Lucent Technologies
Bell Labs Innovations

ISDN DEFINITY® Extender
2101 Remote Module

User's Guide

555-025-111
Comcode 108106881
Issue 2.0
October 1999

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.

Trademarks

DEFINITY is a registered trademark of Lucent Technologies in the US and other countries.

ProCOMM is a registered trademark of Datastorm Technologies Inc.

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Call: Lucent Technologies Publications Center
Voice: 1-800-457-1235 International Voice: 317-322-6791
Fax: 1-800-457-1764 International Fax: 317-322-6699

Write: Lucent Technologies BCS Publications Center
2855 N. Franklin Road
Indianapolis, IN 46219

Order: Document No. 555-025-111
Comcode 108106881
Issue 2.0 October 1999

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 Remote 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, if you need assistance when installing, programming, or using your system, call Lucent Technologies, or your Lucent authorized representative. Customers who are installing the system themselves should call 800/225-7585. To report problems with your unit call 800/242-2121.

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 return of the unit to the factory.

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 an approved terminal adapter. The ISDN-BRI circuit shall be provided via a 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. Within 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

This equipment has been tested and found to comply with the limits for a Class B 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 residential 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 2101 Remote 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 will henceforth be referred to as the “ISDN Remote Module” or simply the “Remote Module.”

The ISDN DEFINITY Extender 2100 Switch Module will henceforth be 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 indicates a number 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 Remote Module.

If you have problems with your ISDN Remote Module, contact your 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.

Call: Lucent Technologies Publications Center
Voice 1 800 457-1235
Fax 1 800 457-1764
International Voice 765 361-5353
International Fax 765 361-5355

Write: Lucent Technologies Publications Center
P.O. Box 4100
Crawfordsville, IN 47933

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Introduction

1

An overview of the functioning and specifications of the ISDN DEFINITY® Extender Remote 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 incorporated, allowing the user to connect off-premise RS-232 equipment to data equipment at the DEFINITY ECS location.

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 provide a way to help reduce ISDN network usage and/or toll charges.

Included with the 2101 Remote Module is a built-in terminal adapter for use with BRI lines. With the 2101 Remote Module, connecting to a BRI line is as simple as plugging a cable into a jack.

The Remote Module has an 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 the COD mode.

NOTE:
When there is data activity, the fax port cannot make or receive calls.

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 Remote module may be slightly different than that shown in Figure 1-1.

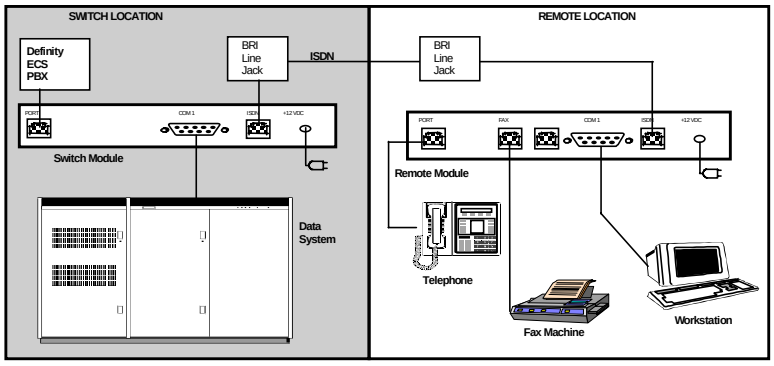

Figure 1-1. System Configuration

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 site.

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 Remote Module comes with most of the necessary equipment required 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 Remote Module package should include:

- ❒ One ISDN Remote Module (identified on the top of the unit)
- ❒ One AC adapter
- ❒ One telephone cable with RJ-45 connectors
- ❒ *ISDN DEFINITY® Extender 2101 Remote Module User's Guide*

Save your packing materials. Even though the ISDN Remote 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 Switch 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:

- ❒ An approved DEFINITY ECS display telephone
- ❒ Telephone cord
- ❒ If you use an 8434D telephone, an MSP-1 power supply is also required
- ❒ 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 Remote Module (refer to the documentation provided with your data equipment for requirements)
- ❒ The appropriate cord to connect a fax machine, an analog modem, or an analog telephone to the FAX port.
- ❒ To program the COM port on your ISDN Remote 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 Remote Module 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 Remote 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 Remote Module.

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

Table 1-1. ISDN Remote 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

Continued on the next page

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

Specification	Description
Data Bits	7 or 8
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 DEFINITY Extender system:

- The 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 for 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.
- When you are operating in the Call On Demand mode, the message-waiting LED on your display telephone will be updated if you receive a message before you make or receive another call.
- Authorized connections require that a password 8 to 10 digits in length be established. Always use the full 10 digits.

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 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 Remote Module

Installing the ISDN Remote Module involves choosing a proper location and connecting the ISDN Remote Module to the BRI line jack, to the DEFINITY telephone, 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 Remote Module within 500 feet (150 meters) of the DEFINITY ECS telephone. The ISDN Remote 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 telephone lines should be ordered by the customer and installed by the local telephone company prior to installation of the ISDN Extender system.

Electrical Requirements

Use only the AC adapters provided with the ISDN Remote Module. The ISDN Remote 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 Remote 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 Remote Module

Connections for the ISDN Remote Module are shown in Figure 2-1 below. The back panel elements are:

- PHONE/SWITCH is the connection between the DEFINITY ECS telephone and the ISDN Remote Module.
- ANALOG DEVICE is the connection between the ISDN Remote Module and a fax machine, an analog modem, or an analog telephone.
- RS-232 provides for simultaneous dial-up RS-232 communication between equipment at the off-premise site and equipment at the central site.
- ISDN is the connection between the Remote Module and the BRI line.
- +12VDC is the connection for the A/C adapter.

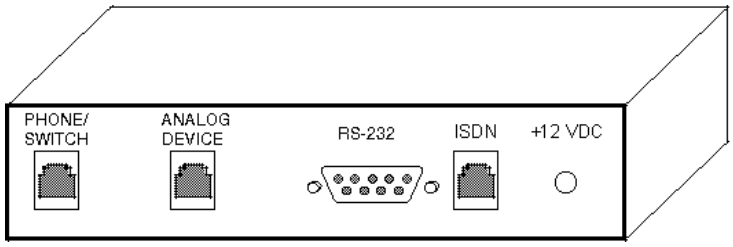

Figure 2-1. ISDN Remote Module Back Panel

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 Remote 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 Remote Module involves connecting the Remote Module to the BRI line jack, the DEFINITY telephone, an optional fax machine, an analog modem, or an analog telephone (optional), and possibly an optional PC. The ISDN-BRI cord and the Extender's power supply are included with your ISDN Remote Module. The telephone cord required for the operation of the telephone is supplied with the display telephone. Power supplies for display telephones are usually ordered separately as well. You must supply any cables required to connect the ISDN Remote Module to your data application.

To install the ISDN Remote 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 Remote 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. 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 ISDN port on the back of the ISDN Remote Module.
2. Connect one end of the D8W cord supplied with the display telephone to the DEFINITY ECS telephone and the other end to the PORT jack of the ISDN Remote Module.
3. Plug the barrel connector of the AC adapter provided with your module into the +12VDC port on the ISDN Remote Module. Plug the adapter into a standard electrical outlet.

The Remote Module begins self-diagnostics. The LED at the top left of the module flashes a pattern of yellow, red, and green blinks. When the Remote 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.

If you have a speakerphone on the DEFINITY ECS telephone, the display on the telephone prompts you to reset the speakerphone.

4. Press the button below the word *Begin* on your telephone display to reset your speakerphone.

The telephone display will show the Main Menu, Go Online?

If the *Go Online?* message does not appear, consult the Troubleshooting guide in Chapter 5 for possible connection errors and suggested corrections.

Connections for Data Transmission

By using the RS232 port on the ISDN Remote 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.

To connect a PC at the off-premise 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 Remote Module. The other cable end must match the user's data application requirements (see Figure 2-2 for pin-out information).

To connect a PC to the Remote Module:

1. Connect the 9-pin male end of the DB9 cable to the RS-232 port of the ISDN Remote Module (see Figure 2-2 for pin-out information).
2. Connect the other end of the cable to your remote PC. Different terminal types require different cable end types. Refer to the user documentation packaged with your PC for requirements.

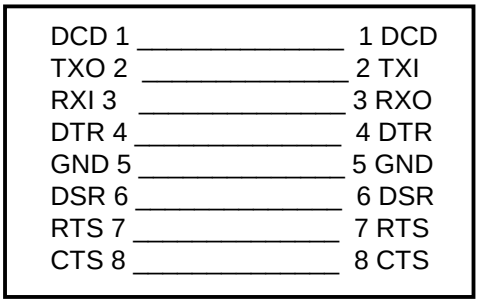

Figure 2-2. RS-232 Cable Pin Connections

Programming

3

How to program the operating parameters for the ISDN Remote Module

Before you can use the ISDN Remote Module, you must program the operating parameters, such as the telephone number, Call On Demand mode, timing parameters, etc.

You can program your ISDN Remote Module by using your display telephone that is connected to the Remote Module. You can set the COM 1 port settings by using a PC running a terminal emulation program such as ProCOMM® or the Windows 95 terminal emulation option.

Using the Telephone for Programming

You can use the DEFINITY telephone connected to the Remote Module to program the operating parameters at the remote location. Prompts appear on the telephone display. To respond to the prompts, press the dialpad keys on the telephone. Table 3-1 shows the keys used to move to or select programming options.

Table 3-1. Telephone Keys Used in Programming

Telephone Key	Function
1	Allows user to move backward through programming menu
2	Allows user to select a parameter for programming
3	Allows user to move forward through programming menu

After you connect your ISDN Remote Module and DEFINITY telephone, the following appears on the telephone display:

```
1: OK  2:NO
Go Online?
```

The Go Online? display is the starting point for programming the Remote Module.

NOTE:
When you are programming and you do not press any key for 30 seconds, the module times out and the display returns to the *Go Online?* prompt.

To access the *Go Online?* display:

If already online:

1. Press **HOLD** four times.

The Disconnect? Menu appears.

2. Press **ENTER**.

The Go Online? display appears.

Use the telephone connected to the Remote Module to program the following:

- ISDN parameters
- Dial-Up Numbers
- Call On Demand (COD) parameters
- Miscellaneous parameters

Additional menus are available to resolve maintenance issues with the DEFINITY Extender:

- Diagnostics
- Serial Number
- Software Version

Setting the ISDN Parameters

To ensure that the Remote 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 ISDN protocol is being used.

To set the ISDN network switch type:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays *Set Switch Type?*

3. Press **2**.

If a switch type was stored, it appears on the display.

If no switch type was stored, the display shows *CO:NI-1*.

4. Press **1** until your ISDN CO switch type is displayed.

5. Press the **DROP or REDIAL** button on the telephone to accept the currently displayed switch type.

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 BRI 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. An example of a SPID is “61755512110101.” In this example, “617” is the area code, “555-1211” 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 first SPID:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays *Set Switch Type?*

3. Press **3** until the display shows *Set SPID1?*
4. Press **2**.

If a previous SPID1 number was stored, the display shows that number.

If no SPID1 number was stored, the display is blank.

5. Enter the first SPID for the Remote Module, up to a maximum of 15 digits.
6. Press **DROP** or **REDIAL** to accept the number.

Setting the Second SPID

The second SPID is for the B-channel that handles the data and/or fax machine, analog modem, or analog telephone.

To set the second SPID:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays Set Switch Type?

3. Press **3** until the display shows *Set SPID2?*
4. Press **2**.

If a previous SPID2 number was stored, the display shows that number.

If no SPID2 number was stored, the display is blank.

5. Enter the second SPID for the Remote Module, up to a maximum of 15 digits.
6. Press **DROP** or **REDIAL** to accept the number.

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:

From the *Go Online?* display

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays *Set Switch Type*?

3. Press **3** until the display shows *Set DN1?*
4. Press **2**.

If a previous DN1 number was stored, the display shows that number.

If no number was stored, the display is blank.

5. Enter the first DN for the Remote Module, up to 15 digits in length.
6. Press **DROP** or **REDIAL** to accept the DN.

Follow these steps to set the second Directory Number:

From the *Go Online?* display,

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays *Set Switch Type?*

3. Press **3** until the display shows *Set DN2?*

4. Press **2**.

If a previous DN2 number was stored, the display shows that number.

If no number was stored, the display is blank.

5. Enter the second DN for the Remote Module, up to 15 digits in length.
6. Press **DROP or REDIAL** to accept the DN.

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 special 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 configure the equipment.

To select *AUTO* as the TEI setting:

From the Go Online display:

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to access the ISDN Parameter Menu.

Telephone displays *Set Switch Type?*

3. Press **3** until the display shows *Set TEI Type*?
4. Press **2** to select the menu item.
5. Press **1** or **3** until *AUTO* appears.
6. Press **2** to select *AUTO* as the TEI type.

To select *FIXED* as the TEI setting:

From the Go On Line display

1. Press **3** until the telephone display shows *Set ISDN Parameters?*
2. Press **2** to enter the ISDN Parameter Menu.

Telephone displays *Set Switch Type?*

3. Press **3** until the display shows *Set TEI Type?*
4. Press **2** to select the menu item.
5. Press **1** or **3** until *FIXED* appears.
6. Press **2** to select *FIXED* as the TEI type.
7. Set TEI1:

a. Press **1** until the display shows *Set TEI1?*

b. Press **2** to input the TEI1 number. TEI1 should be paired with DN1.

If a previous TEI1 number was stored, it appears on the display.

If no number was stored, the display is blank.

c. Enter the first TEI number for the Remote Module (0–63).

d. Press **DROP** or **REDIAL** to accept the number.

7. Set TEI2:

a. Press **3** until the display shows *Set TEI2?*

b. Press **2** to input the TEI2 number. TEI2 should be paired with DN2.

If a previous TEI2 number was stored, it appears on the display.

If no number was stored, the display is blank.

c. Enter the second TEI number for the Remote Module (0–63).

d. Press **DROP** or **REDIAL** to accept the number.

Saving ISDN Changes

If you changed any ISDN parameters, the telephone display prompts you with the option to *Save Changes?*

Do one of the following:

- Press 2 to save the changes.
- Press 3 to discard the changes.

Setting the PBX Phone Number

The PBX Phone number is the Switch Module's first Directory Number (DN1). To establish a connection with the Switch Module, the Remote Module dials this number.

If your system administrator has not preprogrammed this telephone number on your ISDN Remote Module, follow the procedure below to set the PBX Phone number. Ask your system administrator for the telephone number to program.

To set the PBX Phone number:

From the *Go Online* display:

1. Press **3** until the telephone display shows *Set Dial Number?*
2. Press 2 to enter the Set Dial Numbers menu.

Telephone displays *Set PBX Phone Number?*

3. Press **2**.

If a previous number was stored as the DEFINITY ECS dial-up number, the number appears on the display.

If no number was stored, the display is blank.

4. Enter the ISDN Switch Module DN1. You can enter a maximum of 23 digits. Enter the number as you would normally dial it, including the international code, the area code, and any access digits (such as "1") as necessary.
5. Press **DROP** or **REDIAL** to accept the number.

Setting the REM Phone Number

The REM Phone number is the Remote Module's first Directory Number (DN1). To establish a connection with the Remote Module, the Switch Module dials this number.

If your system administrator has not preprogrammed this telephone number for your ISDN Remote Module, follow the procedure below to set the REM Phone Number for your ISDN Remote Module. Ask your system administrator for the telephone number to program.

To set the REM Phone Number:

From the *Go Online* display:

1. Press **3** until the telephone display shows *Set Dial Number?*
2. Press **2** to enter the Set Dial Numbers Menu.

Telephone displays *Set PBX Phone Number?*

3. Press **3** until the display shows *Set REM Phone Number?*
4. Press **2**.

If a previous number was stored as the REM Phone Number, the number appears on the display.

If no number was stored, the display is blank.

5. Enter the ISDN Remote Module DN1. You can enter a maximum of 23 digits. Enter the number as you would normally dial it from the Switch Module location, including the international code, the area code, and any access digits (such as "1") as necessary.
6. Press **DROP** or **REDIAL** to accept the number.

Setting Dialback

Enabling the Dialback parameter directs the ISDN Switch Module to disconnect and then "Dialback" to your ISDN Remote Module after you go online. Dialback enables long distance billing from the ISDN Switch Module location. If the ISDN Remote Module is in COD Mode, the call will timeout at the timeout interval that you specify.

When you connect from the *Go Online?* prompt or place an outgoing call while in COD, the ISDN Remote Module connects to the ISDN Switch Module. Once the connection is made, the connection is automatically disconnected and the call is re-established from the central site. You are then able to make a call.

Dialback should only be enabled when there is a lower cost for long distance calls placed from the ISDN Switch Module location or if you want long-distance charges billed to the central site. Dialback is not recommended if you make frequent short-duration calls. With dialback activated, there are actually two calls being made—one to the central site and the call back to the remote site. This may negate any savings expected as a result of using this feature.

To activate or deactivate the Dialback feature:

From the *Go Online* display:

1. Press **3** until the telephone display shows *Set Dial Number?*
2. Press **2** to access the *Set* Dial Numbers menu.

Telephone displays *Set PBX Phone Number?*

3. Press **3** until the display shows *Set Dialback?*
4. Press **2**.

The display shows the current setting for Dialback.

5. Do one of the following:
   - If the display shows *Enable Dialback*?, press **2** to enable the Dialback feature.

     Telephone displays *Now Enabled.*

   - If the display shows *Disable Dialback?,* press **2** to disable the Dialback feature.

     Telephone displays *Now Disabled.*

6. Press **DROP or REDIAL** to accept the setting.

Setting the Call On Demand (COD) Parameters

Call On Demand (COD) will normally reduce ISDN line costs by connecting the line only when a call occurs. In most cases, Call-On-Demand should be set up when using an ISDN line. When in COD mode, the ISDN Extender system automatically reconnects when you make or receive a new call or when you press any button other than the **DROP** button or dialpad buttons.

Setting COD Mode

COD must be set in one of four modes:

- Disabled
- Ring
- Lamp
- Voice.

NOTE:
COD only affects the first B-channel which is used for voice communication. The second B-channel, used for data and fax transmission, is not affected. Only the Lamp and Voice modes can be used for the CallMaster III and IV telephones.

- DISABLED—In this mode, the ISDN Remote Module remains connected to the ISDN Switch Module at all times, and any charges for the call continue to be billed by the local telephone company until the user logs off.

  You may want to select this mode if you are charged a flat monthly rate for your ISDN service and do not incur long distance charges in connecting to the Switch Module. If you choose this mode, no other COD parameters need to be programmed.

  NOTE:
  Verify your service provider's rates and perform a cost analysis before choosing this mode of operation.

- RING—In RING mode, a ring command from the DEFINITY ECS, the lifting of the handset from the telephone connected to the ISDN Remote Module, or the pressing of a button other than the Drop button or dial pad button causes the ISDN Remote Module to leave COD Waiting and re-establishes the ISDN connection between the ISDN Switch Module and ISDN Remote Module.

  Choose this mode when you are using your display telephone handset instead of a headset to make and receive calls. When you choose this mode, the COD timer starts when there are no active calls on your telephone. When the COD timer reaches the value you program for the Call Timeout parameter, the ISDN line is disconnected and your ISDN Remote Module enters COD Waiting status.

  Your ISDN Extender system will re-establish the connection with the ISDN Switch Module when one of the following occurs:

  - You receive another incoming call.
  - You lift your handset to make a call.
  - You press a button on your display telephone other than the **DROP** button (or a dialpad button.

- LAMP—Choose this mode when you are using a headset connected to your display telephone to make and receive calls. When the COD timer reaches the value you program for the Call Timeout parameter, the ISDN line is disconnected and your ISDN Remote Module enters COD Waiting.

  Your ISDN Extender system re-establishes the connection with the ISDN Switch Module when a call is active on any of the first five call appearance buttons.

- VOICE PATH MODE—Choose this mode when you are using a headset connected to your Call Master III or IV display telephone to make and receive calls (your telephone is always off-hook). Your ISDN Extender system will re-establish the connection with the ISDN Switch Module when the voice-path enabled command is received from the DEFINITY ECS.

To set the COD mode:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set COD Parameters?*
2. Press **2** to access the Set COD Parameters Menu.

Telephone displays Set COD Mode?

3. Press **2** to show the mode choices.
4. Press **1** or **3** until the desired mode appears:
5. Press **2** to accept the displayed mode.
6. Press **3** to move to the next menu
   OR
   Press **1** until you return to the Main Menu.

Setting the COD Timing Parameters

When you activate Call On Demand (COD) mode, you must set the Call Timeout and Connect Timeout parameters to determine the time periods before your ISDN Remote Module goes into COD Waiting status.

Setting the Call Timeout Parameter

When you enable COD mode, the value you set for the Call Timeout parameter determines the amount of time that elapses before the line is disconnected and your ISDN Remote Module is put into COD Waiting status. You can set the time period from 10 seconds to 300 seconds. The default is 15 seconds.

To set the Call Timeout Parameter:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set COD Parameters?*
2. Press **2** to access the Set COD Parameters Menu.

Telephone displays *Set COD Mode?*

3. Press **3** until the telephone display shows *Set Call Timeout?*
4. Press **2** to change the Call Timeout parameter.
5. Using the display telephone dialpad, enter the number of seconds the system waits before disconnecting and entering COD Wait status.
6. Press the **DROP or REDIAL** button on the display telephone to accept the setting.
7. Press **3** to move to the next menu, or press **1** until you return to the Main Menu.

Setting the Connect Timeout Parameter

When you enable COD mode, the value you set for the Connect Timeout parameter determines the minimum amount of time that must elapse after you go online before the line is disconnected and your ISDN Remote Module is put into COD Waiting status. This feature is helpful in avoiding additional charges when your local telephone company charges for a minimum number of seconds on your ISDN line.

For example, if your local telephone company charges a minimum of 60 seconds for each call (each ISDN Remote Module connection to the ISDN Switch Module), it would be advantageous to set the Connect Timeout option to 60 seconds. This would ensure that since you are being billed for the first 60 seconds, you actually use those 60 seconds regardless of the COD Call Timeout setting. If you remain connected for more than 60 seconds, Connect Timeout no longer affects the COD operation and Call Timeout takes over the COD control.

For example, if you are billed for the first 60 seconds of a call, set Connect Timeout to 60 seconds and Call Timeout to 15 seconds. If a call lasts less than 60 seconds, Connect Timeout puts the ISDN Remote Module in COD Waiting status at 60 seconds. If the call lasts more than 60 seconds, Call Timeout places the ISDN Remote Module in COD Waiting status after the phone remains inactive for the duration of the Call Timeout interval, in this case, 15 seconds.

You can set the connect timeout period from 10 seconds to 300 seconds. The default is 60 seconds.

To set the Connect Timeout Parameter:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set COD Parameters?*
2. Press **2** to enter the Set COD Parameters Menu.

Telephone displays *Set COD Mode?*

3. Press **3** until the telephone display shows *Set Connect Timeout?*
4. Press **2** to change the Call Timeout parameter.

The current Connect Timeout setting is shown.

5. Using the display telephone dialpad, enter the number of seconds the system waits before disconnecting. The 60-second default is recommended.
6. Press the **DROP or REDIAL** button (on the display telephone to accept the setting.
7. Press **3** to move to the next menu
   or
   Press **1** until you return to the Main Menu.

Setting the ACD Tone

Enabling the ACD tone causes a tone to sound from a Remote Module in COD Waiting status. If you are using a Remote Module in COD voice mode, it is recommended that you enable the ACD (Automatic Call Distributor) tone.

To set the ACD tone:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set COD Parameters?*
2. Press **2** to access the Set COD Parameters Menu.

Telephone displays Set COD Mode?

3. Press **3** until the telephone display shows *Set ACD Tone?*
4. Press **2**. The display shows the current setting for ACD Tone.
5. Do one of the following:

   - If the display shows *Enable ACD Tone?,* press **2** to enable the ACD tone.

Telephone displays ACD Tone Now Enabled.

   - If the display shows *Disable ACD Tone?,* press **2** to disable the ACD tone.

   Telephone displays *ACD Tone Now Disabled.*

6. Press **1** until you return to the Main Menu.

Setting the Miscellaneous Parameters

Use the display telephone connected to the Remote Module to set the miscellaneous parameters. These parameters are:

- Connect Rate
- Logout Code

Setting the Connect Rate

ISDN B-channels can operate at rates of 64 Kbps or 56 Kbps. When setting the Connect Rate, choose “auto” connect rate, to allow the modules to establish connections at the 64 Kbps rate, or choose “56k,” where the connection rate is a fixed 56 Kbps.

NOTE:
If you experience connection problems with the “auto” setting, change the Connect Rate on both the Switch and Remote Modules to 56 Kbps. In most cases, however, the “auto” setting is recommended.

To set the Connect Rate:

From the *Go Online?* display:

1. Press **3** until the telephone display shows *Set Misc Parameters?*
2. Press **2** to enter the Set Misc Parameters Menu.

Telephone displays *Set Connect Rate?*

3. Press **2** to display the current Connect Rate.
4. Press **1** or **3** to display *AUTO* or *56k.*
5. Press **2** to accept the currently displayed Connect Rate.

Setting the Logout Code

The Logout Code is the sequence of commands sent to the DEFINITY ECS when you disconnect your ISDN Remote Module (go off-line). Check with your System Administrator for the proper logout code sequence for your system.

NOTE:
If you are using Call On Demand, this Logout feature does not work unless you disconnect from the ISDN Switch module using normal exit procedures (press Hold four times and select 2 from the Disconnect screen).

To set the Logout Code:

From the Go Online? display:

1. Press **3** until the telephone display shows *Set Misc Parameters?*
2. Press **2** to access the Set Misc Parameters Menu.

Telephone displays *Set Connect Rate?*

3. Press **3** until the display shows *Set Logout code?*
4. Press **2** to access the Set Logout Code Menu.

Telephone displays the current setting

5. Use the display telephone dial pad to enter the logout code. While you are in the Logout Code screen, the following buttons on your telephone are used to set the logout code sequence:

- Use the Digits 0 through 9 on your dialpad as their own value.
- The Conference button = **BACKSPACE**
- The **HOLD** button = "," representing a two-second delay
- #0 = "D" represents a press of the switchhook.
- #1 = "U" represents the release of the switchhook.
- The '**PREV'** button = **BACKSPACE** (on 6400 Series phones)

NOTE:
The normal on-site operation of logging out your telephone using logout codes is to lift the receiver (release the switchhook), dial the logout code, then hang up (press the switchhook). When you program the Logout Code in the ISDN Remote Module, you must enter the character sequences that simulate the same three actions. For example for a logout code of *89, enter #1*89#0. If your Logout Code begins with a '#' you must precede the Logout Code with a "#'. For example, for a logout code of #89, enter #1##89#0.

6. Press the **DROP or REDIAL** button to accept the code.
7. Press **1** until you return to the Main Menu.

Exiting Programming

To exit the programming mode, press **1** until the telephone display screen shows *Go Online?*

Configuring Your Data Connection

The Enhanced Terminal Interface (ETI) menu system provides you with a user-friendly interface with which to configure your com port settings. Use the Enhanced Terminal Interface ONLY if you use the DEFINITY Extender to connect to your data network. It is recommended the remote module be set up and tested for data connectivity at the switch site. All activities associated with data connectivity are the responsibility of the customer.

The ETI menu requires a terminal emulation prgram, such as HyperTerm and utilizes VT100 terminal emulation. Set the parameters to 57.6, 8,1, and NONE.

To access the ETI Menu:

1. Plug in the Remote Module's RS232 serial port to a PC running a terminal application.

2. Type "AT@MENU"

The ETI Menu appears on the screen.

To select a menu item:

1. Press a hot key (the number of the menu item) OR.

2. Press the arrow up and arrow down keys.

3. Press the **Enter** key when your menu selection is highlighted.

Although rare, the display may become unrecognizable. If this occurs, press **CRTL R** to refresh the display.

You can modify the parameters accessed by the menu by pressing:

1. The **DELETE** key to erase the highlighted parameter, or the **BACKSPACE** key to erase the character to the left of the cursor.

2. The **LEFT** and **RIGHT ARROW** keys to move through the parameter being edited.

3. Type in a new parameter.

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

Setting the COM Port Parameters

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

- 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 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.

To set the COM Port parameters:

1. If you are already in the ETI, skip to Step 2. If you are not in the ETI, 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 and 115.2 Kbps. The default rate is 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.

Setting the PC Modem

When you use a PC connected to the ISDN Remote Module, you can dial up the application server. To do this, you must add a modem driver to your PC configuration.

To add a modem driver in Windows 95 or Windows NT®:

1. Open the *Control Panel* on the desktop.
2. Open *Modems* from the Control Panel Menu.
3. Select *Add* from the Modems Menu.
4. If you do not see a screen asking for the type of modem to install, go to Step 5.

   If you see a screen asking for the type of modem to install, select “Other” for the modem type.
5. Press **NEXT**.
6. Select *Don’t detect my modem. I will select it from a list.*
7. Press **NEXT**.
8. Make the following entries:
   - “Motorola” for the manufacturer
   - “BitSURFR” for the model
9. Press **NEXT**
10. Select the COM port on the PC that will be used
11. Press **NEXT**.
12. Select **FINISH**.
13. Return to the Modems folder “General” window and select the modem you created.
14. Select *Properties*.
15. Select *57600* as the maximum speed.

Your network administrator must set up your dial-up networking connection using the Motorola BitSURFR™ as the modem on the remote PC and the Remote Access Server.

You can establish a dial-up data connection through the ISDN Switch Module, or directly to a Remote Access Server or a Data Router. You are then connected to your corporate network.

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

Operating the ISDN Remote Module

4

Operating the ISDN Remote Module

Once you have installed and programmed the ISDN Remote Module, you are ready to use it. After you have established a connection with the ISDN Switch Module (and consequently the DEFINITY ECS), you can use your DEFINITY ECS telephone as you would any other telephone on the system.

Using your ISDN Remote Module

At the *Go Online?* screen

1. Press **2**

At this point, the ISDN Remote Module dials the ISDN Switch Module at the programmed number (see “Setting the PBX Telephone Number” in Chapter 3, Programming).

The *Enter Password* screen appears.

2. Enter your password.
3. Press the **DROP or REDIAL** button on the telephone connected to the Remote Module.

NOTE:
You must enter your current valid password. A valid password contains 8 to 10 digits. The password will be the one assigned to you by your system administrator.

If a valid password has been entered, the ISDN Remote Module completes the connect sequence and the telephone is operational.

If an invalid password has been entered, you are prompted to re-enter the password. If after three attempts a valid password has not been entered, the ISDN Remote Module disconnects and the *Go Online?* prompt is displayed. Check with your system administrator if you experience problems with your password.

CAUTION:

If you dial 911 on your display telephone while your ISDN Remote Module is connected to the central site, you will reach the 911 office that serves the location of the central site and ***not*** *the 911 office for the location of your ISDN Remote Module. To ensure that you reach the correct 911 service for your area, use a telephone connected locally to make emergency calls.*

If your ISDN Remote Module encounters problems connecting to the ISDN Switch Module, an error message appears on your display. Refer to Chapter 5, “Troubleshooting” for possible error messages and actions you should take.

Disconnecting

To discontinue operation of the DEFINITY Extender system, follow these steps:

1. Press the **HOLD** button on the display telephone four times in rapid succession.

The *Disconnect?* screen appears.

2. Do one of the following:

   - To disconnect, press **2**.

The disconnect sequence appears on the display; after a few seconds the *Go Online?* screen appears. This indicates you are disconnected.

CAUTION:

Be sure that you have completely disconnected by waiting for the Go Online? screen to appear. If you do not completely disconnect, the ISDN Remote Module may continue to try to re-establish the connection, and you will be liable for any applicable toll charges incurred.

- If you do not want to disconnect, press **3** at the *Disconnect*? screen.

The *Reconnect?* screen appears.

3. Do one of the following:
   - Press **1** to return to the *Disconnect?* screen and continue the process of disconnecting the system.
   - Press **2** to retain the connection.
   - Press **3** to go to the Change Password screen.

COD Waiting

If Call On Demand (COD) mode is enabled, the ISDN Remote Module disconnects from the ISDN Switch Module when the COD timer expires. The telephone connected to the ISDN Remote Module displays *COD Waiting*.

During COD Waiting status, the ISDN Switch Module monitors the connection for any activity and the ISDN Remote Module monitors the telephone connected to it for activity. When a call comes in to the ISDN Remote Module, or when you pick up the handset or press a button on the DEFINITY telephone connected to the ISDN Remote Module, the Switch and Remote Modules are re-connected with full functionality.

Aborting a Connection

If the ISDN Switch and ISDN Remote Modules fail to connect, you may want to abort the attempt at connecting. Otherwise, the system may keep trying to establish a connection indefinitely. To abort the connection, press the **DROP or REDIAL** button on the telephone connected to the Remote Module three times. The *Go Online?* display should appear.

Changing a Password

Passwords are initially given to ISDN Remote Module users by the system administrator. As a ISDN Remote Module user, you must use the password given to you by the system administrator the first time you connect to the ISDN Switch Module. After that first connection, follow your corporate guidelines regarding password security. It is a good practice to change your password periodically, provided you have been permitted by the system administrator to change the password.

You cannot set the third digit of your password to a 9. This blocks your ability to change the password in the future. If your password contains a 9 as the third digit, contact your system administrator for assistance if you need to change your password..

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.

Follow these steps to change your password.

1. You must be connected to the DEFINITY ECS to change your password. If you are not connected to the DEFINITY ECS, follow the steps in “Using your ISDN Remote Module” on page 4-2 to connect to the DEFINITY ECS.
2. Once you are connected, press the **HOLD** button on the display telephone four times.

The *Disconnect?* screen appears.

3. Press **3** until the telephone display shows *Change Passwords?*

4. Press **2** until the display shows *Enter old password.*

NOTE:
If you press **2** and the *View S/W Version* screen appears, check with your system administrator. This indicates that you cannot change your own password.

5. Enter your old password (an * appears for each digit entered),
6. Press the **DROP or REDIAL** button.

If the old password is correct, a prompt for the new password appears.

If the old password is not correct, the message *Invalid Password* appears and you are returned to the *Change Password?* screen. Check your password, and repeat Steps 4 and 5. If you continue to have problems, check with your system administrator.

7. Enter the new password (8 to 10 digits; an * appears for each digit entered), and press the **DROP or REDIAL** button. Be sure the new password includes the first two digits of your old password. The first two digits identify your user number.

NOTE:
Although passwords can be 8 to 10 digits in length, use 10 digits for greater security. ***You cannot set the third digit of your password to a 9.*** This blocks your ability to change the password in the future. If your password contains a 9 as the third digit, contact your system administrator for assistance if you need to change your password..

After you enter the new password, you are prompted to enter the password again.

8. Re-enter the new password, and press the **DROP or REDIAL** button.

The display should show *PASSWORD OK.* If the message *PASSWORDS DIFFER* appears, the display returns to repeat the password entry steps again.

NOTE:
The system administrator (User 00) can change all user passwords (see “Changing Passwords” in the “Programming” chapter in the *ISDN DEFINITY® Extender Switch Module User's Guide*). The remaining users can change only their own passwords. For example, User 1 can change only the password which begins with 01 and must use a new password that also must begin with 01.

NOTE:
In some cases your system administrator may have disabled your ability to change your password. Check with your system administrator if you have problems.

Using the Analog Device Port

The Analog Device port on the back of the ISDN Remote Module allows you to plug in a cord from a fax machine, an analog modem, or an analog telephone. This port uses the second Directory Number (DN2) and allows you to make and receive analog calls when there is no data activity. (Data transmission also uses the second B-channel, which is tied to DN2.)

The use of the Analog Device port is completely independent and does not affect usage of DN1 or Call On Demand.

NOTE:
When there is data activity, the Analog Device port cannot make or receive calls. If you need to send or receive a fax, drop the data application.

Checking System Software

You can check the system software version used for the ISDN Switch Module and the ISDN Remote Module.

To check the software version.

You must be connected to the DEFINITY ECS to view the software version. If you are not connected to the DEFINITY ECS, follow the steps in “Using your ISDN Remote Module” on page 4-2 to connect to the DEFINITY ECS.

1. Press the **HOLD** button on the display telephone four times, and the *Disconnect?* screen appears:
2. Press **3** until the *View S/W Version?* screen appears.
3. Press **2**

The Remote Module version screen appears.

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

The Switch version screen follows in a few seconds:

It is possible to check the software version information of the ISDN Remote Module and ISDN Switch Module when you are off line. However, you will only see the ISDN Switch Module information if you had been connected at least once and the ISDN Remote Module has not been powered down since that connection. If you are off-line when you check the software version for the ISDN Switch Module, the information shown on the display will be that of the last ISDN Switch Module to which you were connected in your last session.

To view the software version while off line:

1. Press **3** until the *View S/W Version?* screen appears.
2. Press **2**

The Remote Module version screen appears. The information ~~is~~ displayed is the same as shown above.

Viewing the Serial Number

As problems arise, you may be asked for the serial number of your ISDN Remote Module.

To display the serial number of your module:

1. At the *Go Online?* or the *Disconnect?* display, press **3** until the display shows *View Serial No?*
2. Press **2**.

If you accessed the serial number from the Go Online? display, the following message appears:

Remote xxxxx

then

Switch ?

xxxxx is your module's serial number

If you accessed the serial number from the Disconnect? display, the following message appears:

Remote xxxxx

then

Switch xxxxx

xxxxx is your module's serial number

It is possible to check the ISDN Remote Module's serial number when you are off line. However, the ISDN Switch Module's serial number information appears only if you had been connected at least once and the ISDN Remote Module has not been powered down since that connection. If you are off-line when you check the software version for the ISDN Switch Module, the information shown on the display will be that of the last ISDN Switch Module to which you were connected in your last session.

Diagnostics Menu

The ISDN Remote Module has a Diagnostics Menu used by Lucent Technologies or Authorized Dealer personnel to assist in identifying problems on your ISDN Extender system. You may be asked to access this menu if you experience problems and require Lucent Technologies telephone support.

To access the Diagnostics menu:

1. At the *Go Online?* screen, press **3** until the *Diagnostics Menu?* screen appears:
2. Press **2** to access the Diagnostics Menu.

The screen shows three options used by Lucent Technologies technical support or your Authorized Dealer to determine whether error codes are present.

The following options are shown:

View Remote Stats
View Switch Stats
Reset Stats

Refer to Chapter 5, "Troubleshooting" in this guide for a list of error codes and their meanings.

Troubleshooting

5

Troubleshooting, LED Activity, and Error Messages

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 Module and ISDN Switch Module 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 Remote Module by checking the following general areas:

1. Check that the AC power adapter is connected to the ISDN Remote Module and that the outlet has power.
2. Verify that the ISDN Remote Module LEDs are 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. Check the error message on the telephone connected to the Remote Module, and proceed according to the “Error Messages” section in this chapter.
7. Verify that the ISDN parameters and the Dial Numbers are programmed correctly.

If you cannot locate the source of the problem, contact your system administrator for assistance.

LED Sequences

The LED on the ISDN Remote 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 5-1 contains the LED flash sequences that may be observed on the ISDN Remote Module or ISDN Switch Module during power up; Table 5-2 contains the LED flash sequences during power up verification and Table 5-3 contains flash sequences that indicate errors. Refer to the tables below if you experience problems when powering up.

Table 5-1. 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 Check sum 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 5-2. 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 5-3. 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 5-3. 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 5-3. 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.

Diagnostics Statistics

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, ***you should not power down the module when you experience 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. You may be asked to access Diagnostics Statistics by a Lucent Technologies representative or Authorized Dealer to help resolve any problems you report.

Connection Errors

During the *Go Online?* process, or when you are 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 5-4 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 5-4. Connection Errors

Message	Possible Cause	Action
Line Inactive	There is a problem with the physical connection with the ISDN line interface.	Ensure your 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.	Check ISDN parameters.
	The ISDN Remote Module is not responding.	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 you entered the correct SPID and DN pair combinations.
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*.

Continued on next page

Table 5-4. Connection Errors, *continued*

Message	Possible Cause	Action
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 not operating correctly.	Check with ISDN service provider and request that they test the ISDN line,
	Too 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.
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.

Continued on next page

Table 5-4. Connection Errors, *continued*

Message	Possible Cause	Action
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.
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.

Continued on next page

Table 5-4. Connection Errors, *continued*

Message	Possible Cause	Action
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.
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 5-5 contains the possible COD failure messages.

Table 5-5. 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.

Continued on next page

Table 5-5. 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 5-6 contains the possible fatal error messages.

Table 5-6. 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, your system administrator 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. 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 you have an ISDN Remote Module and not an ISDN Switch Module.
- ❒ 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 Remote Module. Refer to "Setting the Dial Number" on page 3-11 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 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 Module using the information in the "LED Sequences" sequences on page 5-3 of this section.

ISDN Switch Module Will Not Answer

- Someone at the central site could be using the port and is unaware you are trying to connect. Wait for a short period, then try connecting again.
- Ensure you entered the correct PBX dial number (the ISDN Switch Module DN1 number).
- 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 Remote Module.

AT Commands are included in this appendix to help your 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

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

Command	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

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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 then three consecutive escape characters are received, the module will return 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>*

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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	
&F*n*	Load active port profile with factory default profile *n*. (see note)	*n* =0 or blank
&W*n*	Writes the active port profile (into non-volatile memory) to stored profile *n*. (see note)	*n* =0 or blank
Z*n*	Reloads active profile from stored profile *n*.	*n* =0 or blank

Note: Applies to software release 1.20 or higher.

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.

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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.

Central-Site Lines
Communication lines (usually twisted-pair) that are used to connect the DEFINITY ECS to the DEFINITY telephone.

D

Direct Line
A dedicated circuit or private leased line.

Dedicated Subscriber Lines
Communication lines (usually twisted pair) that are used to connect central site telephone equipment (such as a PBX) 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, analog modem, or analog telephone 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 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 DEFINITY Extender module that connects to the DEFINITY ECS.