infrastructure
- Extend the capabilities of embedded ATM-based equipment to voice and video traffic

The AC 60/120 systems offer a variety of user interfaces to support voice, video, and data applications.

The following figure illustrates the interface capabilities of the AC 60/120 systems.

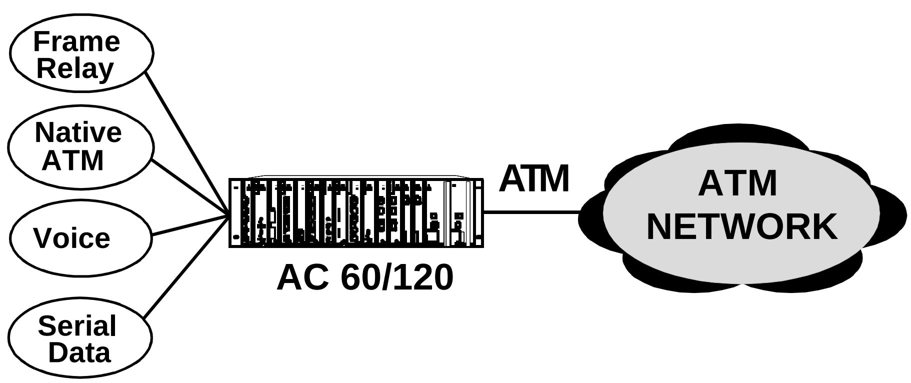

Figure 1. Interface Capabilities of the AC 60/120 Systems

While voice, video, and data traffic are traditionally carried on separate overlay networks, the AC 60/120 systems aggregate all traffic types into a common network infrastructure. Even though such consolidation means that traffic, in effect, competes for the same physical resources, the traffic management and bandwidth utilization capabilities of the AC 60/120 systems ensure that the quality of service (QoS) levels required by applications are satisfied within the available constraints of the network. Unique features of the AC 60/120 systems include:

- Redundant common equipment modules provide continuous operation in mission-critical applications
- Variable-speed ATM access technology supports a wide range of interfaces
- An advanced queuing and cell-switching algorithm differentiates voice, video, and data requirements, thus ensuring QoS levels
- Cell-counting capability allows for an ATM usage-based billing process

AC 120 System Hardware Components

The AC 120 system comprises the following hardware components.

- Chassis—three types of installation:
  - 19-inch chassis, factory installed in a tabletop cabinet
  - 19-inch chassis, user mounted in a standard 19-inch equipment rack or telco frame
  - 23-inch chassis, user mounted in a standard 23-inch equipment rack or telco frame
- Power supply modules:
  - Alternating current (AC) module: requires power at 110/220 V AC, 5 A, 300 W maximum
  - Direct current (DC) module: -48 V DC Module requires power at -42.5 to -56 V DC at 12 A and 400 W maximum

Note:
The chassis accommodates redundant power supplies, which is an optional configuration that is highly recommended.

- Stratum 3–4 Module

Note:
The chassis accommodates redundant Stratum 3–4 Modules, which is an optional configuration that is highly recommended. Redundant Stratum Modules are required for 1.2 Gbits/sec throughput.

- Central processing unit (CPU) Module

Note:
Two CPU Modules provide an optional redundant configuration. System software release 3.2.0 (and above) requires that the CPU module have 32 MB of memory.

User-selected input/output (I/O) and server modules

- DS1/T1 Module, two types:
  - Cell Bearing Module
  - Circuit Emulation Module
- Enhanced DS1 Module

- E1 Module, two types:
  - Cell Bearing Module
  - Circuit Emulation Module
- Enhanced E1 Module
- DS3 Module
- E3 Module
- Ethernet Module
- High Speed Module
- Multiserial Module
- OC-3c Multi-Mode (MM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- OC-3c Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- STM-1 Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- TAXI Module
- Voice 2W Office (2W Sink) Module
- Voice 2W Station (2W Source) Module

AC 120 Chassis

The AC 120 system supports two Stratum 3–4 Modules and two power supply modules to achieve redundant capabilities of common system equipment. The system also supports redundant CPU Modules.

The AC 120 chassis comprises a slotted shelf, a backplane, two lateral pieces, and two honeycomb-patterned, electromagnetic interference (EMI) shields as the top and the bottom horizontal planes. The chassis, available in 19-inch or 23-inch widths, is designed to fit standard 19-inch or 23-inch equipment racks or telco (telecommunications) frames. For mounting in a rack or frame, the chassis is shipped with mounting angle brackets attached to the lateral pieces. These brackets can be attached at three different positions on the lateral pieces to accommodate chassis mounting in three different positions in a rack.

When the rack is configured with multiple chassis, all chassis below the top one require at least four inches of clearance above, below, and behind the rack to provide convection cooling of the system.

In addition, all chassis below the top one must have an air deflector mounted above the chassis to deflect heated air rising from the top of the chassis to the rear of the rack.

The chassis is also available inserted into a tabletop cabinet for use on a hard surface such as a tabletop or wide shelf. See the *"Tabletop Cabinet" on page 30*.

Module Slots

The 19-inch AC 120 chassis contains 16 slots, and the 23-inch chassis contains 20 slots. In both sizes, four slots are reserved for the optionally redundant power supplies and the optionally redundant Stratum 3–4 Modules. The remaining 12 or 16 slots for the CPU Modules (one or two) and user-selected I/O and server modules can be configured based on access and concentration requirements.

The module slots in the AC 120 are numbered from left to right:

- Slots 1 through 12 (19-inch chassis) or slots 1 through 16 (23-inch chassis) are provided for installation of the CPU modules, and the user-selected I/O and server modules.
- In the 19-inch chassis, the CPU modules are placed in slots 11 and 12 (or just in slot 12 for a single CPU configuration).
- In the 23-inch chassis, the CPU modules are placed in slots 15 and 16 (or just in slot 16 for a single CPU configuration).

The gap in numbering from 16 to 21 allows for future expansion of the chassis without renumbering the slots reserved for the common system equipment modules. Therefore, in any size AC 120 system, the Stratum Modules always occupy slots 21 and 22, and the power supply modules always occupy slots 23 and 24. If redundant Stratum and power supply modules are not used, the slots designated for these modules must remain empty. To provide optimum EMI shielding, blank faceplates must be inserted to cover any empty slots in the chassis.

The following figure is an illustration of a sample AC 120 system in a 19-inch chassis. The mounting angle brackets are shown as shipped for equipment rack mounting, that is, for the flush-front position in a rack.

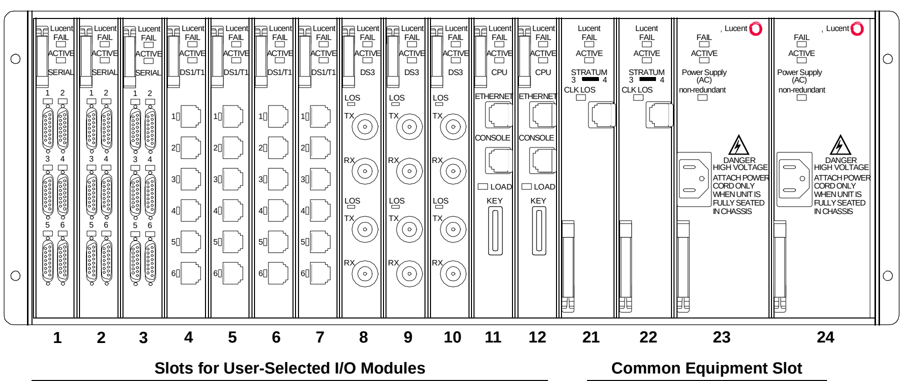

Figure 2. Front View of a Sample 19-inch AC 120 System

Figure 3 on page 29 is an illustration of a sample AC 120 system in a 23-inch chassis.

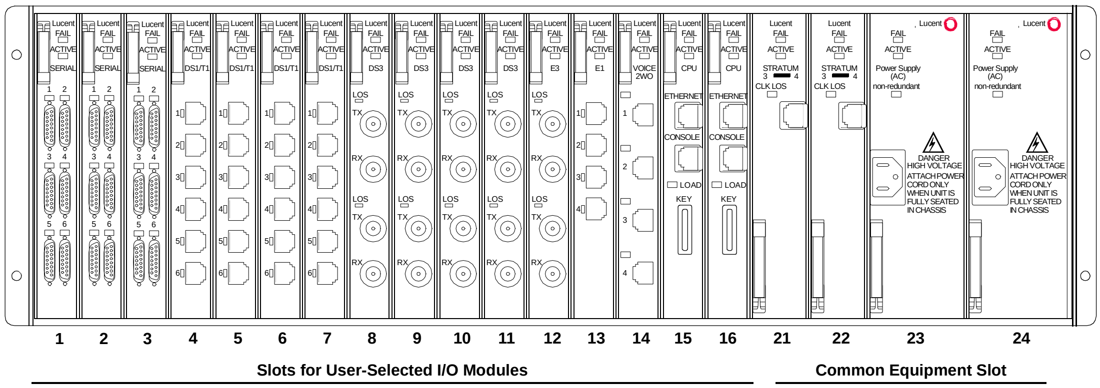

Figure 3. Front View of a Sample 23-inch AC 120 System

Backplane

The chassis backplane provides data, clock, and power distribution for the AC 120 system. From the power supply modules, the backplane distributes +5 V DC of power for logic circuits; -48 V DC for voice, cooling fans, or other applications; and 2.1 V DC for bus termination.

The dual-bus (A/B) architecture of the backplane provides several layers of protection for system resources and functionality. In conjunction with the Stratum 3–4 Modules, this architecture provides the core ATM concentration technologies of the AC 120 system. The dual-bus design provides 1.2 gigabits per second (Gbits/sec) total bandwidth and supports live insertion of primary and redundant common equipment modules. The bus backplane is based entirely on switching ATM cells.

Figure 4 on page 29 shows the 19-inch AC 120 chassis with no modules inserted. Note the enlarged insets showing the backplane connectors for the modules at the back of the chassis and the slot numbers at the front of the chassis.

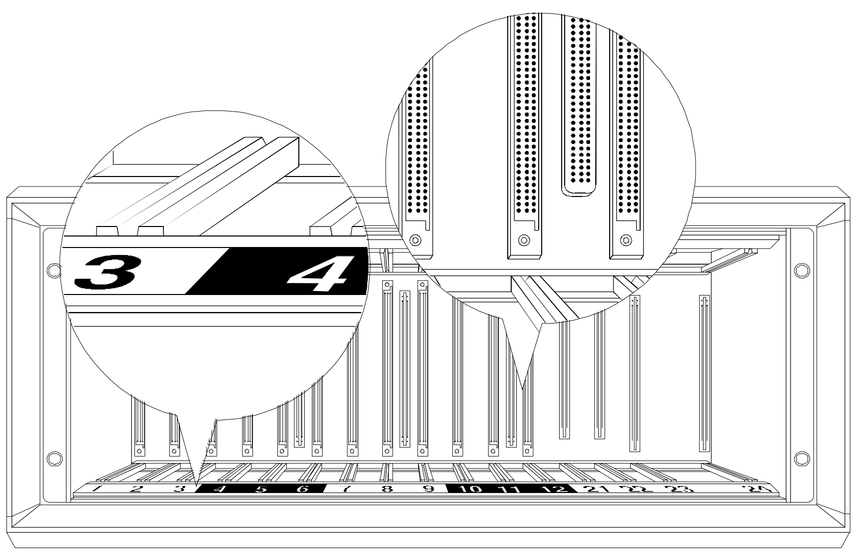

Figure 4. AC 120 19-inch Chassis Backplane

The following figure shows the 23-inch AC 120 chassis with no modules inserted.

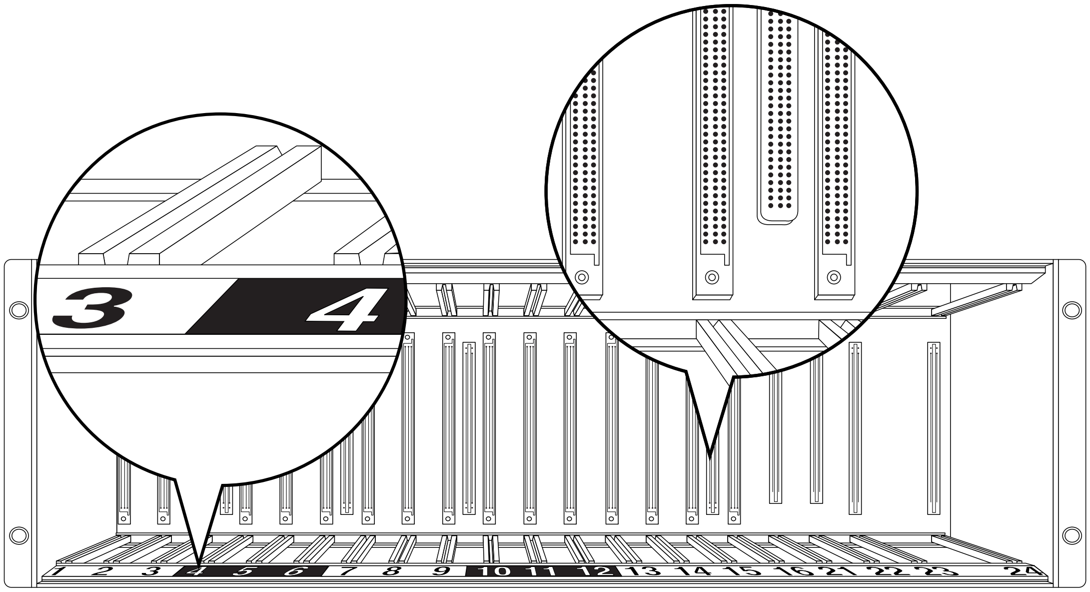

Figure 5. AC 120 23-inch Chassis Backplane

Tabletop Cabinet

The tabletop cabinet option provides housing for a 19-inch AC 120 chassis that is to be placed on a hard surface such as a tabletop or a wide shelf. This cabinet contains two fans on the rear side and sits on short support legs, which provides air space beneath the cabinet. The fans pull in cooling air through the ventilation slots on the bottom of the cabinet and blow the air out the rear. When placed on a hard surface, at least two inches of clearance behind the cabinet must be provided for effective ventilation and cooling. Power to run the fans is obtained from the chassis backplane.

The AC 120 chassis is factory installed in the cabinet. The wiring for the cooling fans is connected to the chassis backplane. *Figure 6 on page 31* shows the cabinet with the chassis removed, for the purpose of illustration.

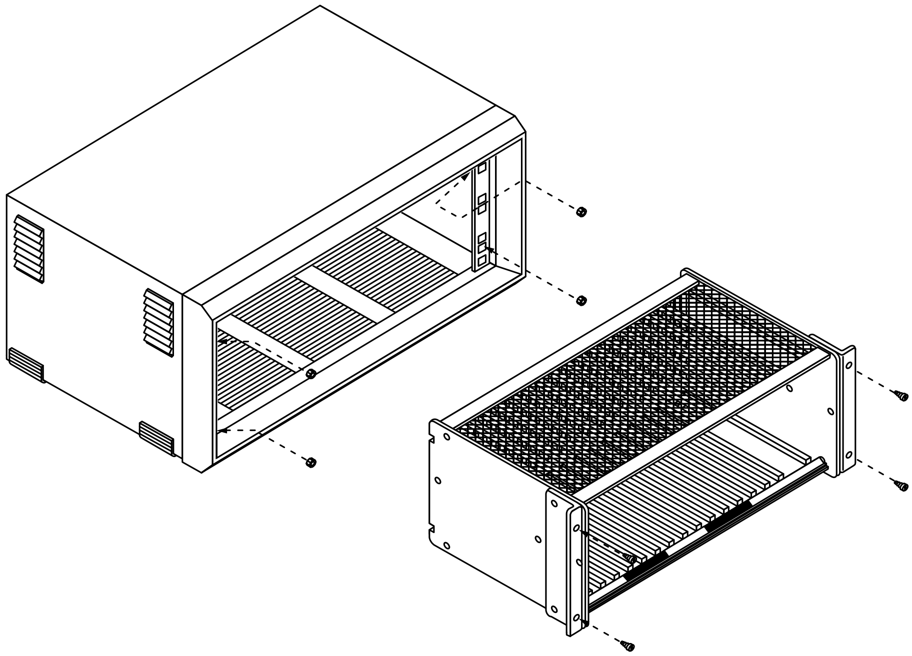

Figure 6. Tabletop Cabinet with 19-inch Chassis Removed

Power Supply Modules

Two types of power supply modules are available:

- 110/220 V AC power supply module
- -48 V DC power supply module

A single power supply module, distributing power to both buses of the backplane, provides the full power necessary to run the AC 120 system, including all the modules in the chassis and the cooling fans in the tabletop cabinet. The system supports the use of two power supply modules (installed in slots 23 and 24) operating in a load-sharing, one-for-one redundant mode for increased system uptime and reliability. This redundant configuration ensures that as long as one power supply module is active, all modules are fully powered. When two power supply modules are installed in a system, each module normally runs at one-half of its capacity.

Stratum 3–4 Module

The Stratum modules provide synchronization and common equipment monitoring for the AC 120 system. Each Stratum 3–4 Module supports a single bus and furnishes 620 megabits per second (Mbit/sec) of ATM bandwidth. Although the AC 120 system can operate with one Stratum module, to achieve the maximum system throughput of 1.2 Gbits/sec and ensure a service-protecting, redundant configuration (slots 21 and 22). With both Stratum modules in service, the I/O modules use both backplane buses. If one Stratum module fails, all the I/O modules use the bus from the remaining Stratum module, but the system throughput is reduced by half, that is, to 600 Mbit/sec.

In addition, the AC 120 system supports network clock synchronization from any of its interfaces. With the ability to accept a timing reference from any of the physical interfaces at low transmission rates, the system provides the network with a reliable transport and access infrastructure. The Stratum 3–4 Module is accurate to Stratum 3 requirements, allowing the AC 120 system to freely run for up to 24 hours without synchronization problems after the total loss of external synchronization references. The Stratum 3–4 Module can also accept a building integrated timing source (BITS) composite clock reference input.

CPU Module

Operating in a nonload-sharing, active/standby mode, the CPU Module provides the processing, switching, and storage functions for the AC 120 system. A reduced instruction-set computer (RISC) based microprocessor provides the processing power to maintain data flow, perform numerical calculations, and manage the direct memory access (DMA) interfaces. The interface-specific physical and link layer protocol functions, in addition to the queuing and traffic management functions, are performed on each of the various I/O modules. The CPU Module has 32 MB of memory to provide routing and signaling functions, forward error correction, processing of SVC connections, and network management capabilities.

AC 60 System Hardware Components

The AC 60 system comprises the following hardware components:

- Chassis—Can be mounted in a standard 19 in. (48.26 cm) equipment rack or a telco frame, or placed on a flat, hard surface
- Common equipment components—are factory installed in the chassis enclosure and are not accessible by the user. No redundancy of these components is supported.
  – AC Power Supply Module — Requires power at either 110 V AC or 220 V AC, 5 A, 300 W maximum

Note:
The power level is set at the factory at either 110 V or 220 V according to user requirements

  – Stratum 3–4
  – CPU

- User-selected I/O and server modules—are the same as those given in the list on page *26*.

AC 60 Chassis

The AC 60 chassis contains single common equipment components that do not support redundant capabilities: the power supply, the Stratum 3–4, and the CPU. These components are factory installed and are not accessible to the user.

The AC 60 chassis comprises an enclosure with a backplane, four horizontal slots for user-selected I/O and server modules, and a cooling fan. The chassis is designed to fit a standard 19-inch (48.3-cm) equipment rack cabinet or a telco frame. When mounted in a rack, the chassis requires at least two inches of clearance above and below and to the sides to facilitate cooling. The cooling fan on the right side of the chassis draws air from the openings in the left side. The right side of the chassis faceplate has controls and indicators for the common equipment components. See the following figure.

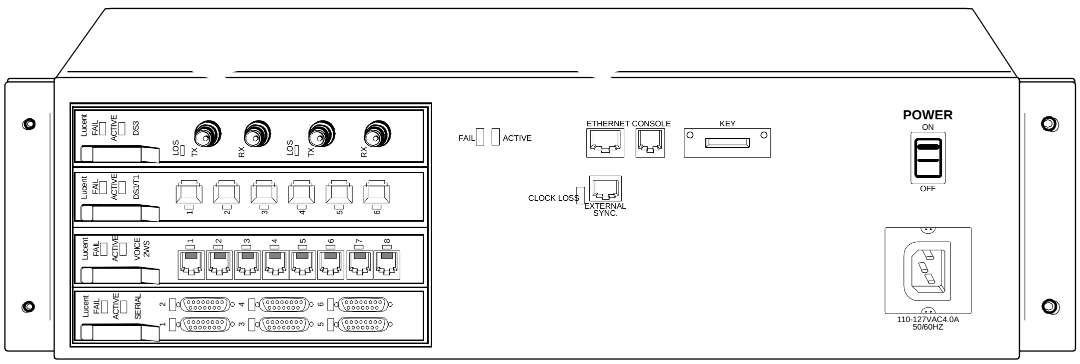

Figure 7. AC 60 System with Enclosed Chassis

The chassis backplane is similar to that of the AC 120 system (see *"Backplane" on page 29*), except that a single-bus architecture is used. The single-bus design supports 600 megabits (106 bits) per second (Mbit/sec) of ATM bandwidth, and live insertion and removal of I/O and server modules.

The power supply component distributes power to the backplane to provide power to the other components, the cooling fan, and the I/O and server modules. The Stratum 3–4 and the CPU components are similar in functionality to the AC 120 Stratum3–4 Module (see *"Stratum 3–4 Module" on page 31*) and the AC 120 CPU Module (see *"CPU Module" on page 32*), except for the redundant capability.

Interface Architecture

The AC 60/120 interface architecture provides clear separation of the physical interface ATM adaptation functions and the switching functions of the ATM access concentrator. The interface architecture can be separated into four distinct functions:

- Physical media access
- Service protocol translation
- ATM addressing
- Queuing

The physical media access layer handles functions specific to each physical interface. These functions allow the user port to connect to other users or network elements.

The service protocol translation layer provides segmentation and reassembly (SAR) functions for the adaptation of nonnative ATM services to ATM-based services. This layer ensures that the service payload is mapped to a standard ATM Adaptation Layer (AAL) protocol.

The ATM addressing layer ensures network-level connectivity by providing a user defined unique virtual path identifier/virtual channel identifier (VPI/VCI), bandwidth allocation, and QoS information.

In the queuing layer, all ATM cells provided by the user port or the backplane are placed in input and output queues based on their QoS parameters. Employing the adaptive queuing traffic management, the AC 120 concentrator transports these cells through the ATM switching fabric and to the I/O port.

Network Management

The AC 60/120 systems provide all the Telecommunications Management Network (TMN) functions applicable to an ATM access concentrator. The network element (AC 60 or AC 120) can be managed in several ways by an element management system or network management system. The AC 60/120 systems feature a Simple Network Management Protocol (SNMP)-compliant management information base (MIB) that allows external management system access to the AC 60/120 systems.

The AC 60/120 system software supports the following options for network management:

- Serial port interface with a direct connection to a standard VT100 terminal emulator.

  As the simplest option, the AC 120 CPU Module and the AC 60 faceplate provide an EIA-232 serial port (RJ-11 connector labeled CONSOLE), to which a PC workstation or console monitor, running a standard VT100 terminal emulator, is connected. This console interface provides access to the configuration, fault, network data collection, and security management features of the system software. A menu-based interface allows a user to perform all the management tasks on the AC 60/120 system software.
- Ethernet interface connection on a LAN to a management workstation running a telnet session.

  A 10 base-T Ethernet interface (RJ-45 connector labeled ETHERNET) on the AC 120 CPU module and the AC 60 faceplate allows the user to access the MIB via the same menu-based interface over a local area network (LAN) using a National Center for Supercomputing Applications (NCSA) telnet (telecommunications network) session.
- In-band management by using a PVC connection over an ATM WAN.

  The in-band management feature on the CPU Module allows a user to access and manage one or more AC 120 and AC 60 systems (managed targets) via a single PVC connection from a management workstation (management host) running an SNMP client over an ATM WAN. The PVC connection is set up with an I/O module with an ATM cell bearing port (for example, OC-3c, DS3, or DS1/T1–Cell Bearing module). Two basic types of configuration are possible. The first type (the simpler option) involves a direct connection from a management host over an ATM WAN to an I/O module port in a remote managed target. The second type involves a routed connection from the management host over an ATM WAN to an I/O module port in a remote

AC 60/120 chassis, which serves as a router, with a connection to the managed target. This second type gives the user the flexibility to manage any number of AC 60/120 systems.

The AC 60/120 systems feature a standard SNMP agent that allows any standard SNMP network management system, including those based on systems such as HP OpenView and SunNet Manager, to perform all management functions.

In conjunction with the visual indicators displayed on the front panels of the individual modules, the system offers a full complement of SNMP trap messages that alert the user to faults in the AC 60 or AC 120 system. Usage-based messages, collected on the CPU Module, allow a service provider to collect cell counts for fault detection, traffic and performance monitoring.

The SNMP MIB provides an extensive series of configuration management and provisioning features that allow the user to easily prepare the various components for supporting services.

AC 60 and AC 120 Software Features

The AC 60/120 system software uses permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) to provide end-to-end connectivity for transmission in a network. Since virtual connections are logical and not physical, multiple connections can be defined simultaneously across a single network facility, with each connection having flexible bandwidth.

Because PVCs establish end-to-end connectivity, establishing a connection with a PVC eliminates the need for a route establishment (call setup) each time a transmission is sent to a remote location. When establishing a connection with a PVC, the user must select a class of service for each connection.

The AC 60/120 systems also feature cell-counting capabilities that allow for network data collection systems to generate usage-based billing reports. An adaptive queue management algorithm maximizes bandwidth efficiency while ensuring QoS for a congested network; and a physical layer protocol efficiently adapts ATM to high-noise wireless and satellite environments.

Adaptive Queuing Traffic Management

With ATM, uniform QoS is achieved for all applications by the transmission of voice, video, and data using short, fixed-length cells interleaved at guaranteed bit rates. The guaranteed bit rates are implemented by assigning ATM Forum established QoS classes for each type of data to be transferred. The following attributes are considered in assigning an ATM service class:

- Cell transfer delay characteristics
- Cell loss ratio
- Type of connection required
- Timing or synchronization of the source and destination

Adaptive queuing traffic management manages traffic while supporting ATM Forum classes of service. This adaptive algorithm allocates bandwidth by statistically multiplexing traffic within two sets of queues according to weighted priorities. One set of queues addresses avoidance of cell loss, which is normally a concern for data traffic, while the other manages cell transfer delay, which is critical to voice and some video traffic. Within each set of queues, internal priorities are assigned that are more specialized than the ATM Forum class definitions. Generally, the lower the assigned priority number, the greater the access to bandwidth and the less likelihood for loss.

The AC 60/120 system supports the following defined ATM service classes:

Constant Bit Rate (CBR) Service that operates on a connection basis and offers consistent delay predictability; used for applications such as circuit emulation, voice, and video.

Variable Bit Rate - Real Time (VBR-RT) Service that operates on a connection basis and offers very low delay variance but requires access to a variable amount of network bandwidth; used for such applications as packet video and voice.

Variable Bit Rate - Non-Real Time (VBR-NRT) Service that operates on both a connection and connectionless basis and allows delay variance between the delivery of cells; used for data applications that have potentially bursty traffic characteristics, including LAN interconnect, CAD/CAM, and multimedia. This class can be used to support switched multimegabit data service (SMDS).

Unspecified Bit Rate (UBR) Service that operates on a connection basis and allows for raw cell or best effort transport by the network. In this service, cells are transported by the network whenever bandwidth is available and traffic is presented by the user. Data using UBR service is more apt to be discarded during peak traffic times in deference to data using other classes of service.

Table 1 on page 36 illustrates the attributes of the classes of service supported by the AC 60/120 system software.

Table 1. Class of Service Descriptions

Feature	Constant Bit Rate (CBR)	Real Time (VBR-RT)	Non-Real Time (VBR-NRT)	Unspecified Bit Rate (UBR)
QoS Class	Class 1	Class 2	Class 3 and 4	Class 5
Applications	Voice and clear channel	Packet video and voice	Data	Data
Bit Rate	Constant	Variable	Variable	Variable
Timing Required Source/ Destination	Required	Required	Not required	Not required
Service Examples	Private line	None	Frame relay, SMDS	Raw cell
AAL	1	3/4 and 5	3/4 and 5	3/4 and 5

The following two tables illustrate how ATM classes of service map to internal priority levels to structure the adaptive queuing traffic management algorithm. *Table 2 on page 37* identifies the cell-loss and the cell-delay tolerance of each service class. *Table 3 on page 37* lists the class of service choices available when configuring AC 60/120 systems PVC connections and provides service level examples for each PVC connection type.

The examples provided are intended simply as illustrations and would need fine-tuning based on the network applications supported by the AC 60/120 systems. The flexibility of the AC 60/120 systems allow the user to tailor the system based on the required service applications and the selection of the appropriate priority levels.

Table 2. Cell-Loss and Cell-Delay Characteristics of ATM Service Classes

ATM Classes of Service	Supported QoS Class	Cell Loss Tolerance	Cell Delay Tolerance	Internal Priority
Constant Bit Rate (CBR)	Class 1	High	Very Low	CBR-1
	Class 1	High	Very Low	CBR-2
	Class 1	High	Low	CBR-3
	Class 1	High	Low	CBR-4
Variable Bit Rate (VBR),	Class 2	Very Low	Very Low	VBR-1
Variable Bit Rate Real Time (VBR-RT)	Class 2	Low	Low	VBR-2
	Class 2	Low	Low	VBR-3
Variable Bit Rate,	Class 3 & 4	Low	Medium	VBR-4
Non-Real Time (VBR-NRT)	Class 3 & 4	Low	High	VBR-5
Unspecified Bit Rate (UBR)	Class 5	Very High	Very High	VBR-6

Table 3. Sample — Mapping ATM Service Classes to AC 60/120 Systems Priority Levels

ATM Classes of Service	Internal Priority	PVC Connection Configuration Selections	Service Examples
Constant Bit Rate (CBR)	CBR-1	CBR1	911 calls
	CBR-2	CBR2	Preferred customers
	CBR-3	CBR3	Standard
	CBR-4	CBR4	Cellular
Variable Bit Rate (VBR)	VBR-1	VBR-express	Network management
Variable Bit Rate,	VBR-2	VBR-RT1	Real-time videos
Real Time (VBR-RT)	VBR-3	VBR-RT2	MPEG1-2/JPEG
Variable Bit Rate,	VBR-4	VBR-NRT1	FR data
Non-Real Time (VBR-NRT)	VBR-5	VBR-NRT2	FTP/email transfer
Unspecified Bit Rate (UBR)	VBR-6	UBR	IP data

The adaptive queuing traffic management classifies traffic based on service-level priorities and limits congestion by addressing three dimensions of traffic management:

- Cell loss versus cell delay for cell discard

  The following table indicates that there are VBR traffic types (for example, network management data traffic) that are, in fact, higher in priority than some CBR traffic (for example, off-peak cellular voice calls). The adaptive queuing traffic management algorithm accounts for the traffic's service-level priorities when determining which cells to discard during traffic congestion. Thus, CBR does not necessarily imply a higher priority.

Table 4. CBR and VBR Service-Level Priorities

Priority	CBR	VBR
High	911 voice call	Network management data
Low	Off-peak cellular voice	IP data

- Weighted priorities using queue depth ratios

  To alleviate congestion in the network caused by lower-priority VBR traffic, adaptive queuing traffic management provides a weighted priority mechanism. This mechanism allows lower-priority VBR data to be sent ahead of higher-priority VBR data in cases where there are too many cells in lower-priority VBR buffers and relatively few cells in higher-priority VBR buffers. The execution of this algorithm is based on the priority levels that the user selects.

- Cell aging

  This capability prevents the lowest priority data (for example, IP data) from being buffered in the AC 60/120 systems indefinitely. Adaptive queuing traffic management keeps track of how long each cell stays in the buffer. The lower the priority of the traffic, the longer its cell-aging time; that is, UBR traffic has a longer cell-aging period than does VBR-RT traffic. This capability allows the AC 60/120 systems to periodically send low-priority cells through the network. Doing so prevents retransmission of IP data traffic while increasing the time-out window for the TCP/IP sessions. The cell-aging mechanism allows for orderly decongestion of the network without resorting to traffic rerouting and other complicated protocols and procedures.

Forward Error Correction

The forward error correction feature is a combination of functions designed to protect data transmission in a noisy communications environment, such as traffic transmitted across satellite and line-of-sight radio frequency circuits. Most of these types of circuits transmit at the rate of 2.048 Mbps or slower. The three stages of FEC are multiple redundancy addressing, cell encoding, and cell scrambling. When these FEC functions are applied in conjunction with the Limitless ATM Network Protocol (see *"Limitless ATM Network Protocol" on page 47*), which helps maintain cell delineation capability up to random 10^{-2} bit error rate (BER) with 0.625 percent bandwidth overhead, maximum protection is obtained.

Multiple redundancy addressing sets up multiple virtual circuits to the same destination. The addresses for the circuits are within the error space of the principal one used for actual transmission. Thus, the most probable error patterns occurring in the address field cause the address to be changed to another valid one. To tolerate 2-bit random errors or 5-bit burst errors, 526 addresses are required for each channel. This is not a serious constraint because high-noise, low-speed links are normally used to support only a small number of users. The more constraining situation, however, is that the signaling channel VPI value 0 and VCI value 5 is within 2 bit-errors of the null cell address (0,0). Thus, in high-error conditions, signaling is inhibited. The PTI and GFC fields need to be separately protected with the payload. The user needs only to set up a single connection using a VPI value 0 and a VCI value in the range from 32 to 92. This provides the capability for 60 simultaneous, noise-tolerant base connections. Each connection (ATM-to-ATM VCC PVC connection type) is created between an ATM-enabled port on a Multiserial Module and another ATM port (such as the OC-3c and the STM-1 modules). Internally within the AC 60/120 chassis, the connection is routed through the CPU Module for the cell encoding stage.

Cell encoding is a function executed by the CPU Module on cell payload data destined for noisy interfaces. Based on a user-selected encoding rate for the connection, source-data cell payloads are divided into six blocks and feed into a Reed Solomon encoder. The encoded data, now approximately 48 bytes larger in size, is loaded into new cell payloads and forwarded to the Multiserial Module for the cell scrambling stage. The user selects a Reed Solomon encoding rate with a specific error correction capability, as follows:

- 1/2 rate: For each data cell, the encoder loads one redundant cell. This rate provides correction of payload cells with 10^{-3} BER to 10^{-6} BER.
- 1/4 rate: For each set of three data cells, the encoder loads one redundant cell. This rate provides correction of payload cells with 10^{-4} BER to 0 BER.
- 1/8 rate: For each set of seven data cells, the encoder loads one redundant cell. This rate provides correction of payload cells with 10^{-5} BER to 0 BER.
- Dynamically changing rate options, as shown in the following table:

Table 5. Dynamically Changing Rate Options

Cell Encoding Rate/Bit Error Rate	10^{-3} Threshold	10^{-4} Threshold	10^{-5} Threshold
Automatic—low quality	1/2 rate	1/4 rate	1/8 rate
Automatic	1/2 rate	1/2 rate	1/8 rate
Automatic—high quality	1/2 rate	1/2 rate	1/4 rate

When the user selects the 1/2, the 1/4, or the 1/8 rate, the encoder maintains that selected rate of encoding regardless of actual error conditions. When the user selects one of the dynamically changing rate options, the encoder employs the 1/2, the 1/4, or the 1/8 rate, dynamically adjusting the rate as needed depending on the number of errors encountered on the decoding side of the circuit.

Cell scrambling is a function performed on the Multiserial Module. This function moves the first three bytes of the cell header (GFC, VPI, and VCI fields) into the payload and spreads them out to protect against burst errors. This action increases the burst error tolerance of the header from 5 bits to 54 bits with no cell loss.

Switched Virtual Circuits

Switched virtual circuit (SVC) connections are used for voice traffic over a public ATM WAN or private line network. SVCs are supported on all the ATM cell bearing interfaces, including the DS1/T1–Cell Bearing, E1–Cell Bearing, DS3, E3, OC-3c, STM-1, TAXI, Multi-Serial, and High Speed modules. The AC 60/120 system software supports the following features:

- Each ATM port on a single module can be individually configured for ATM UNI 3.0 or UNI 3.1, IISP user, IISP network.
- SVCs can be allocated on UNI (public and private) and IISP interfaces.
- Only point-to-point VCC connections are supported.
- VCC connections support both symmetric and asymmetric bandwidth requirements.
- The AC 60/120 system is capable of processing 60 calls per second, 200 maximum UNIs per system, and 500 maximum simultaneous SVC call originations.
- The AC 60/120 system (equipped with 64 MB of memory on the CPU module) can process 20,000 maximum simultaneous SVC calls in progress.

- The individual call setup time is 16 milliseconds maximum, while the minimum call setup time for SVCs is expected to be approximately 10 milliseconds from the time the call setup message enters the CPU module, and the acknowledgment leaves the CPU module.

Functional Description

SVC signaling, per ATM Forum UNI 3.0 and UNI 3.1, is selectable on a per port basis. Call control is performed on the CPU module, including management of the call-state transitions for each of the calls. This process allows on-demand allocation of bandwidth and connection resources. The signaling protocol supports the following basic functions at the UNI interface:

Connection/Call Setup
Origination/establishment of a call.

Connection/Call Request
Request of resources for connectivity to a certain destination. The Information Element (IE) field contains resource information, that is, PCR, SCR, MBS, QoS class, and so on.

Connection/Call Answer
Allows destination party to respond to a request with VPI/VCI and other information related to the connection/call.

Connection/Call Clearing
Provides the information associated for removing the call/connection request. This includes:

- Call removal due to unavailability of resources to meet the call request
- Connection removal due to call disconnect requests from either party
- Call removal due to link and other network failures

Reason for Clearing
Allows the clearing party to indicate the cause for initiating its removal from a connection/call.

Call States

Call states exist on both the user side and the network side of the transaction. Call states define which messages can be accepted by the user of the network entity, and how they are expected to react to those messages. As the user or network entity moves from call state to call state, the call switching process is accomplished.

In cases where the calling party is the user, and the called party is across the network, the UNI at the AC 60/120 port presents a user-side interface to the user. The AC 60/120 port receives these user-side messages from the user, and based on resource availability, route determination, and other network factors, presents a network-side (NNI or IISP) interface to the called party or the network-side AC 60/120 port. Both user-side and network-side interfaces undergo similar state transitions. Transition messages trigger these call state changes. The call states are displayed in *Table 6 on page 41*.

Table 6. Call States

Call State	Description
#0—Null	No call exists.
#1—Call initiated	User—Outgoing call when the user requests call establishment from the network. Network—Received call establishment request, but not responded yet to outgoing call.
#3—Outgoing call proceeding	User—Outgoing call when the user receives acknowledgment that all call information required for call establishment has been received from the network. Network—Network has sent acknowledgment to user acknowledging receipt of all call information.
#6—Call present	User—For incoming calls, has received call establishment request, but has not responded yet. Network—For incoming calls, has sent call establishment request, but has not received satisfactory response.
#8—Connect request	User—For incoming call, when the user has answered the call and is waiting to be awarded the call. Network—For incoming call, when the network has received an answer but the network has not yet awarded the call.
#9—Incoming call proceeding	User—For incoming call, when the user has sent acknowledgment that the user has received all call information necessary to effect call establishment. Network—For incoming call, when the network has received acknowledgment that the user has received all call information necessary to effect call establishment.
#10—Active	User—For incoming call when the user has been awarded the call. For outgoing call when the user has received an indication that the remote user has answered the call. Network—For incoming call when the network has awarded the call to the called user. For outgoing call when the network has indicated that the remote user has answered the call.
#11—Release request	User—The user has requested that the network clear the end-to-end connection and is waiting for a response. Network—The network has requested a request from the user to clear the end-to-end connection.
#12—Release indication	User—The user has received an indication to disconnect because the network has disconnected the end-to-end connection. Network—The network has disconnected the end-to-end connection and has sent an indication to disconnect the user-to-network connection.

The following state transition messages are used for ATM point-to point call and connection control:

Call establishment messages:	• Call proceeding • Connect • Connect acknowledgment • Setup
Call clearing messages:	• Release • Release complete
Miscellaneous messages:	• Status • Status inquiry

The information elements used in the Call Establishment-Setup message allows the user to request called the party number, specific PCR, SCR, MBS, QoS class, forward and backward direction rates, performance, congestion control parameters, and so on, from the AC 60/120 UNI. The Call Establishment-Connect message allows the called party to respond with available traffic parameters, such as PCR, SCR, MBS, QoS class, forward and backward direction rates, performance, and congestion control parameters. Usually this message also indicates the available VPI/VCI allocated for the connection. The other state transition messages are specified by the ATM Forum UNI 3.0 and UNI 3.1 specification and are transparent to the user.

Traffic Shaping

The traffic shaping feature is a method for controlling the flow of data traffic through the following modules:

- OC-3c MM Module
- OC-3c SM Module
- STM-1 SM Module

Traffic shaping ensures that VBR traffic traveling into the AC 60/120 system (via the OC-3c and STM-1 Modules) complies with the parameters of established service contracts. If bursty VBR traffic exceeds the parameters of the output connection, the rate of the traffic flow is controlled to comply to the specified output rate by means of an input cell selection algorithm before the traffic flow reaches the backplane. If traffic exceeds the buffer capacity of the OC-3c or STM-1 Modules (that is, rises above the maximum-capacity level), cells are discarded. Traffic shaping allows the network side of the AC 60/120 system to multiplex more efficiently the traffic-shaped virtual channel connections (VCCs) with other customer premises equipment (CPE) traffic (voice, video, and so on) for transport across the ATM network link. CBR traffic is unaffected by the traffic shaping function.

An example of a traffic shaping application is illustrated in *Figure 8 on page 43*.

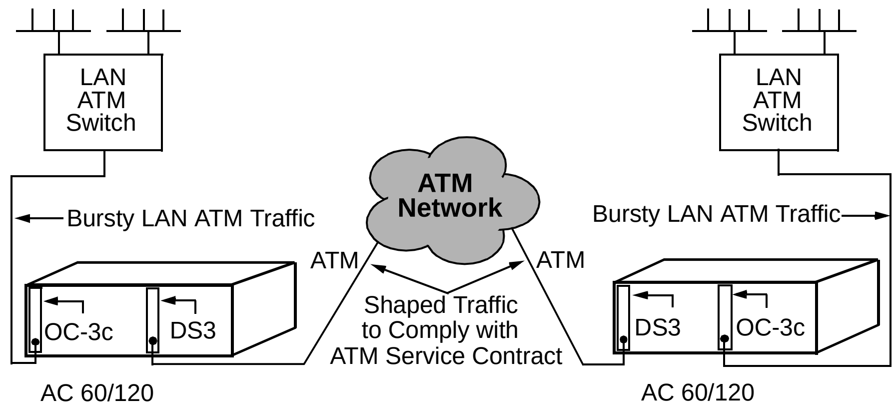

Figure 8. Example of a Traffic Shaping Application

An end user has an ATM DS3 network connection and has subscribed to a VBR VCC connection contract from a carrier (service provider) with the following traffic parameters: 1) sustained cell rate (SCR) is 40,000 cells/second; 2) peak cell rate (PCR) is 80,000 cells/second; and 3) maximum burst size (MBS) is 250 cells. Even though LAN switches usually maintain a sustained cell transport rate of 40,000 cells/second, they allow LAN traffic to burst in violation of carrier traffic contracts, causing clusters of cells to exceed the MBS parameter. Because carriers monitor traffic at the edge of a network and enforce adherence to traffic contracts by discarding cells that exceed the MBS parameter, end users whose traffic violates their contractual MBS parameter experience high cell-loss (and hence high packet-loss). With the traffic shaping feature of the OC-3c and STM-1 Module, the AC 60/120 system effectively smooths the bursty input LAN traffic to comply with the carrier traffic contract.

An illustration of the input cell selection buffering scheme is illustrated in *Figure 9 on page 44*.

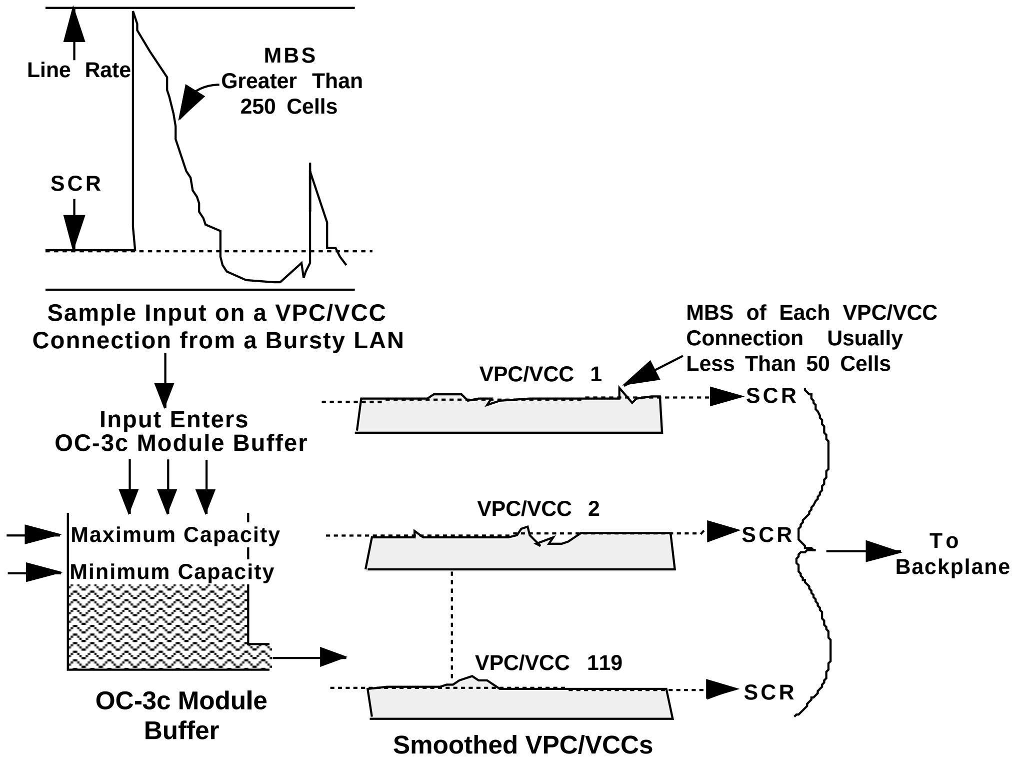

Figure 9. Traffic Shaping Using the Input Cell Selection Algorithm

Connected to the LAN ATM switch via an ATM OC3 or STM-1 link, the OC-3c and STM-1 Modules with traffic shaping supports a total of 119 virtual channel connections (VCCs) and virtual path connections (VPCs). All inbound traffic is processed by the input cell selection algorithm, dynamically shared by all VCCs and VPCs, which smooths the traffic. The size of the module buffer of the OC-3c or STM-1 Module is always 4 MB smaller than the total amount of memory installed on the module. For example, if 8 MB of memory are installed, 4 MB are available for queuing; if 32 MB of memory are installed, 28 MB are available for queuing. This dynamically shared buffer allows inbound VBR traffic to burst up to the line rate.

The module buffer of the OC-3c or STM-1 Module is set up with a maximum-capacity level (defined as 31/32 of the buffer size), and a minimum-capacity level (defined as 3/4 of the buffer size). When the incoming cells exceed the maximum-capacity level, the input cell selection algorithm starts discarding cells to maintain a smooth traffic flow. The algorithm discards traffic on the connection with the longest queue first, then traffic on the connection with the second longest queue, and continues on until the module buffer of the OC-3c or STM-1 Module reaches the minimum-capacity level.

The algorithm processes traffic moving out of the input cell selection buffer according to the SCR of the particular VPC/VCC. The MBSs of traffic-shaped output are shown in *Table 7 on page 45*.

Table 7. MBSs of Traffic-Shaped Output

Sustained Cell Rate (SCR) of VPC/VCC	Maximum Burst Size (MBS) of Traffic-Shaped Output
0–20 Mbits/sec	< 4 cells
20–30 Mbits/sec	< 5 cells
30–40 Mbits/sec	< 6 cells
75–120 Mbits/sec	approximately 20–50 cells

The OC-3c and STM-1 Modules can perform traffic shaping on multiple high-rate connections (such as three 40-Mbit/sec connections). Assigning an SCR to a connection above 75 Mbit/sec, however, is not recommended in sensitive bursty traffic environments. Assigning an SCR above 120 Mbit/sec will essentially eliminate any traffic shaping, and thus is strongly discouraged.

The OC-3c and STM-1 Modules perform only limited traffic management on the output side. The output buffer is limited to 2 Mbit/sec for VBR traffic and 128 cells for CBR traffic, with only three priority levels supported, CBR, VBR1, and VBR2. The maximum-capacity level for congestion control is 32,000 cells, and the minimum-capacity level is 24,576 cells, with VBR traffic being shut off first from the backplane.

Ethernet LAN Bridging

The Ethernet local area network (LAN) bridging feature is provided on the Ethernet Module. The various functions and interfaces associated with Ethernet LANs are governed by standards published by the Institute of Electrical and Electronics Engineers (IEEE). The relationship of the various IEEE standards that affect LAN bridging is shown in the following figure.

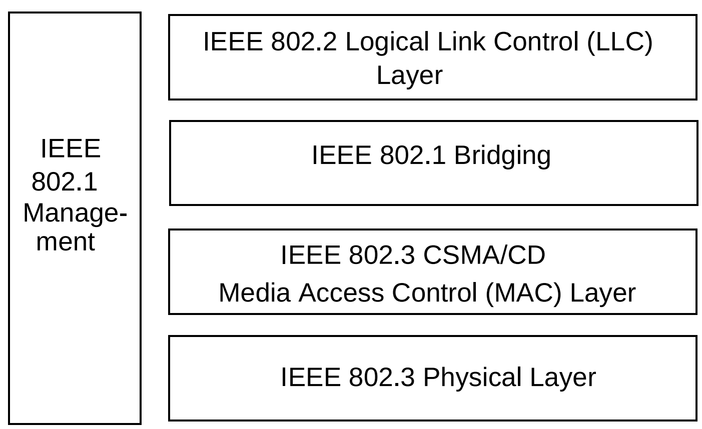

Figure 10. IEEE Protocols for Ethernet LANs (IEEE 802.1)

Bridging is accomplished by relaying data from the media access control (MAC) layer of one LAN to the MAC layer of another LAN. This concept is illustrated in the following figure.

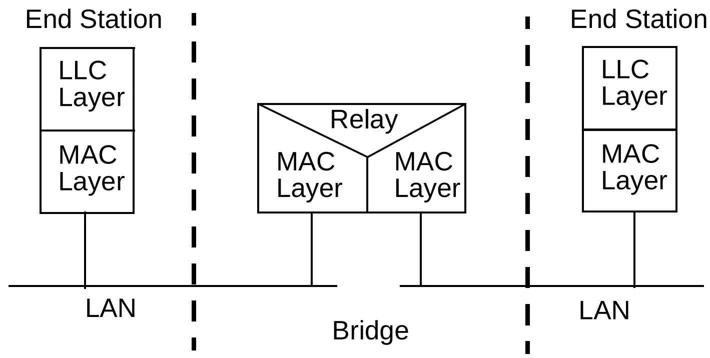

Figure 11. Ethernet Bridging via the MAC Layer (IEEE 802.1)

Ethernet bridging over the ATM network is accomplished using ATM Forum standards, that is, document RFC 1483, which specifies multi-protocol encapsulation within ATM. Ethernet MAC data is encapsulated using ATM Adaptation Layer 5 (AAL5) and transported over the ATM network. This concept is illustrated in the following figure.

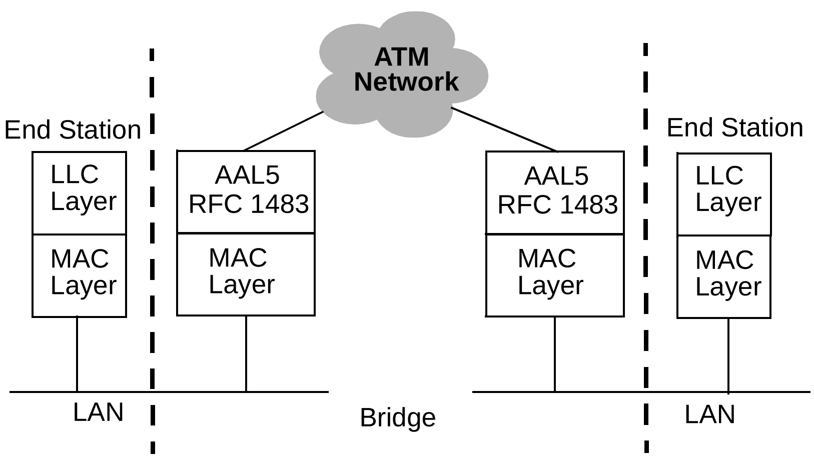

Figure 12. Ethernet Bridging over an ATM Network (RFC 1483, AAL5)

The Ethernet LAN bridging feature incorporates the following functions:

Bridging Ethernet MAC layer data is encapsulated by using standards in the ATM Forum document RFC 1483.

Filtering The filtering function is a process in which certain Ethernet frames are not relayed based on information stored in a filter database. Frame filtering prevents duplicate frames from being relayed and also restricts data flow when a path becomes unavailable. The Spanning Tree Algorithm and Protocol is the mechanism used to populate the filter database dynamically.

Port-to-port restrictions	Ports on the Ethernet Module are mapped into bridge groups. Each bridge group can contain from one to five ports on the Ethernet Module. Unless explicitly set up with a bridge to bridge connection, ports in different bridge groups will not pass traffic. This is true for ports contained on the same Ethernet Module as well as ports that are on other Ethernet Modules.
Throughput limiting	This function allows end users to subscribe to bandwidths that are fractions of the full 10 Mbit/sec line rate. Users can specify the fractional bandwidths in increments of 64 kbit/sec.
Bridge management	This function enables end users to manage configuration and performance, and collect cell records and billing information. Standard Ethernet MIBs, as defined in ATM Forum document RFC 1643, support SNMP management.
Performance	The Ethernet Module provides full operation on all ports simultaneously.

Limitless ATM Network Protocol

The Limitless ATM Network Protocol, coupled with a simple error-tolerant addressing scheme, addresses the fundamental problem with adapting ATM in low-speed environments, that is, noise. This feature permits application-dependent payload protection, allowing selective implementation of bandwidth-costly, forward-error-correction techniques. It is designed to identify and extract ATM cells at bit error rates as high as 10^{-2}. A simple, robust addressing scheme facilitates reliable delivery of ATM cells in a noisy environment. By maintaining the cell extraction capabilities and strengthening the cell-header error protection, the advantages of Limitless ATM Network Protocol is brought to noisy, low-speed links.

The main features include the following:

- Regular framing-bit patterns that enhance cell delineation in high-noise environments
- Compatibility with traditional link enhancement schemes such as forward error correction (FEC) and bit interleaving
- Consistent interface to the higher layer of the protocol stack (that is, ATM layer)
- Transmission rate and media independence
- Natural synchronization with a standard 8-KHz telecommunication clock

This feature permits both application-dependent payload protection and link-quality-dependent header protection, while maintaining maximum compatibility with ATM standards. *Figure 13 on page 48* shows the relationship between this ATM network protocol and the Open Systems Interconnection (OSI) model.

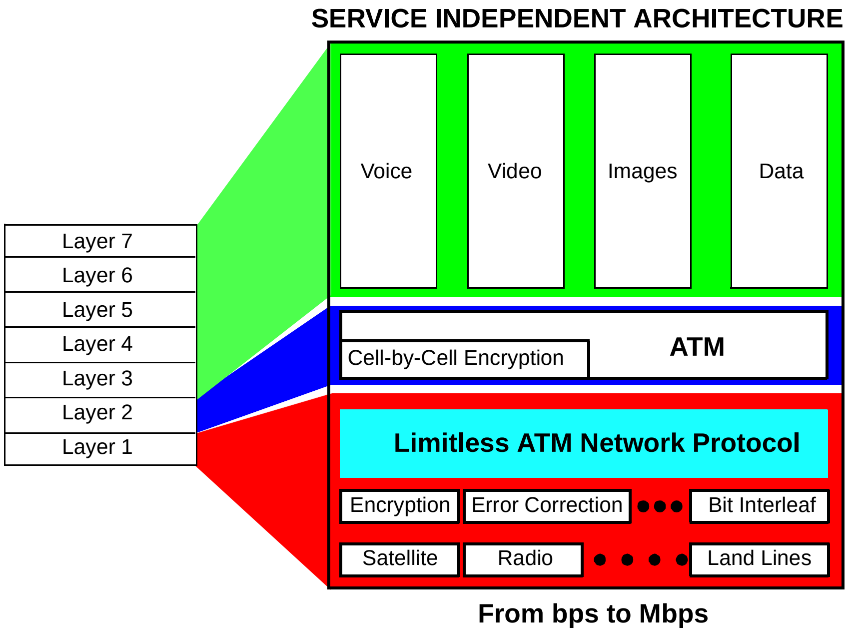

Figure 13. Relationship between the Protocol and the OSI Model

This protocol is designed to be active in the upper end of the physical layer of the OSI seven-layer model. Within a byte-oriented serial data stream, this protocol provides a framing structure around ATM cells for transmission purposes and thus regular frame marker bit patterns for cell extraction. Each frame (2400 bytes) is subdivided into 45 ATM cells (totaling 2385 bytes) with a 15-byte overhead. This structure permits a transmission rate scalable according to the physical medium. The 15-byte overhead, accounting for 0.63% of the bandwidth, includes the frame and subframe headers, which are used in conjunction with traditional cell header error detection methods, such as header error correction (HEC), to enhance cell delineation for noisy environments. The protocol thus becomes independent of the transmission rate while still naturally synchronizing with an 8-KHz transmission clock via the 2400 bytes-per-frame structure.

Traditionally, block-error correction schemes, such as Reed Solomon (RS) coding, have been used to protect the header. As a simple alternative, the AC system software implements an error-tolerant addressing scheme (multiple redundancy addressing) that establishes multiple virtual circuits to the same destination, thus requiring no special hardware and no modification to the current standard. The addresses for the circuits are within the error space of the principal address used for actual transmission. Thus, the most probable error patterns occurring in the address field will simply change the address to another valid one. This approach maintains independence from the application layer because it encodes the header address within the same 10 nibble header space of standard ATM cells. In addition, it avoids the extra delay (detrimental to CBR traffic) required of multiple header encoding schemes. In practice, to tolerate 2-bit random errors or 5-bit burst errors will require setting up 526 addresses per each channel. This is not a serious constraint because high-noise and low-speed links will likely be used to support only a small number of users.

Given the ability to deliver cells, the payload can be FEC-protected on a per virtual-circuit basis depending on the error tolerance of the application at the service specific convergence sublayer (SSCS). *Figure 14 on page 49* shows the frame structure.

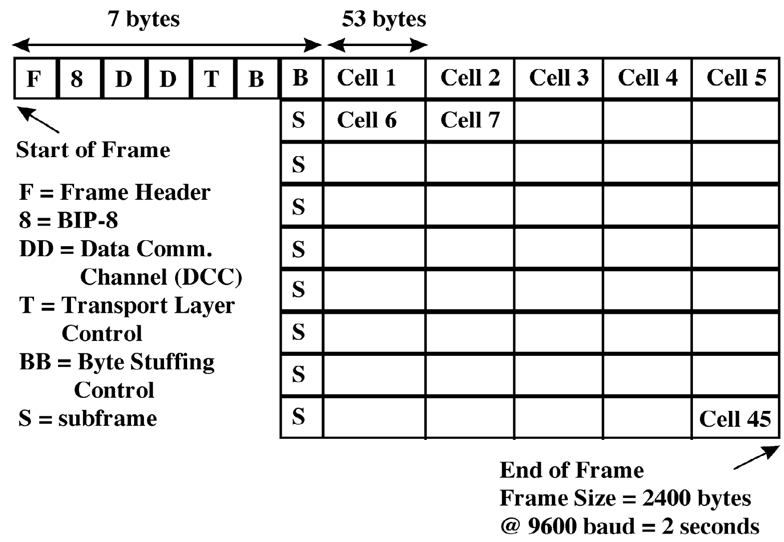

Figure 14. Frame Structure

The subframe functions in the following ways:

- The timely arrival of the header patterns is used as a confidence check, confirming that the system is properly synchronized.
- In the event of synchronization loss, a state machine can easily seek and resynchronize to the regular appearance of the simple header patterns.

I/O and Server Module Features

This section describes the functions and features for each type of I/O and server modules. It contains:

- *"DS1/T1 Cell Bearing Module" on page 50*
- *"DS1/T1 Circuit Emulation Module" on page 50*
- *"Enhanced DS1/T1 Module" on page 51*
- *"E1 Cell Bearing Module" on page 52*
- *"E1 Circuit Emulation Module" on page 52*
- *"Enhanced E1 Module" on page 52*
- *"DS3 Module" on page 53*
- *"E3 Module" on page 53*
- *"Ethernet Module" on page 54*
- *"High Speed Module" on page 54*
- *"Multiserial Module" on page 55*
- *"Voice 2W Office (2W Sink) Module" on page 55*
- *"Voice 2W Station (2W Source) Module" on page 56*
- *"OC-3c Multi-Mode (MM) Module" on page 57*
- *"OC-3c Single Mode (SM) Module" on page 57*
- *"STM-1 Single Mode (SM) Module" on page 58*
- *"TAXI Module" on page 58*

DS1/T1 Cell Bearing Module

The DS1/T1 Cell Bearing Module provides network interfaces at the Digital Signal Level 1 (DS1) at the line rate of 1.544 MHz. This module has built-in CSU capability so that it can also interface directly to a T1 line with multiple repeaters.

Software Features

The DS1/T1 Cell Bearing Module uses the ATM Forum specification UNI 3.0 or UNI 3.1, which allows any DS1/T1 Module port to act as a user network interface (UNI) to an ATM network.

Hardware Features

- Number of ports: six
- Connector type: RJ48
- Line rate: 1.544 MHz (typical)
- Framing modes: ESF
- Line encoding modes: AMI, B8ZS

DS1/T1 Circuit Emulation Module

The DS1/T1 Circuit Emulation Module provides network interfaces at the DS1 at the data transmission rate of 1.544 Mbit/sec. This module has built-in CSU capability so that it can also interface directly to a T1 line with multiple repeaters.

Software Features

The DS1/T1 Circuit Emulation Module interfaces with time division multiplexing (TDM) channelized DS1/T1 circuits and converts the data signals (usually voice data) to ATM. This module can adapt a maximum of 24 DS0 channels per port to ATM virtual channels with individual virtual path identifier (VPI) and virtual channel identifier (VCI) using structured (channelized) circuit emulation. Signaling bit transport based on ATM Forum standards for channel-associated signaling (CAS) Robbed-bit is also provided. This module has the capability of connecting to a device using 56 Kbps or 64 Kbps for service transport and 8 Kbps for signaling per DS0. With the 64 Kbps “clear channel” capability, this module can connect to a device using the Integrated Services Digital Network (ISDN) primary rate interface (PRI) protocol. Circuit emulation services are essentially constant bit rate (CBR) data, and ATM forum ATM adaptation layer 1 (AAL1) standards are used in providing the circuit emulation.

The dynamic bandwidth circuit emulation service (DBCES) feature is used with voice PVC connections to better utilize the available network bandwidth. This feature allows channels to be dynamically allocated as needed based on the ABCD signaling bit information. The firmware supports 1x56 Kbit/sec time-slot trunking with channel-associated signaling (CAS) detection used, based on ATM Form Specification AF-VTOA-0085.000. Note that this feature is not fully compliant with the specification and does not interoperate with other devices that are fully compliant (Nx64 Kbit/sec).

The DBCES feature, in essence, performs idle channel suppression for voice traffic. PBX voice traffic uses DBCES to save some of the available T1 WAN bandwidth for LAN traffic. On average, only 8 DS0s are used for voice traffic, but at peak times, the number of DS0s used might approach full T1 usage (24 channels). When channels are not being used for voice traffic, the available bandwidth can be used for LAN UBR-type traffic.

Hardware Features

- Number of ports: six
- Connector type: RJ48
- Line rate: 1.544 MHz (typical)
- Framing: D4, ESF
- Encoding: AMI, B8ZS

Enhanced DS1/T1 Module

The Enhanced DS1/T1 module supports channelized and unchannelized frame relay configurations and circuit emulation services.

Configured for channelized DS1/T1 Frame Relay Services, the module maps up to 24 individual HDLC data links on a single T1 connection (144 HDLC data links per module). This module provides an integrated DSU/CSU for each port, enabling access and configuration of individual DS0s.

When configured for DS1/T1 Circuit Emulation Services the module interfaces with time division multiplexing (TDM) channelized DS1/T1 circuits. It converts the channelized digital signals (usually voice data) to ATM virtual channels. This module can adapt a maximum of 24 DS0 channels per port to ATM virtual channels with individual virtual path identifier (VPI) and virtual channel identifier (VCI) using structured (channelized) circuit emulation. Signaling bit transport based on ATM Forum standards for channel-associated signaling (CAS) is also provided. This module has the capability of connecting to a device using 56 Kbps or 64 Kbps for service transport with 8 Kbps for robbed bit signaling per DS0. With the 64 Kbps "clear channel" capability, this module can connect to a device using the Integrated Services Digital Network (ISDN) primary rate interface (PRI) protocol.

Software Features

The software supports the following Frame Relay Forum (FRF) Implementation Agreements:

- FRF.1—User-to-Network Interface (UNI)
- FRF.2—Network-to-Network Interface (NNI)
- FRF.5—Frame Relay/ATM PVC Network Interworking
- FRF.8—Frame Relay/ATM PVC Service Interworking

The software supports the ATM Forum Technical Committee Specification: Circuit Emulation Service Interoperability Specification Version 2.0 af-vtoa-0078.00.

Hardware Features

- Number of ports: six
- Connector type: RJ45
- Line rate: 1.544 Mbit/sec
- Framing mode: D4, ESF
- Line encoding mode: AMI, B8ZS

E1 Cell Bearing Module

The E1 Cell Bearing Module provides network interfaces at the DS1 at the line rate of 2.048 Mbit/sec (CCITT standard). This module has built-in CSU capability so that it can also interface directly to an E1 line with multiple repeaters.

Software Features

The E1 Cell Bearing Module uses the ATM Forum specification UNI 3.0 or UNI 3.1, which allows any E1 Module port to act as a user network interface (UNI) to an ATM network.

Hardware Features

- Number of ports: four
- Connector type: RJ48C [120-ohm symmetrical pair (4 wire) interface only]
- Line rate: 2.048 MHz (typical)
- Framing modes: CRC-mf
- Line encoding mode: HDB3

E1 Circuit Emulation Module

The E1 Circuit Emulation Module provides network interfaces at the Digital Signal Level 1 (DS1) at the line rate of 2.048 MHz (CCITT standard). This module has built-in CSU capability so that it can also interface directly to a T1 line with multiple repeaters.

Software Features

The E1 Circuit Emulation Module interfaces with TDM channelized E1 circuits and converts the data signals (usually voice data) to ATM. This module can adapt a maximum of 32 DS0 channels per port to ATM virtual channels with individual VPI and VCI using structured (channelized) circuit emulation. Signaling bit transport based on ATM Form standards for channel associated signaling (CAS) is also provided. This module has the capability of connecting to a device using 56 Kbps or 64 Kbps for service transport and 8 Kbps for signaling per DS0. With the 64 Kbps "clear channel" capability, this module can connect to a device using the ISDN PRI protocol.

Hardware Features

- Number of ports: four
- Connector type: RJ48C [120-ohm symmetrical pair (4 wire) interface only]
- Line rate: 2.048 MHz (typical)

Enhanced E1 Module

The Enhanced E1 module supports channelized and unchannelized frame relay configurations. Configured for channelized E1 configurations, the module maps up to 30 individual HDLC data links on a single E1 connection (180 HDLC data links per module). This module provides an integrated DSU/CSU for each port, enabling access and configuration of individual DS0s.

Software Features

The software supports the following Frame Relay Forum (FRF) Implementation Agreements:

- FRF.1—User-to-Network Interface (UNI)
- FRF.2—Network-to-Network Interface (NNI)
- FRF.5—Frame Relay/ATM PVC Network Interworking
- FRF.8—Frame Relay/ATM PVC Service Interworking

Hardware Features

- Number of ports: six
- Connector type: RJ48C [120-ohm symmetrical pair (4 wire) interface only]
- Line rate: 2.048 Mbit/sec
- Framing mode: CRC-mf
- Line encoding mode: HDB3

DS3 Module

The DS3 Module provides a network interface at the Digital Signal Level 3 (DS3) at the line rate of 44.736 MHz. Typical use of the DS3 Module would to be connect the AC 120 system to an ATM edge switch.

Software Features

The DS3 Module uses the ATM Forum specification UNI 3.0 or UNI 3.1, which allows either DS3 port to act as a UNI or IISP (user, network) to an ATM network.

Hardware Features

- Number of ports: two
- Connector type: four BNC connectors for the two ports (each port has one receive connector and one transmit connector)
- Line rate: 44.736 MHz (typical)

E3 Module

The E3 Module provides a network interface at the DS3, at the line rate of 34.368 MHz. Typical use of the E3 Module would be to connect the AC 120 system to an ATM edge switch.

Software Features

The E3 Module uses the ATM Forum specification UNI 3.0 or UNI 3.1, which allows either E3 port to act as a UNI or IISP (user, network) to an ATM network.

Hardware Features

- Number of ports: two
- Connector type: four BNC connectors for the two ports (each port has one receive connector and one transmit connector)
- Line rate: 34.368 MHz (typical)

Ethernet Module

The Ethernet Module provides Ethernet bridging from LAN to LAN and LAN to ATM. Each port can also be configured to do router port extension. Both bridging and routing configuration use RFC 1483 encapsulation.

The module has five ports on the faceplate which are all mapped to a logical sixth port. Each port can be mapped to the logical sixth port using up to 15 of the available 70 virtual channels. Multiple channels mapping a physical port to a logical port must be consecutive. These multiple channels are then mapped to redundant VCC connections. The aggregate maximum throughput for all ports is 140 Mbit/sec, with a sustained rate of 120 Mbit/sec.

Software Features

The Ethernet bridging feature includes the following functions: encapsulation of MAC layer data using standards in the ATM forum RFC 1483, filtering, port-to-port restrictions, throughput limiting, and bridge management. See *"Ethernet LAN Bridging" on page 45*.

Hardware Features

- Number of ports: five physical ports, one logical port
- Connector type: RJ45
- Line rate:
  - Per port: 10 Mbit/sec each
  - Aggregate of all ports, maximum: 50 Mbit/sec

High Speed Module

The High Speed Module has one serial and one parallel port. The serial interface operates at higher speeds than the speeds available on the Multiserial Module. The High Speed Module provides the only parallel interface in the AC 60/120 systems, and would typically be used for connecting to Direct Broadcast Satellite transmitters and receivers and video "set-top boxes" (converters of satellite broadcast signals to video images). Both ports can operate simultaneously and independently.

Software Features

The protocol is used for both ports on this module to provide interface capability with an ATM network. The ATM protocol as designed for high-speed environments (such as DS3 and OC-3), and its advantages apply equally well to low-speed links by offering a standards-based method to optimally interleave CBR (such as voice signals) and VBR (such as data communication) traffic for efficient bandwidth utilization and multimedia capability.

Hardware Features

- Number of ports:
  - One parallel (ECL/CMOS chip)
  - One serial (EIA-422 interface)
- Connector type:
  - Micro-dual-row 36-pin for the parallel port
  - Micro-DB25 for the serial port
- Interfaces supported on the parallel port:
  - Direct Broadcast Satellite transmitters and receivers
  - Video "set-top boxes"

- Interfaces supported on the serial port:
  - EIA-422-A
  - EIA-449
  - EIA-530
- Data transmission rate:
  - Using external clock timing: up to 30 Mbit/sec
  - Using internal clock timing: data transmission rates are given in *Table 83 on page 279*.

Multiserial Module

The Multiserial Module has six serial ports providing several types of serial data interfaces. Typically, this module would be used to connect a LAN traffic router or a terminal to the ATM network.

Software Features

The Limitless ATM Network protocol is used on all ports configured for ATM cell-bearing service on this module to provide interface capability with an ATM network. The ATM Adaptation Layer Type 1 (AAL1) standard is used for circuit emulation ports, and the ATM Adaptation Layer Type 5 (AAL5) standard is used for the terminal emulation ports on this module.

Frame relay network-level interworking (FRF.5) and service-level interworking (FRF.8) interfaces are provided on this module. This feature enables the AC 60/120 system to act as a gateway between routers, remote dial access servers, IBM SNA equipment, and other devices configured for frame relay operation.

Hardware Features

- Number of ports: six serial
- Connector type: micro-DB15
- Interfaces supported: EIA-232-D, EIA-530, EIA-449, and V.35, with AC 120 configured as either a DTE or a DCE device, FRF.5 network-level interworking, FRF.8 service-level interworking
- Data transmission rate:
  - Per port maximum: 2.048 Mbit/sec
  - Aggregate of all ports maximum: 4 Mbit/sec

Voice 2W Office (2W Sink) Module

The Voice 2W Office Module (also known as 2W Sink) provides support for the office (central office or PBX switch) end of a two-wire analog telephone line. This allows a voice loop from a voice switch to be connected directly to an AC 120 system and communicate over an ATM network to a distant telephone set or other analog device.

Software Features

A PVC connection can be set up between this module and a Voice 2W Station Module. This connection enables foreign exchange (FX) voice service to be transmitted across an ATM network. With FX service, the voice switch provides dial tone, ringing, and digit translation, which are not provided by the ATM network.

Hardware Features

- Number of ports: four
- Connector type: RJ11
- Ringing frequency: 20 Hz
- Termination impedance: 600 ohms
- Signaling: DTMF
- Supervision: loop start

Voice 2W Station (2W Source) Module

The Voice 2W Station Module (also known as 2W source) provides support for the station (telephone set) end of a two-wire analog telephone line. A telephone set or other analog voice device can be connected directly to this module in the AC 60 or AC 120 system to communicate over an ATM network.

Software Features

This module provides the capability to set up a PVC on a voice circuit originating in this module and to provide PLAR service for that PVC. PLAR provides a point-to-point private line between two telephone sets. If either station goes to the off-hook condition, the other station automatically rings. Ringing stops when the called station goes to the off-hook condition, or the calling station returns to the on-hook condition. The PLAR service provides 20 Hz ring-down, loop-start supervision, and no signaling.

Hardware Features

- Number of ports: eight
- Connector type: RJ-11
- Ringing frequency: 20 Hz
- Termination impedance: 600 ohms

Optical-Type Modules

Several modules are available with fiber-optic interfaces:

- OC-3c Multi-Mode (MM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- OC-3c Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- STM-1 Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- TAXI Module

The module hardware features are shown in *Table 8 on page 57*.

Table 8. Optical-type Modules

Feature	OC-3c SM, STM-1 SM	OC-3c MM	TAXI
Number of ports	1	1	1
Connector type (two for each module—transmit and receive)	SC	ST	ST
Type of fiber-optic cable	single mode	multi-mode	multi-mode
Fiber-optic cable reach (approximate, depending on fiber makeup)	16 miles (25.7 km)	6,560 feet or 1.2 miles (2 km)	6,560 feet or 1.2 miles (2 km)
Line rate	155 Mbit/sec (megabits per second)	155 Mbit/sec	100 or 140 Mbit/sec (user selectable)
Optical wave length (nominal value)	1,300 nm (nanometer)	1,330 nm	1,330 nm
Optical power budget:			
System gain	15 dB (decibel)	13.5 dB	13.5 dB
Transmitter—minimum optical output power (average)	-15 dBm (decibels relative to 1 milliwatt)	-19 dBm	-19 dBm
Transmitter—maximum optical output power (average)	-8 dBm	-14 dBm	-14 dBm
Receiver—minimum optical input power (average)	-31 dBm	-32.5 dBm	-32.5 dBm
Receiver—maximum optical input power (average)	-8 dBm	-14 dBm	-14 dBm

OC-3c Multi-Mode (MM) Module

The OC-3c MM Module provides a fiber-optic interface operating in the concatenated mode of the SONET-defined line rate of 155 Mbit/sec. This interface is intended for very short-reach applications, typically connections in a building. A typical use of this module is to connect high-speed LAN products (routers and so on) to the ATM network.

This module is available in two variations, which differ from each other by the type of firmware installed on the circuit boards. The first variant uses the adaptive queuing traffic management method of traffic flow control. The second variant uses the traffic shaping method of traffic flow control.

OC-3c Single Mode (SM) Module

The OC-3c SM Module provides a fiber-optic interface operating in the concatenated mode of the SONET-defined line rate of 155 Mbit/sec. This interface is intended for long-reach applications, typically between LANs. A typical use of this module is to connect high-speed LAN products (routers and so on) to the ATM network. This module uses the traffic shaping method of traffic flow control.

STM-1 Single Mode (SM) Module

The STM-1 SM Module provides a fiber-optic interface operating in the concatenated mode of the SONET-defined line rate of 155 Mbit/sec. This interface is intended for long-reach applications, typically between LANs. A typical use of this module is to connect high-speed LAN products (routers and so on) to the ATM network.

This module is available in two variations, which differ from each other by the type of firmware installed on the circuit boards. The first variation uses the adaptive queuing traffic management method of traffic flow control. The second variation uses the traffic shaping method of traffic flow control.

TAXI Module

The TAXI Module provides the Transparent Asynchronous Transmitter/Receiver Interface (TAXI), which is a high-speed fiber-optic interface used by some UNIX workstations and ATM switches. This interface is required to support the installed base of TAXI-compliant products. The SONET standard OC-3c interface is a more popular interface for new optical network deployment.

2 Installing and Operating the AC 60 and AC 120 Systems

This chapter explains how to do the following:

- Set up your hardware components in preparation for installation
- Install the modules into the AC 60/120 chassis
- Start up the AC 60/120 systems
- Shut down the AC 60/120 systems
- Remove modules from an installed system

In the AC 60 system, the power supply, stratum, and CPU components are factory installed in the chassis enclosure. You need to install only the I/O and the server modules.

If you are installing a new, unconfigured system for the first time, it is recommended that you read through this chapter first, before you start the installation process.

Before You Begin

➤ Procedure

Before you start setting up the AC 60/120 system:

1 If you are installing one or more AC 120 chassis in an equipment cabinet or a telco rack, make sure that you have ordered the correct combination of power supply type, cable management guide kit, and air deflector kit for the type of installation configuration and operational environment you need. See the following table for the various types of installation configurations for the AC 120 system. To find the part numbers for the types of equipment, refer to *Section 13, "Parts List"*.

Table 9. AC 120 Chassis Installation Configurations

Equipment Selected		Operational Environment	Accessories Required		
Chassis Size	**Power Supply Type**		**Air Deflector Below Chassis**	**Air Deflector Above Chassis**	**Cable Management Guide**
23 inch	48 V DC	NEBS	Yes	Yes	Yes
23 inch	48 V DC	Standard	Yes	No	Yes
19 inch	110/220 V AC	Standard	Yes	No	No

2 Select a location that:

- Accommodates the weight and size of the AC 60/120 system
- Offers adequate ventilation and a controlled climate
- Is conveniently located near electrical outlets or other power source and the equipment it will serve

Note:
Refer to *"Hardware Physical and Environmental Specifications" on page 333*, for information you need to choose a suitable location for your AC 60/120 system.

3 Remove all the components from their packaging. You should save the original carton (including cushioning foam material and module packaging) in which the AC 120 chassis, AC 120 tabletop cabinet, or AC 60 chassis was received to ship the system to another location in the future. See *"Shipping the AC 60/120 Systems" on page 80*.

Note:
Do not take the individual modules out of their electrostatic discharge (ESD) protective bags until you are actually ready to install them in the chassis.

4 Verify that the shipment is complete.

5 Verify that the input power from your facility power source meets the specifications for the type of power supply you have in your system. See the following two tables.

Table 10. Facility Power Source Specifications for 110/220 V AC Power Supply

Voltage ranges	90 to 130 V AC (for the 110 V switch setting), or 180 to 250 V AC (for the 220 V switch setting) at 50 to 60 Hz **Note:** For the Access Concentrator 120 AC power supply, the user selects the volt setting. For the Access Concentrator 60 AC power supply, the volt setting is factory set.
Maximum current	5 A
Maximum power	300 W

Table 11. Facility Power Source Specifications for -48 V DC Power Supply

Voltage ranges	-42.5 to -56 V DC
Maximum current	12 A
Maximum power	400 W

Setting Up the Hardware

The AC 60/120 systems are shipped to be set up for one of the following types of installation:

- The AC 120 chassis in a tabletop cabinet and the AC 60 enclosed chassis can be placed on a flat hard surface.
- The 19-inch AC 120 chassis for rack mounting and the AC 60 enclosed chassis can be mounted in a standard 19-inch equipment rack cabinet or a 19-inch telco frame. The 23-inch AC 120 chassis is mounted in a 23-inch cabinet or telco frame. See *"Rack-Mounted Setup" on page 61*.

Tabletop Setup

An AC 120 system already installed in a tabletop cabinet and the AC 60 enclosed chassis do not need special setup. To ensure satisfactory operation of these systems and to prevent any damage when you set them up for tabletop installation, use the following guidelines when placing your system:

- The supporting hard surface, such as a tabletop or a wide shelf, is sturdy enough to support the weight and size of the unit.
- The location of the supporting hard surface is out of the way of personnel so that no one will bump into the chassis or the cabling on the front.
- The AC 120 unit must be at least 4 inches away from any objects behind it.
- The AC 60 unit must be at least 4 inches away from any objects on either side of it.

CAUTION:
You must maintain the minimum 4 inches clearance for adequate air flow, or the equipment might fail due to overheating. If you choose to place the unit on the floor, be aware that dust will accumulate faster inside the chassis.

Place the AC 120 tabletop system or the AC 60 system in your chosen location.

Note:
If you have more than one unit, you can stack them with no more than three in the stack.

You are ready to install the modules. See *"Installing the Common Equipment Modules in the AC 120 System" on page 68* and *"Installing the I/O and Server Modules in the AC 60/120" on page 70*.

Rack-Mounted Setup

The AC 60 enclosed chassis has mounting angle brackets already installed for flush-front mounting. These brackets cannot be repositioned.

To prepare for mounting the AC 120 chassis, do the following tasks before installing the chassis into an equipment rack cabinet or telco frame:

- Determine whether you want to reposition the AC 120 mounting angle brackets from their factory-installed position, and then reposition them if necessary. See *"Repositioning Chassis Angle Brackets" on page 61*.
- Determine whether you want to reposition the air deflector mounting angle brackets from their factory-installed position, and then reposition them if necessary. See *"Repositioning Air Deflector Angle Brackets" on page 63*.
- If you are installing a 23-inch chassis with -48 V DC power supplies, you need to install the -48 V DC filter kit into the 23-inch air deflector. See *"Installing the -48 V DC Filter Kit" on page 65*.

Repositioning Chassis Angle Brackets

For installing the AC 120 chassis in a standard 19-inch or 23-inch cabinet or frame, the following options are available for positioning the AC 120 chassis in the rack or frame:

- Mounting angle brackets are placed in a position (front edge of the chassis sidewall), as shipped from the factory, with rack-attaching flanges facing the front for flush-front mounting in a equipment rack. See *Figure 15 on page 62* for the positioning of the brackets.

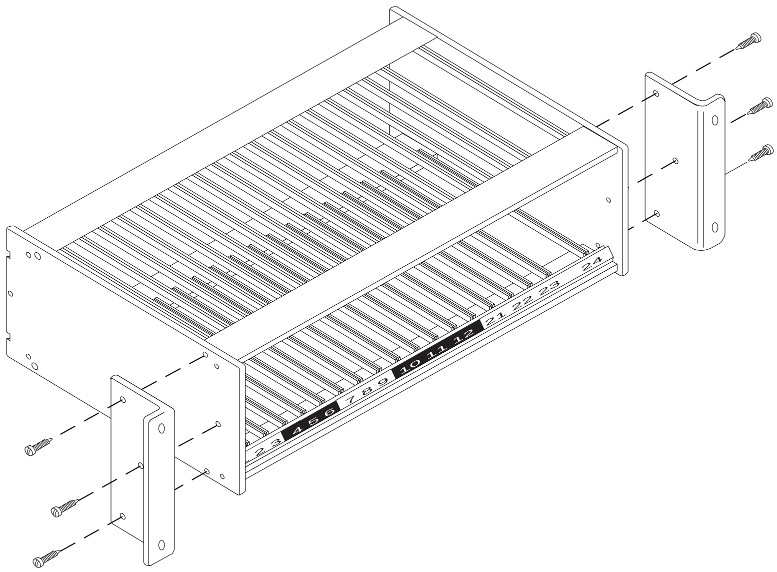

Figure 15. AC 120 Chassis with Front-Position Mounted Brackets

- Mounting angle brackets are placed in a position with frame-attaching flanges facing the rear for mid-position mounting in a telco frame. See the following figure for the positioning of the brackets.

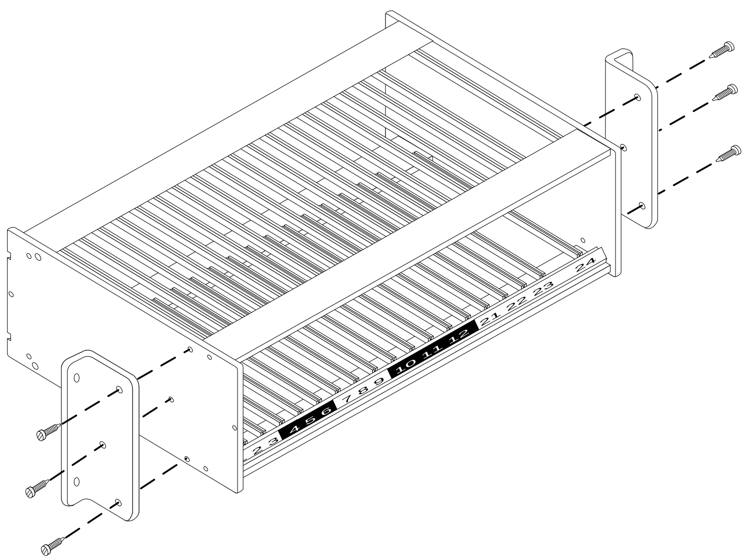

Figure 16. AC 120 Chassis with Mid-Position Mounted Brackets

- Mounting angle brackets are placed in a position (rear edge of chassis sidewall) with rack-attaching flanges facing the rear for flush-rear mounting on a wall. Do not use this mounting position in a cabinet or frame. See the following figure for the positioning of the brackets.

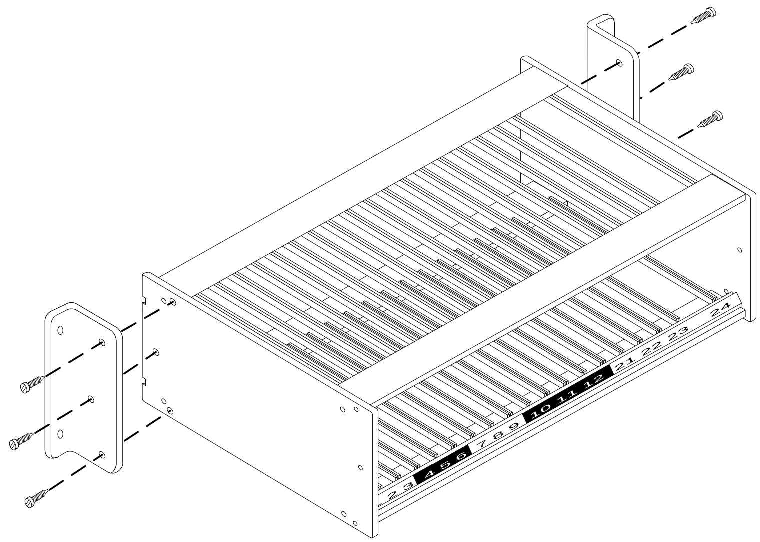

Figure 17. AC 120 Chassis with Rear-Position Mounted Brackets

➤ Procedure

To change the position of the mounting angle brackets:

1. Determine whether you want to reposition the angle brackets.
2. To change the mounting position, if necessary, remove the mounting screws, reposition the brackets, and then reinsert the screws.

Repositioning Air Deflector Angle Brackets

The following options are available for positioning the AC 120 chassis in the rack or frame:

- Mounting angle brackets are placed in a position (front edge of the air deflector sidewall), as shipped from the factory, with rack-attaching flanges facing the front for flush-front mounting in a equipment rack. See *Figure 18 on page 64* for the positioning of the brackets. This figure illustrates a filter kit for a -48 V DC power supply installed on the back side of the cable management guide. If you are using an AC power supply, this kit is not needed.

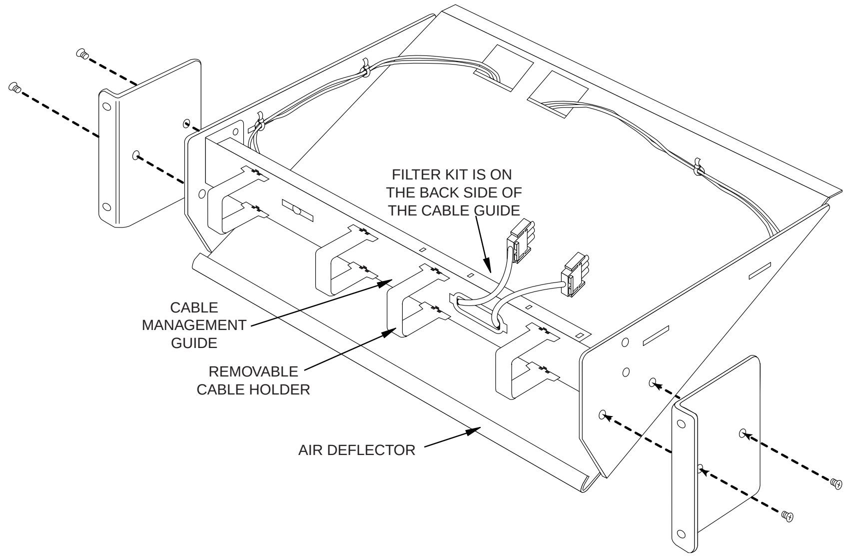

Figure 18. Air Deflector with Front-Position Mounted Brackets

- Mounting angle brackets are placed in a position with frame-attaching flanges facing the rear for mid-position mounting in a telco frame. See the following figure for the positioning of the brackets. This figure illustrates a filter kit for a -48 V DC power supply installed on the back side of the cable management guide. If you are using an AC power supply, this kit is not needed.

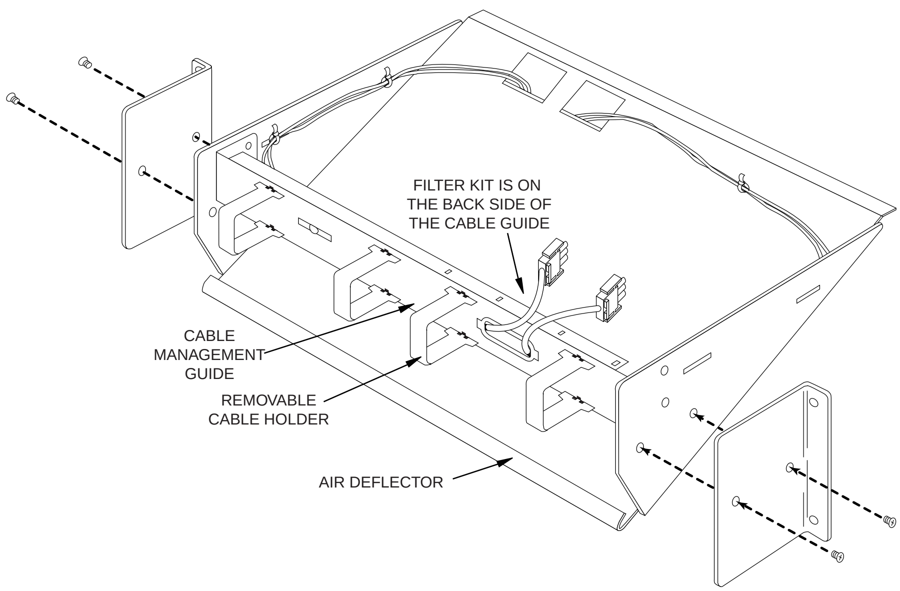

Figure 19. Air Deflector with Mid-Position Mounted Brackets

➤ Procedure

To change the position of the mounting angle brackets:

1. Determine whether you want to reposition the angle brackets.
2. To change the mounting position, if necessary, remove the mounting screws, reposition the brackets, and then reinsert the screws.

Installing the -48 V DC Filter Kit

If you are installing a -48 V DC power supply in your AC 120 chassis, you must install a filter kit (shipped with the power supply) into the air deflector/cable management guide assembly before installing it into the cabinet or frame. The air deflector assembly is shipped already assembled as one unit. The filter kit is shipped with its component parts already assembled as illustrated in *Figure 20 on page 65*.

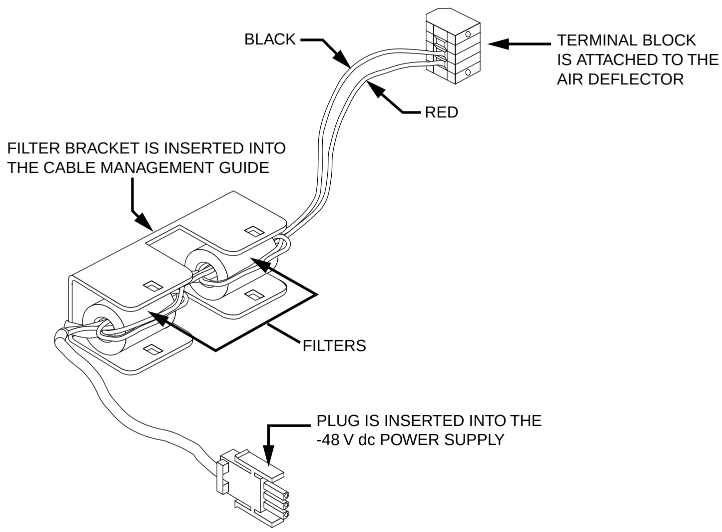

Figure 20. Filter Kit for the -48 V DC Power Supply

Figure 21 on page 66 illustrates the installation of the filter kit into the air deflector/cable management guide assembly.

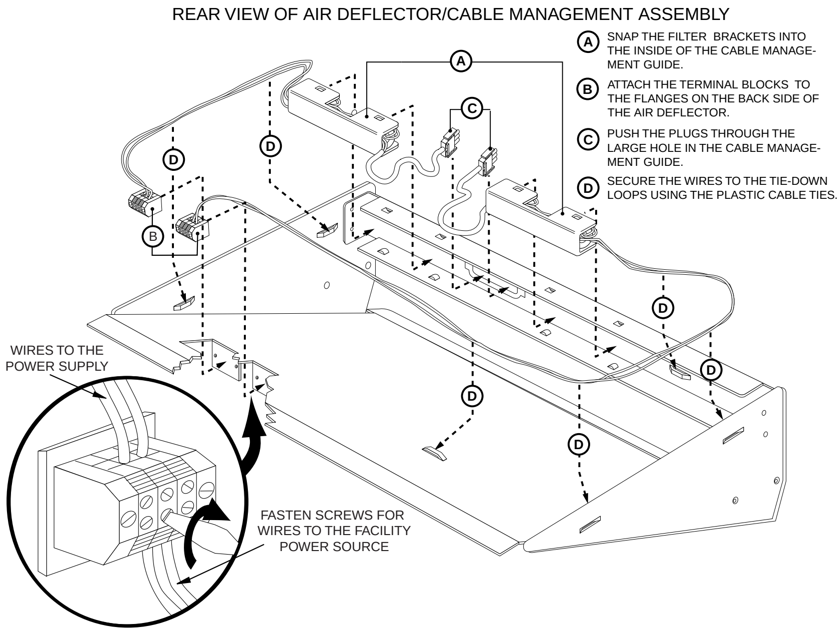

Figure 21. Filter Kit for the -48 V DC Power Supply—Installation in the Air Deflector

➤ Procedure

Using *Figure 20 on page 65* and *Figure 21 on page 66* as a guide, do the following to install the filter kit into the air deflector/cable management assembly:

1 Place the air deflector assembly on a level surface with the front facing away from you.

2 Snap the filter brackets into the clips on the horizontal flanges of the cable management guide (label A in *Figure 21 on page 66*).

3 Push the terminal blocks through the square holes near the back of the air deflector (label B in *Figure 21 on page 66*).

4 Attach the terminal blocks to the flanges on the back side of the air deflector with two screws per terminal block (screws included with the filter kit).

5 Push the plugs to the front of the cable management guide through the large oval hole on the vertical plane of the guide (label C in *Figure 21 on page 66*).

6 Secure the wires connecting the filters and the terminal blocks to the inside of the air deflector by using the plastic cable ties (included with the filter kit) to fasten the wires to the tie-down loops (label D in *Figure 21 on page 66*).

   To review what the installed filter kit looks like from the front of the air deflector/cable management guide assembly, refer to *Figure 19 on page 64*.

⚠ WARNING:

At this point, do not attach the plugs to the faceplate connectors of the -48 V DC power supply, and do not attach the facility power source wires to the terminal blocks. These steps are provided in *"Starting Up the AC 120 System" on page 72***.**

Mounting the Chassis and Air Deflector in a Rack

When installing the AC 120 chassis in a rack cabinet or telco frame, you must have already done the following before installing the chassis and the air deflector assembly:

- Positioned the angle brackets in the desired position on the AC 120 chassis and on the air deflector assembly
- If using the -48 V DC power supply, installed the filter kit into the air deflector/cable management guide assembly

Figure 22 on page 67 shows a 23-inch AC 120 chassis mounted in a frame with an air deflector/cable management guide assembly and an installed filter kit for a -48 V DC power supply.

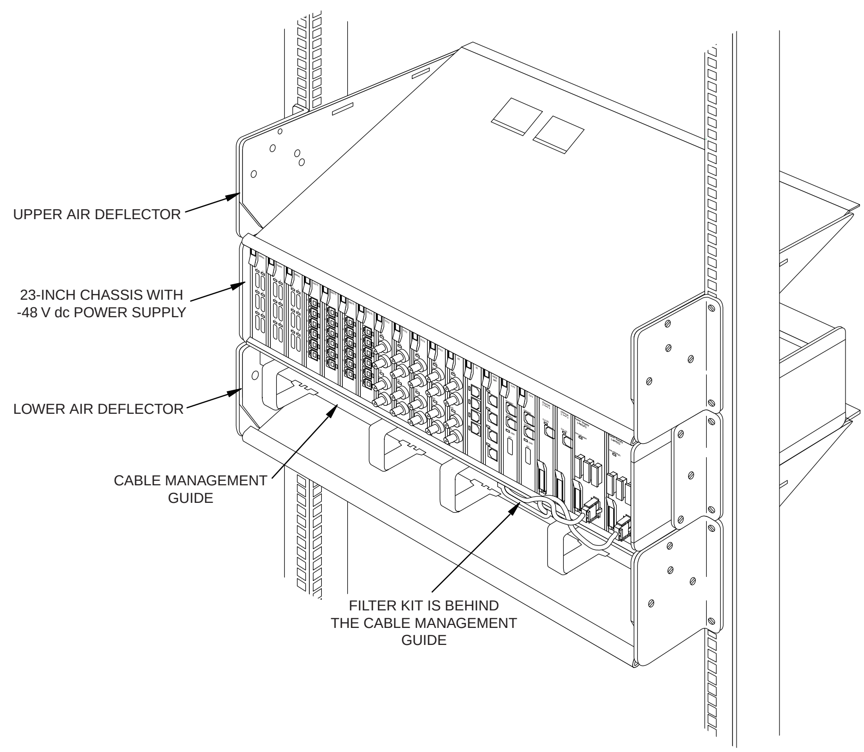

Figure 22. Rack-Mounted 23-inch AC 120 System with Air Deflectors

DANGER:
When populated with modules, the AC 120 chassis can weigh up to 30 pounds or more. Lifting or holding such a load while trying to fasten it to a rack can be hazardous, especially when working alone. To avoid personal injury or damage to the equipment, mount and securely bolt the chassis to the rack or the frame before inserting the modules.

➤ Procedure

To mount the chassis and air deflector:

1. Place the chassis in the desired position in the rack cabinet or the frame.
2. Secure the chassis to the rack cabinet or the frame with the screws provided in the installation kit.

3 If you are installing more than one AC 60/120 chassis in a rack cabinet or a frame, ensure that the clearance above and below the chassis is enough to accommodate the air deflectors. Ensure that the clearance behind the rack is at least 4 inches.

CAUTION:
You must install an air deflector/cable management assembly below each AC 120 chassis in the rack or frame. If you are operating your equipment in a NEBS environment, you must install an air deflector (with no cable management guide or filter kit) above the highest chassis in the rack or frame. See *Table 9 on page 59*.

4 Place the air deflector/cable management guide assembly directly below the AC 120 chassis in the rack or the frame.

5 Secure the assembly to the rack or the frame with the screws provided in the installation kit.

6 Repeat steps 4 and 5 for each chassis in the rack or frame.

Note:
For a NEBS environment, install an air deflector (with no cable management guide or filter kit) above the highest chassis in the rack or frame.

Note:
For a 19-inch chassis with AC power supplies, a cable management guide is not required, but is highly recommended to help keep the cable connections on the module faceplates secure and organize the cabling on side of the chassis out of the way (see *Section 13, "Parts List"*).

If you are installing an AC 120 system, see *"Installing the Common Equipment Modules in the AC 120 System" on page 68* for more instructions.

If you are installing an AC 60 system, see *"Installing the I/O and Server Modules in the AC 60/120" on page 70* for more instructions.

Installing the Common Equipment Modules in the AC 120 System

Install the common equipment modules into the AC 120 chassis before installing the I/O and server modules. See *Figure 4 on page 29* for an illustration of slot numbering on the AC 120 chassis.

Installing the Power Supply Modules

DANGER:
Dangerous voltage is present in a power supply connected to an electrical power source. Before beginning installation of the power supply module, be sure the power cord is not connected to the module.

➤ Procedure
To install the power supply:

1 DC power supply: Ensure that you have installed the filter kit for the -48 V DC power supply into the air deflector/cable management guide assembly. See *"Installing the -48 V DC Filter Kit" on page 65*.

AC power supply: Slide the input voltage switch on the circuit board of the AC power supply to either the 115 V or the 230 V setting as shown in *Figure 23 on page 69*.

CAUTION:
The input voltage from the AC power source must be compatible with the switch setting on the AC power supply or it will fail.

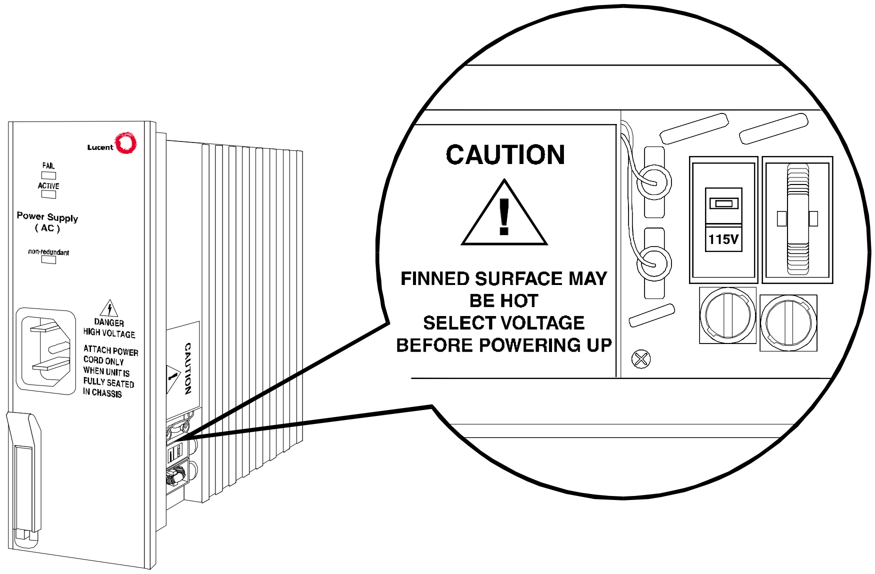

Figure 23. Input Voltage Switch on the AC 120 AC Power Supply

2 Slide the AC or the DC power supply module into either slot 23 or 24 of the chassis.
3 Firmly press the latch on the faceplate, as shown in *Figure 24 on page 69*, and verify that the module is secure in its slot.

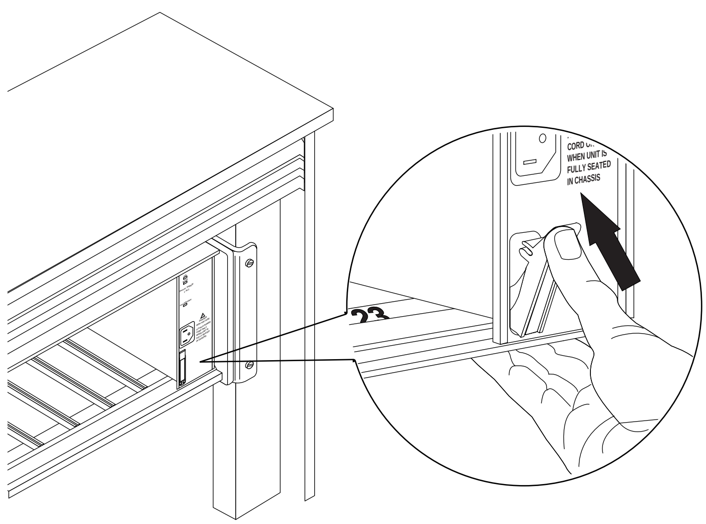

Figure 24. Securing the AC 120 Power Supply Module in the Chassis

DANGER:
When setting up an AC 120 system that uses a single (nonredundant) power supply module, you must install a blank faceplate over the empty power supply slot to prevent potential electrical shock.

4 If you are not installing a second (redundant) power supply, insert a blank faceplate into the empty slot (either slot 23 or 24).

Note:
A blank faceplate to cover the empty CPU Module slot is included in the installation kit packed with your AC 120 system. Additional faceplates are available. See *Section 13, "Parts List"*.

5 Optional: Repeat Steps 1 through 3 to install the redundant power supply module into slot 23 or 24.

Installing the Stratum 3–4 Modules

➤ Procedure

To install the Stratum 3–4 Module:

1 Slide the Stratum 3–4 Module into slot 21 or 22 of the chassis.

2 Firmly press the latch on the faceplate, and verify that the module is secure in its slot as demonstrated in *Figure 24 on page 69*.

3 If you are not installing a second (redundant) stratum module, insert a blank faceplate into the empty slot (either slot 21 or 22).

Note:
A blank faceplate to cover the empty stratum module slot is available. See *Section 13, "Parts List"*.

4 Optional: Repeat Steps 1 and 2 to install the redundant stratum module into slot 21 or 22.

5 Connect your network cabling (user supplied) to the faceplate(s) of the stratum module(s).

Installing the CPU Module

➤ Procedure

To install the CPU Module:

1 19-inch chassis: slide the CPU modules (redundant configuration) into slots 11 and 12.

Note:
For a single CPU chassis, position the CPU module in slot 12.

2 23-inch chassis: slide the CPU modules (redundant configuration) into slots 15 and 16.

Note:
For a single CPU chassis, position the CPU module in slot 16.

3 Firmly press the latch on the module faceplate and verify that the module is secure in its slot as demonstrated in *Figure 24 on page 69*.

4 Connect the cable supplied in the installation kit to the connector on the faceplate labeled CONSOLE.

Installing the I/O and Server Modules in the AC 60/120

Install the AC 120 common equipment modules before installing the I/O and the server modules (see *"Installing the Common Equipment Modules in the AC 120 System" on page 68*). See *Figure 4 on page 29* for an illustration of slot numbering on the AC 120 chassis. The common equipment components in the AC 60 are shipped factory installed.

Note:
Because of the architecture of the backplane in a redundant AC 120 system, it is recommended that you install your I/O and server modules beginning at the left side of the chassis in slot 1. If you have a mix of different module types with lower speed line rates such as the DS1/T1 Module and higher speed line rates such as the OC-3c Module, it is recommended that you position your modules so that neither of the dual buses on the backplane are unduly overloaded. The reason for this scheme is that traffic from odd-numbered slots is routed through bus A and traffic from even-numbered slots is routed through bus B. For example, given slots 1 through 10 and five modules with higher-speed rates and five modules with lower-speed rates, you would position two higher-speed modules in adjacent slots 1 and 2, then two lower-speed modules in the next slots 3 and 4, then two higher-speed modules in the next slots 5 and 6, and so on.

➤ Procedure

To install the I/O and server modules:

1. Slide the module vertically into any slot 1 through 10/11 in the 19-inch AC 120 chassis, slot 1 through 14/15 in the 23-inch chassis, or into slot 1 through 4 in the AC 60 chassis.

Note:
In the AC 60 chassis, slide the module in horizontally so that the ejector handle is next to the left side of the chassis. See *Figure 7 on page 33* for an illustration of the AC 60 chassis.

2. Firmly press the latch on the module faceplate and verify that the module is secure in its slot as demonstrated in *Figure 24 on page 69*.
3. Insert blank faceplates into any remaining empty slots numbered 1 through 12 in the AC 120 chassis, or into any empty slots in the AC 60 chassis.

Note:
Blank faceplates to cover any empty I/O module slots are separately orderable items. See *Section 13, "Parts List"*.

⚠ WARNING:
Be sure to cover all empty slots with blank faceplates to maintain optimum electromagnetic interference (EMI) shielding of the chassis.

⚠ DANGER:
The OC-3c SM and the STM-1 SM modules contain a laser-generating device, which emits a laser light beam from the transmit port, labeled TX on the module faceplate. While the module is inserted into an operational AC 60/120 chassis, do not look directly (deliberately or accidentally) into the either port, because direct contact of the laser beam with the human eye will cause damage to it.

Once the chassis is operational (power is applied to the chassis) and the OC-3c SM or STM-1 SM module is fully inserted into the chassis backplane, use extreme caution if you need to remove the fiber-optic cable from one or both ports. Keep the protective port caps supplied with these two types of modules nearby (for example, taped to the cable for the port), and place a cap on the port immediately after removing a cable from a live module.

4 AC 120 chassis: Connect your network cabling to the faceplates of the I/O modules.

AC 60 chassis: Connect the cable supplied with the installation kit to the connector labeled CONSOLE, and your network cabling to the connector labeled EXTERNAL SYNC.

Note:
You must supply most of your own network cabling. However, specialized cables for the Multiserial and High Speed Modules are available as separately orderable parts. See *Table 151 on page 348* for a listing of the parts. See *"Setting DIP Switches" on page 274* and *"Multiserial Module Cables" on page 289* for descriptions of these cables.

Operating the AC 120 System

Be sure you have done the following before starting up your system:

- Installed the power supply module(s), the Stratum 3–4 Module(s), the CPU Module(s), and the I/O and server modules
- Verified that all modules are properly seated in the chassis
- Verified your network and electric power cabling connections

Starting Up the AC 120 System

CAUTION:
Neither the AC 120 chassis nor the power supply module has an on/off switch. The power to the chassis is automatically applied when you have properly installed the power supply module into the chassis, and you connect the power cord to the power source.

➤ Procedure
To start up the AC 120 system:

1 Verify that the input power from the power source meets the specifications for the type of power supply you have installed in your chassis. See *Table 10 on page 60* and *Table 11 on page 60*.

2 Press the L-shaped female plug of the power cord firmly onto the power supply module faceplate, as shown in *Figure 25 on page 73*.

For the -48 V DC power supply, push the connector plug onto the pins on the faceplate. Make sure the connector plug is attached to the wire securely.

3 Make certain that the plug is fully seated onto the pins on the faceplate.

4 AC power: Insert the standard male plug at the other end of the power cord into the AC power source.

DC power: Insert the wires from the facility power source, making sure to match the red wires and the black wires to each other, into the terminal block and tighten the screws. Also check to make sure the wires coming from the filters are connected tightly.

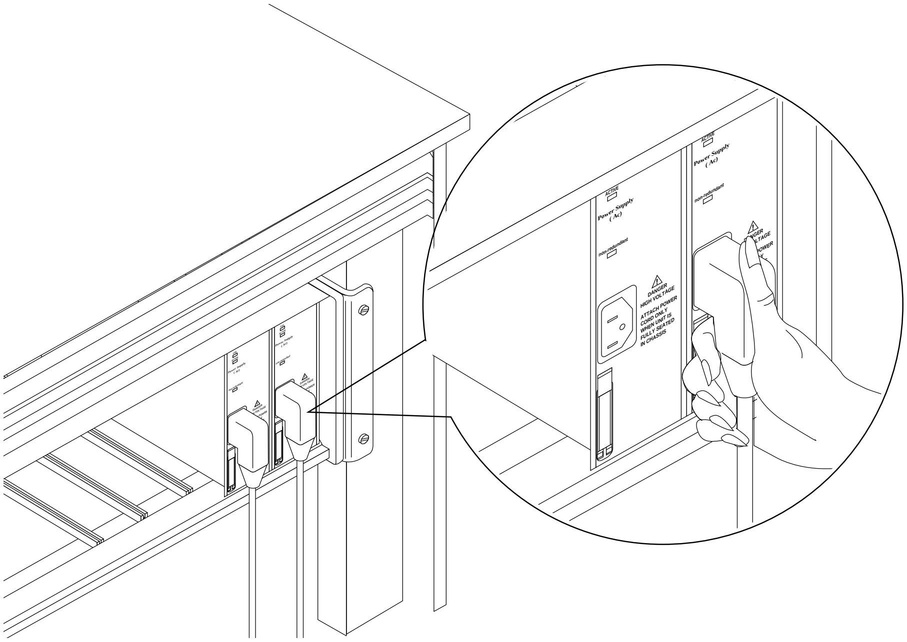

Figure 25. Inserting the Power Cord into the Access Concentrator 120 AC Power Supply Module

5 Optional: Repeat Steps 2 through 4 to connect the redundant power supply to the input power source.

Note:
System response — The AC 120 system initializes (takes about 10–15 seconds). If you have a tabletop cabinet system, the cooling fans start up.

6 Check to see that the green light-emitting diode (LED) indicator, ACTIVE, on both power supply modules (or one for a nonredundant system) are illuminated. If the red LED indicator, FAIL, is illuminated, the power supply module is not functioning, or the power source is not providing power.

Note:
If your AC 120 system does not start up correctly, contact the Technical Support Department. See *"Technical Support" on page 24*.

Shutting Down the AC 120 System

CAUTION:
Neither the AC 120 chassis nor the power supply module has an on/off switch. The power to the chassis is automatically removed when you disconnect the power cord (both power cords for redundant systems) from the power source.

➤ Procedure

To shut down the AC 120 system:

1 Disconnect the power cord from the facility receptacle or other power source by pulling the plug, not the cord, out of the receptacle or connector.

2 AC power supply: Firmly grasp the plug inserted in the power supply module faceplate, and pull it, not the cord, with a steady pressure out of the faceplate, as shown in *Figure 26 on page 74*.

Figure 26. Removing the Power Cord from the Access Concentrator 120 AC Power Supply Module

DC power supply: Turn the collar on the connector plug counterclockwise until it is loose, and pull the plug out of the faceplate.

AC 120 Common Equipment Module Status Indicators

All modules have LED indicators that provide visual status of various functions in the modules. Status indicators for the power supply modules, the Stratum 3–4 Module, and the CPU Module are described in this section. LED indicators for the user-selected I/O modules are described in *Section 4, "Configuring the I/O and Server Modules"*.

Power Supply Module Indicators

The power supply modules has two types of LED indicators:

- The 110/220 V AC power supply is shown in *Figure 27 on page 74*.
- The -48 V DC power supply is shown in *Figure 28 on page 75*.

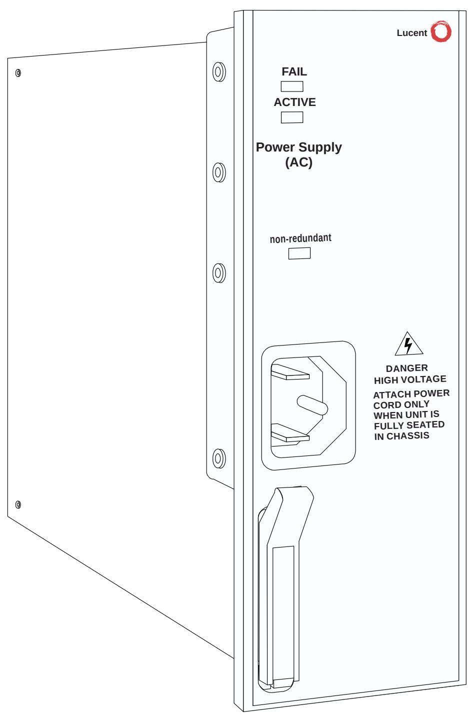

Figure 27. AC 120 110/220 V AC Power Supply Module

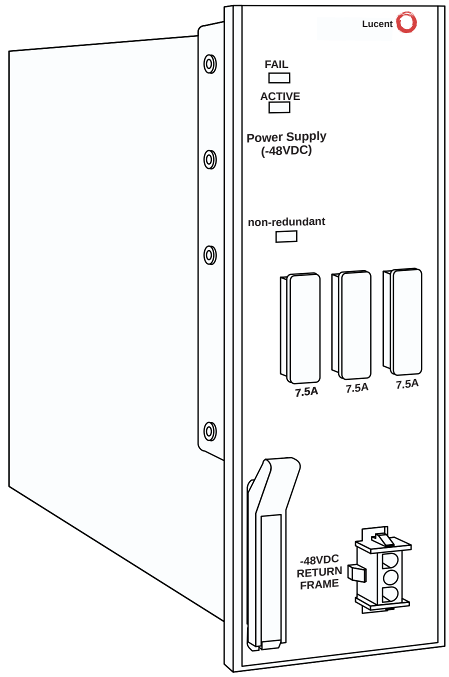

Figure 28. AC 120 -48 V DC Power Supply Module

The status indicators for the power supply modules are described in the following table.

Table 12. AC 120 Power Supply Module Status Indicators

Color	Status	Description
Red	FAIL	Indicates that the power supply module is not functioning or connected to a power source. **Note:** If only one power supply module is used in an AC 120 system and the module fails, none of the other modules in the chassis would have illuminated LEDs because no power would be supplied to the system.
Green	ACTIVE	Indicates that the power supply module is functioning properly. **Note:** The power supply module has no on/off switch. The green ACTIVE LED is illuminated when the power supply module is properly inserted into the chassis backplane, and the power cord is properly connected to both the power supply module faceplate and the power source.
Yellow	NONREDUNDANT	Indicates two different conditions depending on whether one or two power supply modules are in use: • When only one power supply module is installed, a yellow LED indicates that the chassis has no redundant module. • When two power supply modules are installed, a yellow LED on one or both modules indicates that at least one power supply is drawing power at more than one-half of its capacity, which is an abnormal condition. If one of the modules were to fail in this situation, the other would not be able to fully power the system. If this situation occurs, call the Technical Support Department See *"Technical Support" on page 24*.

Stratum 3–4 Module Indicators

The Stratum 3–4 Module has three types of LED indicators. See *Figure 29 on page 76*.

The status indicators for the Stratum 3–4 Module are described in the following table.

Table 13. AC 120 Stratum 3–4 Module Status Indicators

Color	Status	Description
Red	FAIL	Indicates that the stratum module is not functioning.
Green	ACTIVE	Indicates that the stratum module is functioning properly. **Note:** In a redundant configuration, the green LED identifies which of the two stratum modules is providing system synchronization. The green LED on the redundant stratum module (in standby mode) is not illuminated.
Yellow	CLK LOS (Clock Loss of Signal)	Indicates a loss of signal from the external composite clock synchronization source. **Note:** This LED indicator is operational only when the synchronization source value **CompositeClock** was selected on the Stratum Configuration screen. (See *Section 3, "Configuring the Basic System"*.) This LED is not operational when synchronization source value **Freerun** or **LineTiming** was selected.

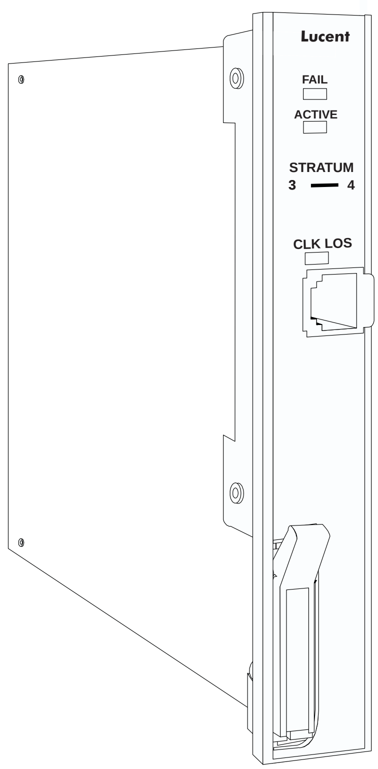

Figure 29. AC 120 Stratum 3–4 Module

CPU Module Status Indicators

The CPU Module has three types of LED indicators. See *Figure 30 on page 77*.

The status indicators for the CPU Module are described in the following table.

Table 14. AC 120 CPU Module Status Indicators

Color	Status	Description
Red	FAIL	Indicates that the CPU Module is not functioning.
Green	ACTIVE	Indicates that the CPU Module is functioning properly. **Note:** Both modules in a redundant configuration have illuminated green LEDs.
Yellow	LOAD	Indicates that the module is initializing the AC 120 system software from the hard disk on the module.

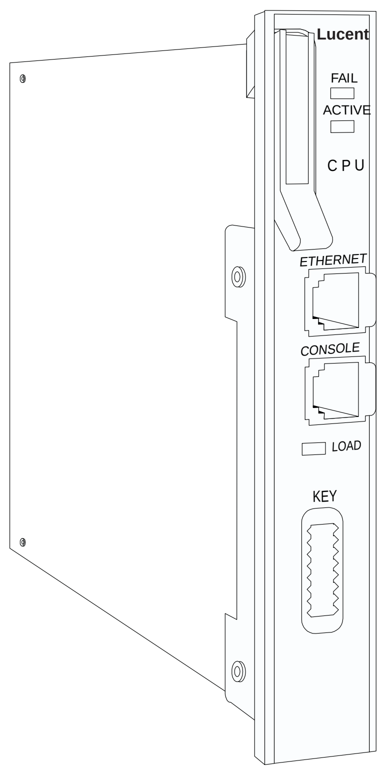

Figure 30. AC 120 CPU Module

Operating the AC 60 System

Be sure you have done the following before starting up your system:

- Installed the I/O and server modules
- Verified that all modules are properly seated in the chassis
- Verified your network cabling connections

Starting Up the AC 60 System

➤ Procedure

To start up the AC 60 system:

1. Verify that the input power from the power source meets the specifications for the type of power supply you have installed in your chassis. See *Table 10 on page 60* and *Table 11 on page 60*.
2. Make sure the POWER toggle switch is set to the OFF position.
3. Insert the L-shaped female plug of the power cord into the chassis faceplate, pressing firmly, as illustrated with the AC 120 chassis shown in *Figure 25 on page 73*.
4. Make certain that the plug is fully seated onto the pins on the faceplate.
5. Insert the standard male plug at the other end of the power cord into the AC power source.
6. Press the POWER switch to the ON position.

   The AC 60 system initializes (takes about 10–15 seconds). The cooling fan starts up.
7. Check to see that the green LED indicator, ACTIVE, on the chassis faceplate is illuminated. If the red LED indicator, FAIL, is illuminated, one of the following conditions is present:
   - The power supply, the CPU, or the stratum component is not functioning.
   - The power source is not providing power.

Note:
If your AC 60 system does not start up correctly, contact the Technical Support Department. See *"Technical Support" on page 24*.

Shutting Down the AC 60 System

➤ Procedure

To shut down the AC 60 system:

1. Press the POWER toggle switch to the OFF position.
2. Disconnect the power cord from the facility receptacle or other power source by pulling the plug, not the cord, out of the receptacle or connector.
3. Firmly grasp the plug inserted in the chassis faceplate, and pull it, not the cord, with a steady pressure out of the faceplate, as illustrated with the AC 120 chassis shown in *Figure 26 on page 74*.

AC 60 Status Indicators

The AC 60 chassis has three types of LED indicators, as shown in the following figure.

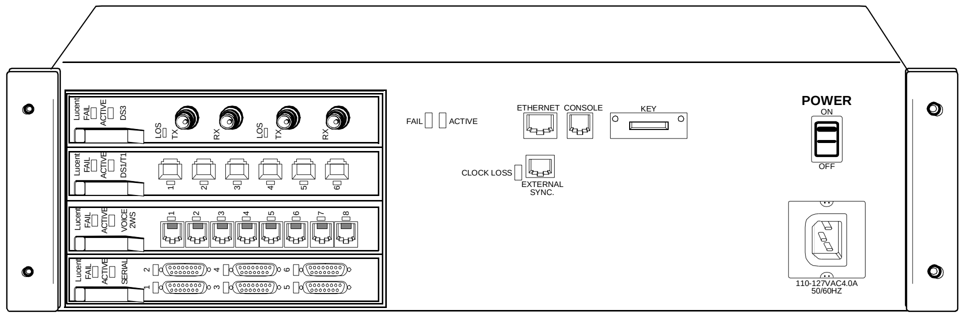

Figure 31. AC 60 Enclosed Chassis

The status indicators for the AC 60 chassis are described in the following table.

Table 15. AC 60 Chassis Status Indicators

Color	Status	Description
Red	FAIL	Indicates that the power supply, the stratum, or the CPU component is not functioning.
Green	ACTIVE	Indicates that the power supply, the stratum, and the CPU components are functioning properly.
Yellow	CLK LOS (Clock Loss of Signal)	Indicates a loss of signal from the external composite clock synchronization source. **Note:** This LED indicator is operational only when the synchronization source **CompositeClock** was selected on the Stratum Configuration screen. (See *Section 3, "Configuring the Basic System"*.) This LED is not operational when synchronization source **Freerun** or **LineTiming** was selected.

Removing Modules from the AC 60/120 Chassis

You can remove any of the I/O and server modules, the CPU Modules, the Stratum 3–4 Modules, and the power supply modules (see the following danger message) from the AC 120 chassis with the system running, that is, with power applied to the chassis. The design of the AC 120 system supports live insertion and removal of modules without disrupting service on the other modules in the system.

You can remove any of the I/O and server modules from the AC 60 chassis with the system running. You cannot, however, remove the CPU, stratum, and power supply components, which are factory installed in the enclosed chassis. The design of the AC 60 system supports live insertion and removal of the I/O and server modules without disrupting service on the other modules in the system.

DANGER:

AC 120 — Dangerous voltage is present in a power supply module connected to a power source. Do not attempt to remove the power supply module from the chassis before disconnecting the power cord. Follow the instructions in *"Shutting Down the AC 120 System" on page 73* ***first.***

➤ Procedure

To remove the modules from the AC 60/120 chassis:

1 Pull the latch on the module faceplate toward you until it releases to the open position. See *Figure 26 on page 74*.

2 Slide the module out of the chassis.

⚠ DANGER:

AC 120 — When you remove a power supply module from the chassis immediately after removing the power from the chassis, do not touch the heat sink area of the module. The heat sink might be very hot. See *Figure 23 on page 69***.**

3 Put the module in an ESD protective bag, and close the bag with adhesive tape.

Shipping the AC 60/120 Systems

At some point, you might need to ship your AC 60/120 system to another location. To prepare the system for shipment, do the following:

⚠ DANGER:

When populated with modules, the AC 120 can weigh up to 30 pounds or more. Lifting or holding such a load while trying to unfasten it from a rack can be hazardous, especially when working alone. To avoid personal injury or damage to the equipment, remove all the modules from the chassis before removing the chassis from the rack.

➤ Procedure

To prepare the system for shipment:

1 After removing power from the system, remove all modules from the chassis, place them in ESD protective bags, seal the bags with tape, and then place them in sturdy cartons with foam packing material (use the original packaging if you saved it).

⚠ WARNING:

Shipping the chassis with any modules installed inside could cause damage to the chassis and the modules. Damage to any of the components in the system resulting from this situation would cause the warranty to be voided.

2 For a rack-mounted chassis, remove the mounting screws.

3 Place the AC 120 chassis (or the AC 120 tabletop cabinet with chassis) or the AC 60 chassis in a sturdy carton (use the original packaging if you saved it). Use foam packing material to cushion the equipment.

4 Secure the boxes with heavy-duty packaging tape.

3 Configuring the Basic System

This chapter describes how to configure the AC 60/120 system after you have installed the system hardware components and applied power to the system, as described in *Section 2, "Installing and Operating the AC 60 and AC 120 Systems"*. Configuring the basic system involves the following tasks:

- Setting the system values for your site
- Setting values for the primary Stratum 3–4 Module

Procedures for configuring the I/O and the server modules are provided in *Section 4, "Configuring the I/O and Server Modules"*.

The AC 60/120 systems are designed for continuous operation after power is applied. The AC 120 system has no power on/off switch. As soon as you connect the power cords from the power supply modules to the power source, the AC 120 system becomes operational. See *"Starting Up the AC 120 System" on page 72*. The AC 60 system becomes operational after you press the POWER switch to the ON position.

After power is initially applied to an unconfigured system, the power supply and the CPU Modules are configured automatically. On the unconfigured I/O modules, which you will configure after your initial system logon, both the ACTIVE and the FAIL LEDs are illuminated briefly and then go out.

The AC 120 CPU Module and the AC 60 chassis faceplate have two external interfaces:

- The RJ-45 connector labeled ETHERNET connects to a 10base-T Ethernet network interface.
- The RJ-11 connector labeled CONSOLE connects directly to any EIA-232 serial device as a console interface.

Telnet sessions are supported on the Ethernet interface. Both the telnet session on the Ethernet interface and the console session provide a console interface for VT100 terminal emulation. See *Section 10, "Configuring the Terminal Emulator"*, for information on configuring the terminal emulation software.

Logging onto the AC 60/120 System

➤ Procedure

To log onto the AC 60/120 system:

1. Connect the cable, included in the installation kit, to the CONSOLE connector on the AC 120 primary CPU Module faceplate or the AC 60 chassis faceplate. See *Section 9, "Pin Configurations for AC 60/120 Modules and Cables"*, for information about RJ11 and RJ45 connector pin configurations.
2. Configure your VT100 terminal emulator according to the instructions in *"Configuring the Terminal Emulator" on page 297*."
3. Wait 10 seconds to allow the system to initialize after you apply power to the AC 60/120 system, and press Return when the prompt is displayed.

   The AC 120 Logon panel is displayed. See *Figure 32 on page 82*.

Note:
The AC 60 Logon panel is similar to the AC 120 Logon panel.

```
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
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LLLLLLLLLLLL /_______________________________________________/ ] LLLLLLLLLLL
LLLLLLLLLLLL [                                               ] ] LLLLLLLLLLL
LLLLLLLLLLLL [    AC 120 ATM Access Concentrator System      ] ] LLLLLLLLLLL
LLLLLLLLLLLL [    Version: V03.00.B00                        ] ] LLLLLLLLLLL
LLLLLLLLLLLL [    Copyright Lucent Technologies, Inc., 1997  ] ] LLLLLLLLLLL
LLLLLLLLLLLL [    Sitename: AC 120 23 INCH                   ] ] LLLLLLLLLLL
LLLLLLLLLLLL [_______________________________________________]/  LLLLLLLLLLL
LLLLLLLLLLLL                                                     LLLLLLLLLLL
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LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
                                                          Use Ctrl-B to exit.

                 Username: _______________________________

                 Password: _______________________________

_________________________________________________________________________________
Press RETURN when done editing.
```

Figure 32. Logon Panel

4 In the Username field (highlighted in reverse video image), type one of the following values, and press Return:
   - read/write if you want to view and change all configuration options
   - read only if you want to view configuration options without the ability to change them

5 In the Password field, type one of the following values, and press Return:
   - lucenttech1 (default value) if you entered readwrite in the Username field
   - lucenttech2 (default value) if you entered readonly in the Username field

The Console Interface Main Menu panel is displayed. See *Figure 33 on page 83*.

Note:
The panels for the AC 60 system are the same as those for the AC 120 except for the Equipment Configuration panel.

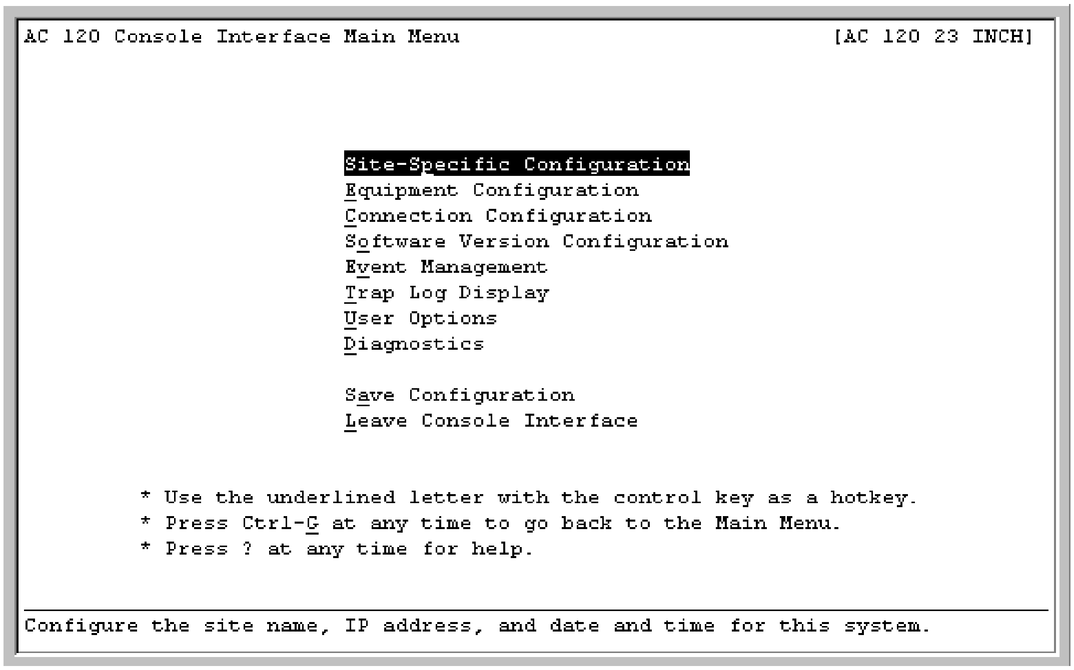


Figure 33. Console Interface Main Menu Panel (Site-Specific Configuration Selected)

At the time of initial configuration, the Console Interface Main Menu panel displays a field with a pair of opposing square brackets in the upper-right corner. This field will contain the site name, which you will enter later in this procedure.

Help Information

The Help panels are accessible from any panel in the AC 60/120 system console interface. In addition to the Help panels, the Console Interface panels have contextual help displayed in the information line at the bottom of each panel. Contextual help provides information about the option or field currently highlighted on that panel. The information line also displays error codes and responses to commands. All responses and notifications are recorded in a trap log. See *Section 11, "SNMP Trap Messages"*, for details on displaying the trap log and explanations of the messages.

To access the Help panels, press the Question Mark (?) key on any panel.

➤ Procedure

For example, to view the Help panels for the Console Interface Main Menu panel:

1. On the Main Menu panel, press the ? key.

   The first Main Menu Help panel is displayed. See *Figure 34 on page 84*.

```
Main Menu Help                                                [AC 120 23 INCH]
________________________________________________________________________________
The Main Menu provides top level access to all functions of the Console
Interface. To select an option, use the UP and DOWN arrow keys to highlight
a menu choice and press RETURN.

Information on basic navigation and shortcuts is provided below after the
Main Menu Choice descriptions.

Main Menu Choices
------------------
Site-Specific Configuration:    Manage information that is unique to this
                                particular system. Configure site ID, ethernet
                                IP address, system date and time, and SNMP
                                manager IP addresses.

Equipment Configuration:        Manage slots, ports, channels, and interfaces.
                                Monitor port and interface statistics.

Connection Configuration:       Manage all connection and routing tables.
                                Create, view, delete, and monitor connections
                                and connection statistics. Create, modify, and
________________________________________________________________________________
| Go Back to Interface: RETURN | Page Down: DOWN ARROW |                    |
```

Figure 34. Main Menu Help (Panel 1)

2 To display the second Main Menu Help panel, press the Down Arrow. See the following figure.

```
Main Menu Help                                                [AC 120 23 INCH]
________________________________________________________________________________
                                delete routing table entries.

Software Version Configuration: Perform software upgrades and firmware
                                downloads.

Event Management:               Configure event manager filters or display
                                event logs.

Trap Log Display:               Scroll through and search the history of SNMP
                                network traps generated by this system.

User Options:                   Manage user specific options. Change password,
                                turn trap display on/off, turn bell on/off,
                                change timeout value, change alternate
                                navigation keys.

Save Configuration:             Permanently save the current system
                                configuration to disk. The configuration can
                                then be restored after a loss of power.

________________________________________________________________________________
| Go Back to Interface: RETURN | Page Down: DOWN ARROW | Page Up: UP ARROW |
```

Figure 35. Main Menu Help (Panel 2)

3 To display the third Main Menu Help panel, press the Down Arrow again. See *Figure 36 on page 85*.

```
Main Menu Help                                                     [AC 120 23 INCH]
-------------------------------------------------------------------------------------
Exit Console Interface:         Log out of the Console Interface.

Basic Navigation
-----------------
Move from field to field................ UP, DOWN, LEFT, or RIGHT ARROW KEYS
Select a menu option.................... RETURN
Edit a field............................ RETURN
Stop editing a field.................... RETURN, UP ARROW, or DOWN ARROW
Cycle forward through an options list... RETURN
Cycle backward through an options list.. BACKSPACE or Ctrl-H
When the arrow keys won't work.......... K=UP, J=DOWN, H=LEFT, L=RIGHT
                                         (or user defined under User Options)
Shortcuts and Hotkeys
----------------------
Redraw the screen display anytime....... Ctrl-R
Go back to the main menu from anywhere.. Ctrl-G
Go back one screen from anywhere........ Ctrl-B
Get help at anytime..................... ?

The contol key plus an underlined letter is a shortcut to that function.
-------------------------------------------------------------------------------------
| Go Back to Interface: RETURN | Page Down: DOWN ARROW | Page Up: UP ARROW |
```

Figure 36. Main Menu Help (Panel 3)

4 To display the fourth Main Menu Help panel, press the Down Arrow again. See the following figure.

```
Main Menu Help                                                     [AC 120 23 INCH]
-------------------------------------------------------------------------------------
All navigation keys and hotkeys can be in upper or lower case.
Always watch the status line at the bottom of the screen for special info.

-------------------------------------------------------------------------------------
| Go Back to Interface: RETURN |                          | Page Up: UP ARROW |
```

Figure 37. Main Menu Help (Panel 4)

Selecting Options, Fields, and Commands

➤ Procedure

To select an option, field, or command:

1. Press the Up Arrow or the Down Arrow to highlight (reverse video image) the option name, field name, or command you want to select.
2. Press Return.

The system responds as follows:

- For a selected option name, the panel corresponding to the option name is displayed.
- For a selected field, the following variations occur:
  – The field entry area appears blank or contains the previously entered value. You can now enter or change data in this field.
  – The field entry area, like the field name, appears in reverse video image and contains a predefined set of values, which you can view by pressing Return to cycle through these values.
- For a selected command, the following variations occur:
  – The information line displays a message indicating an error or successful completion of the command.
  – The system displays the next higher level or previous panel (**Return to <Panel Name>** →).
  – The system displays the next lower level or succeeding panel (**<Panel Name>** →).

The following tips will also help you:

- Display-only fields, which you cannot change, are enclosed in square brackets (for example: [LineStatus]).
- Press Control-G on any panel to return to the Main Menu panel.

Changing the System Password

When initially configuring the system, you should change the initial default password (lucenttech1) to one of your choosing. You can also change the password at any other time.

➤ Procedure

To change the system password:

1. On the Console Interface Main Menu panel (*Figure 33 on page 83*), select the **User Options** option.

   The User Options panel is displayed. See *Figure 38 on page 87.*
2. Select the Change Password For <username> field.
3. As prompted on the panel, type the current password, and press Return.
4. Type a new password that is at least eight characters long, and press Return.
5. Retype the new password, and press Return to confirm it.
6. To return to the Main Menu panel, select the **Return to Main Menu** command.

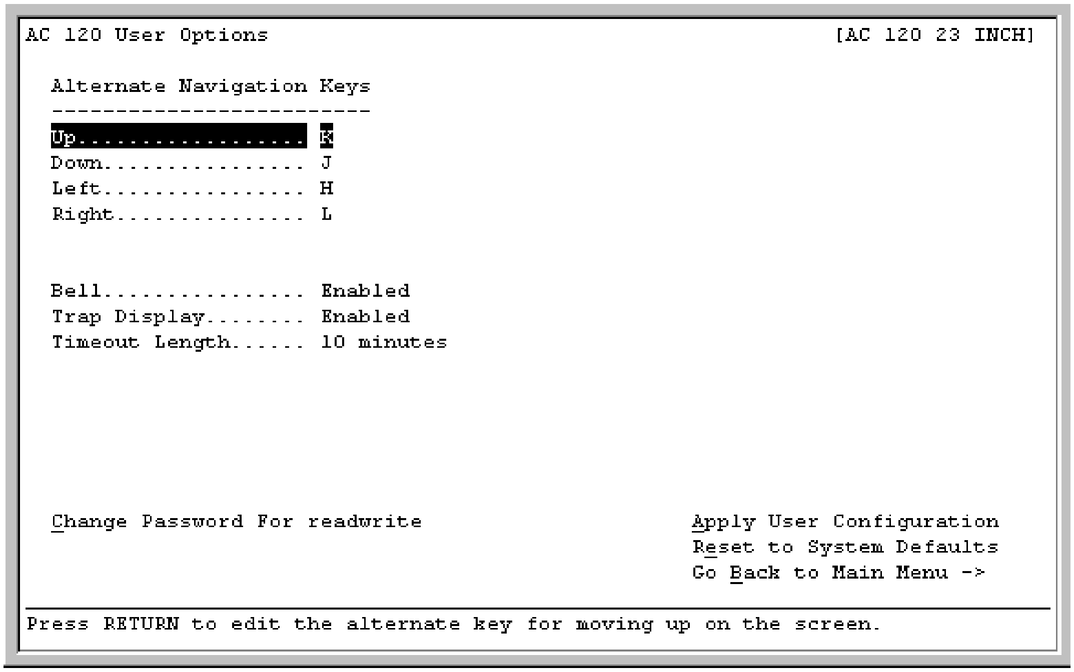


Figure 38. User Options Panel

Console Interface Main Menu

The Console Interface Main Menu panel includes the following options:

- Site-Specific Configuration
- Equipment Configuration
- Connection Configuration
- Trap Log Display
- User Options
- Save Configuration
- Exit Console Interface

This chapter and *Section 4, "Configuring the I/O and Server Modules"*, provide details about these options.

Configuring the System for Your Site

Before proceeding with the site configuration, you must first determine the actual values you will use for the following configuration identifiers:

- Site name
- Site identifier
- Ethernet IP address for Ethernet access
- Ethernet mask address
- Gateway address
- IP addresses of remote network managers configured to receive SNMP traps

➤ Procedure

To configure your system:

1. On the Console Interface Main Menu panel (*Figure 33 on page 83*), select the **Site-Specific Configuration** option.

   The Site-Specific Menu panel is displayed. See the following figure.

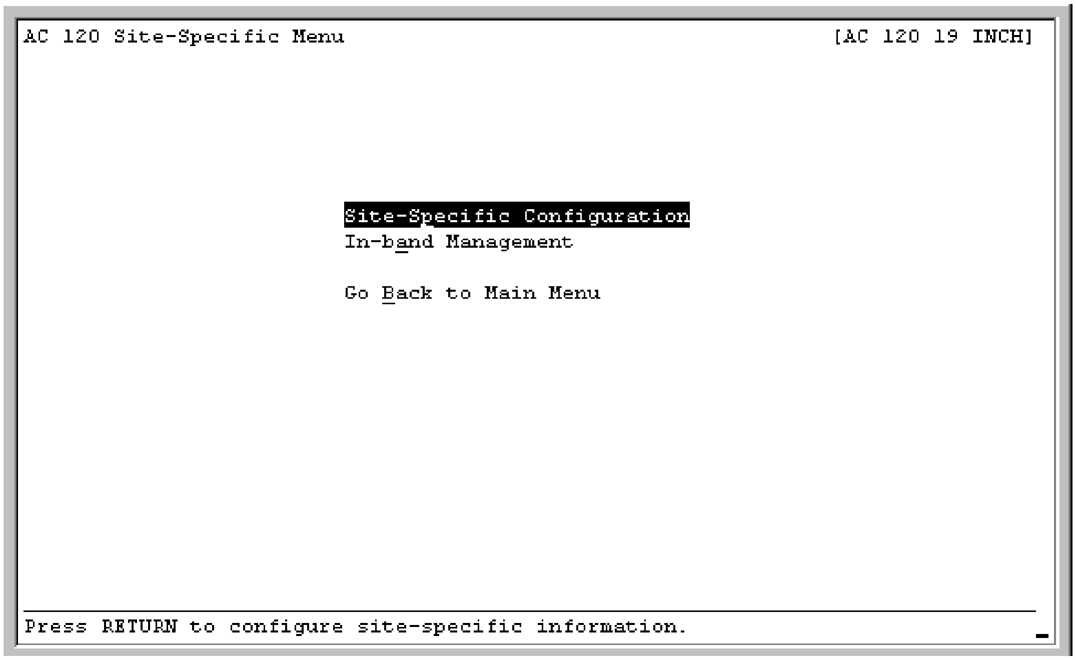


Figure 39. Site-Specific Menu Panel

2. Select the **Site-Specific Configuration** option.

   The Site-Specific Configuration panel is displayed.

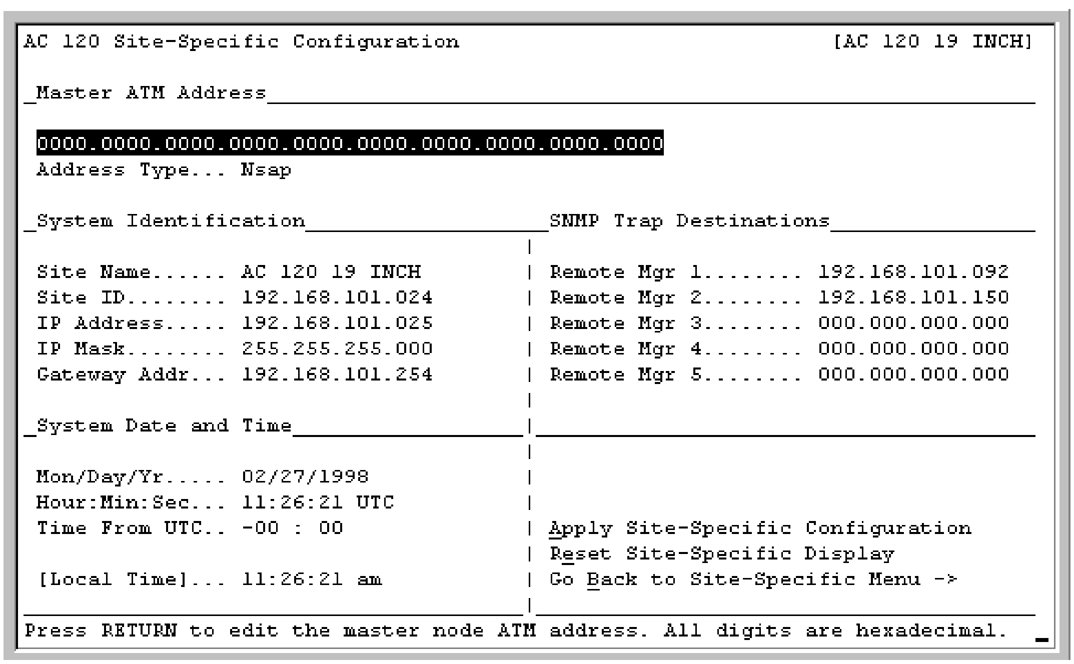


Figure 40. Site-Specific Configuration Panel

Note:
Whenever possible, the system performs error checking on each field by highlighting any field containing an incorrect value. Use the system message displayed in the information line to help you correct any errors.

Setting the System Identification

➤ Procedure

To set the system identification:

1. Select the Site Name field, and type a site name with no more than 20 characters. You can use numbers, letters, spaces, and punctuation. Press Return to exit edit mode.
2. Select the Site ID field, and type the value you have already determined. The Site ID number has four parts, each containing three-digit number not to exceed 255 (for example, 123.087.232.003).

Note:
The site ID is used to identify the system for future ATM routing, remote management, and in-band management. Press Return to exit edit mode.

3. Select the Ethernet IP field, and type the IP address value you have already determined. Press Return to exit edit mode.
4. Select the Ethernet Mask field, and type the address value you have already determined. Press Return to exit edit mode.
5. Select the Gateway Addr field and type the address value you have already determined. Press Return to exit edit mode.
6. Select the **Apply Site-Specific Configuration** command, and press Return to save these values now, or you can wait until you have entered data in all the fields on this panel.

Note:
The master ATM address is not used at this time.

Setting the System Date and Time

➤ Procedure

To set the system date and time:

1. Select the Mon/Day/Yr field, and type the current date using two-digit values for the month and the day, and a four-digit value for the year. Press Return to exit edit mode.
2. Select the Hour:Min:Sec field, and type the current time in Universal Time Coordinated (UTC) format, also known as Greenwich Mean Time (GMT). Press Return to exit edit mode.
3. Select the Time From UTC (Hour) field, and press Return to cycle through the predefined set of values.

Note:
Both negative and positive hourly time selections are available. The time selected represents the difference between your local time and the UTC.

4. Select the Time From UTC (Minutes) field, and press Return to cycle through the predefined set of values (**00** or **30)**.

Note:
Select **00** for all countries except those whose time zones operate at intervals of 30 minutes ahead (and behind) all others. For these locations, select **30**.

5. Select the **Apply Site-Specific Configuration** command and press Return to save these values now, or you can wait until you have entered data in all the fields on this panel.

Note:
The local time is automatically calculated and displayed in the [Local Time] field after you apply (save) the values. The local time is calculated based on the values in the Hour:Min:Sec field and the selected value in the Time From UTC field.

Setting the SNMP Trap Destinations

➤ Procedure

To set the SNMP trap destinations:

1. Select the first Remote Mgr field, and type the IP address value you have already determined. Press Return to exit edit mode.
2. Repeat Step 1 for each remote network manager to be defined.
3. Select the **Apply Site-Specific Configuration** command and press Return.

   After you apply (save) the values on this panel, the system does the following:

   - Writes the values you entered to the AC 60/120 system database
   - Displays your site name in the upper-right corner of the panel
   - Displays the local time in the [Local Time] field
4. Select the **Return to Main Menu** command and press Return

Note:
The alternative is to press Control + b (hot key).

Configuring the In-band Management IP Address

If you want to manage one or more AC systems over an ethernet network connected to an ATM wide-area network backbone, you must set up the primary IP address for the management host. The management host is defined as a PC or Unix workstation running an SNMP client that manages one or more AC systems over an ethernet network. Two basic methods for configuration are possible:

Direct connection	The management host connects directly to the AC system through a fiber-optic cable to a module such as an OC-3c Module in the AC system being managed (the managed target).
Routed connection	The management host connects over an ethernet network to an AC system acting as a router. The router AC system in turn has direct in-band managed PVC connections to remote AC systems (managed targets).

➤ Procedure

To configure the primary IP address for the management host:

1. On the Site-Specific Menu panel (*Figure 39 on page 88*), select the **In-band Management** option.

   The In-Band Management Configuration panel is displayed. See *Figure 41 on page 91*.

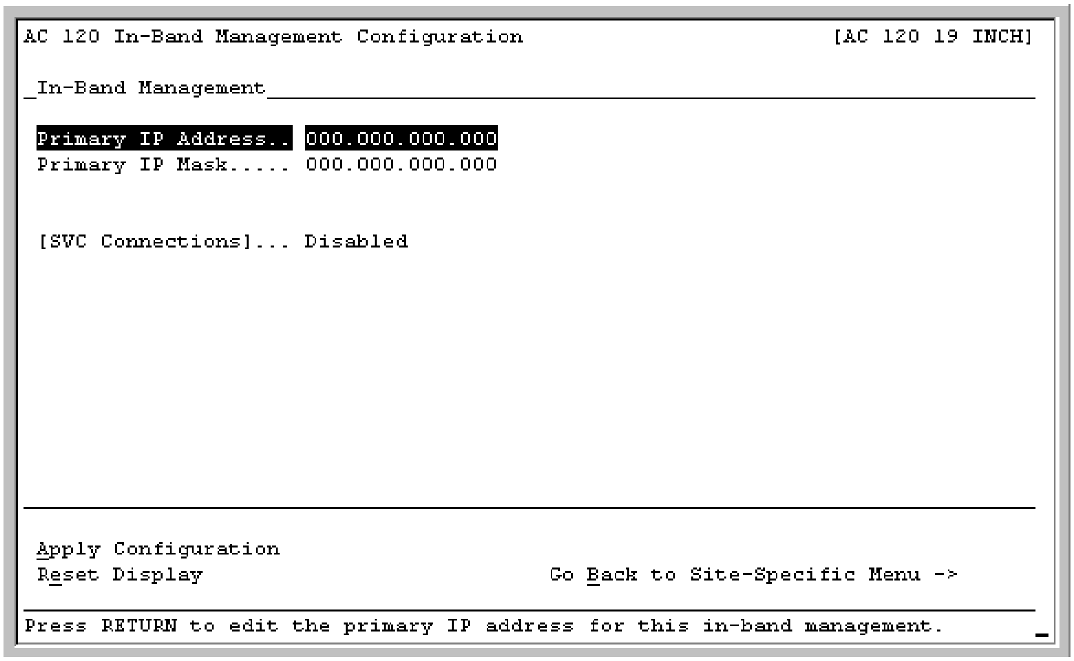


Figure 41. In-Band Management Configuration Panel

2 Select the **Primary IP Address** field, and type the IP address of the management host, and press Return.

Note:
Enter a primary IP address that is on a different subnet from the subnet that is assigned to the Ethernet interface for the management host.

3 Select the **Primary IP Mask** field, and type the IP mask for the primary IP address, and press Return.

4 Select the **Apply Configuration** command, and press Return.

The system applies the configuration.

5 To set up PVC connections for in-band management, see *"In-Band Management ATM PVC Connection" on page 222*.

Note:
If using a routed in-band management connection to a remote AC 60/120, the workstation's default gateway must be set to the IP address of the AC 60/120 CPU IP address.

Configuring the Stratum 3–4 Module

The only common equipment module you need to configure is the Stratum 3–4 Module. On the Stratum Configuration panel, you establish the source of the system synchronization. You must configure the Stratum Module before configuring any I/O modules. After you have configured the Stratum Module, it provides the reference clock to all I/O module ports configured for local timing.

Note:
If your system has redundant Stratum Modules, you configure only the primary Stratum Module. The configuration values are automatically applied to the standby Stratum Module.

➤ Procedure

To configure the primary Stratum Module:

1. On the Console Interface Main Menu panel (*Figure 33 on page 83*), select the **Equipment Configuration** option.

   The Equipment Configuration panel is displayed. See the following figure.

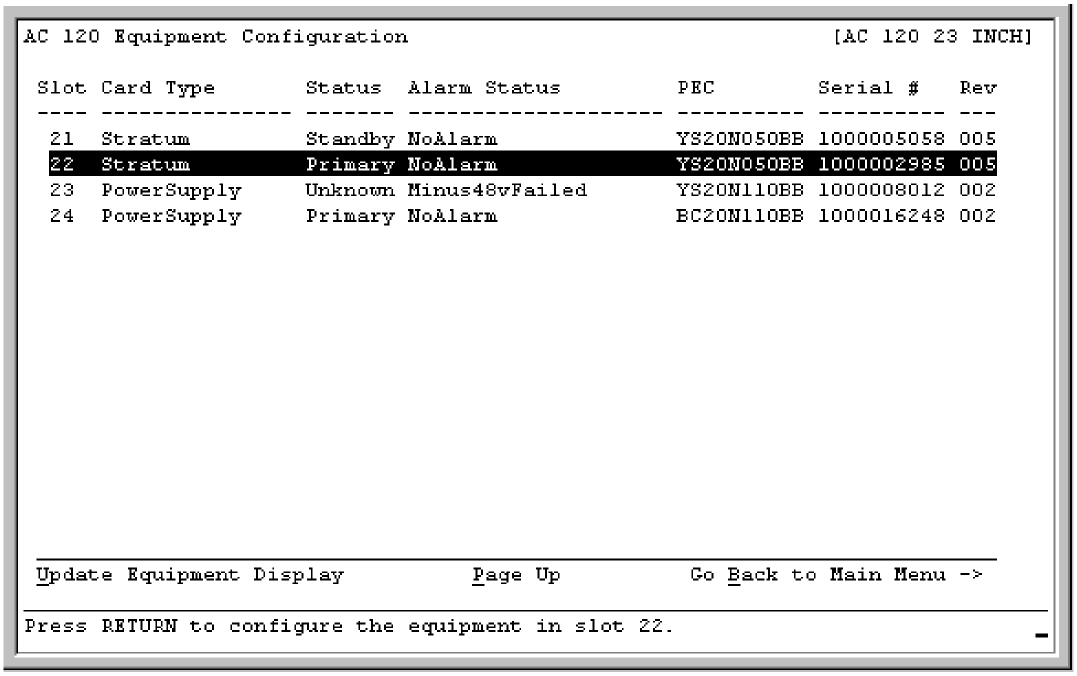


Figure 42. Equipment Configuration Panel (Stratum Module Selected)

This panel displays all the modules in the system and each module location by slot number. For the AC 60 system, this panel displays only slots 1 through 4. The fields found on the Equipment Configuration panel are:

Slot	Indicates the slot number location on the AC 60/120 chassis. You can configure only the Stratum, the I/O, and the server modules.
Card Type	Indicates what kind of module is inserted in the slot.
Status	Indicates whether the module operates in primary or standby mode. This field currently applies to only the CPU, the Stratum, and the Power Supply Modules.
Alarm Status	Indicates whether any alarms are active.
PEC	Indicates the product element code (PEC), which is described in *Section 12, "Hardware Physical and Environmental Specifications"*.
Serial # (serial number)	Indicates the unique identifying number to identify a particular hardware component.
Rev	Indicates the current revision level of the product.

2. On the Equipment Configuration panel, select the **Stratum (Primary)** module in slot 21 or 22, and press Return.

   The Stratum Configuration panel is displayed. See *Figure 43 on page 93*.

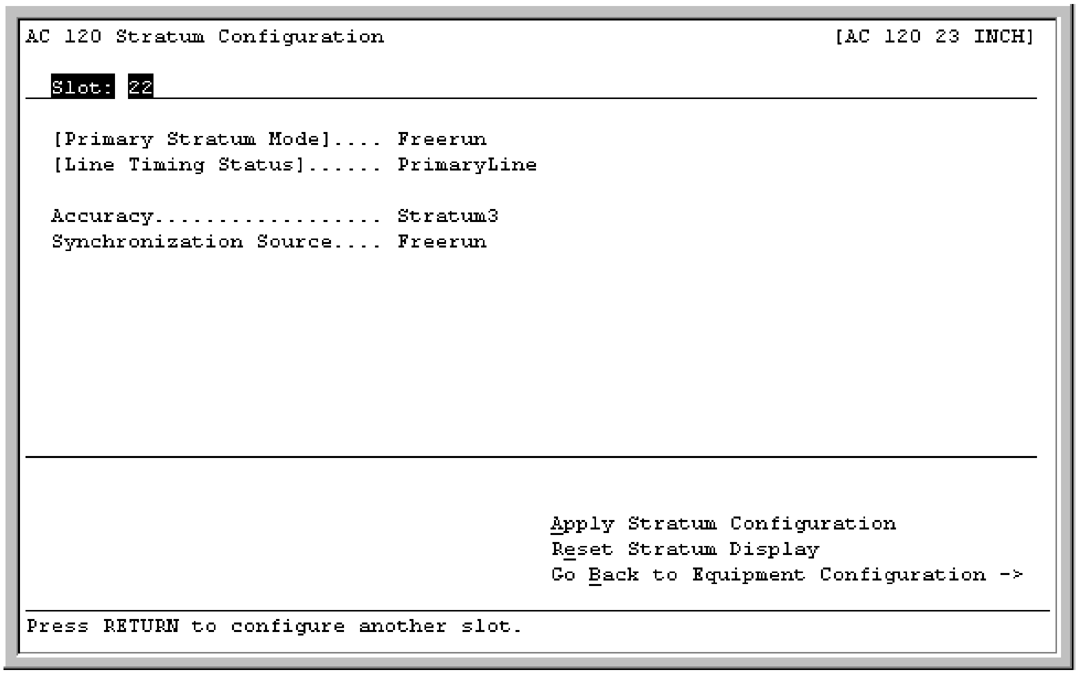


Figure 43. Stratum Configuration Panel

The [Primary Stratum Mode] and the [Line Timing Status] fields indicate the current modes of operation for the stratum module. *Table 16 on page 93* describes the possible values for these fields.

Table 16. Stratum Module Modes of Operation

Field Name	Mode of Operation	Description
[Primary Stratum Mode] (display only)	Holdover	Indicates a loss of timing.
	Freerun	Indicates the initial state of no timing source.
	Synchronized3	Indicates timing has Stratum3 precision.
	Synchronized4	Indicates timing has Stratum4 precision.
[Line Timing Status] (display only)	None	Indicates that the system timing is not being provided by the line source.
	PrimaryLine	Indicates that system timing is provided by the slot and port of the module specified as the Primary Line Source.
	SecondaryLine	Indicates that system timing is provided by the slot and port of the module specified as the Secondary Line Source.

3 Select the Accuracy field, and press Return to cycle through the predefined set of values (Stratum3 or Stratum4).

4 Select the Synchronization Source field, and press Return to cycle through the predefined set of values. The values are:

Freerun (default)	Indicates the system is running on its internal clock.
LineTiming	Indicates the clock will be provided through the slot and port specified in the Line Source fields.
CompositeClock	Indicates the clock will be provided through an external clock connected to the front of the primary Stratum Module.

Note:
Steps 5 and 6 in this procedure apply only if you select the **LineTiming** value in the Synchronization Source field. When you select this value, the Primary Line Source and the Secondary Line Source fields and the **Switch Line Timing Source** command are displayed. See the following figure. If you select the **Freerun** or the **CompositeClock** value, skip to Step 7.

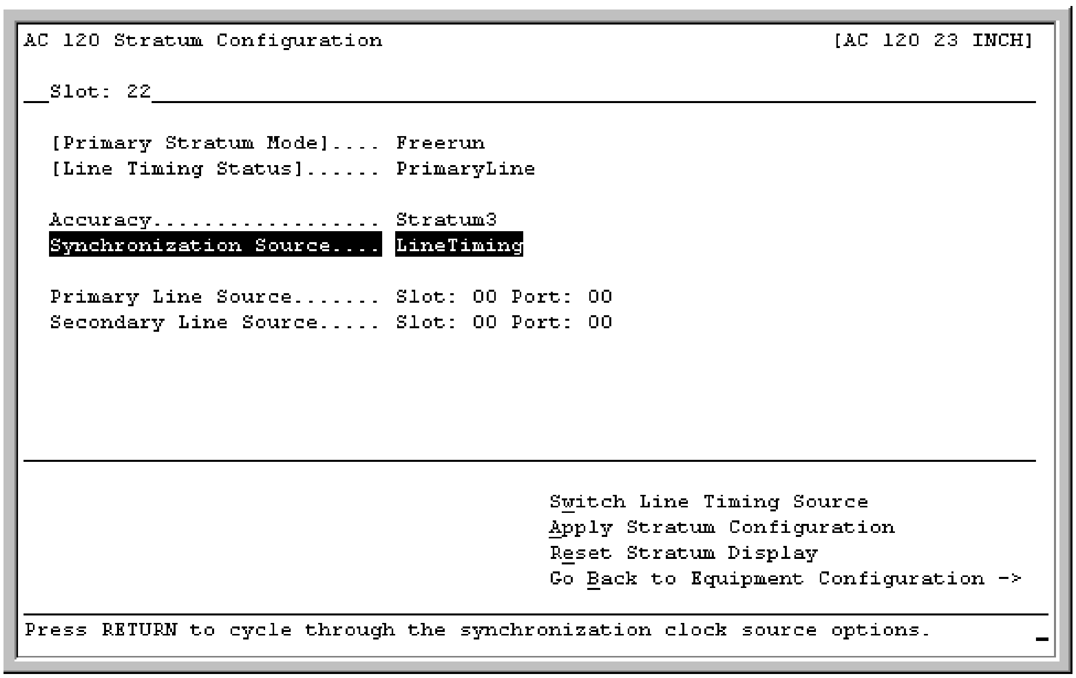


Figure 44. Stratum Configuration Panel (Line Timing Synchronization)

5 Select the Primary Line Source field, and type the values for the slot and the port. Press Return to exit edit mode.

6 Select the Secondary Line Source field, and type the values for the slot and the port. Type zeros (00) if you do not want to specify a secondary line source. Press Return to exit edit mode.

7 Select the **Apply Stratum Configuration** command, and press Return to execute the command.

Switching the Line Timing Source

At any time after initial configuration of the primary Stratum Module when you have selected **LineTiming** as your synchronization source, you can switch between the primary line source or the secondary line source.

➤ Procedure

To switch between the primary line source or the secondary line source:

1. Select the **Switch Line Timing Source** command, and press Return to execute the command.

   The value displayed in the [Line Timing Status] field is changed.

4 Configuring the I/O and Server Modules

This chapter describes how to do the following:

- Set the values for the port and channel configuration for the I/O and the server modules
- Set the values for the interface type configuration for the I/O and the server modules

Before beginning configuration of the I/O and the server modules, be sure you have done the following:

- Set the values to configure your basic system (See *"Configuring the System for Your Site" on page 87*.)
- Set the values to configure the Stratum 3–4 Module (See *"Configuring the Stratum 3–4 Module" on page 91*.)

Configuring the Ports and Channels

You must set the configuration values for the I/O module ports in order to configure an I/O or server module.

Note:
Set the configuration values for the I/O module ports before setting the configuration values for the various types of interfaces.

DS1/T1 and E1 Modules

You must first configure the DS1/T1 or the E1 Module before you can set up connection provisioning. Both the DS1/T1 Module and the E1 Module each have two variations, the Cell Bearing variation and the Circuit Emulation variation. The difference between the two variations is the type of firmware installed on the module. In addition, the DS1/T1 Module has six ports, and the E1 Module has four ports. These modules have three types of LED indicators. See *Figure 45 on page 98*.

Note:
This subsection documents the DS1/T1 and E1 Modules together, since they are similar.

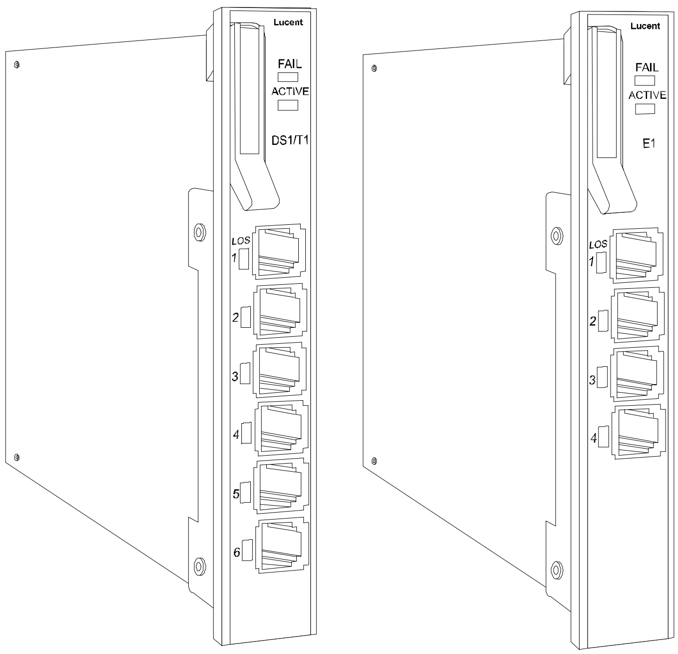


Figure 45. DS1/T1 and E1 Modules (Each with Cell Bearing and Circuit Emulation)

The status indicators on the DS1/T1 and E1 Module are described in the following table.

Table 17. Status Indicators for the DS1/T1 and E1 Modules

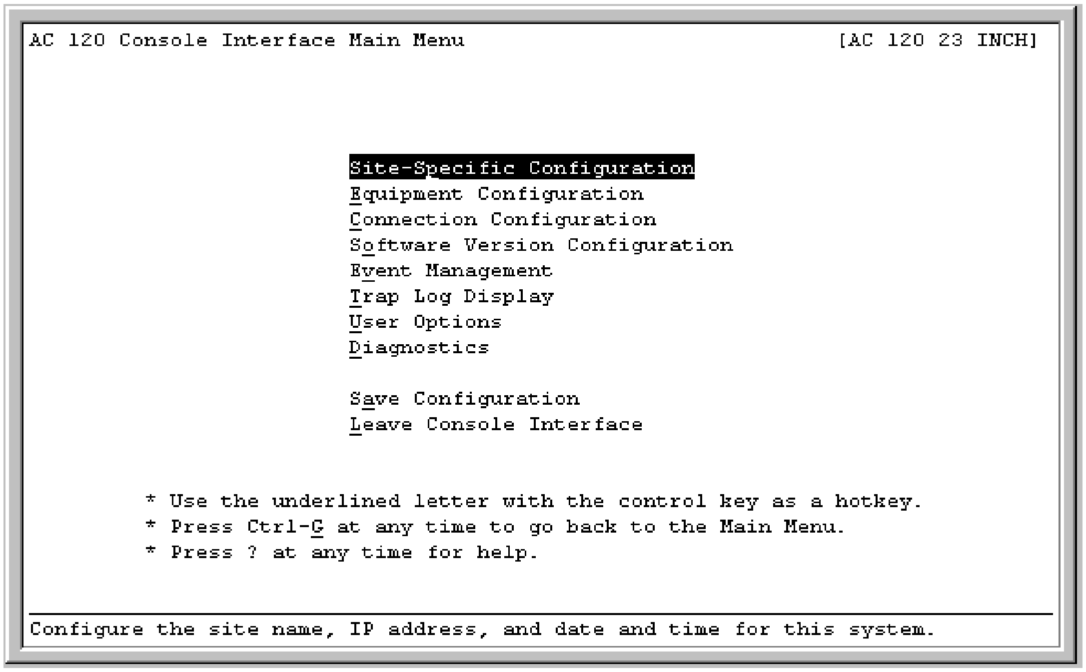
Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	•Not lighted if signal is being received •Lighted if signal is missing

[1] After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2] After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

Configuring the DS1/T1 or E1–ATM Cell Bearing Module

Start at the Console Interface Main Menu panel. See the following figure.



```
AC 120 Console Interface Main Menu                              [AC 120 23 INCH]

                         Site-Specific Configuration
                         Equipment Configuration
                         Connection Configuration
                         Software Version Configuration
                         Event Management
                         Trap Log Display
                         User Options
                         Diagnostics

                         Save Configuration
                         Leave Console Interface

         * Use the underlined letter with the control key as a hotkey.
         * Press Ctrl-G at any time to go back to the Main Menu.
         * Press ? at any time for help.

Configure the site name, IP address, and date and time for this system.
```

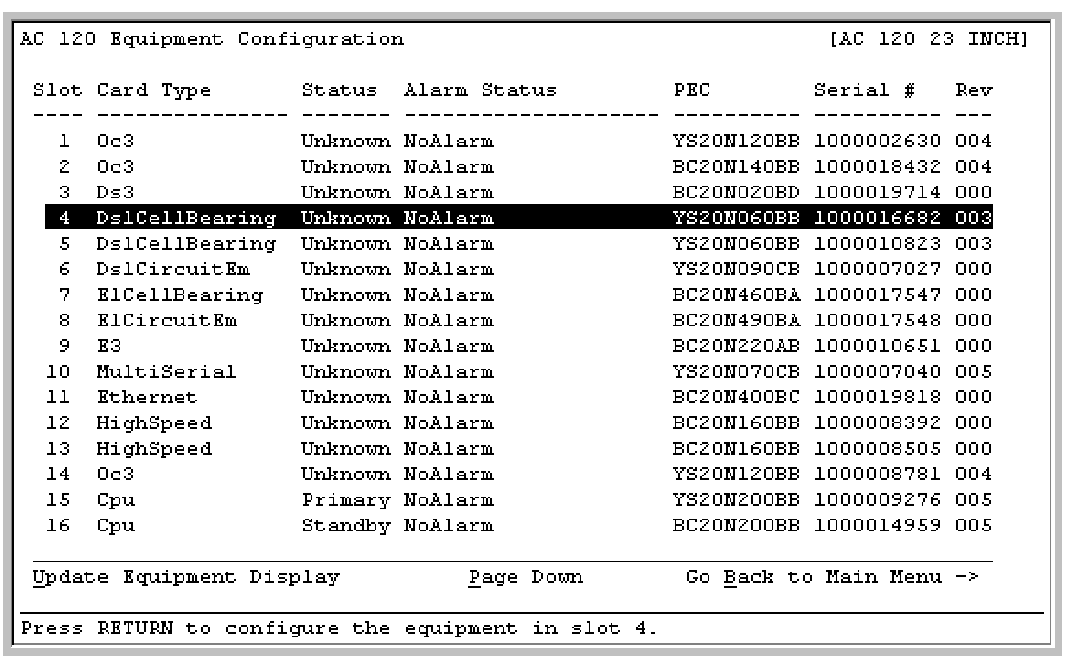
Figure 46. Console Interface Main Menu Panel (Equipment Configuration)

➤ Procedure

To configure the DS1/T1 or the E1–ATM Cell Bearing Module ports and channels:

1 On the Console Interface Main Menu panel, select the **Equipment Configuration** option and press Return.

The Equipment Configuration Panel is displayed. See the following figure.



```
AC 120 Equipment Configuration                                  [AC 120 23 INCH]

 Slot Card Type       Status  Alarm Status        PEC        Serial #   Rev
 ---- --------------- ------- ------------------- ---------- ---------- ---
   1  Oc3             Unknown NoAlarm             YS20N120BB 1000002630 004
   2  Oc3             Unknown NoAlarm             BC20N140BB 1000018432 004
   3  Ds3             Unknown NoAlarm             BC20N020BD 1000019714 000
   4  Ds1CellBearing  Unknown NoAlarm             YS20N060BB 1000016682 003
   5  Ds1CellBearing  Unknown NoAlarm             YS20N060BB 1000010823 003
   6  Ds1CircuitEm    Unknown NoAlarm             YS20N090CB 1000007027 000
   7  E1CellBearing   Unknown NoAlarm             BC20N460BA 1000017547 000
   8  E1CircuitEm     Unknown NoAlarm             BC20N490BA 1000017548 000
   9  E3              Unknown NoAlarm             BC20N220AB 1000010651 000
  10  MultiSerial     Unknown NoAlarm             YS20N070CB 1000007040 005
  11  Ethernet        Unknown NoAlarm             BC20N400BC 1000019818 000
  12  HighSpeed       Unknown NoAlarm             BC20N160BB 1000008392 000
  13  HighSpeed       Unknown NoAlarm             BC20N160BB 1000008505 000
  14  Oc3             Unknown NoAlarm             YS20N120BB 1000008781 004
  15  Cpu             Primary NoAlarm             YS20N200BB 1000009276 005
  16  Cpu             Standby NoAlarm             BC20N200BB 1000014959 005

 Update Equipment Display        Page Down       Go Back to Main Menu ->

Press RETURN to configure the equipment in slot 4.
```

Figure 47. Equipment Configuration Panel (DS1/T1–ATM Cell Bearing Module)

2 Select a DS1/T1 or an E1–ATM Cell Bearing Module on the list and press Return.

The DS1 Cell Bearing Configuration or the E1 Cell Bearing Configuration panel is displayed. See the following figure.

```
AC 120 DS1 Cell Bearing Configuration                               [AC 120 23 INCH]

 Slot: 04
Port Interface Type   Oper Status  Line Status
---- ---------------- ------------ ------------------------------------------------
   1 Unconfigured     Unconfigured NoAlarm
   2 Unconfigured     Unconfigured NoAlarm
   3 Unconfigured     Unconfigured NoAlarm
   4 Unconfigured     Unconfigured NoAlarm
   5 Unconfigured     Unconfigured NoAlarm
   6 Unconfigured     Unconfigured NoAlarm



                                         Bring All Interfaces Into Service
 Update Display                          Take All Interfaces Out Of Service
 Delete All Interfaces                   Go Back to Equipment Configuration ->

Press RETURN and enter a new slot number to configure a different module.
```

Figure 48. DS1 Cell Bearing Configuration Panel (E1 panel is similar)

The commands on this panel have the following functions:

Update Display	Updates the values in the fields to show the most current configuration. **Note:** Use this command mainly to display the most current information in the **Line Status** field.
Delete All Interfaces	Deletes the configured interfaces for all six ports (four ports on the E1 Module). The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields. **Note:** You must take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.
Bring All Interfaces Into Service	Brings the out-of-service configured interfaces for all six ports (four ports on the E1 Module) to in-service status. The value **InService** is displayed in the **Oper Status** field.
Take All Interfaces Out of Service	Takes the in-service configured interfaces for all six ports (four ports on the E1 Module) to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field. **Note:** You must use this command before using the **Delete All Interfaces** command.
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 Select one of the lines with the port you want to configure and press Return.

The DS1 or E1 Cell Bearing Port and Channel Configuration panel is displayed. See the following figure.

```
AC 120 DS1 Cell Bearing Port and Channel Configuration        [AC 120 23 INCH]

_Slot: 04__Port: 01__[Channel: 001]______Channel Configuration_________________
                                        |
 Line Type........ Esf                  | Interface Type..... Unconfigured
 Line Coding...... B8zs                 | [Oper Status]...... Unconfigured
 Loopback......... NoLoop               |
 Transmit Clock... LocalTiming          |
 Line Build Out... UpTo133Feet          |
                                        |
 [Line Status].... NoAlarm              |
                                        |
                                        |
                                        |_______________________________________
                                        |
                                        | Apply Port and Channel Configuration
                                        | Reset Port And Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | View Port Statistics ->
                                        | Go Back to Card Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 49. DS1 Cell Bearing Port and Channel Configuration Panel (E1 panel is similar)

The commands on this panel have the following functions:

Apply Port and Channel Configuration	For a specified port number value, applies the configuration field values you select. See *Table 18 on page 102*.
Reset Port and Channel Display	Resets the fields on this panel to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **Oper Status** field.
Take Interface Out of Service (displayed when the [Oper Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field.
Configure Interface→	Displays the ATM UNI Interface Configuration panel.
View Port Statistics→	Displays the DS1 or E1 Cell Bearing Port Statistics panel (*Figure 50 on page 104*).
Go Back to Card Configuration→	Redisplays the DS1 or E1 Cell Bearing Configuration panel (*Figure 48 on page 100*).

4 Select the values for the fields on this panel from the values given in *Table 18 on page 102* for DS1/T1 or *Table 19 on page 103* for E1.

Table 18. Field Value — DS1/T1 Cell Bearing Port and Channel Configuration Panel

Field Names	Values	Description
Line Type	Esf (default)	Extended Super Frame DS1
	D4	D4 format is not used for ATM cell bearing.
Line Coding	B8ZS (default)	Use of a specified pattern of normal bits and bipolar violations to replace sequence of 8 zero bits.
	Ami	Indicates zero code suppression.
Loopback	NoLoop (default)	Not in loopback state.
	LocalLoop	The received signal is looped back for retransmission after is has passed through the framing function.
	PayloadLoop	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
	LineLoop	The received signal at this interface does not go through the device but is looped back out.
Transmit Clock	LocalTiming (default)	Local clock source is used as the timing source.
	LoopTiming	Recovered receive clock is used as the transmit clock.
Line Build Out	Up To 133 Feet (default)	Indicates the DS1 signal is designed to be valid from 0 to 133 feet
	Up To 266 Feet	Indicates the DS1 signal is designed to be valid from 0 to 266 feet
	Up To 399 Feet	Indicates the DS1 signal is designed to be valid from 0 to 399 feet
	Up To 533 Feet	Indicates the DS1 signal is designed to be valid from 0 to 533 feet
	Up To 655 Feet	Indicates the DS1 signal is designed to be valid from 0 to 655 feet
	negative7-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 7.5 dB
	negative15Db	Indicates the T1 signal level range at which the DS1 is configured is negative 15 dB
	negative22-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 22.5 dB
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured (default)	This interface is not configured.
	AtmUni3-0	This interface is configured as a UNI 3.0 interface.
	AtmUni3-1	This interface is configured as a UNI 3.1 interface.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Oper Status] (display only)	Unconfigured	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.

Table 19. Field Value — E1 Cell Bearing Port and Channel Configuration Panel

Field Names	Values	Description
Line Type (display only)	Crc-mf	Cyclical redundancy check based on multi-frame alignment signals.
Line Coding (display only)	Hdb3	High density bipolar 3 (HDB3). A bipolar coding method that does not allow more than 3 consecutive zeros.
Loopback	NoLoop (default)	Not in loopback state.
	LocalLoop	The received signal is looped back for retransmission after it has passed through the framing function.
	LineLoop	Received signals at this interface do not go through the device but are looped back out.
Transmit Clock	LocalTiming	Local clock source is used as the timing source.
	LoopTiming	Recovered receive clock is used as the timing source.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured (default)	This interface is not configured.
	AtmUni3-0	This interface is configured as a UNI 3.0 interface.
	AtmUni3-1	This interface is configured as a UNI 3.1 interface.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Oper Status] (display only)	Unconfigured	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.

5 Select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

The ATM UNI Interface Configuration panel is displayed. See *"Configuring the ATM UNI Interface" on page 179* for instructions.

7 Repeat Steps 3–6 for the remainder of the ports as needed.

Note:
Whenever needed, use the commands on the DS1 or E1 Cell Bearing Configuration panel (*Figure 48 on page 100*) and on the DS1 or E1 Cell Bearing Port and Channel Configuration panel (*Figure 49 on page 101*) to manage the interfaces.

8 To view statistics for this port, select the **View Port Statistics** command and press Return.

The DS1 or E1 Cell Bearing Port Statistics panel is displayed. See *Figure 50 on page 104*.

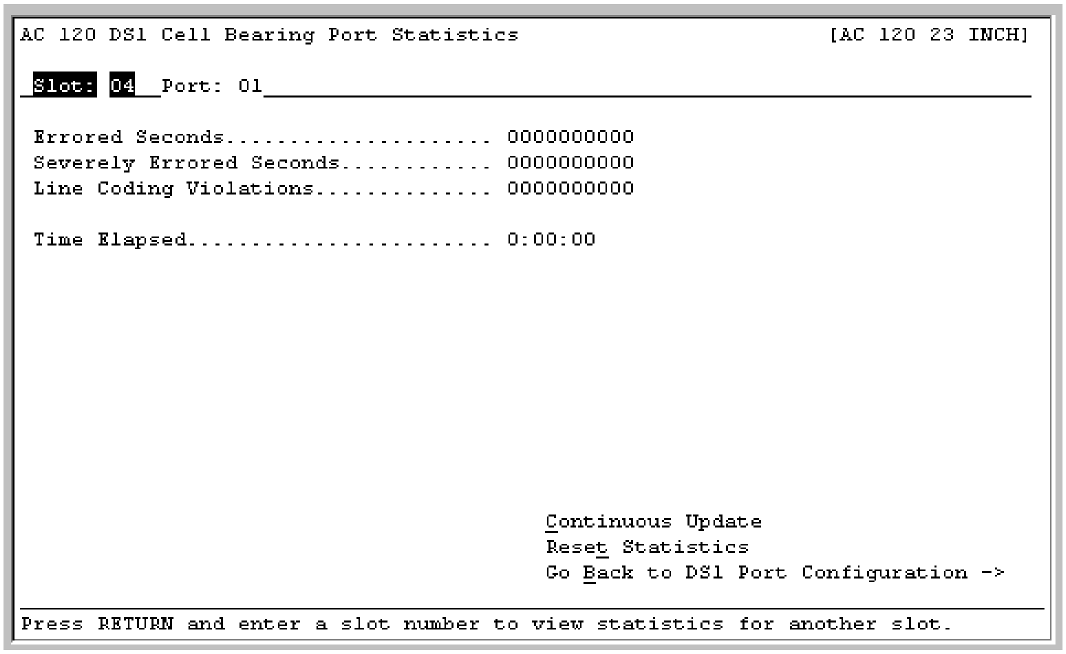


Figure 50. DS1 Cell Bearing Port Statistics Panel (E1 panel is similar)

The commands on this panel have the following functions:

Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to zero.
Go Back to DS1 Port Configuration→	Redisplays the DS1 or E1 Cell Bearing Port and Channel Configuration panel (*Figure 49 on page 101*).

9 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the DS1/T1 or E1–Circuit Emulation Module

Use the steps in the following procedure to configure the DS1/T1 or E1–Circuit Emulation Module ports. Start at the Console Interface Main Menu panel (*Figure 46 on page 99*).

➤ Procedure

To configure the DS1/T1 or E1–Circuit Emulation Module ports:

1 On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2 Select a DS1/T1 or E1–Circuit Emulation Module on the list and press Return.

The DS1 or E1 Circuit Emulation Configuration panel is displayed. See *Figure 51 on page 105*.

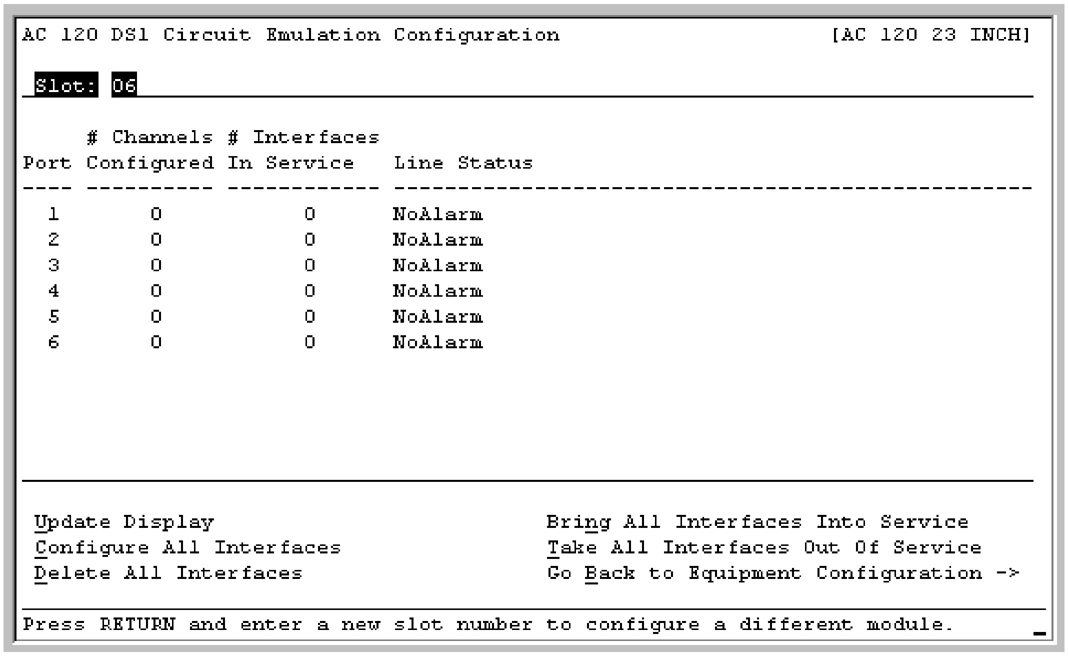


Figure 51. DS1 Circuit Emulation Configuration Panel (E1 panel is similar)

The commands on this panel have the following functions:

Update Display
Updates the values in the fields to show the most current configuration.

Note: Use this command mainly to display the most current information in the **Line Status** field.

Configure All Interfaces
Sets all six ports with 24 channels for the DS1 Module, or four ports with 30 channels for the E1 Module for each port to the circuit emulation type interface. The value **24** or **30** is displayed in the **# Channels Configured** field.

Delete All Interfaces
Deletes the configured interfaces for all of the ports (24 or 30 channels each). The value **0** is displayed in the **# Channels Configured** field.

Note: You must first take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.

Bring All Interfaces Into Service
Brings the out-of-service configured interfaces for all of the ports (24 channels each) to in-service status. The value **24** or **30** is displayed in the **# Interfaces In Service** field for all of the ports.

Take All Interfaces Out Of Service
Takes the in-service configured interfaces for all of the ports (24 or 30 channels each) to out-of-service status. The value **0** is displayed in the **# Interfaces In Service** field for all of the ports.

Note: You must use this command before using the **Delete All Interfaces** command.

Go Back to Equipment Configuration→
Redisplays the Equipment Configuration panel.

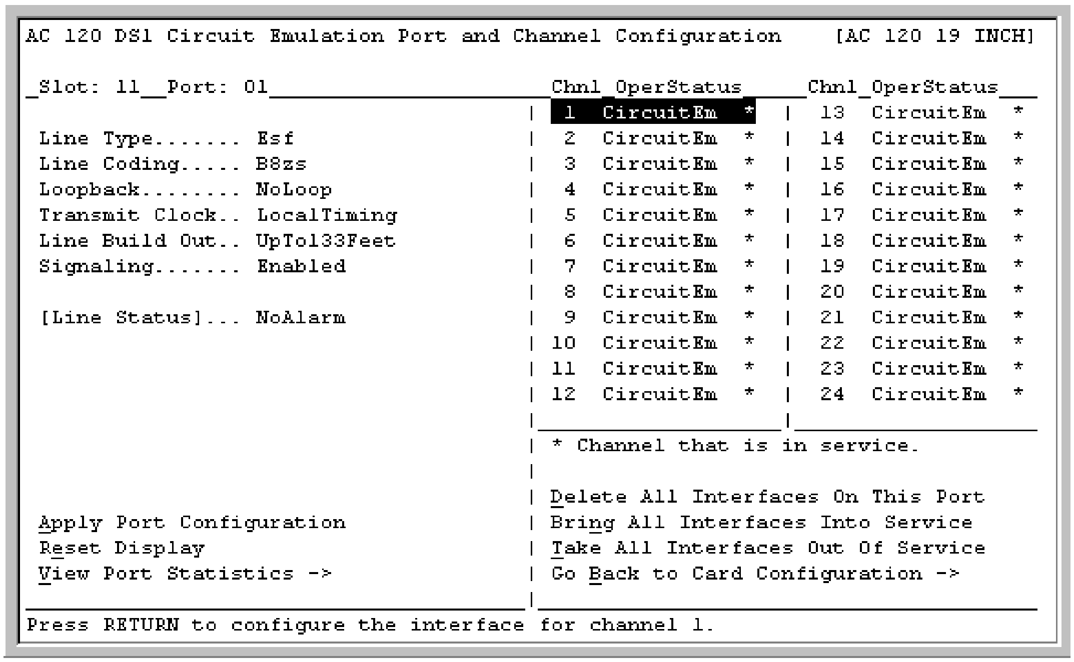
3 To configure the port fields:

a To configure all of the ports with the default port field values given in *Table on page 107*, select the **Configure All Interfaces** command and press Return.

The value **24** (DS1 Module) or **30** (E1 Module) is displayed in the **# Channels Configured** field for all of the ports.

b To configure one port at a time (to set port field values other than the default ones), select the line for the port you want to configure and press Return.

The DS1 or E1 Circuit Emulation Port and Channel Configuration panel is displayed. See the following figure.



```
AC 120 DS1 Circuit Emulation Port and Channel Configuration    [AC 120 19 INCH]

_Slot: 11__Port: 01______________________Chnl_OperStatus____Chnl_OperStatus___
                                       |  1  CircuitEm  *  |  13  CircuitEm  *
 Line Type....... Esf                  |  2  CircuitEm  *  |  14  CircuitEm  *
 Line Coding..... B8zs                 |  3  CircuitEm  *  |  15  CircuitEm  *
 Loopback........ NoLoop               |  4  CircuitEm  *  |  16  CircuitEm  *
 Transmit Clock.. LocalTiming          |  5  CircuitEm  *  |  17  CircuitEm  *
 Line Build Out.. UpTo133Feet          |  6  CircuitEm  *  |  18  CircuitEm  *
 Signaling....... Enabled              |  7  CircuitEm  *  |  19  CircuitEm  *
                                       |  8  CircuitEm  *  |  20  CircuitEm  *
 [Line Status]... NoAlarm              |  9  CircuitEm  *  |  21  CircuitEm  *
                                       | 10  CircuitEm  *  |  22  CircuitEm  *
                                       | 11  CircuitEm  *  |  23  CircuitEm  *
                                       | 12  CircuitEm  *  |  24  CircuitEm  *
                                       |___________________|__________________
                                       | * Channel that is in service.
                                       |
                                       | Delete All Interfaces On This Port
 Apply Port Configuration              | Bring All Interfaces Into Service
 Reset Display                         | Take All Interfaces Out Of Service
 View Port Statistics ->               | Go Back to Card Configuration ->
_______________________________________|______________________________________
Press RETURN to configure the interface for channel 1.
```

Figure 52. DS1 Circuit Emulation Port and Channel Configuration Panel (E1 panel is similar)

The commands on this panel have the following functions:

Apply Port Configuration	For a specified port number value, applies the port configuration field values you set. See *Table 20 on page 107*.
Reset Display	Resets the port configuration fields to the last set of saved values.
View Port Statistics→	Displays the DS1 Circuit Emulation Port Statistics panel (*Figure 54 on page 111*).
Configure All Interfaces On This Port (E1 Circuit Emulation Port and Channel panel only)	Sets all 24 channels to the circuit emulation type interface. The value **OutOfService** is displayed in the **OperStatus** field.

Delete All Interfaces On This Port Deletes all 24 configured interfaces and sets the channels to unconfigured status. The value **Unconfigured** is displayed in the **OperStatus** field.

Note: You must first take all channels that are in-service to out-of-service (using the **Take All Interfaces Out Of Service** command) before you can use this command.

Bring All Interfaces Into Service Brings the out-of-service configured interfaces for all 24 channels to in-service status. The value **InService** is displayed in the **OperStatus** field.

Note: You must first configure all interfaces (using the **Configure All Interfaces On This Port command**) before you can use this command.

Take All Interfaces Out Of Service Takes the in-service configured interfaces for all 24 channels to out-of-service status. The value **OutOfService** is displayed in the **OperStatus** field.

Note: You must use this command before using the **Delete All interfaces On This Port** command.

Go Back to Card Configuration→ Redisplays the DS1 or E1 Circuit Emulation Configuration panel (*Figure 51 on page 105*).

4 Select the values for the fields on this panel from the values given in *Table 20 on page 107* for DS1 or *Table 21 on page 108* for E1.

Table 20. Field Values – DS1 Circuit Emulation Port and Channel Configuration Panel

Field Name	Values	Description
Line Type	Esf (default)	Extended Super Frame DS1 format
	D4	D4 format
Line Coding	B8ZS (default)	Use of a specified pattern of normal bits and bipolar violations to replace sequence of 8 zero bits.
	Ami	Indicates zero code suppression.
Loopback	No Loop (default)	Not in loopback state.
	LocalLoop	The received signal is looped back for retransmission after it has passed through the framing function.
	PayloadLoop	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
	LineLoop	The received signal at this interface does not go through the device but is looped back out.
Transmit Clock	LocalTiming (default)	Local clock source is used as timing source.
	LoopTiming	Recovered receive clock is used as transmit clock.

Table 20. Field Values – DS1 Circuit Emulation Port and Channel Configuration Panel (continued)

Field Name	Values	Description
Line Build Out	Up To 133 Feet (default)	Indicates the DS1 signal is designed to be valid from 0 to 133 feet.
	Up To 266 Feet	Indicates the DS1 signal is designed to be valid from 134 to 266 feet.
	Up To 399 Feet	Indicates the DS1 signal is designed to be valid from 267 to 399 feet.
	Up To 533 Feet	Indicates the DS1 signal is designed to be valid from 400 to 533 feet.
	Up To 655 Feet	Indicates the DS1 signal is designed to be valid from 534 to 655 feet.
	negative7-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 7.5 dB.
	negative15Db	Indicates the T1 signal level range at which the DS1 is configured is negative 15 dB.
	negative22-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 22.5 dB.
Signaling	Disabled (default)	Indicates that channel associated signaling is disabled (also know as clear channel signaling). Use this default value for the circuit emulation interface.
	Enabled	Indicates that channel associated signaling is enabled. Use this value for the dynamic bandwidth circuit emulation interface.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
OperStatus (display only)	Unconfigured (default)	Channel is not operational because the interface is not configured.
	InService	Channel is capable of receiving and sending signals.
	OutOfService	Channel is not capable of receiving and sending signals.

Table 21. Field Values – E1 Circuit Emulation Port and Channel Configuration Panel

Field Name	Values	Description
Line Type (display only)	Crc-mf	Cyclical redundancy clock based on multi-frame calculations (CRC-MF).
Line Coding	Hdb3	High-density bipolar 3 (HDB3). A bipolar coding method that does not allow more than 3 consecutive zeros.
Loopback	No Loop (default)	Not in loopback state
	LocalLoop	The received signal is looped back for retransmission after it has passed through the framing function.
	LineLoop	Indicates that received signals at this interface do not go through the device but are looped back out.
Transmit Clock	LocalTiming (default)	Local clock source is used as timing source.
	LoopTiming	Recovered receive clock is used as transmit clock.

Table 21. Field Values – E1 Circuit Emulation Port and Channel Configuration Panel

Field Name	Values	Description
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
OperStatus (display only)	Unconfigured (default)	Channel is not operational because the interface is not configured.
	InService	Channel is capable of receiving and sending signals.
	OutOfService	Channel is not capable of receiving and sending signals.

5 To apply the values for the port fields, select the **Apply Port Configuration** command and press Return.

a To continue with configuration of the DS1/T1 Circuit Emulation module, go to *"DS1/T1–Circuit Emulation Channel Configuration" on page 109*."

b To continue with configuration of the E1 Circuit Emulation module, go to *"E1–Circuit Emulation Channel Configuration" on page 110*.

DS1/T1–Circuit Emulation Channel Configuration

To configure channels on the DS1/T1–Circuit Emulation module, do the following:

1 On the DS1 Circuit Emulation Port and Channel Configuration panel (see *Figure 52 on page 106*), select the line for the channel you want to configure and press Return.

The DS1 Circuit Emulation Channel Configuration panel is displayed.

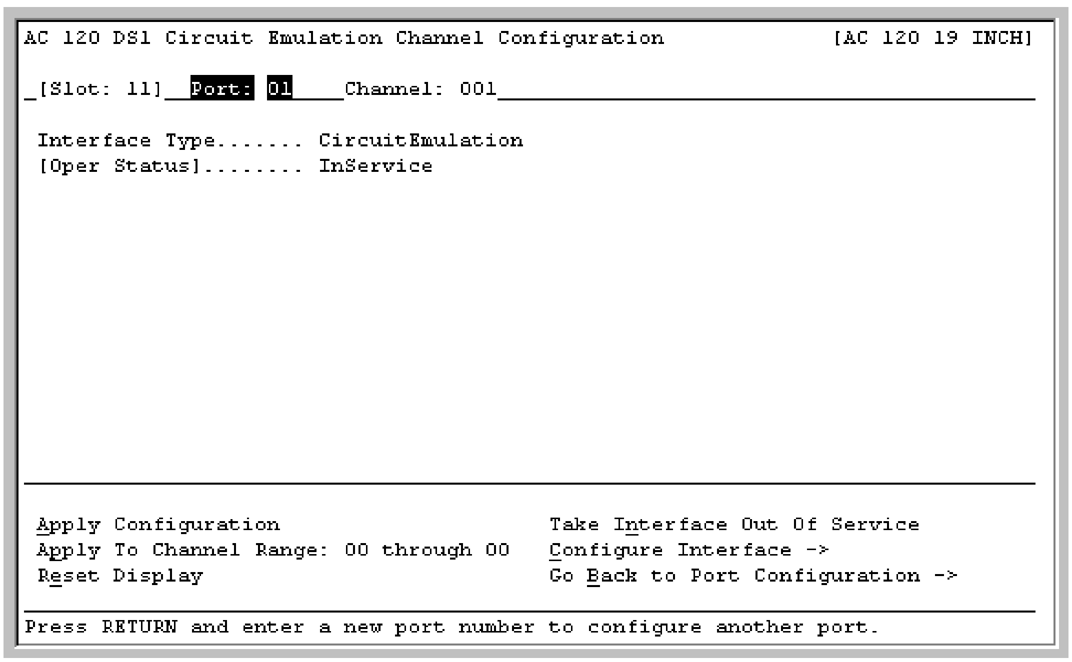


Figure 53. DS1 Circuit Emulation Channel Configuration Panel

The commands on this panel have the following functions:

Apply Configuration	Applies the port configuration field values you selected (see *Table 20 on page 107*).
Apply to Channel Range: 00 through 00	Enter the first and last numbers of the range of channels you want to configure.
Reset Display	Resets interface type to the last applied value.
Bring Interface Into Service	Brings the out-of-service configured interfaces for the channel to in-service status. The value **InService** is displayed in the **OperStatus** field
Configure Interface→	Displays the Circuit Emulation Interface Configuration panel (see *Figure 102 on page 181*) or the Dynamic Bandwidth Circuit Emulation Interface panel (see *Figure 103 on page 182*).
Go Back to Port Configuration→	Redisplays the DS1 Circuit Emulation Port and Channel Configuration panel.

2 Select the **Interface Type** field and select the value **CircuitEmulation** or **DbCirEm** (dynamic bandwidth circuit emulation).

3 Select the **Apply to Channel Range: 00 through 00** command and enter the first and last numbers of the range of channels you want to configure.

4 Select the **Apply Configuration** command and press Return.

   The Circuit Emulation Interface Configuration panel is displayed. See *"Configuring the Circuit Emulation Interface" on page 181* for instructions.

5 Select the **Configure Interface** command and press Return.

   One of the following interface configuration panels is displayed:

   - Circuit Emulation Interface Configuration panel (see *Figure 102 on page 181*)
   - Dynamic Bandwidth Circuit Emulation Interface panel (see *Figure 103 on page 182*)

6 Repeat steps 1–5 for as many of the ports and channels as needed.

E1–Circuit Emulation Channel Configuration

To configure channels on the E1–Circuit Emulation module, do the following:

1 To configure channels, do one of the following on the E1 Circuit Emulation Port and Channel Configuration panel:

   a To configure all 30 channels for a port to the circuit emulation type interface, select the **Configure All Interfaces On This Port** command and press Return.

      The value **OutOfService** is displayed in the **OperStatus** field for all the channels.

   b To configure one channel at a time, select the line for the channel you want to configure and press Return.

      The following message is displayed:

      ```
      Unconfigured channel. Automatically configure it to
      circuit emulation? (y/n)
      ```

      Press the y key (to indicate yes).

      The Circuit Emulation Interface Configuration panel is displayed. See *"Configuring the Circuit Emulation Interface" on page 181* for instructions.

2 Repeat step 1.a or 1.b for as many of the ports and channels as needed.

Note:
Whenever needed, use the commands on the DS1 or E1 Circuit Emulation Configuration panel (see *Figure 51 on page 105*), and on the DS1 or E1 Circuit Emulation Port and Channel Configuration panel (see *Figure 52 on page 106*) to manage the interfaces.

3 Save the values permanently to the AC 60/120 system database now, or before you exit the current session of the system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Note:
Saving your configuration data frequently is highly recommended, so that you can minimize the possibility of losing data due to unforeseen access interruptions, and save yourself time.

Port Statistics

➤ Procedure

To view statistics for this port:

1 Select the **View Port Statistics** command and press Return.

Either the DS1 Circuit Emulation Port Statistics panel (see *Figure 54 on page 111*) or the E1 Circuit Emulation Port Statistics panel is displayed.

Note:
The Port Statistics panels for the DS1/T1 and the E1–Circuit Emulation modules are the same except for the title of the panel.

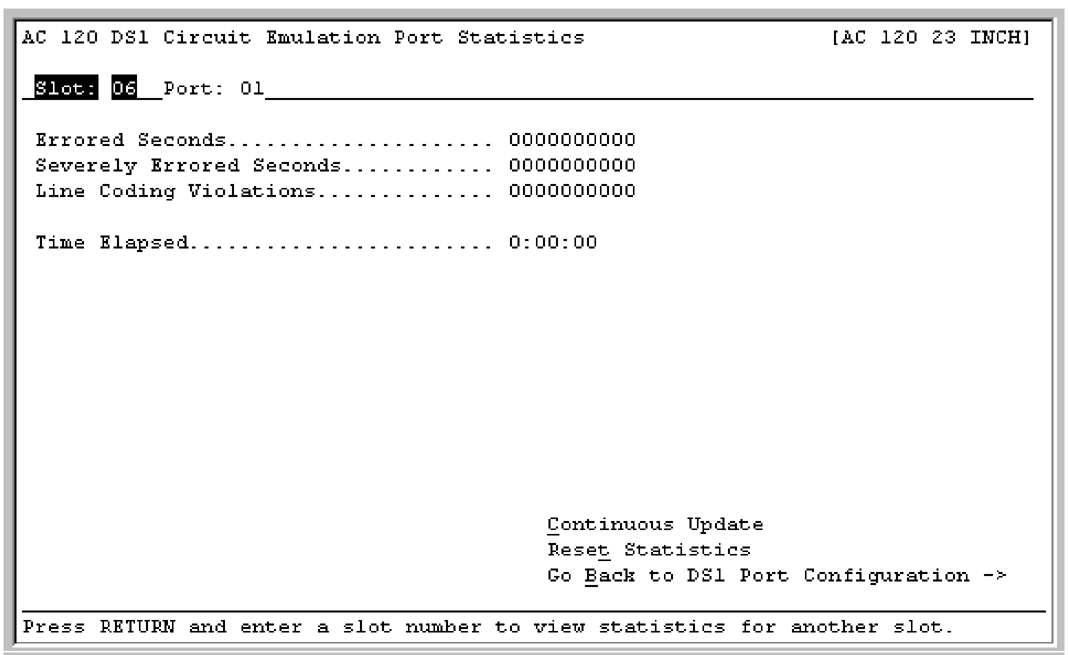


Figure 54. DS1 Circuit Emulation Port Statistics Panel (E1 panel is similar)

The commands on this panel have the following functions:

Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to zero.
Go Back to DS1 Port Configuration→	Redisplays the DS1 or E1 Circuit Emulation Port and Channel Configuration panel (see *Figure 52 on page 106*).

Configuring the Enhanced DS1/T1 and Enhanced E1 Modules

You must first configure the Enhanced DS1/T1 or the Enhanced E1 module before you can set up connection provisioning. These modules have three types of LED indicators. See the following figure.

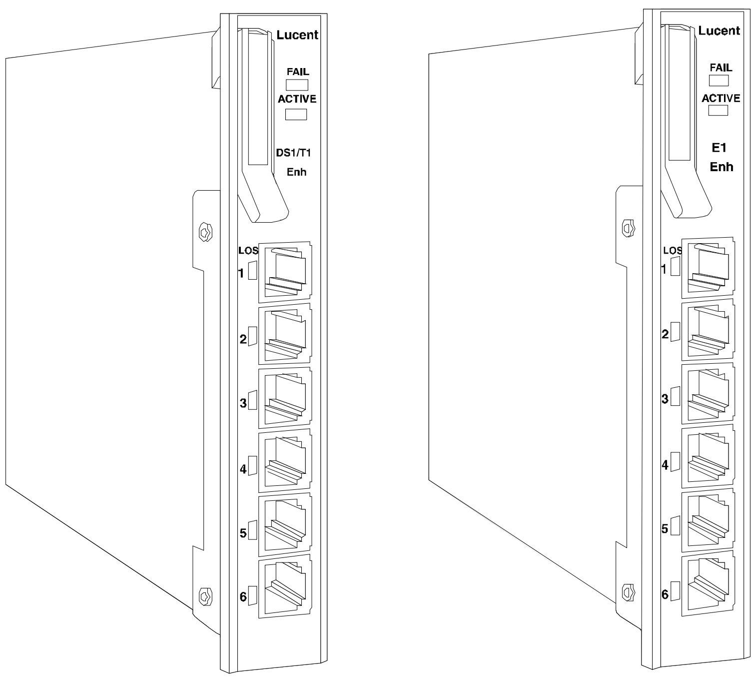


Figure 55. Enhanced DS1/T1 and Enhanced E1 Modules

The status indicators on the Enhanced DS1/T1 and the Enhanced E1 modules are described in the following table.

Table 22. Status Indicators for the Enhanced DS1/T1 and the Enhanced E1 Modules

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing.

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the Enhanced DS1/T1 or the Enhanced E1 Module ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. On the Equipment Configuration panel, select an Enhanced DS1 or an Enhanced E1 Module in the list and press Return.

   Either the Enhanced DS1 Configuration panel or the Enhanced E1 Configuration panel is displayed.

   Figure 56 on page 114 displays the Enhanced DS1 Configuration panel. The Enhanced E1 Configuration panel is similar.

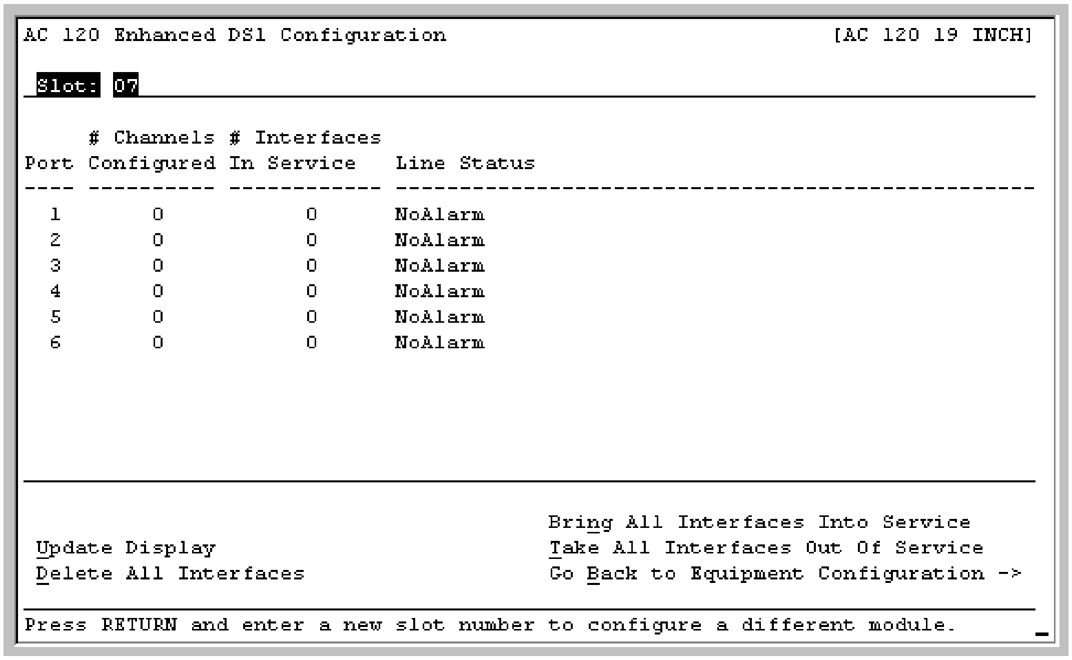


Figure 56. Enhanced DS1 Configuration Panel (Enhanced E1 is similar)

The commands on these panels have the following functions:

Update Display — Updates the values in the fields to show the most current configuration.

Note: Use this command mostly to display the most current information in the **Line Status** field.

Delete All Interfaces — Deletes the configured interfaces for all the ports. The value **0** is displayed in the **# Channels Configured** field.

Note: You must first take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.

Bring All Interfaces Into Service — Brings the out-of-service configured interfaces for all the ports to in-service status. The number of interfaces in service is displayed in the **# Interfaces In Service** field for all the ports.

Take All Interfaces Out Of Service — Takes the in-service configured interfaces for all the ports to out-of-service status. The value **0** is displayed in the **# Interfaces In Service** field for all six ports.

Note: You must use this command first before using the **Delete All Interfaces** command.

Go Back to Equipment Configuration→ — Redisplays the Equipment Configuration panel.

3 Select one of the lines with the port you want to configure and press Return.

Either the Enhanced DS1 Port and Channel Configuration panel (see *Figure 57 on page 115*) or the Enhanced E1 Port and Channel Configuration panel (see *Figure 58 on page 115*) is displayed.

```
AC 120 Enhanced DS1 Port and Channel Configuration          [YourSiteName]

_Slot: 03__Port: 02______________________Chnl_OperStatus_____Chnl_OperStatus___
                                        | 1  Unconfigured   |13  Unconfigured
 Line Type....... Esf                   | 2  Unconfigured   |14  Unconfigured
 Line Coding..... B8zs                  | 3  Unconfigured   |15  Unconfigured
 Loopback........ NoLoop                | 4  Unconfigured   |16  Unconfigured
 Transmit Clock.. LocalTiming           | 5  Unconfigured   |17  Unconfigured
 Line Build Out.. UpTo133Feet           | 6  Unconfigured   |18  Unconfigured
 Channelization.. Enabled               | 7  Unconfigured   |19  Unconfigured
                                        | 8  Unconfigured   |20  Unconfigured
 [Line Status]... LossOfSignal          | 9  Unconfigured   |21  Unconfigured
                                        |10  Unconfigured   |22  Unconfigured
                                        |11  Unconfigured   |23  Unconfigured
                                        |12  Unconfigured   |24  Unconfigured
                                        |___________________|___________________
                                        | * Channel that is in service.
                                        |
 Show Straps ->                         | Delete All Interfaces On This Port
 Apply Port Configuration               | Bring All Interfaces Into Service
 Reset Display                          | Take All Interfaces Out Of Service
 View Port Statistics ->                | Go Back to Card Configuration ->
________________________________________|_______________________________________
Channelization enabled allows the port to be split into 24 DS0 channels.
```

Figure 57. Enhanced DS1 Port and Channel Configuration Panel

```
AC 120 Enhanced E1 Port and Channel Configuration           [YourSiteName]

_Slot: 13__Port: 01________________Chnl_Status____Chnl_Status____Chnl_Status___
                                  | 0--NotForUse |12  Unconfig  |24  Unconfig
 Loopback........ NoLoop          | 1  Unconfig  |13  Unconfig  |25  Unconfig
 Transmit Clock.. LocalTiming     | 2  Unconfig  |14  Unconfig  |26  Unconfig
 Channelization.. Enabled         | 3  Unconfig  |15  Unconfig  |27  Unconfig
 [Line Type]..... Crc-mf          | 4  Unconfig  |16--NotForUse |28  Unconfig
 [Line Coding]... Hdb3            | 5  Unconfig  |17  Unconfig  |29  Unconfig
 [Line Status]... NoAlarm         | 6  Unconfig  |18  Unconfig  |30  Unconfig
                                  | 7  Unconfig  |19  Unconfig  |31  Unconfig
                                  | 8  Unconfig  |20  Unconfig  |
                                  | 9  Unconfig  |21  Unconfig  |
                                  |10  Unconfig  |22  Unconfig  |
                                  |11  Unconfig  |23  Unconfig  |
                                  |______________|______________|______________
                                  | * Channel that is in service
                                  |
 Show Straps ->                   | Delete All Interfaces On This Port
 Apply Port Configuration         | Bring All Interfaces Into Service
 Reset Display                    | Take All Interfaces Out Of Service
 View Port Statistics ->          | Go Back to Card Configuration ->
__________________________________|_____________________________________________
The port configuration has been applied.
```

Figure 58. Enhanced E1 Port and Channel Configuration Panel

The commands on these Port and Channel Configuration panels have the following functions:

Show Straps→	Displays the Enhanced DS1 DS0s Strap Display panel (see *Figure 63 on page 123*) or the Enhanced E1 DS0s Strap Display panel (see *Figure 64 on page 123*).
Apply Port Configuration	For a specified port number value, applies the port configuration field values you set (see *Table 23 on page 117*).
Reset Display	Resets the port configuration fields to the last set of saved values.
View Port Statistics→	Displays the Enhanced DS1 Port Statistics panel or the Enhanced E1 Port Statistics panel (see *Figure 65 on page 124*).
Delete All Interfaces On This Port	Deletes the configured interface and sets the channel to unconfigured status. The value **Unconfigured** is displayed in the **Chnl Status** field. **Note:** You must first take the interface that is in-service to out-of-service (using the **Take All Interfaces Out Of Service** command) before you can use this command.
Bring All Interfaces Into Service	Brings the out-of-service configured interface for the channel to in-service status. An asterisk is displayed beside all the configured channels indicating that they are in service. **Note:** You must first configure the interface before you can use this command.
Take All Interfaces Out Of Service	Takes the in-service configured interface to out-of-service status. The displayed asterisk is removed from all configured channels indicating that they are out of service. **Note:** You must use this command first before using the **Delete All interfaces On This Port** command.
Go Back to Card Configuration→	Redisplays the Enhanced DS1 Configuration panel or the Enhanced E1 Configuration panel.

4 Select the values for the fields on the Port and Channel Configuration panels from the values given in *Table 23 on page 117*.

Table 23. Field Values – Enhanced DS1 and Enhanced E1 Port and Channel Configuration Panels

Field Name	Values	Description
Line Coding **Note:** Enhanced DS1 Module	B8ZS (default)	Use of a specified pattern of normal bits and bipolar violations to replace sequence of 8 zero bits.
[Line Coding] (display only) **Note:** Enhanced E1 Module	Ami	Indicates zero code suppression.
	Hdb3	High density bipolar 3 (HDB3). A bipolar coding method that does no allow more than 3 consecutive zeros.
Line Build Out **Note:** Enhanced DS1 Module	UpTo 133 Feet (default)	Indicates the DS1 signal is designed to be valid from 0 to 133 feet
	Up To 266 Feet	Indicates the DS1 signal is designed to be valid from 134 to 266 feet
	Up To 399 Feet	Indicates the DS1 signal is designed to be valid from 267 to 399 feet
	Up To 533 Feet	Indicates the DS1 signal is designed to be valid from 400 to 533 feet
	Up To 655 Feet	Indicates the DS1 signal is designed to be valid from 534 to 655 feet
	negative7-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 7.5 dB
	negative15Db	Indicates the T1 signal level range at which the DS1 is configured is negative 15 dB
	negative22-5Db	Indicates the T1 signal level range at which the DS1 is configured is negative 22.5 dB
[LineType] (display only) **Note:** Enhanced E1 Module	Crc-mf	Cyclical redundancy check based on multi-frame alignment signals.
Line Type **Note:** Enhanced DS1 Module	Esf (default)	Extended Super Frame DS1 format.
	D4	D4 format.
Loopback	NoLoop (default)	Not in loopback state.
	LocalLoop	The received data from the network will be replaced by the transmitted data.
	LineLoop	Indicates that received signals at this interface do not go through the device but are looped back out.
	PayloadLoop **Note:** Enhanced DS1 Module	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
Transmit Clock	LocalTiming (default)	Local clock source is used as the timing source.
	LoopTiming	Recovered receive clock is used as the transmit clock

Table 23. Field Values – Enhanced DS1 and Enhanced E1 Port and Channel Configuration Panels (continued)

Field Name	**Values**	**Description**
Channelization	Disabled (default)	The division of the T1 line into 24 channels for the Enhanced DS1 module or 31 channels for the Enhanced E1 module is disabled. Use this setting if you do not want to set up channels for the port. When you apply the port configuration, only channel 1 displays the value **Unconfigured**.
	Enabled	The division of the T1 line into 24 channels for the Enhanced DS1 module and 30 channels for the Enhanced E1 module is enabled. Use this setting if you want to bundle or strap together several channels at one time. When you apply the port configuration, all 24 channels or all 31 channels are displayed with the value **Unconfigured**.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
OperStatus (display only)	Unconfigured (default)	This port is not operational because the interface is not configured.
	• FrameRelay Uni • FrameRelay Nni • HldcPassThru • CircuitEmulation (Enhanced DS1 Module only)	When the interface for the port is configured with one of the four interface types, the interface type is displayed in this field. An asterisk beside the interface type indicates that the interface is in service.

5 To apply the values for the port fields, select the **Apply Port Configuration** command and press Return.

6 To configure channels, do one of the following:

a To configure the port as one channel, you must have selected the value **Disabled** in the **Channelization** field. Continue with instructions in *"Configuring a Port with One Channel" on page 119*.

b To configure several ports strapped together, you must have selected the value **Enabled** in the **Channelization** field. Continue with instructions in *"Configuring a Port with Several Channels" on page 121*.

Configuring a Port with One Channel

Perform this procedure after you have completed the steps from Page *113* through Page *118*.

➤ Procedure

To configure one or more ports on the Enhanced DS1/T1 or the Enhanced E1 module with only one channel for a port:

1 Select **Chnl 1 Unconfigured** on the Enhanced DS1 Port and Channel Configuration panel (see *Figure 57 on page 115*) or on the Enhanced E1 Port and Channel Configuration panel (see *Figure 58 on page 115*), and press Return.

The Enhanced DS1 Channel Configuration panel (see *Figure 59 on page 119*) or the Enhanced E1 Channel Configuration (see *Figure 60 on page 120*) is displayed.

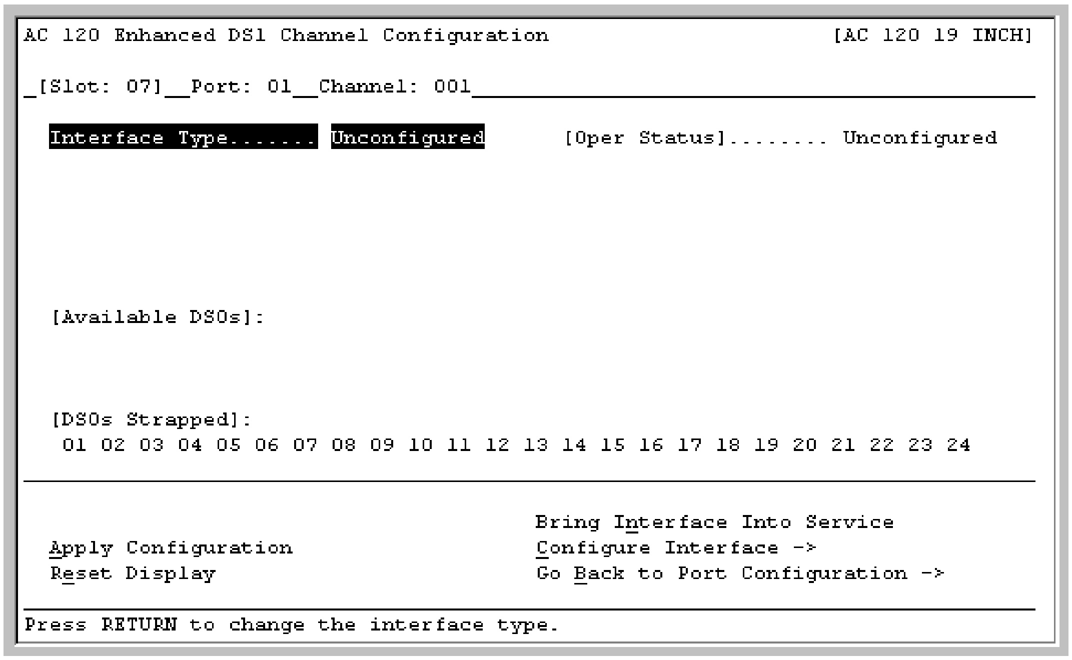


Figure 59. Enhanced DS1 Channel Configuration Panel (One Channel per Port)

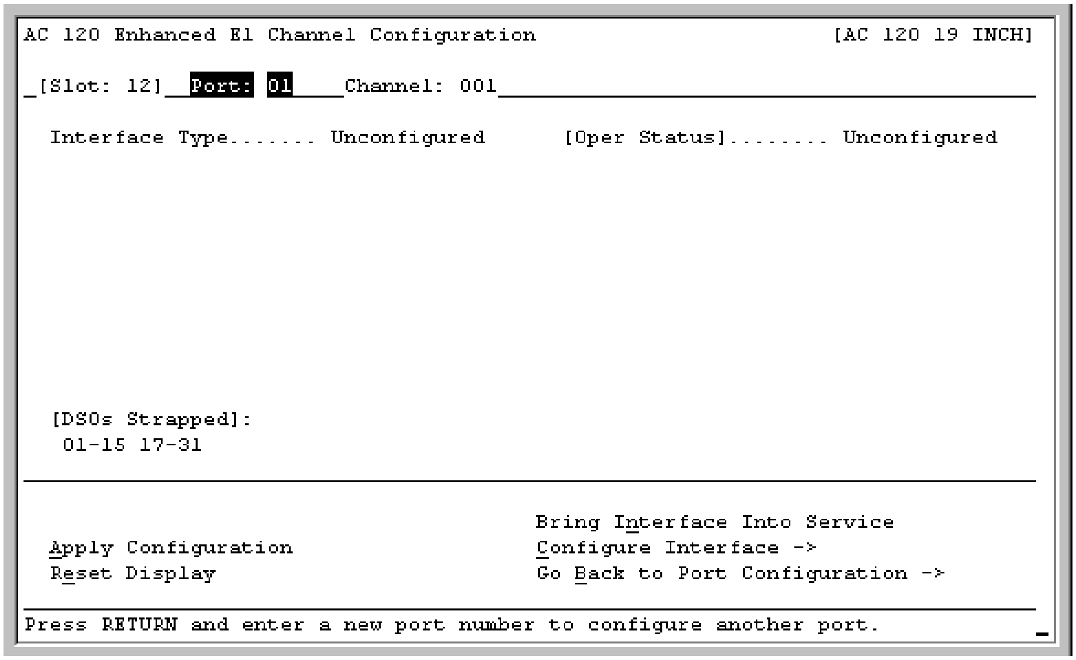


Figure 60. Enhanced E1 Channel Configuration Panel (One Channel per Port)

2 In the **Interface Type** field, select one of the following types of interface types: **CircuitEmulation** (Enhanced DS1 module only), **FrameRelayUni**, **FrameRelayNni**, or **HdlcPassThrough**. Press Return.

If you select **CircuitEmulation** (for the Enhanced DS1 module) as the interface type, the **Signaling** field is displayed. In the Signaling field, select either **Disabled** (default) or **Enabled**, and press Return.

3 Select the **Apply Configuration** command and press Return.

One of the following interface configuration panels is displayed:

- Circuit Emulation Interface Configuration panel (see *"Configuring the Circuit Emulation Interface" on page 181*) (Enhanced DS1 module only)
- Frame Relay Interface Configuration panel (see *"Configuring the Frame Relay Interface" on page 184*)
- HDLC Pass Through Interface Configuration panel (see *"Configuring the HDLC Pass Through Interface" on page 186*)

4 Repeat Step 3 on Page *101* through Step 6 on Page *118* for the Enhanced DS1 (or the Enhanced E1) Port and Channel Configuration panel, and Steps 1 through 3 in this section for the remainder of the ports, as needed. Be sure to complete the module port and channel configuration and then the interface configuration for each port before beginning the configuration of a new port.

5 Save the values permanently to the system database now, or before you exit the current session of the system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

6 To view statistics for this port, go to Step 9 on Page *123*.

Configuring a Port with Several Channels

To configure one or more ports on the Enhanced DS1/T1 or the Enhanced E1 module with several channels strapped together for a port, continue from Step 6 on Page *118* and use the following procedure:

1. Select **Chnl 1 Unconfigured** on the Enhanced DS1 Port and Channel Configuration panel (see *Figure 57 on page 115*) or on the Enhanced E1 Port and Channel Configuration panel (see *Figure 58 on page 115*), and press Return.

   The Enhanced DS1 Channel Configuration panel (see *Figure 61 on page 121*) or the Enhanced E1 Channel Configuration (see *Figure 62 on page 122*) is displayed.

```
AC 120 Enhanced DS1 Channel Configuration                         [YourSiteName]

_[Slot: 03]__Port: 01__Channel: 001____________________________________________

  Interface Type....... Unconfigured      [Oper Status]........ Unconfigured






  [Available DS0s]:
  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
   X

  [DS0s Strapped]:
   01
_______________________________________________________________________________

                                       Bring Interface Into Service
  Apply Configuration                  Configure Interface ->
  Reset Display                        Go Back to Port Configuration ->
_______________________________________________________________________________
Press RETURN and enter a new port number to configure another port.           _
```

Figure 61. Enhanced DS1 Channel Configuration Panel (Several Channels per Port)

```
AC 120 Enhanced E1 Channel Configuration                          [YourSiteName]

_[Slot: 13]__Port: 01____Channel: 001__________________________________________

  Interface Type....... Unconfigured      [Oper Status]........ Unconfigured



  [Available DS0s]:
  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 17 18 19 20 21 22 23 24 25
   X
  26 27 28 29 30 31


  [DS0s Strapped]:
   01
_______________________________________________________________________________

                                        Bring Interface Into Service
  Apply Configuration                   Configure Interface ->
  Reset Display                         Go Back to Port Configuration ->
_______________________________________________________________________________
Press RETURN and enter a new port number to configure another port.          _
```

Figure 62. Enhanced E1 Channel Configuration (Several Channels per Port)

2 In the **Interface Type** field, select one of the following types of interface types: **CircuitEmulation** (Enhanced DS1 module only), **FrameRelayUni**, **FrameRelayNni**, or **HdlcPassThrough**. Press Return.

If you select **CircuitEmulation** (for the Enhanced DS1 module) as the interface type, the **Signaling** field is displayed. In the **Signaling** field, do not change the value **Disabled** (default).

3 In the **[Available DS0s]** field, move the cursor to value **01** (indicates DS0 1) and leave the **x** below DS0 **01**.

4 Move the cursor to the next DS0 value and press Return to display **x** below the DS0 value. Select as many DS0s as you want to strap together for the selected channel.

5 Select the **Apply Configuration** command and press Return.

In the **[DS0s Strapped]** field (display only), the values for the DS0s you just selected are displayed. This first group of strapped DS0s are now shown as Channel 1 on the Port and Channel Configuration panel, which you can view at any time.

6 To strap together more DS0s for another channel in the selected port, reselect the **Channel** field and enter the next channel number, for example, 002.

7 Repeat Steps 2 through 6 of this section, for the rest of the available DS0s (or as many as you want to use).

8 To view the strapped DS0s and their associated channels at any time, select the **Show Straps** command on the Port and Channel Configuration panels (see *Figure 57 on page 115* and *Figure 58 on page 115*).

The Enhanced DS1 DS0s Strap Display panel (see *Figure 63 on page 123*) or the Enhanced E1 DS0s Strap panel (see *Figure 64 on page 123*) is displayed.

```
AC 120 Enhanced DS1 DS0s Strap Display                          [YourSiteName]

_[Slot: 03]__Port: 02__________________________________________________________

 Ch DS0s                                      Ch DS0s
--- --------------------------------------- -----------------------------------
  1 01                                       |13 13
  2 02                                       |14 14
  3 03                                       |15 15
  4 04                                       |16 16
  5 05                                       |17 17
  6 06                                       |18 18
  7 07                                       |19 19
  8 08                                       |20 20
  9 09                                       |21 21
 10 10                                       |22 22
 11 11                                       |23 23
 12 12                                       |24 24
_____________________________________________|_________________________________

  Update Display                              Go Back to DS1 Port Configuration ->

_______________________________________________________________________________
Press RETURN and enter a new port number to configure another port.           _
```

Figure 63. Enhanced DS1 DS0s Strap Display Panel

```
AC 120 Enhanced E1 DS0s Strap Display                           [YourSiteName]

_[Slot: 13]__Port: 01__________________________________________________________

 Ch DS0s                    Ch DS0s                    Ch DS0s
 -- ------------------------- ------------------------- -------------------------
  1 01                    | 15 15                    | 30 30
  2 02                    | 17 17                    | 31 31
  3 03                    | 18 18                    |
  4 04                    | 19 19                    |
  5 05                    | 20 20                    |
  6 06                    | 21 21                    |
  7 07                    | 22 22                    |
  8 08                    | 23 23                    |
  9 09                    | 24 24                    |
 10 10                    | 25 25                    |
 11 11                    | 26 26                    |
 12 12                    | 27 27                    |
 13 13                    | 28 28                    |
 14 14                    | 29 29                    |
_______________________________________________________________________________
  Update Display                              Go Back to E1 Port Configuration ->
_______________________________________________________________________________
Press RETURN and enter a new port number to configure another port.           _
```

Figure 64. Enhanced E1 DS0s Strap Display Panel

Note:
The strapped DS0s you set up are displayed next to their associated channels.

9 To view statistics for this port, select the **View Port Statistics** command on the Port and Channel Configuration panel (see *Figure 57 on page 115* and *Figure 58 on page 115*) and press Return.

The Port Statistics panel (see *Figure 65 on page 124*) is displayed.

Note:
The port statistics panels for the Enhanced DS1 and the Enhanced E1 are the same except for the title of the panel.

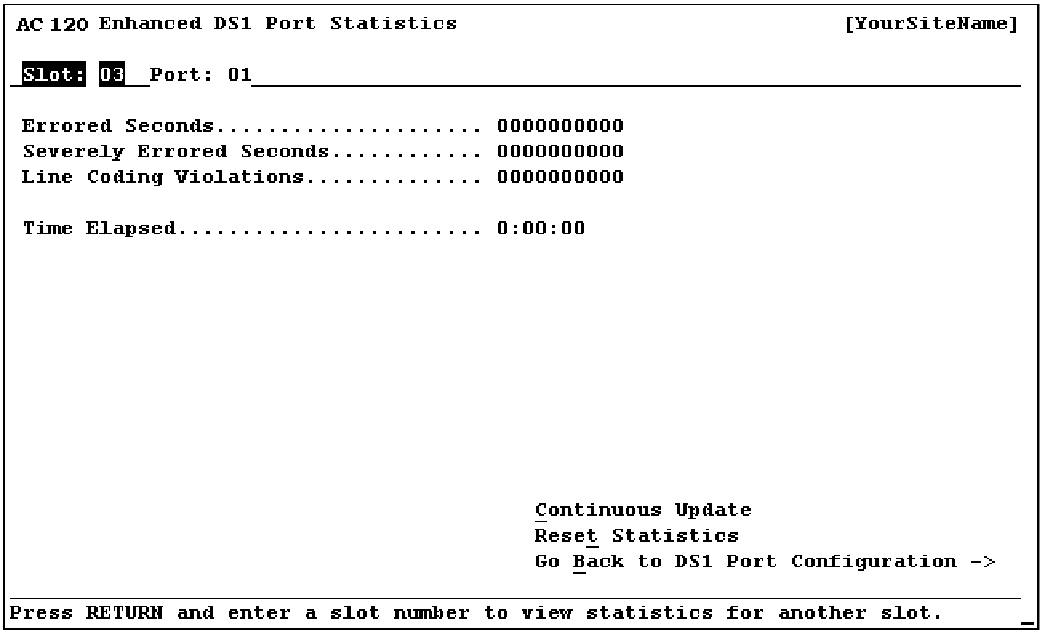


Figure 65. Enhanced DS1 Port Statistics Panel

10 Save the values permanently to the system database now, or before you exit the current session of the system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the DS3 and E3 Modules

You must first configure the DS3 or E3 Module before you can set up connection provisioning. These modules have three types of LED indicators. See *Figure 66 on page 125*.

Note:
This subsection documents the DS3 and E3 Modules together, since they are similar.

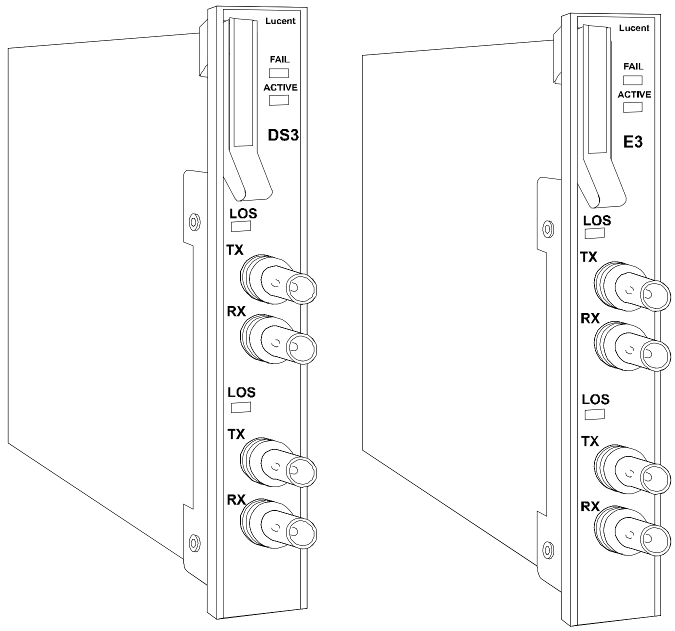


Figure 66. DS3 and E3 Modules

The status indicators on the DS3 and E3 Modules are described in the following table.

Table 24. Status Indicators for the DS3 and E3 Modules

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing

[1] After initial power-on and system start-up is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2] After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the DS3 or E3 Module ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*) select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2 Select a DS3 or E3 Module in the list and press Return.

The DS3 or E3 Configuration panel is displayed. See the following figure.

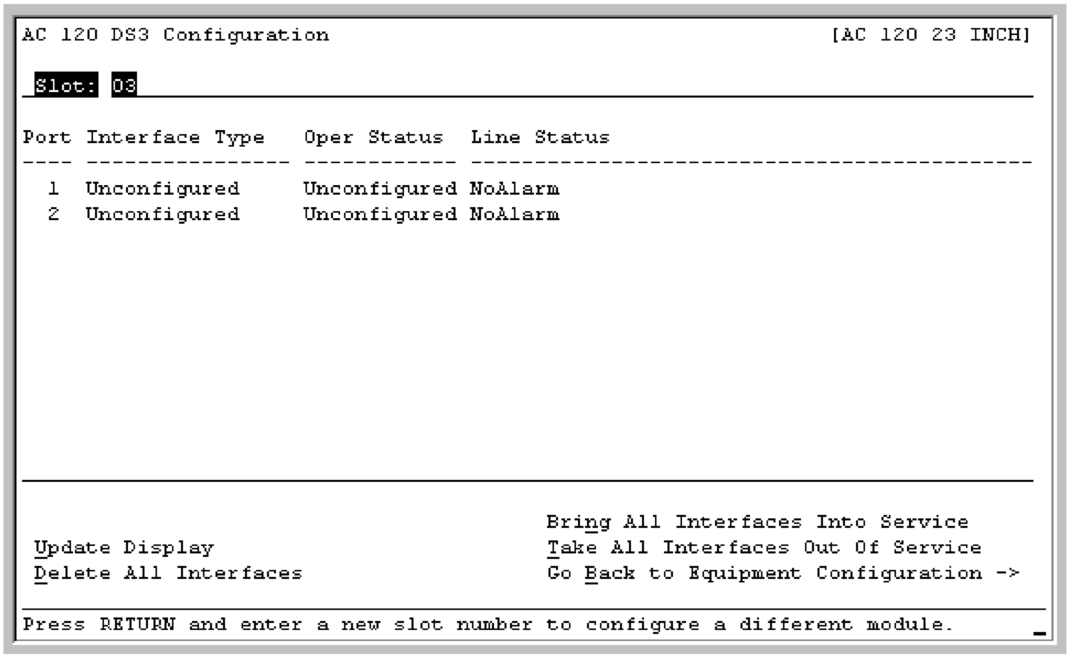


Figure 67. DS3 Configuration Panel (E3 panel is similar)

The commands on this panel have the following functions:

Update Display — Updates the values in the fields to show the most current configuration.

Note: Use this command mainly to display the most current information in the **Line Status** field.

Delete All Interfaces — Deletes the configured interfaces for the two ports. The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields.

Note: You must take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.

Bring All Interfaces Into Service — Brings the out-of-service configured interfaces for the two ports to in-service status. The value **InService** is displayed in the **Oper Status** field.

Take All Interfaces Out of Service — Takes the in-service configured interfaces for the two ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field.

Note: You must use this command before using the **Delete All Interfaces** command.

Go Back to Equipment Configuration→ — Redisplays the Equipment Configuration panel.

3 Select one of the lines with the port you want to configure and press Return.

The DS3 or E3 Port and Channel Configuration panel is displayed. See *Figure 68 on page 127*.

```
AC 120 DS3 Port and Channel Configuration                    [AC 120 23 INCH]

_Slot: 03__Port: 01__[Channel: 001]______Channel Configuration________________
                                        |
 Line Type........... CbitParity        | Interface Type..... Unconfigured
 Loopback Config..... NoLoop            | [Oper Status]...... Unconfigured
 Transmit Clock...... LocalTiming       |
 Line Build Out...... Short             |
 Line Scramble....... Enabled           |
 [Line Coding]....... B3zs              |
 [Cell Mapping]...... Plcp              |
                                        |
 [Line Status]....... NoAlarm           |
                                        |_______________________________________
                                        |
                                        | Apply Port and Channel Configuration
                                        | Reset Port and Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | View Port Statistics ->
                                        | Go Back to Card Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 68. DS3 Port and Channel Configuration Panel (E3 panel is similar)

The commands on this panel have the following functions:

Apply Port and Channel Configuration	For a specified port number value, applies the configuration field values you set. See *Table 25 on page 128* or *Table 26 on page 129*.
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface→	Displays the ATM UNI Interface Configuration panel (*Figure 101 on page 179*).
View Port Statistics→	Displays the DS3 or E3 Port Statistics panel (*Figure 69 on page 130*).
Go Back to Card Configuration→	Redisplays the DS3 or E3 Configuration panel (*Figure 67 on page 126*).

4 Select the values for the fields on this panel from the values given in *Table 25 on page 128* for the DS3 Module or *Table 26 on page 129* for the E3 Module.

Table 25. Field Values – DS3 Port and Channel Configuration Panel

Field Name	Values	Description
Line Type	CbitParity (default)	A framing configuration that uses an M-bit and F-bit to convey a block error and a P-bit to convey parity errors between two nodes.
	ClearChannel	A framing configuration that does not provide block and parity error detection between two nodes.
Transmit Clock	LocalTiming (default)	Indicates that a local clock source is used as the transmit clock.
	LoopTiming	Indicates that the recovered receive clock is used as the transmit clock.
Line Build Out	Short	Indicates that the cable from the DS3 port is less than 225 feet away from the next node.
	Long (default)	Indicates that the cable from the DS3 port is more than 225 feet away from the next node.
Line Scramble	Enabled (default)	Enables ATM cell payload scrambling (optimized cell synchronization).
	Disabled	Disables ATM cell payload scrambling.
[Line Coding] (display only)	B3ZS	An encoding/decoding pattern that utilizes bipolar three-zero substitution to detect line code violations.
Cell Delineation (display only)	Plcp (default)	This interface uses a Physical Layer Convergence Protocol (PLCP) cell mapping for bidirectional transmission.
Loopback Config	NoLoop (default)	Not in the loopback state.
	LocalLoop	The received signal is looped back for retransmission after it has passed through the framing function.
	PayloadLoop	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
	LineLoop	Indicates that the received signal at this interface does not go through the system (minimum penetration) but is looped back out.
Interface Type	Unconfigured	The interface for this channel is not configured.
	AtmUni3-0	Indicates that the channel is configured for the ATM UNI 3.0 interface.
	AtmUni3-1	Indicates that the channel is configured for the ATM UNI 3.1 interface.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
[Oper Status] (display only)	Unconfigured	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.

Table 26. Field Values – E3 Port and Channel Configuration Panel

Field Name	**Values**	**Description**
Transmit Clock	LocalTiming (default)	Indicates that a local clock source is used as the transmit clock.
	LoopTiming	Indicates that the recovered receive clock is used as the transmit clock.
Line Scramble	Enabled (default)	Enables ATM cell payload scrambling (optimized cell synchronization).
	Disabled	Disables ATM cell payload scrambling.
[Line Type] (display only)	G832	Line type supported as differentiated from type G.751.
[Line Coding] (display only)	Hdb3	High-density bipolar 3 (HDB3). A bipolar coding method that does not allow more than 3 consecutive zeros.
[Cell Mapping] (display only)	DirectMapping	This interface uses cell mapping in accordance with G.804, Sec. 6.1, as differentiated from PLCP cell mapping.
Loopback Config	NoLoop (default)	Not in the loopback state.
	LocalLoop	The received signal is looped back for retransmission after it has passed through the framing function.
	PayloadLoop	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
	LineLoop	Indicates that the received signal at this interface does not go through the system (minimum penetration) but is looped back out.
Interface Type	Unconfigured	The interface for this channel is not configured.
	AtmUni3-0	Indicates that the channel is configured for the ATM UNI 3.0 interface.
	AtmUni3-1	Indicates that the channel is configured for the ATM UNI 3.1 interface.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
[Oper Status] (display only)	Unconfigured	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.

5 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

The ATM UNI Interface Configuration panel is displayed. See *"Configuring the ATM UNI Interface" on page 179* for instructions.

7 Repeat Steps 3–6 for the second port as needed.

Note:
Whenever needed, use the commands on the DS3 or E3 Configuration panel (*Figure 67 on page 126*) and on the DS3 or E3 Port and Channel Configuration panel (*Figure 68 on page 127*) to manage the interfaces.

8 To view statistics for this port, select the **View Port Statistics** command and press Return.

The DS3 or E3 Port Statistics panel is displayed. See the following figure.

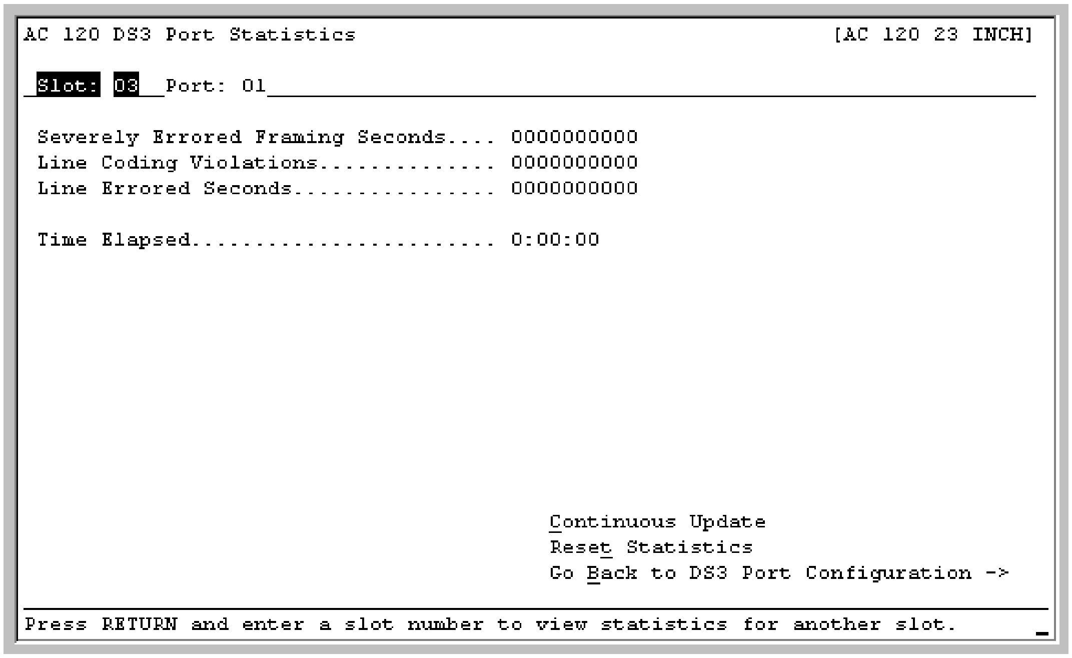


Figure 69. DS3 Port Statistics Panel (E3 panel is similar)

The commands on this panel have the following functions:

Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to zero.
Go Back to DS3 or E3 Port Configuration→	Redisplays the DS3 or E3 Cell Bearing Port and Channel Configuration panel (*Figure 68 on page 127*).

9 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the Ethernet Module

You must first configure the Ethernet Module before you can set up provisioning information. The Ethernet Module has three types of LED indicators. See *Figure 70 on page 131*.

Before beginning configuration of the Ethernet Module, see *Figure 71 on page 132* to understand how the bridge groups are related to physical ports 1 through 5 and virtual port 6. We recommend that you design your scheme for how you will set up bridge groups and connections for channels before you begin actual configuration, described in the following sections. Then refer to your scheme as you configure the Ethernet Module.

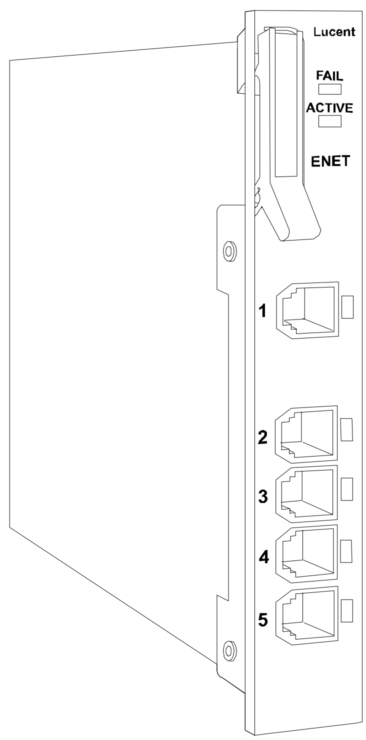


Figure 70. Ethernet Module

The status indicators on the Ethernet Module are described in the following table.

Table 27. Status Indicators for the Ethernet Module

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing

[1] After initial power-on and system start-up is completed, ACTIVE LED responds according to whether the module has no configured ports, or one or more configured ports.

[2] After initial power-on and system startup is completed, the LOS LED responds according to whether or not a proper ethernet signal is being received on the cable connected to the adjacent port.

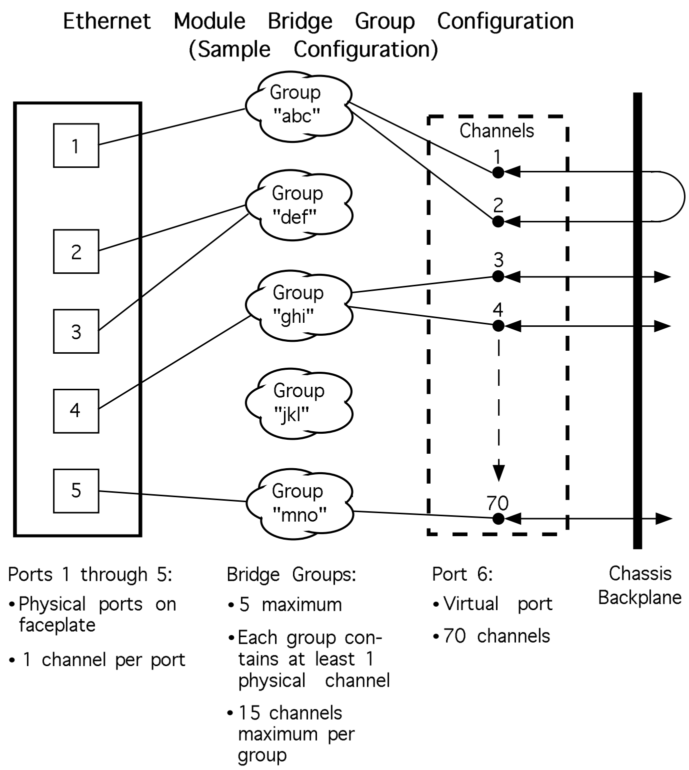


Figure 71. Bridge Group Configuration for the Ethernet Module

Overview of Module Configuration

Configuring the Ethernet Module involves two general aspects:

1. Configuring the interfaces
2. Configuring the bridge groups

The interfaces consist of five physical ports on the faceplate of the module, and 70 virtual interfaces (or channels) that permit data to be encapsulated into ATM cells for transmission across the AC 60/120 backplane to other I/O modules in the chassis. Because the physical ports and the virtual channels are both treated as bridge interfaces, their configuration procedures are similar.

The bridge groups serve as the “container” that houses the physical ports and virtual channels together, and provide management options for the Spanning Tree Algorithm and Protocol. All of the interfaces that are to be combined in a bridge group must be fully configured before the bridge group itself can be brought into service. The bridge groups that are in service can also be thought of as “container lids” that are placed over the interfaces assigned. Interfaces cannot be added or removed from a bridge group while it is in service, that is, when the “lid is on the container.”

Configuring the module requires the following:

1. Configuring the physical ports. This subtask consists of selecting a port speed, duplex mode, bridge group number, and two Spanning Tree Algorithm parameters for each physical port to be put into service.
2. Configuring the virtual channels. This subtask consists of selecting whether a channel is a bridging or a routing interface and assigning the channel to a bridge group.
3. Configuring the bridge groups. This subtask consists of selecting several parameters for managing the bridge.

➤ Procedure

To configure the ports on the Ethernet Module:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*) select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. Select an Ethernet Module on the list and press Return.

   The Multiport Ethernet Card Configuration panel is displayed. See *Figure 72 on page 134*.

```
AC 120 Multiport Ethernet Card Configuration                    [AC 120 23 INCH]

 Slot: 11
________________________________________________________________________________

Port Interface Type Oper Status  Physical Address  Bridge Line Status
---- -------------- ------------ ----------------- ------ ---------------------
  1  Bridge         InService    00:C0:8B:00:13:D3 111    10baseT-HalfDuplex
  2  Unconfigured   Unconfigured 00:C0:8B:00:13:D4        Down
  3  Unconfigured   Unconfigured 00:C0:8B:00:13:D5        Down
  4  Unconfigured   Unconfigured 00:C0:8B:00:13:D6        Down
  5  Unconfigured   Unconfigured 00:C0:8B:00:13:D7        Down

  6  Channels Configured: 1  Channels In Service: 1

________________________________________________________________________________

 Update Display                          Bring All Interfaces Into Service
 Delete All Interfaces                   Take All Interfaces Out Of Service
 Bridge Group Configuration ->           Go Back to Equipment Configuration ->
________________________________________________________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 72. Multiport Ethernet Card Configuration Panel

The commands on this panel have the following functions:

Update Display	Updates the values in the fields to show the most current configuration.
Delete All Interfaces	Deletes the configured, out-of-service interfaces for all ports. The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields. **Note:** Only the interfaces that are out of service can be unconfigured by this command.
Bridge Group Configuration→	Displays the Ethernet Bridge Group Status Configuration panel (see *Figure 71 on page 132*).
Bring All Interfaces Into Service	Brings the out-of-service configured interfaces to in-service status. The value **InService** is displayed in the **Oper Status** field.
Take All Interfaces Out of Service	Takes the in-service configured interfaces for all ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field.
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 To configure any of the physical ports 1–5, see *"Configuring the Physical Ports" on page 135*.

Configuring the Physical Ports

The following instructions are the first stage in configuring the Ethernet Module.

➤ Procedure

To configure the physical ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*) select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.
2. Select an Ethernet Module on the list and press Return.

   The Multiport Ethernet Card Configuration panel (*Figure 72 on page 134*) is displayed.
3. Select the port you want to configure and press Return.

   The Multiport Ethernet Port and Channel Configuration panel is displayed. See the following figure.

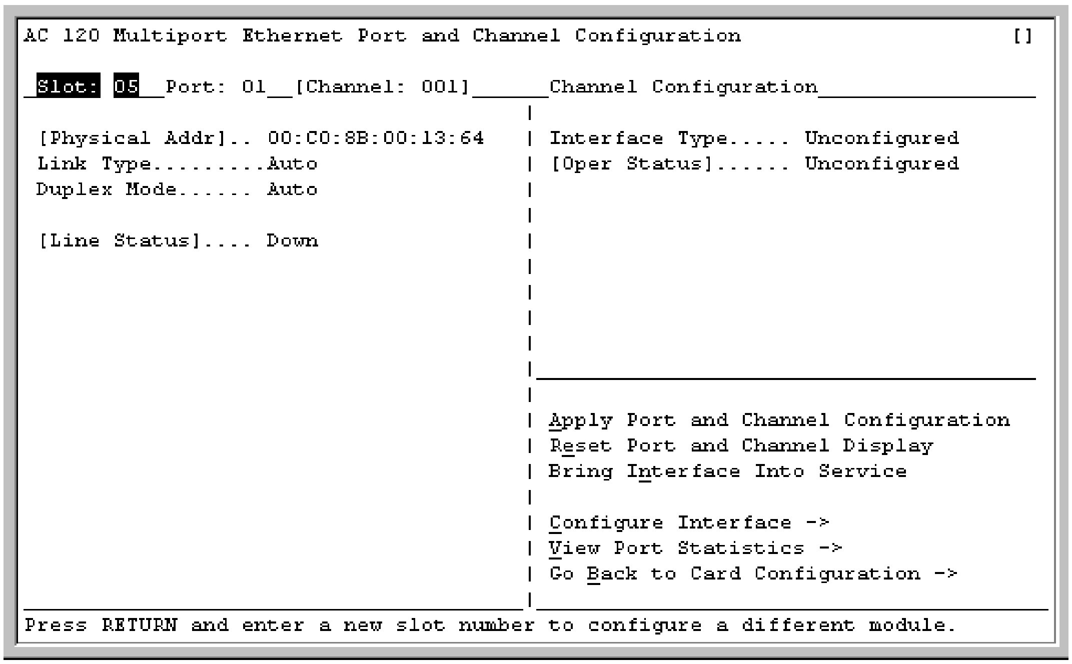


Figure 73. Multiport Ethernet Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration	Applies the configuration field values you selected. See *Table 28 on page 136*.
Reset Port and Channel Display	Resets the fields to the last set of applied values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field. **Note:** The interface must be fully configured before you can bring it into service.
Take Interface Out of Service (displayed when the [Oper Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface→	Displays the Bridge Interface Configuration panel (*Figure 74 on page 137*).

View Port Statistics→	Displays the Ethernet Port Statistics panel.
Go Back to Card Configuration→	Redisplays the Multiport Ethernet Card Configuration panel (*Figure 72 on page 134*).

4 Select the values for the fields on this panel from the values given in *Table 28 on page 136*.

Table 28. Field Values – Multiport Ethernet Port and Channel Configuration Panel

Field Name	**Values**	**Description**
[Physical Addr] (display only)	Variable that is unique	A unique MAC address assigned to each physical port on every Ethernet Module manufactured. This address is unique among all Ethernet devices manufactured.
Link Type	Auto (default)	Speed of the Ethernet LAN. Use the default value when possible. The system selects the correct speed.
	10BaseT	10BaseT is the only port speed supported at this time.
Duplex Mode	Auto (default)	Data traffic transmission method. Use the default value when possible. The system selects the correct method based on negotiation with the device connected to the port.
	Full	Two-way traffic is transmitted simultaneously.
	Half	Two-way traffic is transmitted in an alternating sequence.
Interface Type	Unconfigured (default)	This interface is not configured.
	Bridge	This interface is configured for Ethernet bridging.
[Oper Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).

5 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

The Bridge Interface Configuration panel is displayed. See *Figure 74 on page 137*.

```
AC 120 Bridge Interface Configuration                               [AC 120 23 INCH]

_Slot: 11__Port: 01__Channel: 001________Interface Statistics__________________
                                        |
 [Operational Status]... InService      | [Delay Exceeded Discards].. 0.0000 e0
                                        | [MTU Exceeded Discards].... 0.0000 e0
 Bridge Group Number.... 111            | [Frames In]................ 0.0000 e0
 Port Priority.......... 128            | [Frames Out]............... 2.4855 e13
 Path Cost.............. 00001          | [In Discards].............. 7.4074 e14
 Connection Type........ Llc            |
                                        | [Time Elapsed]............. 0:00:00
                                        |
                                        |
                                        |
                                        |
                                        |
                                        |
                                        | Continuous Update
 Apply Interface Configuration          | Reset Statistics
 Reset Interface Display                |______________________________________
 Take Interface Out Of Service          |
 Delete Interface and Return ->         | Go Back to Port Configuration ->
________________________________________|______________________________________
Press RETURN and enter a new slot number to configure a different interface.
```

Figure 74. Bridge Interface Configuration Panel

The commands on this panel have the following functions:

Apply Interface Configuration	Applies the configuration field values you selected. See *Table 29 on page 138*.
Reset Interface Display	Resets the fields to the last set of applied values.
Bring Interface Into Service (displayed when the [Operational Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Operational Status]** field.
Take Interface Out of Service (displayed when the [Operational Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Operational Status]** field.
Delete Interface and Return→	Unconfigures the interface, and redisplays the Multiport Ethernet Port and Channel Configuration panel (*Figure 73 on page 135*). **Note:** You must take this interface out of service (using the **Take Interface Out of Service** command) before you can use this command to delete the interface.
Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all the **Interface Statistics** field values to zero.
Go Back to Port Configuration→	Redisplays the Multiport Ethernet Port and Channel Configuration panel (*Figure 73 on page 135*).

7 Select the values for the fields on this panel from the values given in the following table.

Table 29. Field Values – Bridge Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).
Bridge Group Number	000 (default) (range 0–999)	Identifies one of five bridge groups for this module. Use the following format for assigning numbers, so that you can easily identify which group is associated with which Ethernet Module (especially when you have several Ethernet Modules in the chassis): **xxy** where *xx* stands for the slot number (for example, 80) and *y* stands for the port number (for example, 1). In this example, you could have a maximum of five groups numbered as follows: 801, 802, 803, 804, and 805. **Note:** The only restriction on bridge group numbers is that each must be unique within the chassis.
Port Priority	128 (default) Range: 0–255	The priority of this port taking into account the other ports in the path between this port and the bridge. Normally, you can use the default because the Spanning Tree Algorithm finds the shortest path.
Path Cost	100 for 10BaseT ports (default) Range: 1-65535	The contribution of the path through this port, when the port is the root port, to the total cost of the path to the root for this bridge.

8 To apply the values for the fields, select the **Apply Interface Configuration** command and press Return.

9 Repeat Steps 3–8 for each port to be used.

10 See *"Configuring the Virtual Port" on page 138* to configure virtual port 6.

Configuring the Virtual Port

The following instructions are the second stage in configuring the Ethernet Module.

➤ Procedure

To configure the virtual ports:

1 On the Multiport Ethernet Card Configuration panel (*Figure 72 on page 134*), select the line displaying port 6 and press Return.

The Ethernet Virtual Channel Configuration panel is displayed. See *Figure 75 on page 139*.

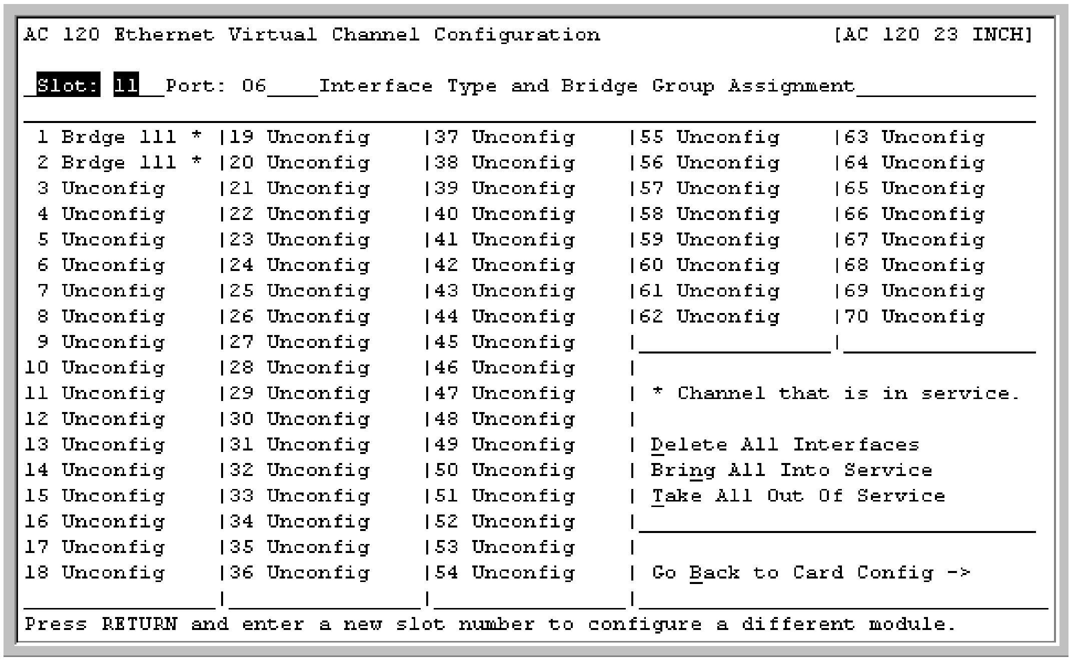


Figure 75. Ethernet Virtual Channel Configuration Panel

The commands on this panel have the following functions:

Delete All Interfaces	Deletes all configured, out-of-service interfaces. The value **Unconfig** is displayed in the status field for all interfaces that are deleted.
	Note: Only the interfaces that are out-of-service can be unconfigured by this command.
Bring All Into Service	Brings out-of-service configured interface to in-service status. An asterisk denoting in-service status is displayed in the status field.
TakeAll Out of Service	Takes an in-service configured interface to out-of-service status. An asterisk denoting in-service is removed from the status field, indicating out-of-service status.
Go Back to Card Configuration→	Redisplays the Multiport Ethernet Card Configuration panel (*Figure 72 on page 134*).

2 Select a channel you want to configure and press Return.

Note:
Each bridge group can have a maximum of 15 interfaces, composed of a mixture of physical ports and virtual channels. The only condition that must be met is that at least one of the interfaces in a bridge group must be a physical port.

The Ethernet Virtual Channel Interface Assignment panel (*Figure 76 on page 140*) is displayed.

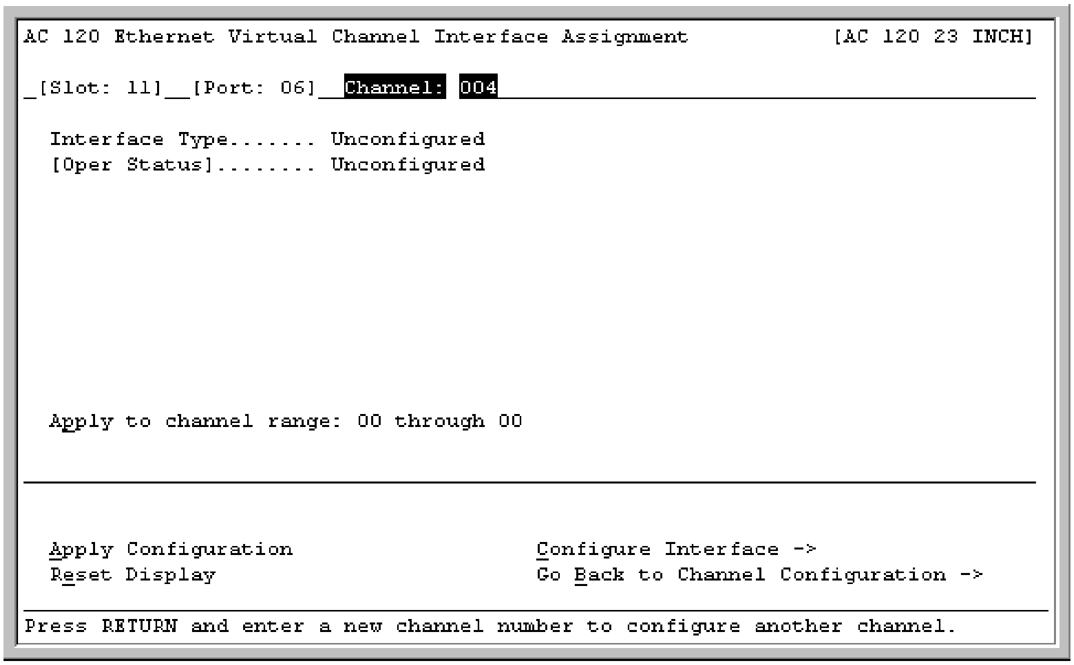


Figure 76. Ethernet Virtual Channel Interface Assignment Panel

The commands on this panel have the following functions:

Apply Configuration	For a specified channel number or a range of channel number values, applies the interface type you selected. See *Table 30 on page 141*.
Apply to Channel Range	Enter the first and last channel numbers of the range of channels to which the interface is being applied.
Reset Display	Resets the fields to the last set of saved values.
Configure Interface	Displays either the Bridge Interface Configuration panel (*Figure 77 on page 141*) or the Routing Interface Configuration panel (*Figure 78 on page 142*), depending on which interface type you selected, **Bridge** or **Routing**.
Go Back to Channel Configuration→	Redisplays the Ethernet Virtual Channel Configuration panel (*Figure 75 on page 139*).

3 Select the values for the fields on this panel from the values given in *Table 30 on page 141*.

Table 30. Field Values – Ethernet Virtual Channel Interface Assignment Panel

Field Name	**Values**	**Description**
Interface Type	Unconfigured	This interface is not configured.
	Bridge	This interface is configured for Ethernet bridging.
	Routing	This interface is configured for connection to an external Ethernet LAN routing device.
[Oper Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).

4 To apply the selected interface type, select the **Apply Configuration** command and press Return.

5 Select the **Configure Interface** command and press Return. One of two interface configuration panels is displayed, depending on which interface type you selected:

- Bridge Interface Configuration panel (see *Figure 77 on page 141*)
- Routing Interface Configuration panel (see *Figure 78 on page 142*)

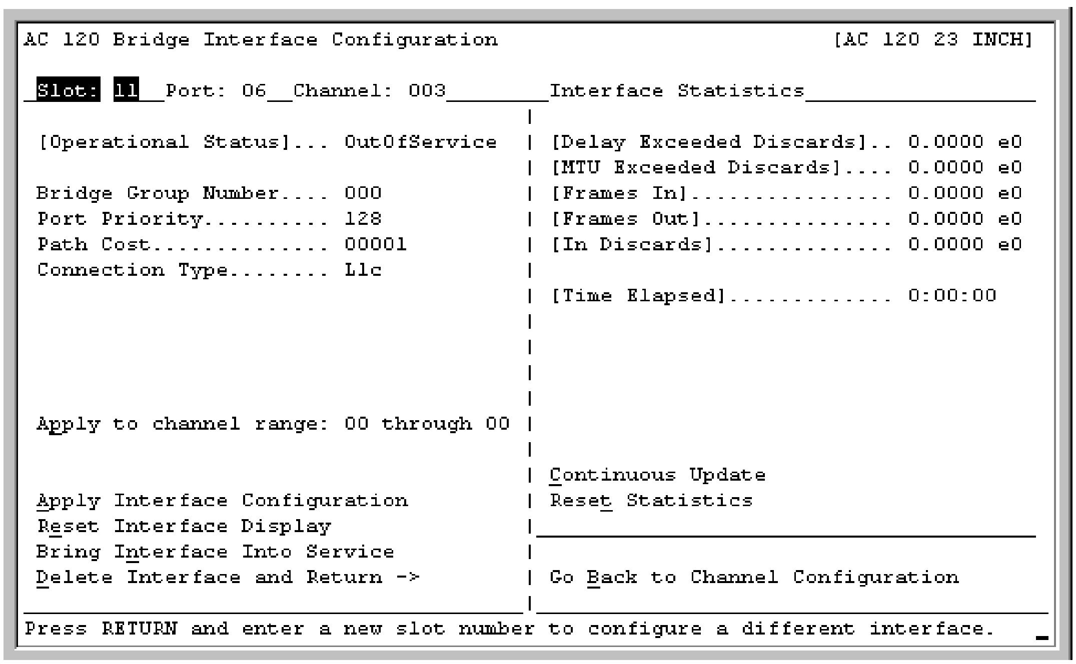


Figure 77. Bridge Interface Configuration Panel

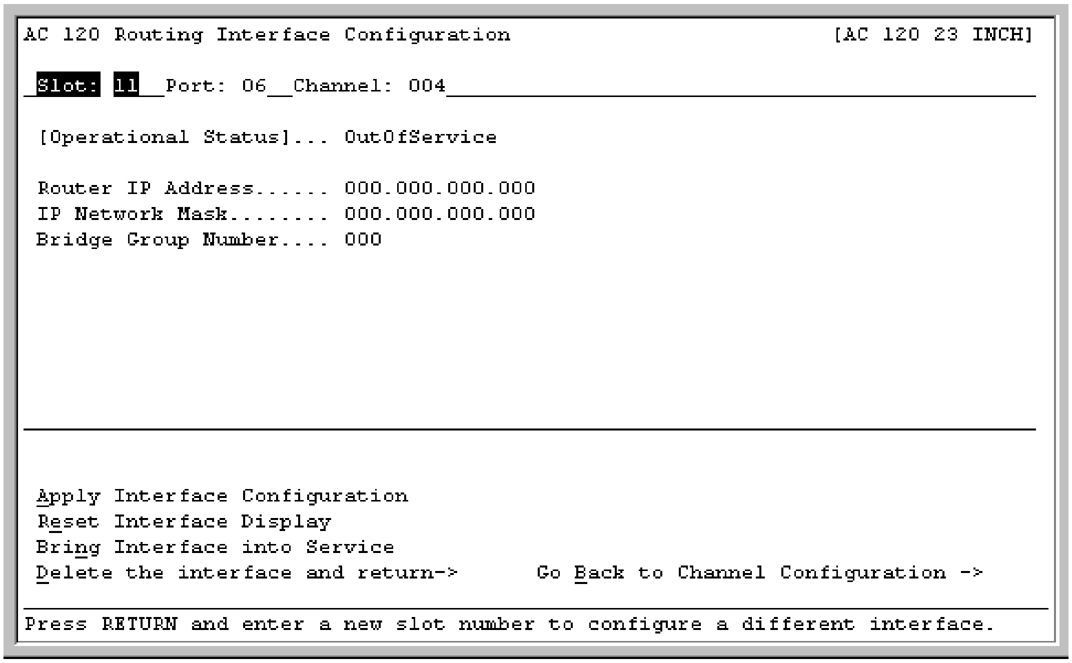


Figure 78. Routing Interface Configuration Panel

The commands on these panels have the following functions:

Apply Interface Configuration	Applies the configuration field values you selected. See *Table 32 on page 144*.
Reset Interface Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Operational Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Operational Status]** field.
Take Interface Out of Service (displayed when the [Operational Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Operational Status]** field.
Delete Interface and Return→	Deletes the out-of-service interface for this port, and redisplays the Ethernet Virtual Channel Interface Assignment panel (*Figure 76 on page 140*). **Note:** You must take this interface out of service (using the **Take Interface Out of Service** command) before you can use this command to delete all the configured interfaces.
Continuous Update (Bridge Interface Configuration panel only)	Updates the values in the fields every second.
Reset Statistics (Bridge Interface Configuration panel only)	Sets all fields values to zero.
Go Back to Channel Configuration→	Redisplays the Ethernet Virtual Channel Configuration panel (*Figure 75 on page 139*).

6 Select the values for the fields on this panel from the values given in *Table on page 144* for the Bridge Interface Configuration Panel and *Table 32 on page 144* for the Routing Interface Configuration Panel.

Table 31. Field Values – Bridge Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (not capable of receiving and sending signals).
Bridge Group Number	000 (default) (range 001–999)	Identifies one of five bridge groups for this module. Use the following format for assigning numbers, so that you can easily identify which group is associated with which Ethernet Module (especially when you have several Ethernet Modules in the chassis): **xxy** where *xx* stands for the slot number (for example, 80) and *y* stands for the port number (for example, 1). In this example, you could have a maximum of five groups numbered as follows: 801, 802, 803, 804, and 805.
Port Priority	128 (default) (range 0–128)	The priority of this port taking into account the other ports in the path between this port and the bridge.
Path Cost	00010 (default) (range 1–99999)	The contribution of the path through this port, when the port is the root port, to the total cost of the path to the root for this bridge.
Connection Type	Llc (default)	Logical link control (LLC) encapsulation method for traffic destined for ATM transmission. This method allows multiplexing of multiple protocols over a single ATM virtual circuit.
	Vc	Virtual circuit (VC) encapsulation method for traffic destined for ATM transmission. This method does higher-layer protocol multiplexing implicitly by ATM virtual circuits.
Apply to channel range	00 through 00 (range 01–70)	Enter the first and last channel numbers of the range of channels to which the configuration values are being applied. **Note:** The number of channels should be no more than 14. If you enter more than 14, the field values will be applied only to channels that will fit within the bridge group maximum of 15 interfaces.

Table 32. Field Values – Routing Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (not capable of receiving and sending signals).
Bridge Group Number	000 (default) (range 0–999)	Identifies one of five bridge groups for this module. Use the following format for assigning numbers, so that you can easily identify which group is associated with which Ethernet Module (especially when you have several Ethernet Modules in the chassis): **xxy** where *xx* stands for the slot number (for example, 80) and *y* stands for the port number (for example, 1). In this example, you could have a maximum of five groups numbered as follows: 801, 802, 803, 804, and 805.
Router IP Address	000.000.000.000	IP address of the external Ethernet LAN router device. Each three-digit segment cannot exceed the value 255.
IP Network Mask	000.000.000.000	Network mask number for the router IP address. Each three-digit segment cannot exceed the value 255.

7 To apply the values for the fields, select the **Apply Interface Configuration** command and press Return.

8 Repeat Steps 2–7 for the remainder of the channels as needed.

9 See *"Configuring the Bridge Groups" on page 144* to configure the bridge groups.

Configuring the Bridge Groups

The following instructions are the third stage in configuring the Ethernet Module.

➤ Procedure

To configure the bridge groups:

1 On the Multiport Ethernet Card Configuration panel, select the **Bridge Groups Configuration** command and press Return.

The Ethernet Bridge Group Status Configuration panel is displayed. See *Figure 79 on page 145*.

```
AC 120 Ethernet Bridge Group Status Configuration           [AC 120 23 INCH]

_[Slot: 11]____________Bridge Group Status and Interface Status________________

_Group 111 * __|_Group 000   __|_Group 000   __|_Group 000   __|_Group 000   __
  Prt 01 FWD   |      -None-   |      -None-   |      -None-   |      -None-
  chn 01 FWD   |               |               |               |
  chn 02 FWD   |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
               |               |               |               |
_______________|_______________|_______________|_______________|_______________
 * In Service       Continuous Update         Go Back to Card Configuration->

Press RETURN to configure Bridge Group 111
```

Figure 79. Ethernet Bridge Group Status Configuration Panel

The commands on this panel have the following functions:

Continuous Update	Updates the values in the fields every second.
Go Back to Card Configuration→	Redisplays the Multiport Ethernet Card Configuration panel (*Figure 72 on page 134*).

2 Select the first field **Group *xxy*** (the group number you used to configure the first interface) and press Return.

The Bridge Group Configuration panel is displayed. See *Figure 80 on page 146*.

```
AC 120 Bridge Group Configuration                                [AC 120 23 INCH]

 Bridge Group: 111_______________________ Interface Statistics___________________
  [Operational Status].... InService     |
  Priority................ 32768         | [Topology Change Count]... 0000000006
  Max Bridge Age.......... 20            | [Learned Entry Discards].. 0000000000
  Bridge Hello Time....... 02            |
  Bridge Forward Delay.... 15            | [Time Elapsed]............ 95:28:58
  Aging Time.............. 0000300       |
  Spanning Tree........... Enabled       | Continuous Update
  [Designated Root]....... 00C08B0013D3  | Reset Statistics
  [Root Path Cost]........ 0000000000    |
  [Root Port]............. 00            |_Interfaces in This Group______________
  [Max Message Age]....... 0000020       |
  [Hello Time]............ 0000002       | [Slot]...... 11
  [Hold Time]............. 0000001       | [Ports]..... 1
  [Forward Delay]......... 0000015       | [Channels].. 1, 2
  [Last Topology Change].. 0000000020    |
                                         |
  Apply Bridge Group Configuration       |________________________________________
  Take Bridge Group Out Of Service (n)   |
  Reset Bridge Group Display             | Go Back to Group Status Screen ->
_________________________________________|_________________________________________
Press RETURN and enter a new domain number to configure a different domain.
```

Figure 80. Bridge Group Configuration Panel

The commands on this panel have the following functions:

Apply Bridge Group Configuration	Applies the configuration field values you selected. See *Table 33 on page 147*.
Bring Bridge Group Into Service (displayed when the [Operational Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Operational Status]** field.
Take Bridge Group Out of Service (n) (displayed when the [Operational Status] field is InService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Operational Status]** field.
Reset Bridge Group Display	Resets the fields to the last set of applied values.
Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all **Interface Statistics** field values to zero.
Go Back to Group Status Screen→	Redisplays the Ethernet Bridge Group Status Configuration panel (*Figure 79 on page 145*).

3 Select the values for the fields on this panel from the values given in *Table 33 on page 147*.

Table 33. Field Values – Bridge Group Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (not capable of receiving and sending signals).
Priority	32678 (default) (range 0–65535)	Bridge priority parameter.
Max Bridge Age	20 (default) (range 6–40)	The max age parameter is defined as a timeout value to be used by all bridges in the bridged LAN. The value of this field is set by the root identifier. The bridge max age is defined as the value of the max age parameter when the bridge is the root or is attempting to become the root.
Bridge Hello Time	02 (default) (range 1–10)	The hello time parameter is defined as the time interval between the generation of configuration bridge protocol data units (BPDUs) by the root identifier. The bridge hello time parameter is defined as the value of the hellp time parameter when the bridge is the root or is attempting to become the root.
Bridge Forward Delay	15 (default) (range 4–30)	The value of the forward delay parameter when the bridge is the root or is attempting to become the root.
Aging Time	0000300 (default)	The message age timer parameter serves to measure the age of the receiveid protocol information recorded for a port, and to ensure that this information is discarded when its age exceeds the value of the max age parameter recorded by the bridge.
Spanning Tree	Disabled (default)	The Spanning Tree Algorithm is not operational (not enabled).
	Enabled	The Spanning Tree Algorithm is operational (enabled). Normally, you set this field value to **Enabled**.

4 To apply the values for the fields, select the **Apply Bridge Group Configuration** command and press Return.

5 Repeat Steps 2–4 for each of the bridge groups 2 through 5.

6 Save the values permanently to the system database now, or before you exit the current session of the system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the High Speed Module

You must first configure the High Speed Module before you can set up provisioning information. The High Speed Module has three types of LED indicators. See *Figure 81 on page 148*.

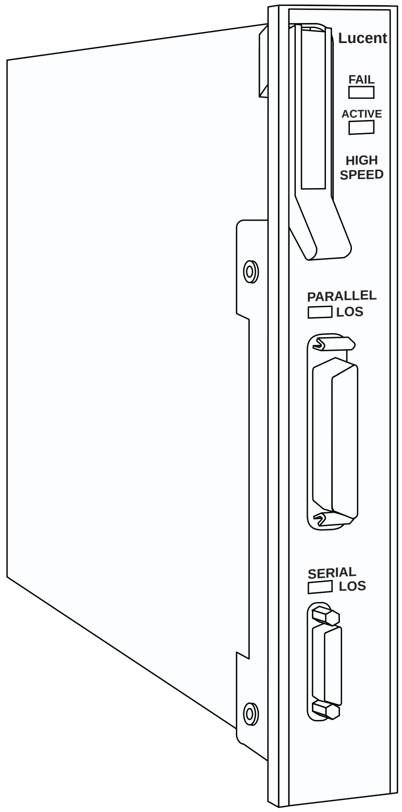


Figure 81. High Speed Module

The status indicators on the High Speed Module are shown in the following table.

Table 34. Status Indicators for the High Speed Module

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

It is important that before you begin setting configuration values in the AC 60/120 system software, you must first determine the method of data transmission, the data transmission rate, and other parameters that you will be using for the serial port and the parallel port. See *"Setting DIP Switches" on page 274* for instructions on physically setting the DIP switches on the right side of the circuit board of the High Speed Module.

➤ Procedure

To configure the ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. Select a High Speed Module on the list and press Return.

   The High Speed Configuration panel is displayed. See the following figure.

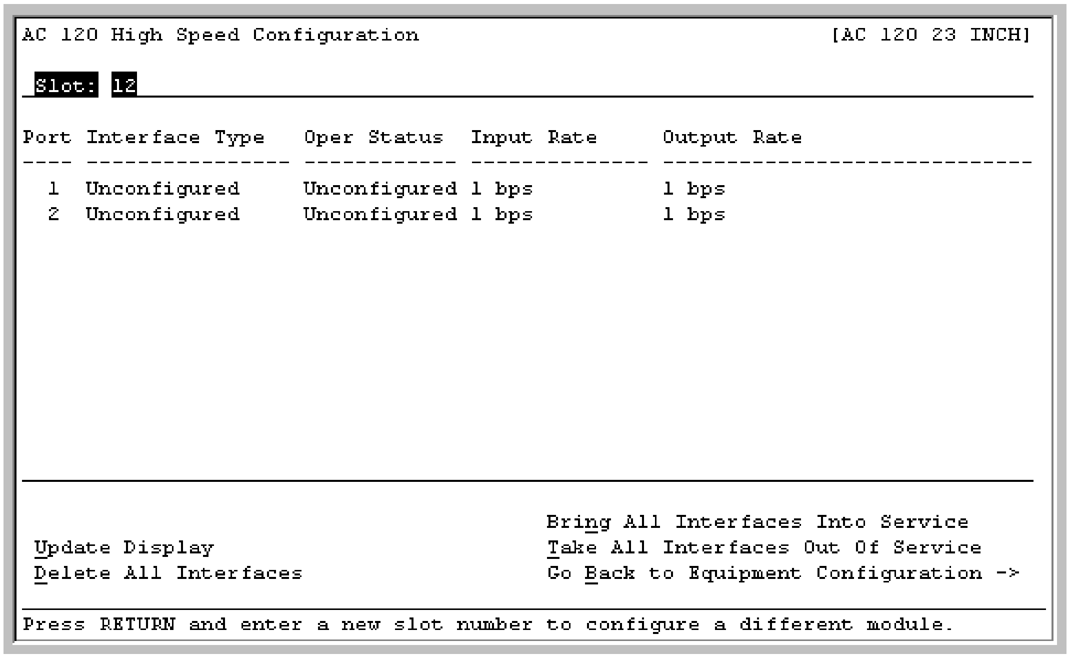


Figure 82. High Speed Configuration Panel

The commands on this panel have the following functions:

Update Display	Updates the values in the fields to show the most current configuration.
Delete All Interfaces	Deletes the configured interfaces for the two ports. The value **Unconfigured** is displayed in the **Oper Status** field. **Note:** You must take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.
Bring All Interfaces Into Service	Brings the out-of-service configured interfaces for the two ports to in-service status. The value **InService** is displayed in the **Oper Status** field.

Take All Interfaces Out of Service — Takes the in-service configured interfaces for the two ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field.

Note: You must use this command before using the **Delete All Interfaces** command.

Go Back to Equipment Configuration→ — Redisplays the Equipment Configuration panel.

3 Select one of the lines with the port you want to configure and press Return. (Port 1 is the parallel port, and port 2 is the serial port.)

The High Speed Port and Channel Configuration panel is displayed. See the following figure.

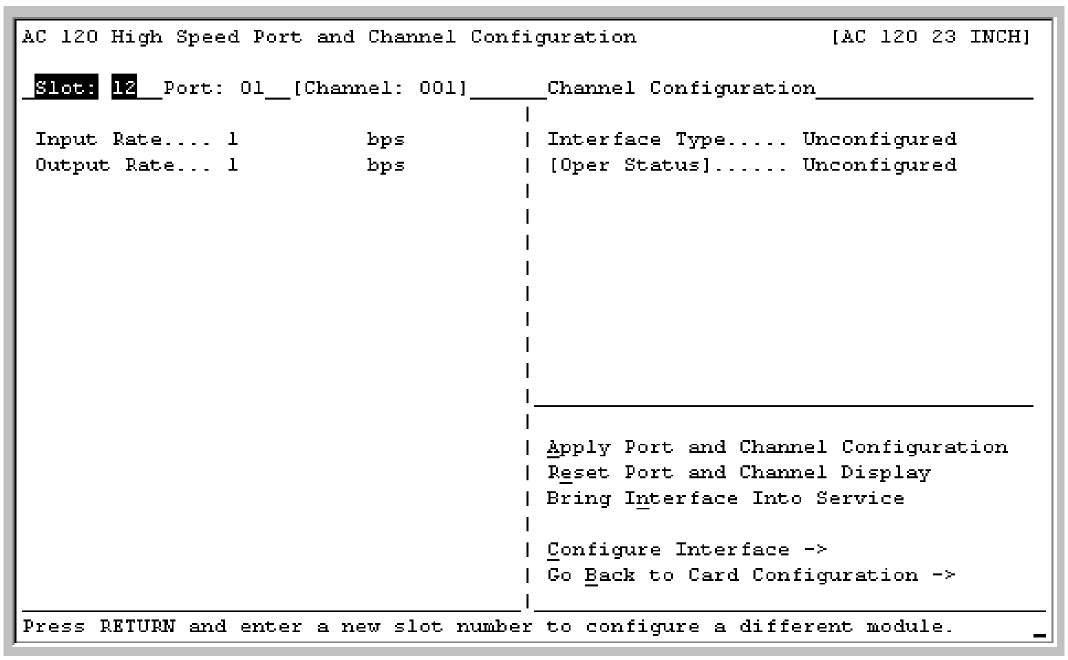


Figure 83. High Speed Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration — For a specified port number value, applies the configuration field values you set. See *Table 35 on page 151*.

Reset Port and Channel Display — Resets the fields to the last set of saved values.

Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService) — Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.

Take Interface Out of Service (displayed when the [Oper Status] field is inService) — Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.

Configure Interface→ — Displays an interface configuration panel.

Go Back to Card Configuration→ — Redisplays the High Speed Configuration panel (*Figure 82 on page 149*).

4 Select the values for the fields on this panel from the values given in *Table 35 on page 151*.

Table 35. Field Values – High Speed Port and Channel Configuration Panel

Field Name	Values	Description
Input Rate	1 (default)	The transmission rate you choose from *"DIP Switch Settings on Switch Sets B and D for High Speed Module Serial Port Data Transmission Rates" on page 279*.
Output Rate	1 (default)	The transmission rate you choose from *"DIP Switch Settings on Switch Sets B and D for High Speed Module Serial Port Data Transmission Rates" on page 279*.
Interface Type	Unconfigured (default)	This interface is not configured.
	AtmUni3-0	This interface is configured for ATM UNI 3.0.
	AtmUni3-1	This interface is configured for ATM UNI 3.1.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
	Circuit Emulation	This interface is configured for circuit emulation. **Note:** You can choose this interface type only for the serial port (port 2).
[Oper Status] (display only)	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).

5 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

One of the following interface configuration panels is displayed:

- Both parallel (port 1) and serial (port 2) ports: ATM UNI Interface Configuration panel. See *"Configuring the ATM UNI Interface" on page 179*.
- Serial (port 2) port only: Circuit Emulation Interface Configuration panel. See *"Configuring the Circuit Emulation Interface" on page 181*.

7 Repeat Steps 3–6 for the other port as needed.

Note:
Whenever needed, use the commands on the High Speed Configuration panel (*Figure 82 on page 149*) and on the High Speed Port and Channel Configuration panel (*Figure 83 on page 150*) to manage the interfaces.

8 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the Multiserial Module

You must first configure the Multiserial Module before you can set up provisioning information. The Multiserial Module has three types of LED indicators. See *Figure 84 on page 152*.

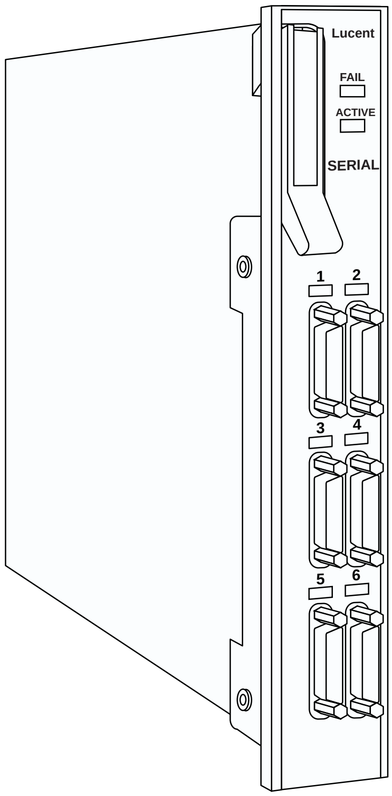


Figure 84. Multiserial Module

The status indicators on the Multiserial Module are described in the following table.

Table 36. Status Indicators for the Multiserial Module

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the Multiserial Module ports:

1 On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2 Select a Multiserial Module on the list and press Return.

The Multiserial Configuration panel is displayed. See the following figure.

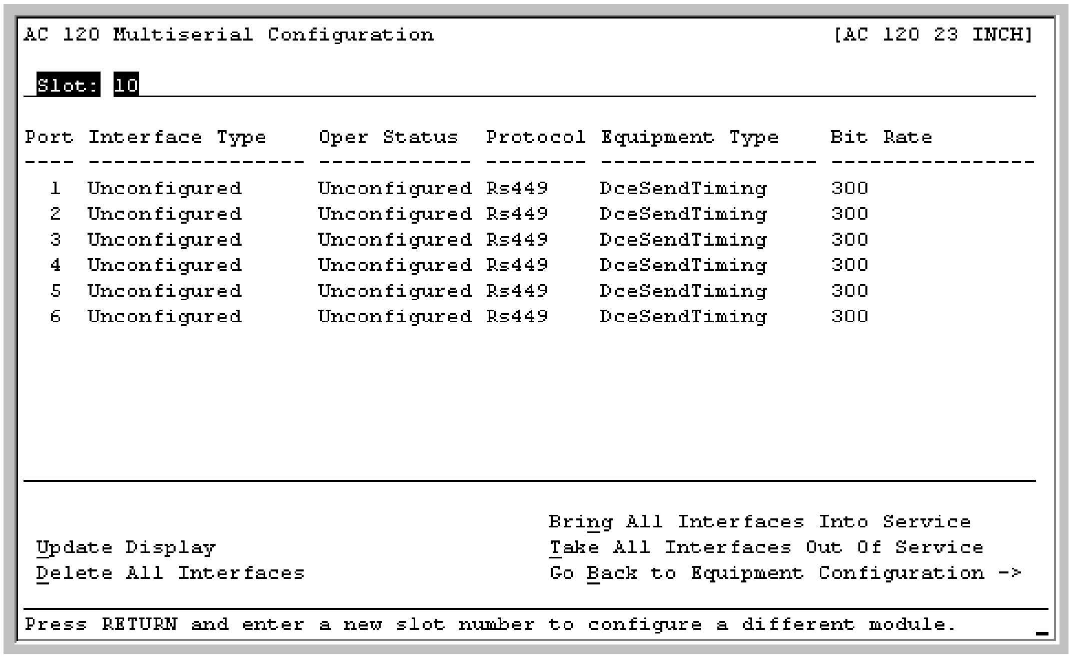


Figure 85. Multiserial Configuration Panel

The commands on this panel have the following functions:

Update Display
Updates the values in the fields to show the most current configuration.

Delete All Interfaces
Deletes the configured interfaces for all six ports. The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields.

Note: You must take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.

Bring All Interfaces Into Service
Brings the out-of-service configured interfaces for all six ports to in-service status. The value **InService** is displayed in the **Oper Status** field.

Take All Interfaces Out of Service
Takes the in-service configured interfaces for all six ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field.

Note: You must use this command before using the **Delete All Interfaces** command.

Go Back to Equipment Configuration→
Redisplays the Equipment Configuration panel.

3 Select one of the lines with the port you want to configure and press Return.

The Multiserial Port and Channel Configuration panel is displayed. See the following figure.

```
AC 120 Multiserial Port and Channel Configuration              [AC 120 23 INCH]

_Slot: 10__Port: 01__[Channel: 001]______Channel Configuration__________________
                                        |
 Protocol........... Rs449              | Interface Type..... Unconfigured
 Equipment Type..... DceSendTiming      | [Oper Status]...... Unconfigured
 Bit Rate........... 300     bps        |
 Handshake.......... Ignored            |
                                        |
                                        |
                                        |
                                        |
 [Line Coding]...... Nrz                |
 [Tx Clk Polarity].. Standard           |_______________________________________
 [Rx Clk Polarity].. Standard           |
                                        | Apply Port And Channel Configuration
                                        | Reset Port And Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | View Port Statistics ->
                                        | Go Back to Card Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 86. Multiserial Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration	For a specified port number value, applies the configuration field values you set. See *Table 37 on page 155*.
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface→	Displays an interface configuration panel.
View Port Statistics→	Displays the Multiserial Port Statistics panel (*Figure 87 on page 157*).
Go Back to Card Configuration→	Redisplays the Multiserial Configuration panel (*Figure 85 on page 153*).

4 Select the values for the fields on this panel from the values given in *Table 37 on page 155*.

Table 37. Field Values – Multiserial Port and Channel Configuration Panel

Field Name	Values	Description
Protocol	Rs449 (default)	The interface type protocol is set to RS-449 (EIA-449).
	Rs530	The interface type protocol is set to RS-530 (EIA-530).
	V35	The interface type protocol is set to V.35.
	Kg	The interface type protocol is set to KG (crypto-gear).
	Rs232	The interface type protocol is set to RS-232 (EIA-232).
Equipment Type	DceSend Timing (default)	Both input and output are locally timed (TxTiming, RxTiming).
	DteExternal Timing	Input is externally timed (RxTiming), and output is externally timed (TxTiming). Select bit rate for resource allocation. See *"Multiserial Module Cables" on page 289*.
	DceTerminal Timing	Both input and output are externally timed from external terminal timing. Select bit rate for resource allocation. See *"Multiserial Module Cables" on page 289*.
	DteLocal/DceHiSpd	Input is externally timed and output is locally timed.
Bit Rate	300 to 2048000	Enter the rate desired. The system provides the nearest supported rate. **Note:** Before you can change the value in the **Bit Rate** field (if the current value has already been applied), you must first set the value in the **Interface Type** field to **Unconfigured**. After you enter a new value in the **Bit Rate** field, again select the desired interface type.
Handshake	Ignored (default)	When **Observed**, signals transmitted both ways to establish an operational connection between two stations.
	Observed	
KG Resync (displayed when **Kg** protocol is selected)	Enabled (default)	When **Enabled**, crypto-gear resynchronization. If the serial port loses cell synchronization when receiving data through the KG interface, pin 22 of the port connector is driven by an RS-423 driver (DS3691). When transmitting data, the transmitter sends a null cell with a payload containing 352 zeros at a rate of 5 Hz.
	Disabled	
Transmit Mode (displayed when **Rs232** protocol is selected)	Synchronous (default)	Data transmission is sent via clock.
	Asynchronous	Data transmission is not sent via clock.
Parity (displayed when **Asynchronous** transmit mode is selected)	None (default)	Parity is set to none.
	Odd	Parity is set to odd.
	Even	Parity is set to even.
Data Bits (displayed when **Asynchronous** transmit mode is selected)	Eight (default)	Data bits is set to 8.
	Seven	Data bits is set to 7.
	Six	Data bits is set to 6.

Table 37. Field Values – Multiserial Port and Channel Configuration Panel (continued)

Field Name	Values	Description
Stop Bits (displayed when **Asynchronous** transmit mode is selected)	One (default)	Stop bits is set to 1.
	Two	Stop bits is set to 2.
[Line Coding] (display only)	Nrz	Nonreturn to zero (NRZ) binary encoding scheme in which there is no return to zero (reference) voltage between encoded bits.
[Tx Clk Polarity] (display only)	Standard	Transmit clock polarity.
[Rx Clk Polarity] (display only)	Standard	Receive clock polarity.
Interface Type	Unconfigured (default)	This interface is not configured.
	AtmUni3-0	This interface is configured for ATM UNI 3.0.
	AtmUni3-1	This interface is configured for ATM UNI 3.1.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
	CircuitEmulation	This interface is configured for circuit emulation.
	TerminalEmulation	This interface is configured for terminal emulation.
	FrameRelayUni	This interface is configured for frame relay user-to-network.
	FrameRelayNni	This interface is configured for frame relay network-to-network.
	HdlcPass Through	This interface is configured for HDLC pass-through.
[Oper Status] (display only)	Unconfigured (default)	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).

5 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

One of the following interface configuration panels is displayed:

- ATM UNI Interface Configuration panel (See *"Configuring the ATM UNI Interface" on page 179*.)
- Circuit Emulation Interface Configuration panel (See *"Configuring the Circuit Emulation Interface" on page 181*.)
- ATM Terminal Emulation Interface Configuration panel (See *"Configuring the Terminal Emulation Interface" on page 187*.)
- Frame Relay Interface Configuration panel (See *"Configuring the Frame Relay Interface" on page 184*.)
- HDLC Pass Through Interface Configuration panel (See *"Configuring the HDLC Pass Through Interface" on page 186*.)

7 Repeat Steps 3–6 for the remainder of the ports, as needed.

Note:
Whenever needed, use the commands on the Multiserial Configuration panel (*Figure 85 on page 153*) and on the Multiserial Port and Channel Configuration panel (*Figure 86 on page 154*) to manage the interfaces.

8 To view statistics for this port, select the **View Port Statistics** command and press Return.

The Multiserial Port Statistics panel is displayed. See the following figure.

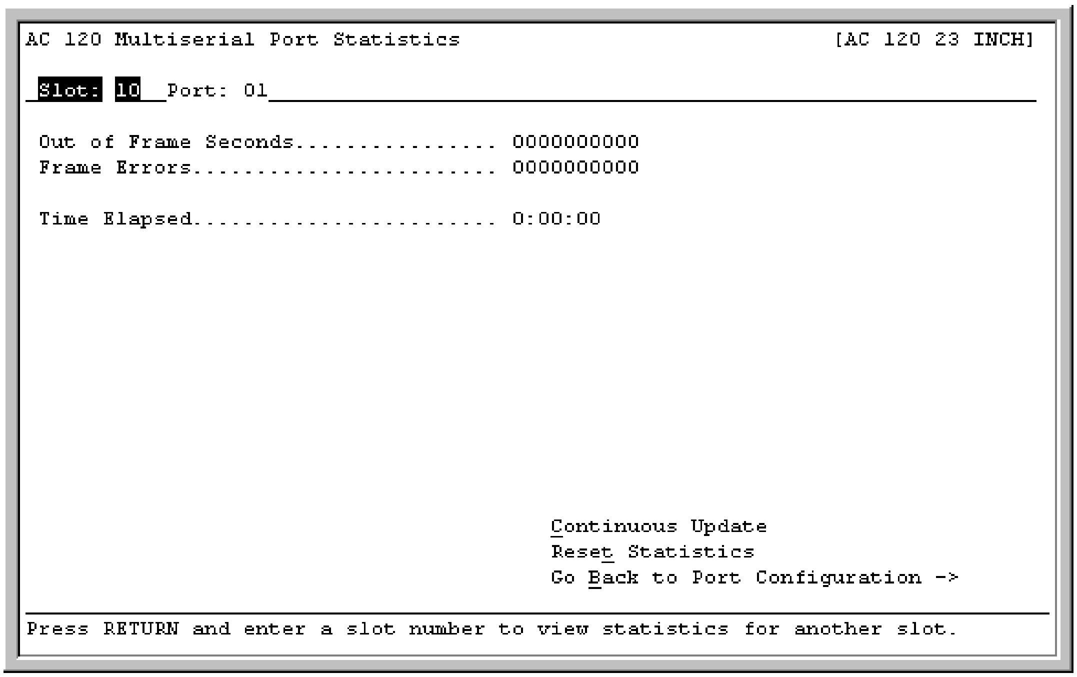


Figure 87. Multiserial Port Statistics Panel

The commands on this panel have the following functions:

Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to zero.
Go Back to Port Configuration→	Redisplays the Multiserial Port and Channel Configuration panel (*Figure 86 on page 154*).

9 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the OC-3c MM, OC-3c SM, and STM-1 SM Modules

You must first configure the OC-3c MM Module, the OC-3c SM Module, and the STM-1 SM Module before you can set up provisioning information. These modules have three LED indicators (see *Figure 88 on page 158*).

Note:
Figure 88 on page 158 illustrates the OC-3c MM and SM Modules. The STM-1 SM Module is similar, with the exception of the module name, which is STM-1 instead of OC-3c.

Figure 88. OC-3c Multi-Mode (MM) and Single Mode (SM) Modules

The status indicators on the OC-3c MM and SM Modules are described in the following table.

Table 38. Status Indicators for the OC-3c MM, OC-3c SM, and STM-1 SM Modules

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing.

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the OC-3c MM, OC-3c SM, or STM-1 SM Module ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. Select an OC-3c or STM-1 Module on the list and press Return.

   The OC-3c Port and Channel Configuration panel (see *Figure 89 on page 159*) or the STM-1 Port and Channel Configuration panel (see *Figure 90 on page 160*) is displayed.

Note:
The Port and Channel Configuration panels for the four types of OC-3c modules are the same except for the title of the panel. The title identifies which OC-3c Module type you are configuring:

- OC-3c MMAQ (multimode with adaptive queuing traffic management)
- OC-3c MMTS (multimode with traffic shaping)
- OC-3c SMAQ (single mode with adaptive queuing traffic management)
- OC-3c SMTS (single mode with traffic shaping)

```
AC 120 Oc-3cMMAQ Port and Channel Configuration                          []

_Slot: 01__[Port: 01]__[Channel: 001]____Channel Configuration_________________
                                        |
 Loopback Config..... NoLoop            | Interface Type..... AtmUni3-1
 Transmit Clock...... LocalTiming       | [Oper Status]...... OutOfService
 Transfer Rate....... FullRate          |
 [Line Status]....... NoAlarm           |
                                        |
                                        |
                                        |
                                        |
                                        |
                                        |_______________________________________
                                        |
                                        | Apply Port and Channel Configuration
                                        | Reset Port and Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | View Port Statistics ->
                                        | Go Back to Equipment Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 89. OC-3c Port and Channel Configuration Panel

Note:
The Port and Channel Configuration panels for the four types of STM-1 Modules are the same except for the title of the panel, which identifies which STM-1 Module type you are configuring:

- STM-1 SMAQ (single mode with adaptive queuing traffic management)
- STM-1 SMTS (single mode with traffic shaping)

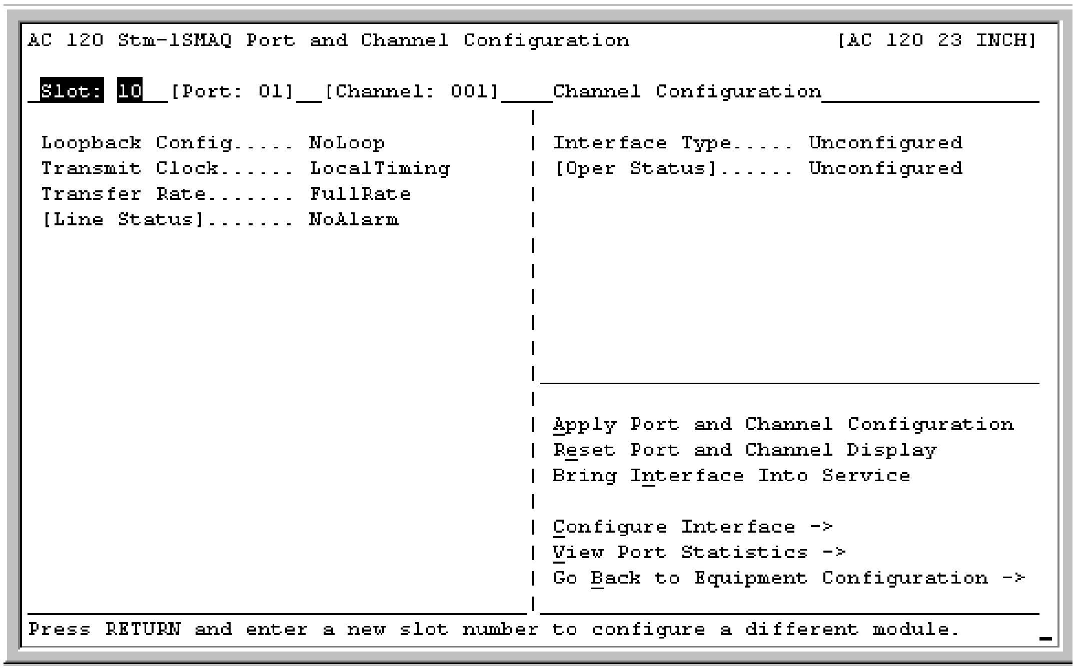


Figure 90. STM-1 Port and Channel Configuration Panel

The commands on the Port and Channel Configuration panels have the following functions:

Apply Port and Channel Configuration	Applies the configuration field values you set (see *Table 39 on page 161*).
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface→	Displays the ATM UNI Interface Configuration panel or the ATM IISP Interface Configuration panel.
View Port Statistics→	Displays one of the OC-3c Port Statistics panels or one of the STM-1 Port Statistics panels (see *Figure 91 on page 162*).
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 Select the values for the fields on the Port and Channel Configuration panel from the values given in the following table.

Table 39. Field Values – OC-3c and STM-1 Port and Channel Configuration Panels

Field Name	Values	Description
Loopback Config	NoLoop (default)	Not in loopback state.
	PayloadLoop	The received signal is looped back for retransmission after it has passed through the framing function. Used with ESF framing line type to loop back the payload. The data link is regenerated.
	LineLoop	Indicates that received signals at this interface do not go through the device but are looped back out.
Transmit Clock	LocalTiming (default)	Indicates that a local clock source is used as the transmit clock.
	LoopTiming	Indicates that the recovered receive clock is used as the transmit clock.
Transfer Rate	FullRate	Data is transmitted at the full line rate.
(display only on the modules with traffic shaping)	HalfRate	Data is transmitted at half the full line rate. (This value can be selected for modules with adaptive queuing traffic management firmware.)
[LineStatus] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured	This interface is not configured.
	AtmUni3-0	This interface is configured for ATM UNI 3.0.
	AtmUni3-1	This interface is configured for ATM UNI 3.1.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Oper Status]	Unconfigured	The interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	The configured interface is not currently operational (that is, not capable of receiving and sending signals).

4 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

Note:
Whenever needed, use the commands on the Port and Channel Configuration panel to manage the interface.

5 Select the **Configure Interface** command and press Return.

One of the following interface configuration panels is displayed:

- The ATM UNI Interface Configuration panel is displayed. See *"Configuring the ATM UNI Interface" on page 179*.
- The ATM IISP Interface Configuration panel is displayed. See *"Configuring the ATM IISP Interface" on page 177*.

6 To view statistics for this port, select the **View Port Statistics** command and press Return.

The Port Statistics panel (see *Figure 91 on page 162*) is displayed.

Note:
The Port Statistics panels for the four types of OC-3c modules and the four types of STM-1 modules are the same except for the title of the panel, which identifies the type of OC-3c or STM-1 module for which you are viewing port statistics.

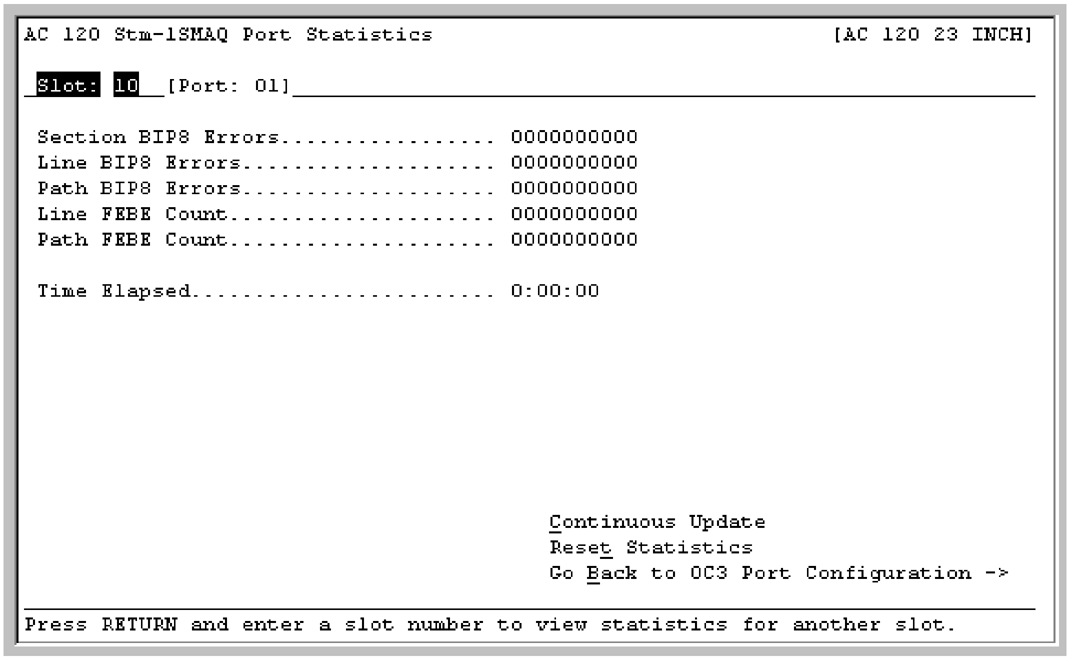


Figure 91. STM-1 Port Statistics Panel

The commands on the Port Statistics panels have the following functions:

Continuous Update	Updates the values in the fields every second.
Reset Statistics	Sets all field values to zero.
Go Back to OC3 or STM-1 Port Configuration→	Redisplays the OC-3c or STM-1 Port and Channel Configuration panels.

7 Save the values permanently to the AC 60/120 system database now, or before you exit the current session of the system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the TAXI Module

You must configure the TAXI Module before you can set up provisioning information. The TAXI Module has three LED indicators. See the following figure.

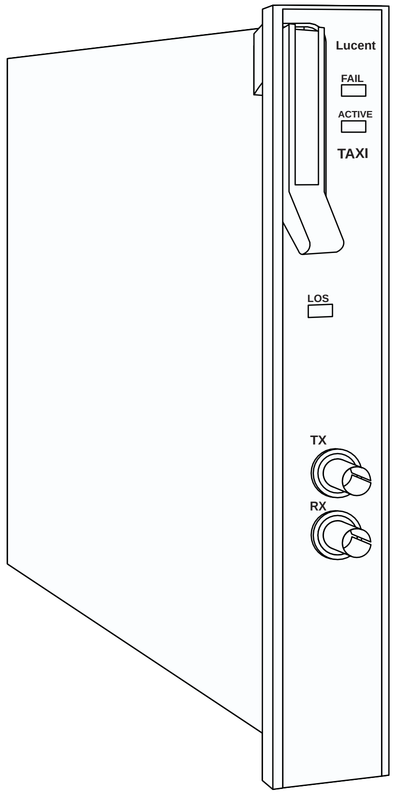


Figure 92. TAXI Module

The status indicators on the TAXI Module are described in *Table 40 on page 163*.

Table 40. Status Indicators for the Voice 2W Station (2W Source) Module

Module Status/LED	**Initial Power-On**	**No Configured Ports**	**One or More Configured Ports**	**No Cable on Port**	**Cable on Port**
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
LOS (Loss of Signal) (yellow)	Lights briefly[2]			Lighted	• Not lighted if signal is being received • Lighted if signal is missing.

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the LOS LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the TAXI Module ports:

1 On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2 Select a TAXI Module on the list and press Return.

The TAXI Port and Channel Configuration panel is displayed. See the following figure.

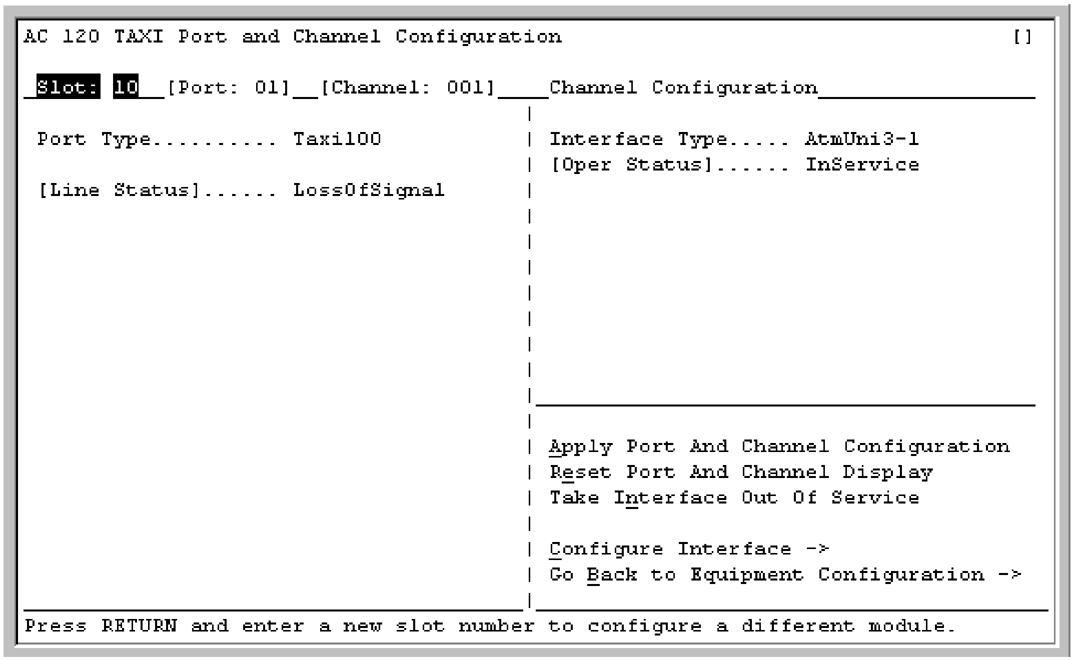


Figure 93. TAXI Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration	Applies the configuration field values you set. See *Table 41 on page 165*.
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface→	Displays the ATM UNI Interface Configuration panel (*Figure 101 on page 179*).
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 Select the values for the fields on this panel from the values given in *Table 41 on page 165*.

Table 41. Field Values – TAXI Port and Channel Configuration Panel

Field Name	Values	Description
Port Type	Taxi100 (default)	Line rate for connecting to a workstation that operates at 100 Mbit/sec.
	Taxi140	Line rate for connecting to a workstation that operates at 140 Mbit/sec.
[LineStatus] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured (default)	This interface is not configured.
	AtmUni3-0	This interface is configured for ATM UNI 3.0.
	AtmUni3-1	This interface is configured for ATM UNI 3.1.
	IispUser	This interface is configured for ATM IISP User.
	IispNetwork	This interface is configured for ATM IISP Network.
[Oper Status]	Unconfigured (default)	This interface is not operational because it is not configured.
	InService	The configured interface is currently operational (that is, capable of receiving and sending signals).
	OutOfService	Interface is not currently operational (that is, not capable of receiving and sending signals).

4 To apply the values for the fields, select the **Apply Port and Channel Configuration** command and press Return.

Note:
Whenever needed, use the commands on the TAXI Port and Channel Configuration panel (*Figure 93 on page 164*) to manage the interface.

5 Select the **Configure Interface** command and press Return.

The ATM UNI Interface Configuration panel is displayed. See *"Configuring the ATM UNI Interface" on page 179* for instructions.

6 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the Voice 2W Office (2W Sink) Module

You must first configure the Voice 2W Office Module (also known as the 2W Sink Module) before you can set up provisioning information. The Voice 2W Office Module has three types of LED indicators. See *Figure 94 on page 166*.

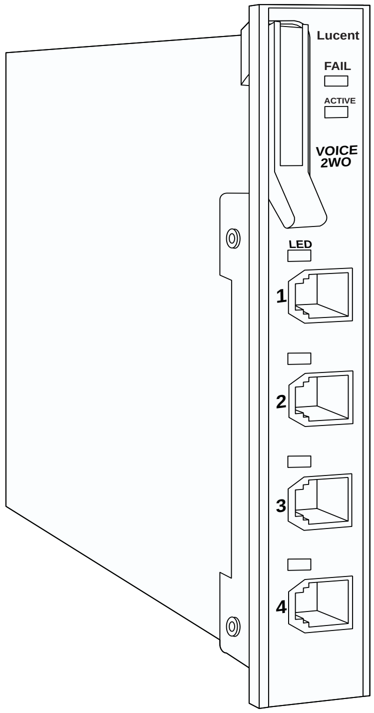


Figure 94. Voice 2W Office (2W Sink) Module

The following table describes the status indicators on the Voice 2W Office Module.

Table 42. Status Indicators for the Voice 2W Station (2W Source) Module

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
Line Status (next to the ports) (green)	Lights briefly[2]			Not lighted	• Flashing green LED indicates the line is ringing. • Solid green LED indicates the line is off-hook (in use) or busy. • Unilluminated LED indicates the line is on-hook (not in use).

[1]After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2]After initial power-on and system startup is completed, the Line Status LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

To configure the Voice 2W Office Module ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. Select a Voice 2W Office Module (shown on the panel as "TwoWireSink") on the list and press Return.

   The Two Wire Sink Configuration panel is displayed. See the following figure.

```
AC 120 Two Wire Sink Configuration                              [AC 120 23 INCH]

 Slot: 07
_______________________________________________________________________________

Port Interface Type    Oper Status  Line Status
---- ---------------- ------------ -------------------------------------------
  1  Unconfigured     Unconfigured NoAlarm
  2  Unconfigured     Unconfigured NoAlarm
  3  Unconfigured     Unconfigured NoAlarm
  4  Unconfigured     Unconfigured NoAlarm

_______________________________________________________________________________

 Update Display                           Bring All Interfaces Into Service
 Configure All Interfaces                 Take All Interfaces Out Of Service
 Delete All Interfaces                    Go Back to Equipment Configuration ->
_______________________________________________________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 95. Two Wire Sink Configuration Panel

The commands on this panel have the following functions:

Update Display — Updates the values in the fields to show the most current configuration.

Note: Use this command mainly to display the most current information in the **Line Status** field.

Configure All Interfaces — Sets all four ports to the circuit emulation type interface. The value **CircuitEmulation** is displayed in the **Interface Type** field, and the value **OutOfService** is displayed in the **Oper Status** field.

Delete All Interfaces — Deletes the configured interfaces for all four ports. The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields.

Note: You must first take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.

Bring All Interfaces Into Service — Brings the out-of-service configured interfaces for all four ports to in-service status. The value **InService** is displayed in the **Oper Status** field for all six ports.

Take All Interfaces Out Of Service	Takes the in-service configured interfaces for all four ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field for all four ports. **Note:** You must use this command before using the **Delete All Interfaces** command.
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 To configure the port fields, do one of the following:

a If you want to configure all four ports with the default port field values given in *Table 43 on page 169*, select the **Configure All Interfaces** command and press Return.

The value **CircuitEmulation** is displayed in the **Interface Type** field, and the value **OutOfService** is displayed in the **Oper Status** field.

b To configure one port at a time (to set values other than the default ones), select the line for the port you want to configure and press Return.

The Two Wire Sink Port and Channel Configuration panel is displayed. See the following figure.

```
AC 120 Two Wire Sink Port and Channel Configuration          [AC 120 23 INCH]

_Slot: 07__Port: 01__[Channel: 001]______Channel Configuration________________
                                        |
 Test Mode......... Off                 | Interface Type....... Unconfigured
 [Signaling Bits].. Ab                  | [Oper Status]........ Unconfigured
 [Dial Mode]....... Dtmf                |
 [Loop Detect]..... LoopStart           | [Connection Type].... Pvc
                                        | [Silence Suppress]... Disabled
 [Line Status].... NoAlarm              | [Echo Cancellation].. Disabled
                                        | [Voice Compression].. Disabled
                                        | [Companding Law]..... MuLawPCM
                                        | [AAL Encapsulation].. Aal1
                                        | [Service Type]....... Fxo
                                        |_______________________________________
                                        |
                                        | Apply Port And Channel Configuration
                                        | Reset Port And Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | Go Back to Card Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 96. Two Wire Sink Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration	Applies the configuration field values you set See *Table 43 on page 169*.
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.

Configure Interface→	Displays the Circuit Emulation Interface Configuration panel.
Go Back to Card Configuration→	Redisplays the Two Wire Sink Configuration panel (*Figure 95 on page 167*).

4 Select the values for the fields on this panel from the values given in *Table 43 on page 169*.

Table 43. Field Values – 2W Sink Port and Channel Configuration Panel

Field Name	Values	Description
Test Mode	None (default)	The module is not in test mode.
	QuietTime	When this value is selected, a noisy line indicates that the module is defective. If the line is not noisy, the line is defective.
	F-1004Hz	A 1004 Hz tone is used in troubleshooting a system where a line is seized by bridging through a resistance the tip and ring wires.
[Signaling Bits] (display only)	Ab	Signaling bits method supported is AB (two-bit signaling).
[Dial Mode] (display only)	Dtmf	Dual tone multi-frequency.
[Loop Detect] (display only)	LoopStart	Loop detection.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured (default)	This interface is not configured.
	Circuit Emulation	This interface is configured for circuit emulation.
[Oper Status] (display only)	Unconfigured (default)	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.
[Connection Type] (display only)	Pvc	Permanent virtual circuit (PVC).
[Silence Suppression] (display only)	Disabled	Silence suppression is disabled.
[Echo Cancellation] (display only)	Disabled	The echo cancellation function is disabled. This function is a method for isolating and filtering unwanted signal energy caused by echos from the main transmitted signal.
[Voice Compression]	Disabled	Voice compression is disabled.
[Companding Law] (display only)	MuLawPCM	The PCM coding and companding standard used in North America and Japan.
[AAL Encapsulation] (display only)	Aal1	ATM Adaptation Layer 1 (AAL1)
[Service Type] (display only)	Fxo	Foreign exchange office (FXO)

5 To apply the values for the fields on this panel, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

The Circuit Emulation Interface Configuration panel is displayed. See *"Configuring the Circuit Emulation Interface" on page 181* for instructions.

7 Repeat Steps 3.b–6 for the remainder of the ports, as needed.

Note:
Whenever needed, use the commands on the Two Wire Sink Configuration panel (*Figure 95 on page 167*) and on the Two Wire Sink Port and Channel Configuration panel (*Figure 96 on page 168*) to manage the interfaces.

8 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the Voice 2W Station (2W Source) Module

You must first configure the Voice 2W Station Module (also known as the 2W Source Module) before you can set up provisioning information. The Voice 2W Station Module has three types of LED indicators. See the following figure.

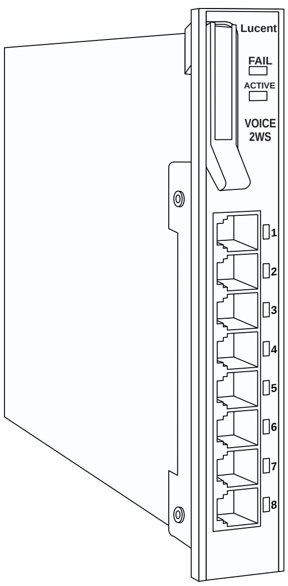


Figure 97. Voice 2W Station (2W Source) Module

The following table describes the Voice 2W Station Module status indicators.

Table 44. Status Indicators for the Voice 2W Station (2W Source) Module

Module Status/LED	Initial Power-On	No Configured Ports	One or More Configured Ports	No Cable on Port	Cable on Port
FAIL (red)	Lights briefly[1]	Not lighted	Lighted only when the module is not functioning		
ACTIVE (green)	Lights briefly[1]	Not lighted	Lighted only when the module is functioning properly		
Line Status (next to the ports) (green)	Lights briefly[2]			Not lighted	• Flashing green LED indicates the line is ringing. • Solid green LED indicates the line is off-hook (in use) or busy. • Unilluminated LED indicates the line is on-hook (not in use).

[1] After initial power-on and system startup is completed, the FAIL and ACTIVE LEDs respond according to whether the module has no configured ports, or one or more configured ports.

[2] After initial power-on and system startup is completed, the Line Status LED responds according to whether or not the port has a cable connected to it.

➤ Procedure

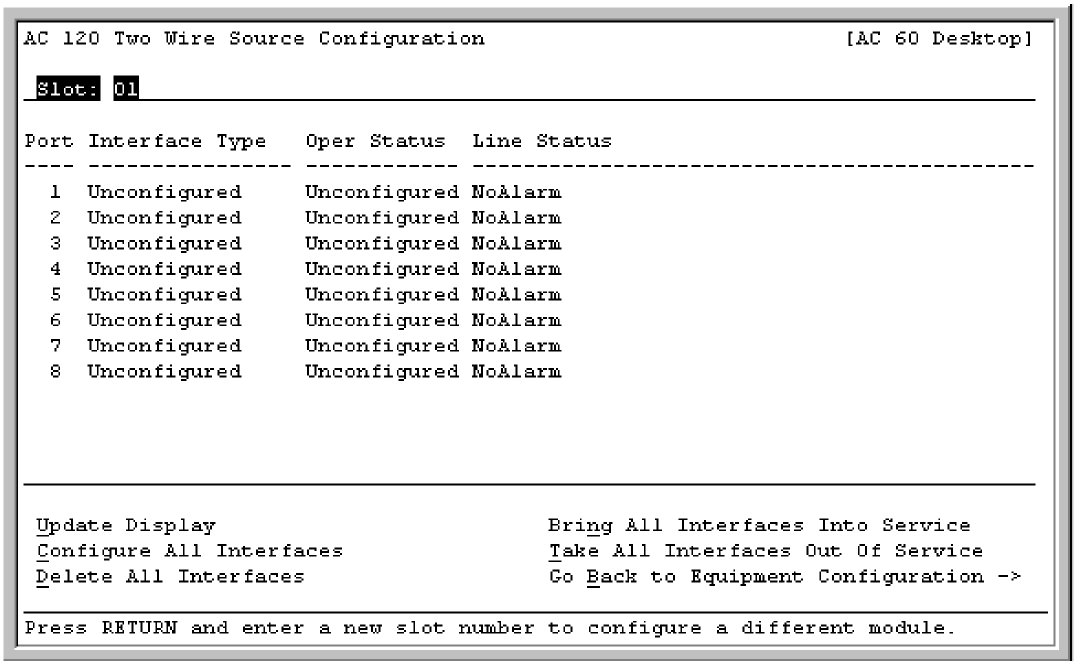
To configure the Voice 2W Station Module ports:

1. On the Console Interface Main Menu panel (*Figure 46 on page 99*), select the **Equipment Configuration** option and press Return.

   The Equipment Configuration panel (*Figure 47 on page 99*) is displayed.

2. Select a Voice 2W Station Module (shown on the panel as "TwoWireSource") on the list and press Return.

   The Two Wire Source Configuration panel is displayed. See *Figure 98 on page 172*.



```
AC 120 Two Wire Source Configuration                           [AC 60 Desktop]

 Slot: 01
_______________________________________________________________________________

Port Interface Type   Oper Status  Line Status
---- ---------------- ------------ --------------------------------------------
  1  Unconfigured     Unconfigured NoAlarm
  2  Unconfigured     Unconfigured NoAlarm
  3  Unconfigured     Unconfigured NoAlarm
  4  Unconfigured     Unconfigured NoAlarm
  5  Unconfigured     Unconfigured NoAlarm
  6  Unconfigured     Unconfigured NoAlarm
  7  Unconfigured     Unconfigured NoAlarm
  8  Unconfigured     Unconfigured NoAlarm

_______________________________________________________________________________

 Update Display                           Bring All Interfaces Into Service
 Configure All Interfaces                 Take All Interfaces Out Of Service
 Delete All Interfaces                    Go Back to Equipment Configuration ->
_______________________________________________________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 98. Two Wire Source Configuration Panel

The commands on this panel have the following functions:

Update Display	Updates the values in the fields to show the most current configuration. **Note:** Use this command mainly to display the most current information in the **Line Status** field.
Configure All Interfaces	Sets all eight ports to the circuit emulation type interface. The value **CircuitEmulation** is displayed in the **Interface Type** field, and the value **OutOfService** is displayed in the **Oper Status** field.
Delete All Interfaces	Deletes the configured interfaces for all eight ports. The value **Unconfigured** is displayed in the **Interface Type** and the **Oper Status** fields. **Note:** You must first take all interfaces out of service (using the **Take All Interfaces Out Of Service** command) before you can use this command to delete all the configured interfaces.
Bring All Interfaces Into Service	Brings the out-of-service configured interfaces for all eight ports to in-service status. The value **InService** is displayed in the **Oper Status** field for all eight ports.
Take All Interfaces Out Of Service	Takes the in-service configured interfaces for all eight ports to out-of-service status. The value **OutOfService** is displayed in the **Oper Status** field for all eight ports. **Note:** You must use this command before using the **Delete All Interfaces** command.
Go Back to Equipment Configuration→	Redisplays the Equipment Configuration panel.

3 To configure the port fields, do one of the following:

a If you want to configure all eight ports with the default port field values given in *Table 45 on page 174*, select the **Configure All Interfaces** command and press Return.

The value **CircuitEmulation** is displayed in the **Interface Type** field, and the value **OutOfService** is displayed in the **Oper Status** field.

b To configure one port at a time (to set values other than the default ones), select the line for the port you want to configure and press Return.

The Two Wire Source Port and Channel Configuration panel is displayed. See the following figure.

```
AC 120 Two Wire Source Port and Channel Configuration          [AC 60 Desktop]

_Slot: 01__Port: 01__[Channel: 001]______Channel Configuration_________________
                                        |
 Test Mode......... Off                 | Interface Type....... Unconfigured
 [Signaling Bits].. Ab                  | [Oper Status]........ Unconfigured
 [Dial Mode]....... Dtmf                |
 [Loopback]........ NoLoopback          | Connection Type...... Pvc
 [Loop Detect]..... LoopStart           | Service Type......... Plar
 [Ring Cadence].... OneOnThreeOff       | [Silence Suppress]... Disabled
                                        | [Echo Cancellation].. Disabled
 [Line Status].... NoAlarm              | [Voice Compression].. Disabled
                                        | [Companding Law]..... MuLawPCM
                                        | [AAL Encapsulation].. Aal1
                                        |_______________________________________
                                        |
                                        | Apply Port And Channel Configuration
                                        | Reset Port And Channel Display
                                        | Bring Interface Into Service
                                        |
                                        | Configure Interface ->
                                        | Go Back to Card Configuration ->
________________________________________|_______________________________________
Press RETURN and enter a new slot number to configure a different module.
```

Figure 99. Two Wire Source Port and Channel Configuration Panel

The commands on this panel have the following functions:

Apply Port and Channel Configuration	Applies the configuration field values you set. See *Table 45 on page 174*.
Reset Port and Channel Display	Resets the fields to the last set of saved values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Configure Interface	Displays the Circuit Emulation Interface Configuration panel.
Go Back to Card Configuration	Redisplays the Two Wire Source Configuration panel (*Figure 98 on page 172*).

4 Select the values for the fields on this panel from the values given in *Table 45 on page 174*.

Table 45. Field Values – 2W Source Port and Channel Configuration Panel

Field Name	Values	Description
Test Mode	None (default)	The module is not in test mode.
	QuietTime	When this value is selected, a noisy line indicates that the module is defective. If the line is not noisy, the line is defective.
	F-1004Hz	A 1004 Hz tone is used in troubleshooting a system where a line is seized by bridging through a resistance the tip and ring wires.
[Signaling Bits] (display only)	Ab	Signaling bits method supported is AB (two-bit signaling).
[Dial Mode] (display only)	Dtmf	Dual tone multi-frequency
[Loopback] (display only)	NoLoopback	The ports on this module cannot be set up for loopback.
[Loop Detect] (display only)	LoopStart	Loop detection.
[Ring Cadence] (display only)	OneOnThreeOff	The pattern of the signaling—one second on and three seconds off.
[Line Status] (display only)	NoAlarm, or one of several alarms	See the appropriate bit map table under the MIB object *"lineStatus" on page 320*.
Interface Type	Unconfigured (default)	This interface is not configured.
	Circuit Emulation	This interface is configured for circuit emulation.
[Oper Status] (display only)	Unconfigured (default)	This channel is not operational because the interface is not configured.
	InService	This channel is capable of receiving and sending signals.
	OutOfService	This channel is not capable of receiving and sending signals.
Connection Type	Pvc	Permanent virtual circuit (PVC).
	Svc	Switched virtual circuit (SVC).
Service Type	Plar	Private line automatic ringdown. Use this only for PVC connections.
	Fxs	Foreign exchange subscriber (FXS). Use this only for PVC connections.
	S-signaling	Use this only for SVC connections.
[Silence Suppression] (display only)	Disabled	Silence suppression is disabled.
[Echo Cancellation] (display only)	Disabled	The echo cancellation function is disabled. This function is a method for isolating and filtering unwanted signal energy caused by echos from the main transmitted signal.
[Voice Compression] (display only)	None	Voice compression is disabled.

Table 45. Field Values – 2W Source Port and Channel Configuration Panel (continued)

Field Name	Values	Description
[Companding Law] (display only)	MuLawPCM	The PCM coding and companding standard used in North America and Japan.
[AAL Encapsulation] (display only)	Aal1	ATM Adaptation Layer 1 (AAL1)

5 To apply the values for the fields on this panel, select the **Apply Port and Channel Configuration** command and press Return.

6 Select the **Configure Interface** command and press Return.

The Circuit Emulation Interface Configuration panel is displayed. See *"Configuring the Circuit Emulation Interface" on page 181* for instructions.

7 Repeat Steps 3.b–6 for the remainder of the ports, as needed.

Note:
Whenever needed, use the commands on the Two Wire Source Configuration panel (*Figure 98 on page 172*) and on the Two Wire Source Port and Channel Configuration panel (*Figure 99 on page 173*) to manage the interfaces.

8 Save the values to the AC 60/120 system database now, or before you exit the current session of the AC 60/120 system console interface. See *"Saving Equipment Configuration and Logging Off" on page 188*.

Configuring the User and Network Interfaces

This section provides instructions for configuring the various types of user and network interfaces:

- ATM IISP (user and network)
- ATM UNI 3.0 or 3.1
- Circuit emulation
- Dynamic bandwidth circuit emulation
- Ethernet bridge
- Frame relay UNI and NNI
- HDLC pass-through
- Terminal emulation

Before you can set interface configuration values, you must have selected an interface type value (other than **Unconfigured**) in the **Interface Type** field on a Port and Channel configuration panel. See *"Configuring the Ports and Channels" on page 97*.

The following table shows the AC 60/120 system interface types by I/O and server module types.

Table 46. Interface Types by I/O and Server Module Types

Module/Interface Type	ATM UNI 3.0/3.1	ATM IISP (User, Network)	Circuit Emulation	Dynamic Bandwidth Circuit Emulation	Frame Relay (UNI, NNI)	HDLC Pass-through	Terminal Emulation
DS1/T1– Cell Bearing I/O	X	X					
DS1/T1– Circuit Emulation I/O			X	X			
Enhanced DS1/T1 I/O			X		X	X	
E1– Cell Bearing I/O	X	X					
E1– Circuit Emulation I/O			X				
Enhanced E1 I/O					X	X	
DS3 I/O	X	X					
E3 I/O	X	X					
High Speed I/O	X	X	X (serial port)				
Multi-Serial I/O	X	X	X		X	X	X
OC-3c MM and SM I/O (four types)	X	X					
STM-1 SM I/O (four types)	X	X					
TAXI I/O	X	X					
Voice 2W Office (Sink) I/O			X				
Voice 2W Station (Source) I/O			X				

Configuring the ATM IISP Interface

If you selected the value **IispUser** or **IispNetwork** as the interface type (refer to *Table 46 on page 176*), the ATM IISP Interface Configuration panel is displayed.

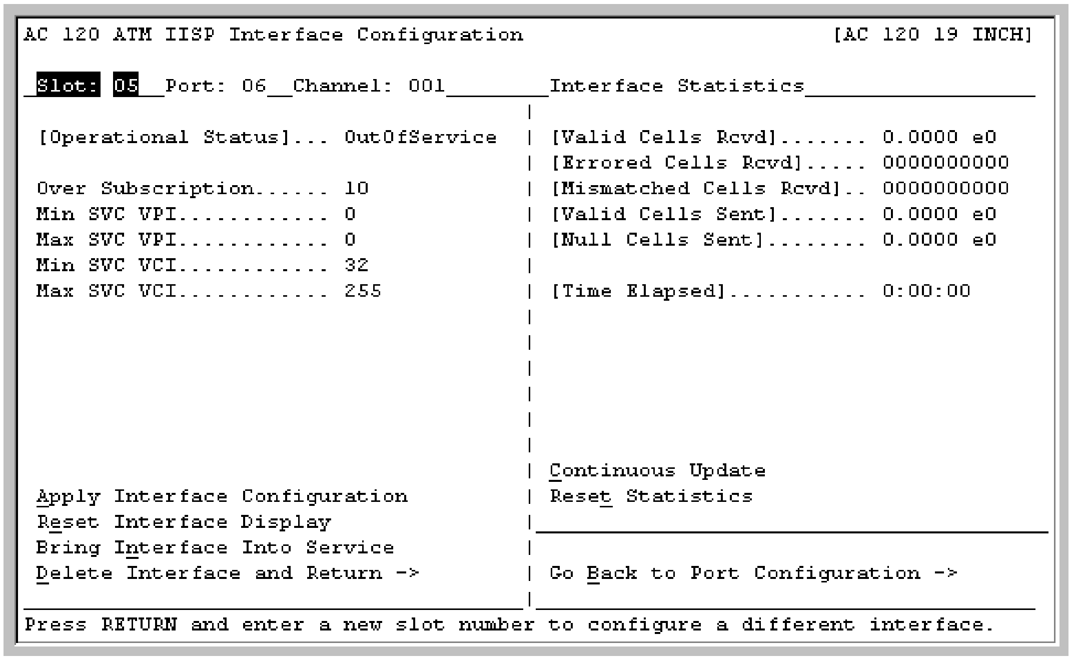


Figure 100. ATM IISP Interface Configuration Panel

The commands on this panel have the following functions:

Apply Interface Configuration	Applies the configuration field values you set (see *Table 47 on page 178*).
Reset Interface Display	Resets the fields to the last set of applied values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Delete Interface and Return→	Deletes an out-of-service interface and redisplays the Port and Channel Configuration panel for the module you are configuring.
Go Back to Port Configuration→	Redisplays the Port and Channel Configuration panel for the module you are configuring.

➤ Procedure

To configure the ATM IISP interface:

1 Select the values for the fields on this panel from the values given in *Table 47 on page 178*.

Table 47. Field Values – ATM IISP Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	InService	Indicates that the interface is operational.
	OutOfService	Indicates that the interface is not operational.
Over Subscription	01 through 10 (default = 10)	The risk factor for this function. This factor indicates the amount of oversubscription allowed by the system.
Min SVC VPI	0 through 255 (default = 0)	The minimum VPI value in which signaling can occur.
Max SVC VPI	0 through 255 (default = 0)	The maximum VPI in which signaling can occur.
Min SVC VCI	32 through 4000 (default = 32)	The minimum VCI in which signaling can occur.
Max SVC VCI	32 through 4000 (default = 255)	The maximum VCI in which signaling can occur.

2. To apply the interface configuration values, select the **Apply Interface Configuration** command and press Return.
3. To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Return.

   The value **InService** is displayed in the **[Operational Status]** field.

   If you need to change the interface configuration values (either in the current session or at some future time), you must first take the interface to out-of-service status. If you do this action, you should be aware that the current permanent virtual circuit (PVC) connections and the switched virtual circuit (SVC) connections using this interface will be deleted from the system. To change the interface configuration values:

   a. Select the **Take Interface Out Of Service** command and press Return.

      The following message is displayed:

      ```
      Taking the interface down will cause all SVCs to be
      lost. Continue? (y/n)
      ```

   b. Press the y key (to indicate yes) to continue.
   c. Repeat steps 1–3.

Note:
The interface must have in-service status so that PVCs and SVCs you set up to use this interface will work.

Configuring the ATM UNI Interface

If you selected the value **AtmUni3-0** or **AtmUni3-1** as the interface type, the ATM UNI Interface Configuration panel is displayed. See the following figure.

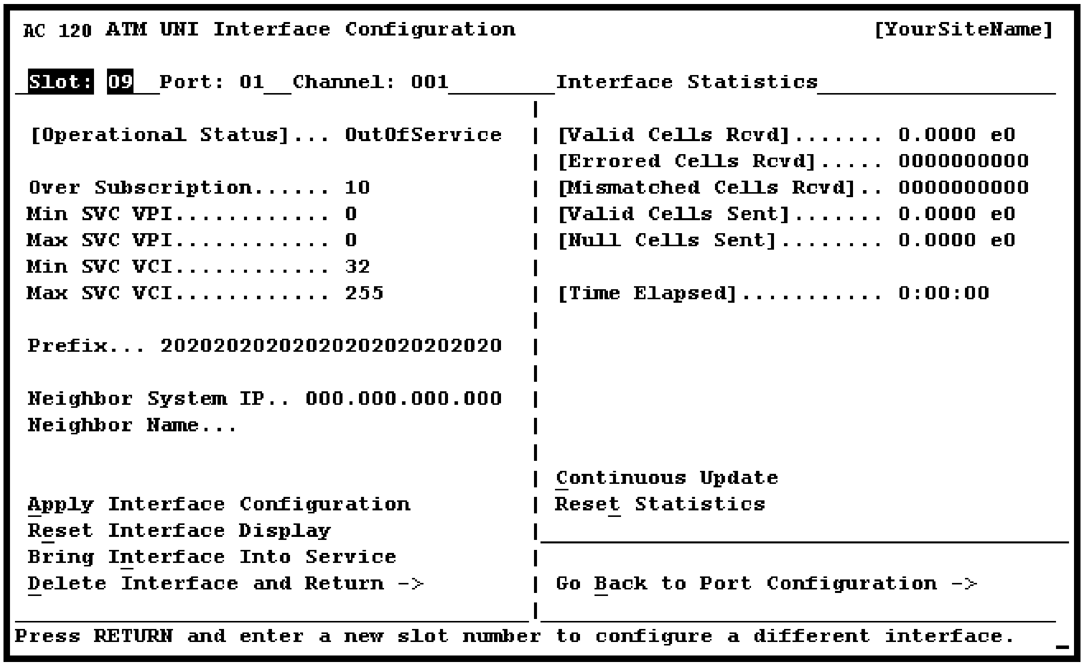


Figure 101. ATM UNI Interface Configuration Panel

The commands on this panel have the following functions:

Apply Interface Configuration	Applies the configuration field values you set (see *Table 48 on page 180*).
Reset Interface Display	Resets the fields to the last set of applied values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Delete Interface and Return→	Deletes an out-of-service interface and redisplays the Port and Channel Configuration panel for the module you are configuring.
Go Back to Port Configuration→	Redisplays the Port and Channel Configuration panel for the module you are configuring.

➤ Procedure

To configure the ATM UNI interface:

1. Select the values for the fields on this panel from the values given in *Table 48 on page 180*.

Table 48. Field Values – ATM UNI Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	In service	Indicates that the interface is operational.
	Out of service	Indicates that the interface is NOT operational.
Over Subscription	01 through 10 (default = 10)	The risk factor for this function. This factor indicates the amount of oversubscription allowed by the system.
Min SVC VPI	0 through 255 (default = 0)	The minimum VPI value in which signaling can occur.
Max SVC VPI	0 through 255 (default = 0)	The maximum VPI in which signaling can occur.
Min SVC VCI	32 through 4000 (default = 32)	The minimum VCI in which signaling can occur.
Max SVC VCI	32 through 4000 (default = 255)	The maximum VCI in which signaling can occur.
Prefix	26 hex	ATM UNI network prefix. The 13 byte NSAP prefix used for signalling. It is specified as 26 hexadecimal digits. Each prefix must begin with 39, 45, or 47.
Neighbor System IP	xxx.xxx.xxx.xxx (IP address)	IP address field to identify the system connected to this port.
Neighbor Name	Up to 20 alpha characters	Text informational field to identify the system connected to this port.

2 To apply the interface configuration values, select the **Apply Interface Configuration** command and press Return.

3 To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to change the interface configuration values (either in the current session or at some future time), you must first take the interface to out-of-service status. If you do this action, you should be aware that the current PVCs using this interface will be deleted from the system. To change the interface configuration values, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

b Press the **y** key (to indicate yes) to continue.

c Repeat Steps 1–3.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Configuring the Circuit Emulation Interface

If you selected the value **CircuitEmulation** as the interface type, the ATM Circuit Emulation Interface Configuration panel is displayed. See the following figure.

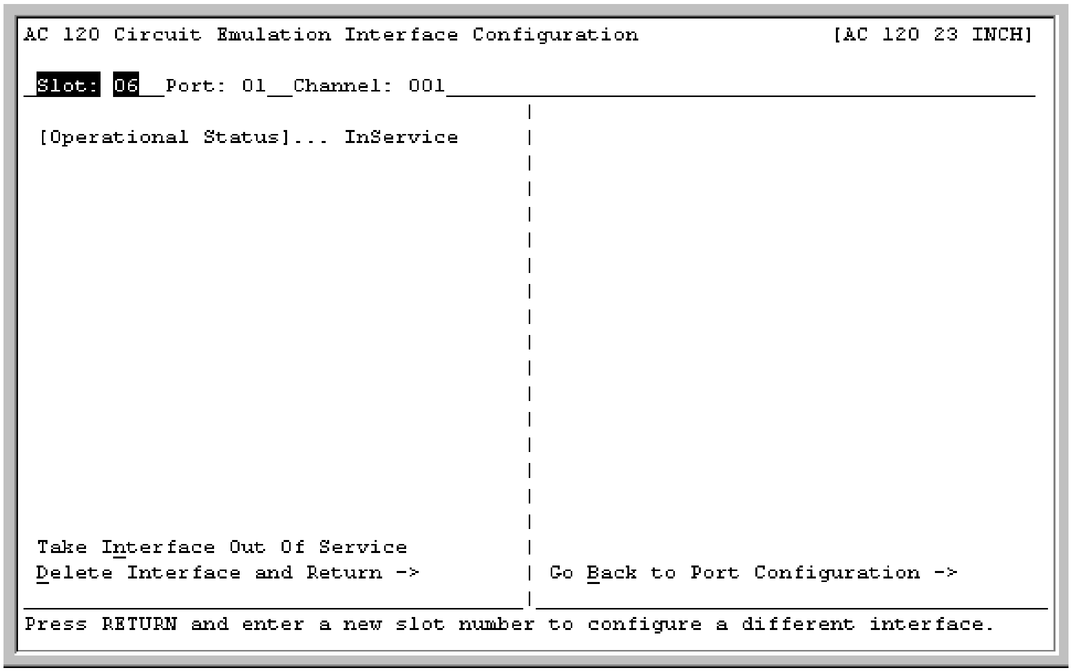


Figure 102. Circuit Emulation Interface Configuration Panel

➤ Procedure

To configure the circuit emulation interface:

1 To bring the interface to in-service status, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to take the interface to out-of-service status, you should be aware that the current PVCs using this interface will be deleted from the system. To take the interface out-of-service, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

b Press the **y** key (to indicate yes) to continue.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Configuring the DBCES Interface

If you selected the value **DBCirEm** (dynamic bandwidth circuit emulation service) as the interface type (refer to *Table 101 on page 179*), the Dynamic Bandwidth Circuit Emulation Interface panel is displayed.

```
AC 120  Dynamic Bandwidth Circuit Emulation Interface           [YourSiteName]

 Slot: 01  Port: 01  Channel: 001
                                              |
 [Operational Status].... OutOfService        |
                                              |
 Signaling Type........ PLAR                  |
 Data Tx Idle Pattern.. 7F                    |
                                              |
                                              |
                                              |
                                              |
                                              |
                                              |
                                              |
                                              |
                                              |
                                              |
 Apply Interface Configuration                |
 Reset Interface Display                      |
 Bring Interface Into Service                 |
 Delete Interface and Return ->               | Go Back to Port Configuration ->
                                              |
Press RETURN and enter a new slot number to configure a different interface.
```

Figure 103. Dynamic Bandwidth Circuit Emulation Interface Panel

The commands on this panel have the following functions:

Apply Interface Configuration	Applies the configuration field values you set.
Reset Interface Display	Resets the fields to the last set of applied values.
Bring Interface Into Service (displayed when the [Oper Status] field is OutOfService)	Brings an out-of-service configured interface to in-service status. The value **InService** is displayed in the **[Oper Status]** field.
Take Interface Out of Service (displayed when the [Oper Status] field is inService)	Takes an in-service configured interface to out-of-service status. The value **OutOfService** is displayed in the **[Oper Status]** field.
Delete Interface and Return→	Deletes an out-of-service interface and redisplays the DS1 Circuit Emulation Channel Configuration panel.
Go Back to Port Configuration→	Redisplays the DS1 Circuit Emulation Channel Configuration panel.

➤ Procedure

To configure the DBCES interface:

1 Select the values for the fields on this panel from the values given in the following table.

Table 49. Field Values – Dynamic Bandwidth Circuit Emulation Interface Panel

Field Name	Values	Description
[Operational Status] (display only)	In service	Indicates that the interface is operational.
	Out of service	Indicates that the interface is not operational.
Signaling Type		ABCD signaling protocol, must be configured based on device configuration connection to the AC 60/120 system.
	PLAR	Private line automatic ringdown.
	FXO-LoopStart	Foreign exchange office-loop start
	FSX-LoopStart	Foreign exchange subscriber-loop start.
Data Tx Idle Pattern	Any hexadecimal number in the range from 00 to FF.	Data pattern transmitted to the TDM network when the channel is idle.

2 To apply the interface configuration values, select the **Apply Interface Configuration** command and press Return.

The value **OutofService** is displayed in the **[Operational Status]** field.

3 To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to change the interface configuration values (either in the current session or at some future time), you must first take the interface to out-of-service status. If you do this action, you should be aware that the current permanent virtual connections (PVCs) using this interface will be deleted from the system. To change the interface configuration values, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

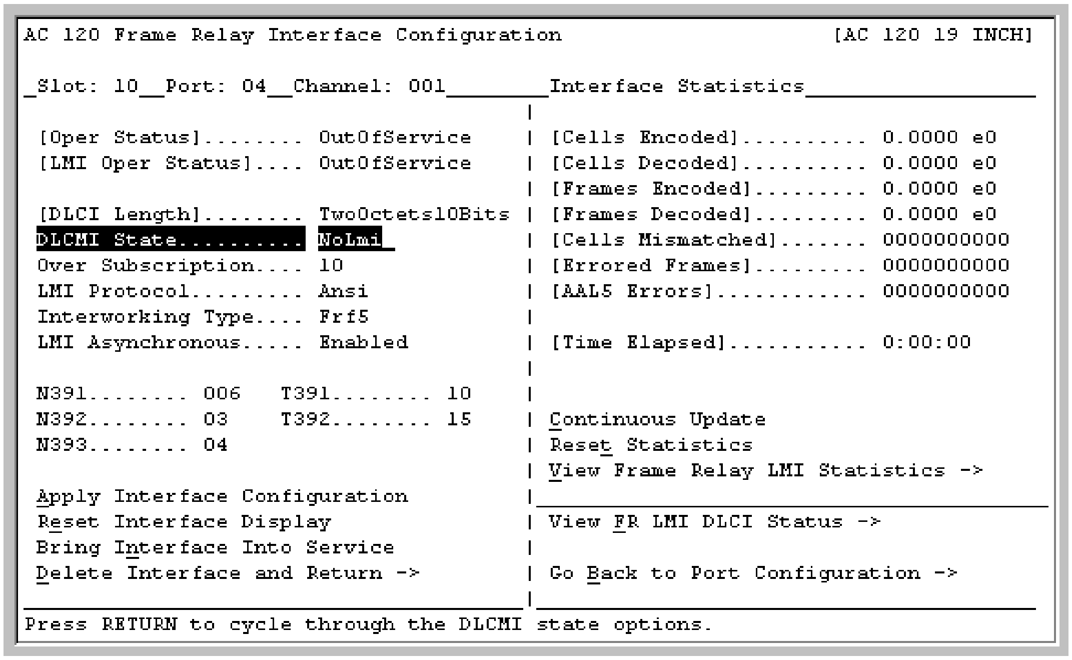
b Press the y key (to indicate yes) to continue.

c Repeat steps 1–3.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Configuring the Frame Relay Interface

If you selected the value **FrameRelay** as the interface type, the Frame Relay Interface Configuration panel is displayed. See the following figure.



```
AC 120 Frame Relay Interface Configuration                  [AC 120 19 INCH]

_Slot: 10__Port: 04__Channel: 001________Interface Statistics___________________
                                        |
 [Oper Status]........ OutOfService     | [Cells Encoded].......... 0.0000 e0
 [LMI Oper Status].... OutOfService     | [Cells Decoded].......... 0.0000 e0
                                        | [Frames Encoded]......... 0.0000 e0
 [DLCI Length]........ TwoOctets10Bits  | [Frames Decoded]......... 0.0000 e0
 DLCMI State.......... NoLmi_           | [Cells Mismatched]....... 0000000000
 Over Subscription.... 10               | [Errored Frames]......... 0000000000
 LMI Protocol......... Ansi             | [AAL5 Errors]............ 0000000000
 Interworking Type.... Frf5             |
 LMI Asynchronous..... Enabled          | [Time Elapsed]........... 0:00:00
                                        |
 N391........ 006   T391........ 10     |
 N392........ 03    T392........ 15     | Continuous Update
 N393........ 04                        | Reset Statistics
                                        | View Frame Relay LMI Statistics ->
 Apply Interface Configuration          |________________________________________
 Reset Interface Display                | View FR LMI DLCI Status ->
 Bring Interface Into Service           |
 Delete Interface and Return ->         | Go Back to Port Configuration ->
________________________________________|______________________________________
Press RETURN to cycle through the DLCMI state options.
```

Figure 104. Frame Relay Interface Configuration Panel

➤ Procedure

To configure the Frame Relay interface:

1. Select the values for the fields on this panel from the values given in the following table.

Table 50. Field Values – Frame Relay Interface Configuration Panel

Field Name	Values	Description
[Operational Status] (display only)	OutOfService (default)	Indicates that the interface is not operational.
	InService	Indicates that the interface is operational.
[LMI Oper Status] (display only)	OutOfService (default)	Indicates that the local management interface (LMI) is not operational.
	InService	Indicates that the local management interface is operational.
[DLCI Length] (display only)	TwoOctets10 Bits	Type of data link connection identifier (DLCI) format used.
DLCMI State (for frame relay UNI only)	NoLmi (default)	No local management interface (LMI).
	LmiDte	LMI is DTE device.
	LmiDce	LMI is DCE device.
DLCMI State (display only for frame relay NNI)	LmiNni	Local management interface is used with network-to-network interface.
Over Subscription	Range: 1–10 (default = 10)	The cell addressing control takes into account the oversubscription factor when determining if a connection can be made.

Table 50. Field Values – Frame Relay Interface Configuration Panel (continued)

Field Name	Values	Description
LMI Protocol	Ccitt (default)	Protocol uses Annex A (ITU Q.933, reference RFR.1).
	Ansi	Protocol uses Annex D (ANSI T2.617
	None	Use of local management interface is disabled.
Interworking Type	Frf8 (default)	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC service interworking.
	Frf5	FRF.8 (Frame Relay Forum Implementation Agreement)—frame relay to ATM PVC network interworking.
LMI Asynchronous	Enabled (default)	This mode sends LMI message whenever there is a status change.
	Disabled	This mode waits for regular LMI polling cycle.
N391	Range: 1–255 Default: 006	System parameter counter for full status (status of all PVCs) polling, used with user and network. **Note:** This parameter always applies to the user equipment. It applies to the user and network if the optional bidirectional network procedures are invoked.
N392	Range: 1–10 Default: 03	System parameter counter for error threshold, used with user and network. **Note:** The value of parameter N392 should be less than or equal to N393.
N393	Range: 1–10 Default: 04	System parameter counter for counting of monitored events, used with user and network. **Note:** If the value of parameter N393 is set to one much less than N391, then the link could go in and out of error-condition without the user equipment or network being notified.
T391	Range: 5–30 sec Default: 10	System parameter timer for link integrity verification polling. When the time expires, status enquiry is transmitted and error is recorded if status message is not received. **Note:** Parameter T391 always applies to the user. It applies to the user and network if the optional bidirectional network procedures are invoked.
T392	Range: 5–30 sec Default: 15	System parameter timer for polling verification. When the time expires, error is recorded by incrementing the value for parameter counter N392, and the timer is restarted. **Note:** Parameter T392 always applies to the network. It applies to the network and user equipment if the optional bidirectional network procedures are invoked. **Note:** The value of parameter T392 should be greater than the one for T391.

2 To apply the interface configuration values, select the **Apply Interface Configuration** command and press Return.

3 To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to change the interface configuration values (either in the current session or at some future time), you must first take the interface to out-of-service status. If you do this action, you should be aware that the current PVCs using this interface will be deleted from the system. To change the interface configuration values, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

b Press **y** (to indicate yes) to continue.

c Repeat Steps 1–3.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Configuring the HDLC Pass Through Interface

If you selected the value **HdlcPassThrough** as the interface type, the HDLC Pass Through Interface Configuration panel is displayed. See the following figure.

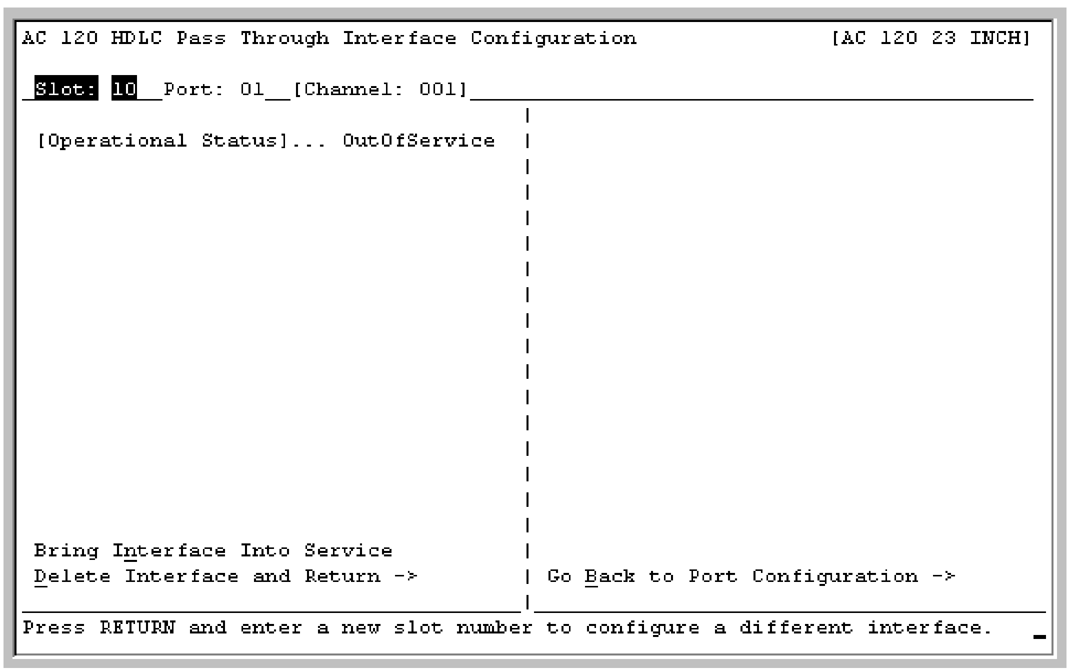


Figure 105. HDLC Pass Through Interface Configuration Panel

➤ Procedure

To configure the HDLC Pass Through Interface:

1 To bring the interface to in-service status, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to take the interface to out-of-service status, you should be aware that the current PVCs using this interface will be deleted from the system. To take the interface out-of-service, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

b Press the **y** key (to indicate yes) to continue.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Configuring the Terminal Emulation Interface

If you selected **TerminalEmulation** as the interface type, the ATM Terminal Emulation Interface Configuration panel is displayed. See the following figure.

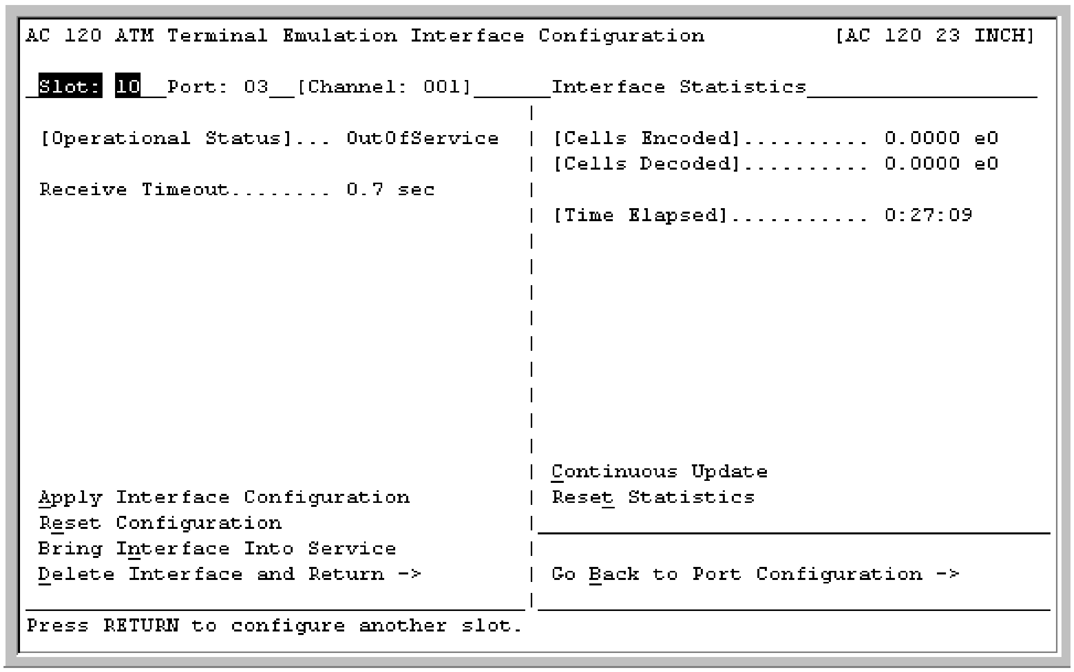


Figure 106. ATM Terminal Emulation Interface Configuration Panel

➤ Procedure

To configure the Terminal Emulation Interface:

1. Select the **Receive Timeout** field, and press Return to cycle through the set of predefined values: **0.7** (default), **0.8**, **0.9**, or **1.0**, and press Return.
2. To apply the interface configuration value, select the **Apply Interface Configuration** command and press Return.

3 To activate the interface after you have applied the configuration values, select the **Bring Interface Into Service** command and press Return.

The value **InService** is displayed in the **[Operational Status]** field.

If you need to change the interface configuration value (either in the current session or at some future time), you must first take the interface to out-of-service status. If you do this action, you should be aware that the current PVCs using this interface will be deleted from the system. To change the interface configuration values, do the following:

a Select the **Take Interface Out Of Service** command and press Return.

The following message is displayed:

```
Taking the interface down will cause all PVCs to be
lost. Continue? (y/n)
```

b Press **y** (to indicate yes) to continue.

c Repeat Steps 1–3.

Note:
The interface must have in-service status so that PVCs you set up to use this interface will work.

Saving Equipment Configuration and Logging Off

After configuring the module ports and channels, the interface types for each port and channel, and the connections, you must save your configuration permanently, before you exit the current session of the AC 60/120 system console interface.

CAUTION:
If you lose power or your current session ends abnormally while you are in the process of configuring the system, and you have not yet saved the values permanently, you would lose the values that you have applied on the various panels.

You can do this task after configuring each module, or at the end of the current session.

➤ Procedure

To save values permanently to the AC 60/120 System database (located on the hard disk of the CPU Module):

1 Press Control+g while on any panel to display the Console Interface Main Menu panel.

2 Select the **Save Configuration** command and press Return.

3 Wait at least 5 seconds for the system to write the values permanently to the AC 60/120 System database. The system displays the following message while it is executing this command:

```
Saving the equipment and connection information
```

When the command is completed, the system displays the following message:

```
The equipment and connection configuration has been
saved.
```

You can now safely exit the current session.

4 Select the **Exit Console Interface** command and press Return.

You are now logged off the AC 60/120 system console interface.

5 Provisioning Connections and Obtaining Statistics

This chapter describes how to set up permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) in the AC 60/120 systems for service provisioning and how to view statistics data for billing and performance monitoring.

Note:
Before you provision connections, you must have first completed:

- Setting the configuration values for one or more ports on the I/O and the server modules
- Setting the configuration values for the various types of interfaces you are using

See *Section 4, "Configuring the I/O and Server Modules"* for details.

This chapter contains the following PVC connection information:

This chapter contains the following SVC connection information:

Permanent Virtual Circuits

PVCs consist of connections between ports on the various AC 60/120 systems. When setting up some types of connections, you can set up data traffic to flow in several ways, depending on the type of connection as follows:

- Duplex

  Data flows in two directions between the two connection points (interface side A and interface side B).
- Simplex

  Data flows in only one direction, from side A to side B, or from side B to side A.
- Point to multipoint—supported for the DS3 and the High Speed Modules

  Data flows in only one direction, from one point on side A to several points on side B, or from one point on side B to several points on side A.

Configuring PVC Connections

Use the steps in the following procedure to set up PVCs, starting at the Console Interface Main Menu panel. See the following figure.

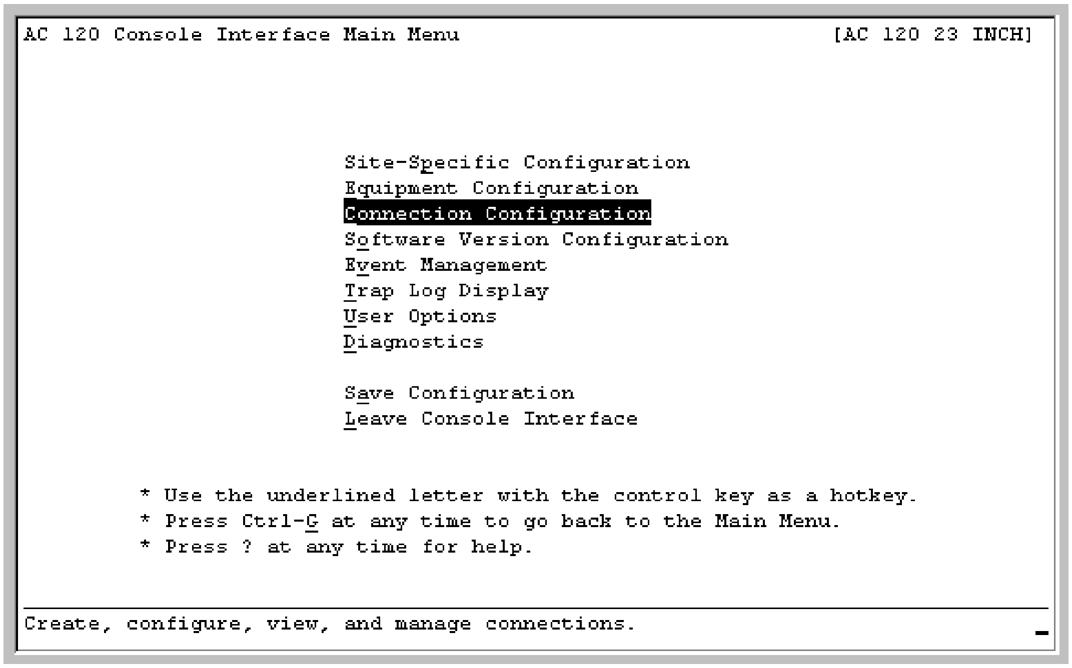


Figure 107. Console Interface Main Menu Panel (Connection Configuration Selected)

➤ Procedure

To set up PVCs:

1. Select **Connection Configuration** and press Return.

   The Connection Configuration Menu panel is displayed. See *Figure 108 on page 191*.

```
AC 120 Connection Configuration Menu                                  [AC 120 19 INCH]

 PVC Configuration:       ATM-to-ATM VCC
                          ATM-to-ATM VPC
                          Circuit Emulation-to-ATM VCC
                          Circuit Emulation-to-Circuit Emulation
                          VBR-to-ATM VCC
                          VBR-to-VBR
                          Bridge-to-ATM VCC
                          Bridge-to-Bridge (k)
                          Frame Relay-to-ATM VCC
                          Frame Relay-to-Frame Relay
                          In-Band Management IP PVC

 SVC Configuration:       ATM-to-ATM VCC (n)
                          IISP VBR Routing Table
                          IISP CBR Routing Table

                          Go Back to Main Menu

--------------------------------------------------------------------------------
Create, delete, view, and manage ATM-to-ATM VCC PVCs.
```

Figure 108. Connection Configuration Menu Panel (ATM-to-ATM VCC Selected)

ATM-to-ATM VCC PVC Connection

➤ Procedure

To add an ATM-to-ATM VCC connection:

1 Select **ATM-to-ATM VCC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The ATM-to-ATM VCC PVC Table panel is displayed. See the following figure.

```
AC 120 ATM-to-ATM VCC PVC Table                                       [AC 120 23 INCH]
           ______________________________________________________________________
Page Up    |    (ATM Interface A)     |     (ATM Interface B)     |             |
Page Down  |Slot Port Chnl VPI  VCI   |Slot Port Chnl VPI  VCI    | Flow        |
Top        |--------------------------|---------------------------|-------------|
Bottom     | [end of table]           |                           |             |
           |                          |                           |             |
Total:     |                          |                           |             |
 0/0       |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |                          |                           |             |
           |__________________________|___________________________|_____________|
Find...... Slot:    Port:    Channel:            Add a Connection ->
           VPI:      VCI:                        Go Back to Connection Menu ->

--------------------------------------------------------------------------------
Press RETURN to view the previous page of connections.
```

Figure 109. ATM-to-ATM VCC PVC Table Panel

Note:
At the time of initial installation, the ATM-to-ATM VCC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VCI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the ATM-to-ATM VCC PVC Connection panel (*Figure 110 on page 193*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel (*Figure 108 on page 191*).

The display fields on this panel provide the following information about all the ATM-to-ATM VCC PVC connections in the AC 60/120 system:

ATM Interface A	This column displays the information for all interface A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, VPI, and VCI.
ATM Interface B	This column displays the information for all interface B sides of the connections.
Flow	This column displays the direction of the data traffic flow for the connections. See page *189* for an explanation of the flow types.
Total: 0/0	The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The ATM-to-ATM VCC PVC Connection panel is displayed. See *Figure 110 on page 193*.

```
AC 120 ATM-to-ATM VCC PVC Connection                            [AC 120 23 INCH]

_ATM Interface A_______________________ATM Interface B_____________________
                                       |
 Slot....... 0      VPI....... 0       | Slot....... 0      VPI....... 0
 Port....... 1      VCI....... 0       | Port....... 1      VCI....... 0
 Channel.... 1                         | Channel.... 1
                                       |
_Traffic Parameters A to B____________|_Traffic Parameters B to A____________
                                       |
 Service Type........ Ubr              | Service Type........ Ubr
 SAR Type............ Aal5             | SAR Type............ Aal5
 Frwd Error Correct.. None             | Frwd Error Correct.. None
 Peak Rate........... 1          cps   | Peak Rate........... 1          cps
 Sustained Rate...... 1          cps   | Sustained Rate...... 1          cps
 Max Burst Size...... 1          cells | Max Burst Size...... 1          cells
_______________________________________|_____________________________________
                                       | Display Next Connection
 Flow............ Duplex               | Add This Connection
                                       | Delete Connection
                                       | View Connection Statistics ->
                                       | Go Back to Connection Table ->
_______________________________________|_____________________________________
Press RETURN to edit the slot number for side A.
```

Figure 110. ATM-to-ATM VCC PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the ATM-to-ATM VCC PVC Statistics panel (*Figure 134 on page 229*).
Go Back to Connection Table→	Redisplays the ATM-to-ATM VCC PVC Connection Table panel (*Figure 110 on page 193*).

3 Select the values for the fields on this panel from the values given in *Table 51 on page 194*.

Table 51. Field Values for the ATM-to-ATM VCC PVC Connection Panel

Field Names	Values	Description
ATM Interface A		Side A of the connection that will send and receive signals.
ATM Interface B		Side B of the connection that will send and receive signals.
Slot		Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		Do not change the value **1** in this field.
VPI	Range: 0 to 255	Virtual path identifier. Enter a value for both sides of the connection.
VCI	Range: 32 to 4000	Virtual channel identifier. Enter a value for both sides of the connection.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express, Cbr4, Cbr3, Cbr2, Cbr1	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
SAR Type	Aal5 (default), Aal3-4, Aal2, Aal1, Null	The SAR type should correspond to the SAR type of the incoming data stream.
Peak Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for peak rate to **0**.
Sustained Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for sustained rate to **0**.
Max Burst Size (cells)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for maximum burst size to **0**.
Flow	Duplex (default), SimplexA2B, PointToMultipointA2B	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B** or **PointToMultipointA2B**, the fields in the **Traffic Parameters B to A** section are not displayed.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The ATM-to-ATM VCC PVC Table panel (*Figure 109 on page 191*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration**, and press Return to store the values to the AC 60/120 system database.

ATM-to-ATM VPC PVC Connection

Use the steps in the following procedure to add an ATM-to-ATM VPC connection, starting at the Connection Configuration Menu panel.

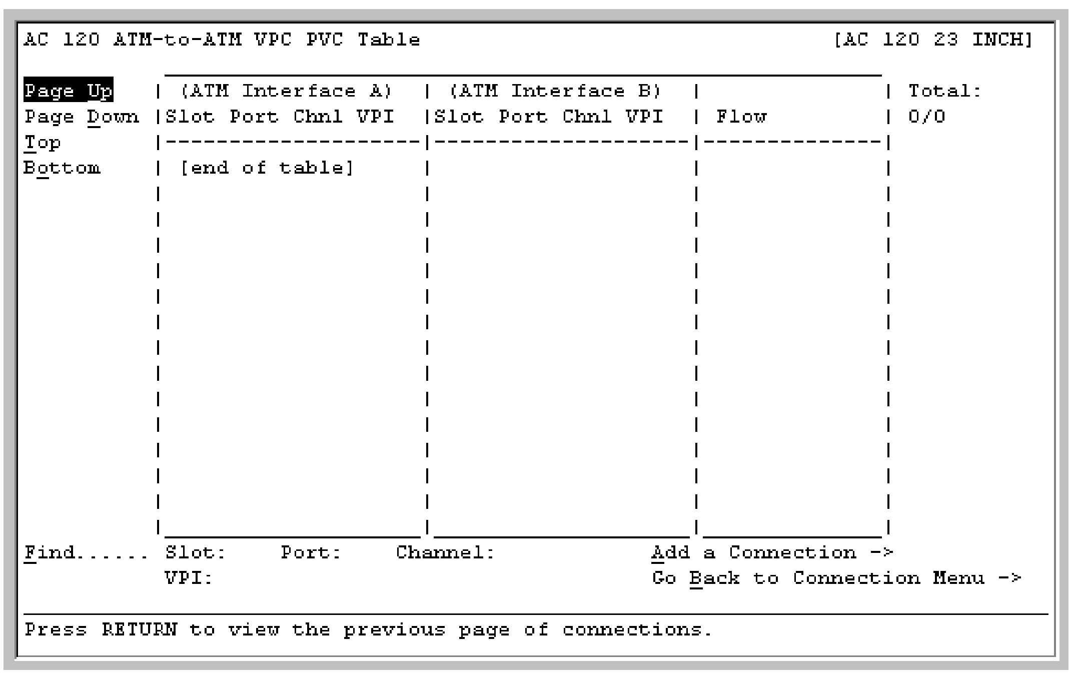
➤ Procedure

To add an ATM-to-ATM VPC connection:

1 Select **ATM-to-ATM VPC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The ATM-to-ATM VPC PVC Table panel is displayed.

Note:
At the time of initial installation, the ATM-to-ATM VPC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.



```
AC 120 ATM-to-ATM VPC PVC Table                                    [AC 120 23 INCH]

Page Up    | (ATM Interface A)    | (ATM Interface B)    |                | Total:
Page Down  |Slot Port Chnl VPI    |Slot Port Chnl VPI    | Flow           | 0/0
Top        |---------------------|---------------------|----------------|
Bottom     | [end of table]       |                      |                |

Find...... Slot:    Port:    Channel:              Add a Connection ->
           VPI:                                    Go Back to Connection Menu ->

Press RETURN to view the previous page of connections.
```

Figure 111. ATM-to-ATM VPC PVC Table Panel

The commands on this panel have the following functions:

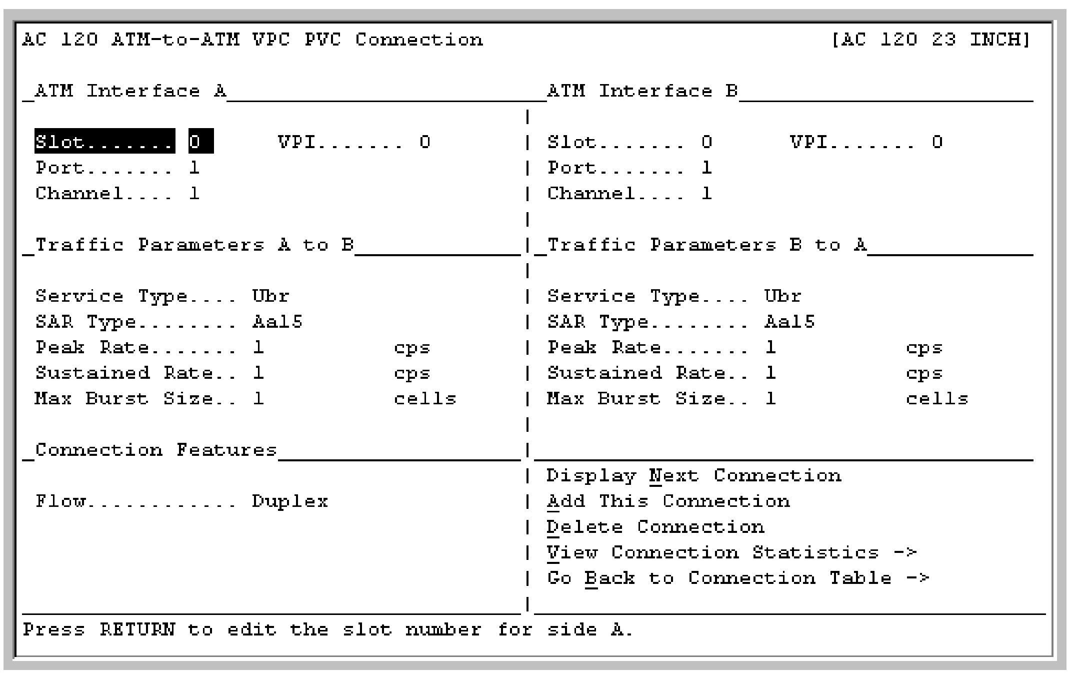
Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, and **VPI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the ATM-to-ATM VPC PVC Connection panel (*Figure 112 on page 196*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

The display fields on this panel provide the following information about all the ATM-to-ATM VPC PVC connections in the AC 60/120 system:

ATM Interface A	This column displays the information for all interface A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and VPI.
ATM Interface B	This column displays the information for all interface B sides of the connections.
Flow	This column displays the direction of the data traffic flow for the connections.
Total: 0/0	The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The ATM-to-ATM VPC PVC Connection panel is displayed.



```
AC 120 ATM-to-ATM VPC PVC Connection                          [AC 120 23 INCH]

_ATM Interface A_________________________ATM Interface B__________________________
                                        |
 Slot....... 0      VPI....... 0        | Slot....... 0      VPI....... 0
 Port....... 1                          | Port....... 1
 Channel.... 1                          | Channel.... 1
                                        |
_Traffic Parameters A to B_____________|_Traffic Parameters B to A_____________
                                        |
 Service Type.... Ubr                   | Service Type.... Ubr
 SAR Type........ Aal5                  | SAR Type........ Aal5
 Peak Rate....... 1          cps        | Peak Rate....... 1          cps
 Sustained Rate.. 1          cps        | Sustained Rate.. 1          cps
 Max Burst Size.. 1          cells      | Max Burst Size.. 1          cells
                                        |
_Connection Features___________________|________________________________________
                                        | Display Next Connection
 Flow............ Duplex                | Add This Connection
                                        | Delete Connection
                                        | View Connection Statistics ->
                                        | Go Back to Connection Table ->
_______________________________________|________________________________________
Press RETURN to edit the slot number for side A.
```

Figure 112. ATM-to-ATM VPC PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the ATM-to-ATM VPC PVC Statistics panel (*Figure 135 on page 230*).
Go Back to Connection Table→	Redisplays the ATM-to-ATM VPC PVC Connection Table panel (*Figure 111 on page 195*).

3 Select the values for the fields on this panel from the values given in *Table 52 on page 197.*

Table 52. Field Values for the ATM-to-ATM VPC PVC Connection Panel

Field Names	**Values**	**Description**
ATM Interface A		One side of the connection that will send and receive signals.
ATM Interface B		The other side of the connection that will send and receive signals.
Slot	Range: 1 to 20	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port	Range: 1 to 8	Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		Not used.
VCI	Range: 32 to 4000	Virtual channel identifier. Enter a value for both sides of the connection.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express, Cbr4, Cbr3, Cbr2, Cbr1	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35.*
SAR Type	Aal5 (default), Aal3-4, Aal2, Aal1, Null	The SAR type should correspond to the SAR type of the incoming data stream.
Peak Rate (cps)	Range: 1 to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for peak rate to **0**.
Sustained Rate (cps)	Range: 1 to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for sustained rate to **0**.

Table 52. Field Values for the ATM-to-ATM VPC PVC Connection Panel (continued)

Field Names	Values	Description
Max Burst Size (cells)	Range: 1 to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for maximum burst size to **0**.
Flow	Duplex (default), SimplexA2B, PointToMultipointA2B	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B** or **PointToMultipointA2B**, the fields in the **Traffic Parameters B to A** section are not displayed.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The ATM-to-ATM VPC PVC Table panel (*Figure 111 on page 195*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration**, and press Return to store the values to the AC 60/120 system database.

Bridge-to-ATM VCC PVC Connection

Use the steps in the following procedure to add a bridge-to-ATM VCC PVC connection, starting at the Connection Configuration Menu panel.

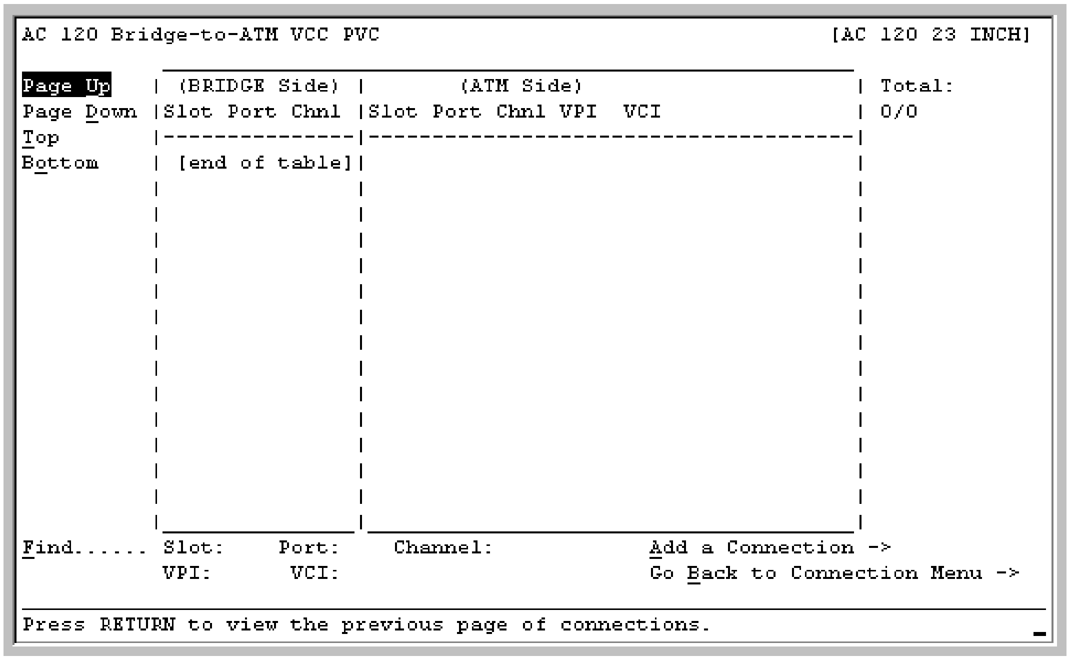
➤ Procedure

To add a bridge-to-ATM VCC PVC connection:

1 Select **Bridge-to-ATM VCC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Bridge-to-ATM VCC PVC Table panel is displayed. See *Figure 113 on page 199*.

Note:
At the time of initial installation, the Bridge-to-ATM VCC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.



```
AC 120 Bridge-to-ATM VCC PVC                                    [AC 120 23 INCH]

Page Up    | (BRIDGE Side) |        (ATM Side)                     | Total:
Page Down  |Slot Port Chnl |Slot Port Chnl VPI  VCI                | 0/0
Top        |---------------|---------------------------------------|
Bottom     | [end of table]|                                       |

Find...... Slot:    Port:    Channel:            Add a Connection ->
           VPI:     VCI:                         Go Back to Connection Menu ->

Press RETURN to view the previous page of connections.
```

Figure 113. Bridge-to-ATM VCC PVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VCI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the Bridge-to-ATM VCC PVC Connection panel (*Figure 114 on page 200*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

2 Select the **Add a Connection** command and press Return.

The Bridge-to-ATM VCC PVC Connection Panel is displayed. See *Figure 114 on page 200*.

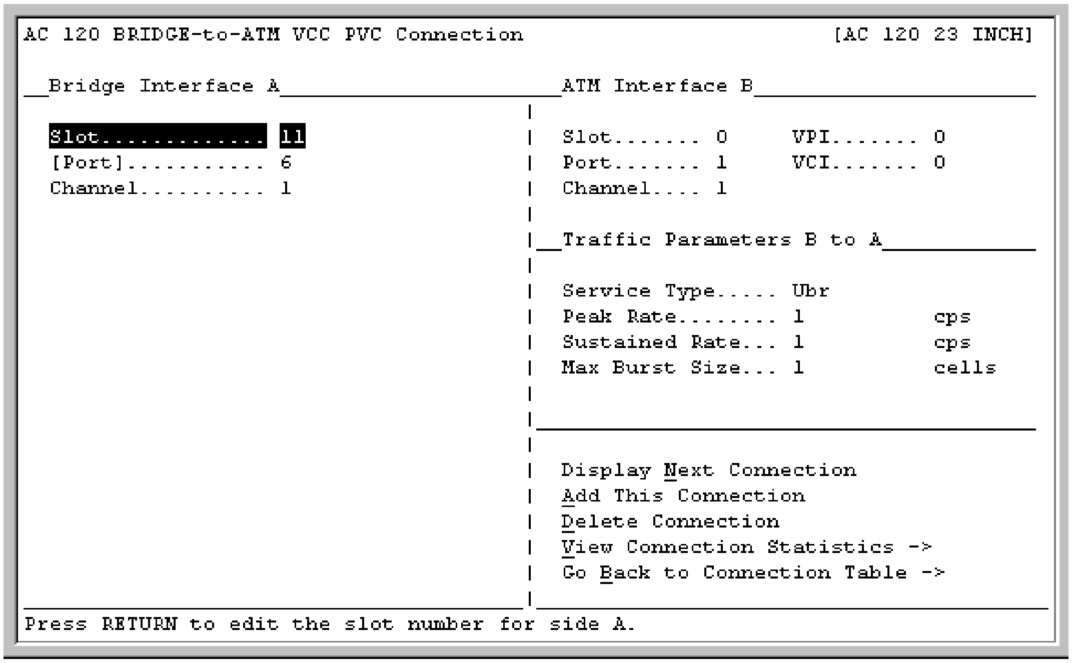


Figure 114. Bridge-to-ATM VCC PVC Connection Panel

Note:
Traffic parameters are used when a connection is made to a traffic shapping ATM module.

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the Bridge-to-ATM VCC PVC Connection Statistics panel.
Go Back to Connection Table→	Redisplays the Bridge-to-ARM VCC PVC Table panel (*Figure 113 on page 199*).

3 Select the values for the fields on this panel from the values given in *Table 53 on page 200*.

Table 53. Field Values for the Bridge-to-ATM VCC PVC Connection Panel

Field Names	**Values**	**Description**
Bridge Interface A		Side A of the connection that will send and receive signals. (Ethernet side)
ATM Interface B		Side B of the connection that will send and receive signals. (ATM side)
Slot	Range: 1 to 20 (based on chassis type)	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
[Port] (display only)	6	The virtual port number on the module for which you are creating a connection.

Table 53. Field Values for the Bridge-to-ATM VCC PVC Connection Panel (continued)

Field Names	**Values**	**Description**
Channel	Range: 1 to 70	Enter the channel number associated with the bridge group number on the Ethernet Module for which you are creating a connection. Enter channel numbers for the Ethernet side of the connection.
VPI	Range: 0 to 255	Virtual path identifier. Enter a value for the ATM side of the connection.
VCI	Range: 32 to 4000	Virtual channel identifier. Enter a value for the ATM side of the connection.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
Peak Rate (cps)	Default: 1	When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for that module. See the ATM UNI 3.0 specifications for details.
Sustained Rate (cps)	Default: 1	When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for that module. See the ATM UNI 3.0 specifications for details.
Max Burst Size (cells)	Default: 1	When setting this value, take into account the line rate for the module and the amount of bandwidth you are setting up for each interface for that module. See the ATM UNI 3.0 specifications for details.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return.

The Bridge-to-ATM VCC PVC Table panel (*Figure 113 on page 199*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration**, and press Return to store the values to the AC 60/120 System database.

Bridge-to-Bridge PVC Connection

Use the steps in the following procedure to add a bridge-to-bridge PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a bridge-to-bridge PVC connection:

1 Select **Bridge-to-Bridge** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Bridge-to-Bridge PVC Table panel is displayed. See the following figure.

```
AC 120 Bridge-to-Bridge PVC                                      [AC 120 23 INCH]
            ________________________________________________
Page Up    |   (Bridge A)           |     (Bridge B)          | Total:
Page Down  | Slot Port Chnl         | Slot Port Chnl          | 0/0
Top        |------------------------|-------------------------|
Bottom     | [end of table]         |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |                        |                         |
           |________________________|_________________________|
                                                  Add a Connection ->
Find...... Slot:    Port:    Channel:             Go Back to Connection Menu ->
________________________________________________________________________________
Press RETURN to view the previous page of connections.
```

Figure 115. Bridge-to-Bridge PVC Table Panel

Note:
At the time of initial installation, the Bridge-to-Bridge PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, and **Channel** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the Bridge-to-Bridge PVC Connection panel (*Figure 116 on page 203*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

2 Select the **Add a Connection** command and press Return.

The Bridge-to-Bridge PVC Connection panel is displayed. See *Figure 116 on page 203*.

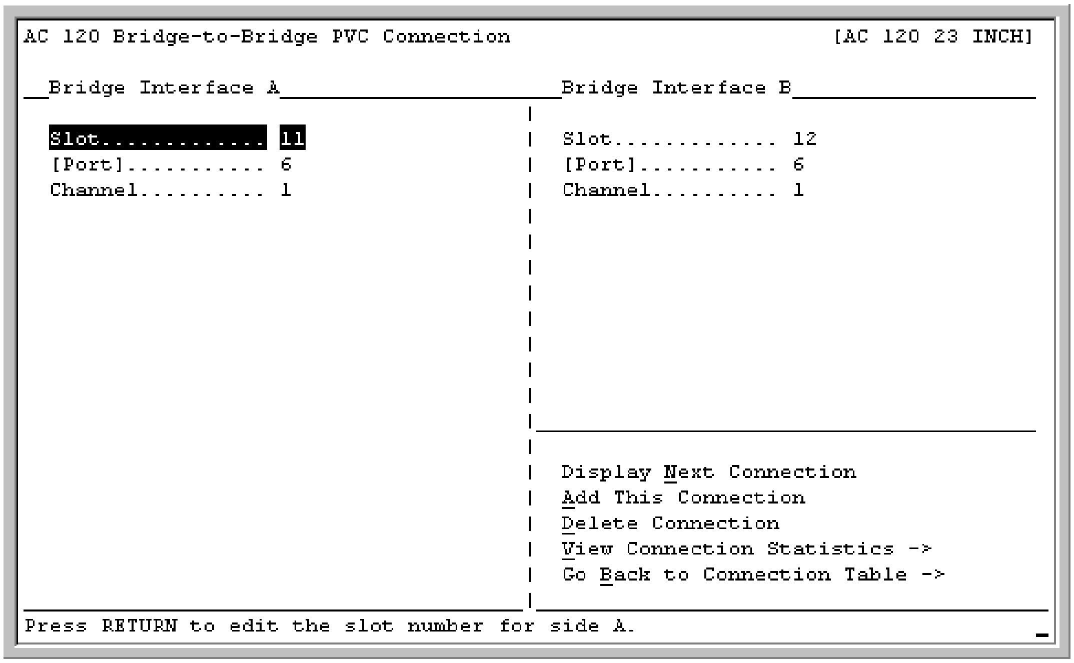


Figure 116. Bridge-to-Bridge PVC Connection Panel

3 Select the values for the fields on this panel from the values given in *Table 54 on page 203*.

Table 54. Field Values for the Bridge-to-Bridge PVC Connection Panel

Field Names	Description
Bridge Interface A	Side A of the connection that will send and receive signals.
Bridge Interface B	Side B of the connection that will send and receive signals.
Slot	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
[Port] (display only)	Port 6, the virtual port on the Ethernet Module, is displayed.
Channel	Enter the channel number associated with the port number on the Ethernet Module for which you are creating a connection. Enter channel numbers for both sides of the connection.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return.

The Bridge-to-Bridge PVC Table panel (*Figure 115 on page 202*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration**, and press Return to store the values to the AC 60/120 system database.

Circuit Emulation-to-ATM VCC PVC Connection

Circuit emulation connections apply to a DS1/T1 interface configured for structured circuit emulation. In a typical scenario, individual DS0s on a DS1 interface are adapted to ATM and transported over an ATM DS3 UNI interface. Use the steps in the following procedure to add a circuit emulation-to-ATM VCC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a circuit emulation-to-ATM VCC connection:

1 Select **Circuit Emulation-to-ATM VCC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Circuit Emulation-to-ATM VCC PVC Table panel is displayed. See the following figure.

Note:
At the time of initial installation, the Circuit Emulation-to-ATM VCC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

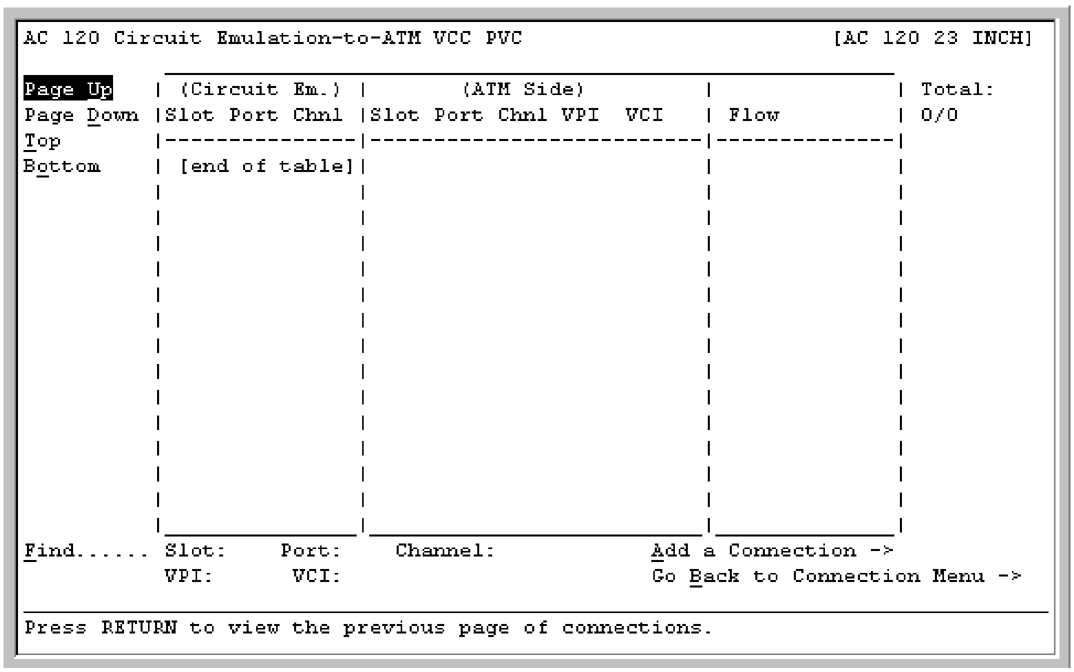


Figure 117. Circuit Emulation-to-ATM VCC PVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VCI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the Circuit Emulation-to-ATM VCC PVC Connection panel (*Figure 118 on page 205*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

The display fields on this panel provide the following information about all the circuit emulation-to-ATM VCC PVC connections in the AC 60/120 system:

Circuit Emulation Side This column displays the information for all circuit emulation sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port and channel.

ATM Interface Side This column displays the information for all ATM interface sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, VPI, and VCI.

Flow This column displays the direction of the data traffic flow for the connections.

Total: 0/0 The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The Circuit Emulation-to-ATM VCC PVC Connection panel is displayed. See the following figure.

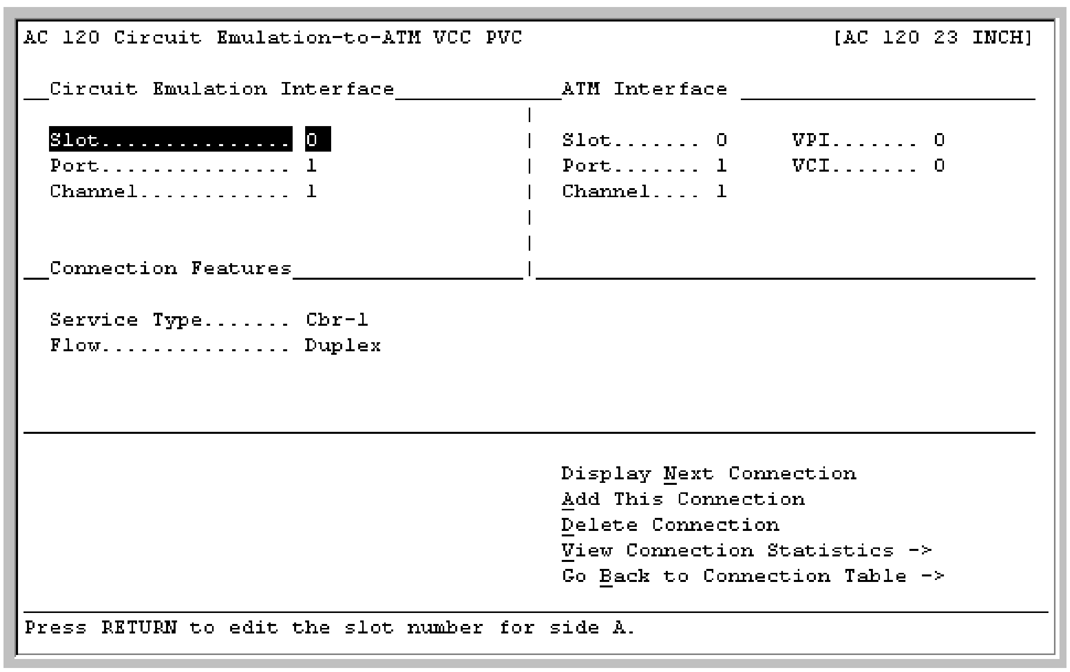


Figure 118. Circuit Emulation-to-ATM VCC PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection Displays the next connection of this type in the table.

Add This Connection Adds a connection having the values currently displayed on the panel.

Delete Connection Deletes the connection having the values currently displayed on the panel.

View Connection Statistics→ Displays the Circuit Emulation-to-ATM VCC PVC Statistics panel (*Figure 136 on page 230*).

Go Back to Connection Table→ Redisplays the Circuit Emulation-to-ATM VCC PVC Connection Table panel (*Figure 117 on page 204*).

3 Select the values for the fields on this panel from the values given in *Table 55 on page 206*.

Table 55. Field Values — Circuit Emulation-to-ATM VCC PVC Connection Panel

Field Names	Values	Description
Circuit Emulation Interface		The circuit emulation side of the connection that will send and receive signals.
ATM Interface		The ATM interface side of the connection that will send and receive signals.
Slot		Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		On the Circuit Emulation Interface side, enter the channel number of the port on the module for which you are creating a connection. On the ATM Interface side, do not change the value **1** in this field.
VPI	Range: 0 to 255	Virtual path identifier. Enter a value for the ATM side of the connection.
VCI	Range: 32 to 4000	Virtual channel identifier. Enter a value for the ATM side of the connection.
Service Type	Cbr-1 (default) Cbr-2, Cbr-3, Cbr-4	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
Flow	Duplex (default), SimplexA2B, SimplexB2A, PointToMulti-pointA2B, PointToMulti-pointB2A	Direction of the flow of data traffic in this connection. See page *189* for more information.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The Circuit Emulation-to-ATM VCC PVC Table panel (*Figure 117 on page 204*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration**, and press Return to store the values to the AC 60/120 system database.

Circuit Emulation-to-Circuit Emulation PVC Connection

Circuit emulation connections apply to a DS1 interface configured for structured circuit emulation. In a typical scenario, individual DS0s on a DS1 interface are adapted to ATM and transported over an ATM DS3 UNI interface. Use the steps in the following procedure to add a circuit emulation-to-circuit emulation connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a circuit emulation-to-circuit emulation connection:

1 Select **Circuit Emulation-to-Circuit Emulation** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Circuit Emulation-to-Circuit Emulation PVC Table panel is displayed. See *Figure 119 on page 207*.

Note:
At the time of initial installation, the Circuit Emulation-to-Circuit Emulation PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

```
AC 120 Circuit Emulation-to-Circuit Emulation PVC          [AC 120 23 INCH]

Page Up    |    (Side A)    |    (Side B)    |                      | Total:
Page Down  |Slot Port Chnl  |Slot Port Chnl  | Flow                 | 0/0
Top        |----------------|----------------|----------------------|
Bottom     | [end of table] |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |                |                |                      |
           |________________|________________|______________________|
                                                  Add a Connection ->
Find...... Slot:    Port:    Channel:             Go Back to Connection Menu ->
______________________________________________________________________________
Press RETURN to view the previous page of connections.
```

Figure 119. Circuit Emulation-to-Circuit Emulation PVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, and **Channel** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the ATM-to-ATM VCC PVC Connection panel (*Figure 120 on page 208*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

The display fields on this panel provide the following information about all the circuit emulation-to-circuit emulation PVC connections in the AC 60/120 system:

Circuit Emulation Side A — This column displays the information for all circuit emulation A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port and channel.

Circuit Emulation Side B — This column displays the information for all circuit emulation B sides of the connections.

Flow — This column displays the direction of the data traffic flow for the connections.

Total: 0/0 — The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The Circuit Emulation-to-Circuit Emulation PVC Connection panel is displayed. See the following figure.

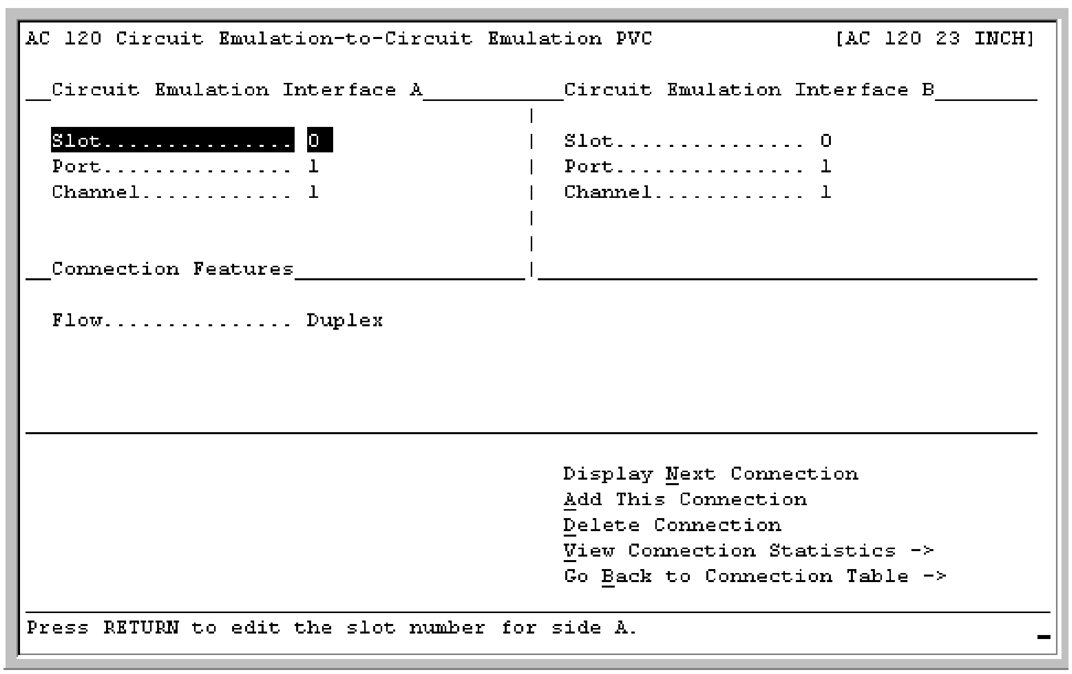


Figure 120. Circuit Emulation-to-Circuit Emulation PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the Circuit Emulation-to-Circuit Emulation PVC Statistics panel (*Figure 137 on page 231*).
Go Back to Connection Table→	Redisplays the Circuit Emulation-to-Circuit Emulation PVC Connection Table panel (*Figure 119 on page 207*).

3 Select the values for the fields on this panel from the values given in *Table 56 on page 209*.

Table 56. Field Values for the Circuit Emulation-to-Circuit Emulation PVC Connection Panel

Field Names	**Values**	**Description**
Circuit Emulation Interface A		Side A of the connection that will send and receive signals.
Circuit Emulation Interface B		Side B of the connection that will send and receive signals.
Slot		Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		Enter the channel number of the port on the module for which you are creating a connection. Enter channel numbers for both sides of the connection.
Flow	Duplex (default), SimplexA2B	Direction of the flow of data traffic in this connection. See page *189* for more information.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The Circuit Emulation-to-Circuit Emulation PVC Table panel (*Figure 119 on page 207*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration,** and press Return to store the values to the AC 60/120 system database.

VBR-to-ATM VCC PVC Connection

Use the steps in the following procedure to add a VBR-to-ATM VCC PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a VBR-to-ATM VCC PVC connection:

1. Select **VBR-to-ATM VCC Connection** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

   The VBR-to-ATM VCC PVC Table panel is displayed. See the following figure.

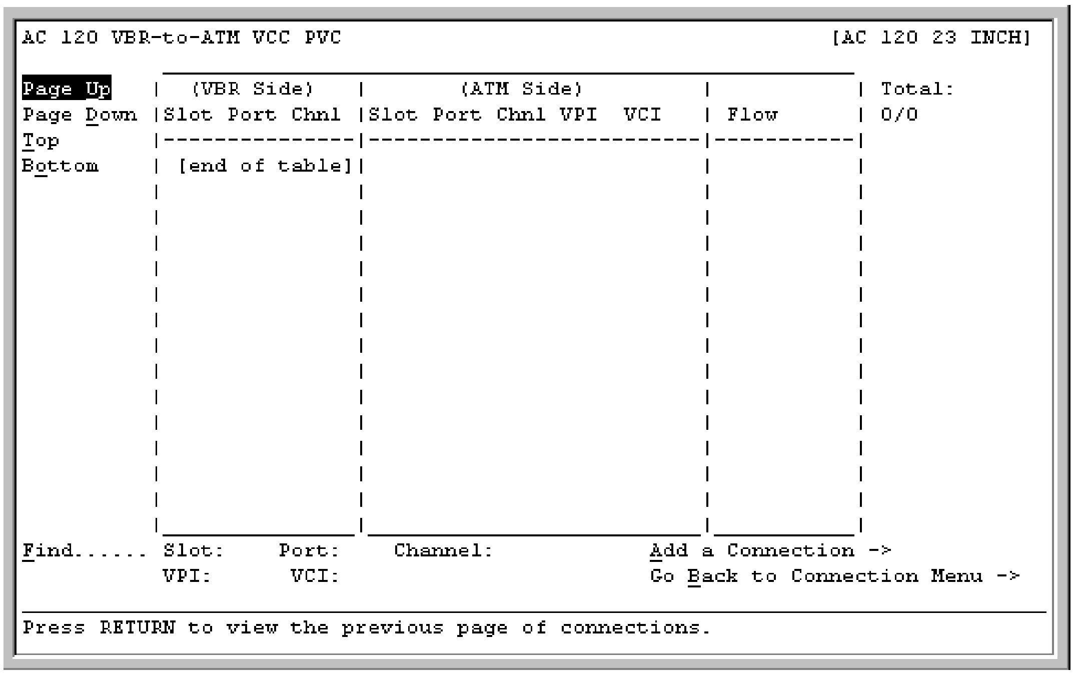


Figure 121. VBR-to-ATM VCC PVC Table Panel

Note:
At the time of initial installation, the VBR-to-ATM VCC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VCI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the VBR-to-ATM VCC PVC Connection panel (*Figure 122 on page 211*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

2. Select the **Add a Connection** command and press Return.

   The VBR-to-ATM VCC PVC Connection panel is displayed. See *Figure 122 on page 211*.

```
AC 120 VBR-to-ATM VCC PVC Connection                              [AC 120 23 INCH]

__VBR Interface A_________________________ATM Interface B______________________
                                        |
  Slot............. 0                   |  Slot....... 0     VPI....... 0
  Port............. 1                   |  Port....... 1     VCI....... 0
  Channel.......... 1                   |  Channel.... 1
                                        |
__Traffic Parameters A to B_____________|__Traffic Parameters B to A____________
                                        |
  Peak Rate........ 1          cps      |  Peak Rate........ 1          cps
  Sustained Rate... 1          cps      |  Sustained Rate... 1          cps
  Max Burst Size... 1          cells    |  Max Burst Size... 1          cells
                                        |
                                        |
__Connection Features___________________|_______________________________________
                                        |
  Service Type..... Ubr                 |  Display Next Connection
  Flow............. Duplex              |  Add This Connection
                                        |  Delete Connection
                                        |  View Connection Statistics ->
                                        |  Go Back to Connection Table ->
________________________________________|_______________________________________
Press RETURN to edit the slot number for side A.
```

Figure 122. VBR-to-ATM VCC PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection — Displays the next connection of this type in the table.

Add This Connection — Adds a connection having the values currently displayed on the panel.

Delete Connection — Deletes the connection having the values currently displayed on the panel.

View Connection Statistics→ — Displays the VBR-to-ATM VCC PVC Statistics panel (*Figure 138 on page 231*).

Go Back to Connection Table→ — Redisplays the VBR-to-ATM VCC PVC Connection Table panel (*Figure 121 on page 210*).

3 Select the values for the fields on this panel from the values given in the following table.

Table 57. Field Values for the VBR-to-ATM VCC PVC Connection Panel

Field Names	Values	Description
VBR Interface A		Side A of the connection that will send and receive signals.
ATM Interface B		Side B of the connection that will send and receive signals.
Slot		Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		Do not change the value **1** in this field.
VPI	Range: 0 to 255	Virtual path identifier. Enter a value for both sides of the connection.

Table 57. Field Values for the VBR-to-ATM VCC PVC Connection Panel (continued)

Field Names	Values	Description
VCI	Range: 32 to 4000	Virtual channel identifier. Enter a value for both sides of the connection.
Peak Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for peak rate to **0**.
Sustained Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for sustained rate to **0**.
Max Burst Size (cells)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for maximum burst size to **0**.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
Flow	Duplex (default), SimplexA2B, SimplexB2A	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B** or **SimplexB2A**, the fields in the **Traffic Parameters B to A** or the **Traffic Parameters A to B** section, respectively, are not displayed.

4. To add (apply) the connection configuration, select the **Add This Connection** command and press Return.
5. To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

   The ATM-to-ATM VCC PVC Table panel (*Figure 109 on page 191*) is returned, displaying the values you just applied.
6. To add more connections of this type, repeat Steps 2–5 for more connections as needed.
7. To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.
8. Select **Save Configuration** and press Return to store the values to the AC 60/120 system database.

VBR-to-VBR PVC Connection

Use the steps in the following procedure to add a VBR-to-VBR PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a VBR-to-VBR PVC connection:

1. Select **VBR-to-VBR Connection** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

   The VBR-to-VBR PVC Table panel is displayed. See *Figure 123 on page 213*.

Note:
At the time of initial installation, the VBR-to-VBR PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

```
AC 120 VBR-to-VBR PVC                                       [AC 120 23 INCH]
             ____________________________________________________
Page Up    |     (Side A)    |     (Side B)    |                      | Total:
Page Down  |Slot Port Chnl   |Slot Port Chnl   | Flow                 | 0/0
Top        |---------------|---------------|---------------------|
Bottom     |  [end of table]|                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |                 |                 |                      |
           |_________________|_________________|______________________|
                                              Add a Connection ->
Find...... Slot:    Port:    Channel:         Go Back to Connection Menu ->
_____________________________________________________________________________
Press RETURN to view the previous page of connections.
```

Figure 123. VBR-to-VBR PVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, and **Channel** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the VBR-to-VBR PVC Connection panel (*Figure 124 on page 214*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

2. Select the **Add a Connection** command and press Return.

   The VBR-to-VBR PVC Connection panel is displayed. See *Figure 124 on page 214*.

```
AC 120 VBR-to-VBR PVC Connection                                [AC 120 23 INCH]

__VBR Interface A__________________________VBR Interface B_____________________
                                        |
  Slot............. 0                   |  Slot............. 0
  Port............. 1                   |  Port............. 1
  Channel.......... 1                   |  Channel.......... 1
                                        |
__Traffic Parameters A to B____________|__Traffic Parameters B to A____________
                                        |
  Peak Rate........ 1          cps      |  Peak Rate........ 1          cps
  Sustained Rate... 1          cps      |  Sustained Rate... 1          cps
  Max Burst Size... 1          cells    |  Max Burst Size... 1          cells
                                        |
                                        |
__Connection Features__________________|_______________________________________
                                        |
  Flow............. Duplex              |  Display Next Connection
                                        |  Add This Connection
                                        |  Delete Connection
                                        |  View Connection Statistics ->
                                        |  Go Back to Connection Table ->
________________________________________|_______________________________________
Press RETURN to edit the slot number for side A.
```

Figure 124. VBR-to-VBR PVC Connection Panel

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the VBR-to-VBR PVC Statistics panel (*Figure 139 on page 232*).
Go Back to Connection Table→	Redisplays the VBR-to-VBR PVC Table panel (*Figure 123 on page 213*).

3 Select the values for the fields on this panel from the values given in *Table 58 on page 215*.

Table 58. Field Values for the VBR-to-VBR PVC Connection Panel

Field Names	**Values**	**Description**
VBR Interface A		Side A of the connection that will send and receive signals.
VBR Interface B		Side B of the connection that will send and receive signals.
Slot		Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port		Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel		Do not change the value **1** in this field.
Peak Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for peak rate to **0**.
Sustained Rate (cps)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for sustained rate to **0**.
Max Burst Size (cells)	Range: 1 (default) to	See the ATM UNI 3.0 specifications for details. **Note:** If you select the value **SimplexA2B** in the **Flow** field, set the value for maximum burst size to **0**.
Flow	Duplex (default), SimplexA2B	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B**, the fields in the **Traffic Parameters B to A** section are not displayed.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The VBR-to-VBR PVC Table panel (*Figure 123 on page 213*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration** and press Return to store the values to the AC 60/120 system database.

Frame Relay-to-ATM VCC PVC Connection

Use the steps in the following procedure to add a frame relay-to-ATM VCC PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a frame relay-to-ATM VCC PVC connection:

1 Select **Frame Relay-to-ATM VCC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Frame Relay-to-ATM VCC PVC Table panel is displayed. See *Figure 125 on page 216*.

Note:
At the time of initial installation, the Frame Relay-to-ATM VCC PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

```
AC 120 Frame Relay-to-ATM VCC PVC                              [AC 120 23 INCH]
           ____________________________________________________________
Page Up   |    (Frame Relay)     |       (ATM Side)         |           | Total:
Page Down |Slot Port Chnl DLCI   |Slot Port Chnl VPI  VCI   | Flow      | 0/0
Top       |---------------------|--------------------------|-----------|
Bottom    | [end of table]       |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |                      |                          |           |
          |______________________|__________________________|___________|
Find...... Slot:    Port:    Channel:           Add a Connection ->
           VPI:      DLCI/VCI:                  Go Back to Connection Menu ->
_______________________________________________________________________________
Press RETURN to view the previous page of connections.                        _
```

Figure 125. Frame Relay-to-ATM VCC PVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **DLCI/VCI** fields. If the connection exists, it is displayed on the first line of the table.
Add a Connection→	Displays the Frame Relay-to-ATM VCC PVC panel (*Figure 126 on page 217*).
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

The display fields on this panel provide the following information about all the frame relay-to-ATM VCC PVC connections in the AC 60/120 system:

Frame Relay Interface — This column displays the information for all interface A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and DLCI or VPI.

ATM Interface — This column displays the information for all interface B sides of the connections.

Flow — This column displays the direction of the data traffic flow for the connections.

Total: 0/0 — The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The Frame Relay-to-ATM VCC PVC panel is displayed. See the following figure.

```
AC 120 Frame Relay-to-ATM VCC PVC                                    [AC 120 23 INCH]

__Frame Relay Interface___________________ATM Interface ___________________________
                                         |
  Slot....... 0     DLCI...... 0         |  Slot....... 0     VPI....... 0
  Port....... 1                          |  Port....... 1     VCI....... 0
  Channel.... 1                          |  Channel.... 1
                                         |
__Traffic Parameters In__________________|__Traffic Parameters Out_________________
                                         |
  Max Frame Size........ 1               |  Max Frame Size........ 1
  Committed Burst Size.. 1               |  Committed Burst Size.. 1
  Excess Burst Size..... 1               |  Excess Burst Size..... 1
  Committed Info Rate... 1               |  Committed Info Rate... 1
                                         |
__Connection Features____________________|_________________________________________
                                         |
  Service Type.......... Ubr             |  Display Next Connection
  Flow.................. Duplex          |  Add This Connection
                                         |  Delete Connection
                                         |  View Connection Statistics ->
                                         |  Go Back to Connection Table ->
_________________________________________|_________________________________________
Press RETURN to edit the slot number for side A.
```

Figure 126. Frame Relay-to-ATM VCC PVC Panel

The commands on this panel have the following functions:

Display Next Connection — Displays the next connection of this type in the table.

Add This Connection — Adds a connection having the values currently displayed on the panel.

Delete Connection — Deletes the connection having the values currently displayed on the panel.

View Connection Statistics→	Displays the Frame Relay-to-ATM VCC PVC Statistics panel (*Figure 140 on page 232*).
Go Back to Connection Table→	Redisplays the Frame Relay-to-ATM VCC PVC Table panel (*Figure 125 on page 216*).

3 Select the values for the fields on this panel from the values given in *Table 59 on page 218*.

Table 59. Field Values for the Frame Relay-to-ATM VCC PVC Panel

Field Names	**Values**	**Description**
Frame Relay Interface		The side of the connection that will send signals.
ATM Interface		The side of the connection that will receive signals.
Slot	Range: 1 to 14	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port	Range: 1 to 6	Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel	ATM side: 01 FR side: 1 to 32	ATM side: Do not change the value **01** in this field. FR side: Enter the channel number of the port on the module for which you are creating a connection.
DLCI	Range: 0 to 1023	Data link connection identifier.
VPI	Range: 0 to 255	Virtual path identifier.
VCI	Range: 32 to 4000	Virtual channel identifier.
Max Frame Size	Range: 1 to 4096	Maximum allowable frame size in bytes.
Committed Burst Size		Not used.
Excess Burst Size		Not used.
Committed Info Rate	Range: 1 to 2048000	Information rate in bits per second. This value is determined by the maximum rate of the physical port.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2,Vbr-rt1, Vbr-express, Cbr-4, Cbr-3, Cbr-2, Cbr-1	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
Flow	Duplex, SimplexA2B, SimplexB2A	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B**, only fields in the **Traffic Parameters In** side are displayed. When you select **SimplexB2A**, only fields in the **Traffic Parameters Out** side are displayed.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The Frame Relay-to-ATM PVC VCC Table panel (*Figure 125 on page 216*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration** and press Return to store the values to the AC 60/120 system database.

Frame Relay-to-Frame Relay PVC Connection

Use the steps in the following procedure to add a frame relay-to-frame relay PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add a frame relay-to-frame relay PVC connection:

1 Select **Frame Relay-to-Frame Relay** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The Frame Relay-to-Frame Relay PVC Table panel is displayed. See the following figure.

Note:
At the time of initial installation, the Frame Relay-to-Frame Relay PVC Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

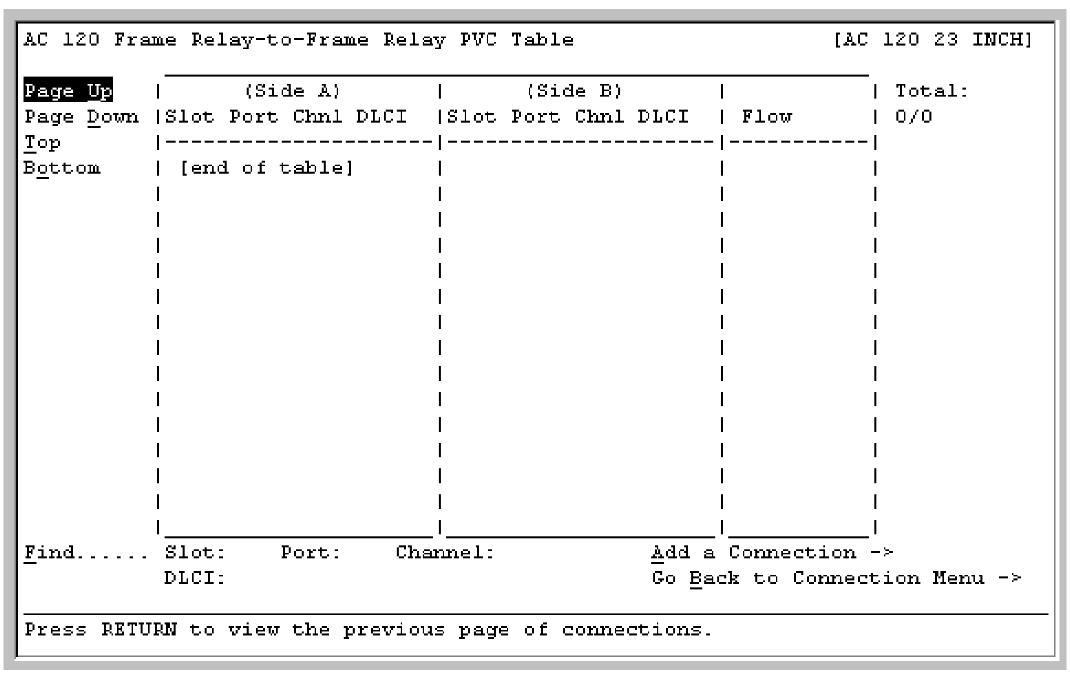


Figure 127. Frame Relay-to-Frame Relay PVC Table Panel

The commands on this panel have the following functions:

Find . . . To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, and **DLCI** fields. If the connection exists, it is displayed on the first line of the table.

Add a Connection→ Displays the Frame Relay-to-Frame Relay PVC panel (*Figure 128 on page 220*).

Go Back to Connection Menu→ Redisplays the Connection Configuration Menu panel.

The display fields on this panel provide the following information about all the frame relay-to-frame relay PVC connections in the AC 60/120 system:

Frame Relay Side A This column displays the information for all A sides of the connections. The connection entries are displayed in ascending numerical order by slot, then by port, channel, and DLCI.

Frame Relay Side B This column displays the information for all B sides of the connections.

Flow This column displays the direction of the data traffic flow for the connections.

Total: 0/0 The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The Frame Relay-to-Frame Relay PVC panel is displayed. See the following figure.

```
AC 120 Frame Relay-to-Frame Relay PVC                          [AC 120 23 INCH]

__Frame Relay Interface A_________________Frame Relay Interface B_______________
                                        |
  Slot....... 0    DLCI...... 0         |  Slot....... 0     DLCI...... 0
  Port....... 1                         |  Port....... 1
  Channel.... 1                         |  Channel.... 1
                                        |
__Traffic Parameters A to B_____________|__Traffic Parameters B to A____________
                                        |
  Max Frame Size........ 1              |  Max Frame Size........ 1
  Committed Burst Size.. 1              |  Committed Burst Size.. 1
  Excess Burst Size..... 1              |  Excess Burst Size..... 1
  Committed Info Rate... 1              |  Committed Info Rate... 1
                                        |
__Connection Features___________________|_______________________________________
                                        |
  Service Type.......... Ubr            |  Display Next Connection
  Flow.................. Duplex         |  Add This Connection
                                        |  Delete Connection
                                        |  View Connection Statistics ->
                                        |  Go Back to Connection Table ->
________________________________________|_______________________________________
Press RETURN to edit the slot number for side A.
```

Figure 128. Frame Relay-to-Frame Relay PVC Panel

The commands on this panel have the following functions:

Display Next Connection	Displays the next connection of this type in the table.
Add This Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
View Connection Statistics→	Displays the Frame Relay-to-Frame Relay panel (*Figure 141 on page 233*).
Go Back to Connection Table→	Redisplays the Frame Relay-to-Frame Relay PVC Statistics panel (*Figure 127 on page 219*).

3 Select the values for the fields on this panel from the values given in *Table 60 on page 221*.

Table 60. Field Values for the Frame Relay-to-Frame Relay PVC Panel

Field Names	Values	Description
Frame Relay Interface A		The side of the connection that will send signals.
Frame Relay Interface B		The side of the connection that will receive signals.
Slot	Range: 1 to 14	Enter the slot number containing the module for which you are creating a connection. Enter slot numbers for both sides of the connection.
Port	Range: 1 to 6	Enter the port number on the module for which you are creating a connection. Enter port numbers for both sides of the connection.
Channel	Range: 1 to 32	Enter the channel number of the port on the module for which you are creating a connection. Enter channel numbers for both sides of the connection.
DLCI	Range: 0 to 1023	Data link connection identifier.
Max Frame Size	Range: 1 to 4096	Maximum allowable frame size in bytes.
Committed Burst Size		Not used.
Excess Burst Size		Not used.
Committed Info Rate	Range: 1 to 2048000	Information rate in bits per second. This value is determined by the maximum rate of the physical port.
Service Type	Ubr (default), Vbr-nrt2, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express, Cbr-4, Cbr-3, Cbr-2, Cbr-1	AC 60/120 system supported quality of service (QoS) class. See *"AC 60 and AC 120 Software Features" on page 35*.
Flow	Duplex, SimplexA2B	Direction of the flow of data traffic in this connection. See page *189* for more information. **Note:** When you select **SimplexA2B**, only fields in the **Traffic Parameters A to B** side are displayed.

4 To add (apply) the connection configuration, select the **Add This Connection** command and press Return.

5 To review this connection, select the **Go Back to Connection Table** command and press Return (or press Control+b).

The Frame Relay-to-Frame Relay PVC Table panel (*Figure 127 on page 219*) is returned, displaying the values you just applied.

6 To add more connections of this type, repeat Steps 2–5 for more connections as needed.

7 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

8 Select **Save Configuration** and press Return to store the values to the AC 60/120 system database.

In-Band Management ATM PVC Connection

Use the steps in the following procedure to add an in-band management ATM PVC connection, starting at the Connection Configuration Menu panel.

➤ Procedure

To add an in-band management ATM PVC connection:

1 Select **In-Band Management IP PVC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The In-Band Management IP PVC Connection Table panel is displayed.

```
AC 120 In-Band Management IP PVC Connection Table              [YourSiteName]
             __________________________________________________________________
Page Up     |                                | In-Band Management PVC  |        |
Page Down   |IP Address      Mask            |Slot Port Chnl VPI  VCI  | Type   |
Top          ------------------------------------------------------------------
Bottom      |[end of table]                  |                         |        |
            |                                |                         |        |
Total:      |                                |                         |        |
    0/      |                                |                         |        |
    0       |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
            |                                |                         |        |
             ------------------------------------------------------------------
Find...... Slot:    Port:    Channel:           Add a Connection ->
           VPI:      VCI:                       Go Back to Connection Menu ->
___________________________________________________________________________
Press RETURN to view the previous page of connections.
```

Figure 129. In-Band Management IP PVC Connection Table Panel

Note:
At the time of initial installation, the In-Band Management IP PVC Connection Table panel is empty. After you have set up connections, this panel displays all the connections of this type in the system.

The commands on this panel have the following functions:

Find . . . — To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VPI/VCI** fields. If the connection exists, it is displayed on the first line of the table.

Add a Connection→ — Displays the In-Band ATM PVC Connection Configuration panel (*Figure 130 on page 223*).

Go Back to Connection Menu→ — Redisplays the Connection Configuration Menu panel (*Figure 108 on page 191*).

The display fields on this panel provide the following information about the in-band management IP PVC connections in the AC 60/120 system:

IP Address, Mask — This column displays the IP addresses and masks for the managed AC 60/120 systems that are being managed from the management workstation.

In-Band Management PVC — This column displays the slot, port, channel, VPI, and VCI of the connection to each managed AC 60/120 chassis.

Type

Total: 0/0 — The first number in this field indicates the number of the connection table entry on the first line of the currently displayed panel. The second number indicates the total number of connection table entries for this connection type.

2 Select the **Add a Connection** command and press Return.

The In-Band Management ATM PVC Connection Configuration panel is displayed.

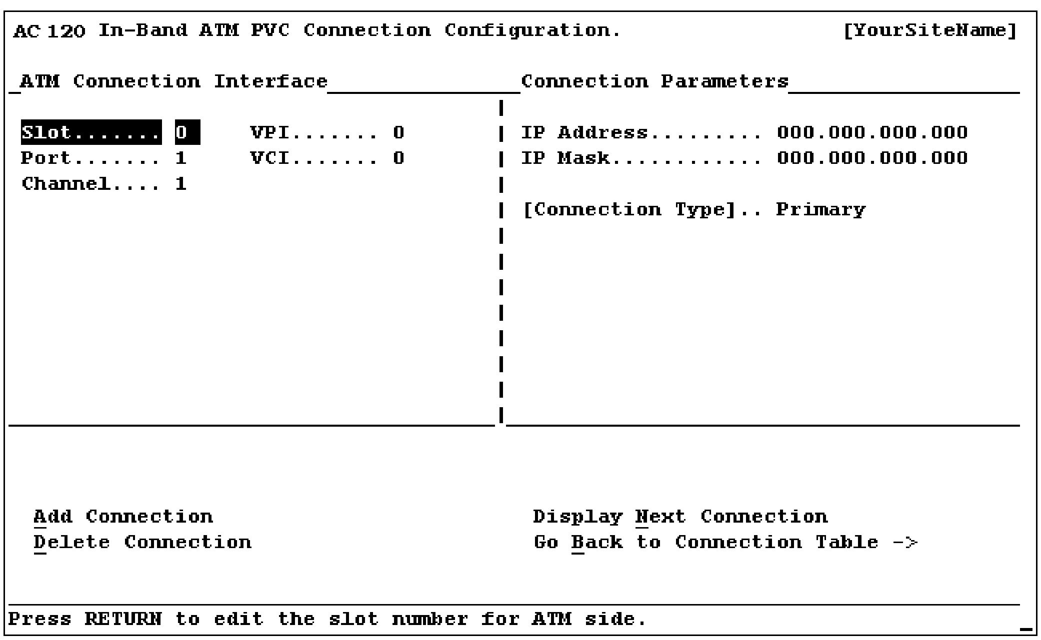


Figure 130. In-Band ATM PVC Connection Configuration Panel

The commands on this panel have the following functions:

Add Connection	Adds a connection having the values currently displayed on the panel.
Delete Connection	Deletes the connection having the values currently displayed on the panel.
Display Next Connection	Displays the next connection of this type in the table.
Go Back to Connection Table→	Redisplays the In-Band Management IP PVC Connection Table panel (*Figure 129 on page 222*).

3 Select the values for the fields on this panel from the values given in the following table.

Table 61. Field Descriptions for the In-Band ATM PVC Connection Configuration Panel

Field Name	Description
Slot, Port, Channel, VPI, and VCI	Enter the values for slot, port, channel, VPI, and VCI for the module in the AC 60/120 chassis to which you are connecting.
IP Address, and IP Mask	Enter the IP address and the IP mask for one of the following depending on your in-band management scheme: • The network interface card in the management workstation **Note:** This IP address must be different from the one for the management workstation interface with its own network. • The "router" AC 60/120 system **Note:** This IP address must be different from the one for the Ethernet interface on the CPU module. • The managed AC 60/120 system **Note:** This IP address must be different from the one for the Ethernet interface on the CPU module.

4 Select the **Add Connection** command and press Return.

5 Repeat Steps 2–4 to set up as many connections as needed.

6 To permanently save these connections, press Control+g to return to the Console Interface Main Menu panel.

7 Select **Save Configuration**, and press Return to store the values to the AC 60/120 System database.

Configuring SVC Connections

IISP CBR Routing Table Entry

Use the steps in the following procedure to add an entry to the CBR routing table.

➤ Procedure

To add an entry to the CBR routing table:

1 Select **IISP CBR Routing Table** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The IISP CBR Routing Table panel is displayed.

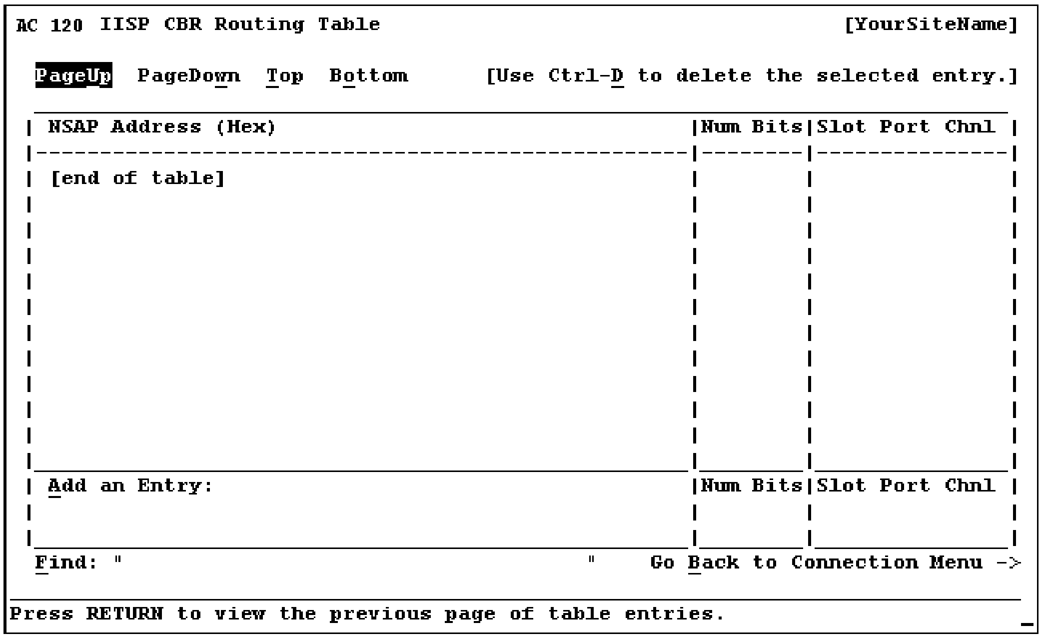


Figure 131. IISP CBR Routing Table

The commands on this panel have the following functions:

Find	Finds the routing entry with the specified NSAP address.
Go Back to Connection Menu→	Redisplays the Connection Configuration panel (*Figure 108 on page 191*).

2 Select the **Add an Entry** field, and press Return.

- **a** Type a network service access point (NSAP) address up to 20 bytes (160 bits) long (10 groups of 4 characters each), and press the Tab key.
- **b** In the **Num Bits** field, type a value from 1 to 152 for the NSAP address mask, and press the Tab key.
- **c** In the **Slot,Port,Channel** field, type the slot, port, and channel values for the ATM cell bearing I/O module that has a configured ATM IISP (User or Network) or ATM UNI 3.0 or 3.1 interface.
- **d** Press Return to add the entry to the table.

3 Repeat step 2 as many times as needed to add entries to the table.

4 To permanently save these table entries, press Control+g to return to the Console Interface Main Menu panel.

5 Select **Save Configuration**, and press Return to store the values to the AC 60/120 System database.

IISP VBR Routing Table Entry

Use the steps in the following procedure to add an entry to the VBR routing table.

➤ Procedure

To add an entry to the VBR routing table:

1 Select **IISP VBR Routing Table** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

The IISP VBR Routing Table panel is displayed.

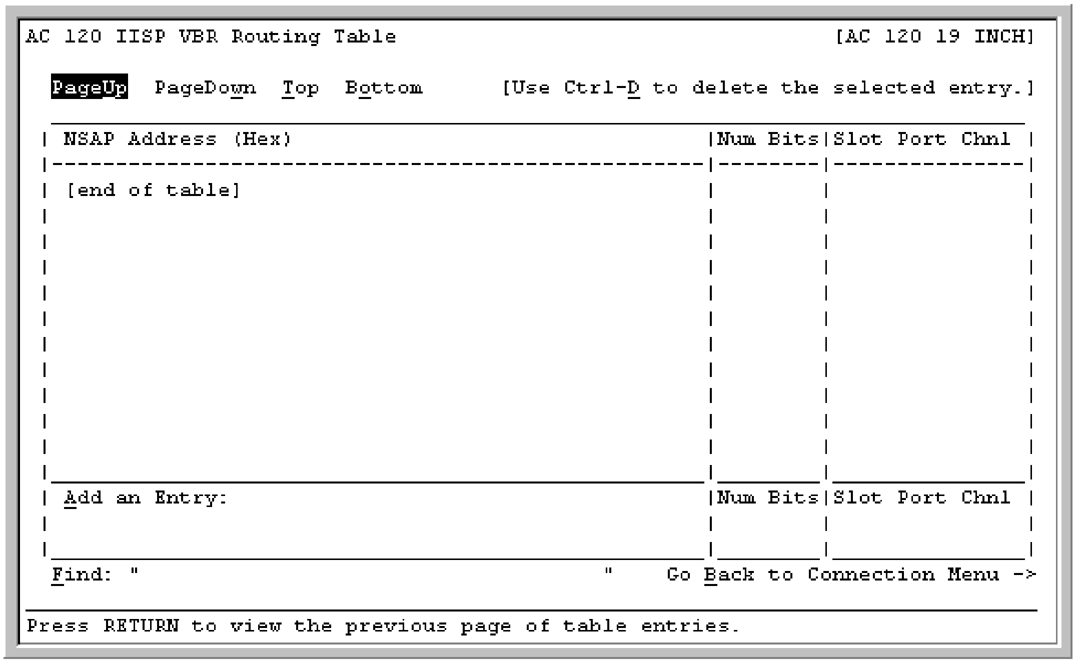


Figure 132. IISP VBR Routing Table

The commands on this panel have the following functions:

Find	Finds the routing entry with the specified NSAP address.
Go Back to Connection Menu→	Redisplays the Connection Configuration panel.

2 Select the **Add an Entry** field, and press Return.

- **a** Type a network service access point (NSAP) address up to 20 bytes (160 bits) long (10 groups of 4 characters each), and press the Tab key.
- **b** In the **Num Bits** field, type a value from 1 to 152 for the NSAP address mask, and press the Tab key.
- **c** In the **Slot,Port,Channel** field, type the slot, port, and channel values for the ATM cell bearing I/O module that has a configured ATM IISP (User or Network) or ATM UNI 3.0 or 3.1 interface.
- **d** Press Return to add the entry to the table.

3 Repeat step 2 as many times as needed to add entries to the table.

4 To permanently save these table entries, press Control+g to return to the Console Interface Main Menu panel.

5 Select **Save Configuration**, and press Return to store the values to the AC 60/120 System database.

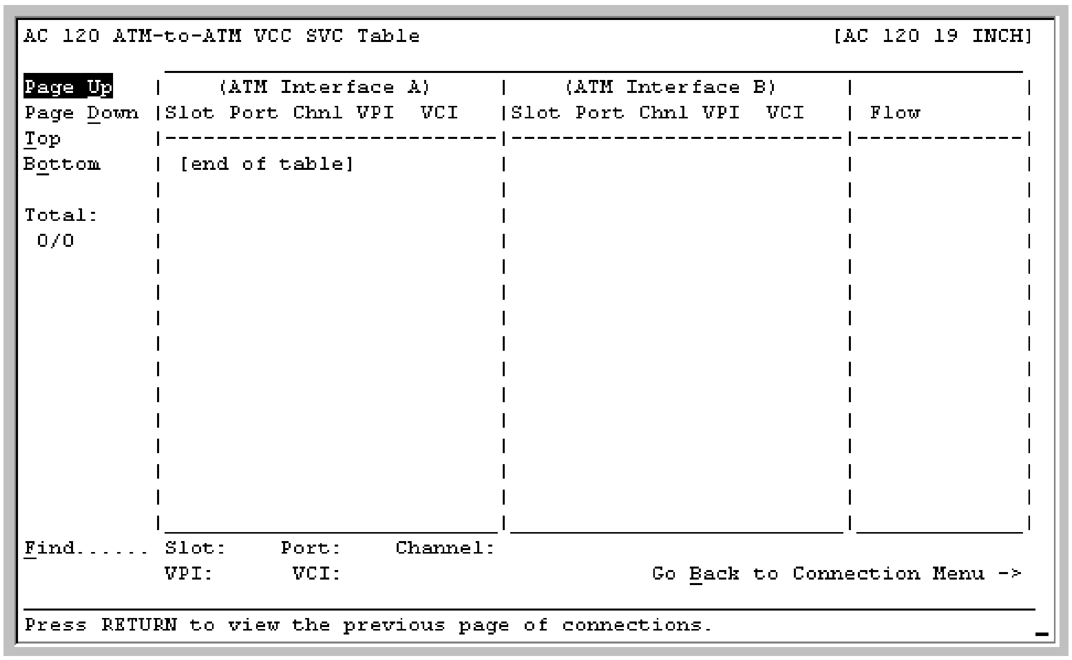
Viewing ATM-to-ATM VCC SVC Connections

The SVC connections displayed on the ATM-to-ATM VCC SVC Table panel changes dynamically as they are created and then torn down.

To display SVC connections:

1. Select **ATM-to-ATM VCC** on the Connection Configuration Menu panel (*Figure 108 on page 191*) and press Return.

   The ATM-to-ATM VCC SVC Table panel is displayed.



```
AC 120 ATM-to-ATM VCC SVC Table                                  [AC 120 19 INCH]

Page Up    |    (ATM Interface A)      |    (ATM Interface B)      |             |
Page Down  |Slot Port Chnl VPI  VCI    |Slot Port Chnl VPI  VCI    | Flow        |
Top        |---------------------------|---------------------------|-------------|
Bottom     | [end of table]            |                           |             |
           |                           |                           |             |
Total:     |                           |                           |             |
 0/0       |                           |                           |             |
Find...... Slot:    Port:    Channel:
           VPI:      VCI:                        Go Back to Connection Menu ->

Press RETURN to view the previous page of connections.
```

Figure 133. ATM-to-ATM VCC SVC Table Panel

The commands on this panel have the following functions:

Find . . .	To find a particular connection, enter values in the **Slot**, **Port**, **Channel**, **VPI**, and **VCI** fields. If the connection exists, it is displayed on the first line of the table.
Go Back to Connection Menu→	Redisplays the Connection Configuration Menu panel.

2. To refresh the display of SVCs, select the **Go Back to Connection Menu** command, and then select the **ATM-to-ATM VCC** option again.

Viewing Statistics on Ports and Connections

After you have finished configuring ports and setting up connections for the modules on the AC 60/120 system, you can obtain statistics on module ports and PVC connections for billing and performance monitoring purposes at any time. You can also obtain network data and statistics through a direct interface with the SNMP MIB.

Examples of the port statistics panels are shown in *Section 4, "Configuring the I/O and Server Modules"*, at the end of each section for configuring the modules.

Examples of the connection statistics panels are shown in the following figures:

- *Figure 134 on page 229*
- *Figure 135 on page 230*
- *Figure 136 on page 230*
- *Figure 137 on page 231*
- *Figure 138 on page 231*
- *Figure 139 on page 232*
- *Figure 140 on page 232*
- *Figure 141 on page 233*.

The commands on the connection statistics panels have the following functions:

Continuous Update	Updates the values in the fields every second.
Display Stats for Next Connection	Displays the values for the next connection of this type in ascending order by slot, then by port and channel, and by VPI and VCI if the connection is ATM VCC or ATM VPC.
Go Back to Connection Display→	Redisplays the connection configuration panel.

Descriptions of the data fields on these panels are given in the following table.

Table 62. Connection Statistics Data Fields by Connection Type

Interface Type	Field	Description
ATM	Cells Received (In)	Number of cells received into interface side A during the amount of time shown in **Time Elapsed** field.
	Cells Transmitted (Out)	Number of cells transmitted out of interface side B during the amount of time shown in **Time Elapsed** field.
Circuit Emulation	Cells Encoded (In)	Number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field.
	Cells Decoded (Out)	Number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field.
VBR	Cells Encoded (In)	Number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field.
	Cells Decoded (Out)	Number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field.
	AAL5 CRC Errors	Number of CRC errors encountered since the time shown in **Time Elapsed** field.

Table 62. Connection Statistics Data Fields by Connection Type (continued)

Interface Type	Field	Description
Frame Relay	Cells Encoded (In)	Number of cells encoded going into interface side A during the amount of time shown in **Time Elapsed** field.
	Cells Decoded (Out)	Number of cells decoded going out of interface side B during the amount of time shown in **Time Elapsed** field.

Connection Statistics Panels

Examples of the connection statistics panels are shown in the following figures:

- *Figure 134 on page 229*
- *Figure 135 on page 230*
- *Figure 136 on page 230*
- *Figure 137 on page 231*
- *Figure 138 on page 231*
- *Figure 139 on page 232*
- *Figure 140 on page 232*
- *Figure 141 on page 233*.

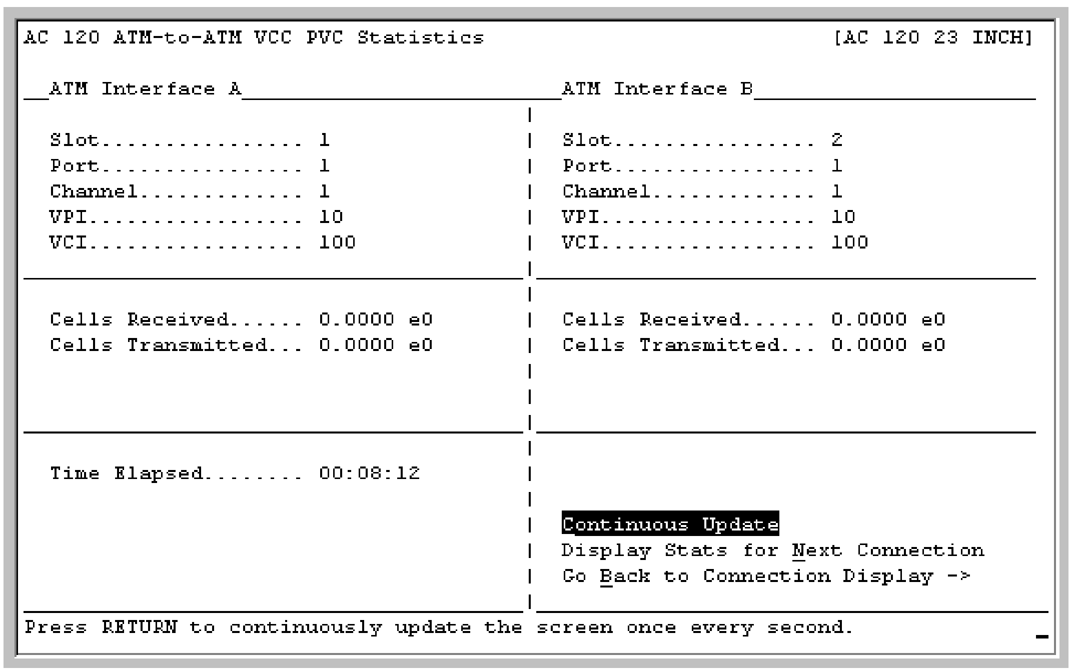


Figure 134. ATM-to-ATM VCC PVC Statistics Panel

```
AC 120 ATM-to-ATM VPC PVC Statistics                          [AC 120 19 INCH]

__ATM Interface A_________________________ATM Interface B______________________
                                        |
  Slot................ 1                |  Slot................ 2
  Port................ 1                |  Port................ 1
  Channel............. 1                |  Channel............. 1
  VPI................. 101              |  VPI................. 101
                                        |
________________________________________|______________________________________
                                        |
  Cells Received...... 0.0000 e0       |  Cells Received...... 0.0000 e0
  Cells Transmitted... 0.0000 e0       |  Cells Transmitted... 0.0000 e0
                                        |
                                        |
________________________________________|______________________________________
                                        |
  Time Elapsed........ 6 days           |
                       22:35:25         |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
________________________________________|______________________________________
Press RETURN to continuously update the screen once every second.
```

Figure 135. ATM-to-ATM VPC Statistics Panel

```
AC 120 Circuit Emulation-to-ATM VCC PVC                       [AC 120 19 INCH]

__Circuit Emulation Interface_____________ATM Interface _______________________
                                        |
  Slot................ 10               |  Slot....... 2     VPI....... 150
  Port................ 5                |  Port....... 1     VCI....... 150
  Channel............. 1                |  Channel.... 1
                                        |
                                        |
__Connection Features___________________|______________________________________

  Service Type....... Cbr-1
  Flow............... Duplex


_______________________________________________________________________________

                                           Display Next Connection
                                           Add This Connection
                                           Delete Connection
                                           View Connection Statistics ->
                                           Go Back to Connection Table ->
_______________________________________________________________________________
T-InterfaceInService: interfaceIndex=501001 interfaceType=AtmUni3-1
```

Figure 136. Circuit Emulation-to-ATM VCC PVC Statistics Panel

```
AC 120 Circuit Emulation-to-Circuit Emulation Statistics       [AC 120 19 INCH]

__Circuit Emulation Interface A__________Circuit Emulation Interface B________
                                        |
  Slot................ 10               |  Slot................ 10
  Port................ 1                |  Port................ 2
  Channel............. 1                |  Channel............. 1
                                        |
                                        |
________________________________________|_______________________________________
                                        |
  Cells Encoded....... 0.0000 e0        |  Cells Encoded....... 0.0000 e0
  Cells Decoded....... 0.0000 e0        |  Cells Decoded....... 0.0000 e0
                                        |
                                        |
________________________________________|_______________________________________
                                        |
  Time Elapsed........ 00:43:29         |
                                        |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
________________________________________|_______________________________________
T-InterfaceInService: interfaceIndex=501001 interfaceType=AtmUni3-1
```

Figure 137. Circuit Emulation-to-Circuit Emulation Statistics Panel

```
AC 120 VBR-to-ATM VCC PVC Statistics                             [AC 120 23 INCH]

__VBR Interface___________________________ATM Interface_________________________
                                        |
  Slot................ 10               |  Slot................ 2
  Port................ 3                |  Port................ 1
  Channel............. 1                |  Channel............. 1
                                        |  VPI................. 135
                                        |  VCI................. 135
________________________________________|_______________________________________
                                        |
  Cells Encoded....... 0.0000 e0        |  Cells In............ 0.0000 e0
  Cells Decoded....... 0.0000 e0        |  Cells Out........... 0.0000 e0
                                        |
                                        |
________________________________________|_______________________________________
                                        |
  Time Elapsed........ 00:00:02         |
                                        |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
________________________________________|_______________________________________
Press RETURN to continuously update the screen every second.                  _
```

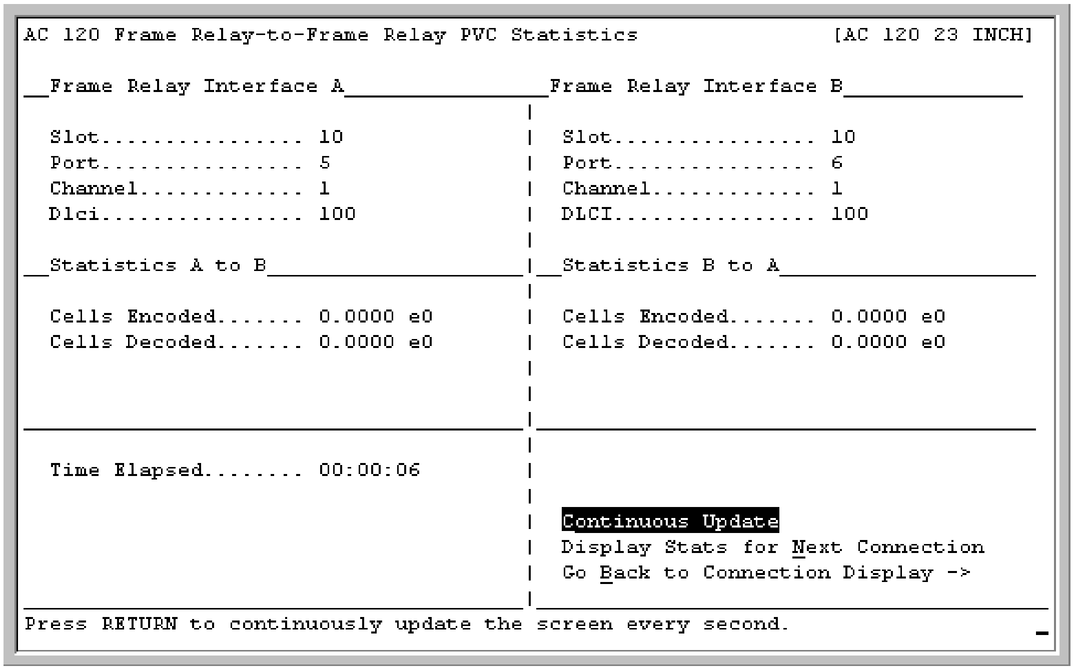
Figure 138. VBR-to-ATM VCC PVC Statistics Panel

```
AC 120 VBR-to-VBR PVC Statistics                              [AC 120 23 INCH]

__VBR Interface A________________________VBR Interface B______________________
                                        |
  Slot................ 10               |  Slot................ 10
  Port................ 3                |  Port................ 4
  Channel............. 1                |  Channel............. 1
                                        |
                                        |
________________________________________|_____________________________________
                                        |
  Cells Encoded....... 0.0000 e0        |  Cells Encoded....... 0.0000 e0
  Cells Decoded....... 0.0000 e0        |  Cells Decoded....... 0.0000 e0
                                        |
                                        |
________________________________________|_____________________________________
                                        |
  Time Elapsed........ 00:00:05         |
                                        |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
________________________________________|_____________________________________
Press RETURN to continuously update the screen every second.
```

Figure 139. VBR-to-VBR PVC Statistics Panel

```
AC 120 Frame Relay-to-ATM VCC PVC Statistics                  [AC 120 19 INCH]

__Frame Relay Interface__________________ATM Interface________________________
                                        |
  Slot................ 10               |  Slot................ 2
  Port................ 4                |  Port................ 1
  Channel............. 1                |  Channel............. 1
  DLCI................ 160              |  VPI................. 160
                                        |  VCI................. 160
________________________________________|_____________________________________
                                        |
  Cells Encoded....... 0.0000 e0        |  Cells In............ 0.0000 e0
  Cells Decoded....... 0.0000 e0        |  Cells Out........... 0.0000 e0
                                        |
                                        |
________________________________________|_____________________________________
                                        |
  Time Elapsed........ 6 days           |
                       22:39:45         |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
________________________________________|_____________________________________
T-InterfaceInService: interfaceIndex=501001 interfaceType=AtmUni3-1
```

Figure 140. Frame Relay-to-ATM VCC PVC Statistics Panel



```
AC 120 Frame Relay-to-Frame Relay PVC Statistics              [AC 120 23 INCH]

__Frame Relay Interface A________________Frame Relay Interface B______________
                                        |
  Slot................ 10               |  Slot................ 10
  Port................ 5                |  Port................ 6
  Channel............. 1                |  Channel............. 1
  Dlci................ 100              |  DLCI................ 100
                                        |
__Statistics A to B____________________|__Statistics B to A___________________
                                        |
  Cells Encoded....... 0.0000 e0        |  Cells Encoded....... 0.0000 e0
  Cells Decoded....... 0.0000 e0        |  Cells Decoded....... 0.0000 e0
                                        |
                                        |
_______________________________________|_______________________________________
                                        |
  Time Elapsed........ 00:00:06         |
                                        |
                                        |  Continuous Update
                                        |  Display Stats for Next Connection
                                        |  Go Back to Connection Display ->
_______________________________________|_______________________________________
Press RETURN to continuously update the screen every second.
```

Figure 141. Frame Relay-to-Frame Relay PVC Statistics Panel

6 Provisioning Scenarios and Examples

This chapter describes examples for provisioning PVC connections for the AC 60/120 systems. You can use the information in this chapter to determine which types of connections to make between the various types of modules.

This chapter describes how to set up connections to adapt voice and video signals, and data from T1 interface circuit emulation traffic to ATM traffic.

Setting Up Connections for Circuit Emulation to ATM Traffic

Structured circuit emulation on the T1 interface allows you to adapt time division multiplexing (TDM) traffic (including voice and video signals and data) to ATM traffic that can be switched and transported through an ATM network. AAL1 adaptation protocols are used to convert the TDM traffic to ATM, providing ATM Forum standard circuit emulation service (CES). Within structured circuit emulation, each DS0 channel is adapted individually to receive its own virtual path identifier/virtual channel identifier (VPI/VCI) assignment. See the following figure.

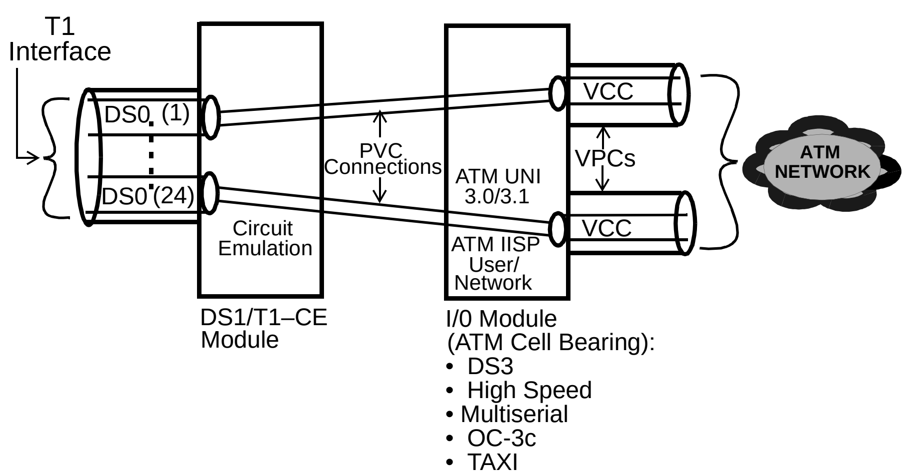


Figure 142. Structured Circuit Emulation

Provisioning for Structured Circuit Emulation of T1

➤ Procedure

To provision for structured circuit emulation of T1:

1. After successfully configuring the T1 interface, on the Connection Configuration Menu panel, highlight the **Circuit Emulation-to-ATM VCC** option. Press Enter.

   The Circuit Emulation-to-ATM VCC PVC panel is displayed. See the following figure.

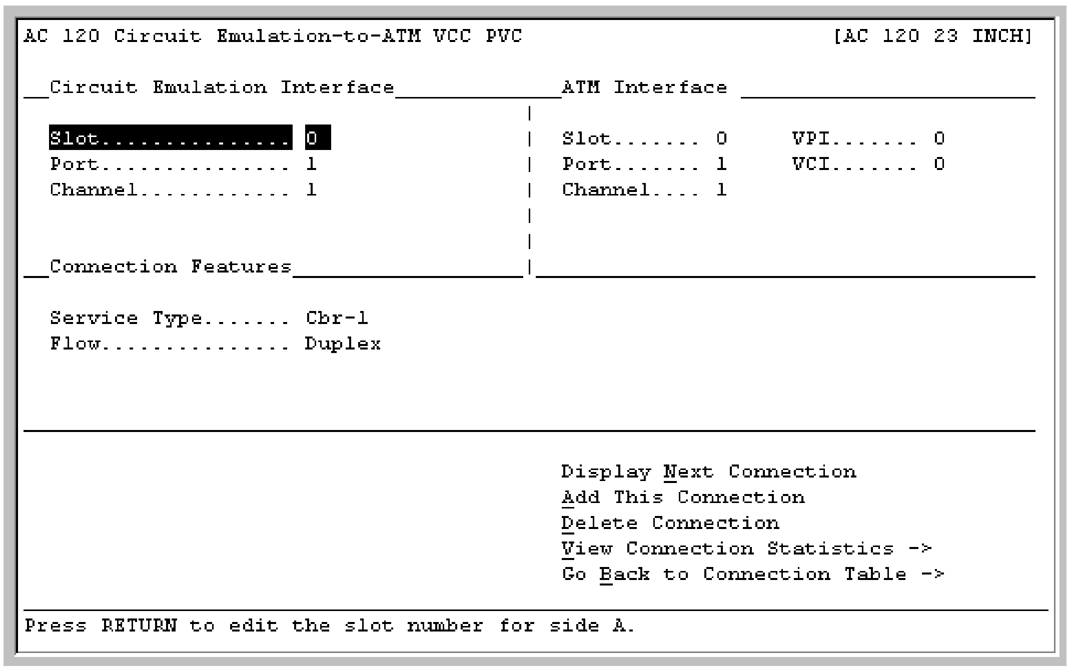


Figure 143. Circuit Emulation-to-ATM VCC PVC Panel

2. On the **Circuit Emulation Interface** side of the panel, in the **Slot** field, type the slot number where the DS1 resides. Press Enter.
3. In the **Port** field, type the desired port number (**1** through **6**). Press Enter.
4. In the **Channel** field, type the channel number (**1** through **24**). Press Enter.
5. Select the appropriate value in the **Service Type** field. Because each DS0 carries constant bit rate (CBR) traffic, to guarantee Quality of Service, you must select the **CBR-1** through **CBR-4** options for this type of PVC connection. Cycle through these options using the Enter key. Once you have selected the desired option, use the Down Arrow key to move to the next field.
6. On the **ATM Interface** side of the panel, in the **Slot** field, type the desired ATM DS3 slot number. Press Enter.
7. In the **Port** field, type the ATM DS3 port number (**1** or **2**). Press Enter.
8. The value in the **Channel** field on the ATM Interface should always be **1**. Use the Down Arrow key to move from this field to the **VPI** and the **VCI** fields.
9. Choose a VPI/VCI combination for the connection. Because the DS0 carries bidirectional traffic, the bandwidth information for both directions of the connection must be the same.
10. Use the Down Arrow key to highlight the **Add This Connection** command (lower right-hand corner). Press Enter to add the connection.

You now have a circuit correctly provisioned for structured emulation circuit. This means that each DS0 in the T1 is assigned its own VPI/VCI. A typical bandwidth parameter is used (for example, 64 kbps). The **ATM VPI** and **VCI** fields indicate the connection attributes on the ATM side of the CES. Typically, a set of T1s (or DS0s) would be adapted to ATM and concentrated on a single ATM DS3 interface.

ATM-to-ATM VPC VCC Connection

ATM-to-ATM VPC VCC connections allow you to set up ATM connections between two ATM interfaces. For example, ATM DS1 to ATM DS3, ATM DS1 to ATM DS1, or ATM DS3 to ATM DS3. These connections are used when you need to route and switch traffic on the AC 60/120 system based on network traffic requirements.

In this mode, both CBR and VBR traffic are supported. The ATM adaptation can be AAL1 or AAL5 as per the ATM Forum standards. The adaptive queuing traffic management algorithm ensures that the QoS requirements are satisfied. With these connections, you can use the statistical multiplexing capabilities of ATM, the adaptive buffer management capabilities of the AC 60/120 systems, and the traffic characteristics of voice (constant bit rate) and data (variable bit rate) traffic to send data at a high virtual level over a lower physical data rate interface. For example, it is possible to assign and service two users with 30 Mbps each of VBR traffic on a single ATM DS3 interface operating at 45 Mbps. The oversubscription option indicates the factor by which you can overprovision the ATM circuit. The oversubscription parameter takes into account that CBR traffic needs a guaranteed bandwidth and that VBR traffic will get buffered in the queues. That is, VBR traffic is most affected by oversubscription.

Figure 144 on page 238 shows the ATM-to-ATM VCC PVC Connection panel.

In this particular example, port 1 is configured for AAL5 UBR traffic. The values for the **Peak Rate**, **Sustained Rate**, and **Max Burst Size** fields are all set to **1**. For details on configuring an ATM-to-ATM VCC VPC connection, see *Section 5, "Provisioning Connections and Obtaining Statistics"*.

```
AC 120 ATM-to-ATM VCC PVC Connection                              [AC 120 23 INCH]

_ATM Interface A_________________________ATM Interface B_______________________
                                        |
 Slot....... 0      VPI....... 0        | Slot....... 0      VPI....... 0
 Port....... 1      VCI....... 0        | Port....... 1      VCI....... 0
 Channel.... 1                          | Channel.... 1
                                        |
_Traffic Parameters A to B______________|_Traffic Parameters B to A____________
                                        |
 Service Type........ Ubr               | Service Type........ Ubr
 SAR Type............ Aal5              | SAR Type............ Aal5
 Frwd Error Correct.. None              | Frwd Error Correct.. None
 Peak Rate........... 1          cps    | Peak Rate........... 1          cps
 Sustained Rate...... 1          cps    | Sustained Rate...... 1          cps
 Max Burst Size...... 1          cells  | Max Burst Size...... 1          cells
________________________________________|______________________________________
                                        | Display Next Connection
 Flow............ Duplex                | Add This Connection
                                        | Delete Connection
                                        | View Connection Statistics ->
                                        | Go Back to Connection Table ->
________________________________________|______________________________________
Press RETURN to edit the slot number for side A.
```

Figure 144. ATM-to-ATM VCC PVC Connection Panel

7 Upgrading and Backing Up System Software

This chapter describes how to upgrade and back up the AC 60 and AC 120. It contains the following procedures:

- Installing a new software release by using the following methods:
  - Upgrading from Release 3.0.0 to later releases using FTP (see *"Upgrading from Release 3.0.0 to Later Releases Using FTP" on page 241*)
  - Upgrading from Release 3.1.1 to later releases using X/Modem/YModem file transfer (see *"Upgrading from Release 3.0.0 to Later Releases Using XModem/ YModem File Transfer" on page 246*)
- Falling back to the previous software release (see *"Falling Back to the Previous Software Release" on page 250*)
- Backing up AC 60/120 system, module, and connection configuration database files by using the following methods:
  - Backing up database files using FTP (see *"Backing Up Databases Using FTP" on page 251*)
  - Backing up database files using XModem/YModem file transfer (see *"Backing Up Databases Using XModem/YModem File Transfer" on page 252*)

Note:
After initially configuring your AC 60/120 system and every time you modify the configuration, be sure to back up the files to a separate storage medium.

- Restoring AC 60/120 configuration and connection database files by using the following methods:
  - Restoring database files using FTP (see *"Restoring Database Files Using FTP" on page 255*)
  - Restoring database files using XModem/YModem file transfer (see *"Restoring Database Files Using XModem/YModem File Transfer" on page 256*)

Software upgrades for the AC 60/120 are provided on CD-ROM. The software on the CD-ROM contains the following:

- The directory ***/version*** **/next**, where ***version*** stands for the new software release number.
- The directory ***/version*** **/mib**, which contains the V1 and V2 management information bases (MIBs), which you can use with an SNMP manager.

The following directory structures are resident on the hard disk on the CPU Module:

/scsi/current/	Contains the initialization files for the current, operational version of the software.
/scsi/current/bin	Contains the library files for the current version of the software.
/scsi/current/snmpagt	Contains the SNMP agent files for the current version of the software.

/scsi/fallback/	Contains all the files for the previous version of system software and database files.
/scsi/next/	Contains all the files for the current version of the software, and is the directory where all files for future system software upgrades are received.

Installing a New Software Release

Installing a new release of the AC 60/120 system software includes the following tasks:

- If you are using FTP server software:
  - Preparing for the software downloading process. See *"Setting Up a Windows FTP Server" on page 240*.
  - Performing the downloading of the software upgrade files to the CPU Module hard disk
- If you are using the XModem or YModem serial transfer protocol:
  - Transferring the software upgrade files to the CPU Module hard disk. See *"Upgrading from Release 3.0.0 to Later Releases Using XModem/YModem File Transfer" on page 246*.

Note:
Upgrading the software on your AC 60/120 system affects its operation.

Setting Up a Windows FTP Server

If you are using a PC workstation or laptop PC running Windows 95 or Windows 3.1 to upgrade your AC 60/120 system software, you need to obtain an FTP server software program. If you are running Windows NT, you can use the FTP server function included in this operating system. We have tested the following freeware and shareware programs, available from the Internet, and found that they work reliably for Windows 95 and Windows 3.1.

Table 63. FTP Server Software Programs

Name	Type	Internet Location
War FTP Daemon (JGAA's Internet) **Note:** In this licensing agreement, the author stipulates that no government agencies or military organizations may use this program.	Freeware	http://www.jgaa.com
Serv-U (Cat Soft)	Shareware	http://www.cat-soft.com
WFTPD (Texas Imperial Software)	Shareware	http://www.shareware.com. **Note:** Type **ftp server** in the **Quick Search** field and press Return. When the search is finished, select the program filename **32wfd234.zip** and download it to your PC.

If you plan to use a shareware program, you are responsible for following the terms of the author's licensing agreement, including payment.

➤ Procedure

To set up your FTP server software:

1. Obtain an FTP server software program (freeware, shareware, or commercial) for Windows 95 or Windows 3.1.
2. Set up the FTP server software as follows:
   a. Create an account and password.
   b. Assign read-only, recursive access privileges to the pathname containing the drive ID and directory where the CD-ROM drive resides.

Upgrading AC 60/120 Software on the CPU Module

The following procedures describe how to upgrade your AC 60/120 system software on the CPU Module.

Upgrading from Release 3.0.0 to Later Releases Using FTP

Upgrading from release 3.0.0 to later releases using the file transfer protocol (FTP) option includes two major tasks.

- First, you set up the FTP server software on the PC workstation or network management workstation, connect the workstation to the CPU module, and ensure you have communication between the two devices (see *"Setting Up for the Downloading Process" on page 242*).
- Second, you perform the downloading process for the new, upgraded software files and the upgrading process on the CPU module (see *"Downloading Software Upgrade Files" on page 242*).

The system software and databases on the CPU Module hard disk undergo migration during the upgrading process. The software system directory structure on the hard disk is described on Page *239*.

Figure 145 on page 242 illustrates the migration of system software and databases that occur during the FTP file transfer and software upgrade processes.

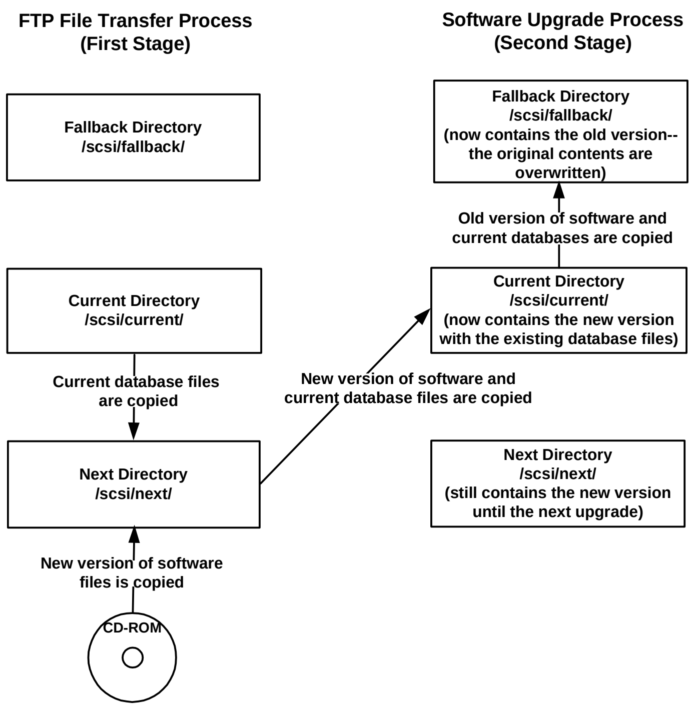


Figure 145. Migration of System Software and Databases During the Software Upgrade Process

Setting Up for the Downloading Process

➤ Procedure

To set up for the download process:

1. Set up the FTP server software on the PC workstation or network management workstation. See *"Setting Up a Windows FTP Server" on page 240*.
2. Connect a standard 10Base-T ethernet cable from the PC workstation or network management workstation to the ethernet port on the primary CPU Module. Ensure that you have a stable connection between the workstation and the CPU Module.
3. To check the communication between the PC workstation and the CPU Module, enter a ping command from the FTP server software.
   - a If you receive a response, go to Step 4.
   - b If you do not receive a response, check your connections and IP address of the CPU Module and enter the ping command again.
   - c Repeat Step 3.b. until you receive a response.
4. Place the CD-ROM containing the AC 60/120 system software in the CD-ROM drive in the PC workstation.
5. On the PC workstation, start up the VT100 terminal emulation software.

Downloading Software Upgrade Files

➤ Procedure

To download the software upgrade files:

1. Log onto the AC 60/120 system (see *"Logging onto the AC 60/120 System" on page 81*).

   The Console Interface Main Menu panel is displayed. See *Figure 146 on page 243*.

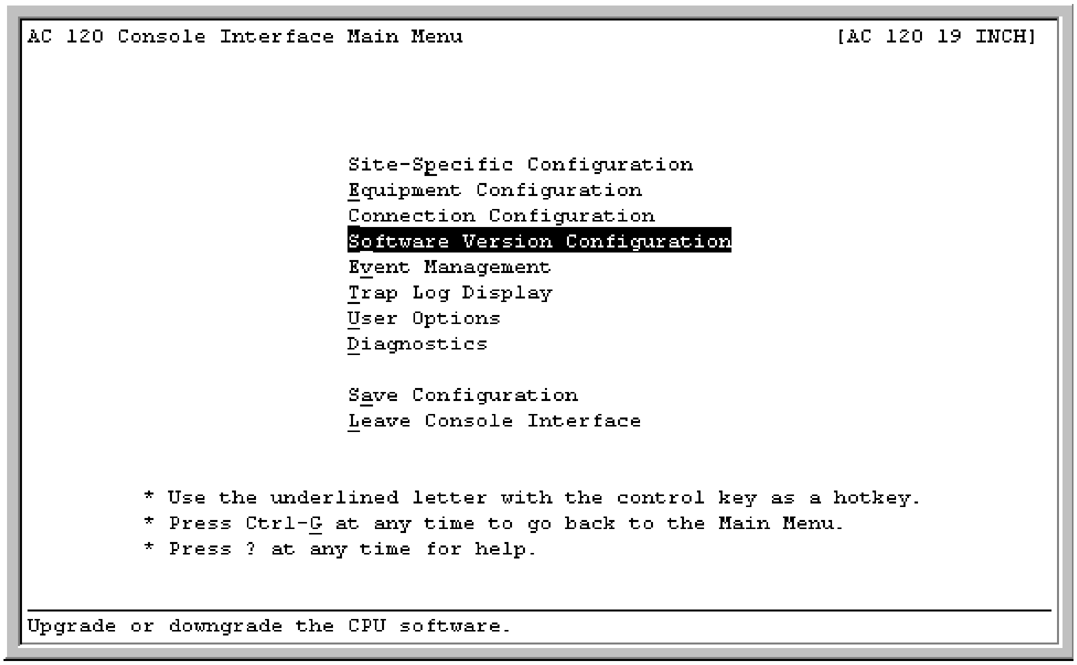


Figure 146. Console Interface Main Menu Panel (Software Version Configuration Selected)

2 On the Console Interface Main Menu panel, select the **Software Version Configuration** option and press Return.

The Software Version Configuration panel is displayed.

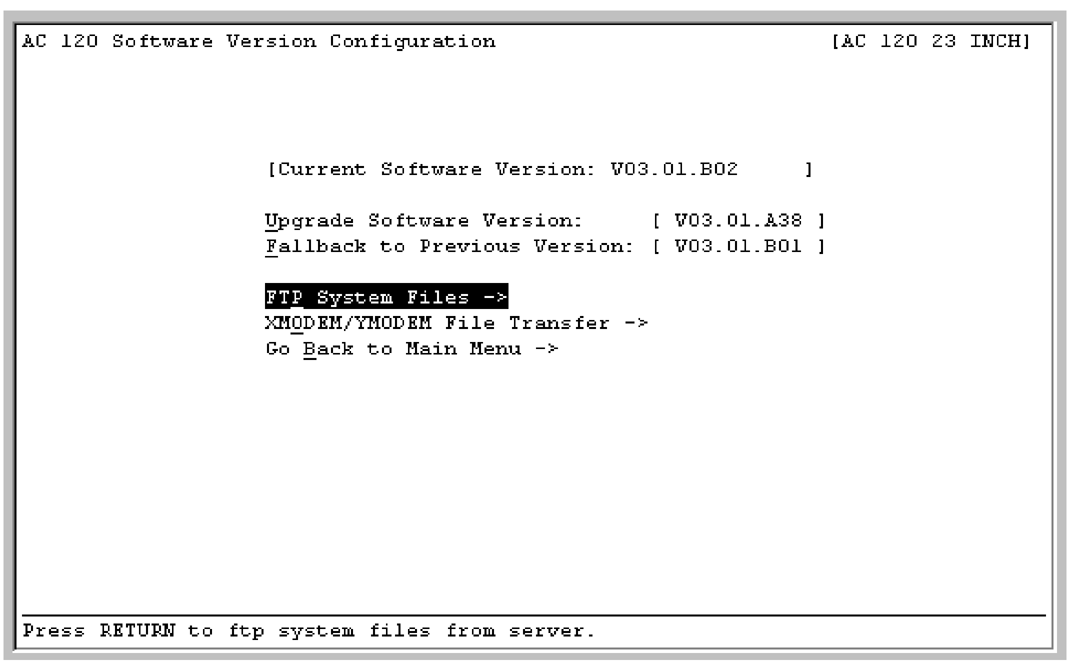


Figure 147. Software Version Configuration Panel (FTP System Files Selected)

3 On the Software Version Configuration panel, select the **FTP System Files** option and press Return.

The FTP System Files Configuration panel is displayed.

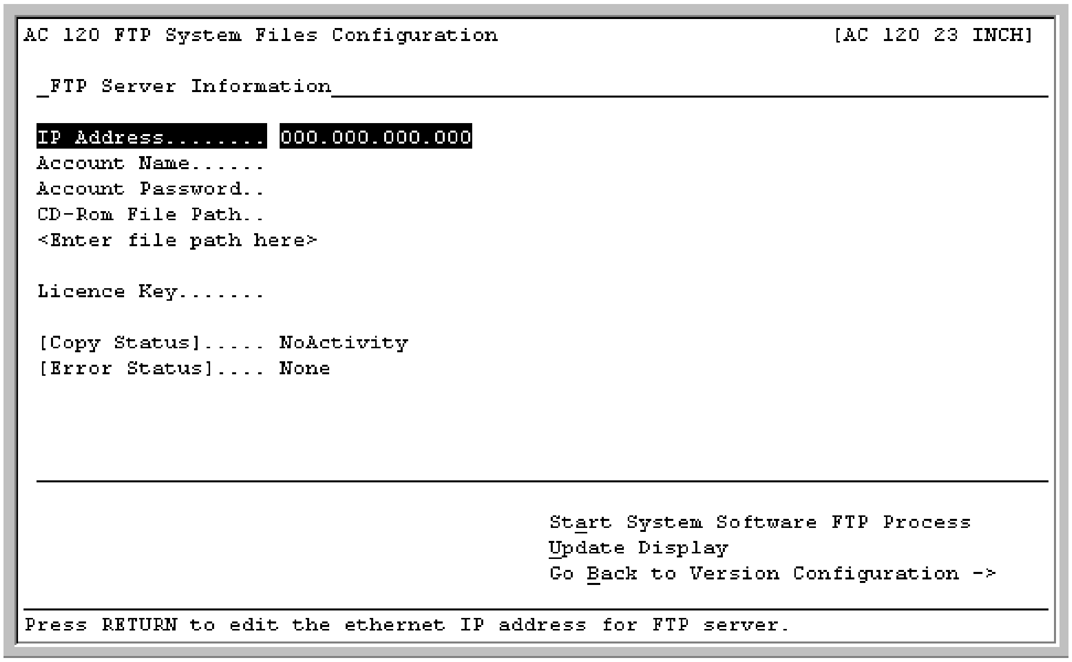


Figure 148. FTP System Files Configuration Panel

The commands on this panel have the following functions:

Start System Software FTP Process	Initiates the downloading of the software upgrade files to the CPU Module hard disk.
Abort System Software FTP Process	Cancels the downloading of the software upgrade files. This command is displayed only while the download process is in progress.
Update Display	Updates the fields.
Go Back to Version Configuration→	Redisplays the Software Version Configuration panel (*Figure 147 on page 243*).

4 Select the values for the fields on this panel from the values given in *Table 64 on page 244*.

Table 64. Field Values for the FTP System Files Configuration Panel

Field Names	**Variable**	**Description**
IP Address	000.000.000.000	Type the IP address of the PC workstation with the CD-ROM drive.
Account Name	accountname	Type the account name (maximum of 20 characters) that you set up in the FTP server.
Account Password	password	Type the password (maximum of 20 characters) that you set up in the FTP server. (The password you type is not displayed on the screen.)
CD-Rom File Path	/cdrom/cdromx/	Type the complete pathname of the directory where the file **upgrade.lib** resides. (You are overwriting the instruction **<Enter file path here>**.) For example, type: ***/cdrom/cdromx/*****upgrade.lib** where */cdrom/cdromx/* is your pathname.

Table 64. Field Values for the FTP System Files Configuration Panel (continued)

Field Names	Variable	Description
License Key		This field is not currently being used.
[Copy Status] (display only)	NoActivity, Working, DoneSuccessfully, DoneWith Error, Aborted	This variable tells you what happened during and after the copying of the files from the CD-ROM to the CPU module hard disk.
[Error Status] (display only)	Varies depending on the source of the error.	If the downloading is not successful, this variable describes the source of the error.

5 Select the **Start System Software FTP Process** command and press Return.

The system begins the downloading process from the CD-ROM drive on the PC workstation to the CPU Module hard disk.

6 Observe the variables in the **[Copy Status]** and the **[Error Status]** fields. If the **[Copy Status]** field displays **DoneSuccessfully**, go to Step 10.

If the **[Copy Status]** field displays **DoneWithError**, do the following:

a Determine the source of the problem and correct it. If you need assistance, contact Technical Support.

b Select the **Start System Software FTP Process** command again and press Return.

c Repeat Step 9.b. until the **[Copy Status]** field displays **DoneSuccessfully**.

7 Select the **Go Back to Version Configuration** command and press Return.

The Software Version Configuration panel (*Figure 147 on page 243*) is displayed.

8 Select the **Upgrade Software Version** option and press Return. The following message is displayed:

```
Are you sure that you want to upgrade the software? (y/n)
```

9 Press the y key (to indicate yes) to continue. While the system completes the software upgrade process, the follow message is displayed:

```
Upgrading the software to the next version ...
```

During the process, the system sends several trap messages indicating events that are occurring. When the process is completed, the system displays a message indicating successful completion.

Note:
The following events occur during the final stage of the upgrade process:

- In an AC 60/120 system with redundant (two) CPU modules, the following events occur:
  - The software copies the fallback and current directories to the standby (backup) CPU module.
  - The standby module reinitializes (reboots).
  - After the standby module reinitializes successfully, it serves momentarily as the primary module and sends a command to the original primary module to reinitialize.
  - The original primary reinitializes and reestablishes itself as the primary, and then the original standby module reinitializes. The system is now ready to perform configuration and other tasks.
- In an AC 60/120 system with one CPU module, it reinitializes. The system is now ready to perform configuration and other tasks.

Canceling the Software Download Process

➤ Procedure

If you need to cancel the downloading process while it is in progress:

1. On the FTP System Files Configuration panel (*Figure 148 on page 244*), select the **Abort System Software FTP Process** command and press Return.

   The following message is displayed:

   `Are you sure you want to abort the FTP process? (y/n)`

2. Press the y key (to indicate yes) to continue.

   While the system cancels the downloading process, the following message is displayed:

   `Aborting the FTP process ...`

   The cancellation might take a short time. When the cancellation is complete, the system displays **Aborted** in the **[Copy Status]** field.

Upgrading from Release 3.0.0 to Later Releases Using XModem/YModem File Transfer

You can use the XModem/YModem file serial transfer option to load new system software to the CPU Module.

Upgrading from release 3.0.0 to later releases using the XModem/YModem file transfer option includes two major tasks. The first task includes:

- Setting up the cabling and connections between the PC workstation and the AC 60/120 system CPU Module
- Starting up the VT100 terminal emulation software on the PC workstation
- Ensuring that you have communication between the two devices

The second task includes:

- Performing the file transfer process for the new software upgrade files
- Upgrading process on the CPU Module

Setting Up for the File Transfer Process

➤ Procedure

To set up for the file transfer process:

1. Set up the cabling and connections between the PC workstation, the local modem, and the telephone line. Do one of the following:
   a. If you are using an external modem, connect a cable from the EIA-232 interface port on the PC workstation to the modem, and a cable from the modem to the telephone line.
   b. If you are using an internal modem, connect a cable from the modem port on the PC to the telephone line.
2. Set up the cabling and connections between the AC 60/120 CPU Module, the remote modem, and the telephone line.
   a. Connect a cable from the CONSOLE port on the CPU Module to the modem. You must use the special modem connector, not the direct console connector.
   b. Connect a cable from the modem to the telephone line.
3. On the PC workstation, start up the VT100 terminal emulation software, and set up the configuration preferences. See *"Configuring the Terminal Emulator" on page 297.*
4. Using the terminal emulator modem communication function, enter the telephone number of the line connected to the modem connected to the AC 60/120 system.

Transferring the Software Upgrade Files

➤ Procedure

To transfer the files:

1. Using the terminal emulator, log onto the AC 60/120 system. See *"Logging onto the AC 60/120 System" on page 81*.

   The Console Interface Main Menu panel (*Figure 146 on page 243*) is displayed.

2. Select the **Software Version Configuration** option and press Return.

   The Software Version Configuration panel is displayed. See *Figure 147 on page 243*.

3. On the Software Version Configuration panel, select the **XMODEM/YMODEM File Transfer** option and press Return.

   The XMODEM/YMODEM File Transfer panel is displayed.

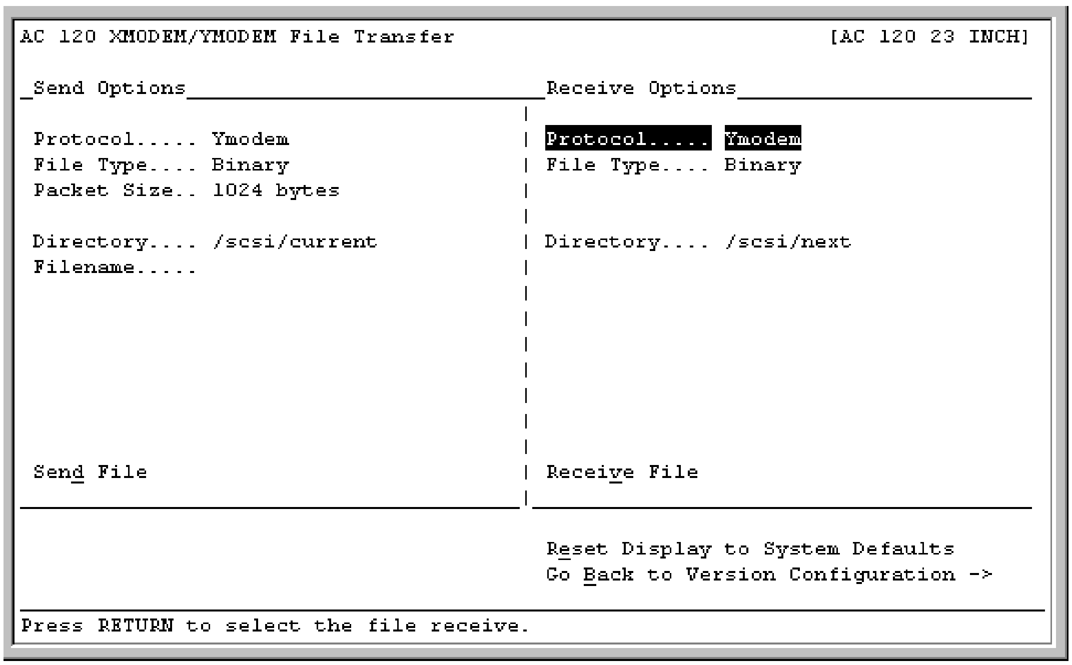


Figure 149. XMODEM/YMODEM File Transfer Panel (Receive Options)

Note:
For the AC 60/120 system upgrade software process, you use only the **Receive Options** side of the panel.

The commands on this panel have the following functions:

Send File	Initiates the send function of the file transfer process from to the CPU Module hard disk to a storage medium (such as a PC workstation hard disk).
Receive File	Initiates the receiving function of the file transfer process to the CPU Module hard disk from the CD-ROM containing the software upgrade files (running in a CD-ROM drive in a PC workstation).

Reset Display to System Defaults	Redisplays the default values in the fields.
Go Back to Version Configuration→	Redisplays the Software Version Configuration panel.

4 Select the values for the fields on this panel from the values given in *Table 65 on page 248*.

Table 65. Field Values for the XMODEM/YMODEM File Transfer Panel

Field Names	Values/Variables	Description
Protocol	YModem (default)	YModem protocol for receiving the upgrade software files.
	Ymodem-G	YModem-G protocol for receiving the upgrade software files.
	XModem	XModem protocol for receiving the upgrade software files.
File Type	Binary (default)	Binary format is the type you use most of the time.
	Text	Text or ASCII format is available but do not use it for software upgrade files.
Error Check (displayed only when the value **XModem** is selected in the Protocol field)	CRC-16 (default)	Indicates that the error checking method is cyclical redundant checking, 16 bits.
	Checksum	Indicates that the error checking method is arithmetic summation checking, 8 bits.
Directory	/scsi/next/***directoryname***/	Subdirectory on the CPU Module hard disk where the software upgrade files are received (stored). For each subdirectory contained in the package of software upgrade files, you must type the subdirectory name in this field, and then receive this directory on the CPU hard disk. **Note:** All subdirectory and file names are listed in the readme.txt file accompanying the software upgrade files on the CD-ROM.
Filename (displayed only when the value **XModem** is selected in the **Protocol** field)	filename	Filename on the CPU Module hard disk where the software upgrade files are received (stored). For each file contained in the package of software upgrade files, you must type the filename in this field, and then receive this file on the CPU hard disk. **Note:** All subdirectory and file names are listed in the readme.txt file accompanying the software upgrade files on the CD-ROM.

We recommend that you use either the YModem or the YModem-G protocol. Use the XModem protocol if that is the only one you have available to use.

- The YModem-G protocol allows the fastest transmission of the three types; however, this protocol does not acknowledge receipt of packets. You can receive at one time all files grouped under a subdirectory.
- The YModem protocol is a somewhat slower method of transmission, but is more reliable because it does acknowledge receipt of packets. You can receive at one time all files grouped under a subdirectory.
- The XModem protocol is a laborious method of transmission because you must type the filename of each file in the complete package of software upgrade files to accomplish the upgrade task.

5 Select the **Receive** command and press Return.

The window displaying the AC 60/120 system interface scrolls the XMODEM/YMODEM File Transfer panel out of view. A message is displayed indicating that you can cancel the transfer by pressing Control+x several times. A second message is displayed indicating that you must start the terminal emulator send function.

6 Using the terminal emulator send function, select one of the protocol types:

- YModem
- YModem-G
- XModem

Be sure to select the same protocol as the one you selected on the AC 60/120 system XMODEM/YMODEM File Transfer panel.

7 In the terminal emulator field for the location of the file, specify the drive where the AC 60/120 system upgrade software files reside (normally, the CD-ROM drive) and the directory pathname.

For example, specify a pathname like one of the following:

- If you are using YModem or YModem-G:

  x*:\scsi\next*subdirectory**.

  where *x* is the drive letter for the CD-ROM drive. All files in the following directories must be transferred:

  next

  next/bin

  next/snmpagt

- If you are using XModem:

  x:\scsi\next*subdirectory**filename*

  where *x* is the drive letter for the CD-ROM drive

Be sure you type the subdirectory name (or the subdirectory and filename if using XModem) exactly so that it matches the names you have already typed on the AC 60/120 system XMODEM/YMODEM File Transfer panel. All subdirectory and file names are listed in the readme.txt file accompanying the software upgrade files on the CD-ROM.

8 Press the OK or Send button or command in the terminal emulator send function dialog box.

9 Repeat Steps 4–8 to specify another subdirectory name (for YModem or YModem-G) or another subdirectory name and filename (for XModem) until you have transferred all files for the AC 60/120 system software upgrade.

10 Redisplay the AC 60/120 system Software Version Configuration panel.

11 Select the **Upgrade Software Version** option and press Return.

The following message is displayed:

```
Are you sure that you want to upgrade the software? (y/n)
```

12 Press the y key (to indicate yes) to continue.

While the system completes the software upgrade process, the follow message is displayed:

```
Upgrading the software to the next version ...
```

During the process, the system sends several trap messages indicating events that are occurring. When the process is completed, the system displays a message indicating successful completion.

Note:
The following events occur during the final stage of the upgrade process:

- In an AC 60/120 system with redundant (two) CPU modules, the following events occur:
  - The software copies the fallback and current directories to the standby (backup) CPU module.
  - The standby module reinitializes (reboots).
  - After the standby module reinitializes successfully, it serves momentarily as the primary module and sends a command to the original primary module to reinitialize.
  - The original primary reinitializes and reestablishes itself as the primary, and then the original standby module reinitializes. The system is now ready to perform configuration and other tasks.
- In an AC 60/120 system with one CPU module, it reinitializes. The system is now ready to perform configuration and other tasks.

Falling Back to the Previous Software Release

CAUTION:
Use the fallback procedure only if you have previously upgraded your CPU Module as described in the previous section, *"Upgrading AC 60/120 Software on the CPU Module" on page 241*.

To fall back (return) to the previous software release:

1. On the Console Interface Main Menu panel (*Figure 146 on page 243*), select the **Software Version Configuration** option and press Return.

   The Software Version Configuration panel is displayed. See *Figure 147 on page 243*.
2. Select the **Fallback to Previous Version** option and press Return.

   The following message is displayed:

   ```
   Are you sure that you want to return to the previous
   version? (y/n)
   ```
3. Press the y key (to indicate yes) to continue.

   While the system completes the fallback process, the follow message is displayed:

   ```
   Returning the software to the previous version ...
   ```

   When the process is completed, the system displays a message indicating successful completion.

Note:
The previous version is restored as the current functional system, and the later version is still stored on the hard disk under the directory structure **/scsi/next/**.

Backing Up AC 60/120 Configuration and Connection Databases

It is recommended that you back up your system, module, and connection configuration database files to a storage medium separate from the hard disk on the CPU Module.

Note:
After initially configuring your AC 60/120 system and every time you modify the configuration, be sure to back up the files to a separate storage medium.

You can use one of the following methods:

- Uploading the database files using FTP server software. See *"Backing Up Databases Using FTP" on page 251*.
- Transferring files using the XModem or YModem serial transfer protocol. See *"Backing Up Databases Using XModem/YModem File Transfer" on page 252*.

The files containing your configuration and connection data are named as follows:

ssid.def	System configuration database
console.def	Password setup (this file exists only if you have changed your password from the system default password)
ecd.def	Module configuration database
cnctn.db	Connection configuration database
iisp.cbr	IISP CBR route table (this file exists even if you have no configured SVCs on your AC 60/120 system)
iisp.vbr	IISP VBR route table (this file exists even if you have no configured SVCs on your AC 60/120 system)

Backing Up Databases Using FTP

➤ Procedure

To back up the database using FTP:

1. Connect a standard 10Base-T ethernet cable to the ethernet port on the primary CPU Module. Ensure that you have a stable connection from the source PC or network management workstation to the CPU Module.
2. Access the drive and directory on the computer to which you want to copy the databases.
3. At DOS prompt, type **ftp -n *999.999.999.999***

   where *999.999.999.999* is the IP address of the AC 60/120 CPU Module. Press Return.
4. At prompt **ftp>**, type **user readwrite *currentpassword***

   where *currentpassword* is the password you currently have for the AC 60/120 system software. Press Return.
5. To be sure you have the correct path selected, type **cd /scsi/current** and press Return.
6. To provide a visual indicator during the backup process, type **hash** and press Return.
7. Type **bin** and press Return.
8. Type **get "ssid.def"** and press Return.
9. Type **get "console.def"** and press Return.
10. Type **get "cnctn.db"** and press Return.

11 Type **get "ecd.def"** and press Return.

12 If you have SVCs configured on your system, type **get "iisp.cbr"** and press Return.

13 If you have SVCs configured on your system, type **get "iisp.vbr"** and press Return.

14 Type **bye** and press Return.

Backing Up Databases Using XModem/YModem File Transfer

You can use the XModem/YModem file transfer option to copy the AC 60/120 system databases from the CPU Module hard disk to another storage medium.

Copying the databases using the XModem/YModem file transfer option includes two major tasks. The first task includes:

- Setting up the cabling and connections between the PC workstation and the AC 60/120 system CPU Module
- Starting up the VT100 terminal emulation software on the PC workstation
- Ensuring that you have communication between the two devices

The second task includes:

- Performing the file transfer (copy) process for the databases

Setting Up for the File Transfer Process

➤ Procedure

To set up for the file transfer process:

1 Set up the cabling and connections between the PC workstation, the local modem, and the telephone line. Do one of the following:

   a If you are using an external modem, connect a cable from the EIA-232 interface port on the PC workstation to the modem, and a cable from the modem to the telephone line.

   b If you are using an internal modem, connect a cable from the modem port on the PC to the telephone line.

2 Set up the cabling and connections between the AC 60/120 system CPU Module, the remote modem, and the telephone line.

   a Connect a cable from the CONSOLE port on the primary CPU Module to the modem.

   b Connect a cable from the modem to the telephone line.

3 On the PC workstation, start up the VT100 terminal emulation software, and set up the configuration preferences. See *"Configuring the Terminal Emulator" on page 297*.

4 Using the terminal emulator modem communication function, enter the telephone number of the line connected to the modem connected to the AC 60/120 system.

Copying the Database Files

➤ Procedure

To copy the database files:

1 Using the terminal emulator, log onto the AC 60/120 system. See *"Logging onto the AC 60/120 System" on page 81*.

   The Console Interface Main Menu panel (*Figure 146 on page 243*) is displayed.

2 Select the **Software Version Configuration** option and press Return.

The Software Version Configuration panel is displayed. See *Figure 147 on page 243*.

3 On the Software Version Configuration panel, select the **XMODEM/YMODEM File Transfer** option and press Return.

The XMODEM/YMODEM File Transfer panel is displayed.

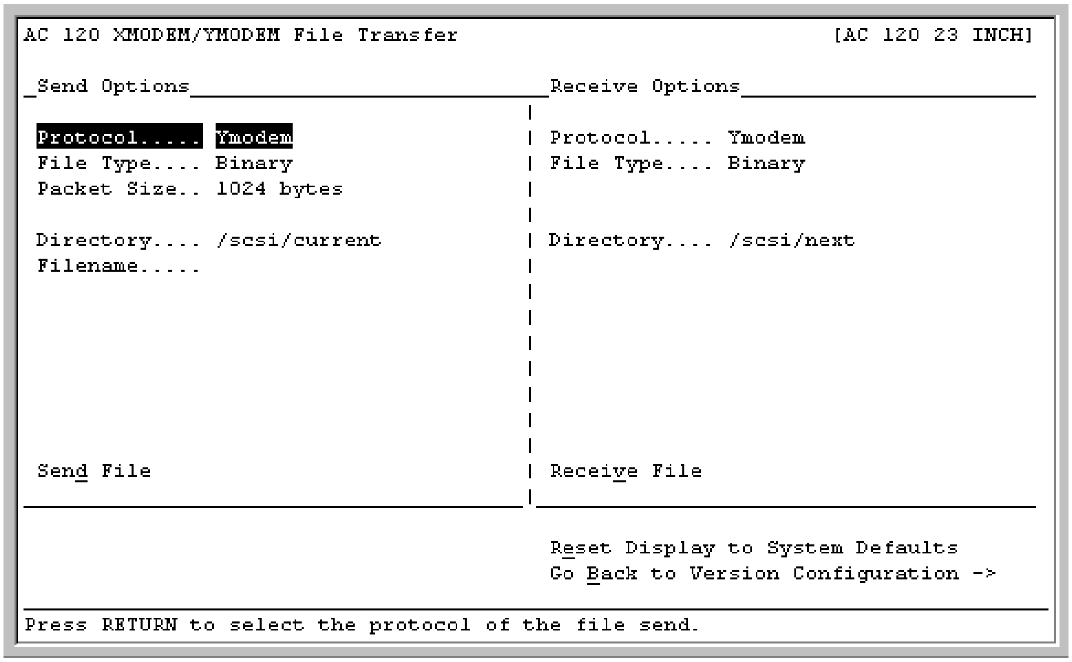


Figure 150. XMODEM/YMODEM File Transfer Panel (Send Options)

Note:
For the AC 60/120 system database file copy process, you use only the **Send Options** side of the panel.

The commands on this panel have the following functions:

Send File	Initiates the send function of the file transfer (copy) process from to the CPU Module hard disk to a storage medium (such as a PC workstation hard disk).
Receive File	Initiates the receiving function of the file transfer process to the CPU Module hard disk from the CD-ROM containing the software upgrade files (running in a CD-ROM drive in a PC workstation).
Reset Display to System Defaults	Redisplays the default values in the fields.
Go Back to Version Configuration→	Redisplays the Software Version Configuration panel.

4 Select the values for the fields on this panel from the values given in *Table 66 on page 254*.

Table 66. Field Values for the XMODEM/YMODEM File Transfer Panel

Field Names	Values/Variables	Description
Protocol	YModem (default)	YModem protocol for receiving the upgrade software files.
	XModem	XModem protocol for receiving the upgrade software files.
File Type	Binary (default)	Binary format is the type you use most of the time.
	Text	Text or ASCII format. If you specify text format here, you must specify the text (ASCII) format setting in the terminal emulator.
Packet Size	1024 bytes (default)	Indicates that the packet size is 1024 bytes.
	128 bytes	Indicates that the packet size is 128 bytes.
Directory	/scsi/current/ ***directoryname***/	Subdirectory on the CPU Module hard disk where the AC 60/120 system databases are stored.
Filename	filename	Filename on the CPU Module hard disk of the database file. You can specify only one filename at a time. **Note:** The files you need to copy are on page *251*.

5 Select the **Send** command and press Return.

The window displaying the AC 60/120 system interface scrolls the XMODEM/YMODEM File Transfer panel out of view. A message is displayed indicating that you can cancel the transfer by pressing Control+x several times. A second message is displayed indicating that you must start the terminal emulator receive function.

6 Using the terminal emulator receive function, select one of the two protocol types: YModem or XModem.

Be sure to select the same protocol as the one you selected on the AC 60/120 system XMODEM/YMODEM File Transfer panel.

7 In the terminal emulator field for the location of the file, specify the drive and the directory pathname on the PC hard disk where you want to transfer (copy) the database file.

For example, specify a pathname like one of the following:

x*:*directory**filename
where *x* is the drive letter for the PC hard disk and *directory* is any name you choose.

Be sure you type the filename of the database file exactly so that it matches the name you have already typed on the AC 60/120 system XMODEM/YMODEM File Transfer panel.

8 Press the OK or Receive button or command in the terminal emulator send function dialog box.

9 Repeat Steps 4–8 to specify another database filename until you have transferred (copied) all the database files to the PC hard disk.

Restoring AC 60/120 System Database Files

If your system, module, and connection configuration database files become corrupted or otherwise unusable, you must restore them from your backup storage medium to the hard disk on the CPU module by using one of the following methods:

- Downloading the database files using FTP server software (see *"Restoring Database Files Using FTP" on page 255*)
- Transferring files using the XModem or YModem serial transfer protocol (see *"Restoring Database Files Using XModem/YModem File Transfer" on page 256*)

Note:
In an AC 60/120 system with redundant CPU modules, you must restore the database files to both modules, either simultaneously or sequentially, depending on your physical setup.

The files containing your configuration and connection data are named as follows:

ssid.def	System configuration database
console.def	Password setup (this file exists only if you have changed your password from the system default password)
ecd.def	Module configuration database
cnctn.db	Connection configuration database
iisp.cbr	IISP CBR route table (this file exists even if you have no configured SVCs on your AC 60/120 system)
iisp.vbr	IISP VBR route table (this file exists even if you have no configured SVCs on your AC 60/120 system)

Restoring Database Files Using FTP

➤ Procedure

To restore database files from a separate storage medium using FTP:

1. In a nonredundant AC 60/120 system, connect a standard 10Base-T ethernet cable to the ethernet port on the CPU module. In a redundant AC 60/120 system, connect cables to both the primary and the standby CPU modules. Ensure that you have a stable connection from the source PC or network management workstation to the CPU module.
2. Access the drive and directory on the computer where you have stored the databases.
3. At DOS prompt, type **ftp -n *999.999.999.999***

   where *999.999.999.999* is the IP address of the AC 60/120 CPU Module. Press Return.
4. At the prompt **ftp>**, **type user readwrite *currentpassword***

   where *currentpassword* is the password you currently have for the AC 60/120 System software. Press Return.
5. To be sure you have the correct path selected, type **cd \scsi\current** and press Return.
6. To provide a visual indicator during the backup process, type **hash** and press Return.
7. Type **bin** and press Return.
8. Type **put "ssid.def"** and press Return.

9 Type **put "console.def"** and press Return.

10 Type **put "cnctn.db"** and press Return.

11 Type **put "ecd.def"** and press Return.

12 If you have SVCs configured on your system, type **put "iisp.cbr"** and press Return.

13 If you have SVCs configured on your system, type **put "iisp.vbr"** and press Return.

14 Type **bye** and press Return.

At this point, you must reinitialize the AC 60/120 system chassis, so that all components are synchronized.

➤ Procedure

To reinitialize the AC 60/120 chassis:

1 Log onto the AC 60/120 system (see *"Logging onto the AC 60/120 System" on page 81*).

The Console Interface Main Menu Panel (see *Figure 146 on page 243*) is displayed

2 On Console Interface Main Menu panel, select the **Diagnostics** option.

The Diagnostics Menu panel (see *Figure 152 on page 261*) is displayed.

3 On the Diagnostics Menu panel, select the **Reboot Hardware Components** command.

The Remote Reboot Configuration panel (see *Figure 156 on page 266*) is displayed.

4 On the Remote Reboot Configuration panel, select the **Reboot Chassis** command.

This command reboots (reinitializes) the primary and standby (redundant) CPU modules, and the I/O and server modules.

Restoring Database Files Using XModem/YModem File Transfer

You can use the XModem/YModem file transfer option to restore the AC 60/120 system databases from a separate storage medium to the CPU module hard disk. Restoring the databases using the XModem/YModem file transfer option is a process similar to the one described in *"Upgrading from Release 3.0.0 to Later Releases Using XModem/ YModem File Transfer" on page 246*, because you are transferring files from the PC workstation to the AC 60/120 system. This procedure includes two major tasks:

- First, you set up the cabling and connections between the PC workstation and the AC 60/120 system CPU module, start up the VT100 terminal emulation software on the PC workstation, and ensure you have communication between the two devices (see *"Setting Up for the File Transfer Process" on page 257*").
- Second, you perform the file transfer (copy) process for the backup database files to the AC 60/120 system (see *"Copying the Backup Database Files to the AC 60/120 System" on page 257*).

Note:
In an AC 60/120 system with redundant CPU modules, you must restore the database files to both modules.

Setting Up for the File Transfer Process

➤ Procedure

To prepare for the file transfer process:

1. Set up the cabling and connections between the PC workstation, the local modem, and the telephone line. Do one of the following:
   - **a** If you are using an external modem, connect a cable from the EIA-232 interface port on the PC workstation to the modem, and a cable from the modem to the telephone line.
   - **b** If you are using an internal modem, connect a cable from the modem port on the PC to the telephone line.
2. Set up the cabling and connections between the AC 60/120 system CPU module, the remote modem, and the telephone line.
   - **a** Connect a cable from the CONSOLE port on the CPU module to the modem.
   - **b** Connect a cable from the modem to the telephone line.
3. On the PC workstation, start up the VT100 terminal emulation software, and set up the configuration preferences. See *Section 10, "Configuring the Terminal Emulator"*.
4. Using the terminal emulator modem communication function, enter the telephone number of the line connected to the modem connected to the AC 60/120 system.

Copying the Backup Database Files to the AC 60/120 System

➤ Procedure

To copy the backup database files:

1. Using the terminal emulator, log onto the AC 60/120 system (see *"Logging onto the AC 60/120 System" on page 81*).
2. On the Console Interface Main Menu panel (see *Figure 146 on page 243*), select the **Software Version Configuration** option and press Return.

   The Software Version Configuration panel (see *Figure 147 on page 243*) is displayed.
3. On the Software Version Configuration panel, select the **XMODEM/YMODEM File Transfer** option and press Return.

   The XMODEM/YMODEM File Transfer panel (see *Figure 151 on page 258*) is displayed.

```
AC 120 XMODEM/YMODEM File Transfer                              [AC 120 19 INCH]

_Send Options___________________________Receive Options_______________________
                                        |
 Protocol..... Ymodem                   | Protocol..... Ymodem
 File Type.... Binary                   | File Type.... Binary
 Packet Size.. 1024 bytes               |
                                        |
 Directory.... /scsi/current            | Directory.... /scsi/next
 Filename.....                          |
                                        |
                                        |
                                        |
                                        |
                                        |
                                        |
                                        |
 Send File                              | Receive File
________________________________________|_____________________________________

                                          Reset Display to System Defaults
                                          Go Back to Version Configuration ->
______________________________________________________________________________
Press RETURN to select the protocol of the file send.
```

Figure 151. XMODEM/YMODEM File Transfer Panel (Receive Options)

Note:
For the AC 60/120 system upgrade software process, you use only the **Receive Options** side of the panel.

The commands on this panel have the following functions:

Send File	Initiates the send function of the file transfer process from to the CPU module hard disk to a storage medium (such as a PC workstation hard disk).
Receive File	Initiates the receiving function of the file transfer process to the CPU module hard disk from the separate storage medium containing the backup database files.
Reset Display to System Defaults	Redisplays the default values in the fields.
Go Back to Version Configuration→	Redisplays the Software Version Configuration panel.

4 Select the values for the fields on this panel from the values given in *Table 67 on page 259*.

Table 67. Field Values for the XMODEM/YMODEM File Transfer Panel (Receive Options)—Restoring Backup Files

Field Names	Values/Variables	Description
Protocol	YModem (default)	YModem protocol for receiving the upgrade software files.
	Ymodem-G	YModem-G protocol for receiving the upgrade software files.
	XModem	XModem protocol for receiving the upgrade software files.
File Type	Binary (default)	Binary format is the type you use most of the time.
	Text	Text or ASCII format is available but do not use it for restoring database files.
Error Check (displayed only when the value **XModem** is selected in the **Protocol** field)	CRC-16 (default)	Indicates that the error checking method is cyclical redundant checking, 16 bits.
	Checksum	Indicates that the error checking method is arithmetic summation checking, 8 bits.
Directory	/scsi/current/	Directory on the CPU module hard disk where the backup database files are to be restored.
Filename (displayed only when the value **XModem** is selected in the **Protocol** field)	***filename***	Filename on the CPU module hard disk, which the backup database file (of the same name) will overwrite.

Note:
It is recommended that you use either the YModem or the YModem-G protocol. Use the XModem protocol if that is the only one you have available to use.

- The YModem-G protocol allows the fastest transmission of the three types; however, this protocol does not acknowledge receipt of packets. You can receive at one time all files grouped under a subdirectory.
- The YModem protocol is a somewhat slower method of transmission, but is more reliable because it does acknowledge receipt of packets. You can receive at one time all files grouped under a subdirectory.
- The XModem protocol is a laborious method of transmission because you must type the filename of each file in the complete package of software upgrade files to accomplish the upgrade task.

5 Select the **Receive** command and press Return.

The terminal emulator displaying the AC 60/120 system window interface scrolls the XMODEM/YMODEM File Transfer panel out of view. A message is displayed indicating that you can cancel the transfer by pressing Control+x several times. A second message is displayed indicating that you must start the terminal emulator send function.

6 Using the terminal emulator send function, select one of the three protocol types: 1) YModem, 2) YModem-G, or 3) XModem. Be sure to select the same protocol as the one you selected on the AC 60/120 system XMODEM/YMODEM File Transfer panel.

7 In the terminal emulator field for the location of the file, specify the drive where the AC 60/120 system backup database files reside and the directory pathname.

For example, specify a pathname like one of the following:

- ***x*:\acbackup*.*** if you are using YModem or YModem-G
  where *x* is the drive letter where the backup database files reside.
- ***x*:\acbackup\filename** if you are using XModem
  where *x* is the drive letter where the backup database files reside.

Be sure you type the directory name (or the directory and filename if using XModem) exactly so that it matches the names you have already typed on the AC 60/120 system XMODEM/YMODEM File Transfer panel.

8 Press the OK or Send button or command in the terminal emulator send function dialog box.

9 Repeat steps 4–8 to specify another filename (for XModem) until you have transferred all the backup files to the hard disk on the CPU module.

At this point, you must reboot (reinitialize) the AC 60/120 system chassis, so that all components are synchronized.

10 Redisplay the Console Interface Main Menu Panel (see *Figure 146 on page 243*).

11 On Console Interface Main Menu panel, select the **Diagnostics** option.

The Diagnostics Menu panel (see *Figure 152 on page 261*) is displayed.

12 On the Diagnostics Menu panel, select the **Reboot Hardware Components** command.

The Remote Reboot Configuration panel (see *Figure 156 on page 266*) is displayed.

13 On the Remote Reboot Configuration panel, select the **Reboot Chassis** command.

This command reboots (reinitializes) the primary and standby (redundant) CPU modules, and the I/O and server modules.

8 System Diagnostics

The system diagnostics functions gives you the ability to do the following:

- View the status of the AC 60/120 system including:
  - Version of the system software currently running
  - Status of the hard disk on the CPU module
  - Statistics on the message pool and the cell buffers
- Run cell test diagnostics to determine whether a specified port is operating correctly.
- Reboot (initialize) the whole AC 60/120 chassis, the primary or backup CPU module, the I/O modules, or all components in the chassis.
- Unlock a telnet session remotely.

Viewing AC 60/120 System Status

To view the status of the system, use the steps in the following procedure, starting at the Console Interface Main Menu panel (see *Figure 33 on page 83*).

➤ Procedure

To view the status of the system:

1 On the Console Interface Main Menu panel (*Figure 33 on page 83*), select the **Diagnostics** option and press Return.

The Diagnostics Menu panel is displayed.

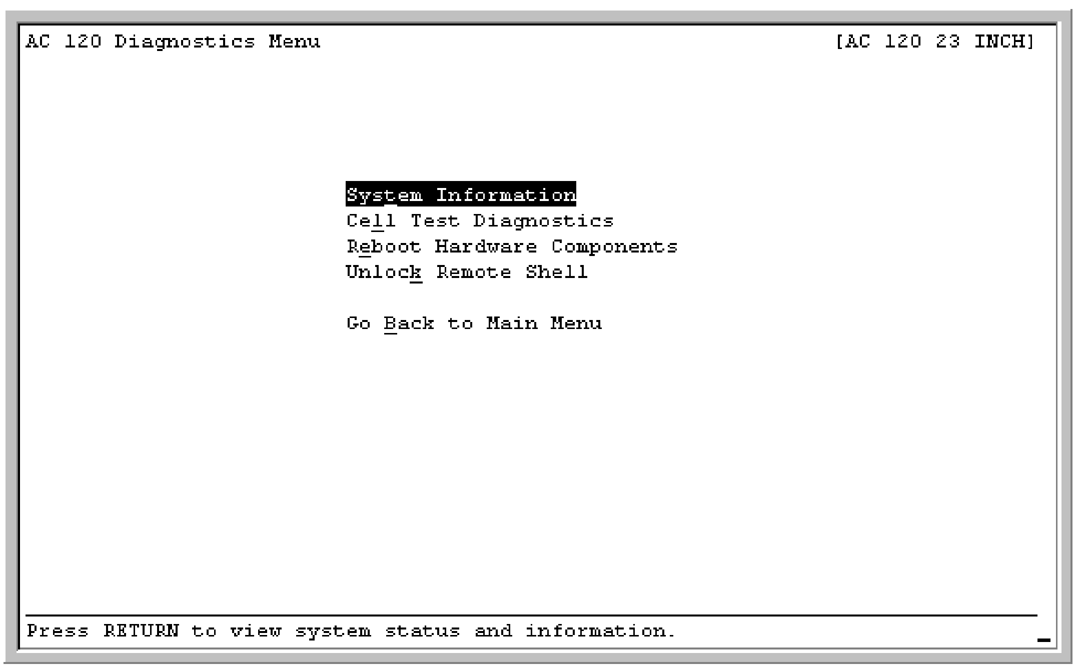


Figure 152. Diagnostics Menu Panel

2 Select the **System Information** option and press Return.

The System Information panel (see *Figure 153 on page 262*) is displayed.

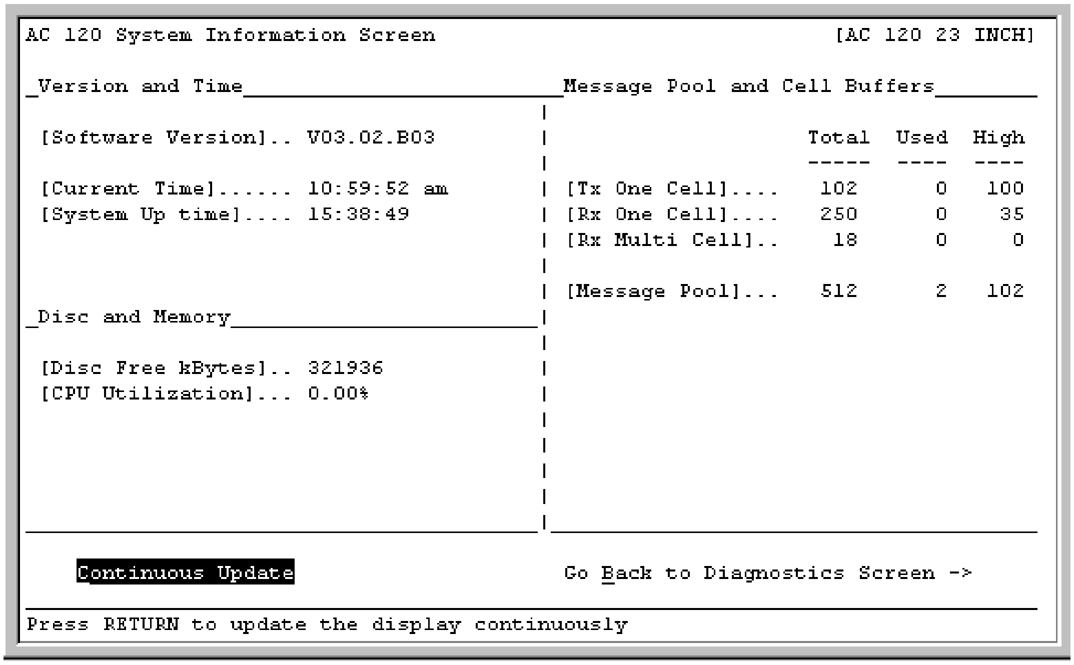


Figure 153. System Information Panel

The commands on this panel have the following functions:

Continuous Update — Continuously updates the information in the fields every second. Select this command and press Return to turn the continuous updating on and off as needed (similar to a toggle switch).

Go Back to Diagnostics Screen→ — Redisplays the Diagnostics Menu panel.

The display-only fields on this panel are described in the following table.

Table 68. Field Descriptions for the System Information Panel

Field Name	Description
[Software Version]	The version of the system software currently running on the CPU module.
[Current Time]	This time value for the system is set up on the Site-Specific Configuration panel (see *"Setting the System Date and Time" on page 89*).
[System Up Time]	The amount of time the AC 60/120 system has been running since the last time you applied power to the system, or rebooted (initialized) the CPU module.
[Disc Free kBytes]	The amount of free space (in kilobytes) on the hard disk of the CPU module.
[CPU Utilization]	The percentage of time the processor uses for data traffic processing.
Message Pool and Cell Buffers	Used primarily by technical support for diagnostic problems.

Running Cell Test Diagnostics

To determine whether a port is operating correctly, use the steps in the following procedure, starting at the Console Interface Main Menu panel (see *Figure 33 on page 83*).

1. On the Console Interface Main Menu panel, select the **Diagnostics** option and press Return.

   The Diagnostics Menu panel (see *Figure 152 on page 261*) is displayed.

2. On the Diagnostics Menu panel, select the **Cell Test Diagnostics** option and press Return.

   The Cell Test Diagnostics panel is displayed.

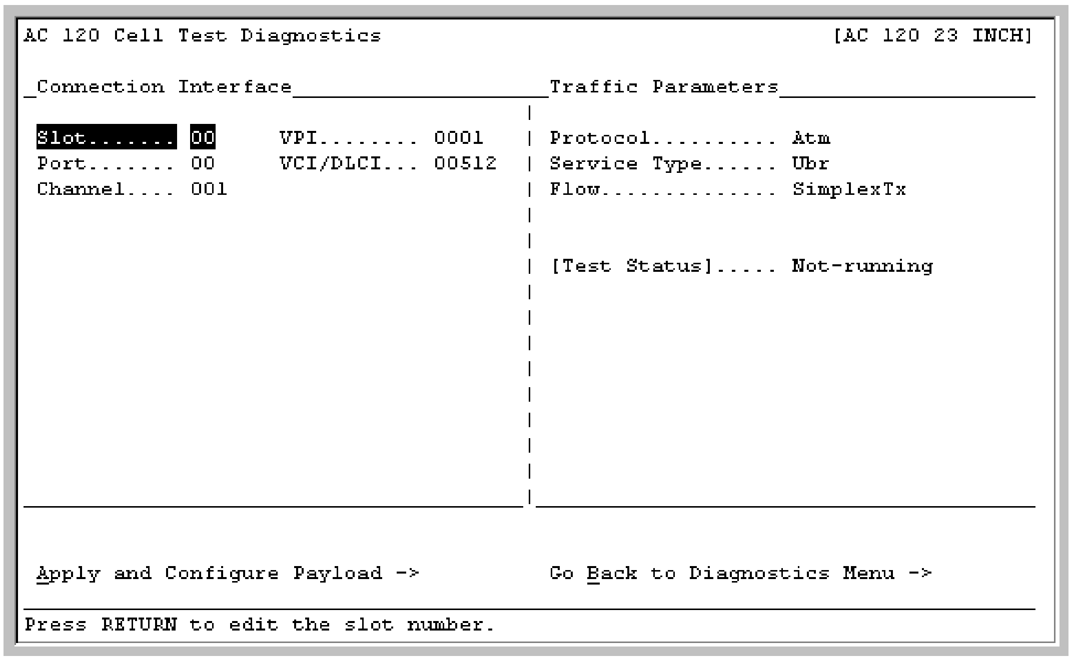


Figure 154. Cell Test Diagnostics Panel

The commands on this panel have the following functions:

Apply and Configure Payload→	Applies the field values you select from *Table 69 on page 264*, and displays the Cell Test Payload Configuration panel (see *Figure 155 on page 264*).
Stop/Delete Connection	When running a test using continuous transmission of test payload (continuous testing), stops the test and deletes the connection. When running a test for which you send one payload at a time (noncontinuous testing), just deletes the connection.
Go Back to Diagnostics Screen→	Redisplays the Diagnostics Menu panel.

3 To set up a connection for the port you want to test, select the values for the fields on this panel from the values given in the following table.

Table 69. Field Values for the Cell Test Diagnostics Panel

Field Names	**Values**	**Description**
Slot	Range: 1–14	The slot number containing the module you want to test.
Port	Range: 1–8	The port number on the module you want to test.
Channel	Range: 1–30	The channel number for the port you want to test.
VPI	Range: 0–255	The VCI for the channel you want to test.
VCI/DLCI	VCI range: 32–65535 DLCI range: 16–1024	The VCI or the data link connection identifier (DLCI) for the channel you want to test.
Protocol	Atm, Frame-relay, Circ-emulation, Hdlc	The interface type you have set up for the port.
Service Type	Ubr, Vbr-nrt1, Vbr-rt2, Vbr-rt1, Vbr-express, Cbr-nrt2, Cbr4, Cbr3, Cbr2, Cbr1	The service type you have set up for the connection.
Flow	SimplexTx, SimplexRx, Duplex	The type of traffic flow you want to set up for the test: one-way transmit, one-way receive, or two-way flow.
[Test Status]	Running, Not-running	Indicates whether or not cell test payload is currently being transmitted or received or both.

4 Select the **Apply and Configure Payload** command and press Return.

The Cell Test Payload Configuration panel is displayed.

```
AC 120 Cell Test Payload Configuration                      [AC 120 23 INCH]

_Payload Formats___________________________Statistics____________________
                                          |
 [Received Payload:]                      | [Test Status].......... Not-running
 XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX  |
 XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX  | [Packets Transmitted].. 0000000000
 XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX  | [Packets Received]..... 0000000000
                                          | [Packets Mismatched]... 0000000000
                                          |
                                          |
                                          |
 Transmitted Payload:                     |
 0000 0000 0000 0000 0000 0000 0000 0000  |
 0000 0000 0000 0000 0000 0000 0000 0000  |
 0000 0000 0000 0000 0000 0000 0000 0000  | Continuous Update
                                          | Reset Cell Counters
                                          |________________________________
                                          | Send Payload Once
                                          | Send Payload Continuously
 Refresh Transmit Payload                 |
 Reset Display                            | Go Back to Cell Test Diagnostics ->
__________________________________________|_______________________________
```

Figure 155. Cell Test Payload Configuration Panel

The commands on this panel have the following functions:

Refresh Transmit Payload	Applies the values you enter in the **Transmitted Payload** field.
Reset Display	Sets the values in the **Transmitted Payload** field to the last saved (applied) set of values.
Continuous Update	Continuously updates the information in the **[Packets Transmitted, Received,** and **Mismatched]** fields every two seconds. Select this command and press Return to turn the continuous updating on and off as needed (similar to a toggle switch).
Reset Cell Counters	Sets the values in the **[Packets Transmitted, Received,** and **Mismatched]** fields to zero.
Send Payload Once	Sends the payload one time.
Send Payload Continuously	Sends the payload continuously 10 times per second.
Delete Connection (displayed only after you have sent a payload one time)	Deletes the connection you set up on the Cell Test Diagnostics panel (see *Figure 154 on page 263*). Use this command after you have sent a test payload by using the **Send Payload Once** command.
Stop Cell Test (displayed only after you have sent a payload continuously)	Stops a continuously running test and deletes the connection you set up on the Cell Diagnostics panel (see *Figure 154 on page 263*). Use this command after you have sent a test payload by using the **Send Payload Continuously** command.
Go Back to Cell Test Diagnostics→	Redisplays the Cell Test Diagnostics panel.

5 Select the first line in the **Transmitted Payload** field and enter numbers in any sequence and press Return. Repeat this step for the second and third lines of this field.

6 Select the **Refresh Transmit Payload** command and press Return.

This command applies the values for the test payload.

7 Select the **Send Payload Once** or the **Send Payload Continuously** command and press Enter.

The system displays the cells transmitted or the cells received or both, depending on the type of flow you selected on the Cell Test Diagnostics panel.

Rebooting AC 60/120 System Components

To reboot (initialize) one or more components in the AC 60/120 chassis, use the steps in the following procedure, starting at the Console Interface Main Menu panel (see *Figure 33 on page 83*).

1 On the Console Interface Main Menu panel (*Figure 33 on page 83*), select the **Diagnostics** option and press Return.

   The Diagnostics Menu panel (see *Figure 152 on page 261*) is displayed.

2 On the Diagnostics Menu panel, select the **Reboot Hardware Components** option and press Return.

   The Remote Reboot Configuration panel is displayed.

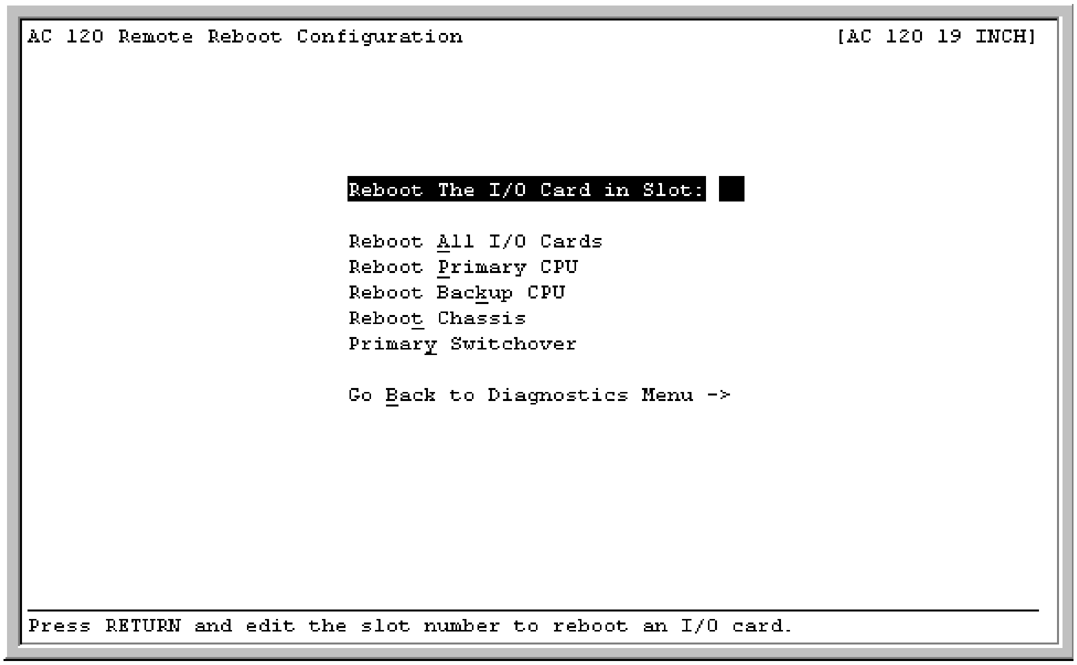


Figure 156. Remote Reboot Configuration Panel

The commands on this panel have the following functions:

Reboot the I/O Card in Slot:__	Reboots the I/O module in the slot you designate (slot number range 1–14). This command is the equivalent to physically removing the module from and then reinserting it into the chassis.
Reboot All I/O Cards	Reboots all I/O modules in the chassis, without affecting the CPU module. This command is the equivalent to physically removing the modules from and then reinserting them into the chassis.
Reboot Primary CPU	Reboots (initializes) the primary CPU module. This command also reboots all I/O modules in the chassis as instructed by the system software initialization process.
Reboot Backup CPU	Reboots (initializes) the backup (redundant) CPU module, without affecting the primary CPU module.
Reboot Chassis	Reboots all components in the chassis, that is, the CPU modules, the Stratum 3–4 modules, and the I/O modules.

Primary Switchover	Sets the backup (redundant) CPU module as the primary one, and sets the original primary CPU module as the backup one.
Go Back to Diagnostics Menu→	Redisplays the Diagnostics Menu panel.

3 Select the appropriate command and press Return.

Unlocking a Telnet Session

Once in a while, a lockup condition of a telnet session you are using to connect to an AC 60/120 system occurs. If this happens, you need to use another AC 60/120 system in the network to remotely access and unlock the AC 60/120 system with the telnet lock-up problem. Use the steps in the following procedure to unlock the telnet session.

1 From another AC 60/120 system, log on to the AC 60/120 system console interface.

2 On the Console Interface Main Menu panel (see *Figure 33 on page 83*), select the **Diagnostics** option and press Return.

The Diagnostics Menu panel (see *Figure 152 on page 261*) is displayed.

3 On the Diagnostics Menu panel, select the **Unlock Remote Shell** option and press Return.

The Unlock Remote Shell panel is displayed.

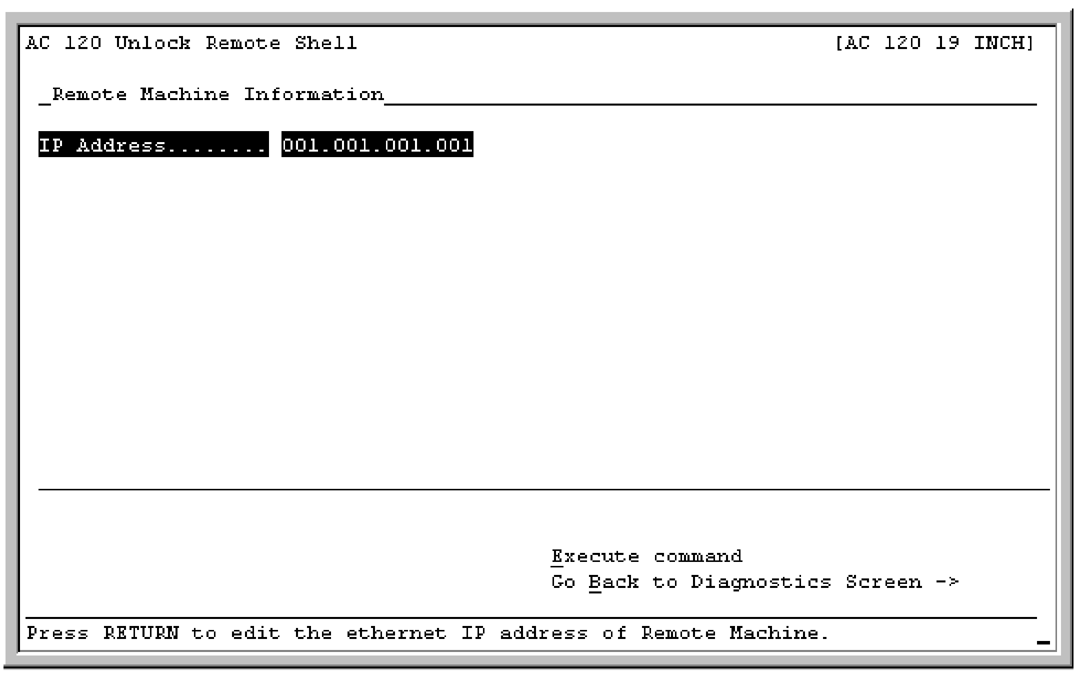


Figure 157. Unlock Remote Shell Panel

4. Type the IP address of the system that is connected to the locked-up telnet session in the **IP Address** field, and press Return.
5. Select **Execute Command** and press Return.

   This command corrects the telnet lock-up condition, and you should now be able to access the AC 60/120 system to which you previously could not get any response.

9 Pin Configurations for AC 60/120 Modules and Cables

This section describes the pinouts on the AC 120 common equipment modules and the AC 120 and the AC 60 I/O modules. The following information is provided to help you connect appropriately configured cables to the AC 60/120 ATM Access Concentrators.

Power Supply Module Configurations

AC Power Supply Module

The configuration of the connector pins on the 110/220 V AC power supply module faceplate is shown in the following figure.

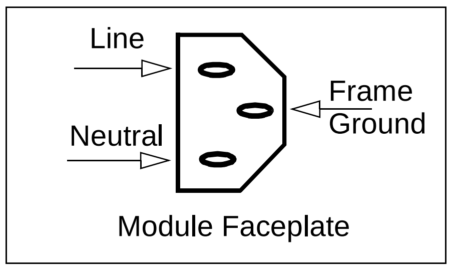


Figure 158. Pin Configuration on the 110/220 V AC Power Supply Module Faceplate

The following table describes the pins on the faceplate connector on the 110/220 V AC power supply.

Table 70. Pin Descriptions for the 110/220 V AC Power Supply Module

Pin	Description
Line	Accepts the appropriate phased voltage.
Ground	Provides the frame ground for the AC 120 chassis. There is a 2 K ohm resistance separator between the frame ground and the logical ground for all circuits in the AC 120 chassis.
Neutral	In conjunction with the line pin, provides the reference voltage.

-48 V DC Power Supply Module

The configuration of the connector pins on the -48 V DC power supply module faceplate is shown in the following figure.

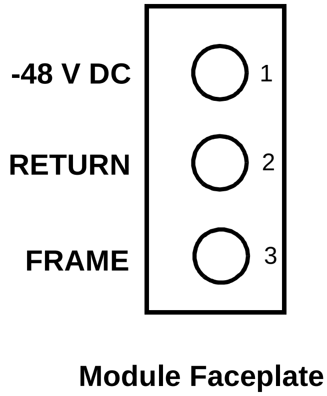


Figure 159. Pin Configuration on the -48 V DC Power Supply Module Faceplate

The following table describes the pins on the faceplate connector on the -48 V DC power supply.

Table 71. Pin Descriptions for the -48 V DC Power Supply Module

Pin	Description
1	Input from battery
2	Return to battery
3	Provides the frame ground for the AC 120 chassis

Stratum 3–4 Module Configuration

The composite clock signal is a 64-Kbps bipolar signal with an 8-Kbps bipolar violation signal. The following figure is a diagram for general reference only. Detailed parameters for the composite clock signal are described in Bellcore document TA-TSY-000378.

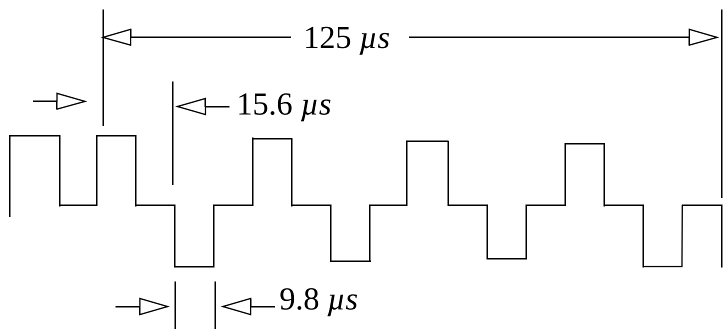


Figure 160. Composite Clock Signal

The composite clock signal is a balanced signal, which is transmitted over a shielded twisted pair cable. The cable shield is grounded at the composite clock source.

The following table describes the RJ11 composite clock interface on the Stratum 3–4 Module.

Table 72. Pin Descriptions for the RJ11 Connector on the Stratum Module

Pin	Description
1	Not used
2	Not used
3	RX
4	RX
5	Not used
6	Not used

CPU Module Configuration

There are two different interfaces available for direct access to the CPU Module. You can use the console interface or the ethernet interface to connect to the terminal emulator to configure and manage the AC 120 system.

Console Serial Interface

The serial port console interface of the CPU Module accepts an RJ11 interface. The CPU Module accommodates the standard RJ11 interface; however, due to differences among manufacturers of connectors, be sure to check your cable and connector to see what type you have. DB9 connectors are available with different wire coloring schemes. On the serial port of the PC or workstation you are using as the console, use a standard DB9 female connector with an attached RJ11 connector. Be sure to use the correct type of cable to ensure proper operation.

See *Table 73 on page 272* and *Table 74 on page 272* for descriptions of DB9 connector pins with wire coloring variations.

Table 73. Pin Descriptions for the DB9 Connector with Black/Red/Green Wires on the Console Serial Interface

Pin (DB 9)	Description	Pin (RJ11, 6 wire)	Pin (RJ11, 4 wire)
2	Black = RX (receive)	2	1
3	Red = TX (transmit)	3	2
5	Green = Ground	4	3

Table 74. Pin Descriptions for the DB9 Connector with Yellow/Green/Red Wires on the Console Serial Interface

Pin (DB 9)	Description	Pin (RJ11, 6 wire)	Pin (RJ11, 4 wire)
2	Yellow = RX (receive)	2	1
3	Green = TX (transmit)	3	2
5	Red = Ground	4	3

A modem, as well as the SUN Microsystems workstation and other types of workstations, can also be used to connect to the serial port of the CPU Module. The SUN workstation uses a DB25 male connector. See the following table for descriptions of the DB25 connector pins.

Table 75. Pin Descriptions for the DB25 Connector on the Console Serial Interface

Pin (DB 25)	Description	Pin (RJ11, 6 wire)	Pin (RJ11, 4 wire)
2	Red = TX (transmit)	2	1
3	Black = RX (receive)	3	2
7	Green = Ground	4	3

The following figure displays the RJ11 connector.

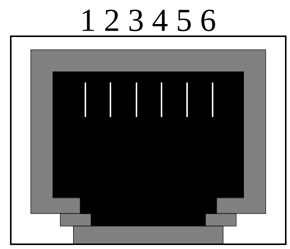


Figure 161. Pin Locations on the RJ11 Connector

Note:
Only pins 2, 3 and 4 are active.

Ethernet 10Base-T Interface

The CPU Module also accommodates the standard RJ45 pin assignments on the ethernet interface on the faceplate. The following figure shows the pin locations for the RJ45 connector for the 10BASE-T connector on the CPU Module faceplate.

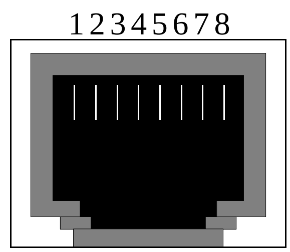


Figure 162. Pin Locations on the RJ45 Connector

See the following table for descriptions of the RJ45 connector pins.

Table 76. Pin Descriptions for the RJ45 Connector on the Console Ethernet Interface

Pin	Description
1	TD+ (transmit to UTP wire)
2	TD– (transmit to UTP wire)
3	RD+ (receive from UTP wire)
4	Not used by 10Base-T
5	Not used by 10Base-T
6	RD– (receive from UTP wire)
7	Not used by 10Base-T
8	Not used by 10Base-T

DS1/T1 Module Configuration

A T1 interface using a RJ45 connector provides the connectivity on the DS1 Module. See the following table for descriptions of the RJ45 connector pins.

Table 77. Pin Descriptions for the RJ45 Connector on the DS1 Module Faceplate

Pin	Description
1	Rx Ring
2	Rx Tip
3	Not used
4	Tx Ring
5	Tx Tip
6	Frame Ground
7	Not used
8	Not used

High Speed Module Configuration

To use the High Speed Module, you must perform the following tasks:

- Setting the dual in-line package (DIP) switches on the module
- Selecting the type of cable you need for connecting to your High Speed Module

Setting DIP Switches

The High Speed Module has four sets of switches on the right side of the module. Each set (red in color) has eight switches that you must set to either the “ON” or the “OFF” position. These switches control the following types of information:

- Clock function settings (*Table 79 on page 278*, *Table 80 on page 278*, and *Table 82 on page 278*)
- Serial port traffic types (*Table 81 on page 278*):
  - Receive and transmit data using limitless ATM network protocol
  - Receive data using AAL1 and transmit data using limitless ATM network protocol
  - Receive data using limitless ATM network protocol and transmit data using AAL1
  - Receive data using AAL1 and transmit data using AAL1
- Serial data type (*Table 82 on page 278*)
- Parallel data type (*Table 79 on page 278*)
- Serial port transmission rates (*Table 83 on page 279*)
- Parallel port transmission rates (*Table 84 on page 281*)

Use the flowcharts in *Figure 164 on page 276* (serial port configuration) and *Figure 165 on page 277* (parallel port configuration) to determine how to set the DIP switches. Then use the tables to select the correct “ON” or “OFF” position.

➤ Procedure

To set the DIP switches:

1 Peel the silver-colored, protective foil film off the four DIP switch sets located on the right side of the module. (The film is tightly glued onto the top of each of the four sets of switches.)

The DIP switches (red in color) are revealed. See the following figure.

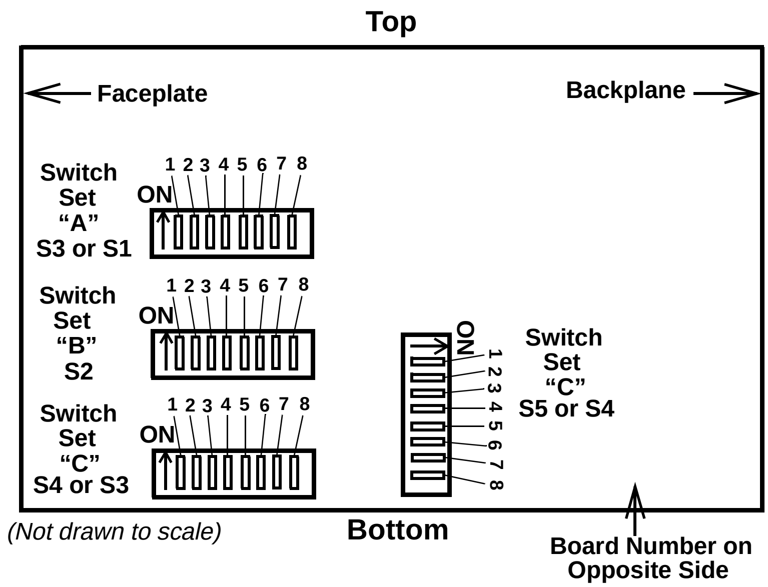


Figure 163. Location of DIP Switch Sets on the High Speed Module

The High Speed Module has one of two different board numbers with the DIP switch sets labeled differently on the circuit board, as described in the following table. Also refer to *Figure 163 on page 275* to match the reference label to the actual board number label.

Table 78. DIP Switch Set Labels on the High Speed Module

DIP Switch Set Reference Label	DIP Switch Set Label on Board Number 25-20N16000	DIP Switch Set Label on Board Number 25-20N16100
A	S3	S1
B	S2	S2
C	S4	S3
D	S5	S4

2 Use a sharp-pointed object, such as a ballpoint pen (but not a graphite pencil), to slide the switches to either the "ON" or the "OFF" position according to the information in:

- *Figure 164 on page 276* (serial port configuration)
- *Figure 165 on page 277* (parallel port configuration)
- *Table 80 on page 278* through *Table 84 on page 281*

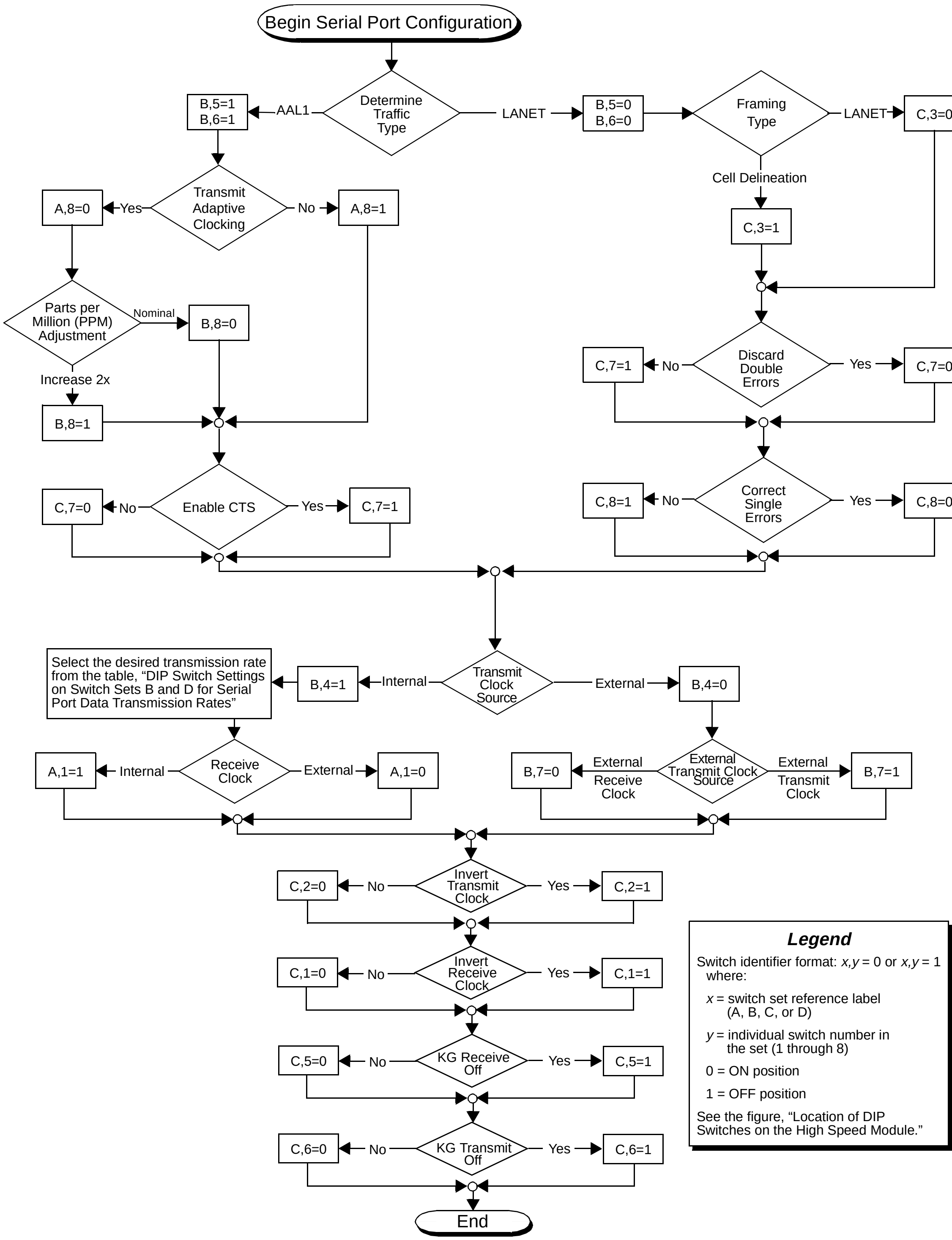


Figure 164. Flowchart to Determine DIP Switch Settings for Serial Port Configuration (High Speed Module)

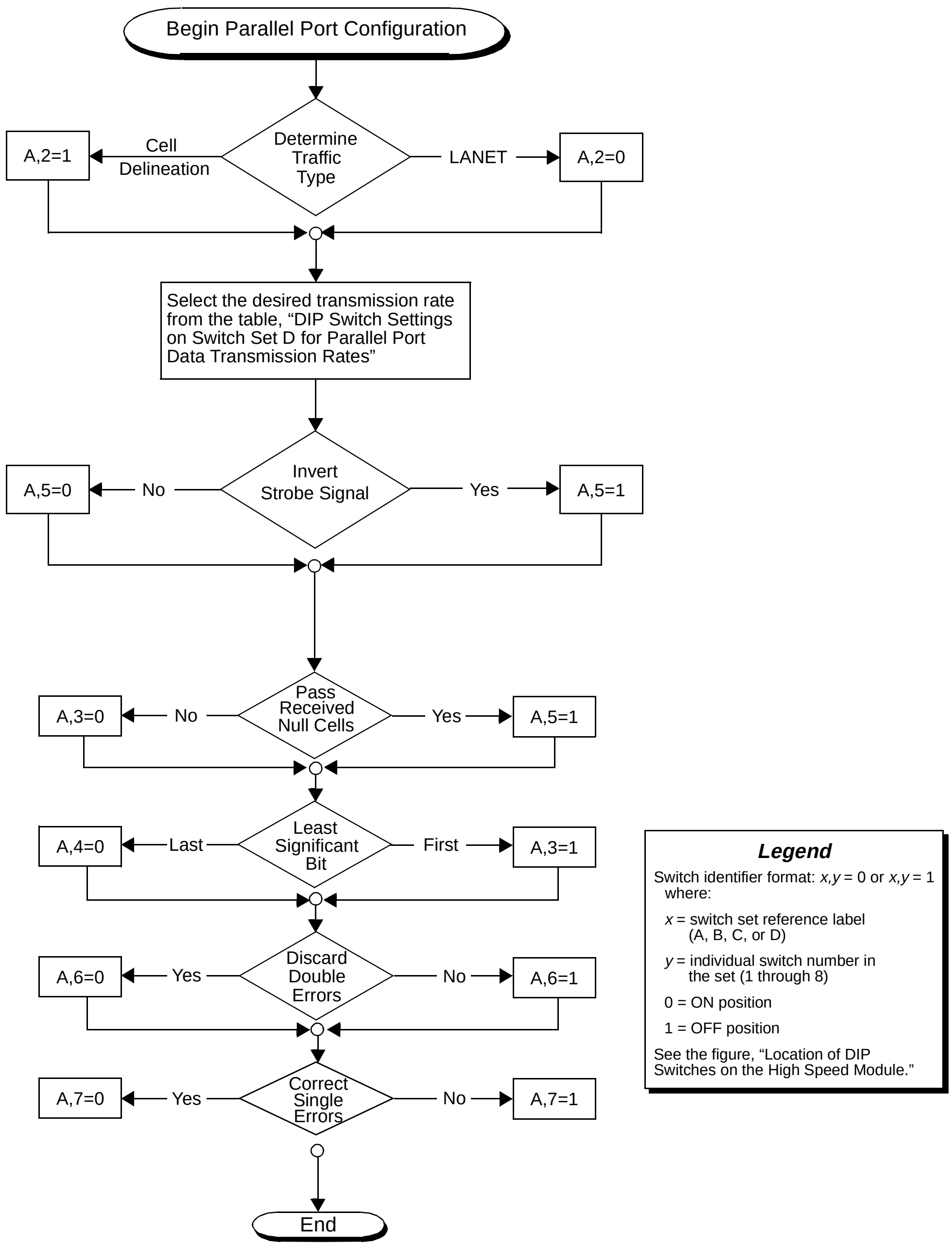


Figure 165. Flowchart to Determine DIP Switch Settings for Parallel Port Configuration (High Speed Module)

Table 79. DIP Switch Settings on Switch Set A for High Speed Module Functions

Switch Set A			
Parallel and Serial Port Function	**Pin**	**Off**	**On**
Serial Receive Clock Source	1	Internal	External
Parallel Frame Type	2	Cell Delineation	LANET
Parallel Null Cells	3	Pass	Do Not Pass
Parallel Least Significant Bit (LSB)	4	First	Last
Parallel Strobe Signal	5	Invert	Normal
Parallel Double Errors (LANET)	6	Do Not Discard	Discard
Parallel Single Errors (LANET)	7	Do Not Correct	Correct
Serial AAL1 Tx Adaptive Clock	8	Off	On

Table 80. DIP Switch Settings on Switch Set B for High Speed Module Functions

Switch Set B			
Serial Port Function	**Pin**	**Off**	**On**
Tx Clock Source	4	Internal	External
External Tx Clock Source	7	Use Ext. Tx Clock	Use Ext. Rx Clock
Parts Per Minute (PPM) Clock Adjustment	8	Increase 2X	Nominal

Table 81. DIP Switch Settings on Switch Set B for High Speed Module Serial Traffic Types

Switch Set B		
Serial Traffic Types	**5**	**6**
LANET Tx, LANET Rx	On	On
LANET Tx, AAL1 Rx	On	Off
AAL1 Tx, LANET Rx	Off	On
AAL1 Tx, AAL1 Rx	Off	Off

Table 82. DIP Switch Settings on Switch Set C for High Speed Module Functions

Switch Set C			
Serial Port Function	**Pin**	**Off**	**On**
Serial Receive Clock	1	Invert	Normal
Serial Transmit Clock	2	Invert	Normal
Serial Frame Type	3	Cell Delineation	LANET
Serial Null Cells	4	Pass	Do Not Pass
Serial KG Receive	5	Off	On
Serial KG Transmit	6	Off	On
Serial Double Errors (LANET) or Serial Monitor CTS (AAL1)	7	Do Not Discard Enable	Discard Disable
Serial Single Errors (LANET)	8	Do Not Correct	Correct

Table 83. DIP Switch Settings on Switch Sets B and D for High Speed Module Serial Port Data Transmission Rates

Serial Port Transmission Rate (Bit/Sec)	Switch Set D				Switch Set B		
	1	2	3	4	1	2	3
29,823,948	Off	Off	Off	Off	Off	--	--
28,999,995	Off	Off	Off	On	Off	--	--
27,999,932	Off	Off	On	Off	Off	--	--
27,000,022	Off	Off	On	On	Off	--	--
25,563,296	Off	On	Off	Off	Off	--	--
25,247,988	Off	On	Off	On	Off	--	--
23,998,293	Off	On	On	Off	Off	--	--
23,000,076	Off	On	On	On	Off	--	--
22,091,836	On	Off	Off	Off	Off	--	--
22,000,012	On	Off	Off	On	Off	--	--
20,998,411	On	Off	On	Off	Off	--	--
20,000,039	On	Off	On	On	Off	--	--
18,999,976	On	On	Off	Off	Off	--	--
18,720,044	On	On	Off	On	Off	--	--
17,000,002	On	On	On	Off	Off	--	--
16,383,999	On	On	On	On	Off	--	--
14,911,974	Off	Off	Off	Off	On	Off	Off
14,499,998	Off	Off	Off	On	On	Off	Off
13,999,966	Off	Off	On	Off	On	Off	Off
13,500,011	Off	Off	On	On	On	Off	Off
12,781,648	Off	On	Off	Off	On	Off	Off
12,623,994	Off	On	Off	On	On	Off	Off
11,999,147	Off	On	On	Off	On	Off	Off
11,500,038	Off	On	On	On	On	Off	Off
11,045,918	On	Off	Off	Off	On	Off	Off
11,000,006	On	Off	Off	On	On	Off	Off
10,499,205	On	Off	On	Off	On	Off	Off
10,000,020	On	Off	On	On	On	Off	Off
9,499,988	On	On	Off	Off	On	Off	Off
9,360,022	On	On	Off	On	On	Off	Off
8,500,001	On	On	On	Off	On	Off	Off
8,192,000	On	On	On	On	On	Off	Off
7,455,987	Off	Off	Off	Off	On	Off	On
7,249,999	Off	Off	Off	On	On	Off	On
6,999,983	Off	Off	On	Off	On	Off	On
6,750,005	Off	Off	On	On	On	Off	On
6,390,824	Off	On	Off	Off	On	Off	On
6,311,997	Off	On	Off	On	On	Off	On

Table 83. DIP Switch Settings on Switch Sets B and D for High Speed Module Serial Port Data Transmission Rates (continued)

Serial Port Transmission Rate (Bit/Sec)	Switch Set D				Switch Set B		
	1	2	3	4	1	2	3
5,999,573	Off	On	On	Off	On	Off	On
5,750,019	Off	On	On	On	On	Off	On
5,522,959	On	Off	Off	Off	On	Off	On
5,500,003	On	Off	Off	On	On	Off	On
5,249,603	On	Off	On	Off	On	Off	On
5,000,010	On	Off	On	On	On	Off	On
4,970,658	Off	Off	Off	Off	On	On	Off
4,833,333	Off	Off	Off	On	On	On	Off
4,749,994	On	On	Off	Off	On	Off	On
4,680,011	On	On	Off	On	On	Off	On
4,666,655	Off	Off	On	Off	On	On	Off
4,500,004	Off	Off	On	On	On	On	Off
4,260,549	Off	On	Off	Off	On	On	Off
4,250,001	On	On	On	Off	On	Off	On
4,207,998	Off	On	Off	On	On	On	Off
4,096,000	On	On	On	On	On	Off	On
3,999,716	Off	On	On	Off	On	On	Off
3,833,346	Off	On	On	On	On	On	Off
3,727,993	Off	Off	Off	Off	On	On	On
3,681,973	On	Off	Off	Off	On	On	Off
3,666,669	On	Off	Off	On	On	On	Off
3,624,999	Off	Off	Off	On	On	On	On
3,499,991	Off	Off	On	Off	On	On	On
3,499,735	On	Off	On	Off	On	On	Off
3,375,003	Off	Off	On	On	On	On	On
3,333,340	On	Off	On	On	On	On	Off
3,195,412	Off	On	Off	Off	On	On	On
3,166,663	On	On	Off	Off	On	On	Off
3,155,999	Off	On	Off	On	On	On	On
3,120,007	On	On	Off	On	On	On	Off
2,999,787	Off	On	On	Off	On	On	On
2,875,009	Off	On	On	On	On	On	On
2,833,334	On	On	On	Off	On	On	Off
2,761,479	On	Off	Off	Off	On	On	On
2,750,002	On	Off	Off	On	On	On	On
2,730,667	On	On	On	On	On	On	Off
2,624,801	On	Off	On	Off	On	On	On
2,500,005	On	Off	On	On	On	On	On
2,374,997	On	On	Off	Off	On	On	On

Table 83. DIP Switch Settings on Switch Sets B and D for High Speed Module Serial Port Data Transmission Rates (continued)

Serial Port Transmission Rate (Bit/Sec)	Switch Set D				Switch Set B		
	1	2	3	4	1	2	3
2,340,005	On	On	Off	On	On	On	On
2,125,000	On	On	On	Off	On	On	On
2,048,000	On	On	On	On	On	On	On

Table 84. DIP Switch Settings on Switch Set D for High Speed Module Parallel Port Data Transmission Rates

Parallel Port Transmission Rate (Bit/Sec)	Switch Set D			
	5	6	7	8
39,900,000	Off	Off	Off	Off
29,820,000	Off	Off	Off	On
25,200,000	Off	Off	On	Off
20,160,000	Off	Off	On	On
18,060,000	Off	On	Off	Off
15,960,000	Off	On	Off	On
15,120,000	Off	On	On	Off
13,860,000	Off	On	On	On
13,020,000	On	Off	Off	Off
11,340,000	On	Off	Off	On
10,500,000	On	Off	On	Off
7,560,000	On	Off	On	On
6,720,000	On	On	Off	Off
6,300,000	On	On	Off	On
5,040,000	On	On	On	Off
3,360,000	On	On	On	On

High Speed Module Cables

Cables are available for the following types of port connections:

- Serial port connection from the High Speed Module to another device using an EIA-422, EIA-449, or EIA-530 interface.

  This cable has a micro-DB25 connector at one end and an open end at the other, which enables you to set up the pin configuration for the interface you want.
- Serial port connection from the High Speed Module as a DCE device to a DTE device using an EIA-449 or EIA-530 interface.
- Serial port connection from the High Speed Module as a DTE device to a DCE device using an EIA-449 or EIA-530 interface.
- Parallel port connection from the micro-36 pin connector on the High Speed Module to another device, such as a Direct Broadcast Satellite receiver or a "set-top box."

  This cable has a micro-36-pin parallel connector at one end and an open end at the other, which allows one-way signal transmission.

- Parallel port connection from the micro-36 pin connector on the High Speed Module to another device, such as a Direct Broadcast Satellite receiver or transmitter.

  This cable has a micro-36-pin parallel connector at one end and an open-ended Y-cable at the other, which allows two-way signal transmission.

Note:
See *Table 151 on page 348* for cable part numbers.

The following connectors are used for these cables:

- *Micro-DB25 Serial Connector*
- *Micro-DB37 Serial Connector*
- *Micro-36-pin Parallel Connector*

Micro-DB25 Serial Connector

The following figure displays the Micro-DB25 serial connector.

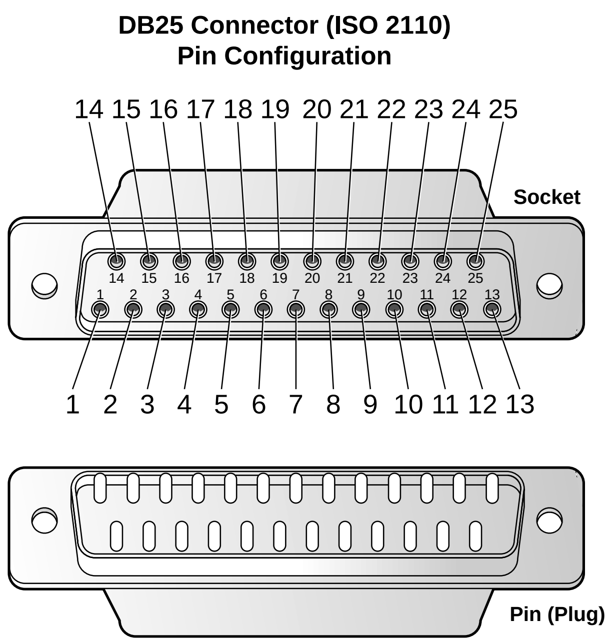


Figure 166. Pin Locations on the Micro-DB25 Connector

Micro-DB37 Serial Connector

The following figure displays the Micro-DB37 serial connector.

DB37 Connector (ISO 4902)
Pin Configuration

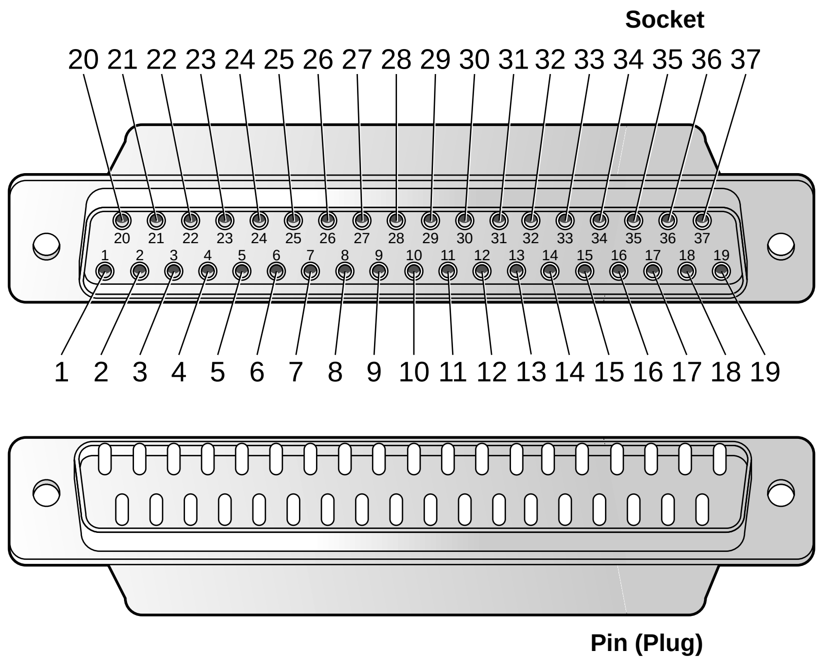


Figure 167. Pin Locations on the Micro-DB37 Connector

Micro-36-pin Parallel Connector

The following figure displays the Micro-36-pin parallel connector.

Parallel Connector (36 Pin)

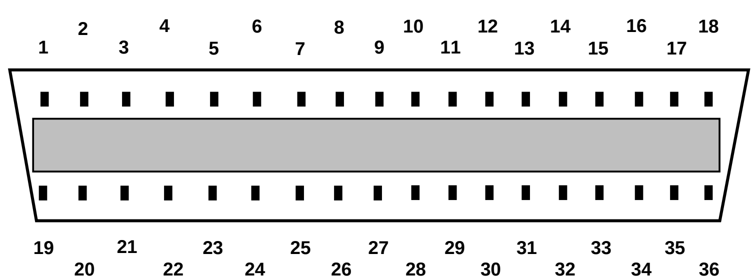


Figure 168. Pin Locations on the Micro-36-pin Parallel Connector

The pin configurations for the serial port interfaces are as follows:

- EIA-422, EIA-449, or EIA-530 serial port interface

  This cable has a micro-DB25 connector on one end, which attaches to the pin (or plug) connector on the High Speed Module faceplate, and is open on the other end, which enables you to set up the pin configuration for the interface you want (see the following figure). You must configure and attach your own connector to the open end.

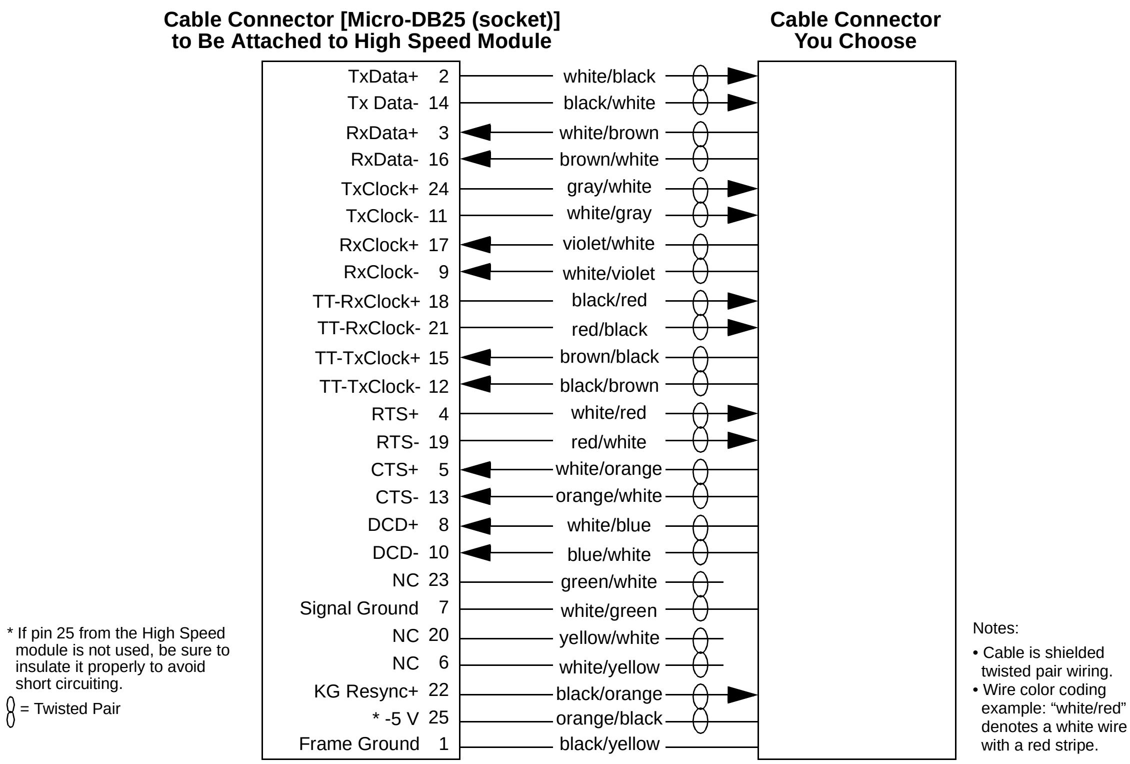


Figure 169. High Speed Module—Pin Configurations for Open-Ended Cable for Serial Port

- EIA-449 serial port interface with the High Speed Module as a DCE device

  The cable has a micro-DB25 connector on one end, which attaches to the pin (or plug) connector on High Speed Module faceplate, and a DB37 connector at the other end, which attaches to the socket connector on the DTE device. See *Figure 170 on page 285*.

- EIA-530 serial port interface with the High Speed Module as a DCE device

  The cable has a micro-DB25 connector on one end, which attaches to the pin (or plug) connector on High Speed Module faceplate, and a DB25 connector at the other end, which attaches to the socket connector on the DTE device. See *Figure 171 on page 285*.

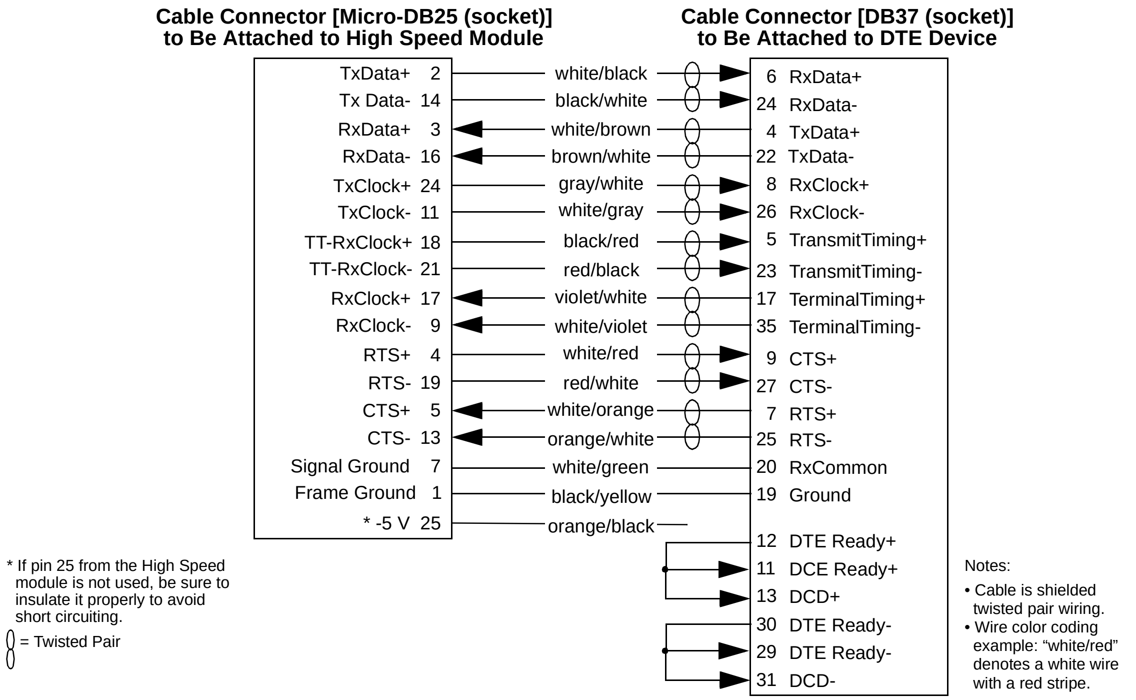


Figure 170. High Speed Module—Pin Configurations for EIA-449 Interface (High Speed Module as DCE Device)

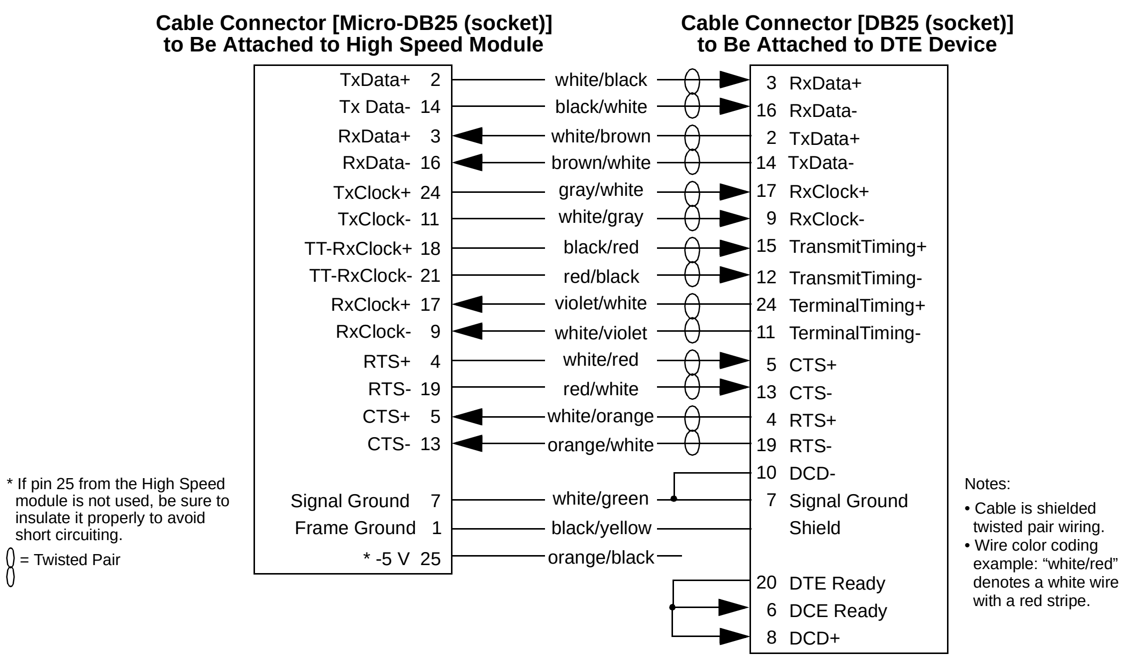


Figure 171. High Speed Module—Pin Configurations for EIA-530 Interface (High Speed Module as DCE Device)

- EIA-449 serial port interface with the High Speed Module as a DTE device

  The cable has a micro-DB25 connector on one end, which attaches to the pin (or plug) connector on High Speed Module faceplate, and a DB37 connector at the other end, which attaches to the pin (or plug) connector on the DCE device. See *Figure 172 on page 286*.
- EIA-530 serial port interface with the High Speed Module as a DTE device

  The cable has a micro-DB25 connector on one end, which attaches to the pin (or plug) connector on High Speed Module faceplate, and a DB25 connector at the other end, which attaches to the pin (or plug) connector on the DCE device. See *Figure 173 on page 287*.

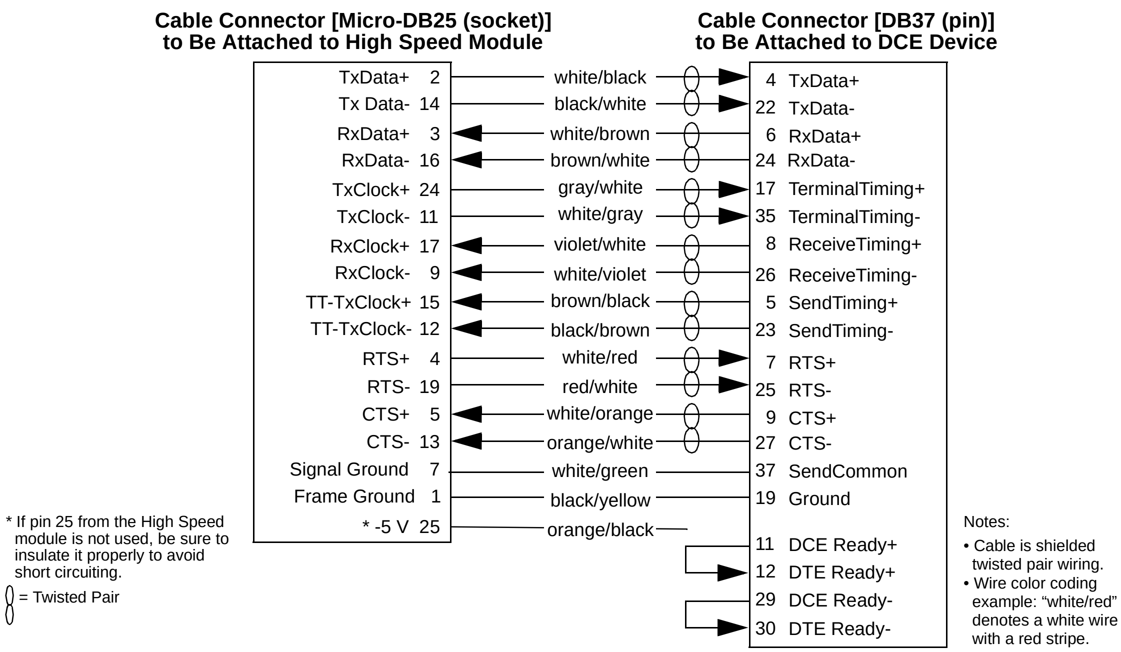


Figure 172. High Speed Module—Pin Configurations for the EIA-449 Interface (High Speed Module as DTE Device)

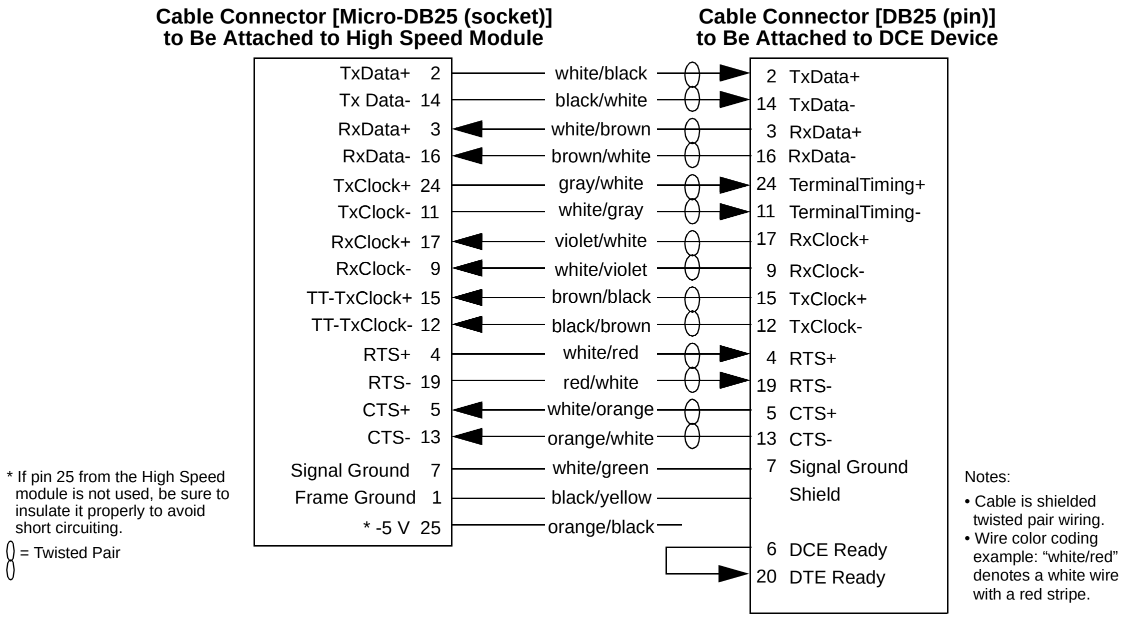


Figure 173. High Speed Module—Pin Configurations for the EIA-530 Interface (High Speed Module as DTE Device)

- Parallel port interface—two cables
  - One cable has a micro-36 connector on one end, which attaches to the pin (or plug) connector on the High Speed module faceplate, and is open on the other end, which enables you to set up the pin configuration for the interface you want (see *Figure 174 on page 288* for the pin configuration). You must configure and attach your own connector to the open end.

    A specific application for this parallel cable is connecting the High Speed module to a video "set-top box" (used to convert satellite broadcast signals to video images). For cable connector pin configurations, see *Figure 175 on page 288*.

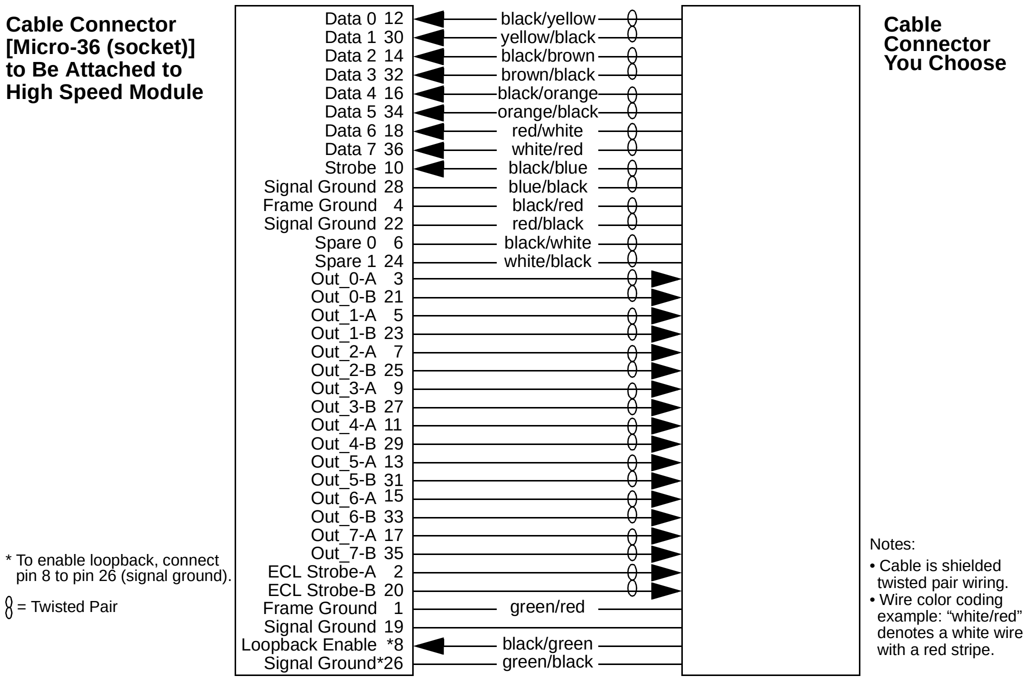


Figure 174. High Speed Module Cable—Pin Configurations for the Open-Ended Cable for the Parallel Port

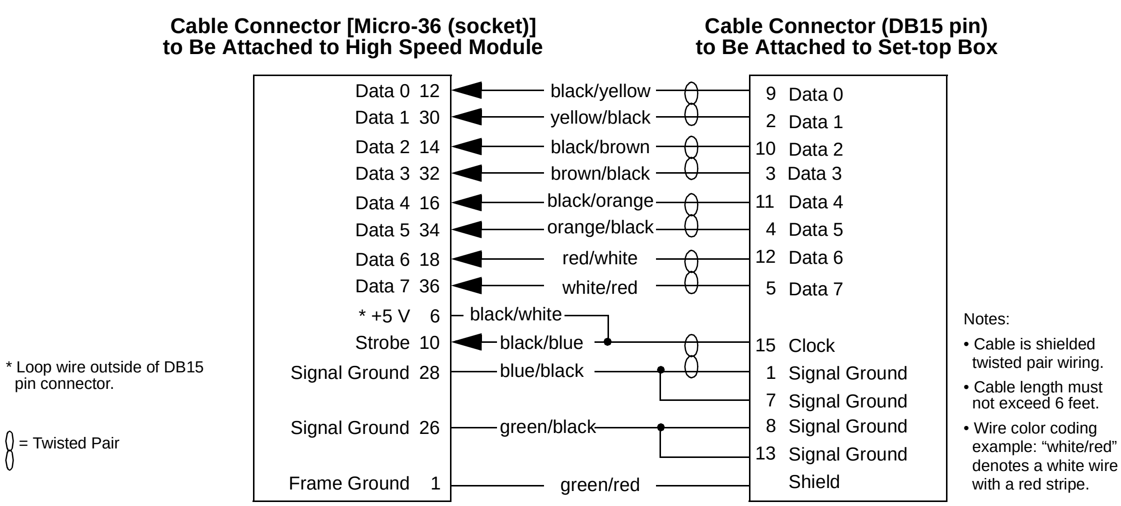


Figure 175. High Speed Module—Pin Configurations for the Cable Between the Parallel Port and a Set-top Box

– The other cable is a Y-cable that has a micro-36 connector on one end, which attaches to the pin (or plug) connector on the High Speed module faceplate, and is divided into two separate cables, which are open on the other two ends, enabling you to set up the pin configuration for the interface you want. You must configure and attach your own connectors to the open ends. Because this cable has a limited, specialized use (typically, connecting to Direct Broadcast Satellite transmitters and receivers), call the Technical Support staff (see *"Technical Support" on page 24*) for instructions on configuring and attaching connectors to this cable to accommodate your application.

Multiserial Module Cables

Cables are available for the following types of port connections:

- Multiserial Module as a DCE device using an EIA-530 interface
- Multiserial Module as a DCE device using an EIA-449 interface
- Multiserial Module as a DCE device using a V.35 interface
- Multiserial Module as a DCE device using an EIA-232-D interface
- Multiserial Module as a DTE device using an EIA-530 interface
- Multiserial Module as a DTE device using an EIA-449 interface
- Multiserial Module as a DTE device using a V.35 interface
- Multiserial Module as a DTE device using an EIA-232-D interface
- Port connections between two Multiserial Modules on two different AC 60/120 systems using an EIA-449 or EIA-530 interface (cable with a micro-DB15 connector at one end and an open end at the other)

Note:
See *Table 151 on page 348* for cable part numbers.

Four types of connectors are used for these cables:

- *Micro-DB15*
- *Micro-DB25*
- *Micro-DB37*
- *Micro-Winchester*

Micro-DB15

The following figure displays the Micro-DB15 pin locations.

DB15 Connector (ISO 4903)
Pin Configuration

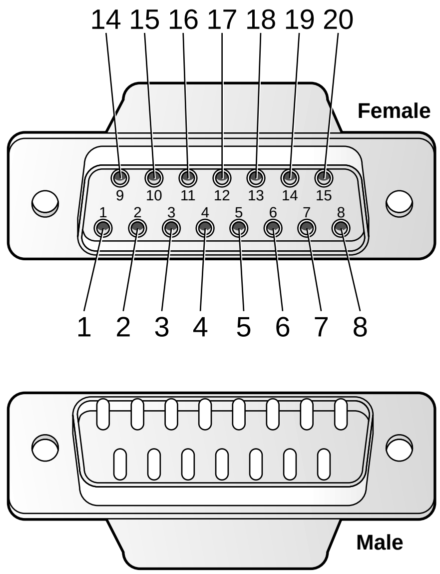


Figure 176. Pin Locations on the Micro-DB15 Connector

Micro-DB25

The following figure displays the Micro-DB25 pin locations.

DB25 Connector (ISO 2110)
Pin Configuration

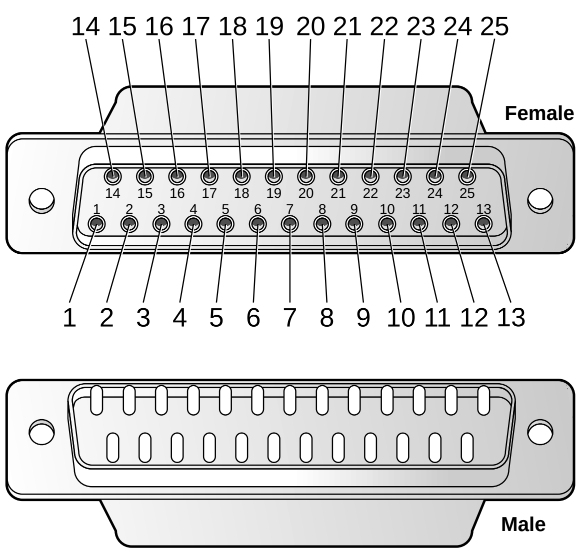


Figure 177. Pin Locations on the Micro-DB25 Connector

Micro-DB37

The following figure displays the Micro-DB37 pin locations.

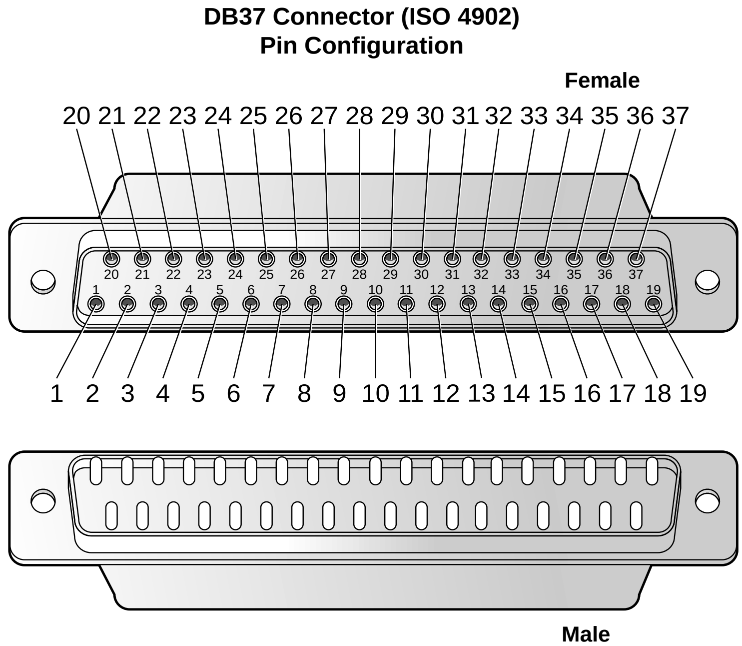


Figure 178. Pin Locations on the Micro-DB37 Connector

Micro-Winchester

The following figure displays the Micro-Winchester pin locations.

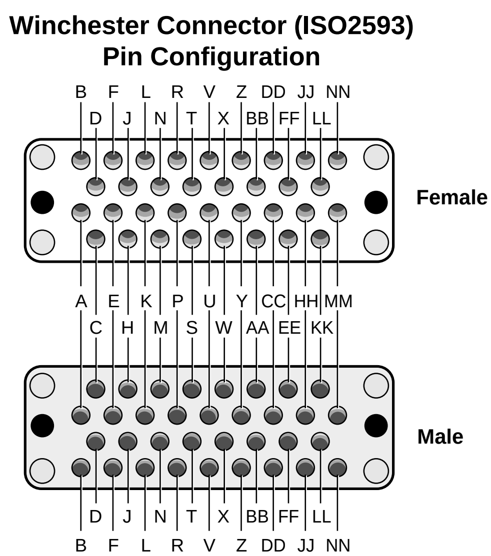


Figure 179. Pin Locations on the Micro-Winchester Connector

The cable configurations for the various interfaces are as follows:

- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB25 (socket or female) connector (at the other end) is used in an EIA-530 interface with the AC 120 system as a DCE device. See *Figure 180 on page 293* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB37 (socket or female) connector (at the other end) is used in an EIA-449 interface with the AC 120 system as a DCE device. See *Figure 180 on page 293* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a Winchester (socket or female) connector (at the other end) is used in a V.35 interface with the AC 120 system as a DCE device. See *Figure 181 on page 293* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB25 (socket or female) connector (at the other end) is used in an EIA-232-D interface with the AC 120 system as a DCE device. See *Figure 181 on page 293* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB25 (pin or male) connector (at the other end) is used in an EIA-530 interface with the AC 120 system as a DTE device. See *Figure 182 on page 294* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB37 (pin or male) connector (at the other end) is used in an EIA-449 interface with the AC 120 system as a DTE device. See *Figure 182 on page 294* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a Winchester (pin or male) connector (at the other end) is used in a V.35 interface with the AC 120 system as a DTE device. See *Figure 183 on page 294* for pin configuration.
- A cable with a micro-DB15 (pin or male) connector (at the module faceplate) connected to a DB25 (pin or male) connector (at the other end) is used in an EIA-232-D interface with the AC 120 system as a DTE device. See *Figure 183 on page 294* for pin configuration.

You can build specialized cables from open-ended cables with micro-DB15 (pin or male) connectors at one end. A cable with a micro-DB15 (pin or male) connector at both ends connects two AC 120 systems in an EIA-449 or an EIA-530 interface. See *Figure 184 on page 295* for pin configuration.

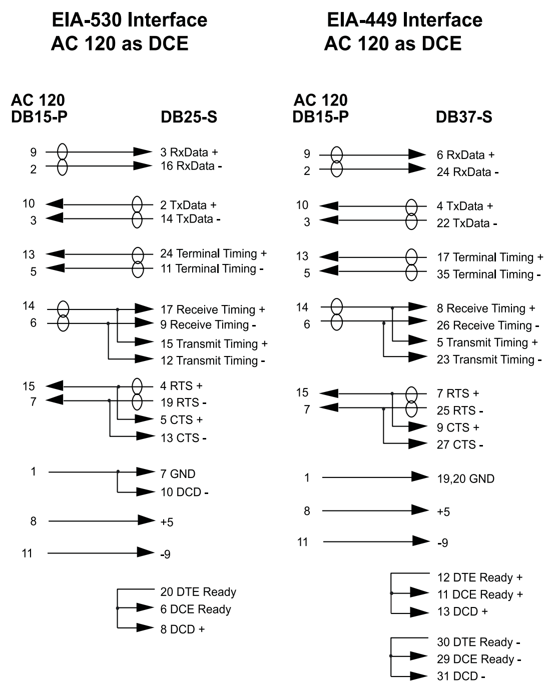


Figure 180. Pin Configurations — Multiserial Cables used with the EIA-530 and EIA-449 Interfaces (AC 120 as DCE Device)

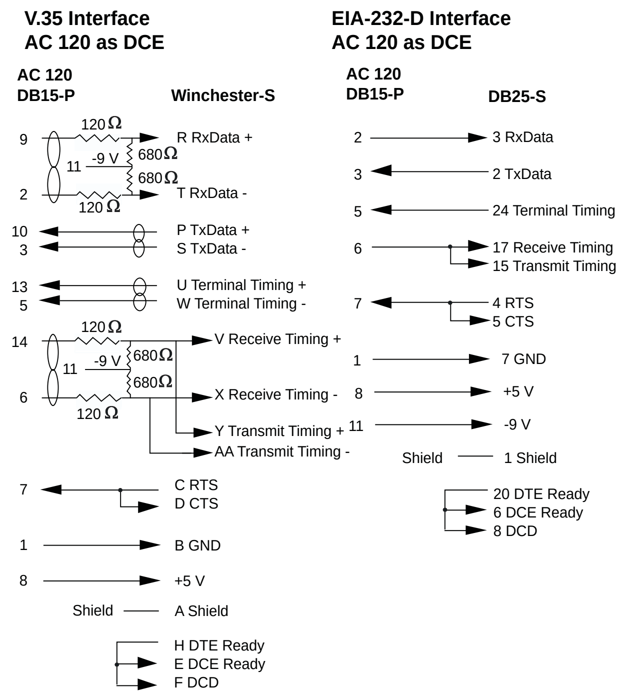


Figure 181. Pin Configurations — Multiserial Cable used for the V.35 and EIA-232-D Interfaces (AC 120 as DCE Device)

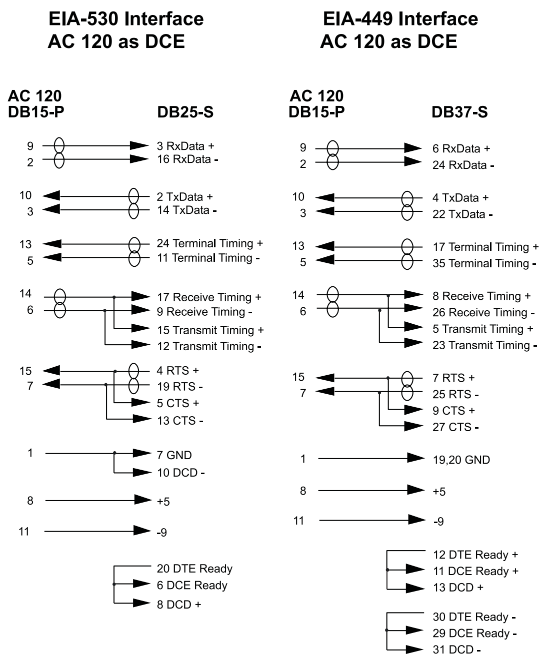


Figure 182. Pin Configurations — Multiserial Cable used for the EIA-530 and EIA-449 Interfaces (AC 120 as DTE Device)

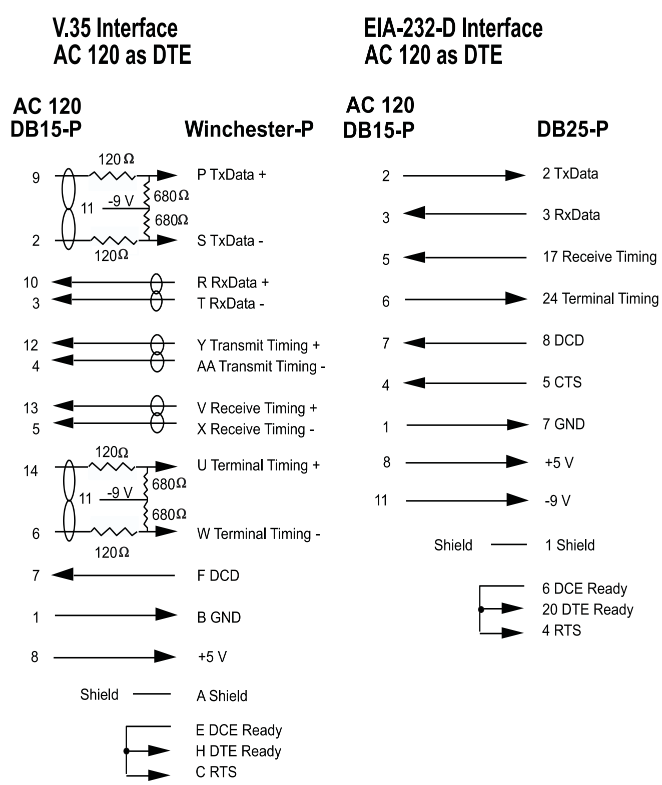


Figure 183. Pin Configurations — Multiserial Module Cable used for the EIA-530 and EIA-449 Interfaces (AC 120 as DTE Device)

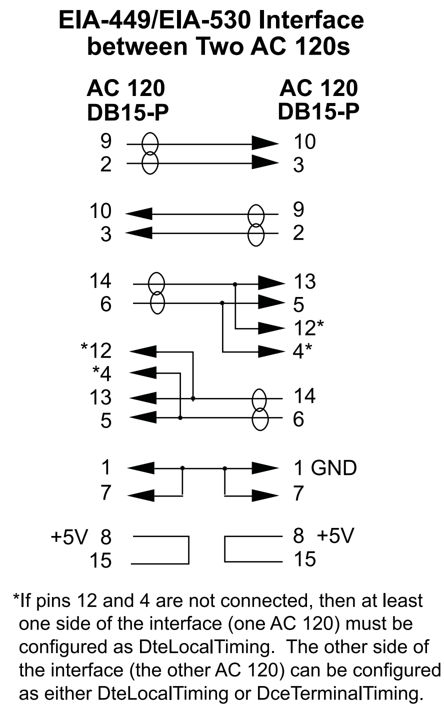


Figure 184. Pin Configurations — Multiserial Module Cable used for the EIA-530 and EIA-449 Interfaces between Two AC 120 Systems

Two pin configurations are set up to create either an EIA-449 or an EIA 530 interface loopback or an EIA-232-D interface loopback by using a micro-DB15 connector on the module faceplate. See the following figure for pin configurations.

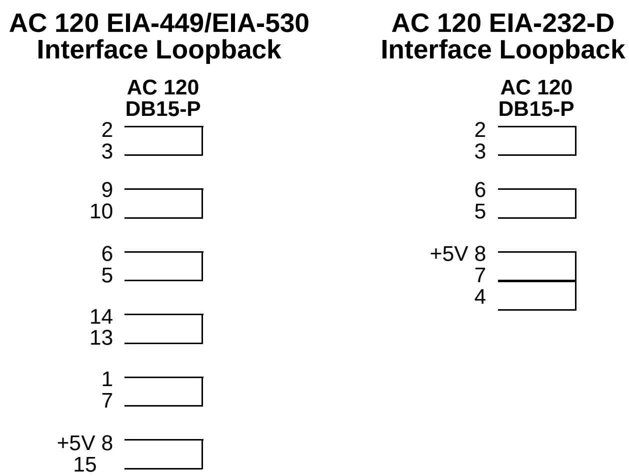


Figure 185. Pin Configurations for the EIA-530, EIA-449, and EIA-232-D Interfaces—Loopback on the AC 120 System

10 Configuring the Terminal Emulator

The AC 60/120 system software supports the following terminal emulator software to set up VT100 terminal emulation for configuring and managing the console interface:

- Microsoft Windows 3.1 terminal emulator
- Microsoft Windows 95 Hyper Terminal terminal emulator
- Alternate terminal emulation software

Windows 3.1 Terminal Emulator for VT100 Emulation

➤ Procedure

To configure the terminal settings using the Microsoft Windows 3.1 terminal emulator:

1. From the Terminal menu, select the **Settings** option.
2. Select the **Terminal Emulation** option from the Settings Menu.
3. Set the **Terminal Emulation** field to **DEC VT100(ANSI)**.
4. Select **OK**.
5. Return to the Settings Menu.
6. Select the **Terminal Preferences** option from the Settings Menu.
7. Select the settings in the following table for each option.

Table 85. Settings for VT100 Terminal Preferences Using the Windows 3.1 Emulator

Option	Setting
Line wrap:	off
Local echo:	off
Sound:	on
CR->CR/LF inbound and outbound:	off
Columns:	80
Cursor:	underline is recommended
Cursor Blink:	blink is not recommend
Terminal font:	Courier 13 is recommended
Translations:	none
Fonts:	optional
Show scroll:	off
Use function, arrow, and Ctrl keys for Windows:	off
Buffer lines:	100

8. Select **OK**.
9. Return to the Settings Menu.
10. From the Settings Menu, select the **Communications** option.

11 Select the settings in *Table 86 on page 298* for each option.

Table 86. Port Settings for VT100 Terminal Communication

Option	Setting
Baud:	9600
Data bits:	8
Stop bits:	1
Parity:	none
Flow control:	none
Connector:	user defined
Parity check:	off
Carrier detect:	off

12 Select **OK**.

13 From the File Menu, select the **Save** option.

14 Maximize the terminal window.

Windows 95 Hyper Terminal for VT100 Emulation

To configure VT100 terminal emulation using the Windows 95 Hyper Terminal emulator, use the settings in the following table.

Table 87. Windows 95 Hyper Terminal Settings

Option	Setting
Phone number:	Connect Using Direct to COM1
Configure:	9600 baud
Data bits:	8
Parity:	none
Stop bits:	1
Flow control:	none
Advanced Settings:	
(Port settings):	turn off FIFO buffers
Settings:	select terminal keys
Emulation:	VT100
Terminal setup	
Cursor:	block or underline, no blink
Font:	Fixedsys 15
Translations:	none
Scroll bars:	off
Keys for window:	off

Alternate Software for VT100 Terminal Emulation

The console serial interface supports the standard VT100 terminal emulator configuration. When using various types of workstations or other terminal emulation software with the AC 120 console interface, use the settings listed in the following table.

Table 88. Settings for VT100 Terminal Preferences Using Other Software Emulators

Option	Setting
Terminal emulation:	VT100
Terminal preferences:	
Communications:	9600 baud, 8 bits, 1 stop bit, no parity
Flow control:	none
Terminal modes:	
Line Wrap:	off
Local Echo:	off
Sound:	on (optional)
CR	CR/LF
Inbound:	off
Outbound:	off
Columns:	80
Cursor:	block or underline
Translations:	none
Scroll bars:	Off
Keys for window:	Off

11 SNMP Trap Messages

This appendix describes the SNMP trap and notification messages transmitted by the AC 60/120 Console Interface system SNMP agent. External SNMP managers can perform various functions in the AC 60/120 system, and can receive the trap and notification messages. You can access the Trap Log Display panel to view the messages, as described in the following procedure.

Note:
An electronic copy of the full ASN.1 version of the SNMP MIB is available upon request.

Start at the Console Interface Main Menu panel (*Figure 186 on page 301*) to view SNMP trap and notification messages.

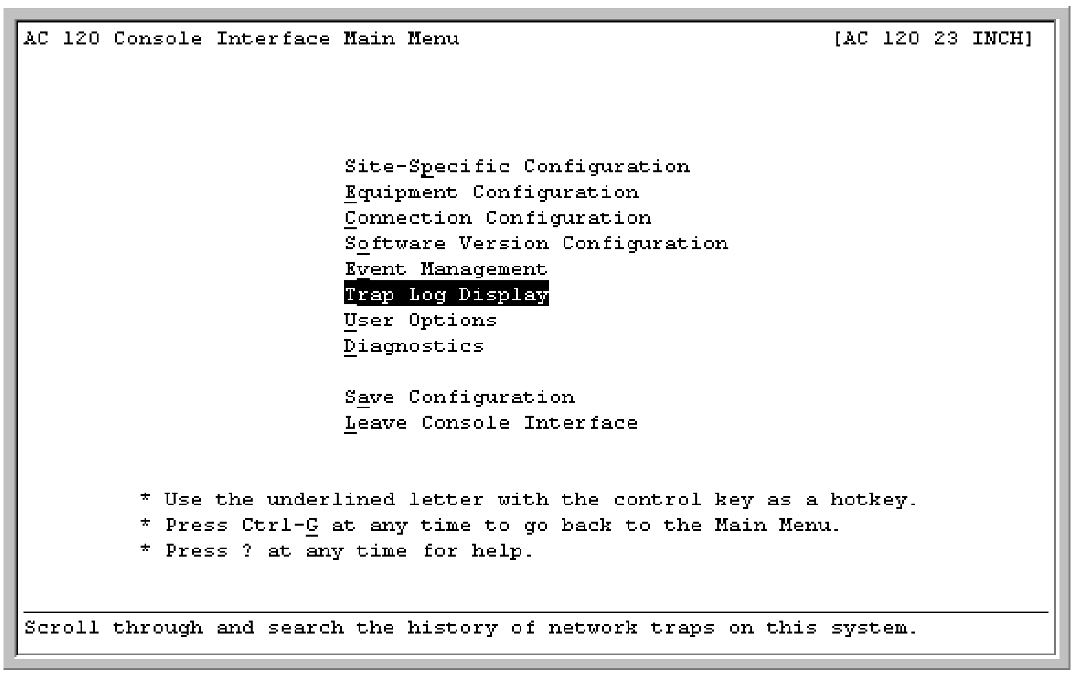


Figure 186. Console Interface Main Menu Panel (Trap Log Display Selected)

➤ Procedure

To view SNMP trap and notification messages:

1 Select the **Trap Log Display** option.

The Trap Log Display panel is displayed.

```
AC 120 Trap Log Display                                          [AC 120 23 INCH]
            ________________________________________________________________
  PageUp   |saveConfigurationReasonCode: Thursday, 12/11/1997 at 14:08:22   |
  PageDown |    saveConfigurationReasonCode = All-OK                        |
  Top      |                                                                |
  Bottom   |cardInsertionNotify: Thursday, 12/11/1997 at 14:08:11           |
           |    cardSlot = 22                                               |
           |    cardType = Stratum                                          |
           |    cardProtectionStatus = None                                 |
           |    cardOperStatus = Primary                                    |
           |                                                                |
           |cardInsertionNotify: Thursday, 12/11/1997 at 14:08:10           |
           |    cardSlot = 21                                               |
           |    cardType = Stratum                                          |
           |    cardProtectionStatus = None                                 |
           |    cardOperStatus = Primary                                    |
           |                                                                |
           |cardInsertionNotify: Thursday, 12/11/1997 at 14:08:03           |
           |    cardSlot = 24                                               |
           |    cardType = PowerSupply                                      |
           |________________________________________________________________|
  Find.... "                              "            Go Back to Main Menu ->
________________________________________________________________________________
Press RETURN to view the previous page of traps.
```

Figure 187. Trap Log Display Panel

➤ Procedure

To find a description of what a trap message means:

1 Look for the message you want information about in *Table 89 on page 303* through *Table 92 on page 304*.

For example, you want information about the trap message **cardInsertionNotify**. You find this message under the enterprise object identifier **Module Events**.

2 Look for the message you want information about in *Table 93 on page 306*.

Using the preceding example, you find the message **cardInsertionNotify** and find the following information:

- Type of event that caused the message: a system, module, interface, or connection event
- System indicator for the trap message
- MIB objects associated with the trap message
- Description of the trap message indicating what happened.

3 To find out more information about the MIB objects, find the object you want more information about in *"Definitions of MIB Objects used for Traps" on page 314*.

The description of the object includes the type of information the object presents. If the object has enumerated types, the integer values and their definition are also listed. In the preceding example, **cardInsertionNotify** has four associated MIB objects, **cardSlot**, **cardType**, **cardProtectionStatus**, and **cardOperStatus**, which are all enumerated-type objects.

The following four tables list the enterprise-specific trap names and trap numbers in the four groups of enterprise object identifiers:

- System events (see *Table 89 on page 303*)
- Module events (see *Table 90 on page 304*)
- Interface events (see *Table 91 on page 304*)
- Connection events (see *Table 92 on page 304*)

Table 89. Enterprise-Specific SNMP Trap Names and Trap Numbers: System Events

Trap Number	Trap Name
1	systemColdStartNotify
2	systemWarmStartNotify
3	ecdBootFailureNotify
4	referenceClockFailNotify
5	referenceClockClearedNotify
6	compositeClockFailNotify
7	compositeClockClearedNotify
8	stratumModeChangeNotify
9	powerSupplyStatusNotify
10	software DownloadStatusNotify
11	Reserved
12	Reserved
13	Reserved
14	Reserved
15	Reserved
16	Reserved
17	completeClockFailedNotify
18	completeClockRecoveredNotify
19	backplaneCircuitryFailedNotify
20	backplaneCircuitryRecoveredNotify
21	remoteRebootNotify
22	saveConfigurationNotify
23	versionConfigurationNotify
24	fileTransferStatusNotify

Table 90. Enterprise-Specific SNMP Trap Names and Trap Numbers: Module Events

Trap Number	Trap Name
1	cardInsertionNotify
2	cardRemovedOrFailedNotify
3	lineStatusChangedNotify
4	firmwareDownloadSucceededNotify
5	firmwareDownloadFailedNotify
6	moduleRebootNotify

Table 91. Enterprise-Specific SNMP Trap Names and Trap Numbers: Interface Events

Trap Number	Trap Name
1	interfaceCreatedNotify
2	interfaceDeletedNotify
3	interfaceModifiedNotify
4	interfaceModifyFailNotify
5	interfaceOutOfServiceNotify
6	interfaceInServiceNotify
7	bridgeDomainFullNotify
8	bridgeDomainExceededForSlotNotify
9	bridgeDomainNumberInUseNotify
10	bridgeDomainInServiceNotify
11	bridgeDomainNumberInvalidNotify
12	signalingModifyFailNotify
13	lmiIntfStatusNotify

Table 92. Enterprise-Specific SNMP Trap Names and Trap Numbers: Connection Events

Trap Number	Trap Name
1	atmPvcVccReqFailNotify
2	atmPvcVpcReqFailNotify
3	ipAtmAppPvcVccReqFailNotify
4	cirEmAtmPvcVccReqFailNotify
5	vbrAtmPvcVccReqFailNotify
6	frAtmPvcVccReqFailNotify
7	frFrPvcReqFailNotify
8	cirEmCirEmPvcReqFailNotify
9	vbrVbrPvcReqFailNotify
10	atmPvcVccSetupNotify
11	atmPvcVpcSetupNotify
12	ipAtmAppPvcVccSetupNotify
13	cirEmAtmPvcVccSetupNotify

Table 92. Enterprise-Specific SNMP Trap Names and Trap Numbers: Connection Events (continued)

Trap Number	Trap Name
14	vbrAtmPvcVccSetupNotify
15	frAtmPvcVccSetupNotify
16	frFrPvcSetupNotify
17	cirEmCirEmPvcSetupNotify
18	vbrVbrPvcSetupNotify
19	atmPvcVccTearDownNotify
20	atmPvcVpcTearDownNotify
21	ipAtmAppPvcVccTearDownNotify
22	cirEmAtmPvcVccTearDownNotify
23	vbrAtmPvcVccTearDownNotify
24	frAtmPvcVccTearDownNotify
25	frFrPvcTearDownNotify
26	cirEmCirEmPvcTearDownNotify
27	vbrVbrPvcTearDownNotify
28	bridgeBridgePvcReqFailNotify
29	bridgeBridgePvcSetupNotify
30	bridgeBridgePvcTearDownNotify
31	bridgeAtmPvcVccReqFailNotify
32	bridgeAtmPvcVccSetupNotify
33	bridgeAtmPvcVccTearDownNotify
34	cellTestReqFailNotify
35	lmiDlciStatusNotify

Table 93 on page 306 provides information about the SNMP enterprise-specific trap messages, including the following:

- Enterprise-specific trap name
- Type of event that caused the message: a system, module, interface, or connection event
- System indicator for the trap message
- MIB objects associated with the trap message
- Description of the trap message indicating what happened

The system indicators for the trap messages are defined as follows:

System Response A system-supplied reply to a command a user enters, usually indicating the success or failure of a requested action.

System Information A system-supplied informational message indicating the completion of a particular process (for example, a maintenance function).

Minor Problem A notification of a problem that does not affect service or function of a component of the AC 60/120 system (for example, the failure of a redundant power supply module).

Major Problem A notification of a problem that affects service of function of a component of the AC 60/120 system (for example, failure of a DS1/T1 module).

Critical Problem A notification of a problem that affects functioning of the whole AC 120 system (for example, failure of a nonredundant stratum module). Critical notifications indicate that all traffic flow through the system has ceased.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
atmPvcVccReq FailNotify	Connection	Response	atmPvcVccIfA atmPvcVccVpiA atmPvcVccVciA atmPvcVccIfB atmPvcVccVpiB atmPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between two ATM interfaces failed.
atmPvcVccSetup Notify	Connection	Response	atmPvcVccIfA atmPvcVccVpiA atmPvcVccVciA atmPvcVccIfB atmPvcVccVpiB atmPvcVccVciB	The PVC VCC connection between two ATM interfaces has been created.
atmPvcVccTear DownNotify	Connection	Response	atmPvcVccIfA atmPvcVccVpiA atmPvcVccVciA atmPvcVccIfB atmPvcVccVpiB atmPvcVccVciB	The PVC VCC connection between two ATM interfaces has been deleted.
atmPvcVpcReq FailNotify	Connection	Response	atmPvcVpcIfA atmPvcVpcVpiA atmPvcVpcIfB atmPvcVpcVpiB pvcFailureReasonCode	The PVC VPC connection request between two ATM interfaces failed.
atmPvcVpcSetup Notify	Connection	Response	atmPvcVpcIfA atmPvcVpcVpiA atmPvcVpcIfB atmPvcVpcVpiB	The PVC VPC connection between two ATM interfaces has been created.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
atmPvcVpcTear DownNotify	Connection	Response	atmPvcVpcIfA atmPvcVpcVpiA atmPvcVpcIfB atmPvcVpcVpiB	The PVC VPC connection between two ATM interfaces has been deleted.
backplaneCircuitry FailedNotify	System	Critical	No objects associated	There is no activity on the cell bus. Call Tech. Support immediately to resolve the problem.
backplaneCircuitry Recovered Notify	System	Info	No objects associated	The CPU card is able to detect activity on the cell bus.
bridgeAtmPvc VccReqFailNotify	Connection	Response	bridgeAtmPvcVccIfA bridgeAtmPvcVccIfB bridgeAtmPvcVccVpiB bridgeAtmPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between a bridge interface and an ATM interface has failed.
bridgeAtmPvc VccSetupNotify	Connection	Response	bridgeAtmPvcVccIfA bridgeAtmPvcVccIfB bridgeAtmPvcVccVpiB bridgeAtmPvcVccVciB	The PVC VCC connection between a bridge interface and an ATM interface has been created.
bridgeAtmPvc VccTearDown Notify	Connection	Response	bridgeAtmPvcVccIfA bridgeAtmPvcVccIfB bridgeAtmPvcVccVpiB bridgeAtmPvcVccVciB	The PVC VCC connection between a bridge interface and an ATM interface has been deleted.
bridgeBridge PvcReqFailNotify	Connection	Response	bridgeBridgePvcIfA bridgeBridgePvcIfB pvcFailureReasonCode	The PVC connection request between two bridge interfaces has failed.
bridgeBridgePvc SetupNotify	Connection	Response	bridgeBridgePvcIfA bridgeBridgePvcIfB	The PVC connection between two bridge interfaces has been created.
bridgeBridgePvc TearDownNotify	Connection	Response	bridgeBridgePvcIfA bridgeBridgePvcIfB	The PVC connection between two bridge interfaces has been deleted.
bridgeDomain ExceededForSlot Notify	Interface	Info	cardSlot	The bridge domain (group) number has been exceeded for the slot.
bridgeDomain FullNotify	Interface	Info	bridgeDomainNumber	The 15 ports available for the bridge domain (group) are being used, leaving no space for an additional port.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
bridgeDomain InServiceNotify	Interface	Info	bridgeDomainNumber	Notification that a bridge domain (group) is now in service.
bridgeDomain NumberInUse Notify	Interface	Info	bridgeDomainNumber	Notification that a bridge domain (group) number is currently in use.
bridgeDomain NumberInvalid Notify	Interface	Info	interfaceIndex	Indicates that this interface contains an invalid bridge domain (group) number. To create a domain (group), associate a port with a domain (group), or bring an interface into service, a valid domain (group) number must be provided.
cardInsertion Notify	Module	Info	cardSlot cardType cardProtectionStatus cardOperStatus	The indicated slot has had a card inserted into it.
cardRemoved OrFailedNotify	Module	Major	cardSlot	The indicated slot has changed state.
cellTestReqFail Notify	Connection	Response	cellTestIfB cellTestVpiB cellTestVcidB pvcFailureReasonCode	The PVC connection request has failed.
cirEmAtmPvcVcc ReqFailNotify	Connection	Response	cirEmAtmPvcVccIfA cirEmAtmPvcVccIfB cirEmAtmPvcVccVpiB cirEmAtmPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between a circuit emulation interface and an ATM interface has failed.
cirEmAtmPvc VccSetupNotify	Connection	Response	cirEmAtmPvcVccIfA cirEmAtmPvcVccIfB cirEmAtmPvcVccVpiB cirEmAtmPvcVccVciB	The PVC VCC connection between a circuit emulation interface and an ATM interface has been created.
cirEmAtmPvcVcc TearDownNotify	Connection	Response	cirEmAtmPvcVccIfA cirEmAtmPvcVccIfB cirEmAtmPvcVccVpiB cirEmAtmPvcVccVciB	The PVC VCC connection between a circuit emulation interface and an ATM interface has been deleted.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
cirEmCirEmPvc ReqFailNotify	Connection	Response	cirEmCirEmPvcIfA cirEmCirEmPvcIfB pvcFailureReasonCode	The PVC connection request between two circuit emulation interfaces has failed.
cirEmCirEmPvc SetupNotify	Connection	Response	cirEmCirEmPvcIfA cirEmCirEmPvcIfB	The PVC connection between two circuit emulation interfaces has been created.
cirEmCirEmPvc TearDownNotify	Connection	Response	cirEmCirEmPvcIfA cirEmCirEmPvcIfB	The PVC connection between two circuit emulation interfaces has been deleted.
completeClock FailedNotify	System	Critical	No objects associated	The stratum cards have either been removed or have failed, resulting in no clock being provided.
completeClock RecoveredNotify	System	Info	No objects associated	A stratum card is now available to provide a clock source.
compositeClock ClearedNotify	System	Info	No objects associated	The error in the composite clock has been corrected.
compositeClock FailNotify	System	Critical	No objects associated	The composite clock has failed. Call Tech. Support immediately to resolve the problem.
ecdBootFailure Notify	System	Critical	No object associated	The system failed during the boot (startup) process. Call Tech. Support immediately to resolve the problem.
fileTransferStatus Notify	System	Info	percentComplete	Indicates the percent complete of the current upgrade, downgrade, or FTP download in progress.
firmwareDownload FailedNotify	Module	Minor	fwReleaseSlot firmwareDownloadReasonCode	The indicated slot had the indicated failure during a firmware download.
firmwareDownload Succeeded Notify	Module	Info	fwReleaseSlot	The indicated slot has successfully completed a firmware download.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
frAtmPvcVccReq FailNotify	Connection	Response	frAtmPvcVccIfA frAtmPvcVccDlciA frAtmPvcVccIfB frAtmPvcVccVpiB frAtmPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between a frame relay interface and an ATM interface has failed.
frAtmPvcVcc SetupNotify	Connection	Response	frAtmPvcVccIfA frAtmPvcVccDlciA frAtmPvcVccIfB frAtmPvcVccVpiB frAtmPvcVccVciB	The PVC VCC connection between a frame relay interface and an ATM interface has been created.
frAtmPvcVccTear DownNotify	Connection	Response	frAtmPvcVccIfA frAtmPvcVccDlciA frAtmPvcVccIfB frAtmPvcVccVpiB frAtmPvcVccVciB	The PVC VCC connection between a frame relay interface and an ATM interface has been deleted.
frFrPvcReqFail Notify	Connection	Response	frFrPvcIfA frFrPvcDlciA frFrPvcIfB frFrPvcDlciB pvcFailureReasonCode	The PVC connection request between two frame relay interfaces has failed.
frFrPvcSetup Notify	Connection	Response	frFrPvcIfA frFrPvcDlciA frFrPvcIfB frFrPvcDlciB	The PVC connection between two frame relay interfaces has been created.
frFrPvcTearDown Notify	Connection	Response	frFrPvcIfA frFrPvcDlciA frFrPvcIfB frFrPvcDlciB	The PVC connection between two frame relay interfaces has been deleted.
interfaceCreated Notify	Interface	Info	interfaceIndex interfaceType	Notification that an interface has been created.
interfaceDeleted Notify	Interface	Info	interfaceIndex	Notification that an interface has been deleted.
interfaceInService Notify	Interface	Info	interfaceIndex interfaceType	Notification that an interface is now in service.
interfaceModified Notify	Interface	Info	interfaceIndex interfaceType	Notification that an interface has been modified.
interfaceModify FailNotify	Interface	Info	interfaceIndex interfaceType interfaceFailureReasonCod e	Notification that an attempt to modify an interface has failed.
interfaceOutOf ServiceNotify	Interface	Major	interfaceIndex interfaceType	Notification that an interface is now out of service.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
ipAtmAppPvcVcc ReqFailNotify	Connection	Response	ipAtmAppPvcVccDestAddrA ipAtmAppPvcVccSubnetMaskA ipAtmAppPvcVccIfB ipAtmAppPvcVccVpiB ipAtmAppPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between in-band management and an ATM interface has failed.
ipAtmAppPvcVcc SetupNotify	Connection	Response	ipAtmAppPvcVccDestAddrA ipAtmAppPvcVccSubnet MaskA ipAtmAppPvcVccIfB ipAtmAppPvcVccVpiB ipAtmAppPvcVccVciB	The PVC VCC connection between in-band management and an ATM interface has been created.
ipAtmAppPvcVcc TearDownNotify	Connection	Response	ipAtmAppPvcVccDestAdrA ipAtmAppPvcVccSubnetMaskA ipAtmAppPvcVccIfB ipAtmAppPvcVccVpiB ipAtmAppPvcVccVciB	The PVC VCC connection between in-band management and an ATM interface has been deleted.
lineStatus ChangedNotify	Module	Major	portId lineStatus	The indicated port has had a change in the line status.
lmiDlciStatus Notify	Connection	Response	frFrPvcDlciA lmiDlciOperStatus	Indicates the end-to-end status of the PVC of which this DLCI is a segment.
lmiIntfStatus Notify	Interface	Info	frFrPvcIfA frFrPvcDlciA lmiDlciOperStatus	Indicates the status of an interface from the LMI perspective.
moduleReboot Notify	Module	Major	cardSlot cardType	Indicates that when an I/O card in a specific slot becomes busy, the CPU card reboots it. This condition is different from the one when the card is actually removed from the slot.
powerSupplyStatus Notify	System	Minor	powerSupplyReasonCode	Indicates the status of the power supply.
referenceClock Cleared Notify	System	Info	No objects associated	The error in the backplane reference clock has been corrected.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
referenceClock FailNotify	System	Critical	No objects associated	The reference clock used for the operation of the bus-based backplane has failed. Call Tech. Support immediately to resolve the problem.
remoteReboot Notify	System	Info	remoteRebootReasonCode	Indicates the result of the requested reboot action.
saveConfiguration Notify	System	Info	saveConfigurationReason Code	Indicates the result of the requested save configuration.
signalingModify FailNotify	System	Critical	interfaceIndex interfaceType InterfaceFailureReason Code	Indicates that signaling has already been configured for this port. To change the port, you must take all interfaces out of service, including the channel specified in interfaceIndex.
softwareDownload StatusNotify	System	Info	upgradeSwCopyStatus upgradeSwErrorStatus	Indicates the completion status of the FTP download of a software upgrade.
stratumMode ChangeNotify	System	Major	stratumMode	An operational action has resulted in the switchover or failure of the Stratum card synchronization source.
systemColdStart Notify	System	Info	No objects associated	The system has successfully completed initialization from a complete power- down state and is ready for operation.
systemWarm StartNotify	System	Info	No objects associated	The system has successfully completed initialization from a user or other system-level interrupt or restart, and is ready for operation.

Table 93. SNMP Trap Names, Descriptions and Associated MIB Object Names (continued)

Enterprise-Specific Trap Name	Event Type for the Trap	System Indicator for the Trap	MIB Object Name	Trap Description
vbrAtmPvcVcc ReqFailNotify	Connection	Response	vbrAtmPvcVccIfA vbrAtmPvcVccIfB vbrAtmPvcVccVpiB vbrAtmPvcVccVciB pvcFailureReasonCode	The PVC VCC connection request between a VBR interface and an ATM interface has failed.
vbrAtmPvcVcc SetupNotify	Connection	Response	vbrAtmPvcVccIfA vbrAtmPvcVccIfB vbrAtmPvcVccVpiB vbrAtmPvcVccVciB	The PVC VCC connection between a VBR and an ATM interface has been created.
vbrAtmPvcVcc TearDownNotify	Connection	Response	vbrAtmPvcVccIfA vbrAtmPvcVccIfB vbrAtmPvcVccVpiB vbrAtmPvcVccVciB	The PVC VCC connection between a VBR interface and an ATM interface has been deleted.
vbrVbrPvcReq FailNotify	Connection	Response	vbrVbrPvcIfA vbrVbrPvcIfB pvcFailureReasonCode	The PVC connection request between two VBR interfaces has failed.
vbrVbrPvcSetup Notify	Connection	Response	vbrVbrPvcIfA vbrVbrPvcIfB	The PVC connection between two VBR interfaces has been created.
vbrVbrPvcTear DownNotify	Connection	Response	vbrVbrPvcIfA vbrVbrPvcIfB	The PVC connection between two VBR interfaces has been deleted.
versionConfigurationNotify	System	Info	versionConfigurationReasonCode	Indicates the completion status of the upgrade or downgrade.

Definitions of MIB Objects used for Traps

The following list contains the definitions of the MIB objects that are associated with the SNMP enterprise-specific trap names. This list is provided in alphabetical order.

atmPvcVccIfA	Interface index for side A of an ATM-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
atmPvcVccIfB	Interface index for side B of an ATM-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
atmPvcVccVciA	VCI value for side A of an ATM-ATM PVC VCC connection. Valid range is a number between 0 and 65535.
atmPvcVccVciB	VCI value for side B of an ATM-ATM PVC VCC connection. Valid range is a number between 0 and 65535.
atmPvcVccVpiA	VPI value for side A of an ATM-ATM PVC VCC connection. Valid range is a number between 0 and 4095.
atmPvcVccVpiB	VPI value for side B of an ATM-ATM PVC VCC connection. Valid range is a number between 0 and 4095.
atmPvcVpcIfA	Interface index for side A of an ATM-ATM PVC VPC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
atmPvcVpcIfB	Interface index for side B of an ATM-ATM PVC VPC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
atmPvcVpcVpiA	VPI value for side A of an ATM-ATM PVC VPC connection. Valid range is a number between 0 and 4095.
atmPvcVpcVpiB	VPI value for side B of an ATM-ATM PVC VPC connection. Valid range is a number between 0 and 4095.
bridgeAtmPvcVccIfA	Interface index for side A, the bridge side, of a bridge-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

bridgeAtmPvcVccIfB Interface index for side B, the ATM side, of a bridge-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

bridgeAtmPvcVccVciB VCI value for side B, the ATM side, of a bridge-ATM PVC VCC connection. Valid range is a number between 0 and 65535.

bridgeAtmPvcVccVpiB VPI value for side B, the ATM side, of a bridge-ATM PVC VCC connection. Valid range is a number between 0 and 4095.

bridgeBridgePvcIfA Interface index for side A of a bridge-bridge PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

bridgeBridgePvcIfB Interface index for side B of a bridge-bridge PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

bridgeDomainNumber The bridge number of the bridge which this interface is a part of. If the interface is currently not associated with any bridge this will be set to none.

cardOperStatus Current operational status of the card. Valid range is a number between 1 and 3. See the following table for a mapping between numbers and their enumerated type.

Table 94. cardOperStatus

Number Value	Enumerated Type
1	primary
2	standby
3	unknown

cardProtectionStatus Current protection status of the card. Valid range is a number between 1 and 3. See the following table for a mapping between numbers and their enumerated type.

Table 95. cardProtectionStatus

Number Value	Enumerated Type
1	none
2	protected
3	wrongType

cardSlot Physical slot location. Valid range is a number between 1 and 24.

cardType Type of card in a physical slot. A specific type of card is associated with each number. Valid range is a number between 1 and 29. See the following table for a mapping between numbers and their enumerated type.

Table 96. cardType

Number Value	Enumerated Type
1	none
2	taxi
3	oc3
4	ds3
5	ds1CircuitEm
6	ds1CellBearing
7	e1CircuitEm
8	e3
9	highSpeed
10	multiSerial
11	dspl
12	twoWireSource
13	twoWireSink
14	cpu
15	stratum
16	powerSupply
17	protectionCard
18	e1CellBearing
19	ethernet
20	enhancedDs1
21	enhancedE1
22	oc-3cMMAQ
23	oc-3cMMTS
24	oc-3cSMAQ
25	oc-3cSMTS
28	stm-1SMAQ
29	stm-1SMTS

cellTestIfB	Interface index used for testing cell transfer. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
cellTestVcidB	Virtual Check Id for testing cell transfer to an I/O card. Valid range is a number between 0 and 65535. If the I/O card interface is frame relay, this field acts as DLCI and the valid range is a number between 0 and 1023. If the I/O card interface is circuit emulation, then this will always be 0.
cellTestVpiB	VPI value for testing cell transfer to an I/O card. Valid range is a number between 0 and 4095. If the I/O card interface is not ATM, then this will always be zero.
cirEmAtmPvcVccIfA	Interface index for side A, the circuit emulation side, of a circuit emulation-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
cirEmAtmPvcVccIfB	Interface index for side B, the ATM side, of a circuit emulation-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
cirEmAtmPvcVccVciB	VCI value for side B, the ATM side, of a circuit emulation-ATM PVC VCC connection. Valid range is a number between 0 and 65535.
cirEmAtmPvcVccVpiB	VPI value for side B, the ATM side, of a circuit emulation-ATM PVC VCC connection. Valid range is a number between 0 and 4095.
cirEmCirEmPvcIfA	Interface index for side A of a circuit emulation-circuit emulation PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
cirEmCirEmPvcIfB	Interface index for side B of a circuit emulation-circuit emulation PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.
firmwareDownloadReasonCode	The suspected reasons of why a firmware download would fail. Valid range is a number between 1 and 3. See the following table for a mapping between numbers and their enumerated type.

Table 97. firmwareDownloadReasonCode

Number Value	Enumerated Type
1	cardInService
2	errorInFile
3	otherFailure

frAtmPvcVccDlciA DLCI value for side A, the frame relay side, of a frame relay-ATM PVC VCC connection. Valid range is a number between 0 and 1023.

frAtmPvcVccIfA Interface index for side A, the frame relay side, of a frame relay-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

frAtmPvcVccIfB Interface index for side B, the ATM side, of a frame relay-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

frAtmPvcVccVciB VCI value for side B, the ATM side, of a frame relay-ATM PVC VCC connection. Valid range is a number between 0 and 65535.

frAtmPvcVccVpiB VPI value for side B, the ATM side, of a frame relay-ATM PVC VCC connection. Valid range is a number between 0 and 4095.

frFrPvcDlciA DLCI value for side A of a frame relay-frame relay PVC connection. Valid range is a number between 0 and 1023.

frFrPvcDlciB DLCI value for side B of a frame relay-frame relay PVC connection. Valid range is a number between 0 and 1023.

frFrPvcIfA Interface index for side A of a frame relay-frame relay PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

frFrPvcIfB Interface index for side B of a frame relay-frame relay PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

frLmiOperStatus The operational status of the LMI protocol. Valid range is a number between 1 and 2. See the following table for a mapping between numbers and their enumerated type.

Table 98. frLmiOperStatus

Number Value	Enumerated Type
1	outOfService
2	inService

fwReleaseSlot Physical slot location. Valid range is a number between 1 and 16.

interfaceFailureReasonCode Identification of cause for failure in changing the status of an interface. Valid range is a number between 1 and 6. See *Table 99 on page 319* for a mapping between numbers and their enumerated type.

Table 99. interfaceFailureReasonCode

Number Value	Enumerated Type
1	interfaceInService
2	interfaceNotNew
3	interfaceExists
4	bridgeGroupActive
5	signallingNotEnabled
6	firmwareOutOfDate

interfaceIndex Interface index used for identification in traps. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

interfaceType Interface type used for identification in traps. A specific interface is associated with each number. Valid range is a number between 1 and 15. See the following table for a mapping between numbers and their enumerated type.

Table 100. interfaceType

Number Value	Enumerated Type
1	atmUni3-0
2	atmUni3-1
3	iispUser
4	iispNetwork
5	circuitEmulation
6	frameRelayUni
9	terminalEmulation
10	dsp
11	hdlcPassThrough
12	bridge
13	routing
14	dbCirEm
15	frameRelayNni

ipAtmAppPvcVccDestAddrA Destination IP address of an in-band management-ATM connection. Value is and IP address.

ipAtmAppPvcVccIfB Interface index for side B, the ATM side, of an in-band management ATM connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

ipAtmAppPvcVccSubnetMaskA The subnet mask of the destination IP address. Value is an IP address.

ipAtmAppPvcVccVciB VCI value for side B, the ATM side, of an in-band management-ATM connection. Valid range is a number between 0 and 65535.

ipAtmAppPvcVccVpiB VPI value for side B, the ATM side, of an in-band management-ATM connection. Valid range is a number between 0 and 4095.

lineStatus Bit map of the status of a line connected to a port. The bit maps for the I/O modules are shown in *Table 101 on page 320* through *Table 109 on page 322*.

Table 101. Line Status for the DS1/T1 and Enhanced DS1 Modules

Bit Value	Alarm	Description
1	dsx1NoAlarm	No alarm present
2	dsx1RcvFarEndLOF	Far end LOF (that is, Yellow Alarm)
4	dsx1XmtFarEndLOF	Near end sending LOF Indication
8	dsx1RcvAIS	Far end sending AIS
16	dsx1XmtAIS	Near end sending AIS
32	dsx1LossOfFrame	Near end LOF (a.k.a., Red Alarm)
64	dsx1LossOfSignal	Near end Loss Of Signal
128	dsx1LoopbackState	Near end is looped
256	dsx1T16AIS	E1 TS16 AIS
512	dsx1RcvFarEndLOMF	Far End Sending TS16 LOMF
1024	dsx1XmtFarEndLOMF	Near End Sending TS16 LOMF
2048	dsx1RcvTestCode	Near End detects a test code
4096	dsx1OtherFailure	Any other line status not shown in this table

Table 102. Line Status for the DS3 Module

Bit Value	Alarm	Description
1	dsx3NoAlarm	No alarm present
2	dsx3RcvRAIFailure	Receiving Yellow/Remote Alarm Indication
4	dsx3XmitRAIAlarm	Transmitting Yellow/Remote Alarm Indication
8	dsx3RcvAIS	Receiving AIS failure state
16	dsx3XmitAIS	Transmitting AIS failure statue
32	dsx3LOF	Receiving LOF failure state
64	dsx3LOS	Receiving LOS failure state
128	dsx3LoopbackState	Looping the received signal
256	dsx3RcvTestCode	Receiving a Test Pattern
512	dsx3OtherFailure	Any other line status not shown in this table

Table 103. Line Status for the E1 and Enhanced E1 Modules

Bit Value	Alarm	Description
1	e1NoAlarm	No Alarm Present
2	e1RcvFarEndLOF	Far end LOF (a.k.a., Yellow Alarm)
4	e1XmtFarEndLOF	Near end sending LOF Indication
8	e1RcvAIS	Far end sending AIS
16	e1XmtAIS	Near end sending AIS
32	e1LossOfFrame	Near end LOF (a.k.a., Red Alarm)
64	e1LossOfSignal	Near end Loss Of Signal
128	e1LoopbackState	Near end is looped
256	e1T16AIS	E1 TS16 AIS
512	e1RcvFarEndLOMF	Far End Sending TS16 LOMF
1024	e1XmtFarEndLOMF	Near End Sending TS16 LOMF
2048	e1RcvTestCode	Near End detects a test code
4096	e1OtherFailure	Any other line status not shown in this table

Table 104. Line Status for the E1 Module

Bit Value	Alarm	Description
1	e3NoAlarm	No alarm present
2	e3RcvRAIFailure	Receiving Yellow/Remote Alarm Indication
4	e3XmitRAIAlarm	Transmitting Yellow/Remote Alarm Indication
8	e3RcvAIS	Receiving AIS failure state
16	e3XmitAIS	Transmitting AIS failure statue
32	e3LOF	Receiving LOF failure state
64	e3LOS	Receiving LOS failure state
128	e3LoopbackState	Looping the received signal
256	e3RcvTestCode	Receiving a Test Pattern
512	e3OtherFailure	Any other line status not shown in this table

Table 105. Line Status for the Ethernet Module

Bit Value	Line Status
1	Down
2	10baseT-FullDuplex
4	10baseT-HalfDuplex
8	100baseT-FullDuplex
16	100baseT-HalfDuplex

Table 106. Line Status for the OC-3c and STM-1 Modules

Bit Value	Alarm	Description
1	oc3NoAlarm	No alarm present
2	oc3RcvRAIFailure	Receiving Yellow/Remote Alarm Indication
4	oc3XmitRAIAlarm	Transmitting Yellow/Remote Alarm Indication
8	oc3RcvAIS	Receiving AIS failure state
16	oc3XmitAIS	Transmitting AIS failure statue
32	oc3LOF	Receiving LOF failure state
64	oc3LOS	Receiving LOS failure state
128	oc3LoopbackState	Looping the received signal
256	oc3RcvTestCode	Receiving a Test Pattern
512	oc3OtherFailure	Any other line status not shown in this table

Table 107. Line Status for the TAXI Module

Bit Value	Alarm
1	NoAlarm
2	Loss of Signal

Table 108. Line Status for the Voice 2W Office (2W Sink) Module

Bit Value	Alarm	Description
1	NoAlarm	No alarm present
2	SignalingFailureState	
4	FacilityLoopBack	
8	Maintenance	
16	Out Of Service	
32	OtherFailure	Any other line status not shown in this table

Table 109. Line Status for the Voice 2W Station (2W Source) Module

Bit Value	Alarm	Description
1	NoAlarm	No alarm present
2	SignalingFailureState	
4	FacilityLoopBack	
8	Maintenance	
16	OutOfService	
32	OtherFailure	Any other line status not shown in this table

lmiDlciOperStatus The operational status of the LMI protocol. Valid range is a number between 1 and 2. See *Table 110 on page 323* for a mapping between numbers and their enumerated type.

Table 110. lmiDlciOperStatus

Number Value	Enumerated Type
1	outOfService
2	inService

percentComplete Used for the trap message fileTransferStatusNotify, and the value equals the percent of the upgrade, downgrade, or FTP download completed.

portId Port ID used for identification in traps. Number value is interpreted as a port of the form, SSPP, where SS is the card slot and PP is the port number.

powerSupplyReasonCode Identification for change in status of a power supply. Valid range is a number between 1 and 8. See *Table 111 on page 323* for a mapping between numbers and their enumerated type.

Table 111. powerSupplyReasonCode

Number Value	Enumerated Type
1	overload
2	overloadCleared
3	plus5vFailed
4	plus5vCleared
5	plus120vFailed
6	plus120vCleared
7	minus48vFailed
8	minus48vCleared

pvcFailureReasonCode An identified reason why an ATM PVC connection request failed. Valid range is a number between 1 and 187. See the following table for a mapping between numbers and their enumerated type.

Table 112. pvcFailureReasonCode

Number Value	Enumerated Type
1	vpiVciUnavailableA2B
2	vpiVciUnavailableB2A
3	bandwidthUnavailableA2B
4	bandwidthUnavailableB2A
5	qosUnavailableA2B
6	qosUnavailableB2A
7	internalResourceUnavailable
8	cantUseSignalingChnlIgrsA2B
9	cantUseSignalingChnlEgrsA2B
10	cantUseSignalingChnlIgrsB2A
11	cantUseSignalingChnlEgrsB2A
12	cantUseManagementChnlIgrsA2B

Table 112. pvcFailureReasonCode (continued)

Number Value	Enumerated Type
13	cantUseManagementChnlEgrsA2B
14	cantUseManagementChnlIgrsB2A
15	cantUseManagementChnlEgrsB2A
16	vcLessThanVcMinIgrsA2B
17	vcLessThanVcMinEgrsA2B
18	vcLessThanVcMinIgrsB2A
19	vcLessThanVcMinEgrsB2A
20	vcGreaterThanVcMaxIgrsA2B
21	vcGreaterThanVcMaxEgrsA2B
22	vcGreaterThanVcMaxIgrsB2A
23	vcGreaterThanVcMaxEgrsB2A
24	vpLessThanVpMinIgrsA2B
25	vpLessThanVpMinEgrsA2B
26	vpLessThanVpMinIgrsB2A
27	vpLessThanVpMinEgrsB2A
28	vpGreaterThanVpMaxIgrsA2B
29	vpGreaterThanVpMaxEgrsA2B
30	vpGreaterThanVpMaxIgrsB2A
31	vpGreaterThanVpMaxEgrsB2A
32	vpGreaterThanVpMaxIispIgrsA2B
33	vpGreaterThanVpMaxIispEgrsA2B
34	vpGreaterThanVpMaxIispIgrsB2A
35	vpGreaterThanVpMaxIispEgrsB2A
36	rsvdChnlRangeIgrsA2B
37	rsvdChnlRangeEgrsA2B
38	rsvdChnlRangeIgrsB2A
39	rsvdChnlRangeEgrsB2A
40	internalSrvcTypeUnavailableA2B
41	internalSrvcTypeUnavailableB2A
42	unrecognizableBindTypeEgrsA2B
43	unrecognizableBindTypeEgrsB2A
44	callWithoutConnections
45	callDataStructuresUnavailable
46	cnctnDataStructuresUnavailable
47	nullTrafficParametersRejectedA2B
48	nullTrafficParametersRejectedB2A
49	vpiWithinSvcRangeIgrsA2B
50	vpiWithinSvcRangeEgrsA2B
51	vpiWithinSvcRangeIgrsB2A
52	vpiWithinSvcRangeEgrsB2A

Table 112. pvcFailureReasonCode (continued)

Number Value	Enumerated Type
53	vpiInReservedListA2B
54	vpiInReservedListB2A
55	vpiInPvcListA2B
56	vpiInPvcListB2A
57	vpiInReleasedListA2B
58	vpiInReleasedListB2A
59	vciIsNotNullInVpcIgrsA2B
60	vciIsNotNullInVpcEgrsA2B
61	vciIsNotNullInVpcIgrsB2A
62	vciIsNotNullInVpcEgrsB2A
63	vpiInVpcReservedListA2B
64	vpiInVpcReservedListB2A
65	vpiVciInReservedListA2B
66	vpiVciInReservedListB2A
67	vpiInVpcPvcListA2B
68	vpiInVpcPvcListB2A
69	vpiVciInPvcListA2B
70	vpiVciInPvcListB2A
71	vpiInVpcReleasedListA2B
72	vpiInVpcReleasedListB2A
73	vpiVciInReleasedListA2B
74	vpiVciInReleasedListB2A
75	illegalMulticaseIdA2B
76	illegalMulticaseIdB2A
77	unsupportedConnectionA2B
78	unsupportedConnectionB2A
79	connectionsUnavailableInModuleA2B
80	connectionsUnavailableInModuleB2A
81	scrBandwidthUnavailableIgrsA2B
82	scrBandwidthUnavailableEgrsA2B
83	scrBandwidthUnavailableIgrsB2A
84	scrBandwidthUnavailableEgrsB2A
85	pcrBandwidthUnavailableIgrsA2B
86	pcrBandwidthUnavailableEgrsA2B
87	pcrBandwidthUnavailableIgrsB2A
88	pcrBandwidthUnavailableEgrsB2A
89	vpiVciWithinSvcRangeIgrsA2B
90	vpiVciWithinSvcRangeEgrsA2B
91	vpiVciWithinSvcRangeIgrsB2A
92	vpiVciWithinSvcRangeEgrsB2A

Table 112. pvcFailureReasonCode (continued)

Number Value	Enumerated Type
93	multicastDataStructuresUnavailable
94	semaphoreTimeout
95	dlciFoundInReservedList
96	dlciFoundInPvcList
97	dlciFoundInReleasedList
98	invalidDlci
99	slotA-OutOfRange
100	portA-OutOfRange
101	channelA-OutOfRange
102	moduleA-Uninitialized
103	physicalPortA-Uninitialized
104	channelA-NotBound
105	moduleA-UnrecognizablePortType
106	slotB-OutOfRange
107	portB-OutOfRange
108	channelB-OutOfRange
109	moduleB-Uninitialized
110	physicalPortB-Uninitialized
111	channelB-NotBound
112	moduleB-UnrecognizablePortType
113	interfaceA-NotAtm
114	interfaceB-NotAtm
115	unrecognizableServiceTypeA2B
116	unrecognizableServiceTypeB2A
117	unrecognizableSarTypeA2B
118	unrecognizableSarTypeB2A
119	interfaceA-NotCircuitEmulation
120	interfaceB-NotCircuitEmulation
121	unrecognizableSilenceDetectionMode
122	unrecognizableEchoCancellationMode
123	unrecognizableVoiceCompressionMode
124	interfaceA-NotVbr
125	interfaceB-NotVbr
126	interfaceA-NotFrameRelay
127	interfaceB-NotFrameRelay
128	interfaceA-InHdlcPvcList
129	interfaceA-InHdlcReleasedList
130	interfaceA-InHdlcReservedList
131	interfaceA-InTerminalEmulationPvcList
132	interfaceA-InTerminalEmulationReleasedList

Table 112. pvcFailureReasonCode (continued)

Number Value	Enumerated Type
133	interfaceA-InTerminalEmulationReservedList
134	interfaceA-InCircuitEmulationPvcList
135	interfaceA-InCircuitEmulationReleasedList
136	interfaceA-InCircuitEmulationReservedList
137	notNullVpcInNoisyLinkA2BIgrs
138	notNullVpcInNoisyLinkA2BEgrs
139	invalidVccInNoisyLinkA2BIgrs
140	invalidVccInNoisyLinkA2BEgrs
141	unsupportedFrwdErrCorrectValueA2B
142	interfaceB-InHdlcPvcList
143	interfaceB-InHdlcReleasedList
144	interfaceB-InHdlcReservedList
145	interfaceB-InTerminalEmulationPvcList
146	interfaceB-InTerminalEmulationReleasedList
147	interfaceB-InTerminalEmulationReservedList
148	interfaceB-InCircuitEmulationPvcList
149	interfaceB-InCircuitEmulationReleasedList
150	interfaceB-InCircuitEmulationReservedList
151	notNullVpcInNoisyLinkB2AIgrs
152	notNullVpcInNoisyLinkB2AEgrs
153	invalidVccInNoisyLinkB2AIgrs
154	invalidVccInNoisyLinkB2AEgrs
155	unsupportedFrwdErrCorrectValueB2A
156	interfaceInUse
157	unsupportedFrwdErrCorrectSettings
158	unsupportedFlowSettings
159	frwdErrCorrectResourceInternalError
160	unsupportedConnection
161	ipDestAddrSubnetAInReservedList
162	ipDestAddrSubnetAInPvcList
163	ipDestAddrSubnetAInReleasedList
164	ipDestAddrSubnetBInReservedList
165	ipDestAddrSubnetBInPvcList
166	ipDestAddrSubnetBInReleasedList
167	notCpuIpInterfaceA
168	ipResourceUnavailable
169	fecAutoInSimplexNotValid
170	fecResourceUnavailable
171	notBridgeInterfaceA
172	notBridgeInterfaceB

Table 112. pvcFailureReasonCode (continued)

Number Value	Enumerated Type
173	invalidBridgePortA2B
174	invalidBridgePortB2A
175	interfaceAInBridgePvcList
176	interfaceBInBridgePvcList
177	interfaceAInBridgeReleasedList
178	interfaceBInBridgeReleasedList
179	interfaceAInBridgeReservedList
180	interfaceBInBridgeReservedList
181	invalidDlciA
182	invalidDlciB
183	unrecognizableServiceType
184	moduleAMcstNotSupported
185	moduleBMcstNotSupported
186	moduleAMultiPortMcstNotSupported
187	moduleBMultiPortMcstNotSupported

remoteRebootReasonCode The result of a remote reboot request. Valid range is a number between 1 and 45. See the following table for a mapping between numbers and their enumerated type.

Table 113. remoteRebootReasonCode

Number Value	Enumerated Type
1	ioCard1Reboot-OK
2	ioCard2Reboot-OK
3	ioCard3Reboot-OK
4	ioCard4Reboot-OK
5	ioCard5Reboot-OK
6	ioCard6Reboot-OK
7	ioCard7Reboot-OK
8	ioCard8Reboot-OK
9	ioCard9Reboot-OK
10	ioCard10Reboot-OK
11	ioCard11Reboot-OK
12	ioCard12Reboot-OK
13	ioCard13Reboot-OK
14	ioCard14Reboot-OK
15	ioCard15Reboot-OK
16	ioCard16Reboot-OK
17	ioCard1Reboot-NoCardInSlot
18	ioCard2Reboot-NoCardInSlot

Table 113. remoteRebootReasonCode (continued)

Number Value	Enumerated Type
19	ioCard3Reboot-NoCardInSlot
20	ioCard4Reboot-NoCardInSlot
21	ioCard5Reboot-NoCardInSlot
22	ioCard6Reboot-NoCardInSlot
23	ioCard7Reboot-NoCardInSlot
24	ioCard8Reboot-NoCardInSlot
25	ioCard9Reboot-NoCardInSlot
26	ioCard10Reboot-NoCardInSlot
27	ioCard11Reboot-NoCardInSlot
28	ioCard12Reboot-NoCardInSlot
29	ioCard13Reboot-NoCardInSlot
30	ioCard14Reboot-NoCardInSlot
31	ioCard15Reboot-NoCardInSlot
32	ioCard16Reboot-NoCardInSlot
33	allIOCardReboot-OK
34	allIOCardReboot-NoIOCards
35	chassisReboot-Proceeding
36	backupCpuReboot-Proceeding
37	backupCpuReboot-NoBackup
38	primaryCpuReboot-Proceeding
39	primaryCpuSwitchover-Proceeding
40	primaryCpuSwitchover-NoBackup
41	chassisReboot-Fail-VersionControlInProgress
42	backupCpuReboot-Fail-VersionControlInProgress
43	primaryCpuReboot-Fail-VersionControlInProgress
44	primaryCpuSwitchover-Fail-VersionControlInProgress
45	primaryCpuSwitchover-Fail-BkCPUDataBaseNotNew

saveConfigurationReasonCode The result of a save configuration request. Valid range is a number between 1 and 14. See *Table 114 on page 330* for a mapping between numbers and their enumerated type.

Table 114. saveConfigurationReasonCode

Number Value	Enumerated Type
1	equipment-OK
2	equipment-Fail-VersionControlInProgress
3	equipment-Fail
4	connections-OK
5	connections-Fail-VersionControlInProgress
6	connections-Fail
7	routing-OK
8	routing-Fail-VersionControlInProgress
9	routing-Fail
10	all-OK
11	all-Fail-VersionControlInProgress
12	all-Fail
13	fileTransferFailed
14	fileTransferCompleted

stratumMode Current status of the primary stratum card. Valid range is a number between 1 and 4. See the following table for a mapping between numbers and their enumerated type.

Table 115. stratumMode

Number Value	Enumerated Type
1	synchronized3
2	synchronized4
3	holdover
4	freerun

upgradeSwCopyStatus Current status of the FTP software upgrade download. Valid range is a number between 1 and 5. See the following table for a mapping between numbers and their enumerated type.

Table 116. upgradeSwCopyStatus

Number Value	Enumerated Type
1	noActivity
2	working
3	doneSuccessfully
4	doneWithError
5	aborted

upgradeSwErrorStatus The result of the finish of the FTP software upgrade download. Valid range is a number between 1 and 22. See the following table for a mapping between numbers and their enumerated type.

Table 117. upgradeSwErrorStatus

Number Value	Enumerated Type
1	none
2	userAbort
3	invalidIpAddress
4	invalidAccountName
5	invalidAccountPassword
6	invalidCdromFile
7	libraryCRCFail
8	unableToOpenLibraryFile
9	unableToLoadLibraryModule
10	unableToFindTaskSymbolName
11	failureInSpawningTask
12	failureInCreatingMsgQ
13	failureInCopyingDataFiles
14	failureToRemoveNextTree
15	unableToMakeNextTree
16	unableToOpenFile
17	unableToMakeFtpConnection
18	unableToWriteFile
19	unableToCompleteFtp
20	fileCRCFail
21	unableToWritePackageList
22	taskSuspendOrDead

vbrAtmPvcVccIfA Interface index for side A, the variable bit rate side, of a variable bit rate-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

vbrAtmPvcVccIfB Interface index for side B, the ATM side, of a variable bit rate-ATM PVC VCC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

vbrAtmPvcVccVciB VCI value for side B, the ATM side, of a variable bit rate-ATM PVC VCC connection. Valid range is a number between 0 and 65535.

vbrAtmPvcVccVpiB VPI value for side B, the ATM side, of a variable bit rate-ATM PVC VCC connection. Valid range is a number between 0 and 4095.

vbrVbrPvcIfA Interface index for side A of a variable bit rate-variable bit rate PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

vbrVbrPvcIfB Interface index for side B of a variable bit rate-variable bit rate PVC connection. Number value is interpreted as an interface of the form, SSPPCCC, where SS is the card slot, PP is the port number, and CCC is the channel number.

versionConfigurationReasonCode Valid range is a number between 1 and 12. The following table is a mapping between the numbers and their enumerated type.

Table 118. versionConfigurationReasonCode

Number Value	Enumerated Type
1	upgrade-Start
2	upgrade-Completed
3	upgrade-Fail
4	downgrade-Start
5	downgrade-Completed
6	downgrade-Fail
7	upgrade-Fail-NoVersion
8	upgrade-Fail-VersionControlInProgress
9	downgradeFail-NoVersion
10	downgrade-Fail-VersionControlInProgress
11	upgrade-InProgress
12	downgrade-InProgress

12 Hardware Physical and Environmental Specifications

This section describes the physical and environmental specifications for the hardware components that make up the AC 60/120 systems. These components are the following:

- AC 120 chassis
  - 19-inch chassis
  - 23-inch chassis
- AC 120 tabletop cabinet with chassis built in
- AC 60 chassis
  - 110 V AC power supply
  - 220 V AC power supply
- AC 120 power supply modules:
  - Alternating current (AC) module requiring input source power at 110/220 V AC, 5 A, 300 W (user-selectable voltage setting
  - Direct current (DC) module requiring input source power at -48 V DC, 12 A, 400 W
- AC 120 Stratum 3–4 Module
- AC 120 CPU Module
- DS1/T1 - ATM Cell Bearing Module
- DS1/T1 - Circuit Emulation Module
- Enhanced DS1 Module
- E1 - ATM Cell Bearing Module
- E1 - Circuit Emulation Module
- Enhanced E1 Module
- DS3 Module
- E3 Module
- Ethernet Module
- High Speed Module
- Multiserial Module
- OC-3c Multi-Mode (MM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- OC-3c Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- STM-1 Single Mode (SM) Module, two types:
  - With traffic shaping
  - With adaptive queuing traffic management
- TAXI Module
- Voice 2W Office (2W Sink) Module
- Voice 2W Station (2W Source) Module

Comcodes for the components in the AC 120 system are indicated on barcode labels affixed to the components.

Common Equipment

AC 120 Chassis

The specifications for the AC 120 chassis are given in the following table.

Table 119. AC 120 Chassis Hardware Specifications

Item	Description
Comcode	• 19-inch chassis: 407831775 • 23-inch chassis: 407831791
Slot configuration	• 19-inch chassis—16 total: 12 slots for CPU Modules and user-selected I/O and server modules • 23-inch chassis—20 total: 16 slots for CPU Modules and user-selected I/O and server modules • 2 reserved slots for Stratum 3–4 Modules • 2 reserved slots for power supply modules
Dimensions	• 19-inch chassis: 19 in. (W) x 10.5 in. (D) x 7 in. (H) • 23-inch chassis: 23 in. (W) x 10.5 in. (D) x 7 in. (H)
Weight	• 19-inch chassis: – Empty: 9 lb – Fully populated: approximately 30 lb • 23-inch chassis: – Empty: 12 lb – Fully populated: approximately 35 lb
Operating temperature	0° to 50° C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Material	Aluminum
Color	Black
Cooling method	• Convection when mounted in rack • Fan cooling when installed in tabletop cabinet
Mounting clearance	• 2 in. above and below unit when mounted in an equipment rack or a telco frame • 2 in. behind unit when installed in tabletop cabinet
Power source requirement	One of the following: • 110/220 V AC power supply (19-inch and 23-inch chassis) • -48 V DC power supply (19-inch and 23-inch chassis)

AC 120 Tabletop Cabinet

The specifications for the AC 120 tabletop cabinet are given in the following table.

Table 120. Tabletop Cabinet Hardware Specifications

Item	Description
Comcode	407831783
Dimensions	21.5 in. (W) x 13.25 in. (D) x 9.57 in. (H)
Weight	25.8 lb (without chassis)
Operating temperature	0° to 50° C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Material	Aluminum
Color	Light gray
Cabinet placement: • Clearance • Location	 • 2 inches behind the cabinet • Flat, hard surface
Cooling fan power requirements	-48 V DC from chassis backplane with output power provided by one of the following: • 110/220 V AC power supply • -48 V DC power supply

AC 60 Chassis

The specifications for the AC 60 chassis are given in the following table.

Table 121. AC 60 Chassis Hardware Specifications

Item	Description
Comcode	• 110 V AC power supply: 407831809 • 220 V AC power supply: 407895705
Slot configuration	Four for I/O and server modules
Dimensions	19 in. (W) x 10.25 in. (D) x 5.25 in. (H)
Weight	16.2 lb (fully loaded with four I/O and/or server modules)
Operating temperature	0° to 50° C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Material	Aluminum
Color	Black
Cooling method	Single fan
Mounting clearance	2 in. above and below the unit and to both sides
Power source requirements	One of the following built-in (factory-installed) power supplies: • 110 V AC power supply • 220 V AC power supply **Note:** See input specifications in *Table 122 on page 336*.
Clock synchronization	Built-in (factory-installed) Stratum 3–4 Module
CPU	Built-in (factory-installed) module

AC 120 Power Supply Modules

The specifications for the two types of AC 120 power supply modules are given as follows:

- 110/220 V AC Module (See *Table 122 on page 336* for specifications.)
- -48 V DC Module (See *Table 123 on page 336* for specifications.)

Table 122. AC 120 110/220 V AC Power Supply Specifications

Item	**Description**
Comcode	407831908
Slot configuration	Slot 23 or 24 or both (for redundant configuration)
Dimensions	2.125 in. (W) x 9.5 in. (D) x 6.2 in. (H)
Weight	2.5 lb
Operating temperature	0° to 50° degrees C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Units per system	2 recommended (redundant)
Input: • Voltage range • Maximum current • Maximum power • Voltage selection	Values: • 90 to 130 V AC, or 180 to 250 V AC at 50 to 60 Hz • 5 A • 300 W • 115 V or 230 V switch settings, user selectable

Table 123. AC 120 -48 V DC Power Supply Specifications

Item	**Description**
Comcode	407831924
Slot configuration	Slot 23 or 24 or both (for redundant configuration)
Dimensions	2.125 in. (W) x 9.5 in. (D) x 6.2 in. (H)
Weight	2.5 lb
Operating temperature	0° to 50° C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Units per system	2 recommended (redundant)
Input: • Voltage range • Maximum current • Maximum power	Values: • -42.5 to -56 V DC • 12 A • 400 W
Connector	One 3-pin connector on the faceplate

AC 120 Stratum 3–4 Module

The specifications for the AC 120 Stratum 3–4 Module are given in the following table.

Table 124. AC 120 Stratum 3–4 Module Specifications

Item	Description
Comcode	407831635
Slot configuration	Slot 21 or 22 or both (for redundant configuration)
Dimensions	0.7 in. (W) x 9.5 in. (D) x 6.2 in. (H)
Weight	0.475 lb
Operating temperature	0° to 50° C
Operating humidity	0% to 95%, noncondensing
Storage temperature	-20° to +70° C
Units per system	2 recommended (redundant)
Synchronization source	Internal or external
Accuracy	Stratum 3 or 4, selectable
External clock input	Standard 8 kHz/64 kHz composite clock
Connector	One RJ11 connector on the faceplate

AC 120 CPU Module

The specifications for the AC 120 CPU Module are given in the following table.

Table 125. AC 120 CPU Module Specifications

Item	Description
Comcode	407831668
Slot configuration	Slot 11 or 12 or both (for redundant configuration) recommended; however, any I/O Module slot (numbered 1–12 on chassis) can be used
Dimensions	0.95 in. (W) x 9.5 in. (D) x 6.2 in. (H)
Weight	1.2 lb
Operating temperature	0° to 50° C, ambient
Operating humidity	0 to 90%, noncondensing
Storage temperature	-20° to 70° C, ambient
Units per system	2 recommended (redundant)
Power requirements	15 W average
Processing	RISC microprocessor
Memory	16 MB to 64 MB
Connectors	One RJ45 connector labeled ETHERNET and one RJ11 connector labeled CONSOLE on the faceplate

I/O and Server Modules

The specifications that all I/O and server modules have in common are given in the following table. Specifications unique to the individual modules are given in the following subsections.

Table 126. General Specifications for the I/O and the Server Modules

Item	**Description**
Slot configuration	Any I/O or server module slot, numbered 1–12 on the AC 120 chassis, or J1–J4 on the AC 60 chassis
Dimensions	0.95 in. (W) x 9.5 in. (D) x 6.2 in. (H)
Weight	1.0 lb
Operating temperature	0° to 50° C
Operating humidity	5 to 95%, noncondensing
Storage temperature	-20° to 70° C

DS1/T1 - Cell Bearing Module

The specifications unique to this module are given in the following table.

Table 127. DS1/T1 - Cell Bearing Module Specifications

Item	**Description**
Comcode	407831676
Connectors	6 RJ45 connectors, 6 ports per module
Protocol	ATM

DS1/T1 - Circuit Emulation Module

The specifications unique to this module are given in the following table.

Table 128. DS1/T1 - Circuit Emulation Module Specifications

Item	**Description**
Comcode	407831684
Connections	6 RJ45 connectors, 6 ports per module
Protocol	Circuit emulation service, dynamic bandwidth circuit emulation

Enhanced DS1 Module

The specifications unique to this module are given in the following table.

Table 129. Enhanced DS1 Module Specifications

Item	**Description**
Comcode	407842202
Connections	6 RJ45 connectors, 6 ports per module
Protocol	Structured circuit emulation (nx64 Kbps); frame relay NNI (FRF.2)

E1 Module (Cell Bearing)

The specifications unique to this module are given in the following table.

Table 130. E1 - Cell Bearing Module Specifications

Item	Description
Comcode	407842194
Connections	4 RJ45 connectors, 4 ports per module
Protocol	ATM

E1 - Circuit Emulation Module

The specifications unique to this module are given in the following table.

Table 131. E1 - Circuit Emulation Module Specifications

Item	Description
Comcode	407842186
Connections	4 RJ45 connectors, 4 ports per module
Protocol	CES

Enhanced E1 Module

The specifications unique to this module are given in the following table.

Table 132. Enhanced E1 Module Specifications

Item	Description
Comcode	407942838
Connections	6 RJ45 connectors, 6 ports per module
Protocol	Frame relay UNI (FRF.1), frame relay NNI (FRF.2)

DS3 Module

The specifications unique to this module are given in the following table.

Table 133. DS3 Module Specifications

Item	Description
Comcode	407831692
Connectors	4 BNC coaxial connectors for 2 ports: 1 RX (input) and 1 TX (output) connector per port
Protocol	ATM PLCP

E3 Module

The specifications unique to this module are given in the following table.

Table 134. E3 Module Specifications

Item	Description
Comcode	407842178
Connectors	4 BNC coaxial connectors for 2 ports: 1 RX (input) and 1 TX (output) connector per port
Protocol	ATM

Ethernet Module

The specifications unique to this module are given in the following table.

Table 135. Ethernet Module Specifications

Item	Description
Comcode	407842160
Connectors	5 RJ45 connectors on the faceplate, 1 internal (virtual) port built into the circuit board, for a total of 6 ports
Protocol	RFC 1483 multi-protocol encapsulation and Layer 2 bridging service

High Speed Module

The specifications unique to this module are given in the following table.

Table 136. High Speed Module Specifications

Item	Description
Comcode	407831742
Connectors	• 1 micro-36 pin for the parallel port • 1 micro-DB25 for the serial port
Protocol	ATM PLCP

Multiserial Module

The specifications unique to this module are given in the following table.

Table 137. Multiserial Module Specifications

Item	Description
Comcode	407831759
Connectors	6 micro-DB15, 6 serial ports per module
Protocol	Limitless ATM network protocol

OC-3c MM Module (with adaptive queuing traffic management)

The specifications unique to this module are given in the following table.

Table 138. OC-3c MM Module (with adaptive queuing traffic management) Specifications

Item	Description
Comcode	407831700
Connectors	2 ST connectors, 1 port per module
Protocol	ATM

OC-3c MM Module (with traffic shaping)

The specifications unique to this module are given in the following table.

Table 139. OC-3c MM Module (with traffic shaping) Specifications

Item	Description
Comcode	407842210
Connectors	2 ST connectors, 1 port per module
Protocol	ATM

OC-3c SM Module (with adaptive queuing traffic management)

The specifications unique to this module are given in the following table.

Table 140. OC-3c SM Module (with adaptive queuing traffic management) Specifications

Item	Description
Comcode	407842228
Connectors	2 SC connectors, 1 port per module
Protocol	ATM

OC-3c SM Module (with traffic shaping)

The specifications unique to this module are given in the following table.

Table 141. OC-3c SM Module (with traffic shaping) Specifications

Item	Description
Comcode	407842236
Connectors	2 SC connectors, 1 port per module
Protocol	ATM

STM-1 SM Module (with adaptive queuing traffic management)

The specifications unique to this module are given in the following table.

Table 142. STM-1 SM Module (with adaptive queuing traffic management) Specifications

Item	Description
Comcode	407942812
Connectors	2 SC connectors, 1 port per module
Protocol	ATM

STM-1 SM Module (with traffic shaping)

The specifications unique to this module are given in the following table.

Table 143. STM-1 SM Module (with traffic shaping) Specifications

Item	Description
Comcode	407942820
Connectors	2 SC connectors, 1 port per module
Protocol	ATM

TAXI Module

The specifications unique to this module are given in the following table.

Table 144. TAXI Module Specifications

Item	Description
Comcode	407831718
Connectors	2 ST connectors, 1 port per module
Protocol	ATM

Voice 2W Office (2W Sink) Module

The specifications unique to this module are given in the following table.

Table 145. Voice 2W Office (2W Sink) Module Specifications

Item	Description
Comcode	407831734
Connectors	4 RJ11 connectors, 4 ports per module
Protocol	Foreign exchange voice service

Voice 2W Station (2W Source) Module

The specifications unique to this module are given in the following table.

Table 146. Voice 2W Station (2W Source) Module Specifications

Item	Description
Comcode	407831726
Connectors	8 RJ11 connectors, 8 ports per module
Protocol	PLAR service

13 Parts List

This section contains comcodes for all separately orderable components in the AC 60/120 systems. It contains a table for each of the following topics:

- *AC 60 Chassis*
- *AC 120 Chassis*
- *AC 60/120 Software*
- *AC 60/120 Modules*
- *AC 60/120 Cables*
- *AC 60/120 Accessories*

Table 147. AC 60 Chassis

Comcode	Item	Description
407831809	Chassis, enclosed 19 in., 110 V AC power supply installed	Height: 6 in. Width: 19 in. Depth: 10.5 in. I/O module slots: 4 Mounting: 2 angle brackets Cooling: single built-in fan Common equipment: nonredundant power supply, stratum, and CPU are built in
407895705	Chassis, enclosed 19 in., 220 V AC power supply installed	Height: 6 in. Width: 19 in. Depth: 10.5 in. I/O module slots: 4 Mounting: 2 angle brackets Cooling: single built-in fan Common equipment: nonredundant power supply, stratum, and CPU are built in

Table 148. AC 120 Chassis

Comcode	Item	Description
407831775	AC 120 System Unit (19 in., Rack-Mount Chassis)	Height: 7 in. Width: 19 in. Depth: 10.5 in. Common equipment slots: 4 I/O module slots: 12 Mounting: 2 angle brackets Cooling: convection
407831783	AC 120 System Unit (19 in., Desktop Chassis)	Chassis: same as 407831775 Cabinet: • Placement: hard surface • Cooling: dual fans, built in
407831791	AC 120 System Unit (23 in., Rack-Mount Chassis)	Height: 7 in. Width: 23 in. Depth: 10.5 in. Common equipment slots: 4 I/O module slots: 16 Mounting: 2 angle brackets Cooling: convection

Table 149. AC 60/120 Software

Comcode	Item	Description
407831817	System Software **Note:** 12 month advance replacement warranty applies.	• Software loaded on CPU Module • One copy required per system
407831825	SNMP Management Software **Note:** 12 month advance replacement warranty applies.	• SNMP-compliant MIB • Ability to manage via SNMP workstation • One copy required per system
407831858	Frame Relay Software **Note:** one copy per system	• Software loaded on Multiserial Module, Enhanced DS1 Module and Enhanced E1 Module • One copy required per system
407895721	Device Management Software **Note:** one copy per system	• Software includes SNMPc and AC Device Manager • One copy required per system

Table 150. AC 60/120 Modules

Comcode	Item	Description
407831676	DS1/T1—ATM Cell Bearing Module	Number of ports: 6 Protocol(s) supported: ATM Integral CSU Connector type: RJ45
407831684	DS1/T1—Circuit Emulation Module	Number of ports: 6 Protocol(s) supported: CES Channelized T1 Integral CSU Connector type: RJ45
407831692	DS3 Module	Number of ports: 2 Protocol(s) supported: ATM Connector type: 4 BNC (2 per port)
407842194	E1–ATM Cell Bearing Module	Number of ports: 4 Protocol(s) supported: ATM Connector type: RJ45
407842186	E1–Circuit Emulation Module	Number of ports: 4 Protocol(s) supported: CES Connector type: RJ45
407842178	E3 Module	Number of ports: 2 Protocol(s) supported: ATM Connector type: 4 BNC (2 per port)
407842202	Enhanced DS1 Module	Number of ports: 6 Protocol(s) supported: structured circuit emulation (nx64 Kbps), frame relay NNI Connector type: RJ45
407942838	Enhanced E1 Module	Number of ports: 6 Protocol(s) supported: frame relay UNI (FRF.1), frame relay NNI (FRF.2) Connector type: RJ45
407842160	Ethernet Module	Number of ports: 5 (physical ports on faceplate) Protocol(s) supported: RFC 1483 multi-protocol encapsulation, Layer 2 bridging service Connector type: RJ45
407831700	OC-3c Multi-Mode (MM) Module with adaptive queuing traffic management	Number of ports: 1 Protocol(s) supported: ATM Connector type: ST
407842210	OC-3c Multi-Mode (MM) Module with traffic shaping	Number of ports: 1 Protocol(s) supported: ATM Connector type: ST

Table 150. AC 60/120 Modules (continued)

Comcode	Item	Description
407842236	OC-3c Single Mode (SM) Module with traffic shaping	Number of ports: 1 Protocol(s) supported: ATM Connector type: SC
407842228	OC-3c Single Mode (SM) Module with adaptive queuing traffic management	Number of ports: 1 Protocol(s) supported: ATM Connector type: SC (2 per port)
407942812	STM-1 Single Mode (SM) Module with adaptive queuing traffic management	Number of ports: 1 Protocol(s) supported: ATM Connector type: SC (2 per port)
407942820	STM-1 Single Mode (SM) Module with traffic shaping	Number of ports: 1 Protocol(s) supported: ATM Connector type: SC (2 per port)
407831718	TAXI Module	Number of ports: 1 Protocol(s) supported: ATM Line rate: 100 Mbps or 140 Mbps Connector type: ST
407831726	Voice 2W Station (2W Source) Module	Number of ports: 8 2-wire connection for station end of circuit Connector type: RJ11
407831734	2W Office (2W Sink) Module	Number of ports: 4 2-wire connection for office (central office or PABX switch) end of circuit Connector type: RJ11
407831742	High Speed Module	Number of ports: 2 Port types: • 1 serial: EIA-422, V.35 • 1 parallel: ECL/CMOS Protocol(s) supported: ATM, limitless ATM network protocol Data rate: 50 Mbit/sec per port Connector types: • serial: micro-DB25 • parallel: micro-36-pin
407831759	Multiserial Module	Number of ports: 6 Protocol(s) supported: ATM, terminal emulation, CES, limitless ATM network protocol, HDLC, FR Serial port: EIA-232, EIA-442, EIA-449, EIA-530, V.35 Data format: synchronous, asynchronous Connector type: micro-DB15

Table 150. AC 60/120 Modules (continued)

Comcode	Item	Description
407831908	Power Supply Module, 110/220 V AC **Note:** AC 120 only	Input voltage: 110/220 V AC Input current (maximum): 5 A Input power (maximum): 300 W Voltage switch settings: 115 V (default) or 230 V, user selectable
407831924	Power Supply Module, -48 V DC **Note:** AC 120 only	Input voltage: -42.5 to 56 V DC Input current (maximum): 12 A Input power (maximum): 400 W
407831635	Stratum 3–4 Module **Note:** AC 120 only	Synchronization source: internal, external, or loop Accuracy: Stratum 3 or 4, user selectable External clock input: standard 8 kHz/64 kHz composite clock Connector: RJ11
407831668	CPU Module **Note:** AC 120 only	Disk drive: 127 MB RAM: 32 MB Connectors: • Ethernet port: RJ45 • Console (EIA-232 interface) port: RJ11
407842178	E3 I/O Module	Number of Ports: 2 Connector Type: 4 BNC (2 per port) Protocol(s) supported: ATM
407842202	Enhanced DS1 I/O Module	Number of Ports: 6 Channelized T1 Connector Type: RJ45 Integral CSU Protocol(s) supported: FR
407842160	Ethernet Module	Number of Ports: 5 Connector Type: RJ45 Protocol(s) supported: IP • 5 ports - 10 BaseT (4-I0M, I-10/100M) • 1 port - 100 BaseT
407842194	E1 ATM Cell-Bearing I/O Module	Number of Ports: 4 Connector Type: RJ45 Integral CSU Protocol(s) supported: ATM
407842186	E1 Circuit Emulation I/O Module	Number of Ports: 4 Channelized E1 Connector Type: RJ45 Integral CSU Protocol(s) supported: CES

Table 151. AC 60/120 Cables

Comcode	Item	Description
407890045	Cable, serial, 9 ft, for Multiserial Module	Connector: micro-DB15 (pin or male) to open-end cable **Note:** You attach a connector to the open end of the cable.
407890052	Cable, serial, 12 ft, for Multiserial Module	For EIA-530 interface (AC 120 as DTE device) Connectors: micro-DB15 (pin or male) to DB25 (pin or male)
407890078	Cable, serial, 12 ft, for Multiserial Module	For EIA-449 interface (AC 120 as DTE device) Connectors: micro-DB15 (pin or male) to DB37 (pin or male)
407847078	Cable, serial, 12 ft, for Multiserial Module	For V.35 interface (AC 120 as DTE device) Connectors: micro-DB15 (pin or male) to Winchester (pin or male)
407890086	Cable, serial, 12 ft, for Multiserial Module	For EIA-232 interface (AC 120 as DTE device) Connectors: micro-DB15 (pin or male) to DB25 (pin or male)
407890094	Cable, serial, 12 ft, for Multiserial Module	For EIA-530 interface (AC 120 as DCE device) Connectors: micro-DB15 (pin or male) to DB25 (socket or female)
407890102	Cable, serial, 12 ft, for Multiserial Module	For EIA-449 interface (AC 120 as DCE device) Connectors: micro-DB15 (pin or male) to DB37 (socket or female)
407847086	Cable, serial, 12 ft, for Multiserial Module	For V.35 interface (AC 120 as DCE device) Connectors: micro-DB15 (pin or male) to Winchester (socket or female)
407890060	Cable, serial, 12 ft, for Multiserial Module	For EIA-232 interface (AC 120 as DCE device) Connectors: micro-DB15 (pin or male) to DB25 (socket or female)
407847094	Cable, serial, 9 ft, for High Speed Module	For EIA-422, EIA-449, and EIA-530 interfaces Connector: micro-DB25 (pin or male) to open-end cable **Note:** You attach a connector to the open end of the cable.
407847102	Cable, parallel-Y, 9 ft, for High Speed Module	For interface with Direct Broadcast Satellite transmitters and receivers (two-way transmission) Connector: Micro-36-pin (pin or male) to open-end Y-cable **Note:** You attach a connector to the open end of the cable.
407847110	Cable, parallel, 9 ft, for High Speed Module	For interface with Direct Broadcast Satellite receivers and video "set-top" boxes (one-way transmission) Connector: Micro-36-pin (pin or male) to open-end cable **Note:** You attach a connector to the open end of the cable.
407852284	Mini DB25M to EIA-530M, 12 ft	For high-speed EIA-530 DTE cable Connector: DB25 Male to MDSM-25
407852292	Mini DB25F to EIA-530F, 12 ft	For high-speed EIA-530 DCE cable Connector: DB25 Female to MDSM-25

Table 151. AC 60/120 Cables (continued)

Comcode	Item	Description
407852300	Mini DB37F to RS-449F, 12 ft	For high-speed EIA-449 DCE cable Connector: DB37 Female to MDSM-25
407852276	Mini DB37 to RS-449M, 12 ft	For high-speed EIA-449 DTE cable Connector: DB37 Male to MDSM-25

Table 152. AC 60/120 Accessories

Comcode	Item	Description
407831874	Blank Faceplate—I/O and CPU Module slots	Covers empty I/O and CPU Module slots (slots 1–12)
407831882	Blank Faceplate—Stratum Module slots **Note:** AC 120 only	Covers empty Stratum 3–4 Module slot (slot 21 or 22)
407831890	Blank Faceplate—Power Supply Module slots **Note:** AC 120 only	Covers empty power supply module slot (slot 23 or 24)
407942804	19 in. Heat Shield	19 in. Heat Shield
407895713	23 in. Heat Shield	23 in. Heat Shield
407842244	Installation Kit	Includes: • User's Guide • Cable with DB9 connector to connect to VT100 interface terminal (such as Windows PC) • Blank faceplate—power supply module slot • 4 screws
407942929	CPU Memory Upgrade (32 meg.)	32 megabyte memory upgrade for CPU Module
407942937	I/O Memory Upgrade (32 meg.)	32 megabyte memory upgrade for I/O Module
108239401	AC 60/120 User Guide	CD-ROM version
108239419	AC 60/120 User Guide	Hard copy version

Acronyms

AAL	ATM adaptation layer
ATM	asynchronous transfer mode
BER	bit error rate; bit error ratio
BIP	bit interleaved parity
BITS	building integrated timing source
bps	bits per second
CAS	channel associated signaling
CBR	constant bit rate
CES	circuit emulation service
CPE	customer premises equipment
DEC	Digital Equipment Corporation
DLCI	data link connection identifier
DMA	direct memory access
DS0	digital signal level 0
DS1	digital signal level 1
DS3	digital signal level 3
FEC	forward error correction
FIFO	first in first out
Gb	gigabit (10^9 bits)
Gbps	gigabits per second
GMT	Greenwich Mean Time
Hz	hertz—unit of measure for cycles per second
IISP	interim interswitch protocol
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISP	Internet service provider
kb	kilobit [one thousand (10^3) bits]
kbps	kilobits per second
LAN	local area network

LOF	loss of frame
LOS	loss of signal
Mb	megabit [one million (10^6) bits]
Mbps	megabits per second
MIB	management information base
NCSA	National Center for Supercomputing Applications
NNI	network-node interface
NSAP	network service access point
OC-n	optical carrier level *n*
OS	operating system
OSI	Open Systems Interconnection
PLCP	Physical Layer Convergence Protocol
PVC	permanent virtual circuit
QoS	quality of service
RISC	reduced instruction-set computer
SAR	segmentation and reassembly
SCSI	small computer system interface
SMDS	Switched Multimegabit Data Service
SNMP	Simple Network Management Protocol
SSCS	Service-Specific Convergence Sublayer
SVC	switched virtual circuit
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	time division multiplexer
UBR	unspecified bit rate
UNI	user-network interface
UTC	universal time coordinate
UTP	unshielded twisted pair
VBR	variable bit rate
VBR-NRT	variable bit rate–non-real time
VBR-RT	variable bit rate–real time
VC	virtual channel

VCC	virtual channel connection
VCI	virtual channel identifier
VP	virtual path
VPC	virtual path connection
VPI	virtual path identifier
WAN	wide area network

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