Lucent Technologies
Bell Labs Innovations

ISDN DEFINITY® Extender
2100 Switch Module

System Administrator's Guide

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Issue 2.0
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Notice

Every effort was made to ensure that the information in this book was complete and accurate at the time of printing. However, information is subject to change.

Your Responsibility for Your System's Security

Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party, for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

You and your system manager are responsible for the security of your system, such as programming and configuring your equipment to prevent unauthorized use. The system manager is also responsible for reading all installation, instruction, and system administration documents provided with this product in order to fully understand the features that can introduce risk of toll fraud and the steps that can be taken to reduce that risk. Lucent Technologies does not warrant that this product is immune from or will prevent unauthorized use of common-carrier telecommunication services or facilities accessed through or connected to it. Lucent Technologies will not be responsible for any charges that result from such unauthorized use.

Lucent Technologies Fraud Intervention

If you *suspect that you are being victimized* by toll fraud and you need technical support or assistance, call the Lucent Technologies National Customer Care Center at 1 800 643-2353.

Federal Communications Commission Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. For further FCC information, see "Customer Support Information" below.

Industry Canada (IC) Interference Information

This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Le Présent Appareil Numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A préscrites dans le reglement sur le brouillage radioélectrique édicté par le ministère le ministère des Industrie Canada.

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For more information about Lucent Technologies documents, refer to the section entitled "Related Documents" in "About This Book"

Support Telephone Number

In the continental US, Lucent Technologies provides a toll-free customer helpline 24 hours a day. Call the Lucent Technologies Helpline at 1 800 242-2121 or your Lucent Technologies authorized dealer if you need assistance when installing programming, or using your system. Outside the continental US, contact your local Lucent Technologies representative.

Warranty

Lucent Technologies provides a limited warranty on this product. Refer to "Limited Warranty" in "Customer Support Information."

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The exclamation point in an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY INSTRUCTIONS

To reduce the risk of fire, electrical shock, and injury to persons when installing telephone equipment, always follow basic safety precautions, including:

- Read and understand all instructions.
- Follow all warnings and instructions marked on or packed with the product.
- Never install this unit or telephone wiring for it during a lightning storm.
- Never install a telephone jack in a wet location unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone wiring has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Use only Lucent Technologies-manufactured DEFINITY® Enterprise Communications Server (ECS) circuit packs, carrier assemblies, and power units in the DEFINITY ECS control unit.
- Use only Lucent Technologies-recommended/approved DEFINITY ECS accessories.

- Do not install this product near water, for example, in a wet basement location.
- Do not overload wall outlets, as this can result in the risk of fire or electrical shock.
- Do not attach the power supply cord to building surfaces. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Unplug the product from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not use cleaners or aerosol cleaners.
- Do not operate the system if chemical or gas leakage is suspected in the area. Use telephones located in some other safe area to report the trouble.

WARNING:

DO NOT open the ISDN Switch Module. There are no user-serviceable parts inside the unit. Only an authorized technician should open the unit for required maintenance or upgrading purposes.

SAVE THESE INSTRUCTIONS

Customer Support Information

Support Telephone Number

In the USA only, Lucent Technologies provides a toll-tree customer Helpline (1 800 242-2121) 24 hours a day. If you need assistance when installing, programming, or using your system, call the Helpline, or your Lucent Technologies authorized representative.

Outside the USA, if you need assistance when installing, programming, or using your system, contact your Lucent Technologies authorized representative.

Security of Your System: Preventing Toll Fraud

As a customer of new telephone equipment, you should be aware that there is an increasing problem of telephone toll fraud. Telephone toll fraud can occur in many forms, despite the numerous efforts of telephone companies and telephone equipment manufacturers to control it. Some individuals use electronic devices to prevent or falsify records of these calls. Others charge calls to someone else's number by illegally using lost or stolen calling cards, billing innocent parties, clipping on to someone else's line, or breaking into someone else's telephone equipment physically or electronically. In certain instances, unauthorized individuals make connections to the telephone network through the use of remote access features.

Common carriers are required by law to collect their tariffed charges. While these charges are fraudulent charges made by persons with criminal intent, applicable tariffs state that the customer of record is responsible for payment of all long-distance or other network charges. Lucent Technologies cannot be responsible for such charges and will not make any allowance or give any credit for charges that result from unauthorized access.

To minimize the risk of unauthorized access to your DEFINITY ECS:

- When possible, restrict the off-network capability of off-premises callers, using calling restrictions, Facility Restriction Levels, and Disallowed List capabilities.

- When possible, block out-of-hours calling through Time-of-Day Routing.

- Frequently monitor system call detail reports for quicker detection of any unauthorized or abnormal calling patterns.
- Limit Outcalling to persons on a need-to-have basis.

The DEFINITY ECS, through proper administration, can help you reduce the risk of unauthorized persons gaining access to the network. However, phone numbers and authorization codes can be compromised when overheard in a public location, lost through theft of a wallet or purse containing access information, or when treated carelessly (writing codes on a piece of paper and improperly discarding them).

Additionally, hackers may use a computer to dial an access code and then publish the information to other hackers. Substantial charges can accumulate quickly. It is your responsibility to take appropriate steps to implement the features properly, to evaluate and administer the various restriction levels, and to protect and carefully distribute access codes.

Under applicable tariffs, you will be responsible for payment of toll charges. Lucent Technologies cannot be responsible for such charges and will not make any allowance or give any credit resulting from unauthorized access.

Lucent Technologies Fraud Intervention

If you *suspect you are being victimized* by toll fraud and you need technical support or assistance, call Lucent Technologies at **1 800 642-2353**.

Limited Warranty

Lucent Technologies Inc. warrants this equipment to be free of defects in materials and workmanship for a period of one year from date of shipment. All defects within this time will be repaired without charge upon notification of Lucent Technologies or its authorized reseller.

This warranty is null and void if the manufacturer determines that any modifications have been made to the unit or the unit has been subjected to physical or electrical stress.

This warranty covers parts and labor only and does not include shipping costs, travel expenses, or travel time.

Installation of the equipment is the sole responsibility of the purchaser. The manufacturer, its agents, or its distributors accept no responsibility for malfunction or damage caused by improper treatment or connection of the unit.

The manufacturer, its agents, or its distributors are not liable for any losses incurred through use or malfunction of the equipment or any losses or damages incurred by the use of the equipment in any means whatsoever.

This warranty is limited to the repair of the equipment to its normal functioning capability.

This warranty is complete as stated and all other warranties, expressed or implied, are invalid.

The ISDN DEFINITY Extender System should be installed only by qualified personnel. No user-serviceable parts are contained within the units. Installation or programming should not begin prior to review of all sections of this manual.

FCC Notification and Repair Information

This equipment is registered with the FCC in accordance with Part 68 of its rules. In compliance with those rules, you are advised of the following:

- **Means of Connection.** Connection of this equipment to the telephone network shall be through a an approved terminal adapter. The ISDN-BRI circuit shall be provided via an RJ-45 jack for connection to the terminal adapter. These USOCs must be ordered from your telephone company.
- **Party Lines and Coin Telephones.** This equipment cannot be used with party lines or coin telephone lines.
- **Notification to the Telephone Companies.** Before connecting the terminal adapters, you or your equipment supplier must notify your local telephone company's business office of the following:
  - The telephone number(s) you will be using with this equipment.
  - The appropriate registration number and ringer equivalence number (REN), which can be found on the back or bottom of the unit.
  - For each jack, the sequence in which lines are to be connected, the line types, the Facility Interface Code (FIC), and the Ringer Equivalence Number (REN) by position when applicable.

- **Ringer Equivalence Number (REN).** The REN is used to determine the number of devices that can be connected to the telephone line. Excessive RENs on the line can result in the devices not ringing in response to an incoming call. In most, but not all, areas the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that can be connected to the line, as determined by the total RENs, contact the local telephone company to determine the maximum REN for the calling area.
- **Disconnection.** You must also notify your local telephone company if and when this equipment is permanently disconnected from the line(s).

Installation and Operational Procedures

This manual contains information about installation and operational procedures.

- **Repair Instructions.** If you experience trouble because your equipment is malfunctioning, the FCC requires that the equipment not be used and that it be disconnected from the network until the problem has been corrected. Repairs to this equipment can be made only by the manufacturers, their authorized agents, or others who may be authorized by the FCC. In the event repairs are needed on this equipment, contact your authorized Lucent Technologies dealer or Lucent Technologies. With**in the United States** contact Lucent Technologies at 1 800 242-2121.

- **Rights of the Local Telephone Company.** If this equipment causes harm to the telephone network, the local telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will also be informed of your right to file a complaint with the FCC.
- **Changes at Local Telephone Company.** Your local telephone company may make changes in its facilities, equipment, operations, or procedures that affect the proper functioning of this equipment. If they do, you should be notified in advance to give you an opportunity to maintain uninterrupted telephone service.
- **New Network Area and Exchange Codes.** The DEFINITY ECS software does not restrict access to any new area codes or exchange codes established by a local telephone company. If the user has established toll restrictions on the system that could restrict access, then the user should check the lists of allowed and disallowed dial codes and modify them as needed.
- **Equal Access Codes.** This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modifications of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

Federal Communications Commission (FCC) Electromagnetic Interference Information

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

About This Book

Intended Audience

This book is intended to help in the installation, system administration, and maintenance of the ISDN (Integrated Services Digital Network) DEFINITY Extender 2100 Switch Module. It is intended for use as a reference by anyone needing such information, including system managers, support personnel, sales representatives, and account executives. It is also intended for technicians who are responsible for system installation, maintenance, and troubleshooting.

Terms and Conventions

The ISDN DEFINITY Extender 2101 Remote Module is henceforth referred to as the “ISDN Remote Module” or just “Remote Module.”

The ISDN DEFINITY Extender 2100 Switch Module is henceforth referred to as the “ISDN Switch Module” or simply the “Switch Module.”

Throughout this document, toll fraud security hazards are indicated by an exclamation point inside a triangle and the words Security Alert.

Security Alert:

Security Alert indicates the presence of toll fraud security hazard. Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party (e.g., persons other than your company’s employees, agents, subcontractors, or persons working on your company’s behalf). Be sure to read “Your Responsibility for Your System’s Security” on the inside front cover of this book and “Security of Your System: Preventing Toll Fraud” in About This Book.

Typographical Conventions

Certain type fonts and styles act as visual cues to help you rapidly understand the information presented:

Purpose	Example
Italics indicate emphasis.	Do *not* recycle old passwords.
Italics also tell you instructions about what to do next in a procedure.	If you do not want to disconnect, *go to Step 3.*
Italics also indicate a response the system makes to your input.	*The following screen appears.*
Italics indicate text that appears on the telephone display.	*2:OK 3:Next*
The names of fixed-feature, factory-imprinted buttons on a telephone appear in bold.	Press the **DROP** button four times.
The names of keys on the computer keyboard also appear in bold.	Select the desired value, and press **ENTER**.
A bolded number is used to designate a button on your telephone dial pad.	At the *Go Online* screen, press **3** until the following screen appears.

How to Use This Book

This book is organized into chapters that give information on procedures necessary for the proper installation and administration of your ISDN Switch Module.

Problems with Definity Extender should first be referred to the system administrator. If the problem cannot be solved by the system administrator, contact Lucent Technologies or your local Lucent authorized dealer. Within the continental USA call Lucent Technologies at 1 800 242-2121.

Product Safety Labels

Throughout this document, hazardous situations are indicated by an exclamation point inside a triangle and the word *Caution* or *Warning*.

WARNING:

Warning indicates the presence of a hazard that could cause death or severe personal injury if the hazard is not avoided.

CAUTION:

Caution indicates the presence of a hazard that could cause minor personal injury or property damage if the hazard is not avoided.

Related Documents

You may need copies of Definity ECS documentation, especially information on voice terminal installation and use. Documentation is available at URL https://www.lucent.com or can be ordered from the Lucent Technologies Publications Center.

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Introduction

1

An overview of the functioning and specifications of the ISDN DEFINITY® Extender Switch Module

The ISDN (Integrated Services Digital Network) DEFINITY® Extender system enables DEFINITY Enterprise Communications Server (ECS) telephone users to use their DEFINITY digital telephone at a remote location. The ISDN Extender is transparent to the user and provides access to the features and functions of the DEFINITY ECS. In addition, an RS-232 data port is included, allowing the user to connect off-premise RS-232 equipment to data equipment at the DEFINITY ECS location using a dial-up PPP connection.

The ISDN DEFINITY Extender uses an ISDN-BRI line (Basic Rate Interface) to establish the connections between the DEFINITY ECS central site and the remote location. By using ISDN-BRI circuits, the user at the remote location can effectively use the Call On Demand (COD) mode. This mode automatically drops the ISDN network connection to the DEFINITY ECS system on the first B-channel after a specified time period if there is no call activity on the display telephone. When there is a request for a connection, COD mode automatically reconnects the remote location to the DEFINITY ECS. COD mode may provides a way to help reduce ISDN network usage and/or toll charges.

Included with the ISDN Switch and Remote Modules is a built-in terminal adapter for use with BRI lines. Connecting the modules to a BRI line is as simple as plugging a cable into a jack.

Only the ISDN Remote Module has a analog port on the back. You can connect a fax machine, an analog modem, or an analog telephone to this port. Sending or receiving faxes does not affect COD mode. The ISDN Switch Module does not have the Analog Device port on the back.

System Operation and Configuration

The ISDN DEFINITY Extender system is designed for use with a DEFINITY ECS of Release 3, Version 3 or later. The ISDN Extender system consists of two modules. One module, identified as the ISDN Switch Module, connects to your DEFINITY ECS. The other module, identified as the ISDN Remote Module, connects to your DEFINITY ECS telephone at your off-premise site. Figure 1-1 shows the Extender system configuration.

NOTE:
The backplane of your Switch module may be slightly different than that shown in Figure 1-1.

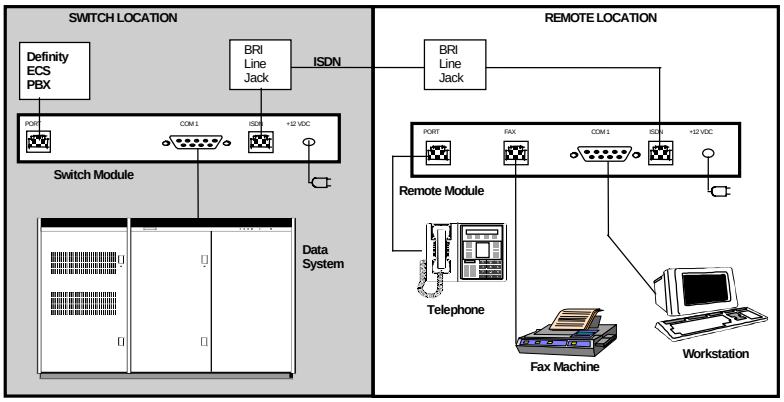

Figure 1-1. System Configuration

The ISDN Definity Extender uses an ISDN BRI line to connect the modules. Digital voice transmits over one of the B-channels, providing a 64-Kbps digital link between the modules. This allows you to extend your DEFINITY ECS telephone to virtually unlimited distances. See “Specifications” later in this chapter for detailed circuit specifications.

With the second B-channel, you can also transmit data via the built-in RS-232 port. This allows you to connect to the office local area network (LAN) via a router or server with an RS-232 interface.

With the use of Lucent Technologies’ ISDN DEFINITY Extender system, the features and capabilities of your central site digital telephone are extended to your off-premise location.

NOTE:
Voice quality and data speed depend on the quality of the local telephone company’s ISDN lines, the trunks between central offices, and the long-distance carrier facilities used to establish the connection between the ISDN Remote Module and the ISDN Switch Module. However, since the connecting facilities are digital, call set-up time is reduced and voice quality should be improved over the analog DEFINITY Extender system.

Security Alert:

Using the ISDN Remote Module provides access to the features of the DEFINITY ECS, including access to WATS lines, FX lines, etc., which are subject to toll fraud. Guard passwords carefully!

Equipment List

The ISDN Switch Module comes with most of the equipment necessary to set up the unit. However, some additional items are required. The additional required items are listed under “Customer-Supplied Equipment” following this section.

Your ISDN Switch Module package should include:

- ❑ One ISDN Switch Module (identified on the top of the unit)
- ❑ One AC adapter
- ❑ One 7-ft. D8W cord to connect to the DEFINITY ECS digital port
- ❑ One telephone cable with RJ-45 to RJ-11 connectors
- ❑ One *ISDN DEFINITY® Extender 2100 Switch Module System Administrator's Guide*

Save your packing materials. Even though the ISDN Switch Module is a reliable product, it may be necessary to return it for maintenance. When returning the module, use the original package.

NOTE:
The ISDN Remote Module is ordered and shipped separately. A DEFINITY ECS telephone and its associated telephone cord are not supplied with the ISDN Remote Module and must be ordered separately. Contact your system administrator or Lucent Technologies representative for information.

Customer-Supplied Equipment

You must supply the following for the installation:

- ❑ DEFINITY ECS two-wire, 16-port TN-2181 circuit pack or DEFINITY ECS two-wire, 24-port TN-2224 circuit pack
- ❑ Any additional DEFINITY ECS circuit packs needed (see the *DEFINITY® Communications System Generic 3, Installation for Single-Carrier Cabinets* manual, document #555-230-894, comcode #107595423, for further information).
- ❑ Power and central office line suppressers are highly recommended. For current products available through Lucent Technologies search for 'surge protector' at URL http://www.lucentdirect.com/direct/owa/search_frame_h. Or contact your Lucent Technologies representative to order.
- ❑ An RS-232 serial cable with a male DB9 cable end to connect the data equipment to the RS-232 port on the ISDN Switch Module (refer to the documentation provided with your data equipment for requirements)
- ❑ To program the ISDN Switch Module, you will need a PC with a terminal emulation software package such as ProCOMM® or the Windows® Hyperterminal.
- ❑ If you intend to use the second B-channel for data communications, you must supply all required cables and software.

Compatibility

The DEFINITY Extender is compatible with the following commercial two-wire DEFINITY ECS display telephones.

- 6408D + (This display telephone is certified for residential use.)
- 6416D+ (This display telephone is certified for residential use.)
- 6424D+ (This display telephone is certified for residential use.)
- 8410D
- 8410DR (This display telephone is certified for residential use.)
- 8434D (Requires a separate power supply.)

  NOTE:

  The power supply that comes with the ISDN Remote Module cannot produce the power required by the 8434D telephone. An MSP-1 (WP924644) power supply must be used. Check with your MCK Communications representative for ordering information.
- 603 E Callmaster III®
- 603F1 Callmaster IV®
- Callmaster VI® (This PC-based product is certified for residential use.)
- 9031DCP (not recommended for administrative purposes)

NOTE:
For residential installations, FCC regulations prohibit use of telephones not certified for residential use.

Options

You can order a wall-mounted metal bracket (PEC 2174-MTG[A]) with a slide-in style sleeve for use with the ISDN Switch Module. Contact your Lucent Technologies representative for ordering information.

Specifications

The ISDN DEFINITY Extender system should operate properly with any ISDN-BRI (Integrated Services Digital Network-Basic Rate Interface) telephone service (2 B-channels plus a D-channel). However, National ISDN-1 service is recommended.

NOTE:
You are responsible for ensuring that the ISDN-BRI service you order is compatible with the internal terminal adapter in the Switch Module.

See Appendix A for a worksheet with complete ordering information.

Table 1-1 shows the specifications of the ISDN Switch Module.

NOTE:
Specifications are subject to change without notice as technological or manufacturing changes warrant.

Table 1-1. ISDN Switch Module Specifications

Specification	Description
Size	8.0" x 8.0" x 1.50" (205 mm x 205 mm x 40 mm)
Weight	1.5 pounds (0.68 kilograms)
Power Requirements	USA and Canada: 12-Vdc supplied by 120-Vac adapters, 800 mA maximum
User Data Port	
Data Type	RS-232
Data Rate Setting	115.2 Kbps, 57.6 Kbps, 38.4 Kbps, 19.2 Kbps, 9.6 Kbps, 4.8 Kbps, 2.4 Kbps
Data Bits	7 or 8

Continued on the next page

Table 1-1. ISDN Switch Module Specifications—*Continued*

Specification	Description
Stop Bits	1 or 2
Parity	Even, odd, none
Operating Specifications	
Environment	Indoors
Temperature	32 to 131 degrees Fahrenheit (0 to 55 degrees Centigrade)
Relative Humidity	5% to 95% non-condensing
Approvals	UL, CSA, FCC Class B (ISDN Remote Module), FCC Class A (ISDN Switch Module)

Considerations

Keep the following in mind when you use the ISDN DEFINITY Extender system:

- The ISDN DEFINITY Extender system is to be used with a DEFINITY ECS of Release 3, Version 3 or later.
- No custom calling features, such as Call Waiting or Call Forwarding, should be ordered from the local telephone company on the line to which you connect the ISDN Remote Module.
- Use of the speakerphone on the DEFINITY telephone connected to the ISDN Remote Module may degrade voice quality.
- Sessions can be established only from the ISDN Remote Module.
- Only one ISDN Remote Module at a time can be "on-line" with the ISDN Switch Module.
- Order a separate ISDN-BRI central office (CO) line for each Switch Module. Sharing lines or bridging the line on another Switch Module causes problems. For example, having two Switch Modules on the same ISDN circuit will prevent both from synchronizing to the CO.
- Be sure that the DEFINITY ECS port to which the ISDN Switch Module is connected is programmed correctly for the telephone being used.
- When an ISDN Remote Module user is operating in Call On Demand mode, the message-waiting LED on the display telephone will be updated if a message is received before the user makes or receives another call.

- Authorized connections require that a password 8 to 10 digits in length be established. Always use the full 10 digits.

CAUTION:

If a user dials 911 on the display telephone while the ISDN Remote Module is connected to the central site, the user will reach the 911 office that serves the location of the central site and not the 911 office for the location of the ISDN Remote Module. To ensure that the user reaches the correct 911 service for the local area, the remote user should use a telephone connected locally to make emergency calls.

Security Alert:

Using the ISDN Remote Module gains access to the features of the DEFINITY ECS, including access to WATS lines, FX lines, etc., which are subject to toll fraud. Passwords should be as long as allowed. Passwords should be hard to guess and therefore should not contain:

- *all the same numbers (for example, 88888888)*
- *sequential characters (for example, 987654321)*
- *character strings associated with you or with the remote user or with your business. These include:*
  - *Names*
  - *Birthdays*
  - *Business name*
  - *Telephone number*
  - *Social security number*
- *Words and commonly used names*

Passwords should be changed regularly, at least on a quarterly basis. Do not recycle old passwords.

Installation

2

How to install the ISDN Switch Module

Installing the ISDN Switch Module involves choosing a proper location, connecting the ISDN Switch Module to the BRI line jack, connecting the ISDN Switch Module to the designated port on the DEFINITY ECS system, and optionally, to the data equipment.

Location Requirements

To ensure successful operation of the ISDN DEFINITY Extender system, the installation area should:

- be well ventilated and free of dust.
- have an ambient temperature of 32°F to 131°F (0°C to 55°C).
- have humidity levels between 5% and 95% non-condensing.
- be free of any large electrical equipment such as copiers or motors that generate electromagnetic, radio frequency, and electrostatic interference.

Place the ISDN Switch Module within 500 feet (150 meters) of the DEFINITY ECS. The ISDN Switch Module may be mounted in any position or may be wall-mounted by using the optional wall-mount bracket. Install the module's power supply and cabling away from high-power/high-RF noise devices such as computers, fans, fluorescent ballasts, and power supplies.

NOTE:
The ISDN-BRI circuits should be ordered by the customer and installed by the local telephone company prior to installation of the ISDN Extender system. Refer to Appendix A of this guide for information on ISDN-BRI circuits.

Electrical Requirements

Use only the AC adapter provided with the ISDN Switch Module. The ISDN Switch Module has been designed to operate from nominal 120-Vac, 60-Hz commercial power in 120-volt countries, including the USA and Canada.

CAUTION:

Do not apply power to the ISDN Switch Module until specifically instructed in the installation procedures.

NOTE:
Lucent Technologies strongly recommends that you supply both power and central office line surge protection for the DEFINITY ECS location and the remote location. For current products available through Lucent Technologies search for 'surge protector' at URL http://www.lucentdirect.com/direct/owa/search_frame_h. Or contact your Lucent Technologies representative to orde.

Wiring Requirements

Use twisted-pair cable for all connections.

Connecting the ISDN Switch Module

Connections for the ISDN Switch Module are shown in Figure 2.1 below. The back panel elements are:

- PHONE/SWITCH is the connection between the ISDN Switch Module and the DEFINITY ECS digital circuit pack. The circuit packs to which the ISDN Switch Module can be connected are the 16-port TN2181 and the 24-port TN2224.
- RS-232 provides for simultaneous RS-232 communication between equipment at the off-premise site and equipment at the central site.
- ISDN is the connection between the Switch Module and the BRI line.
- +12VDC is the connection for the A/C adapter.

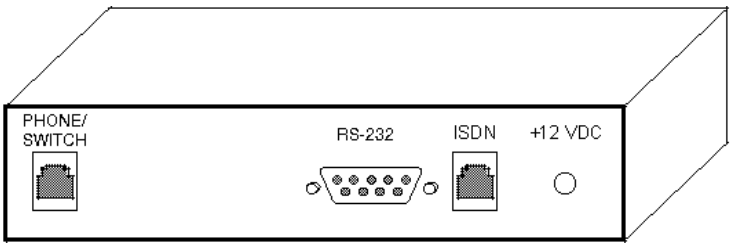

Figure 2-1. ISDN Switch Module Back Panel

CAUTION:

*Use **extreme** caution to be sure that you are matching the correct cord/cable to the correct port on the back of the ISDN Switch Module. Incorrect matching of the cord/cable with the port will result in irreversible damage to the module that is not covered under the warranty or maintenance agreement.*

In addition to the back panel connections, a three-color light-emitting diode (LED) is visible through the top of each unit and provides information about the status of the equipment.

Installation Procedure

Installing the ISDN Switch Module involves connecting the Switch module to the BRI line jack and to the DEFINITY ECS, and connecting the power cord. To program the ISDN Switch Module, you must connect a PC or other data terminal running emulation software (such as ProCOMM or the Windows Hyperterminal) to the RS-232 port of the ISDN Switch Module by using a customer-provided RS-232 cable. You will need the applicable wiring to connect the ISDN Switch Module to the DEFINITY ECS and to your router or server. See the *DEFINITY® Communications System Generic 3, Installation for Single-Carrier Cabinets* manual, document #555-230-894, comcode #107595423, for complete installation requirements.

Before installing the ISDN Switch Module, administer the digital port that uses the ISDN Switch Module according to the instructions in *DEFINITY® Communications System Generic 3 Implementation Guide, Issue 2,* document #555-230-655.

CAUTION:

Connecting the ISDN Remote Module to the DEFINITY ECS can result in damage to the module. Prior to installation, check that you have the ISDN Switch Module by looking at the name on the top of the unit.

To install the ISDN Switch Module:

CAUTION:

Do not plug the A/C adapters into the electrical outlets until instructed to do so in the following procedure.

CAUTION:

*In the following procedure, use **extreme** caution to be sure that you are matching the correct cord/cable to the correct port on the back of the ISDN Switch Module. Incorrect matching of the cord/cable with the port will result in irreversible damage to the module that is not covered under the warranty or maintenance agreement.*

1. Using the D8W cord (or customer-supplied longer cord), connect the ISDN Switch Module PORT jack to the 2-wire, 16-port TN2181 or 24-Port TN2224 digital circuit pack on the DEFINITY ECS. See the *DEFINITY® Communications System Generic 3, Installation for Single-Carrier Cabinets* manual for complete instructions.

2. Connect one end of the supplied telephone cable with the RJ-45 connector to the ISDN BRI line jack and the other end to the port labeled “ISDN” on the back of the Switch Module.

3. Plug the barrel connector of the AC adapter provided with your module into the +12 VDC port on the ISDN Switch Module.

4. Plug the adapter into a standard electrical outlet.

5. The Switch Module begins self-diagnostics. The LED at the top left of the module flashes a pattern of yellow, red, and green blinks. When the Switch Module completes self-diagnostics, the LED flashes three green blinks if the module has been correctly configured. If there is a problem in configuring the module, the LED flashes a combination of red blinks after power-up. (See "LED Sequences" in Chapter 5, *Troubleshooting*.)

CAUTION:

Do not plug a 120-volt A/C adapter into a 240-Vac outlet because you will damage the adapter and the module.

6. Administer the station ports by using the procedures in the *DEFINITY® Communications System Generic 3 Implementation Guide, Issue 2,* document #555-230-655.

7. Administer the digital station port as you would any other on-premise station.

Connections for Data Transmission

By using the RS-232 port on the ISDN Switch Module, you can establish a dial-up connection between the off-premise site and the central site. Typically this involves a personal computer at the off-premise site communicating with a server at the central site.

NOTE:
If the Remote Module users are going to be dialing directly into a data router, no connections to the Switch Module are required. However, consult your Information Services Department about setting up a Dial-Up Network connection.

NOTE:
To program the ISDN Switch Module, you must connect a PC running a terminal emulation software package to the ISDN Switch Module. The PC must have its communications parameters set to 57,600 bps, no parity, 8 data bits and 1 stop bit. Terminal emulation must be set to VT100.

To connect the PC at the central site to the RS-232 port of the ISDN Remote Module, you need a cable with a male 9-pin RS-232 cable connection on one end for the ISDN Switch Module. The other cable end must match the user's data application requirements (see Figure 2-2 for pinout information).

To connect a PC to the Switch Module:

1. Connect the 9-pin male end of the DB9 cable to the RS-232 port of the Switch Module (see Figure 2-2 for pinout information).

2. Connect the other end of the cable to your PC. Different terminal types require different cable end types. Refer to the user documentation packaged with your PC for requirements.

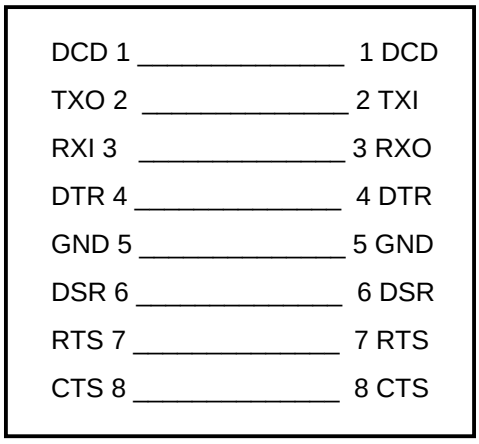

Figure 2-2. RS-232 Cable Pin Connections

NOTE:
A Dial-Up Networking connection on the remote PC can be configured to connect to an Internet service provider. Contact your Information Services Department for this connection.

Programming

3

How the system administrator programs the passwords and operating parameters into the ISDN Switch Module

You must program your ISDN Switch Module by using a PC connected to the ISDN Switch Module via the RS-232 port and by running a terminal emulation program such as ProCOMM or the Windows Hyperterminal option.

NOTE:
Remote users should use the telephone connected to the Remote Module only for programming the ISDN Remote Module. Refer to the *ISDN DEFINITY Extender 2101 Remote Module User's Guide* for instructions on using the telephone to program remote options.

Programming the ISDN Switch Module

The system administrator must program the following for the ISDN Switch Module:

- ISDN parameters
- COM 1 port parameters (data rate, parity and stop bits)
- Passwords for ISDN Remote Modules that will dial into the ISDN Switch Module (If you permit, passwords can also be changed from the ISDN Remote Module.)

Use a PC running terminal emulation software ProComm or the Windows Hyperterminal to assign passwords and to program the operating parameters at the DEFINITY ECS location. It is recommended that the PC have its communications parameters set to the following:

- 57,600 bps
- No parity
- 8 bits
- 1 stop bit

Terminal emulation must be set to VT100.

ETI And TTI Menus

The Enhanced Terminal Interface (ETI) or the Text Terminal Interface (TTI) menu system provides you with a user-friendly interface with which to configure your system when accessing the ISDN Switch Module through the serial port.

The ETI menu is the default menu that appears after powering up your module and operates using VT100 terminal emulation. If your PC doesn't have VT100 terminal emulation, you need to use the TTI menu, which is accessed after the ETI menu displays. The ETI menu will be unrecognizable, but you still access the TTI menu from this point.

The ETI menu provides you with a window after power-up, along with a terminal edit line.

To access the configuration:

When you power up the ISDN Switch Module, the Switch Module runs self-diagnostic testing accompanied by LED flashes (see "LED Sequences" in Chapter 5, *Troubleshooting*). Then the three-color LED flashes in the following sequence:

a) seconds of very fast red blinks

b) green flashes and one red flash

c) sets of 8 yellow flashes

1. During or after the three sets of yellow flashes, type "AT@MENU"

2. Press **ENTER**.

The ETI menu appears on the screen.

NOTE:
Whether or not your PC has VT100 emulation, the ETI menu appears first. However, if your PC does not have VT100 emulation, the menu will be unrecognizable. Press *Ctrl T* to access the TTI menu. Press *Ctrl T* again to return to ETI menu. Press *Ctrl R* to refresh your display in either mode.

Saving ISDN Changes

To change ISDN parameters:

1. Select *Exit* from the Main Menu

The terminal prompts you to *Save ISDN Changes?*

Do one of the following:

1. Type **Y** to save the changes.
2. Type **N** to discard the changes.

NOTE:
Pressing **ENTER** to accept changes on each screen does not save the changes made during a session. You must type **Y** when exiting to save your changes.

Setting the ISDN Parameters

To ensure that the Switch Module communicates properly with the ISDN network, you must set the ISDN parameters. These parameters are:

- ISDN network switch type
- Two Service Profile Identifier (SPID) numbers
- Two Directory Numbers (DNs)
- Terminal Endpoint Identifier (TEI)

Setting the ISDN Network Switch Type

Setting the switch type informs the ISDN network what type of central office (CO) switch is being used.

To set the ISDN network switch type:

1. Select **1** for *Configure ISDN* from the Main Menu on the terminal emulation program to reach the ISDN Parameter Menu.

2. Press **1** for *Set Switch Type* from the Configure ISDN Menu.

The screen shows the choices for the communications system type.

3. Press the appropriate number to select the desired communications system type.

The Configure ISDN Menu will appear automatically.

To save the ISDN parameter changes:

1. Exit the Configure ISDN Menu.

2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

Setting the SPID Numbers

A Service Profile Identifier (SPID) number is a unique identifier that associates a Basic Rate Interface (BRI) line with a particular User Service Order Profile (USOP). The USOP contains the information needed by the central office to provide BRI service to the line. A unique SPID number is assigned for each of the 2 B channels associated with your ISDN line.

The SPID can be up to 15 digits long and usually contains the digits of the Directory Number (DN) to which it is linked.

Example: 61755512110101

In this example, “617” is the area code; “5551211” is the regular 7-digit dial number; and “0101” is the network ID code. The network ID code can consist of 2 or 4-digits and is usually a combination of 0’s and 1’s. ***Please ensure that you get this information from your network provider.***

Setting the First SPID

SPID1 is for the first B-channel, which connects your digital telephone to the DEFINITY ECS system.

To set the SPID1:

1. Select **1** for *Configure ISDN* from the Main Menu to view the ISDN Parameter Menu.

2. Select **2** for *Set SPID1* from the Configure ISDN Menu.

If a previous SPID1 number was stored, the display shows that number. If no SPID1 number was stored, the display is blank.

3. Enter the first SPID for the Switch Module, up to a maximum of 15 digits.

4. Press **ENTER** to accept the change.

You automatically return to the Configure ISDN Menu

To save the SPID1:

1. Exit the Configure ISDN Menu.

2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

Setting the Second SPID

The second SPID is for the B-channel that handles the data.

To set the SPID2:

1. Select **1** for *Configure ISDN* from the Main Menu to view the ISDN Parameter Menu.

2. Select **3** for *Set SPID2* from the Configure ISDN Menu.

If a previous SPID2 number was stored, the display shows that number. If no SPID2 number was stored, the display is blank.

3. Enter the second SPID for the Switch Module, up to a maximum of 15 digits.

4. Press **ENTER** to accept the change.

You automatically return to the Configure ISDN Menu.

To save the SPID2 changes:

1. Exit the Configure ISDN Menu.

2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

Setting the Directory Numbers

Your network provider must provide you with two Directory Numbers. Directory Number 1 (or DN1) is associated with SPID1; Directory Number 2 (DN2) is associated with SPID2 of your ISDN-BRI service.

The DN is usually seven to ten digits long and includes an area code if required to reach the Remote Module.

Example: 6175551211

In this example, “617” is the area code, “5551211” is the regular 7-digit dial number. ***Please ensure that you get this information from your network provider.***

To set the first Directory Number:

1. Select **1** for *Configure ISDN* from the Main Menu to view the ISDN Parameter Menu.

2. Select **4** for *Set DN1* from the Configure ISDN Menu.

If a previous DS1 number was stored, the display shows that number. If no DN1 number was stored, the display is blank.

3. Enter the first DN for the Switch Module, up to 15 digits in length.

4. Press **ENTER** to accept the changes.

You automatically return to the Configure ISDN Menu .

To save the DN1:

1. Exit the Configure ISDN Menu.

2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

To set the second Directory Number:

1. Select **1** for *Configure ISDN* from the Main Menu to reach the ISDN Parameter Menu.

2. Select **5** for *Set DN2* from the Configure ISDN Menu.

If a previous DN2 number was stored, the display shows that number. If no DN2 number was stored, the display is blank.

3. Enter the second DN for the Switch Module, up to 15 digits in length.

4. Press **ENTER** to accept the change.

You automatically return to the Configure ISDN Menu .

To save the DN2 changes:

1. Exit the Configure ISDN Menu.

2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

Setting the TEI

The Terminal Endpoint Identifier (TEI) tells the Central Office which communication device is communicating with it. How you set the TEI may depend on the ISDN switch type.

If you are an NI-1 user, or if your telephone company has not provided you with TEI parameters, leave the TEI setting on “AUTO”. If your telephone company has given you custom parameters, select “FIXED” as the TEI type.

NOTE:
If you change the TEI setting, you must power down and then power up your module to properly use the equipment.

To select *AUTO* as the TEI setting:

1. If the screen shows *FIXED* press **6** to display *AUTO*.

2. The screen will show *AUTO*.

To select *FIXED* as the TEI setting:

NOTE:
If you want to use a Fixed TEI setting, you must first power down and then power up the Switch Module to use the settings.

1. If the screen shows *AUTO*, press **6** to display *FIXED*.

2. Select **7** for *Set TEI1* from the Configure ISDN Menu.

3. Enter the first TEI number for the Switch Module (0–63).

4. Press **Enter** to save the number.

5. Select **8** for *Set TEI2* from the Configure ISDN Menu.

6. Enter the second TEI number for the Switch Module (0–63).

7. Press **ENTER** to save the number.

You automatically return to the Configure ISDN Menu.

To save TEI settings changes:

1. Exit from the Configure ISDN Menu.
2. Type **Y** to save your changes.

OR

3. Type **N** to discard your changes.

Setting the COM Port Parameters

You must set the following parameters for the COM port according to the requirements for your data application:

- Data Rate. This is the rate at which data will be transmitted to and from your central site terminal device, usually a router or server. The available rates are: 2.4 Kbps, 4.8 Kbps, 9.6 Kbps, 19.2 Kbps, 38.4 Kbps, 57.6 Kbps and 115.2 Kbps. The default rate of 57.6 Kbps is recommended.
- Data Bits. The number of bits for characters sent to the COM port required for proper communications with the remote location. The choices are 7 or 8. The default is 8
- Parity. The choices are Even, Odd, or None. The default is None.
- Stop Bits. The choices are 1 or 2. The default is 1.

NOTE:
Defaults for these settings should be acceptable in many environments. Check with your network administrator for the settings you will need.

Set the COM Port parameters at the same time.

To set the COM Port parameters:

1. If you are already in the Extender Programming Menu, skip to Step 2. If you are not in the Extender programming menu, ensure your COM port settings are set to 57,600 bps and type **AT@MENU** to access the Programming Menu from your PC.

2. Type **AT@MENU** to access the Main Menu

3. Select *Configure System* from the Main Menu.

4. Select *COM* from the Configure System Menu.

The Data Rate menu appears.

To set the Data Rate:

1. Highlight the data rate you want.

   Data rate options are: 2.4, 4.8, 9.6, 19.2, 38.4 57.6 Kbps and 115 Kbps. The default rate of 57.6 Kbps.

   NOTE:
   Selecting a data rate slower than 57.6 Kbps may cause some connection problems.

2. Press **ENTER**

When you make your selection, the Parity menu appears.

To set the Parity:

1. Highlight the parity you want.

Your choices are None, Even or Odd. The default is None.

2. Press **ENTER**.

When you make your selection, the Data Bits menu appears.

To set the Data Bits:

1. Highlight the Data Bits you want.

Your two options are 8 or 7 data bits. The default is 8 data bits.

2. Select the number of the Data Bits you want.

3. Press **ENTER**.

When you make your selection, the Stop Bits menu appears.

To set the Stop Bits:

1. Highlight the Stop Bit format you want.

Your options are 1 or 2 stop bits. The default is 1 stop bit.

2. Press **ENTER**.

You automatically return to the Configure System Menu.

If you connect the Switch Module to a Remote Access Server (RAS), you must supply an RS-232 cable to connect the RS-232 port on the Switch Module to an RS-232 COM port on the RAS.

If you dial directly into a Data Router at the central site, no connections are required for the RS-232 connector on the Switch module. Your network administrator should ensure that all required connections and programming are complete before using this application.

Show Settings

To display the current module settings:

1. Select *Show Settings* from the System Menu.
2. Press **ENTER**.

Your system settings will appear on the screen.

Setting Passwords

Before an ISDN Remote Module user can communicate with the ISDN Switch Module, the system administrator must program a password for each remote user. As a default, all passwords are disabled.

Up to 100 passwords can be programmed into the ISDN Switch Module. This allows a number of different users to access the ISDN Switch Module at different times. However, only one ISDN Remote Module user can be connected to an individual ISDN Switch Module at any one time.

The first two digits of each password identify each one of the 100 passwords (00–99). When you assign each remote user a two-digit user number, this user number becomes the first two digits of the user's password. The third digit of the password determines whether the user can change his or her password. If you want to prevent the user from changing the password, assign a 9 as the third digit for the password. If you want the user to be able to change the password assign a digit from 0-8 as the third digit.

Users with a password that contains a 9 as the third digit, are instructed to contact the system administrator for assistance in changing the password.

A user that does not have a 9 as the third digit of the password is permitted to change only his or her own password. If the first two digits of the new password do not correspond to the user number, the new password is not accepted. An exception to the above is password “00,” which is used by the system administrator.

Security Alert:

All information about passwords should be considered proprietary and should not be given to ISDN Remote Module users.

Users can change passwords by entering the old password and then the new password. As the system administrator, you can disable any password (except password “00”) by changing the password to a two-digit code (the number of the user whose password is to be disabled).

Security Alert:

A correct password permits the remote user access to the full DEFINITY ECS, including those areas, such as WATS lines, most liable to toll fraud. Passwords should be as long as allowed. Passwords should be hard to guess and therefore should not contain:

- *all the same numbers (for example, 88888888)*
- *sequential characters (for example, 987654321)*
- *character strings associated with you or with the remote user or with your business. These include:*
  - *Names*
  - *Birthdays*
  - *Business name*
  - *Telephone number*
  - *Social security number*
- *Words and commonly used names*

Passwords should be changed regularly, at least on a quarterly basis. Do not recycle old passwords.

Considerations

Consider the following when programming the ISDN Switch Module:

- Up to 100 passwords can be programmed into each ISDN Switch Module.
- Only one ISDN Remote Module at a time can be “on-line” with an individual ISDN Switch Module.
- Passwords are retained in non-volatile memory and are not affected by power outages.
- All passwords must contain 8 to 10 digits.
- To prevent a user from changing a password, assign a 9 as the third digit of the password.
- Each password begins with two digits (00–99). The “00” password is reserved for the system administrator and can be used to change any of the remaining passwords.

Security Alert:

Change your system administrator password as soon as possible, and store the new password in a secure place.

Programming Passwords Procedure

To program passwords for the ISDN Remote Module users:

1. If you are already in the Extender Programming Menu, skip to Step 2. If you are not in the Extender Programming Menu but the unit is powered-up, simply type **AT@MENU** to access the Programming Menu from your PC.

When you type **AT@MENU**, the Main Menu appears:

2. Select *Configure System* from the Main Menu.

The Configure System Menu appears.

3. Select *Password* from the Configure System Menu

4. Press **ENTER**.

The screen prompts you to enter your administrator password.

5. Type your system administrator password (the default is 00000000)

6. Press **ENTER**.

The Password Menu is displayed.

7. Do one of the following:

To check a password:

1. Select *Display Password* from the Password Menu
2. Press **ENTER**.

The system prompts you to enter the user's two-digit user number.

3. Type the user's two-digit user number
4. Press **ENTER**.

The user number and the password assigned are displayed.

To change a password:

1. Select *Change Password* from the Password Menu
2. Press **ENTER**.

The system prompts you to enter the password.

3. Enter the new password (8 to 10 digits), beginning with the remote user's two-digit code
4. Press **ENTER.** (If you want to disable a password, enter the first two digits only).
5. Repeat for each password you need change.

Security Alert:

Using the ISDN Remote Module gains access to the features of the DEFINITY ECS, including access to WATS lines, FX lines, etc., which are subject to toll fraud. Passwords should be as long as allowed. Passwords should be hard to guess and therefore should not contain:

- *all the same numbers (for example, 88888888)*
- *sequential characters (for example, 987654321)*
- *character strings associated with you or with the remote user or with your business. These include:*
  - *Names*
  - *Birthdays*
  - *Business name*
  - *Telephone number*
  - *Social security number*
- *Words and commonly used names*

Passwords should be changed regularly, at least on a quarterly basis. Do not recycle old passwords.

Troubleshooting

4

Troubleshooting and LED Activity

As with all equipment of a sophisticated nature, occasionally an error in connection or transmission may occur. The ISDN DEFINITY Extender system provides an indication of errors via light-emitting diodes (LEDs) on the ISDN Remote and ISDN Switch Modules and by error messages on the display telephone connected to the ISDN Remote Module.

Troubleshooting Procedure

Errors occur for a variety of reasons during transmission or connection. When you encounter a problem, you should check for malfunctions in an organized manner. Begin troubleshooting your ISDN Switch Module by checking the following general areas:

1. Check that the AC power adapter is connected to the ISDN Switch Module and that the outlet has power.
2. Verify that the ISDN Switch Module LED is flashing
3. Check that all interconnecting cables and connections to wiring blocks are secure and properly seated.
4. Make sure you have an ISDN 2101 Remote Module at the remote site and an ISDN 2100 Switch Module at the central site. You cannot mix the 2100/2101 ISDN DEFINITY Extenders with the previous (non-integrated terminal adapter) models.
5. Eliminate potential causes of interference such as heavy-duty electrical equipment, copiers, motors, or any other equipment that emits radio frequency or electrostatic interference.
6. Verify that the ISDN parameters and the Dial Numbers are programmed correctly.

If a remote user reports a problem with the ISDN Remote Module, verify that the user has followed the appropriate troubleshooting steps:

1. Check that all interconnecting cables and connections to wiring blocks are secure and properly seated.
2. Make sure you have an ISDN 2101 Remote Module at the remote site and an ISDN 2100 Switch Module at the central site. You cannot mix the 2100/2101 ISDN DEFINITY Extenders with the previous (non-integrated terminal adapter) models.
3. Eliminate potential causes of interference such as heavy-duty electrical equipment, copiers, motors, or any other equipment that emits radio frequency or electrostatic interference.
4. Check the error message on the telephone connected to the Remote Module, and proceed according to the “Error Messages” section in this chapter.
5. Verify that the ISDN parameters and the Dial Numbers are programmed correctly.
6. Check that the AC power adapter is connected to the ISDN Remote Module and that the outlet has power.
7. Verify that the ISDN Remote Module LED is flashing

If you cannot locate the source of the problem, contact Lucent Technologies or your authorized Lucent dealer. In the US, Lucent can reached by calling 1 800 242-2121.

Viewing the Software Version

If you contact Lucent Technical Support, you may be asked what version of software your Extender system is using. You can view the software version in the Show Settings option under the System Menu.

Vx.xxxx,y.y, where x.xxxx is the module software version and y.y is the DSP software version.

LED Sequences

The LED on the ISDN Switch Module helps to indicate problems that occur.

Operational LED Sequences

The LED sequences on the ISDN Switch Module and the ISDN Remote Module are indicators of the status during power up and operation. Table 4-1 contains the LED flash sequences that may be observed on the ISDN Remote Module or ISDN Switch Module during power up. Table 4-2 contains the LED flash sequences during power up verification. Table 4-3 contains flash sequences that indicate errors. Table 4-4 contains LED sequences that may be observed during Extender operation. Refer to the tables below if you experience problems when powering up or using the Extenders.

Table 4-1. LED Power Up Sequences

LED Sequence	Description
No LED blinks	Error with hardware or AC adapter.
First blink: Red or Green	LED is not functioning properly as units should blink Yellow.
Yellow	EPROM Checksum test failed. Faulty EPROM or Board problem.
Yellow & 1 Red	DRAM, Data test failed
Yellow & 2 Red	DRAM Address test failed
Yellow & 3 Red	DUART, test failed.
Yellow & 7 Reds & 1 Green	Passed all hardware tests

Table 4-2. LED Power Up Verification Sequences

LED Sequence	Description
Rapidly blinking Red during process and then 1 Green to indicate process is complete.	■ 10 - 15 seconds. FLASH code is being verified and if valid will be executed. ■ 25-30 seconds FLASH code is invalid EPROM code copied to FLASH.
3 Reds or 3 Greens followed by a Red.	■ Red - Running EPROM code, FLASH write *failed*. Contact Customer Service. ■ Green - FLASH load *passed*, running FLASH code.
3 sets of 8 Yellow blinks	Access Terminal Configuration Menu by typing 'MENU'.

Table 4-3. LED Error Indicator Sequences

LED Sequence	Description
1 Red	The DSP (*Digital Signal Processor*) is faulty.
2 Red	■ Port to PBX (Switch Module) is not operational or ■ Port to the phone (Remote Module) is not operational.
3 Red	ISDN line is inactive. Check cabling.
4 Red	ISDN (B1) & (B2) have not synchronized. Check SPID and DN numbers have been programmed correctly.
1 Red 1 Green	ISDN (B1) channel has not synchronized. Data / Fax* * (B2) is synchronized.

Continued on next page

* For ISDN Remote Module only

Table 4-3. LED Error Indicator Sequences, *continued*

LED Sequence	Description
1 Green	Unit is online with the ISDN Switch Module (B1). Data & Fax* (B2) channel is synchronized. Data connection is not established.
1 Green & 1 Red	Data connection is established.
1 Green & 2 Red	Data (B2) dialing for connection.
2 Green	Unit is in COD Waiting Mode (B1). The Data & Fax* (B2) channel is synchronized. Data connection is not established.
2 Green *&* 1 Red	Data connection is established.
2 Green *&* 2 Red	Data (B2) dialing for connection.

Continued on next page

* For ISDN Remote Module only.

Table 4-3. LED Error Indicator Sequences, *continued*

LED Sequence	Description
3 Green	Phone display is Go Online? (B1) initial connection has not been established. Data & Fax* (B2) channel is synchronized. Data connection is not established.
3 Green & 1 Red	Data connection is established.
3 Green & 2 Red	Data (B2) dialing for connection.
1 Yellow	Unit is online with the Switch Module (B1). Data & Fax* (B2) channel is not synchronized.
2 Yellow	Unit is in COD Waiting Mode (B1). The Data & Fax* (B2) channel is not synchronized.
3 Yellow	Phone display is Go Online? (B1) initial connection has not been established. Data & Fax* (B2) channel is not synchronized.
1 Red 1 Yellow 1 Green	Fatal Error. Contact Customer Support.

* For ISDN Remote Module only.

Table 4-4. LED Sequences

LED Color	Number of Flashes	Description
GREEN	1*	Online to ISDN Remote Module.
GREEN	2*	In Call On Demand (COD) waiting mode on DN1
GREEN	3*	Waiting for a “Go Online” request on DN1
RED	1	The DSP is offline. Power off and then power on the module. If the problem persists, contact your corporate technical support center.

NOTE: These LED sequences are followed by two red flashes when the module is establishing a Dial-up Networking connection.

Table 4-4. LED Sequences— Continued

LED Color	Number of Flashes	Description
RED	2	The TCM is offline. Check that the digital port is connected properly.
RED	3	The ISDN line is inactive because it is not plugged in or functioning correctly. Check that the line is plugged in correctly. If the problem persists, contact your local telephone company or your corporate technical support center.
RED	4	Both DNs are offline. Check that the SPIDs are correct and that the ISDN network is ready.
RED, GREEN	1R, 1G	The DN1 channel is offline. Check that the DN and SPID for DN1 and SPID1 are correct. If the problem persists, contact the ISDN provider first and then your corporate technical support center.

Continued on the next page

Table 4-4. LED Sequences— Continued

LED Color	Number of Flashes	Description
YELLOW	1	The DN1 channel is synchronized, but the DN2 channel is not. Check that the DN and SPID for DN2 and SPID2 are correct. If the problem persists, contact the ISDN provider first and then your corporate technical support center.
YELLOW	2	The Switch Module is in COD waiting mode on DN1, but DN2 is not synchronized. Check that the DN and SPID for DN2 and SPID2 are correct. If the problem persists, contact the ISDN provider first and then your corporate technical support center.

Continued on the next page

Table 4-4. LED Sequences— Continued

LED Color	Number of Flashes	Description
YELLOW	3	The Switch Module is waiting for a “Go Online” request on DN1, but DN2 is not synchronized. Check that the DN and SPID for DN2 and SPID2 are correct. If the problem persists, contact the ISDN provider first and then your corporate technical support center.
NONE	None	There is a problem with the AC adapter, or the LED is not working.

Diagnostics Statistics

When a user reports trouble with the ISDN Remote Module’s, accessing Diagnostic Statistics could be helpful in determining whether an error has occurred before. For each error code, a count of the number of occurrences is kept until the ISDN Remote Module is powered down or until the information is reset. For this reason, ***the user should not power down the module when experiencing problems*** to ensure that diagnostic data is not lost.

While going online or making a connection with the ISDN network when leaving COD, the remote display telephone may display *Connect Error*, indicating an ISDN error event occurred.

Errors are displayed as a code number and letter. When you report a problem for a remote user, to provide information to a Lucent Technologies representative or Authorized Dealer, you may need to ask the remote user to access Diagnostics Statistics to help resolve any problems you report.

Error Codes for the 2100

Error Codes ISDN		
Error Code	**Description**	**Explanation**
101A	Number of received ISDN Voice packets that contained a CRC error.	Occurs on old ISDN 875 only.
102A	Number of received ISDN TCM Signaling packets that contained a CRC error.	Occurs on old ISDN 875 only.
103A	Number of received ISDN User Data packets that contained a CRC error.	Occurs on old ISDN 875 only.
104A	Number of received ISDN Packets that contained an Invalid V42 Address.	Received HDLC packet that was not ADPCM, Signaling or User Data. Should not occur on current code. Would need further investigation by MCK.

105A	Number of rejected Extender or phone signaling packets received because they were out of sequence.	Far end rejected signaling packet. Might occur often. Should not cause a significant functional problem.
106B	Number of times Extender or phone signaling packet re-transmissions exceeded maximum (Causes Digital Port Data to be lost).	A packet of signaling data was sent with no acknowledgement. After 5 tries this error is incremented.
107B	Number of times Extender or phone signaling channel had to be re-synchronized.	There was a request to re-synchronize signaling channel from far end because there was no acknowledgement. Excessive errors would indicate a problem with data delivery in the ISDN network.
108B	Number of times Extender or phone signaling channel had no data for 16 consecutive seconds.	Indicates that no data has been received for 16 sec. MCK always sends a keep alive every 8 sec. so this error would indicate data is not getting through the ISDN network.
109A	Number of times Extender or phone signaling channel timed out waiting for packet acknowledgment.	Did not get a V42 signaling acknowledgement. As long as you are not getting 106B errors, this is not necessarily a problem. Excessive errors or 106B errors indicate a problem with the ISDN line.
110C	Number of times Extender or phone signaling channel transmit locked up (transmit buffers full when no data to send).	The 8 second TX timer timed out and buffers were full. This should not occur. Needs further investigation by MCK.
111A	Number of rejected serial data packets received because they were out of	Same as ‘105A’ except this is Serial Data. Will not occur on 2100. May occur on 2300.

	sequence.	
112B	Number of times serial data packet re-transmissions exceeded maximum (Causes serial data to be lost).	Same as ‘106B’ except this is Serial Data. Will not occur on 2100. May occur on 2300.
113B	Number of times serial data channel had to be re-synchronized.	Same as ‘107B’ except this is Serial Data. Will not occur on 2100. May occur on 2300.
114A	Number of times serial data channel timed out waiting for packet acknowledgment.	Same as ‘109A’ except this is Serial Data. Will not occur on 2100. May occur on 2300.
116B	Number of times carrier detect lost from ISDN termination.	ISDN call was lost or far end disconnected because of errors. May be an ISDN problem or problem with unit on far end. ISDN problems should have other errors accompanying this one.
117C	Number of times Terminal Adapter check failed.	Occurs on old ISDN 875 only.
118C	Number of times communications to DSP failed.	Contact MCK. Should never occur.
119B	Number of times Digital port link re-activated.	Digital port or phone was disconnected. Check wiring If customer uses TTI you will see these errors also.
120B	Number of times Digital port connection was lost or de-activated.	Contact MCK. Should never occur.

121A	Number of times Digital port data was re-transmitted.	Contact MCK. Should never occur.
122B	Number of times IVP (V42) link failed.	Could be the wrong ‘Connect Rate’ or the V42 process failed. Problem with ISDN network or connect rate between units.
123A	Number of times User disconnected by pressing HOLD key 4 times and then disconnecting.	The user pressed the HOLD key four times and disconnected. Normal Operation.
124C	Number of times Synchronous Communications Controller IC transmit locked up.	Occurs on old ISDN 875 only.
125B	Number of fatal errors that caused unit to restart (caused by errors 124C, 118C, and 120B).	Occurs on old ISDN 875 only.
126C	Invalid length of SCC Tx packet	Contact MCK. Should never occur.
127B	SCC Transmit Busy	Contact MCK. Should never occur.
128A	SCC Rx Status Error	Received a bad packet. Excessive errors could affect voice quality. Usually network related.
129A	SCC Tx Status Error	Contact MCK. Should never occur.
130A	Invalid Voice Packet ID detected	Not used.

131A	Number of times all Serial Data buffers were in use	Will not occur on 2100. May occur on 2300.
132A	Number of times Serial Data packets too long	Will not occur on 2100. May occur on 2300.
133A	Number of times all Extender or phone signaling buffers were in use	Contact MCK. Should never occur.
134A	Number of times Extender or phone signaling packets too long	Contact MCK. Should never occur.
139A	PBX ISDN Connect failed	Switch could not establish an ISDN connection. Problems with ISDN service.
140A	RMT ISDN Connect failed	Remote could not establish an ISDN connection. Problem with ISDN service.
141B	V42 Connect Failed	The V42 Connect Process failed. Problem with ISDN service.

Note:

When a user is receiving functional errors with their Definity Extender 2100 units, it is important to check for the presence of these errors. If they are receiving serious functional errors and there are no applicable error codes, the problem may be with the Extenders themselves. Functional errors should always produce a cause which would be indicated through the error codes above.

Connection Errors

During the *Go Online* process, or when the ISDN Remote Module is online with the ISDN Switch Module, the remote display telephone may display a connection error. This error may indicate a line condition problem or a configuration problem that is preventing the ISDN Remote Module and ISDN Switch Modules from completing a successful connection or that a problem that could disconnect the existing connection.

Table 4-5 lists all possible connection errors that could be displayed, the likely causes of the error condition, and suggestions on how to correct the error.

Table 4-5. Connection Errors

Message	Possible Cause	Action
Line Inactive	There is a problem with the physical connection with the ISDN line interface.	Ensure the Remote Module is fully connected with the ISDN line, check cables and jack connections.
Line Not Ready	Could be Invalid SPID or wrong switch type. The ISDN Remote Module is not responding.	Check ISDN parameters. The ISDN Remote Module is not connecting to the ISDN Network. Ensure the ISDN parameters and Dial numbers are correct and the ISDN Remote Module connects to the line.
Invalid SPID	The SPID numbers do not match the DN and access to the ISDN failed.	Check ISDN parameters. Ensure the user entered the correct SPID and DN pair combinations.

Continued on next page

Table 4-5. Connection Errors, *continued*

Message	Possible Cause	Action
Channel in Use	If the previous call failed to connect, the network requires a delay between the next call attempt. This indicates that not enough time has elapsed since the last failed attempt.	If connection fails, re-attempt to Go Online.
No Dial Tone	Invalid number entered for PBX Dial number	Check PBX dial number and reprogram if necessary.
	:Possible problems with ISDN network:, no route is available, or channel is no operating correctly.	Check with ISDN service provider and request that they test the ISDN line,
	To many calls received at the central site.	Wait a few minutes and try the call again. If the problem persists, check with your system administrator.
No Answer	Call has been rejected by far end (Switch). No user response.	May have dialed the wrong PBX Dial number. Check the number and dial again. If the problem persists, check with your system administrator.

Continued on next page

Table 4-5. Connection Errors, *continued*

Message	Possible Cause	Action
No Carrier	On initial connection did not receive connect acknowledge from network.	Check physical ISDN connections and parameters. Possible network problem.
Line Busy	The PBX Dial number is busy. Someone is on line with the Switch Module.	Ensure you entered your Dial numbers correctly and check that no one else is currently using the Switch Module.
Invalid Number	The PBX Dial number is an invalid number.	Ensure you have entered your Dial numbers correctly.
Call Prog Tout	Call progress time out. The module was waiting for a message from the network that was not received.	Possible ISDN network problem. Check with your ISDN service provider and have them check the line.
User Abort	You pressed the **HOLD** button three times to abort the connection process.	No action required.

Continued on next page

Table 4-5. Connection Errors, *continued*

Message	Possible Cause	Action
V42 Connect Fail	The Remote and Switch Modules connect but the IVP does not synchronize. Possible ISDN Connect rate problem.	Try changing your ISDN Connect Rate from Auto to 56k.
	Your Switch Module PBX digital port may be off line or disconnected. Or you are connected to an incompatible communication device.	Check with your system administrator
	The ISDN link has too many errors to maintain a valid connection.	Check with your ISDN service provider and have them test the line.
DSP Fatal Error	DSP communication failed. If continues to be displayed, then possible hardware problem.	Contact customer support.
Port Disconnect	The Digital port at the Switch Module was disconnected from the Switch Module.	Check with your system administrator.

Continued on next page

Table 4-5. Connection Errors, *continued*

Message	Possible Cause	Action
No SCC Transmit	If continues to be displayed, then possible hardware problem.	Contact customer support.

Note

If you are still experiencing difficulties, the suitability of the phone lines is in question. Check with your phone company to ensure the line requirements have been met.

COD Failure Messages

The following diagnostic messages are used to facilitate troubleshooting of ISDN line problems during COD (Call on Demand) operation, the remote display telephone shows 'COD Waiting,' followed by a message. Table 4-6 contains the possible COD failure messages.

Table 4-6. COD Failure Messages

Message	Description	Possible Cause
Dialback Timeout	The unit is in Dialback mode and the Remote came out of COD, but never received a Dialback call from the Switch module.	Switch unit could not place an ISDN call to the Remote.
ISDN Conn Lost	The unit comes out of COD mode and successfully connects, but the connection is lost. *Note: If placing an outgoing call the unit tries to reconnect.*	Connectivity problems with the ISDN network.
V.42 Failed	The units wake out of COD and successfully establish a connection, but were disconnected due to a V.42 failure. *Note: If placing an outgoing call the unit tries to reconnect.*	Data problems on the ISDN network.

Table 4-6. COD Failure Messages, *continued*

Message	Description	Possible Cause
Handshake Failed	The units wake out of COD and successfully establish a connection, but the Remote was unable to establish a V.42 connection to the Switch module.	Data problems on the ISDN network.
ISDN Conn Failed	The units attempt to wake out of COD mode but are unable to establish an ISDN connection.	Connectivity problems with the ISDN network.

Fatal Errors

If a fatal error occurred during the previous operation cycle (the last time the extender was powered up), the remote display telephone shows *The Last Error Was*, followed by a message. Table 4-7 outlines the possible fatal error messages.

Table 4-7. Fatal Error Messages

Message	Possible Cause	Description
No DSP Response	The DSP is not operating correctly.	Contact Customer Support.
Port Disconnected	The Digital port at the Remote Module was disconnected during normal operation.	Reconnect the port.
No SCC Transmit	If it continues to be displayed, then possible hardware problem.	Contact customer support.
Unknown Error	Unknown fatal error occurred on previous power up.	Contact customer support.

Specific Problems

Common problems that may develop with the ISDN DEFINITY Extender system are listed on the following pages. In any case, you should test the ISDN Switch Modules at the DEFINITY ECS location to determine if the problem is with the ISDN Switch Module or with the communications system. Two independent BRI circuits are required at the central site to perform this test.

The following problems may occur with the ISDN Remote Module or ISDN Switch Module. The possible steps to solve the problem are listed after each problem heading.

No Display on the Telephone at the Remote Location

To correct this problem, check or do the following:

- ❒ Make sure an ISDN Remote Module and not an ISDN Switch Module is connected at the remote location.
- ❒ Ensure the AC power adapter is connected to the ISDN Remote Module and the LED is lit.
- ❒ Check the phone and make sure it is functioning correctly.
- ❒ Ensure the installation has not been moved and that no new wiring was done.

No Switch Module Connection

- ❒ Ensure the correct dial numbers have been programmed into the ISDN Switch Module and the ISDN Remote Module. Refer to “Setting the ISDN Parameters” on page 3-5 of this guide.
- ❒ Ensure the AC power adapter is connected to the ISDN Remote Module and all interconnecting cables are properly seated.
- ❒ Ensure you have an ISDN Switch Module at the central site, and not an ISDN Remote Module.
- ❒ Ensure your ISDN Remote Module and ISDN Switch Modules have the correct ISDN parameters.

No Indicator Lights At Power Up

- ❒ Ensure the AC power adapter is connected to the ISDN Switch Module and/or the ISDN Remote Module.
- ❒ Ensure the AC power outlet is working by plugging in another known working electrical device.
- ❒ Check the LED sequences on the ISDN Remote using the information in the “LED Sequences” sequences on page 4-5 of this section.

ISDN Switch Module Will Not Answer

- ❒ Someone at the central site could be using the port and is unaware the user trying to connect. Advise the remote user to wait for a short period, then try connecting again.
- ❒ Ensure you the correct PBX dial number (the ISDN Switch Module DN1 number) has been entered
- ❒ The ISDN Switch Module's DN1 may be entered incorrectly. If a DN is incorrect, the ISDN line cannot receive a call on that DN.

ISDN Ordering Guide

A

Worksheet for ordering ISDN BRI lines.

The worksheets in this appendix can be used as a guide when ordering the ISDN-BRI lines from the local telephone company.

Worksheet: 1
Use this worksheet to record information to provide to the telephone company about the ISDN-BRI circuit you will require.

Worksheet: 2
Use this worksheet to record information provided by the telephone company when the ISDN-BRI circuit is ordered and installed.

WORKSHEET 1	**Page 1**
Information For The Telephone Company	
Customer Name	
Customer Title	
Company Name	
Billing Address	
City	
State/Province	
Zip/Postal Code	
Telephone Number	
Fax Number	
Installation Address (If different from above)	
City	
State/Province	

WORKSHEET 1	**Page 2**
Information For The Telephone Company	
Zip/Postal Code	
Preferred Long Distance Carrier	
ISDN Physical Line Requirements	**2B + D Basic Rate Interface (BRI)**
SPID and DN Information	**Independent SPID and DN numbers for each B Channel**
Capabilities on Each B Channel	**Circuit Switched Voice and Circuit Switched Data on Each B Channel**
Terminal Equipment Type	**Terminal Type A**
National ISDN Service (NI-1)	**Preferred and Recommended**

WORKSHEET 1	**Page 3**
Information For The Telephone Company -	
Other Requirements	**Circuit mode voice service for speech and 3.1 KHz audio**
	Circuit mode data for 56 Kbps and 64 Kbps unrestricted data
	Simultaneous circuit switched voice and circuit switched data calls
	Long distance service provider must be capable of meeting all requirements

WORKSHEET 2	**Page 1**
Required Information From the Telephone Company	
CIRCUIT NUMBER _____	
Custom or NI-1	
Switch Type	
Switch Version	
64 Kbps or 56 Kbps Channels (Local)	
64 Kbps or 56 Kbps Channels (Long Distance)	
SPID B1	
DN B1	
SPID B2	
DN B2	
Long Distance Service Company Provided/Arranged For	

IMPORTANT NOTE:
Your local telephone company may request that you select and arrange for long distance ISDN service that meets your requirements. Please ensure that any required long distance service is arranged prior to installation of the products. Please be advised that not all long distance carriers can provide ISDN Data service. Also, some carriers are only capable of 56 Kbps service and not 64 Kbps. Ensure that the level of service provided is clearly specified.

AT Command Set

B

AT commands for configuring the ISDN Switch Module.

AT Commands included in this appendix to help the Information Service Department, should they need to customize specific configurations to meet the needs of your system. Changing these commands would be unusual and outside normal operation.

AT Commands

AT commands may be entered via a terminal program, such as ProComm or the Windows Hyperterminal.

Most commands can be combined on one line, although some must be on a separate AT command line, or the last command on an AT command line (*1!C6=, *2!C6=, *1!N1=, *1!N2=, and ATD). Commands are executed left to right on the line. If there is an error in a command in the middle of a line, the commands to the left of it will have been executed.

If the command consists solely of a letter followed by a number (e.g. Q*n*), omitting the number in place of the *n* is the same as specifying 0 (i.e. ATQ is the same as ATQ0). Also, following the letter with a question mark will display the current value for the configuration parameter (e.g. ATE? will display the current value for the local echo configuration parameter).

For commands that use the equals sign to assign a value to a parameter, a value must be specified. ATS0= is an improper command, the value does not default to zero. To display the value of the parameter configured by such a command, either replace the equal sign with a question mark or place a question mark after the equal sign (e.g. ATS0? or ATS0=? Will both display the value of the auto answer configuration parameter).

Table B-1. ISDN Configuration Commands

Command	Description	Values
!C0=	Sets the ISDN switch type	0 - AT&T 5ESS 1 - DMS 100 2 - NI-1 3 - Pure Q.931
*1!C6=	SPID 1 - The SPID for the first B channel	1-15 digits
*2!C6=	SPID 2 - The SPID for the second B channel	1-15 digits
*1!D3=	TEI 1 - The TEI for the first B channel	0-63, 255 A value of 255 enables auto TEI on both B channels
*2!D3=	TEI 2 - The TEI for the second B channel	0-63, 255 A value of 255 enables auto TEI on both B channels
*1!N1=	DN 1 - The directory number for the first B channel	1-15 digits
*2!N1=	DN 2 - The directory number for the second B channel	1-15 digits

Continued on next page

Table B-1. ISDN Extender AT Command Set, *continued*

Comman d	Description	Values
>V=	View the ISDN parameters	G - View ISDN switch type C - View DNs, SPIDs, and TEIs
>W	Save active ISDN configuration	
>Z	Replace active ISDN configuration with the saved settings	

Table B-2. COM1 Port Configuration Commands

Command	Description	Values
@P2=	DTE speed - the speed at which the COM1 serial port is to run	2400, 4800, 9600, 19200, 38400, 57600*<default>. 115.2*
@P3=	Parity	N - none *<default>* O - odd E - even
@P4=	Number of data bits	7 or 8 *<default>*
@P6=	Number of stop bits	0 - 1 stop bit *<default>* 2 - two stop bits

Table B-3. Terminal Adapter Configuration Commands

Command	Description	Values
En	Local echo	n=0- Disabled 1- Enabled*<default>*
Qn	Status messages - are AT command responses and connection progress messages displayed	n=0- Enabled *<default>* 1- Disabled
Vn	Message format	n=0- Numeric messages 1- Verbose messages *<default>*
Wn	Carrier/Protocol result codes - are carrier and protocol messages displayed	n=0- Disabled*<default>* 1- Enabled
Xn	Connect Messages - allows only a subset of all result messages to be displayed	n=0- Enable result codes 0-4 1- 0-4, 17, 19, 2- All result codes *<default>* Refer to the AT result codes section for a description of the codes

Continued on next page

Table B-3. Terminal Adapter Configuration Commands *continued*

Command	Description	Values
S0=	Auto answer - does the module automatically answer an incoming call or wait for the AT answer command to be issued before answering	0 - auto answer disabled *<default>* 1 –255, auto answer enabled
S1=	Ring count. The value of this command never increments.	000 (Compatible with BitSURFR command lines)
S2=	Escape character - defines the value of the escape character that may be used to exit from the online mode. If there is no data for an interval greater than or equal to the Guard Time and three consecutive escape characters are received, the module returns to the AT command mode from the online mode while keeping the data connection alive.	0-127 - The specified character is the escape character (default = 43) 128-255 - the escape feature is disabled
S3=	Carriage return character	0-127 (default = 13)
S4=	Line feed character	0-127 (default = 10)
S5=	Backspace character	0-127 (default = 8)

Continued on next page

Table B-3. Terminal Adapter Configuration Commands *continued*

Command	Description	Values
S7=	Supported for compatibility with BitSURFR command lines. The value of this command is ignored.	1-255
S12=	Guard Time - The guard time before the module starts looking for the escape sequence (see S2=)	0-255 (default = 50) The units for this value are 1/50 of a second
&Cn	Data Carrier Detect - Sets whether DCD is always asserted or tracks the ISDN connection	n=0- always on 1- tracks connection *<default>*
&Dn	Data Terminal Ready - Sets how the module handles the DTR signal from the PC	n=0- ignore DTR 1- Return to AT command mode from online mode (connection remains active) 2 - Disconnect the call and return to AT command mode *<default>*
&W*n*	Writes the active port profile (into non-volatile memory) to stored profile *n. Applies to software release 1.20 or higher.*	*n* = 0

Continued on next page

Table B-3. Terminal Adapter Configuration Commands *continued*

Command	Description	Values
%A2=	Select the protocol used on the ISDN connection	95 - PPP *<default>*
%A95=	Accept incoming data calls	D - do not answer E - answer *<default>*
%A96=	Supported for compatibility with BitSURFR command lines. The value of this command is ignored.	0 or 1
&V	View TA configuration	
@MENU	Display the 2100/2101 Extender configuration menu	
&Fn	Reset configuration parameters to factor defaults	0
Z*n*	Reloads active profile from stored profile *n*. *Note: Applies to software release 1.20 or higher.*	*n* =0 or blank

Table B-4. Terminal Adapter Action Commands

Command	Description	Values
A	Answer an incoming call	
D	Initiate an ISDN call	‘0’-‘9’, ‘(‘, ‘)’, ‘-‘, ‘;’, ‘,’ For backwards compatibility the D may be followed by P, T, or W
H	Hang-up a call	
O	Return back to online mode from AT command mode	

AT Result Codes

The following codes may be returned after an AT command is executed. Depending upon the value of the message format configuration parameter, either the numeric or verbose message will be displayed. The settings of the Carrier/Protocol Result Codes and the Connect Messages parameters may also keep some of the messages from being displayed.

Table B-5. AT Results Codes

Numeric Code	Text Message	Description
0	OK	The command line was successfully executed
2	RING	An incoming call has been detected (this may appear at any time in AT command mode and not as the result of executing an AT command)
3	NO CARRIER	No carrier was detected when trying to place a call
4	ERROR	An error was encountered in the AT command line. Commands to the left of the erroneous command were executed.

Continued on next page

Table B-5. At Results Codes *continued*

Numeric Code	Text Message	Description
6	NO DIALTONE	No dial tone was detected when trying to place a call
7	BUSY	The called number was busy or the second EXT-DEFINITY 2100/2101 B channel was already in use for a POTS call
17	CONNECT 56000	A connection was established at 56 Kbps
19	CONNECT 64000	A connection was established at 64 Kbps
79	PROTOCOL PPPC	The PPP protocol is in use on the connection
96	CHANNEL B1	The call was established using the B1 channel
97	CHANNEL B2	The call was established using the B2 channel

Glossary

+12 Vdc

12 volt direct current.

120 Vac

120 volt alternating current (North American standard electrical supply).

B

Baud Rate

The speed in Kbps at which digital data can be transmitted.

C

Call On Demand mode

A feature of the ISDN Extender system that disconnects the ISDN connection between the Switch and Remote Modules when there is no activity and reconnects the modules when activity occurs.

D

Direct Line

A dedicated circuit or private leased line.

Dedicated Subscriber Lines

Communication lines (usually twisted pair) that are used to connect on-premise telephone equipment (such as a DEFINITY ECS) to the Central Office. Also referred to as direct lines.

Dial Line

A telephone line which is part of the Public Switched Telephone Network and is accessed through the DEFINITY Extender's automatic dial-up function.

Directory Number

A Directory Number (DN) is the number programmed into the Switch and Remote Modules used to dial the modules and any equipment connected to them. There are two Directory Numbers for each module, one to dial the module and one to dial the PC, server, or fax machine connected to the module.

F

Facility

Transmission facilities. Usually a metallic pair of wires, but can be telephone company carriers, T-1, microwave or dial-up telecommunications lines.

L

LED

Light-emitting diode. A semiconductor diode which emits light when a current is passed through it, indicating that the power is on.

P

PBX

Private Branch Exchange.

R

Remote Module

The ISDN DEFINITY Extender module that connects to the remote DEFINITY telephone.

S

Service Profile Identifier

A Service Profile Identifier (SPID) is a number that identifies to the ISDN network the type of service to be provided. Each SPID is attached to a Directory Number. Each module must be programmed with two SPIDs, one for each Directory Number. *See Directory Number*.

Switch Module

The ISDN DEFINITY Extender module that connects to the DEFINITY ECS.