



**IQ Probe**  
**Frame Relay**  
**Monitoring Probe**

**USER MANUAL**

<b>IQ Probe Unit</b>	<b>1200214L1</b>
<b>ESP 4-wire SW56 DBU Card</b>	<b>1204001L1</b>
<b>ESP V.34 DBU Card</b>	<b>1204002L1</b>
<b>ESP ISDN DBU Card</b>	<b>1204004L1</b>
<b>ESP External DCE Card</b>	<b>1204006L1</b>

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## **ABOUT THIS MANUAL**

This manual is arranged so you can quickly and easily find the information you need. The following is an overview of the contents of this manual:

- Chapter 1, Introduction, familiarizes you with frame relay networks and IQ Probe highlights.
- Chapter 2, Installation, describes the IQ Probe connectors (pin assignments are given in Appendix A) and provides an installation diagram.
- Chapter 3, Operation, explains how to operate your IQ Probe using either the front panel or a terminal interface.
- Chapter 4, Applications, provides examples of some common IQ Probe applications. This chapter includes network diagrams as well as configuration examples.
- Chapter 5, Configuration Overview, explains how to access the IQ Probe configuration menu and provides menu trees for both the front panel and the terminal interface.
- Chapters 6 through 9 provide brief explanations for selections made in the Configuration menus. These chapters are based on the first level menu branches of the Configuration menu: DTE Port, DCE Port, Dial Backup, and System Configuration.
- Chapter 10, Statistics, describes how to access statistical information from the IQ Probe.
- Chapter 11, Testing, explains how to access the IQ Probe diagnostic features, including PVC loopback and ping tests.
- Chapter 12, Activating Dial Backup Options, provides information on the dialing options accessed through the Main menu.
- Appendix A provides pinouts for the IQ Probe connectors.
- Appendix B contains product specifications.

**NOTE**

*Notes provide additional useful information.*

**CAUTION**

*Cautions signify information that could prevent service interruption.*

**WARNING**

*Warnings provide information that could prevent damage to the equipment or endangerment to human life.*

## **IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS**

When using your telephone equipment, please follow these basic safety precautions to reduce the risk of fire, electrical shock, or personal injury:

1. Do not use this product near water, such as near a bath tub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
2. Avoid using a telephone (other than a cordless-type) during an electrical storm. There is a remote risk of shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord, power supply, and/or batteries indicated in the manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for special disposal instructions.

FCC regulations require that the following information be provided in this manual:

1. This equipment complies with Part 68 of the FCC rules. On the bottom of the ESP DBU card is a label that shows the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, provide this information to the telephone company.
2. If this equipment causes harm to the telephone network, the telephone company may temporarily discontinue service. If possible, advance notification is given; otherwise, notification is given as soon as possible. The telephone company will advise the customer of the right to file a complaint with the FCC.
3. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment; advance notification and the opportunity to maintain uninterrupted service are given.
4. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. The telephone company may require this equipment to be disconnected from the network until the problem is corrected, or it is certain the equipment is not malfunctioning.
5. This unit contains no user-serviceable parts.
6. An FCC compliant telephone cord with a modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using an FCC compatible modular jack, which is Part 68 compliant.
7. The following information may be required when applying to the local telephone company for dial backup service:

<b>Service Type</b>	<b>REN/SOC</b>	<b>FIC</b>	<b>USOC</b>
56 kbps Digital Interface	6.0F	04DU5-56	RJ-48S
64 kbps Digital Interface	6.0F	04DU5-64	RJ-48S
Loop Start (V.34)	0.8B/0.4A	02LS2	RJ-11C

8. The REN is useful in determining the quantity of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, the sum of the RENs of all devices should not exceed five. To be certain of the number of devices you may connect to your line as determined by the REN, call your telephone company to determine the maximum REN for your calling area.
9. This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. (Contact your state public utility commission or corporation commission for information.)

**FEDERAL COMMUNICATIONS COMMISSION  
RADIO FREQUENCY INTERFERENCE 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 frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

***Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.***

***WARNING***

*Change or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

**CANADIAN EMISSIONS REQUIREMENTS**

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministre des Communications.

## CANADIAN EQUIPMENT LIMITATIONS

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

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

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

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



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

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

## **ISDN Service Ordering Information for the ADTRAN IQ Probe With ISDN Dial Backup**

For ADTRAN IQ Probe ISDN dial backup applications, the following guide can be used as an aid in ordering basic ISDN service from your local telephone company. The ADTRAN IQ Probe ISDN includes NT1 and Terminal adapter functionality and supports data rates up to 128 kbps.

### **Request an ISDN Basic Rate Interface (BRI) line with the following features:**

U-interface reference point  
2B1Q line coding  
1B+D Service (supports up to 64 kbps)  
2B+D Service (supports up to 128 kbps)

### **The IQ Probe ISDN supports the following switch types and software protocols:**

<i>Lucent 5ESS</i>	Custom, 5E6 and later software, National ISDN-1
<i>NT1 DMS-100</i>	BCS-32 and later software (Pvc1), National ISDN-1 (Pvc2)
<i>Siemens EWSD</i>	National ISDN-1

Request that the ISDN line allocate one DYNAMIC Terminal Endpoint Identifier (TEI) for the number.

### **For service offered from an Lucent 5ESS, request a point-to-point line with the following features:**

Feature: *Value*  
B1 Service: *On Demand (DMD)*  
Data Line Class: *Point-to-Point*  
Maximum B Channels: *1 (1B+D) or 2 (2B+D)*  
Circuit Switched Data (CSD) Bearer Channels: *Any*  
Number of CSD Calls: *1 (1B+D) or 2 (2B+D)*  
Terminal Type: *Type A*



**Turn the Following Features Off:**

Packet Mode Data  
Multi-line Hunt  
Multiple Call Appearances  
Electronic Key Telephone Sets (EKTS)  
Shared Dictionary Numbers  
Accept Special Type of Number  
Intercom Groups  
Network Resource Selector (Modem Pools)  
Message Waiting  
Hunting  
InterLata Competition

**For service offered from a Northern Telecom DMS-100, request a Point-to-Point Multi-Point line with the following features:**

Line Type: *Basic Rate, Functional*  
Electronic Key Telephone Sets (EKTS): *No*  
Call Appearance Handling (CACH): *No*  
Non-Initializing Terminal: *No*  
Circuit Switched Service: *Yes*  
Packet Switched Service: *No*  
TEI: *Dynamic*  
Bearer Service: *Circuit Switched voice and data permitted on any B channel (packet mode data not permitted)*



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# Chapter 1

## Introduction

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### PRODUCT OVERVIEW

The ADTRAN IQ Probe provides the visibility and control needed for both the physical and logical connections made in frame relay networks. The IQ Probe provides logical layer monitoring and management for frame relay. Each permanent virtual circuit (PVC) accessed through an IQ Probe is managed end-to-end as if it were a leased line connection. Real-time statistics on throughput, bandwidth utilization, availability, bursting, congestion, and network delay are collected and stored. The statistics are viewable through the IQ Probe using the front panel, the VT 100 interface, or the Frame IQ MIB (management information base). This information can be gathered by management systems via SNMP (simple network management protocol) and used to monitor network health and perform long-term network planning.

The unit's embedded SNMP agent provides complete SNMP access to the unit. SNMP access is available through the DTE or DCE port or through an integral SLIP (serial line internet protocol) or PPP (point-to-point protocol) async port. The IQ Probe also provides integrated 10baseT ethernet access for SNMP.

The following are features of the IQ Probe:

- Complete and comprehensive frame relay monitoring
- Real-time measurement of bandwidth utilization, committed

- information rates (CIRs), and excess burst rates on each PVC
- True non-intrusive, in-band transmission of statistics
- Embedded SNMP and TELNET through the DTE, DCE, or SLIP/PPP port
- Embedded SNMP and TELNET access available through the integrated 10baseT ethernet port
- Control port provides SLIP and async PPP access to SNMP or VT 100 terminal configuration
- Dial backup (DBU) available with ESP DBU cards; options include 4-wire Switched 56 (SW56), V.34, ISDN, and external DCE card
- End-to-end network round trip delay measurements for network optimization
- Frame IQ MIB is standard ASN.1 format compatible with popular enterprise reporting systems
- Optional IQ View™ software system provides a cost-effective, easy-to-use GUI (graphical user interface) for performance management
- DTE (data terminal equipment) and DCE (data communications equipment) interfaces support interface standards of EIA-232, V.35, X.21, and EIA-530

## **UNDERSTANDING FRAME RELAY**

Frame relay is a wide area network (WAN) service designed to minimize physical connections. This is accomplished by using virtual connections within the frame relay cloud and accessing these virtual circuits with normally one physical connection at each location to the frame relay service. Virtual circuits are addressed using header information at the beginning of each frame. These frames are formatted by a device such as a router or FRAD (frame relay access device) and monitored by the IQ Probe.

ANSI (American National Standards Institute) standards describe how each frame must be constructed to provide interoperability between CPE equipment and frame relay switching equipment. Each frame must contain a header, at least one byte of information data, two bytes of CRC16, and a trailing flag 0x7E.

This header information contains a virtual circuit address known as a DLCI (data link connection identifier). The header information also contains bits used for network congestion control.

Frame relay virtual circuits may be defined as permanent (PVC) or switched (SVC). PVCs have the same DLCI for a given path each time a user protocol session is established. The network service provider assigns these DLCIs at subscription time. SVCs, on the other hand, have DLCIs dynamically assigned each time a user protocol session is established. The CPE equipment must request a call and the DLCI is assigned by the network switching equipment. This DLCI is valid until the call is disconnected and may be assigned a different value each time a call is requested.

## **SNMP MANAGEMENT**

SNMP management capability is provided in-band with support for RFC 1315 (frame relay DTE MIB), RFC 1213 (MIB II), and ADTRAN Enterprise MIB. MIB files are available from ADTRAN in the support section of the ADTRAN Web page at [www.adtran.com](http://www.adtran.com). TELNET capability is also supported. For non-TCP/IP environments, VT 100 and front panel operation are supported.

The IQ Probe's embedded SNMP feature allows the unit to be accessed and controlled by a network manager in-band at the DTE or DCE interface, out-of-band at the control port via SLIP or async PPP, or using a LAN connection.

The term SNMP broadly refers to the message protocols used to exchange information between the network and the managed devices, as well as to the structure of network management data bases. The three basic components of SNMP follow:

### **Network Manager**

Control program that collects, controls, and presents data pertinent to the operation or management of the network devices. It resides on a network management station.

**Agent**

Control program that resides in each connected network device. This program responds to queries and commands from the network manager and returns requested information or invokes configuration changes initiated by the manager.

**MIB**

Index to the organized data within a network device. It defines the operation parameters that can be controlled or monitored.

**TELNET**

TELNET provides a password-protected, remote login facility to the IQ Probe. TELNET allows a user on a network manager to control the IQ Probe through the terminal menus.

**DIAL BACKUP OPERATION**

The IQ Probe dial backup (DBU) option cards allow frame relay circuit outage recovery for one user-to-network interface (UNI) at a time. The IQ Probe can be configured to originate a call based on physical layer conditions and/or PVC signaling loss. Once the criteria are met, the IQ Probe establishes a call to the configured phone number and the connection is used to carry traffic for the PVC(s) configured for DBU operation.

These cards allow the unit receiving the call to continue to use the network frame relay circuit for PVCs that are not affected by the outage, while using the DBU interface for PVCs that are inactive due to the outage. An IQ Probe with multiple PVCs to multiple sites can also originate a call to one site during an outage and restore connection for PVCs to that destination.

The cards are field-installable by the customer. See the chapter *Installation* for information on installing DBU cards. The DBU cards are compatible with other ADTRAN ESP products supporting DBU. The backup options are described in the following section, *ESP Card Options*. Contact the local telco provider to determine which services are available in your area. See the chapter *Applications* for more information, including an example of a dial backup application.

## **ESP CARD OPTIONS**

### **4-Wire Switched 56 DBU Card**

This dial-up 4-wire SW56 DBU card allows you to pay for data connection only for the time the unit is active. The regional operating companies provide the 4-wire local loop service to SW56 customers. This card is compatible with AT&T Accunet and Sprint SW56 type services.

### **V.34 DBU Card**

This module backs up the leased line application at data rates up to 33.6 kbps over an ordinary telephone network.

### **ISDN DBU Card**

2B+D Basic Rate ISDN service provides a switched 56/64 kbps circuit with support for bonding of 112/128 kbps. This DBU card supports a U-interface to the Basic Rate ISDN and is compatible with National ISDN, Lucent, and DMS.

### **ESP DCE Card**

This module connects an external DCE device to the IQ Probe for the purpose of using an external DSU/CSU to support access rates up to 2.048 Mbps.

## **WARRANTY AND CUSTOMER SERVICE**

ADTRAN will replace or repair this product within five years from the date of shipment if it does not meet its published specifications or fails while in service. For detailed warranty, repair, and return information refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure.

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or further information, contact one of the numbers listed on the inside back cover of this manual.



# Chapter 2

## Installation

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### **UNPACK, INSPECT, POWER UP**

#### **Receipt Inspection**

Carefully inspect the IQ Probe for any shipping damage. If damage is suspected, file a claim immediately with the carrier and contact ADTRAN Customer Service. If possible, keep the original shipping container for use in shipping the IQ Probe for repair or for verification of damage during shipment.

#### **ADTRAN Shipments Include**

The following items are included in ADTRAN shipments of the IQ Probe:

- IQ Probe unit
- User manual
- 8-position modular to 8-position modular cable and a modular to female DB-25 adapter for access to the Control/SLIP/PPP port
- Power cord



*The ADTRAN IQ Probe MIB is available from ADTRAN in the support section of the ADTRAN Web page at [www.adtran.com](http://www.adtran.com).*

The following items are included in ADTRAN shipments of ESP DBU cards:

- ESP DBU card
- An 8-position modular to 8-position modular cable for the 4-wire SW56 and ISDN DBU options or an 8-position modular to 4-position modular cable for the V.34 DBU option

### **Customer Provides**

You must provide male interface cables for the DTE and DCE ports. Use a standard DB-25 cable for EIA-232 or EIA-530, or use an optional ADTRAN adapter cable for X.21 or V.35. Part numbers for the optional cables are given later in this chapter in the section *Rear Panel*.

For SNMP management not accessed through the DTE or DCE port, you must provide access to the IQ Probe either through a SLIP port, Async PPP port (requires a male 25-pin D-type connector), or a 10baseT ethernet port. See the appendix *Pinouts* for the pin assignments of the control port (for SLIP and Async PPP) and the ethernet port.

### **Power Up**

The IQ Probe is provided with an IEC-type 8-foot power cord, terminated by a three-prong plug which connects to a grounded power receptacle with supply voltage from 90-240 VAC.



*For international applications, please use the appropriate IEC adapter cable for power connection.*



*Power to the IQ Probe must be provided from a grounded 90-240 VAC, 50/60 Hz receptacle.*

## REAR PANEL

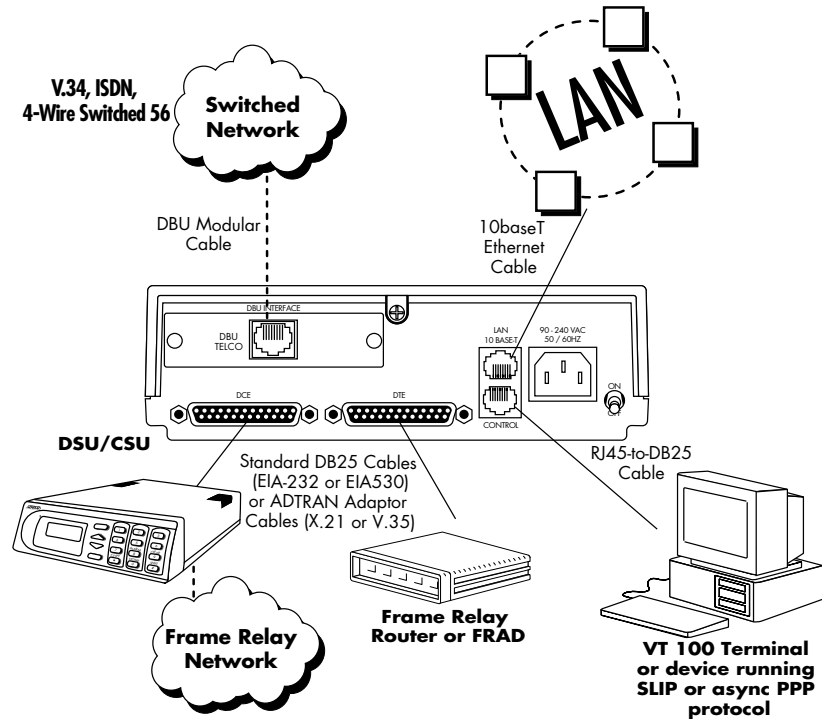
Connectors for the IQ Probe are located on the rear panel. The DTE and DCE connectors provide DTE DB-25 interfaces. These connectors can be cabled to V.35 or X.21 interfaces (using optional ADTRAN adapter cables) or to an EIA-232 or EIA-530 interface (using a standard DB-25 cable). Part numbers for the optional cables follow:

DB-25 to V.35 male adapter cable: 1200281L1

DB-25 to V.35 female adapter cable: 1200285L1

DB-25 to female DB-15 (X.21) adapter cable: 1200282L1

The DBU option card slot, control port, 10baseT LAN port, IEC power receptacle, and power switch are also found on the rear panel. Connector pin assignments are listed in the appendix *Pinouts*. The IQ Probe rear panel is shown in Figure 2-1 with an optional ESP DBU card installed. The connectors are described in the sections following the figure.



Item	Function
DBU Interface Card Slot	Houses an ESP DBU card
DCE Interface	Connects to a DSU/CSU which connects to the dedicated frame relay circuit
DTE Interface	Provides high-speed DTE interface to a FRAD
LAN 10baseT Interface	Provides ethernet connection for SNMP/TELNET access
Control Port	Connects to a VT 100 terminal or a device running SLIP or async PPP protocol
IEC Power Receptacle	Connects to standard IEC power cord
Power Switch	Turns power on or off

**Figure 2-1**  
*IQ Probe Rear View*

## DBU Interface Card Slot

The IQ Probe rear panel has one card slot (labeled **DBU INTERFACE**) for the installation of dial backup and DCE cards. To insert cards, perform the following procedure:

1. Remove power from the IQ Probe.
2. Slide the card into the DBU Interface rear slot until the card panel is flush with the IQ Probe chassis.
3. Push card locks in (until they click) to secure the card and ensure proper installation.



*Remove power from the unit prior to installing or removing option cards.*

## DCE Interface

Connect the IQ Probe to the dedicated frame relay circuit through a DSU/CSU connected to the IQ Probe DCE port. The port provides an EIA-232 or EIA-530 interface (using a standard DB-25 cable) or it can be cabled to an X.21 or V.35 interface (using optional ADTRAN adapter cables). Part numbers for the adapter cables are listed earlier in this section. The pinouts for this connector and for the adapter cables are listed in the appendix *Pinouts*.

## DTE Interface

Connect a FRAD/router to the DTE port using a standard DB-25 cable (for EIA-232 or EIA-530) or an ADTRAN adapter cable (for X.21 or V.35). Part numbers for the adapter cables are listed earlier in this section.

The maximum cable lengths recommended are 15 meters for EIA-232, 60 meters for EIA-530, 60 meters for X.21, and 30 meters for V.35. The pin assignments for this connector and for the adapter cables are listed in the appendix *Pinouts*.



*To prevent possible radio frequency interference emissions, a shielded cable is required.*

### **LAN 10baseT Interface**

This port is an 8-pin modular connector that provides a 10baseT ethernet local area network (LAN) interface. This LAN interface is used for SNMP and TELNET control.

### **Control Port**

The IQ Probe has an 8-pin modular jack labeled **CONTROL**. The control port provides connection to a VT 100 EIA-232 compatible interface, a device running SLIP protocol, or a device running Async PPP protocol. An 8-foot cable with adapter connector provides a standard DB-25 EIA-232 interface. See the appendix *Pinouts* for the control port's pin assignments. The operation of this port is described in the *Operation* chapter.

# Chapter 3

## Operation

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### FRONT PANEL

The IQ Probe faceplate is shown in Figure 3-1. Descriptions of each part of the front panel follow.

#### **LCD Window**

Displays menu items and messages in 2 lines by 16 characters.

#### **Enter**

Selects active menu items. To activate a menu item, scroll to it using the arrow keys or press the number of the item. The flashing cursor indicates the active parameter. Press **Enter** to select the active menu item.

#### **Up and Down Arrows**

Up and down arrows scroll through and activate the menu items of the current menu. The flashing cursor indicates the active parameter.

#### **Cancel**

Pressing the **Cancel** key stops the current activity and returns to the previous menu. Repeat until the desired menu level is reached. When a submenu item is displayed, press **Cancel** to exit the current display and return to the previous menu.

### **Quick Key**

Pressing the **Quick** key returns the front panel to the Main menu.

### **Numeric Keypad**

The numeric keypad contains the numbers 0 through 9 and alpha characters A through F, which are used to activate menu items and enter information such as the IP address.

### **Next, Prev, Add, Delete**

To activate these functions, press and release the **Shift** key, then press the **Next**, **Prev**, **Add**, or **Delete** key. Use these keys when editing tables such as the PVC Configuration table. See the chapter *Configuring the DCE Port* for more information.

### **Shift**

To activate a menu item designated by an alpha character rather than a number, place the cursor on the menu item using the up and down arrows or press **Shift** and then the letter. The flashing cursor indicates the active parameter. Press **Enter** to select the item. The **Next**, **Prev**, **Add**, and **Delete** keys are also activated by first pressing **Shift**.



page holder for foldout Figure 3-1

page holder for back of foldout Figure 3-1

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## LED Descriptions

The IQ Probe has seven LED indicators: RS, CS, TD, RD, CD, TR, and ALM. These LEDs are identified as follows:

**RS: Request to Send**

Reflects the status of the RS pin of the DTE/DCE interface.

**CS: Clear to Send**

Reflects the status of the CS pin of the DTE/DCE interface.

**TD: Transmit Data**

This LED is active when the IQ Probe DTE/DCE port is transmitting data.

**RD: Receive Data**

This LED is active when the IQ Probe DTE/DCE port is receiving data.

**CD: Carrier Detect**

This LED reflects the status of the CD pin of the DTE/DCE interface.

**TR: Data Terminal Ready**

This LED reflects the status of the TR pin of the DTE/DCE interface.

**ALM: Alarm**

This LED is active when an alarm condition exists (such as when the network frame relay signaling state is down).

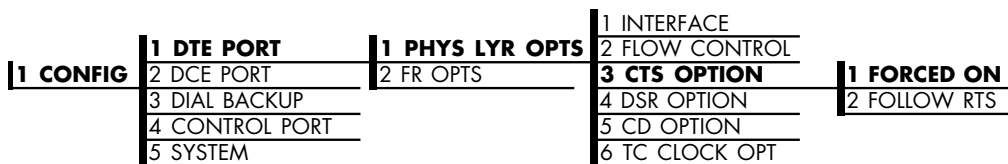


*The LEDs reflect the states of either the DTE side or the DCE side. This is selectable in the IQ Probe Configuration menu (CONFIGURATION ->SYSTEM -> SYSTEM LEDS REFLECT).*

## Front Panel Operation

To choose a menu item, press the corresponding number or alpha character on the keypad. Press **Shift** to activate menu items with alpha selections. Scrolling to the selection by pressing the up and down arrows also activates the menu items. The flashing cursor indicates the active selection. Press **Enter** to select the item. The following steps and Figure 3-2 illustrate how to select IQ Probe options:

1. Activate Configuration (CONFIG) by using the arrow keys or by pressing **1**. The cursor will flash on the number next to the activated selection. Press **Enter**.
2. Use the arrow keys to view submenu items.
3. Choose an item on the submenu such as DTE PORT.
4. Activate DTE PORT by using the arrow keys or by pressing **1**. Press **Enter**.
5. Activate PHYS LYR OPTS by using the arrow keys or by pressing **1**. Press **Enter**.
6. Activate CTS OPTION by using the arrow keys or by pressing **3**. Press **Enter**.
7. Choose **FORCED ON** by using the arrow keys or by pressing **1**. Press **Enter**.



**Figure 3-2**  
*Example of Basic Front Panel Menu Navigation*

## VT 100 Terminal Connection and Operation

To control the IQ Probe using a VT 100 terminal, follow this procedure:

1. Set the IQ Probe baud rate to match the terminal through the front panel (maximum rate is 38.4k). Select **1 CONFIG**, then **4 CONTROL PORT**.
2. Using the ADTRAN-provided VT 100 terminal adapter, connect the COM port of a VT 100 compatible terminal or equivalent to the eight-pin modular jack labeled **CONTROL** on the rear of the IQ Probe. This connection is used for both local and remote configuration.
3. Open the connection and press **Enter** repeatedly until the Login Menu appears (Figure 3-3).
4. Select Local Login to configure the IQ Probe unit connected to the terminal. Select Remote Login to configure a remotely located IQ Probe unit. For remote applications, at the remote DLCI prompt, enter the outgoing DLCI (see the following note) by pressing **1**, then **Enter**, entering the DLCI number, and pressing **Enter** again. Next, select Begin Remote Session by pressing **2** and **Enter**.



*When entering the DLCI for a remote application, enter the DLCI associated with the local unit that you are logged in to (not the far end DLCI).*

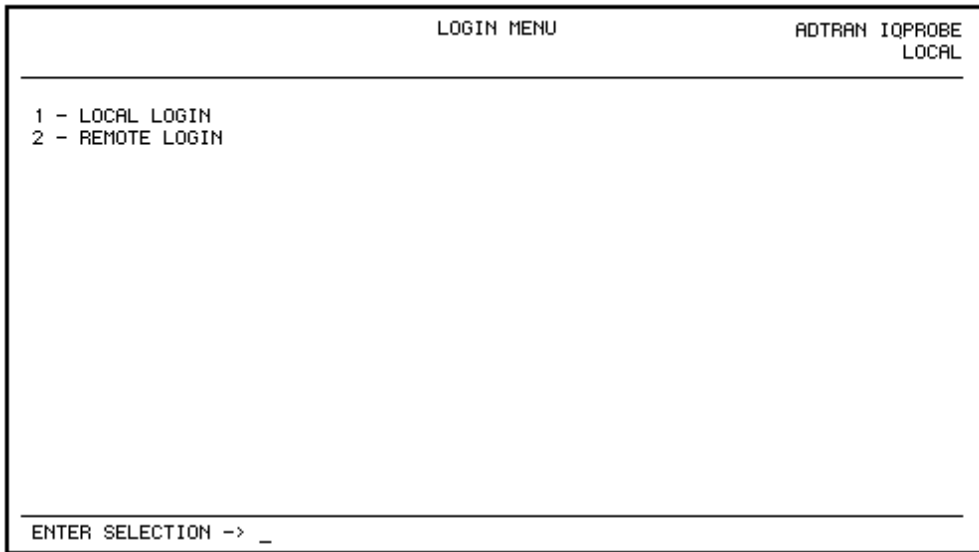


*If the wrong DLCI is entered or a network problem exists, the screen freezes at the **Press any key to continue** prompt. Press **CNTL + L** twice to return the unit to the Login screen.*

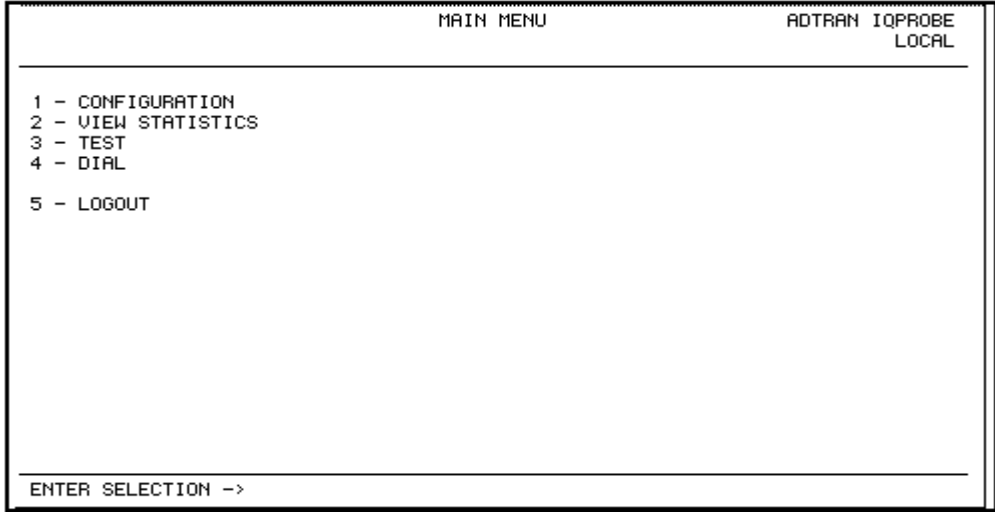
5. Enter the password. The factory default password is **adtran**. The Main menu will appear (Figure 3-4).
6. Make selections by entering the number corresponding to the chosen parameter. Press **ESC** to return to the previous screen.



*In the upper right-hand corner of the VT 100 screen, LOCAL or REMOTE is displayed, indicating which unit the current screen represents. See Figure 3-3.*



**Figure 3-3**  
*Terminal Login Menu*



**Figure 3-4**  
*Terminal Main Menu*

**IQ PROBE MENU STRUCTURE**

The opening menu is the access point to all other operations. The Main menu branches are Configuration, View Statistics, Test, Dial, and Logout. See Figure 3-4. Each Main menu item has several functions and submenus to identify and access specific parameters.



*The Logout selection is only available on the terminal interface. The Dial selection is only available when an ESP DBU card is installed.*



*In this chapter, the terminal selections are listed first, followed by the Front Panel selections (if the names differ).*

## Main Menu

Definitions for the branches of the Main menu follow:

### **Configuration (CONFIG)**

Configuration is used to select DTE, DCE, dial backup, and system operating parameters. For more information on configuration options, see the following chapters: *Configuration Overview*, *DTE Port Configuration*, *Configuring the DCE Port*, *Configuring Dial Backup Options*, and *System Configuration*.

### **View Statistics (STATS)**

This selection displays statistical information for the DTE port, DCE port, dial backup port, and the system. See the chapter *Statistics* for more information.

### **Test**

Test options allow you to perform ping and PVC loopback tests. See the chapter *Testing* for more information.

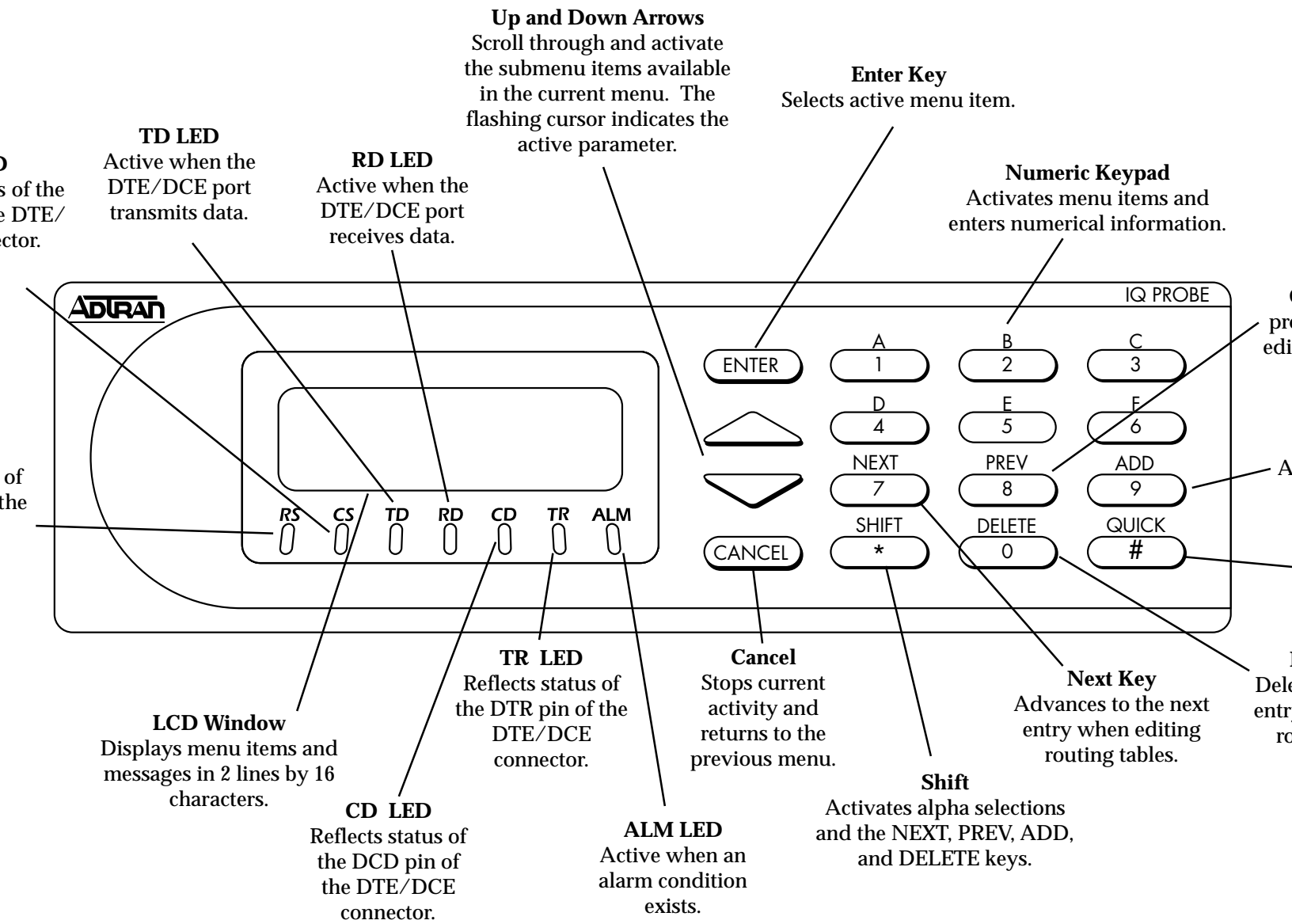
### **Dial (with ESP DBU card installed)**

This selection allows you to access manual dialing capabilities. See the chapter *Activating Dial Backup Options* for more information.

### **Logout (terminal menu only)**

This parameter logs out of the system.





**Figure 3-1**  
IQ Probe Front Panel



# Chapter 4

## Applications

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This chapter provides examples of some common IQ Probe management options as well as an example of a dial backup application. The management application examples include VT 100 management, out-of-band SNMP/TELNET management, and in-band PVC SNMP/TELNET management. Descriptions and configuration tips for these options are provided in the sections that follow.



*The application drawings in this chapter show routers as the frame relay device. The frame relay device could be any device with frame relay capabilities. However, to use in-band management, the management DLCI must be RFC 1490 encapsulated IP traffic.*

### MANAGEMENT APPLICATIONS

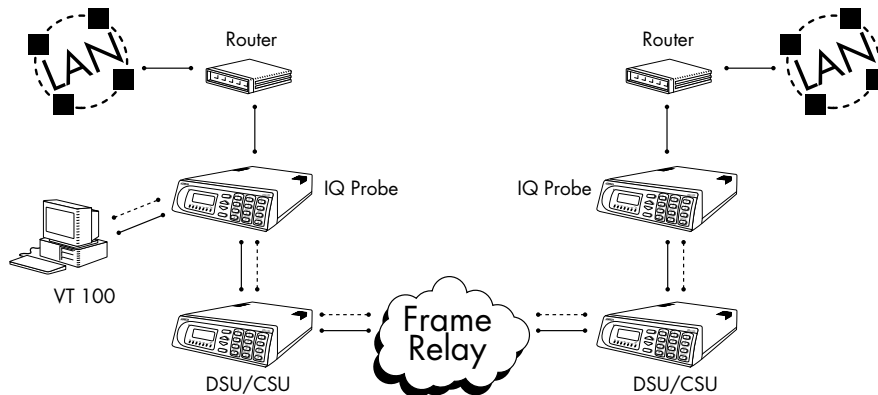
One of the main advantages of the IQ Probe is management flexibility. The IQ Probe front panel interface provides complete configuration capabilities and viewing of key frame relay statistics information. Other management options described in this chapter provide configuration and diagnostics capabilities as well as all-inclusive statistics information.

## Local VT 100 Terminal Management

Connect a VT 100 terminal to the IQ Probe **CONTROL** port. This interface provides full-screen configuration and all-inclusive statistics access. VT 100 management also allows for remote configuration. Through this port, a remotely located ADTRAN IQ device is fully accessible for configuration, diagnostics, and statistics viewing. Figure 4-1 gives an example of a VT 100 application.



*VT 100 remote mode is proprietary and non-intrusive. Therefore, you can perform all VT 100 management functions without disrupting the flow of data.*



**Figure 4-1**  
*VT 100 Management Application Example*

### Minimum Configuration Requirements for VT 100 Management

The following options are the minimum configuration requirements for establishing VT 100 management access.

#### **Baud Rate**

Set the baud rate to match the VT 100 terminal rate. This is accessible from the front panel only (select CONTROL PORT from the CONFIGURATION menu).

**Control Port Mode**

Set the Control Port Mode for TERMINAL (which is the default setting). This selection is found in the SYSTEM portion of the CONFIGURATION menu (SYSTEM -> CONTROL PORT OPTIONS -> CONTROL PORT MODE).

**Out-of-Band Management**

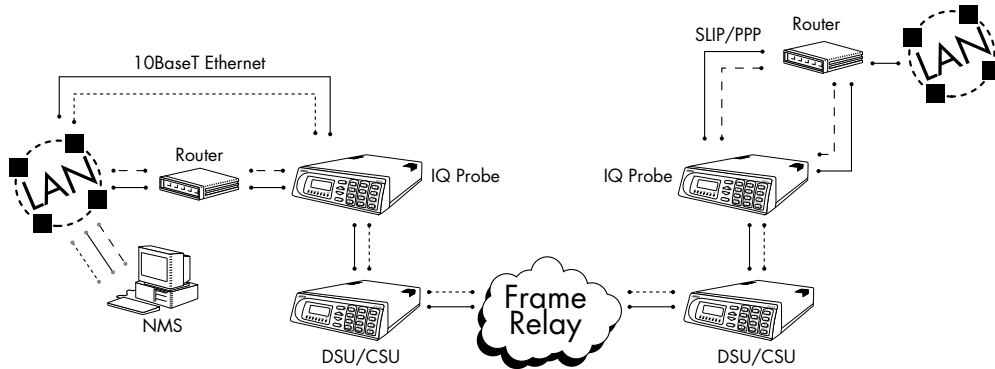
This management option (shown in Figure 4-2) is commonly used in situations where the customer is trying to reduce the amount of management traffic flowing through the frame relay device. The IQ Probe can be managed through an established TELNET session or an SNMP-based network manager like HP OpenView®, IBM Netview®, or SunNet Manager®.



*The ADTRAN IQ Probe MIB is available in the support section of the ADTRAN Web page at [www.adtran.com](http://www.adtran.com).*

SNMP and TELNET management is provided by one of the following interfaces:

- A device (e.g., a router) running SLIP protocol. Connection is made through the IQ Probe's control port.
- A device (e.g., a router) running async PPP protocol. Connection is made through the IQ Probe's control port.
- A LAN. Connection is made through the 10baseT ethernet interface.



**Figure 4-2**  
*Out-of-Band Management Application Example*

### Minimum Configuration Requirements for Out-of-Band Management

The following options (all found in the SYSTEM portion of the CONFIGURATION menu) are the minimum configuration requirements for establishing out-of-band SNMP or TELNET access. Once these options are configured, the unit may be accessed using SNMP/TELNET.

#### Control Port Mode

If necessary, select SLIP or PPP as the IQ Probe control port mode. If ethernet is the interface type, this parameter does not affect setup.

#### IP Address

Enter the IQ Probe IP address.

#### Subnet Mask

Enter the subnet mask number assigned to the network formed by the IQ Probe and the other FRAD/routers across the frame relay network. The subnet mask is available from the network administrator.

**Gateway IP Address (if required)**

Enter the Gateway node IP address. This address is applicable only if the IQ Probe and the network manager are connected through a Gateway node. This address is available from the network administrator.

The next five settings are applicable for SNMP access only:

**Read Community**

Set the Read Community name to match the NMS (network management system) settings.

**Write Community**

Set the Write Community name to match the NMS settings.

**Trap Manager DLCI**

Identify the virtual circuit used for all traps generated by the IQ Probe. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager IP Address**

Enter the IP address of the SNMP manager to which the IQ Probe sends traps. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager Port**

Enter the IQ Probe port used to transmit traps to the SNMP manager. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**NOTE**

*You may assign up to five possible trap destinations in the TRAP MGR OPTIONS table.*

**In-Band Management**

The ADTRAN IQ Probe supports three modes of in-band management using the frame relay structure of PVCs. These modes are local (see Figure 4-3), shared (see Figure 4-4), and dedicated PVC management (see Figure 4-5). All three types support complete SNMP management as well as TELNET capabilities.



*All PVC-based in-band management traffic must be noncompressed IP and use RFC 1490 encapsulation.*

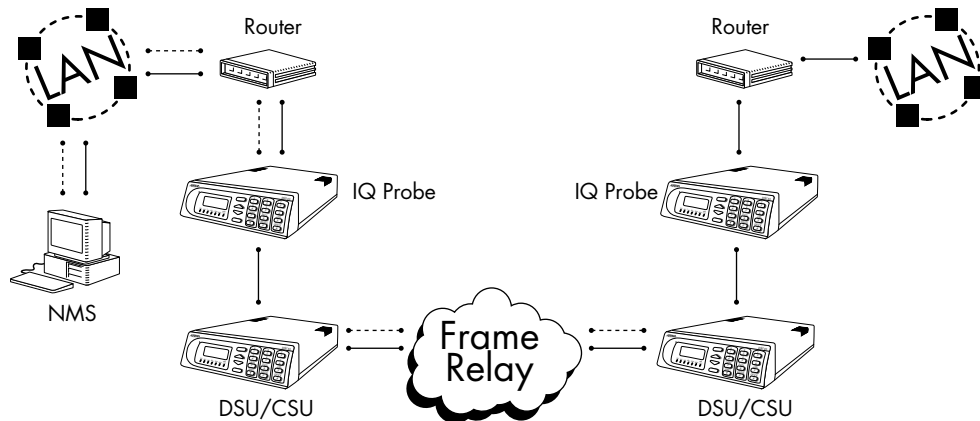
### **Local PVC Management**

Local PVC management refers to a PVC created between the IQ Probe and the frame relay router on the DTE interface of the IQ Probe. This type of management is ideal when local management is needed but an ethernet connection is not available. To support this type of management, all traffic on the selected PVC must be RFC 1490 encapsulated, noncompressed IP traffic.

The local PVC is sent out of the WAN serial port of the router as normal WAN traffic and is terminated in the IQ Probe. Since the IQ Probe responds to Inverse ARP, it is not necessary to set up a static route in the router. The router will discover the IP address automatically; however, it will be necessary to set up a local PVC between the router and the IQ Probe. Accomplish this by setting a value (between 16 and 1007) for the DTE management DLCI on the IQ Probe to a value not used by the frame relay network.

Local PVC management can be used at any location that has a router. Therefore, remote sites can be accessed through the remote router. One consideration when using local PVC management is that if the remote router goes down, access to the remote IQ Probe is lost.





**Figure 4-3**  
*Local PVC Management Application*

#### **Minimum Configuration Requirements for Local PVC Management**

The following options are the minimum configuration requirements for establishing in-band local PVC management. Once these options are configured, the unit may be accessed using SNMP/TELNET. All options (with the exception of the Management DLCI option) are found in the SYSTEM portion of the CONFIGURATION menu.

##### **IP Address**

Enter the IQ Probe IP address.

##### **Management DLCI**

Enter a DLCI number (between 16 and 1007) that is not used by the frame relay service. This option is found in the FRAME RELAY OPTIONS portion of the DTE PORT CONFIGURATION menu.

The next five settings are applicable for SNMP access only:

##### **Read Community**

Set the Read Community name to match the NMS settings.

**Write Community**

Set the Write Community name to match the NMS settings.

**Trap Manager DLCI**

Identify the virtual circuit used for all traps generated by the IQ Probe. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager IP Address**

Enter the IP address of the SNMP manager to which the IQ Probe sends traps. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager Port**

Select DTE PORT. The port will then be used to transmit traps to the SNMP manager. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.



**NOTE**

*You may assign up to five possible trap destinations in the TRAP MGR OPTIONS table.*

**Shared PVC Management**

Shared PVC management refers to a PVC that is used for normal data traffic between locations. The IQ Probe monitors this PVC for packets that contain its IP address. When the IQ Probe detects a packet containing a destination IP address that matches the IQ Probe IP address, the unit intercepts the packet and processes its TCP/IP information. To support this type of management, all traffic on the selected PVC must be RFC 1490 encapsulated, noncompressed IP traffic.

Shared PVC management is used to manage remote ADTRAN IQ devices without being dependent on services from the remote router. This usually requires a static route at the host location.

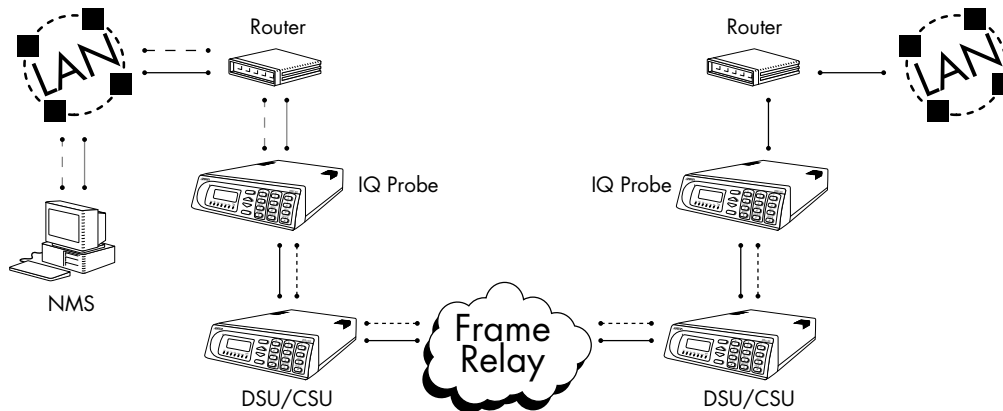


**NOTE**

*By setting a local PVC management and shared PVC management on the remote IQ Probe, its IP address can be found through Inverse ARP.*



Since the unit is set up for shared PVC management, all management traffic will be intercepted prior to reaching the remote router.



**Figure 4-4**  
Shared PVC Management Application

### Minimum Configuration Requirements for Shared PVC Management

The following options are the minimum configuration requirements for establishing in-band shared PVC management. Once these options are configured, the unit may be accessed using SNMP/TELNET. All options (with the exception of the Management DLCI options) are found in the SYSTEM portion of the CONFIGURATION menu.

#### **IP Address**

Enter the IQ Probe IP address.

#### **Management DLCI 1 and/or DLCI 2**

Enter the management DLCI(s) used to carry management traffic to and from the network. This option is found in the DCE Port Configuration menu.

#### **Management DLCI 1 and/or DLCI 2 Mode**

Set to DEDICATED if the management DLCI is used only to manage the IQ Probe (and not used to carry customer traffic). If set to DEDICATED, the router is not notified of that DLCI. Set to

SHARED if the DLCI is used to carry customer traffic as well as management data. This option is found in the DCE Port Configuration menu.



*The IQ Probe unit supports management from two network DLCIs either shared or dedicated.*

The next five settings are applicable for SNMP access only:

**Read Community**

Set the Read Community name to match the NMS settings.

**Write Community**

Set the Write Community name to match the NMS settings.

**Trap Manager DLCI**

Identify the virtual circuit used for all traps generated by the IQ Probe. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager IP Address**

Enter the IP address of the SNMP manager to which the IQ Probe sends traps. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

**Trap Manager Port**

Select DCE PORT. The port will then be used to transmit traps to the SNMP manager. This selection is found under TRAP MGR OPTIONS in the SYSTEM portion of the CONFIGURATION menu.

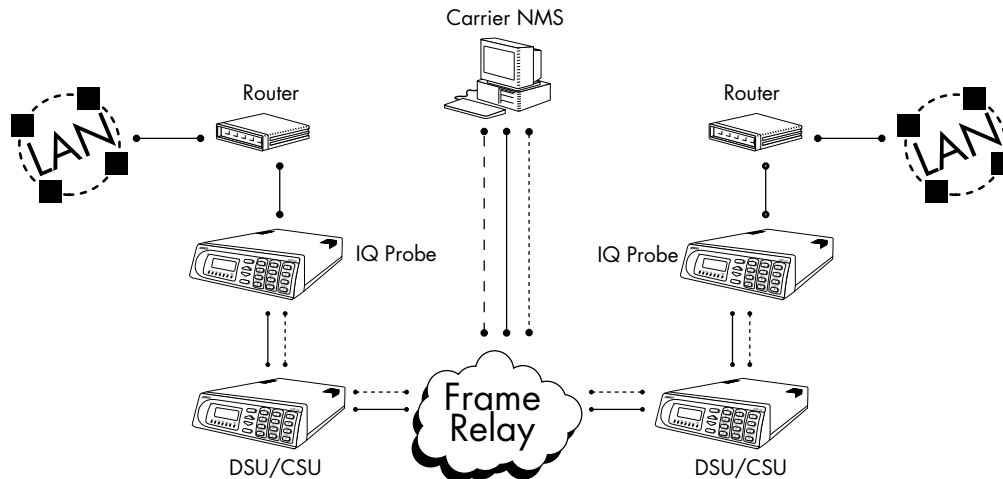


*You may assign up to five possible trap destinations in the TRAP MGR OPTIONS table.*

**Dedicated PVC Management**

Dedicated PVC management refers to the ability to have a PVC originated from the network and terminated in the IQ Probe. This is an ideal configuration for third-party management. It isolates the customer's data traffic from network management

traffic, and it also acts as a fire-wall that restricts management data to the IQ Probe. Dedicated PVC management is also ideal when the user wants to guarantee access to a remote IQ Probe regardless of the state of the remote LAN.



**Figure 4-5**  
*Dedicated PVC Management Application*

#### **Minimum Configuration Requirements for Dedicated PVC Management**

The configuration requirements for dedicated PVC management are identical to those listed for shared PVC management. See the previous section, *Minimum Configuration Requirements for Shared PVC Management*, for more information.

### **DIAL BACKUP APPLICATION**

The IQ Probe dial backup (DBU) options allow frame relay circuit outage recovery for one user to network interface (UNI) at a time. Therefore, if the host site goes down, only one remote site (the primary remote) is backed up. The IQ Probe can be configured to originate a call based on physical layer conditions and/or PVC signaling loss. Once the criteria are met, the IQ Probe establishes a call to the configured phone number (see Table 4-A) and the connection is used to carry traffic for the PVC(s) configured for DBU operation.

During dial backup, the IQ device receiving the call continues to use the frame relay circuit for PVCs that are not affected by the outage, while using the DBU interface for PVCs that are inactive due to the outage. This is done (without the attached DTE device's intervention) by modifying the status of PVCs that are in DBU state to active when the PVC status is given to the DTE. An IQ Probe with multiple PVCs to multiple sites can also originate a call to one site during an outage and restore connection for PVCs to that destination. Since the IQ Probe can only make one call at a time, the other PVCs to other sites in this scenario will be inactive.

Information entered into the PVC Configuration Table (see Table 4-B) marks PVCs for DBU operation. The key element in each entry of the table is the DBU DLCI. For each PVC connecting two sites for DBU operation, the DLCI field represents the PVC DLCI at the local UNI and the DBU DLCI represents the PVC DLCI at the remote site UNI. The IQ Probe uses this information in the outbound side to change the PVC DLCI so the far end DTE device receives frames on the DBU PVC addressed in the same manner as when the frame relay circuit is operational. For PVCs not used for DBU operation, leave the DBU DLCI field set to zero.

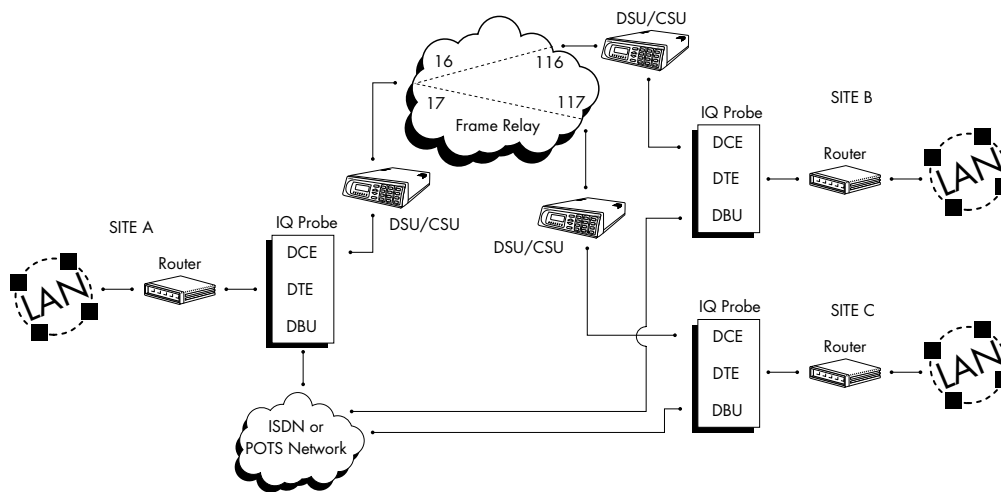
The DBU DLCI information is only required for the IQ Probe originating the call. In cases such as remote sites establishing calls to host sites, the remote site should have only non-zero values for the DBU DLCI fields in the PVC Configuration Table.



*Only PVCs that are used in DBU should have the DBU DLCI set to a non-zero value.*

The range for the DBU DLCI field is from 16-1007. Therefore, you cannot manually enter 0 for the PVCs not used in DBU. When an entry is first created with the ADD selection, it is set to 0 by default. To reset a previously configured DBU DLCI to 0, delete the entry and then add it back in (using the DELETE and ADD selections).

See Figure 4-6 for an example of a dial backup application. Tables 4-A and 4-B provide example setups for the DBU Options (CONFIG ->DIAL BACKUP) and the PVC Configuration Table (CONFIG ->DCE PORT ->PVC CONFIG). The tables are based on the example application shown in Figure 4-6. Please note that the configuration selections given may need modification based on your network configuration.



**Figure 4-6**  
*Dial Backup Application*

**Table 4-A**  
*Example Settings for Dial Backup Options*

<b>AUTO DBU</b>	Enable
<b>WITH CARRIER DETECT LOSS</b>	Disable
<b>WITH NO LMI</b>	Enable
<b>FAIL TIMER</b>	10 seconds
<b>RESTORE TIMER</b>	1 minute
<b>REDIAL COUNTER</b>	5
<b>WAIT TO REDIAL</b>	15 seconds
<b>PHONE NUMBERS</b>	Enter phone number to reach far end.

**Table 4-B**  
*Example Settings for PVC Configuration Table*

	<b>SITE A (ENTRY #1)</b>	<b>SITE A (ENTRY #2)</b>	<b>SITE B</b>	<b>SITE C</b>
<b>DLCI</b>	16	17	116	117
<b>DBU DLCI</b>	116 or 0 *	117 or 0 **	16	17
<b>SEQ #</b>	Enable	Enable	Enable	Enable
<b>PVC DELAY</b>	Enable	Enable	Enable	Enable

\* DBU DLCI should be zero if Site B is not designated as the primary remote.

\*\* DBU DLCI should be zero if Site C is not designated as the primary remote.

Both DBU DLCI entries for Site A should be zero if only the remotes are to originate the call.



# Chapter 5

## Configuration Overview

---

### LOCAL AND REMOTE CONFIGURATION

The IQ Probe can be configured locally, or communications can be established so that a local IQ Probe can configure a remote IQ Probe using a VT 100 interface. See the chapter *Operation* for information on selecting Local or Remote operation.

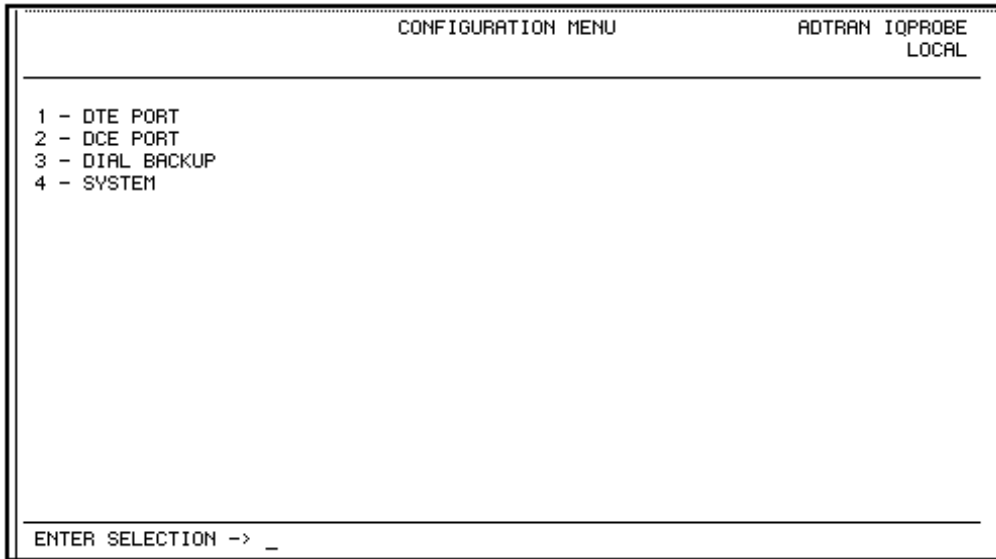
The Configuration menu consists of submenus relating to specific interfaces or functions of the IQ Probe requiring setup:

- DTE Port
- DCE Port
- Dial Backup (if ESP DBU card is installed)
- Control (front panel only)
- System

The terminal configuration menu is shown in Figure 5-1.

For detailed information on configuration, see the chapters *DTE Port Configuration*, *Configuring the DCE Port*, *Configuring Dial Backup Options*, and *System Configuration*.

Configuration menu trees are shown in Figures 5-2 (for the terminal) and 5-3 (for the front panel interface).



**Figure 5-1**  
*Terminal Configuration Menu*

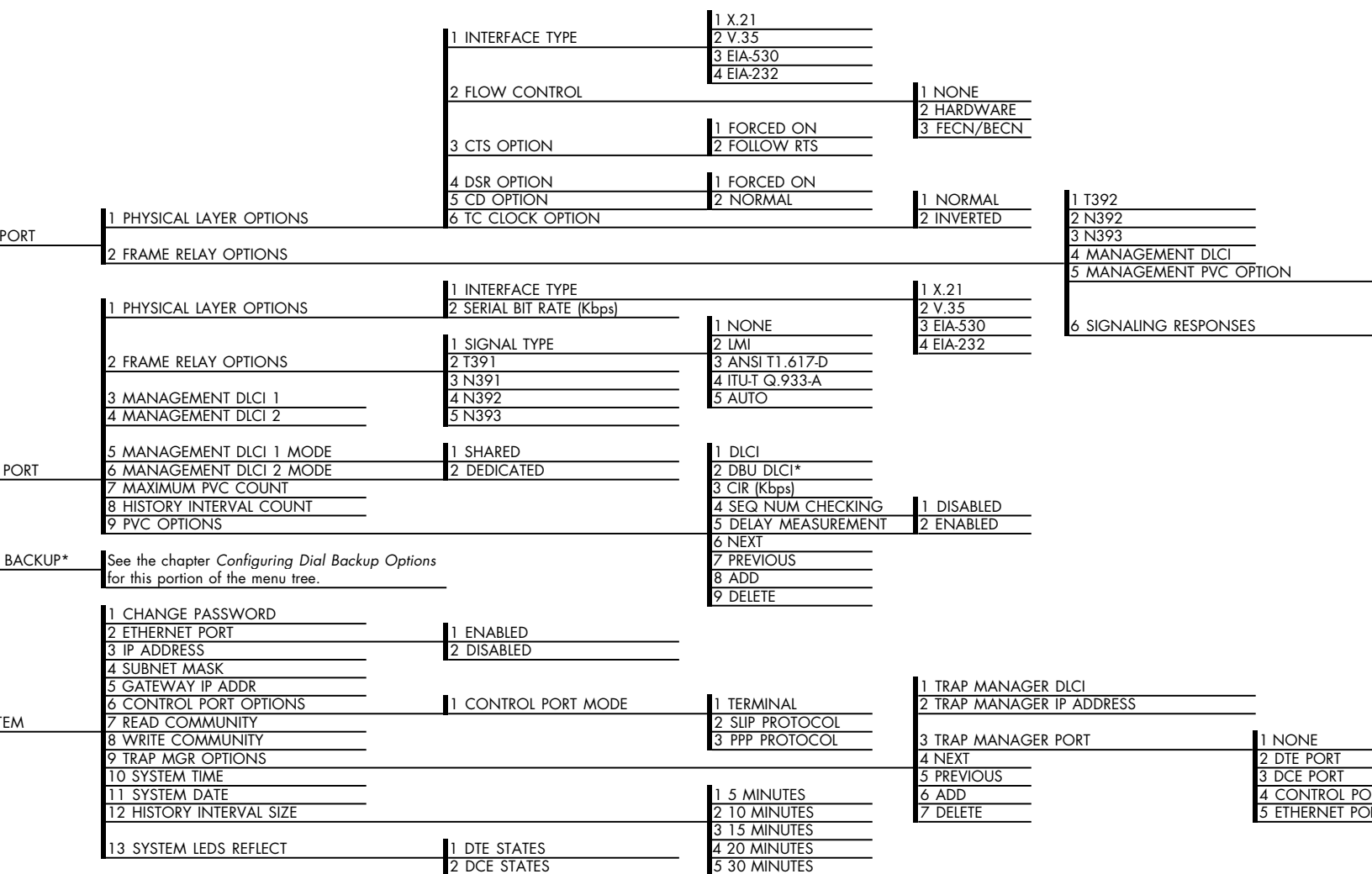
*Page holder for foldout page (Figure 5-2)*

*Page holder for back of foldout page (Figure 5-2)*

*Pageholder for foldout page (Figure 5-3)*

*Page holder for back of foldout page (Figure 5-3)*

Chapter 5. Configuration Overview



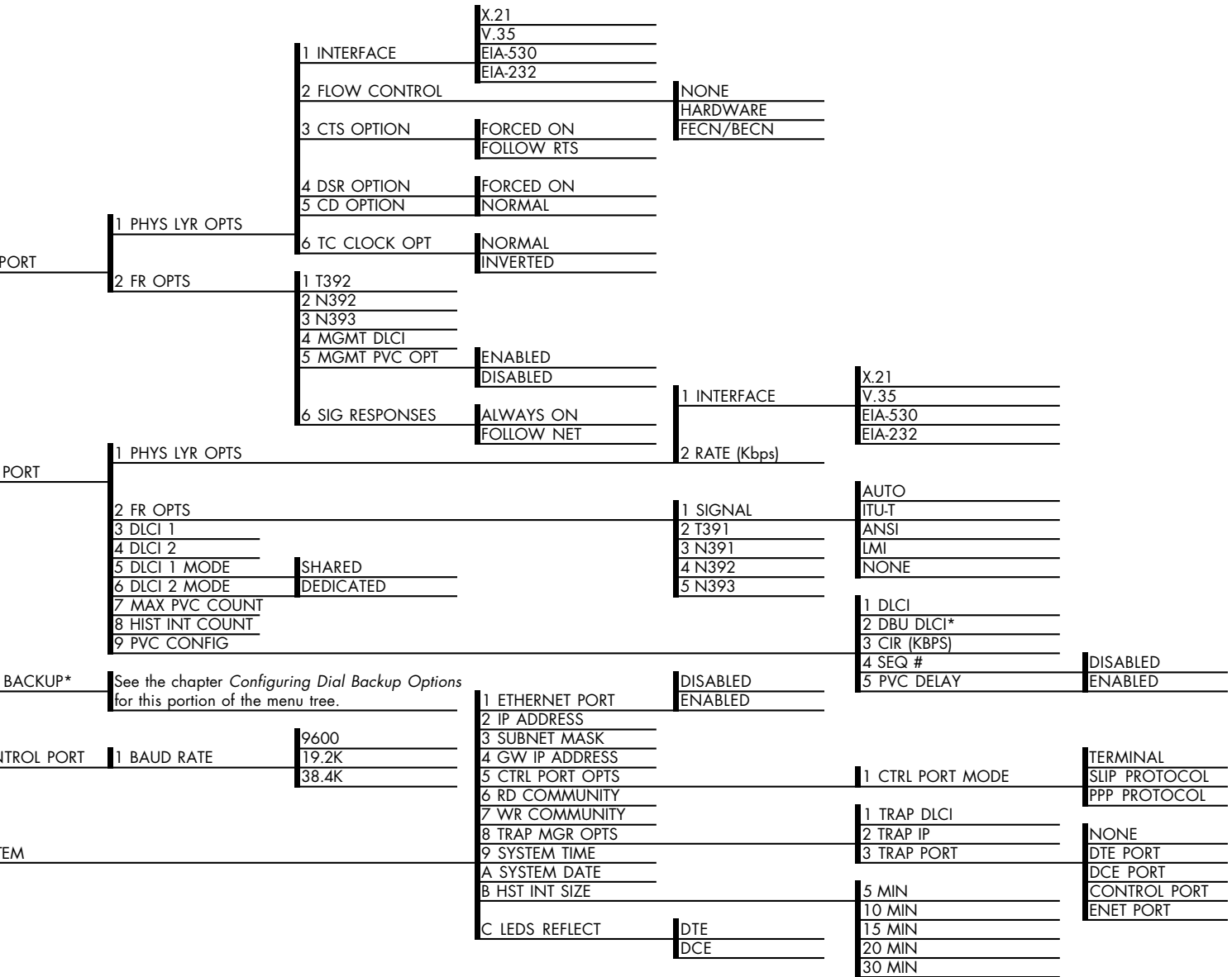
... if an ESP DBU card is installed.

**Figure 5-2**  
Terminal Configuration Menu Tree





Chapter 5. Configuration Overview



**Figure 5-3**  
Front Panel Configuration Menu Tree



# Chapter 6

## DTE Port Configuration

---

Configure the physical layer and frame relay protocol options for the DTE port located on the rear of the IQ Probe by selecting DTE PORT from the Configuration menu. Figure 6-1 illustrates the terminal Configuration menu for the DTE Port. The menu tree in Figure 6-2 shows the choices available in this menu.

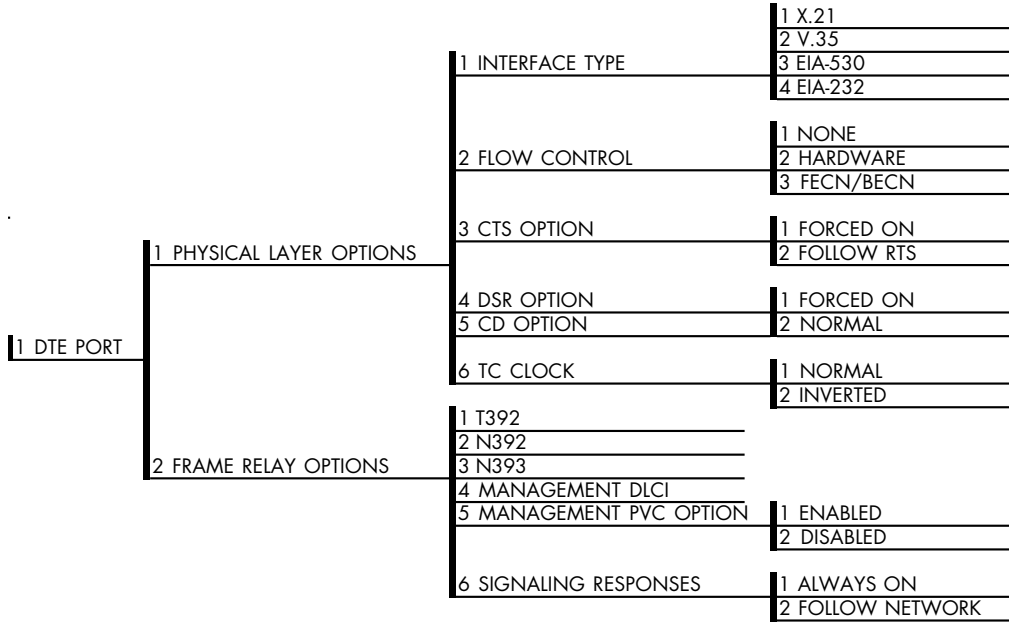
```
DTE PORT                                CONFIGURE DTE PORT                ADTRAN IQPROBE
                                         LOCAL
-----
1 - PHYSICAL LAYER OPTIONS
2 - FRAME RELAY OPTIONS

ENTER SELECTION -> _
```

**Figure 6-1**  
*Terminal DTE Port Configuration Menu*



*In this chapter, the terminal selections are listed first followed by the Front Panel selections in parenthesis (if the names differ).*



**Figure 6-2**  
*DTE Port Menu Tree*

## Physical Layer Options (PHYS LYR OPTS)

### Interface Type

Select the DTE interface type. The choices are X.21, V.35, EIA-530, and EIA-232.

### Flow Control

This option determines how the IQ Probe responds to congestion during DBU operation.

**None**

No flow control is used and the IQ Probe drops frames during severe congestion while in DBU operation.

**Hardware**

The IQ Probe varies the DTE TC clock as necessary to relieve congestion during DBU operation.

**FECN/BECN**

While in a congested state during DBU operation, frames across the DBU PVCs have FECN or BECN set depending on the direction. Frames outbound to the network have FECN set, while frames inbound to the attached DTE device have BECN set. This method is useful if the attached DTE devices can respond to congestion notification.

**CTS Option**

Set the CTS lead to FORCED ON or FOLLOW RTS.

**Forced On**

The CTS lead is always on and the RTS lead is ignored.

**Follow RTS**

The CTS lead is on when the RTS lead is on (and off when the RTS lead is off).

**DSR Option**

Set the DSR lead to FORCED ON or NORMAL.

**Forced On**

The DSR lead is always on.

**Normal**

The DSR lead is off when the IQ Probe does not receive DSR from the DSU/CSU on the DCE port.

**CD Option**

Set the CD lead to FORCED ON or NORMAL.

**Forced On**

The CD lead is always on.

**Normal**

The CD lead is off when the IQ Probe does not receive CD from the DSU/CSU on the DCE port.

**TC Clock Option (TC CLOCK OPT)**

**Normal**

Clock for DTE's transmit data normal phase.

**Inverted**

Clock for DTE's transmit data inverted phase. May be used in high speed circuits (>512 kbps) when the DTE's V.35 interface has high delay. This is usually indicated by HDLC errors on the IQ Probe's DTE port.

**Frame Relay Options (FR OPTS)**

These selections apply to the signaling between the router or FRAD and the IQ Probe DTE port.

**T392**

Set the timeout (in seconds) between polling intervals. This parameter needs to be a few seconds longer than the T391 setting of the attached frame relay device.

**N392 and N393**

These parameters define the error threshold for the UNI (user to network interface) formed by the IQ Probe DTE port and the attached frame relay device. If the error threshold is met, the signaling state status is changed to down, which indicates a service-affecting condition. This condition is cleared once N393 consecutive error-free events are received. N392 defines the number of errors required in a given event window, while N393 defines the number of polling events in each window.

For example:

If N392=3 and N393=4, then if three errors occur within any four events, the interface is determined inactive.

The status of the connection can be viewed in the Status menu under DTE Port Signaling State. The status will return to active once the threshold is no longer exceeded.

### **Management DLCI (MGMT DLCI)**

To use local PVC management, enter the management data link connection identifier (DLCI). The management DLCI is a special DLCI used between the attached DTE device and the IQ Probe to carry SNMP and TELNET packets to/from the IQ Probe on the DTE port.

#### **Guidelines for Configuring Management DLCI**

If the attached router or FRAD is used to route SNMP/TELNET frames to the IQ Probe, set the Management DLCI to a unique value (between 16 and 1007) that identifies the virtual circuit between the router/FRAD and the IQ Probe. The router/FRAD must also be configured to route the IQ Probe IP address to this DLCI. The IP address and subnet mask for the DTE port must also be set in the System Configuration menu.

### **Management PVC Option (MGMT PVC OPT)**

If this option is set to ENABLED, the management DLCI is included in the Full Status response to the router. Enable this option when the management DLCI is used to route management traffic to the IQ Probe.

### **Signaling Responses (SIG RESPONSES)**

This option determines when PVC signaling responses are sent to the router.

#### **Always On**

If ENABLED, PVC signaling responses are sent to the router regardless of the network signaling state. Enable this option when the IQ Probe is used for dial backup.

**Follows Network (FOLLOW NET)**

If ENABLED, PVC signaling responses are sent to the router only when the network signaling state is up. Enable this option when the router is going to use an alternate path for dial backup.



# Chapter 7

## Configuring the DCE Port

---

### DCE PORT

Access the DCE port menus by selecting DCE PORT from the Configuration menu. Full menu trees for the DCE Configuration selections are shown in Figures 5-2 (*Terminal Configuration Menu Tree*) and 5-3 (*Front Panel Configuration Menu Tree*) of the *Configuration Overview* chapter. The DCE port terminates the user end of the frame relay UNI interface. The IQ Probe supports three standard PVC signaling formats: LMI (gang of four), ANSI T1.617-D (Annex D), and ITU Q.933-A (Annex A). The selected signaling format is used to poll the DCE end of the UNI interface and retrieve virtual circuit information. Optionally, the polling process can be disabled.

When configuring from a terminal, the screen in Figure 7-1 will appear when DCE Port is selected.



#### NOTE

*In this chapter, the terminal selections are listed first followed by the Front Panel selections in parenthesis (if the names differ).*

```
DCE PORT                CONFIGURE DCE PORT                ADTRAN IQPROBE
                                                                LOCAL
-----
1 - PHYSICAL LAYER OPTIONS
2 - FRAME RELAY OPTIONS

3 - MANAGEMENT DLCI 1  1006
4 - MANAGEMENT DLCI 2  1005
5 - MGMT DLCI 1 MODE  SHARED
6 - MGMT DLCI 2 MODE  SHARED

7 - MAXIMUM PVC COUNT  20
8 - HISTORY INTERVAL COUNT  157

9 - PVC OPTIONS

-----
ENTER SELECTION ->
```

**Figure 7-1**  
*Terminal DCE Port Configuration Menu*

## Physical Layer Options (PHYS LYR OPTS)

The following sections describe the physical layer options available for the DCE port:

### Interface Type

Select the DCE interface type. The choices are X.21, V.35, EIA-530, and EIA-232.

### Serial Bit Rate <Kbps> (RATE <Kbps>)

Set the Serial Bit Rate to match the speed of the attached DSU/CSU. The IQ Probe uses this information for statistical analysis. If this field is not set correctly, it could cause some statistics to be inaccurate.

## Frame Relay Options (FR OPTS)

The terminal screen in Figure 7-2 appears when Frame Relay Options is selected from the DCE Port Configuration Menu.

```

DCE PORT                CONFIGURE FRAME RELAY PARAMETERS      ADTRAN IQPROBE
                                                                LOCAL
-----
1 - SIGNAL TYPE  AUTO
2 - T391      10
3 - N391      6
4 - N392      3
5 - N393      4

ENTER SELECTION -> _

```

**Figure 7-2**  
*Terminal DCE Port Frame Relay Options Menu*

### Signaling Type (SIGNAL)

Set the signaling type option to match the DCE signaling type. Choices are none, LMI (gang of four), ANSI T1.617-D (Annex D), ITU-T Q.933-A (Annex A), or auto. AUTO mode forces the IQ Probe to use the same signaling type as the attached frame relay DTE. If AUTO is selected and there is no DTE device attached, the IQ Probe uses ANSI T1.617-D signaling type.

### T391

Set the time (in seconds) between polls to the frame relay network.

### **N391**

Determine how many link integrity polls occur in between full status polls.

### **N392 and N393**

These parameters define the error threshold for the UNI formed by the IQ Probe DCE port and the frame relay switch. If the error threshold is met, the signaling state status is changed to down, which indicates a service-affecting condition. This condition is cleared once N393 consecutive error-free events are received. N392 defines the number of errors required in a given event window, while N393 defines the number of polling events in each window.

For example:

If N392=3 and N393= 4, then if three errors occur within any four events the interface is determined inactive.

The status of the connection can be viewed in the Statistics menu under DCE Port Signaling State. The status will return to active again once the threshold is no longer exceeded.



*The network service provider should recommend the values entered into the T391, N391, N392, and N393 fields.*

### **Management DLCI 1 and 2 (DLCI 1 and 2)**

Enter the management data link connection identifiers (DLCIs). These DLCIs are used to carry management traffic to and from the network.

### **Management DLCI 1 and 2 Mode (DLCI 1 and 2 MODE)**

Set to DEDICATED if the management DLCI is used only to manage the IQ Probe (and not used to carry customer traffic). If set to DEDICATED, the router is not notified of that DLCI. Set to SHARED if the management DLCI is used for carrying customer traffic and management data.

### Maximum PVC Count (MAX PVC COUNT)

Sets the maximum number of PVCs that the IQ Probe will monitor for statistical information. This value determines the amount of history intervals available for storage. To get the maximum amount of statistical history storage, set this value equal to the number of PVCs assigned to the frame relay port. A smaller value increases history interval count but puts some of the PVC statistics into the unknown category.

### History Interval Count (HIST INT COUNT)

Sets the number of history intervals to store for statistics. History intervals are displayed in the View by Interval portions of the Statistics menus. These views provide data divided into columns grouped by the interval of time selected in the History Interval Size field (see the chapter *System Configuration* for more information). The History Interval Count field determines how many intervals can be stored at a time. The maximum value allowed is affected by the previously mentioned PVC Count selection.

### PVC Options (PVC CONFIG)

The PVC Options table enables optional features such as delay measurement for each PVC. DLCI numbers and their corresponding CIRs are supplied by the service provider.



*When configuring PVC options using the front panel, the **Next**, **Prev**, **Add**, and **Delete** keys are used. See the chapter **Operation** for more information on front panel operation.*

#### **DLCI**

Enter the DCE port's DLCI.

#### **DBU DLCI**

Enter the far end DLCI for each PVC used for dial backup. Only the IQ Probe that originates the call is required to have this option set.



*Only PVCs that are used in DBU should have the DBU DLCI set to a non-zero value.*

The range for the DBU DLCI field is from 16-1007. Therefore, you cannot manually enter 0 for the PVCs not used in DBU. When an entry is first created with the ADD selection, it is set to 0 by default. To reset a previously configured DBU DLCI to 0, delete the entry and then add it back in (using the Delete and Add selections/keys).

**CIR (Kbps)**

Enter the CIR (committed information rate) in kbps for the corresponding DLCI. The information is supplied by your service provider and must be entered for each PVC to ensure accuracy of statistical information.

**Seq Num Checking (SEQ #)**

Set to ENABLE only if there are IQ products on both ends of the PVC. When enabled, the IQ Probe tags each frame with a sequence number which is then used by the remote IQ device to detect lost packets. Lost packet counts are given in the Statistics menus.

**Delay Measurement (PVC DELAY)**

Set to ENABLE only if there are IQ products on both ends of the PVC. When enabled, the IQ Probe periodically transmits a loopback frame to the remote IQ device which is then returned to measure round trip delay of each PVC. Minimum, maximum, and average delay measurements are given in the Statistics menus.

**Next (NEXT key on front panel)**

Edit the next entry in the PVC Options table.

**Previous (PREV key on front panel)**

Edit the previous entry in the PVC Options table.

**Add (ADD key on front panel)**

Add a new entry to the PVC Options table.

**Delete (DELETE key on front panel)**

Delete the current entry in the PVC Options table.



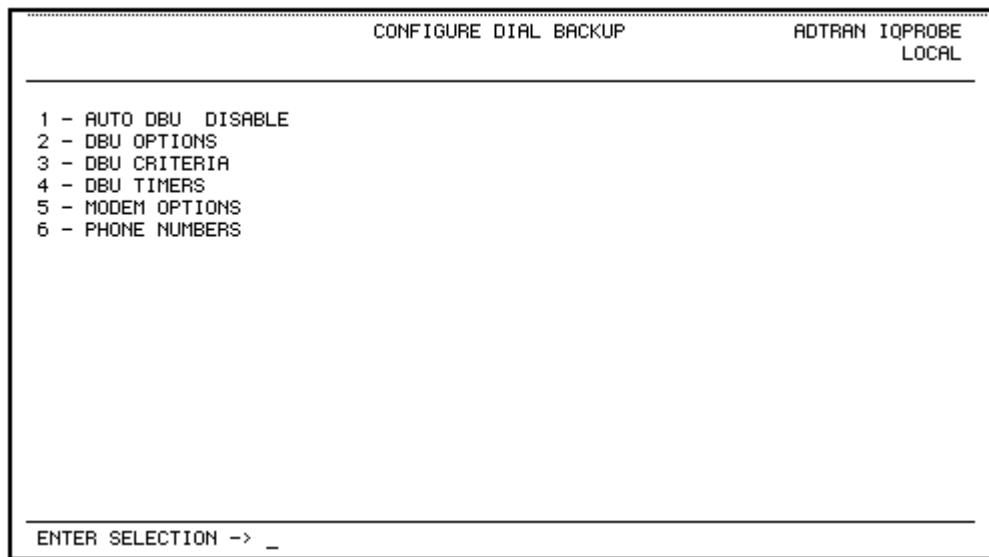


# Chapter 8

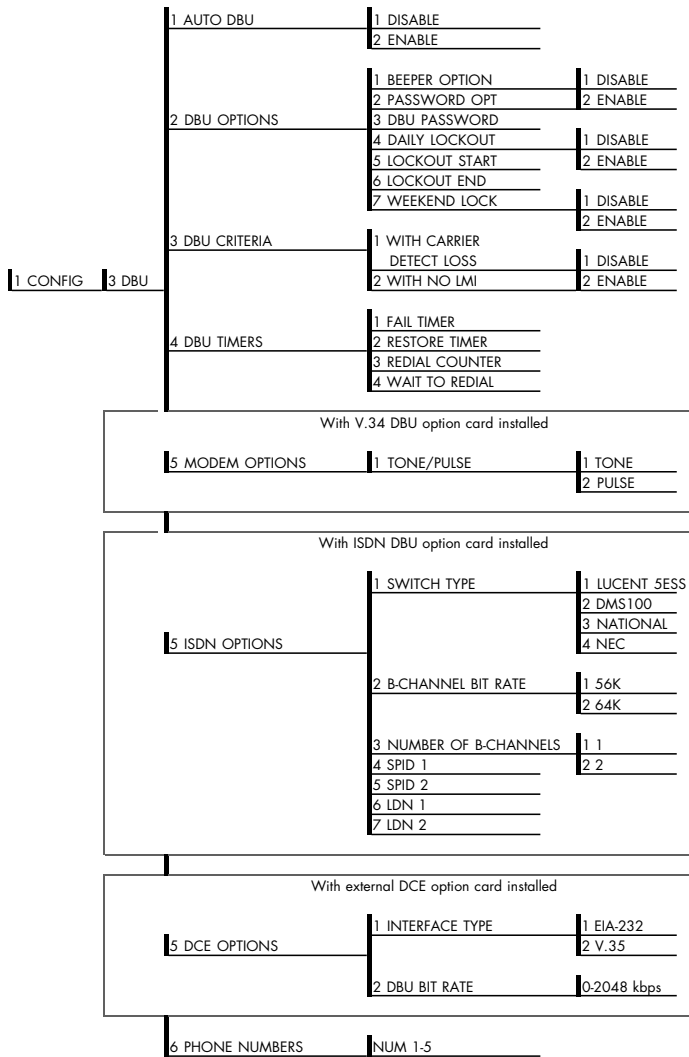
## Configuring Dial Backup Options

### DIAL BACKUP OPTIONS

The Dial Backup Configuration menu (Figure 8-1) is available only when an optional ESP DBU card is installed in the IQ Probe. Use this menu to configure DBU options such as auto DBU capability, DBU criteria, DBU timer functions, and DBU phone numbers. See Figure 8-2 for a complete menu tree of the DBU selections.



**Figure 8-1**  
*DBU Options Menu (with V.34 DBU Card Installed)*



**Figure 8-2**  
*Dial Backup Menu Tree*



*In this chapter, the terminal selections are listed first followed by the Front Panel selections in parenthesis (if the names differ).*

The AUTOMATIC DBU option specifies whether the unit automatically enters dial backup mode or waits for manual setup. The factory default setting is DISABLE.

## **DBU Options**

### **Beeper Option (BEEP OPTION)**

If enabled, the IQ Probe issues an intermittent beep while in dial backup.

### **Password Opt**

When enabled, the passwords entered in the DBU PASSWORD fields of both the near and far end IQ devices are required to match before a dial backup connection can be made. The setting in this field must also be identical in both units (i.e., they both must be set to either ENABLED or DISABLED).

### **DBU Password**

Enter the authentication string used for making a dial backup connection. The near and far end IQ devices must have identical DBU passwords. If using front panel entry, see the section *Entering Letters Using the Front Panel* in the chapter *System Configuration* for more information.

### **Daily Lockout**

Enable this field to disable dial backup during a certain time period each day. The time period is specified in the LOCKOUT START and LOCKOUT END fields.

### **Lockout Start**

Enter the hour that the daily lockout begins and dial backup is disabled (0 to 23). This setting only applies if the DAILY LOCKOUT parameter is enabled.

**Lockout End**

Enter the hour that the daily lockout ends and dial backup is reactivated (0 to 23). This setting only applies if the DAILY LOCKOUT parameter is enabled.

**Weekend Lock**

If enabled, no backup will occur from midnight Friday to midnight Sunday.

**DBU Criteria**

**With Carrier Detect Loss (WITH DCD LOSS)**

When enabled, the IQ Probe enters backup mode when a loss of carrier detect signal is detected on the DCE port. The factory default setting is ENABLE.

**With No LMI**

When enabled, the IQ Probe enters backup mode when a loss of signaling from the frame relay switch is detected. The default setting is ENABLE.

**DBU Timers**

**Fail Timer (FAIL TMR x 10)**

This option sets the amount of time the dedicated circuit failure condition must be active before the IQ Probe attempts backup. The value entered is multiplied by 10. The amount of time can be up to 990 seconds (i.e., an entry of 99). The factory default setting is 10 seconds (an entry of 1).

**Restore Timer (RESTORE TMR)**

Once the circuit is down, the IQ Probe remains in backup until the circuit is active for the length of time specified for the restore timer. The selection is entered in minutes (up to 255). If set to 0, the line must be restored manually. The factory default setting is 1 minute.

**Redial Counter**

This option sets the number of times the IQ Probe redials the far end when entering backup mode. The redial count, which is manually entered, can be up to a maximum of 99 attempts. If the

IQ Probe encounters a busy or reorder, it attempts to establish the call the specified number of times. The factory default setting is 5.

**Wait to Redial (REDIAL DELAY)**

This option works in conjunction with the preceding Redial Counter. It selects the amount of time between redial attempts to connect the backup line. The amount of time, which is manually entered, can be up to 99 seconds. The factory default setting is 15 seconds.

## **DBU Card Configuration Options**

The following selections are dependent upon the type of ESP DBU card installed (if any). If no card is installed or if the ESP 4-Wire SW56 card is installed, then the selections in this section do not appear.

### **Modem Options**

The Modem Options field is available when the ESP V.34 DBU card is installed.

**Tone/Pulse**

Select the dialing method for the dial backup service.

### **ISDN Options**

The ISDN Options field is available when the ESP ISDN DBU card is installed.

**Switch Type**

Select which type of telco CO switch is providing the ISDN service. There are four options for ISDN switch types:

- Lucent 5ESS
- DMS100
- National
- NEC

**B-Channel Bit Rate (B-CH BIT RATE)**

Select the channel bit rate for the ISDN service. Select 64k unless your service only provides 56k.

**Number of B-Channels (NUM B-CHANNELS)**

Select the number of B-channels supported by the ISDN service. Select 2 if bonding is used.

**SPID 1/2**

For ISDN dial backup, enter the service profile identifier (SPID) for both B-channels. The SPID is a sequence of digits identifying ISDN terminal equipment to the ISDN switch when more than one ISDN set has been attached to the same central office line. The SPID is assigned by the telco when the ISDN line is installed and normally resembles the phone number.

Only the Lucent 5ESS switch is capable of recognizing a point-to-point configuration, eliminating the need for a SPID. All other switch types require a SPID.

**LDN 1/2**

For ISDN dial backup, enter the LDN for both B-channels.

**DCE Options**

The DCE Options field is available when the ESP External DCE option card is installed.

**Interface Type**

Select the connector type for the DCE interface. The choices are EIA-232 and V.35.

**DBU Bit Rate**

Set to the operating speed of the DBU interface (0-2048 kbps) to ensure accurate statistical information.

**Phone Numbers 1-5**

The IQ Probe stores up to 5 numbers of 36 digits each. Edit a phone number by reentering the entire number. This process overwrites the previously stored number.

# Chapter 9

## System Configuration

---

Access System configuration selections by first choosing CONFIGURATION from the Main menu. Then choose SYSTEM from the Configuration menu. Full menu trees for the System configuration selections are shown in Figures 5-2 (*Terminal Configuration Menu Tree*) and 5-3 (*Front Panel Configuration Menu Tree*). The Terminal System configuration menu is shown in Figure 9-1.



### NOTE

*In this chapter, the terminal selections are listed first followed by the Front Panel selections in parenthesis (if the names differ).*

### **Change Password (not available on front panel)**

Enter a new password of ten characters or less. The default password is **adtran**.

### **Ethernet Port**

Choose to either enable or disable the LAN 10baseT ethernet port. Set to disable if the IQ Probe's IP address is not a member of the local ethernet subnet.

### **IP Address**

Enter the IQ Probe IP (internet protocol) address.

## Subnet Mask

Enter the subnet mask assigned to the LAN that the LAN 10baseT port is attached to.

```
CONFIGURE UNIT                                ADTRAN IQPROBE
                                                LOCAL
-----
1 - CHANGE PASSWORD
2 - ETHERNET PORT  ENABLE
3 - IP ADDRESS  0.0.0.0
4 - SUBNET MASK  0.0.0.0
5 - GATEWAY IP ADDR  0.0.0.0
6 - CONTROL PORT OPTIONS
7 - READ COMMUNITY  public
8 - WRITE COMMUNITY private
9 - TRAP MGR OPTIONS
10 - SYSTEM TIME  21:59:47
11 - SYSTEM DATE  08/14/97
12 - HISTORY INTERVAL SIZE  5 MIN
13 - SYSTEM LEDs REFLECT  DTE STATES

ENTER SELECTION -> _
```

**Figure 9-1**  
*System Configuration Menu*

## Gateway IP Addr (GW IP ADDRESS)

Enter the Gateway IP address. The gateway is used when an ethernet packet is transmitted from the IQ Probe to a foreign subnet.

## Control Port Options (CTRL PORT OPTS)

### Control Port Mode (CTRL PORT MODE)

Set the Control port for terminal, SLIP protocol, or PPP protocol mode. Set for SLIP or PPP when using the Control port for an SNMP/TELNET path.





*Changing this option causes a complete system configuration and unit reset.*

### **Read Community (RD COMMUNITY)**

Enter the authentication strings used for SNMP management. Match the IQ Probe to the SNMP manager for read privileges. If using front panel entry, see the section *Entering Letters Using the Front Panel* in this chapter for more information.

### **Write Community (WR COMMUNITY)**

Enter the authentication strings used for SNMP management. Match the IQ Probe to the SNMP manager for write privileges. If using front panel entry, see the section *Entering Letters Using the Front Panel* in this chapter for more information.

### **Trap Mgr Options**

The Trap Manager Options table defines routes for up to five SNMP managers.

#### **Trap Manager DLCI (TRAP DLCI)**

If the trap manager port is set for DCE or DTE, this parameter identifies the virtual circuit used for all traps generated by the IQ Probe.

#### **Trap Manager IP Address (TRAP IP)**

Enter the IP address of the SNMP manager to which the IQ Probe sends traps.

#### **Trap Manager Port (TRAP PORT)**

Enter the IQ Probe port used to transmit traps to the SNMP manager. Choices are none, DTE port, DCE port, control port, and ethernet port.

**Next (NEXT key on front panel)**

Edit the next entry in the Trap Manager Options table.

**Previous (PREV key on front panel)**

Edit the previous entry in the Trap Manager Options table.

**Add (ADD key on front panel)**

Add a new entry to the Trap Manager Options table.

**Delete (DELETE key on front panel)**

Delete the current entry in the Trap Manager Options table.

**System Time/Date**

Set the current hour, minute, day, month, and year. This is used to date/time stamp all statistical data captured by the IQ Probe.

**History Interval Size (HIS INT SIZE)**

The time entered in this field affects the Interval View in the Statistics menus. The Interval View provides historical data for the current day. The data is divided into columns grouped by the interval of time (5, 10, 15, 20, or 30 minutes) selected in this field. The IQ Probe stores up to 288 intervals. Once the maximum is reached, new information overwrites existing information, beginning with the least current.



**NOTE**

*If data is not retrieved before the Total Time Stored is exceeded, it is overwritten and cannot be restored. Total Time Stored = History Interval Size x History Interval Count.*

**System LEDs Reflect**

Select DTE STATES or DCE STATES. This selection determines which interface the LEDs on the unit's front panel reflect.

## ENTERING LETTERS USING THE FRONT PANEL

Configuring the Read/Write Community names requires the entry of letters rather than numbers. When configuring the unit using the front panel, special steps must be taken in order to perform these entries. The following example of entering the Write Community name illustrates this procedure:

1. Select WRITE COMMUNITY from the System configuration menu.
2. Press the up arrow to scroll to the desired character.
3. Press **Enter**.
4. Repeat steps 2 and 3 until all characters have been selected.
5. Press the **Enter** key to complete the entry.



# Chapter 10

## Statistics

---

For descriptions of the terminal statistics menus, see the following section, *Viewing Statistical Information (Terminal Interface)*. For front panel menu descriptions, see the section *Viewing Statistical Information (Front Panel Interface)*.

### **VIEWING STATISTICAL INFORMATION (TERMINAL INTERFACE)**

Select View Statistics from the Main menu to access the View Statistics Menu shown in Figure 10-1. From this menu, select to view statistics for the ports (DTE, DCE, or DBU), all available DLCIs, or the system. Select Reset Statistics to clear all current information.

```
STATISTICS MENU                                ADTRAN IQPROBE
                                                LOCAL
-----
1 - DTE PORT
2 - DCE PORT
3 - DBU PORT

4 - DLCI LIST
5 - SYSTEM

6 - RESET STATISTICS

ENTER SELECTION -> _
```

**Figure 10-1**  
*View Statistics Menu*

## Terminal Statistics Display Options

DTE port, DCE port, DBU port, and DLCI statistics are given in two formats: View by Interval and View by Day.

### **View by Interval**

In this view, the first column is a running total for the current day. All other columns are grouped into user-configured time frames with the most recent information displayed on the left. The first column's header displays the current date, and the interval columns display the time the intervals began. In order to categorize the interval columns by date also, the midnight time stamp is replaced with the date. Note that this column still represents the timed interval (not a day's worth of information).

To configure the interval time frame, go to the System Configuration menu under History Interval Size and select the time you want the history interval to be set for (from 5 to 30 minutes, in five minute intervals). The IQ Probe gathers and displays the information according to the time selected.



*The IQ Probe cuts the first gathering session short in order to begin falling on the selected time boundary. For example: If the unit or the statistics information was last reset at 12:03 and the History Interval is set for five minutes, then the first interval session will last only two minutes. Therefore, the first interval column (i.e., the column farthest to the right if no columns have been deleted yet) normally represents a time shorter than the other columns.*

#### **View by Day**

This view provides historical information for the last seven days (not including the current day). The most recent information is displayed on the left.



*The first day's column (i.e., the column furthest to the right) does not represent a full day's worth of information (unless the unit or the statistics information was reset at **exactly** 12 AM).*

## Hot Keys

Once you have entered one of the statistics menus, hot keys are displayed across the bottom of the screen, allowing you to quickly access other menus or navigate within the current menu. These keys vary depending on the menu currently displayed.

### **ESC=Menu**

Press the **ESC** key to return to the main View Statistics menu (shown in Figure 10-1).

### **D=DLCI**

When viewing DCE port statistics, press **D** to view the DLCI Statistics menu shown in Figure 10-8.

### **Page (+, -)**

Press the + and - keys to scroll through statistics menu pages.



*The **Shift** key must be used in conjunction with the + key in order to advance a menu page.*

### **Scroll (<, >)**

Press the < and > keys to scroll left and right on a statistics menu page.



*The **Shift** key must be used in conjunction with the < and > keys in order to scroll a menu page.*

### **V=View by Day/View by Interval**

Press **V** to change the view format.



The following sections describe the information given on the DTE port, DCE port, DBU port, DLCI, and System Statistics menus.

### DTE Port Statistics

Information given is for the DTE port since the last reset. See Figures 10-2 and 10-3 for the two DTE Port Statistics screen formats.

#### Leads On

If a lead is active on the selected port, it is listed in the View Statistics menu. See Figure 10-2.

RTS	Request to send
DTR	Data terminal ready
CTS	Clear to send
DSR	Data set ready
DCD	Data carrier detect

DTE PORT	ADTRAN IQPROBE VIEW STATISTICS							LOCAL
Leads On -->	CTS	RTS	DSR	DTR	DCD	Interval Remaining		51
Signaling State -->	UP							
	JUL 31	16:55	16:50	16:45	16:40	16:35	16:33	
Loc PUC Rx Fr	0	0	0	0	0	0	0	0
Loc PUC Rx Bt	0	0	0	0	0	0	0	0
Loc PUC Tx Fr	0	0	0	0	0	0	0	0
Loc PUC Tx Bt	0	0	0	0	0	0	0	0
Sig Down Time	0	0	0	0	0	0	0	0
Signal Error	0	0	0	0	0	0	0	0
Signal T/O	0	0	0	0	0	0	0	0
Sig State Chg	0	0	0	0	0	0	0	0
Rx Full Stat	906	1	5	4	5	5	5	5
Rx LI Only	4530	4	23	25	24	23	24	24
Discard Frame	0	0	0	0	0	0	0	0
Aborts	0	0	0	0	0	0	0	0
CRC Error	0	0	0	0	0	0	0	0
Octet Align	0	0	0	0	0	0	0	0
Length Error	0	0	0	0	0	0	0	0
_ ESC = Menu    -, + = Page    >, < = Scroll    U = View By Day								

**Figure 10-2**  
DTE Port Statistics (View by Interval)

DTE PORT DAYS	ADTRAN IQPROBE VIEW STATISTICS							LOCAL
Leads On -->	CTS	DSR	DCD					
Signaling State -->	UP							
	JUL 13	JUL 12	JUL 11	JUL 10	JUL 09	JUL 08	JUL 07	
Loc PVC Rx Fr	0	1166	2919	1629	3	10	1	
Loc PVC Rx Bt	0	67628	169146	94118	174	580	58	
Loc PVC Tx Fr	0	0	6	14	0	0	0	
Loc PVC Tx Bt	0	0	192	448	0	0	0	
Sig Down Time	0	756	142	0	0	0	0	
Signal Error	0	0	0	0	0	0	0	
Signal T/O	0	48	9	0	0	0	0	
Sig State Chg	0	2	2	0	0	0	0	
Rx Full Stat	1379	1378	1398	776	1	5	1	
Rx LI Only	6897	6880	6992	3878	8	22	4	
Discard Frame	0	233773	2913	1615	3	10	1	
Aborts	0	232606	0	0	0	0	0	
CRC Error	0	1	0	0	0	0	0	
Octet Align	0	0	0	0	0	0	0	
Length Error	0	0	0	0	0	0	0	
ESC = Menu	D = DLCI	-,+ = Page		U = View Intervals				

**Figure 10-3**  
DTE Port Statistics (View by Day)

#### Interval Remaining

Number of seconds remaining in the current timed interval. This field is only shown in View by Interval menus.

#### Signaling State

Indicates if the frame relay signaling state is currently up or down.

#### Local PVC Rx Frames

Total frames received by the DTE port across the local management PVC.

#### Local PVC Rx Bytes

Total bytes received by the DTE port across the local management PVC.

#### Local PVC Tx Frames

Total frames transmitted by the DTE port across the local management PVC.

**Local PVC Tx Bytes**

Total bytes transmitted by the DTE port across the local management PVC.

**Signal Down Time**

Time in seconds the signaling state is down.

**Signal Error**

Number of signal frames received with PVC signaling protocol violations.

**Signal Timeouts**

Number of T392 timeouts that have occurred.

**Signal State Change**

Number of changes in the signaling protocol state.

**Rx Full Status**

Number of full status polls received on the DTE side.

**Rx LI Only**

Number of link integrity (LI) only polls received on the DTE side.



*On the DTE side, transmit and receive counts for full status and link integrity polls would be identical. Therefore, only receive counts are given.*

**Discard Frame**

Number of frames discarded by the IQ Probe due to bad IP frames received on the management DLCI, transmission errors, or link violations. This count includes aborts, CRC errors, octet align, and length errors.

**Aborts**

Number of frames received without a closing flag. This transmission error is also reflected in the Discard Frame field.

**CRC Errors**

Number of frames received with CRC violations. This transmission error is also reflected in the Discard Frame field.

**Octet Align**

Number of frames received with a bit count that does not fall on 8-bit boundaries. This transmission error is also reflected in the Discard Frame field.

**Length Error**

Number of frames received with fewer than 5 octets or greater than 4500 octets. This link violation is also reflected in the Discard Frame field.

**EA Violation**

Number of frames received with an error in the extended address (EA) bit field of the frame relay header.

**Encapsulation Error**

Number of frames received on the management DLCI that have RFC 1490 errors.

**Inactive DLCI**

Number of frames received on an inactive DLCI.

**Invalid DLCI**

Number of frames received on a DLCI that is out of range. The valid DLCI range is 16-1007.

**Unrouteable**

Number of frames received on the management DLCI with an IP address that does not match the IQ Probe IP address.

**DCE Port Statistics**

Information given is for the DCE port since the last reset. See Figures 10-4 and 10-5 for both formats of the DCE Port Statistic screens.

**Leads On**

If a lead is active on the DCE port, it is listed in the View Statistics menu.

**Signaling State**

Indicates if the signaling state is currently up or down.

**Interval Remaining**

Number of seconds remaining in the current timed interval. This field is only shown in View by Interval menus.

**DBU State**

Current state of the DBU circuit. This field is only shown if an ESP DBU card is installed.

**Rx Frames**

Number of frames received by the DCE port.

**Rx Bytes**

Number of bytes received by the DCE port.

**Maximum Rx Throughput**

Maximum throughput sample in the receive direction for the given interval. This is displayed in kbps.

**Average Rx Throughput**

Average throughput in the receive direction for the given interval. This is displayed in kbps.

**Maximum Rx Utilization**

Maximum utilization sample in the receive direction for the given interval. Utilization is displayed as a percentage of the Serial Bit Rate (set in the DCE Configuration menu).

**Average Rx Utilization**

Average utilization sample in the receive direction for the given interval. Utilization is displayed as a percentage of the Serial Bit Rate (set in the DCE Configuration menu).

**Tx Frames**

Number of frames transmitted by the DCE port.

**Tx Bytes**

Number of bytes transmitted by the DCE port.

DCE PORT	ADTRAN IQPROBE VIEW STATISTICS						LOCAL
Leads On --> RTS							Interval Remaining 65
Signaling State --> UP							V.34 DBU State --> IDLE
	JUL 31	16:55	16:50	16:45	16:40	16:35	16:33
Rx Frames	12419	171	212	214	60	63	60
Rx Bytes	767952	10108	12103	12338	3611	3871	3403
Max Rx Thru	7096	3584	2688	4928	1920	1920	2040
Avg Rx Thru	107	346	324	331	97	103	91
Max Rx Util %	11%	5%	4%	7%	3%	3%	3%
Avg Rx Util %	0%	0%	0%	0%	0%	0%	0%
Tx Frames	11592	149	228	212	56	58	53
Tx Bytes	816550	23059	60121	40171	3392	3616	3152
Max Tx Thru	22944	16216	21888	22944	1920	1920	1920
Avg Tx Thru	114	789	1609	1079	91	96	84
Max Tx Util %	35%	25%	34%	35%	3%	3%	3%
Avg Tx Util %	0%	1%	2%	1%	0%	0%	0%
Port UA Time	0	0	0	0	0	0	0
Sig Down Time	0	0	0	0	0	0	0
Signal Error	0	0	0	0	0	0	0
ESC = Menu    D = DLCI    -, + = Page    >, < = Scroll    U = View By Day							

Figure 10-4

*DCE Port Statistics with DBU Card Installed (View by Interval)*

#### Maximum Tx Throughput

Maximum throughput sample in the transmit direction for the given interval. This is displayed in kbps.

#### Average Tx Throughput

Average throughput in the transmit direction for the given interval. This is displayed in kbps.

#### Maximum Tx Utilization

Maximum utilization sample in the transmit direction for the given interval. Utilization is displayed as a percentage of the Serial Bit Rate (set in the DCE Configuration menu).

#### Average Tx Utilization

Average utilization sample in the transmit direction for the given interval. Utilization is displayed as a percentage of the Serial Bit Rate (set in the DCE Configuration menu).

DCE PORT DAYS	ADTRAN IQPROBE VIEW STATISTICS						LOCAL
Leads On --> RTS DTR							
Signaling State --> UP							
					U.34 DBU State --> IDLE		
	JUL 13	JUL 12	JUL 11	JUL 10	JUL 09	JUL 08	JUL 07
Rx Frames	18163	32858	46921	27313	136	285	56
Rx Bytes	1113666	4058768	6699819	3859844	13703	28997	5219
Max Rx Thru	11552	11768	11808	11936	7440	6944	7520
Avg Rx Thru	103	377	623	648	1138	866	7
Max Rx Util %	18%	18%	18%	18%	11%	10%	0%
Avg Rx Util %	0%	0%	0%	1%	1%	1%	0%
Tx Frames	16724	33214	52515	30442	139	302	59
Tx Bytes	1043099	3521737	6209148	3675822	31864	67847	18247
Max Tx Thru	6744	10368	10760	17120	19768	20912	22096
Avg Tx Thru	97	327	578	617	2647	2027	25
Max Tx Util %	10%	16%	16%	26%	30%	32%	0%
Avg Tx Util %	0%	0%	0%	0%	4%	3%	0%
Port UA Time	0	0	0	0	0	0	0
Sig Down Time	0	0	0	0	0	0	0
Signal Error	0	0	0	0	0	0	0

\_ ESC = Menu    D = DLCI    -, + = Page    U = View Intervals

**Figure 10-5**  
DCE Port Statistics (View by Day)

#### Port UA Time

Time in seconds the DCE port is unavailable for data delivery. This means that the data link is down or in test, or that the frame relay signaling state is down.

#### Signal Down Time

Time in seconds the signaling state has been down.

#### Signal Error

Number of signal frames received with PVC signaling protocol violations.

#### Signal Timeouts

Number of T391 timeouts that have occurred.

#### Signal State Change

Number of changes in the signaling protocol state.

**Rx Full Status**

Number of full status responses received on the DCE side.

**Tx Full Status**

Number of full status polls transmitted by the IQ Probe.

**Rx LI Only**

Number of link integrity (LI) only responses received on the DCE side.

**Tx LI Only**

Number of link integrity polls transmitted by the IQ Probe.

**Async Status**

Number of asynchronous status messages received by the IQ Probe.

**Discard Frame**

Number of frames discarded by the IQ Probe due to bad IP frames received on the dedicated management DLCI, transmission errors, or link violations.

**Aborts**

Number of frames received without a closing flag. This transmission error is also reflected in the Discard Frame field.

**CRC Errors**

Number of frames received with CRC violations. This transmission error is also reflected in the Discard Frame field.

**Octet Align**

Number of frames received with a bit count that does not fall on 8-bit boundaries. This transmission error is also reflected in the Discard Frame field.

**DCD State Change**

Count of carrier detect (CD) state changes for the DCE port.

**DSR State Change**

Count of data set ready (DSR) state changes for the DCE port.



**Length Error**

Number of frames received with fewer than 5 octets or greater than 4500 octets. This link violation is also reflected in the Discard Frame field.

**EA Violation**

Number of frames received with an error in the extended address (EA) bit field of the frame relay header.

**Encapsulation Error**

Number of frames received on a dedicated management DLCI that have RFC 1490 errors. These errors are also reflected in the Discard Frames field.



*If both management DLCIs are shared, the Encapsulation Error field is N/A. See the section **Management DLCI Mode** in the chapter **Configuring the DCE Port** for more information.*

**Inactive DLCI**

Number of frames received on an inactive DLCI.

**Invalid DLCI**

Number of frames received on a DLCI that is out of range. The valid DLCI range is 16-1007.

**Unrouteable**

Number of frames received on a dedicated management DLCI with an IP address that does not match the IQ Probe IP address.



*If both management DLCIs are shared, the Unrouteable field is N/A. See the section **Management DLCI Mode** in the chapter **Configuring the DCE Port** for more information.*

**DBU Port Statistics**

Information given is for the dial backup port since the last reset. These menus are only available if an ESP DBU card is installed. See Figures 10-6 and 10-7 for both formats of the DBU Port Statistic screens.

**DBU State**

Current state of the DBU circuit.

**Interval Remaining**

Number of seconds remaining in the current timed interval.  
This field is only shown in View by Interval menus.

**Rx Frames**

Number of frames received by the DBU port.

**Rx Bytes**

Number of bytes received by the DBU port.

**Maximum Rx Throughput**

Maximum throughput sample in the receive direction for the given interval. This is displayed in kbps.

**Average Rx Throughput**

Average throughput in the receive direction for the given interval. This is displayed in kbps.

**Maximum Rx Utilization**

Maximum utilization sample in the receive direction for the given interval. Utilization is displayed as a percent of DBU port bandwidth.

**Average Rx Utilization**

Average utilization sample in the receive direction for the given interval. Utilization is displayed as a percent of DBU port bandwidth.

**Tx Frames**

Number of frames transmitted by the DBU port.

**Tx Bytes**

Number of bytes transmitted by the DBU port.

**Maximum Tx Throughput**

Maximum throughput sample in the transmit direction for the given interval. This is displayed in kbps.

**Average Tx Throughput**

Average throughput in the transmit direction for the given interval. This is displayed in kbps.

**Maximum Tx Utilization**

Maximum utilization sample in the transmit direction for the given interval. Utilization is displayed as a percent of DBU port bandwidth.

**Average Tx Utilization**

Average utilization sample in the transmit direction for the given interval. Utilization is displayed as a percent of DBU port bandwidth.

DBU PORT	ADTRAN IQPROBE VIEW STATISTICS						LOCAL
U.34 DBU State --> CONNECT 33.6							Interval Remaining 235
	JUL 31	16:55	16:50	16:45	16:40	16:35	16:33
Rx Frames	171	171	0	0	0	0	0
Rx Bytes	10108	10108	0	0	0	0	0
Max Rx Thru	3584	3584	0	0	0	0	0
Avg Rx Thru	346	346	0	0	0	0	0
Max Rx Util %	5%	5%	0%	0%	0%	0%	0%
Avg Rx Util %	0%	0%	0%	0%	0%	0%	0%
Tx Frames	149	149	0	0	0	0	0
Tx Bytes	23059	23059	0	0	0	0	0
Max Tx Thru	16216	16216	0	0	0	0	0
Avg Tx Thru	789	789	0	0	0	0	0
Max Tx Util %	25%	25%	0%	0%	0%	0%	0%
Avg Tx Util %	1%	1%	0%	0%	0%	0%	0%
Time in DBU	150	150	0	0	0	0	0
Discard Frame	0	0	0	0	0	0	0
Aborts	0	0	0	0	0	0	0
_ ESC = Menu    -,+ = Page    >,< = Scroll    U = View By Day							

**Figure 10-6**  
*DBU Port Statistics (View by Interval)*

**Time in DBU**

Time in seconds that the DBU port was active.

**Discard Frame**

Number of frames discarded by the IQ Probe due to bad IP

frames received on the dedicated management DLCI, transmission errors, or link violations.

**Aborts**

Number of frames received without a closing flag. This transmission error is also reflected in the Discard Frame field.

**CRC Errors**

Number of frames received with CRC violations. This transmission error is also reflected in the Discard Frame field.

**Octet Align**

Number of frames received with a bit count that does not fall on 8-bit boundaries. This transmission error is also reflected in the Discard Frame field.

DBU PORT DAYS	ADTRAN IQPROBE VIEW STATISTICS						LOCAL
U.34 DBU State --> IDLE							
	JUL 13	JUL 12	JUL 11	JUL 10	JUL 09	JUL 08	JUL 07
Rx Frames	171	0	0	0	0	0	0
Rx Bytes	10108	0	0	0	0	0	0
Max Rx Thru	3584	0	0	0	0	0	0
Avg Rx Thru	346	0	0	0	0	0	0
Max Rx Util %	5%	0%	0%	0%	0%	0%	0%
Avg Rx Util %	0%	0%	0%	0%	0%	0%	0%
Tx Frames	149	0	0	0	0	0	0
Tx Bytes	23059	0	0	0	0	0	0
Max Tx Thru	16216	0	0	0	0	0	0
Avg Tx Thru	789	0	0	0	0	0	0
Max Tx Util %	25%	0%	0%	0%	0%	0%	0%
Avg Tx Util %	1%	0%	0%	0%	0%	0%	0%
Time in DBU	150	0	0	0	0	0	0
Discard Frame	0	0	0	0	0	0	0
Aborts	0	0	0	0	0	0	0
ESC = Menu    D = DLCI    -,+ = Page    U = View Intervals							

**Figure 10-7**  
DBU Port Statistics (View by Day)

**Length Error**

Number of frames received with fewer than 5 octets or greater than 4500 octets. This link violation is also reflected in the Discard Frame field.

**Encapsulation Error**

Number of frames received on a dedicated management DLCI that have RFC 1490 errors. These errors are also reflected in the Discard Frames field.



*If both management DLCIs are shared, the Encapsulation Error field is N/A. See the section **Management DLCI Mode** in the chapter **Configuring the DCE Port** for more information.*

**Unrouteable**

Number of frames received on a dedicated management DLCI with an IP address that does not match the IQ Probe IP address.



*If both management DLCIs are shared, the Unrouteable field is N/A. See the section **Management DLCI Mode** in the chapter **Configuring the DCE Port** for more information.*

**DLCI Statistics**

Access specific DLCI statistics by pressing **D** from the DCE Statistics menu. Enter the DLCI number for information on a specific DLCI (displayed in the **View by Interval and Day** formats). For a status summary of all available DLCIs, select **DLCI LIST** from the View Statistic menu shown in Figure 10-1. Figure 10-8 shows the statistics menu for a specific DLCI.

ADTRAN IQPROBE VIEW STATISTICS							LOCAL
DLCI 100 A	Throughput: Tx		896 Rx	896	Remaining		259
	Utilization: Tx		5% Rx	5%			
	JUL 31	16:55	16:50	16:45	16:40	16:35	16:33
Rx Frames	12419	171	212	214	60	63	60
Rx Bytes	767952	10108	12103	12338	3611	3871	3403
Max Rx Thru	7096	3584	2688	4928	1920	1920	2040
Avg Rx Thru	107	346	324	331	97	103	91
Max Rx Util %	11%	5%	4%	7%	3%	3%	3%
Avg Rx Util %	0%	0%	0%	0%	0%	0%	0%
Tx Frames	11592	149	228	212	56	58	53
Tx Bytes	816550	23059	60121	40171	3392	3616	3152
Max Tx Thru	22944	16216	21888	22944	1920	1920	1920
Avg Tx Thru	114	789	1609	1079	91	96	84
Max Tx Util %	35%	25%	34%	35%	3%	3%	3%
Avg Tx Util %	0%	1%	2%	1%	0%	0%	0%
Time in DBU	0	0	0	0	0	0	0
PVC IA Time	136	0	0	0	0	0	0
Rx FECN	0	0	0	0	0	0	0
ESC = Menu    -,+ = Page    >,< = Scroll    U = View By Day							

**Figure 10-8**  
DLCI Statistics for a Specific DLCI (View by Interval)

### DLCI Statistics for a Specific DLCI

#### Throughput (Tx and Rx)

Displays the current throughput sample for this PVC. This is displayed in kbps.

#### Utilization (Tx and Rx)

Displays the current CIR utilization sample for this PVC.

#### Remaining

Number of seconds remaining in the current timed interval.

#### Rx Frames

Number of frames received by the DCE port on the specified DLCI.

#### Rx Bytes

Number of bytes received by the DCE port on the specified DLCI.

**Maximum Rx Throughput**

Maximum throughput sample in the receive direction for the given interval. This is displayed in kbps.

**Average Rx Throughput**

Average throughput in the receive direction for the given interval. This is displayed in kbps.

**Maximum Rx Utilization**

Maximum utilization sample in the receive direction for the given interval. Utilization is displayed as a percentage of CIR.

**Average Rx Utilization**

Average utilization in the receive direction for the given interval. Utilization is displayed as a percentage of CIR.

**Tx Frames**

Number of frames transmitted by the DCE port on the specified DLCI.

**Tx Bytes**

Number of bytes transmitted by the DCE port on the specified DLCI.

**Maximum Tx Throughput**

Maximum throughput sample in the transmit direction for the given interval. This is displayed in kbps.

**Average Tx Throughput**

Average throughput in the transmit direction for the given interval. This is displayed in kbps.

**Maximum Tx Utilization**

Maximum utilization sample in the transmit direction for the given interval. Utilization is displayed as a percentage of CIR.

**Average Tx Utilization**

Average utilization sample in the transmit direction for the given interval. Utilization is displayed as a percentage of CIR.

**Time in DBU**

Time (in seconds) that the specified DLCI is in DBU mode.

**PVC IA Time**

Time in seconds that the PVC is in the inactive state.

**Rx FECN**

Number of frames received on the DCE port over the specified DLCI with the FECN bit of the frame relay header enabled.

**Tx FECN**

Number of frames transmitted from the DCE port over the specified DLCI with the FECN bit of the frame relay header enabled.

**Rx BECN**

Number of frames received on the DCE port over the specified DLCI with the BECN bit of the frame relay header enabled.

**Tx BECN**

Number of frames transmitted from the DCE port over the specified DLCI with the BECN bit of the frame relay header enabled.

**Rx DE**

Number of frames received on the DCE port over the specified DLCI with the discard eligibility (DE) bit of the frame relay header enabled.

**Tx DE**

Number of frames transmitted from the DCE port over the specified DLCI with the DE bit of the frame relay header enabled.

**Rx CR**

Number of frames received on the DCE port over the specified DLCI with the CR bit of the frame relay header enabled.



**Tx CR**

Number of frames transmitted from the DCE port over the specified DLCI with the CR bit of the frame relay header enabled.

**Lost Frames**

Number of frames lost across the PVC. This field is applicable only if the DCE port's Sequence Number Checking option (accessed through the DCE Port Configuration menu) is ENABLED.

**Remote Lost Frames**

Number of lost frames reported by the remote IQ device. This field is applicable only if the DCE port's Sequence Number Checking option (accessed through the DCE Port Configuration menu) is ENABLED.

**Rx Burst Seconds**

Amount of time (in seconds) that throughput in the receive direction is greater than the CIR.

**Tx Burst Seconds**

Amount of time (in seconds) that throughput in the transmit direction is greater than the CIR.

**Minimum Rx Frame**

Size of smallest frame received across the DLCI.

**Maximum Rx Frame**

Size of largest frame received across the DLCI.

**Average Rx Frame**

Average size of frames received across the DLCI.

**Minimum Tx Frame**

Size of smallest frame transmitted across the DLCI.

**Maximum Tx Frame**

Size of largest frame transmitted across the DLCI.

**Average Tx Frame**

Average size of frames transmitted across the DLCI.

**Minimum Frame Delay**

Minimum round trip delay of the DLCI. This field is applicable only if the DCE port's PVC Delay Measurement option (accessed through the DCE Port Configuration menu) is ENABLED.

**Maximum Frame Delay**

Maximum round trip delay of the DLCI. This field is applicable only if the DCE port's PVC Delay Measurement option (accessed through the DCE Port Configuration menu) is ENABLED.

**Average Frame Delay**

Average round trip delay of the DLCI. This field is applicable only if the DCE port's PVC Delay Measurement option (accessed through the DCE Port Configuration menu) is ENABLED.

**PVC State Change**

Number of changes in the PVC state.

## DLCI List

This menu lists all available DLCIs and classifies them as active (A), inactive (I), or unknown (U). See Figure 10-9. A byte and frame break out of each DLCI is also provided including an in/out count and a count of how many frames were received with FECN, BECN, or DE enabled.

ADTRAN IQPROBE VIEW DLCI STATISTICS							LOCAL	
DLCI		Frames				Bytes		
		In	Out	FECN	BECN	DE	In	Out
300	A	3416	2602	0	0	0	320424	291020
311	A	3348	3359	0	0	0	346768	453220
314	A	0	0	0	0	0	0	0
UNKNOWN		0	0				0	0
INACTIVE		0	0				0	0
SIGNAL		5748	5720				106306	91520

ESC = Prev Menu                      +,- = Page

**Figure 10-9**  
*DLCI Statistics Summary for All Available DLCIs*

## System Statistics

The system time and date (as set in the System Configuration menu), the software revision, and the ethernet address are displayed in this menu. Also, the elapsed time since the unit was turned on (or since the last restart) is given in seconds. The buffer information provided in this menu is used mainly by ADTRAN technical support in troubleshooting situations. See Figure 10-10.

ADTRAN IQPROBE VIEW SYSTEM STATISTICS					LOCAL
Buf Type	Curr Use	Curr Free	Curr Use Per	High Buf Use	Avg Buf Use
1	15	65	18	15	15
2	0	5	0	4	0
3	2	8	20	2	0
4	200	0	100	200	123
5	30	80	27	30	30
E	18	18	0		

System Time	---->	22:03
System Date	---->	SAT 08-15-98
Elapsed Time	---->	2624
S/W Revision	---->	321h
Ethernet Address	->	00A0C8028009

**Figure 10-10**  
*System Statistics Screen*

## VIEWING STATISTICAL INFORMATION (FRONT PANEL INTERFACE)

Select STATS from the Main menu. From this menu, choose to view DTE, DCE, DBU, DLCI, or System statistics or to reset the statistics. Once a selection (other than Reset) is made, the first Statistics screen of that category appears. Scroll through the remaining screens using the arrow keys. The character displayed in reverse video in the upper right-hand corner of the screen indicates which port the displayed information applies to (1=DTE, N=DCE, D=DBU). Statistic counts are running totals for the current day (i.e., since 12 AM).

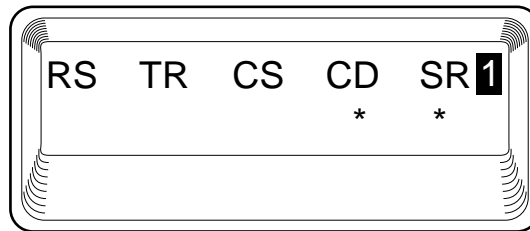
### DTE Port Statistics Available on Front Panel

The following information is displayed when the DTE port is selected.

#### Control Signal Status Screen

An asterisk (\*) indicates that the signal is active for the DTE port. See Figure 10-11.

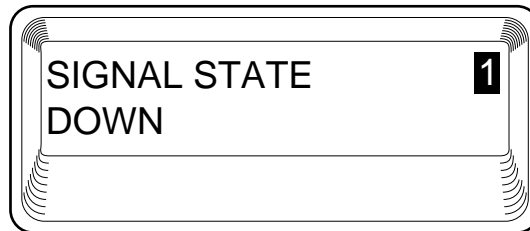
RS	request to send
TR	data terminal ready
CS	clear to send
CD	carrier detect
SR	data set ready



**Figure 10-11**  
*Control Signal Status Screen*

**Signal State**

Current signaling state of DTE port (up or down). See Figure 10-12.



**Figure 10-12**  
*Signal State Screen*

**Signal State Change**

Number of changes in the signaling protocol state.

**Signal Timeouts**

Total T392 timeouts that have occurred since the last reset.

**Signal Errors**

Total signal frames received with PVC signaling protocol violations.

**Errored Frames**

Total errored frames received since last reset.

**CRC Errors**

Number of frames received with CRC violations.

**Abort Frames**

Total frames received without a closing flag.

**Octet Align**

Number of frames received with a bit count that does not fall on 8-bit boundaries.

**Signal Down Time**

Time in seconds that signaling state has been down.

**DCE Port Statistics Available on Front Panel**

**Control Signal Status Screen**

An asterisk (\*) indicates that the signal is active for the DCE port.

RS      request to send  
TR      data terminal ready  
CS      clear to send  
CD      carrier detect  
SR      data set ready

**DBU Status**

Current state of the incoming DBU circuit (only appears if an ESP DBU card is installed).

**Signal State**

Current state of the DCE port (up or down).

**Signal State Change**

Number of changes in the signaling protocol state.

**Signal Timeouts**

Total T391 timeouts that have occurred since the last reset.

**Signal Errors**

Total signal frames received with PVC signaling protocol violations.

**Frames In**

Total received frames since last reset.

**Frames Out**

Total transmitted frames since last reset.

**Errored Frames**

Total errored frames received since last reset.

**CRC Errors**

Number of frames received with HDLC CRC violations.

**Abort Frames**

Total frames received without a closing flag.

**Octet Align**

Number of frames received with a bit count that does not fall on 8-bit boundaries.

**Port UA Time**

Time in seconds the DCE port is unavailable for data delivery. This can mean that the data link is down or in test, or that the PVC signaling state is down.

**DBU Port Statistics Available on Front Panel**

DBU statistics are only available if an ESP DBU card is installed.

**DBU Status**

Current state of the DBU circuit.

**Time in DBU**

The amount of time (in seconds) that the unit has been in dial backup mode.

**Frames In**

Total received frames since the unit went into dial backup mode (or since last reset).

**Frames Out**

Total transmitted frames since the unit went into dial backup mode (or since last reset).

**Errored Frames**

Total errored frames received since the unit went into dial backup mode (or since last reset).

**CRC Errors**

Number of frames received on the dial backup circuit with CRC violations.

**Abort Frames**

Total frames received on the dial backup circuit without a closing flag.

**Octet Align**

Number of frames received on the dial backup circuit with a bit count that does not fall on 8-bit boundaries.

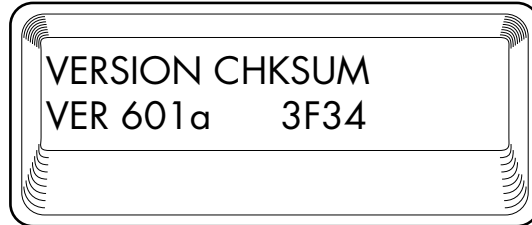
**DLCI List**

Select DLCI List to display a list of all DLCIs and their current states. Scroll through the list by pressing **Shift + Next** and **Shift + Prev**.

**System Statistics Available on Front Panel**

Select SYS from the STATS menu to display the software version, checksum, the current time and date, and the ethernet address. The first of four System Statistics screens is shown in Figure 10-13. Use the arrow keys to scroll through the screens. Press **Cancel** to return to the STATS menu.





**Figure 10-13**  
*System Statistics Screen*



# Chapter 11

## Testing

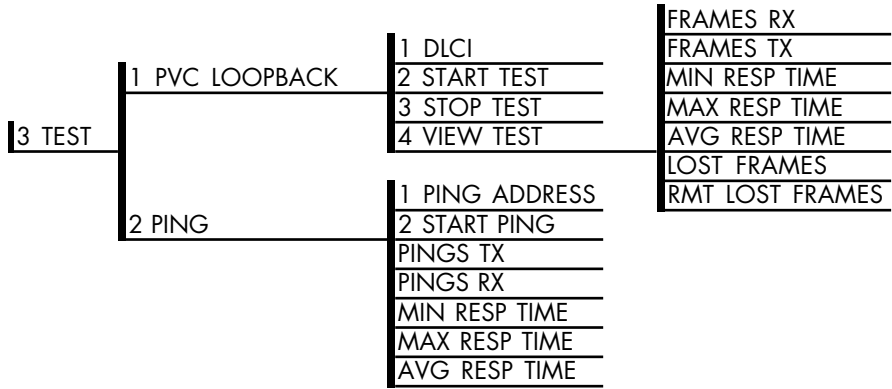
---

This menu allows you to perform diagnostics by initiating PVC loopback tests and ping tests. See Figure 11-1 for the terminal Test menu. See Figure 11-2 for the Front Panel menu tree.

```
TEST MENU                                ADTRAN IQPROBE
                                         LOCAL
-----
1 - PVC LOOPBACK
2 - PING

ENTER SELECTION ->
```

**Figure 11-1**  
*Terminal Test Menu*



**Figure 11-2**  
Front Panel Test Menu



*In this chapter, the terminal selections are listed first followed by the Front Panel selections in parenthesis (if the names differ).*

### PVC Loopback

A PVC loopback test is a non-intrusive loopback option for each PVC. During this test, the IQ Probe periodically sends test frames to the remote IQ device which are then returned for analysis. The bandwidth required is approximately 1 kbps for each PVC in test. See Figure 11-3 for the terminal menu.

```
PVC LOOPBACK                                ADTRAN IQPROBE
                                             LOCAL
-----
1 - DLCI <0=ALL> 0
2 - TEST LEN : MIN <0=UNTIMED> 0
3 - START TEST
4 - STOP TEST
5 - VIEW TEST
6 - RESET TEST STATS
7 - VIEW DLCI LIST

-----
ENTER SELECTION -> _
```

**Figure 11-3**  
*PVC Loopback Menu*

**DLCI <0 = all> (DLCI)**

Enter the DLCI of the PVC to be tested (or enter 0 to test all available PVCs).

**Test Length**

Amount of time (in minutes) that you want the test to take place. Enter 0 for a continuous test. This option is not available on the front panel.

**Start Test**

Starts the test.

**Stop Test**

Ends the test in progress prematurely or terminates a continuous test.

## View Test

Displays the Test Statistics menu shown in Figure 11-4. Descriptions of each field in the Test Statistics menu follow:

### **PVC Active/Inactive/Undefined**

Displays current state of the selected PVC as determined by the switch (only available in the terminal menu).

- **Active:** The PVC is currently operational.
- **Inactive:** There is currently a physical or frame relay layer problem at the remote end of the PVC, or a problem exists inside the frame relay cloud for the selected PVC.
- **Undefined:** The PVC is undefined for the switch.

### **Test Active/No Test Active**

Displays current testing state of the IQ Probe (only available in the terminal menu).

### **Frames Rx**

Number of frames received on the selected PVC during the current loopback test.

### **Frames Tx**

Number of frames transmitted across the selected PVC during the current loopback test.

### **Lost Frames**

Number of frames lost in the receiving direction (traveling from the remote IQ device to the local IQ Probe).

### **Remote Lost Frames**

Number of frames lost in the transmitting direction (traveling from the local IQ Probe to the remote IQ device).

### **Minimum Loop Response Time (MIN RESP TIME)**

Minimum round-trip time (in seconds) for the current test.

### **Maximum Loop Response Time (MAX RESP TIME)**

Maximum round-trip time (in seconds) for the current test.

**Average Loop Response Time (AVG RESP TIME)**

Average round-trip time (in seconds) for the current test.

```

VIEW TEST RESULTS                                ADTRAN IQPROBE
                                                LOCAL
-----
1 - DLCI <0=ALL> 100

PVC ACTIVE

NO TEST ACTIVE
FRAMES RX----->          0          FRAMES TX----->          0
LOST FRAMES----->        0          RMT LOST FRAMES--->        0
MIN LOOP RSP TIME->        0          MAX LOOP RSP TIME->        0
AVG LOOP RSP TIME->        0

RANGE IS 0 TO 1007.

ENTER VALUE FOR DLCI <0=ALL> -> _

```

**Figure 11-4**  
*Test Status Screen***Reset Test Stats**

Resets the information shown in the Test Statistics menu (only available in the terminal menu).

**View DLCI List**See the section *DLCI List* in the chapter *Statistics* for a description of this menu (only available in the terminal menu).

## Ping

Select PING to send a ping request to a specific address. Ping testing is only available when the ethernet port is enabled (CONFIG -> SYSTEM -> ETHERNET PORT).

### Address to Ping (PING ADDRESS)

Enter the IP address of the unit the IQ Probe is sending an echo request (ping) to.

### Start Ping

The Start Ping command causes the IQ Probe to send ten ping requests to the target station. At the end of the ten-ping test, the following results are shown. During front panel operation, use the arrow keys to scroll through the results.

#### Pings Transmitted (PINGS TX)

This field shows the number of pings sent (always 10).

#### Ping Responses (PINGS RX)

This field shows the number of responses received from the pinged device.

#### Min Response Time (MIN RESP TIME)

This field shows the shortest round-trip delay (in ms) of the received responses. Round-trip delay is counted from the time the ping is sent until the response is received.

#### Max Response Time (MAX RESP TIME)

This field shows the longest round-trip delay (in ms) of the received responses. If a response is not received before the unit times out, the delay is not calculated in.

#### Avg Response Time (AVG RESP TIME)

This field shows the average response time (in ms) based on all received responses.

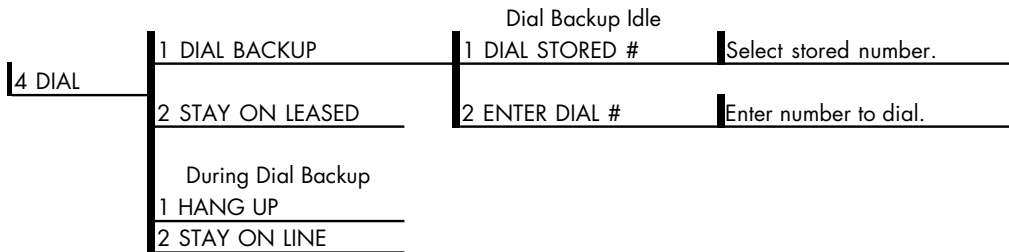


# Chapter 12

## Activating Dial Backup Options

---

The dial backup options available from the Main menu (4=DIAL) appear in Figure 12-1. These options are only available when an ESP DBU card is installed.



**Figure 12-1**  
*Dial Options Menu*

### Dial Options when Dial Backup is Idle

#### **Dial Backup**

The IQ Probe prompts to dial a stored number or enter a number to dial for dial backup.

#### **Stay on Leased**

The IQ Probe remains on the leased line and does not enter dial backup mode.

## **Dial Options During Dial Backup**

### **Hang Up**

Terminates the dial backup connection and attempts to reestablish communication on the data line.

### **Stay On Line**

This IQ Probe remains in dial backup mode and returns to the Statistics menu.

# Appendix A

## Pinouts

---

The following tables give the pin assignments for the IQ Probe connectors, adapter cables, and card options. For more information, see the chapter *Installation*.

**Table A-A**  
*Pin Assignments for 10baseT Connector*

<b>Pin</b>	<b>Name</b>	<b>Description</b>
1	TD+	The positive signal for the TD differential pair. This signal contains the serial output data stream transmitted onto the network.
2	TD-	The negative signal for the TD differential pair (pins 1 and 2).
3	RD+	The positive signal for the RD differential pair. This signal contains the serial input data stream received from the network.
4, 5	N/A	not used
6	RD-	The negative signal for the RD differential pair (pins 3 and 6).
7, 8	N/A	not used

**Table A-B**  
*Pin Assignments for Control Connector*

RJ Pin#	Function	Direction
1	GND	
2	RTS	I
3	TD	I
4	DSR	O
5	RD	O
6	CTS*	O
7	DTR	I
8	DCD	O

\*Used for hardware flow control.

**Table A-C**  
*EIA -232 Connector Pin Assignments*

Pin	EIA	Description
1	AA	Protective Ground (PG)
2	BA	Transmit Data (SD)
3	BB	Receive Data (RD)
4	CA	Request to Send (RS)
5	CB	Clear to Send (CS)
6	CC	Data Set Ready (SR)
7	AB	Signal Ground (SG)
8	CF	Received Line Signal Detector (CD)
9	-	+12 Test Point
10	-	-12 Test Point
15	DB	Transmit Clock (TC)
17	DD	Receive Clock (RC)
18	-	Local Loopback (LL)
20	CD	Data Terminal Ready (TR)
21	-	Remote Loopback (RL)
22	CE	Ring Indicator (RI)
24	DA	External Tx Clock (ETC)
25	-	Test Indicator (TI)

**Table A-D**  
*EIA-530 Connector Pin Assignments*

<b>Pin</b>	<b>EIA</b>	<b>Description</b>
1	-	Shield
2	BA	Transmit Data
3	BB	Receive Data
4	CA/CJ	Request to Send/Ready for Receiving
5	CB	Clear to Send
6	CC	DCE Ready
7	AB	Signal Ground
8	CF	Received Line Signal Detector
9	DD	Receive Signal Element Timing (DCE source)
10	CF	Received Line Signal Detector
11	DA	Transmit Signal Element Timing (DTE source)
12	DB	Transmit Signal Element Timing (DCE source)
13	CB	Clear to Send
14	BA	Transmit Data (return)
15	DB	Transmit Signal Element Timing (DCE source)
16	BB	Receive Data (return)
17	DD	Receive Signal Element Timing (DCE source)
18	LL	Local Loopback
19	CA/CJ	Request to Send/Ready for Receiving (return)
20	CD	DTE Ready
21	RL	Remote Loopback
22	CE	Ring Indicator
23	AC	DTE Ready (return)
24	DA	Transmit Signal Element Timing (DTE source)
25	TM	Test Mode

**Table A-E**  
*Pin Assignments for DB-25 to X.21 (DB-15) Adapter Cable*

<b>DB25 Pin#</b>	<b>X.21 Pin#</b>	<b>Function</b>
1	1	SHIELD
2	2	TX (A)
3	4	RX (A)
4	3	CONTROL (A)
7	8	GROUND
8	5	INDICATION (A)
9/12	13	SIGNAL TIMING (B)
10	12	INDICATION (B)
19	10	CONTROL (B)
14	9	TX (B)
15/17	6	SIGNAL TIMING (A)
16	11	RX (B)

**Table A-F**  
*Pin Assignments for DB-25 to V.35 Adapter Cable*  
*(Rear Panel Connector)*

<b>DB25 Pin#</b>	<b>V.35 Pin#</b>	<b>Description</b>	<b>CCITT</b>
1	A	Protective Ground (PG)	101
2	P	Transmitted Data (SD-A)	103
3	R	Received Data (RD-A)	104
4	C	Request to Send (RTS)	105
5	D	Clear to Send (CTS)	106
6	E	Data Set Ready	107
7	B	Signal Ground (SG)	102
8	F	Received Line Signal Detector (CD)	109
9	X	Receiver Signal Element Timing (SCR-B)	115
11	W	External TX Signal Element (SCX-B)	113
12	AA	Transmitter Signal Element Timing (SCT-B)	114
13	V	Receiver Signal Element Timing (SCR-A)	115
14	S	Transmitted Data (SD-B)	103
15	Y	Transmitter Signal Element Timing (SCT-A)	114
16	T	Received Data (RD-B)	104
17	V	Receiver Signal Element Timing (SCR-A)	115
18	J	Ring Indicator (RI)	-
19	P	Transmitted Data (SD-A)	103
20	H	Data Terminal Ready (DTR)	-
21	BB		
24	U	External TX Signal Element (SCX-A)	113
25	K		

**Table A-G**  
*Pin Assignments for DB-25 to V.35 Adapter Cable  
 (DCE Card Option Connector)*

<b>DB25 Pin#</b>	<b>V.35 Pin#</b>	<b>Function</b>	<b>DTEx Port Direction</b>	<b>DCE Port Direction</b>
1	A	FGND		
2		TD(EIA-232)	I	O
3		RD(EIA-232)	O	I
4	C	RTS	I	O
5	D	CTS	O	I
6	E	DSR	O	I
7	B	GND		
8	F	DCD	O	I
9		NEG		
10		POS		
11	AA	TC-B(V.35)	O	I
12	Y	TC-A(V.35)	O	I
13	V	RC-A(V.35)	O	I
14	T	RD-B(V.35)	O	I
15		TC(EIA-232)	O	I
16	R	RD-A(V.35)	O	I
17		RC		
18	S	TD-B(V.35)	I	O
19	P	TD-A(V.35)	I	O
20	H	DTR	I	O
21	W	ETC-B(V.35)	I	O
22				
23	U	ETC-A(V.35)	I	O
24		ETC(EIA-232)	I	O
25	X	RC-B(V.35)	O	I



**Table A-H**  
*Dial Backup Card Connectors*

<b>Pin</b>	<b>Name</b>	<b>Description</b>
<b>4-wire Switched 56</b>		
1	R1	Transmit Data from DSU to Network-Ring 1
2	T1	Transmit Data from DSU to Network-Tip 1
3-6	-	Not Used
7	T	Receive Data from Network to DSU-Tip
8	R	Receive Data from Network to DSU-Ring
<b>V.34 and 2B+D ISDN</b>		
1-3	-	Not Used
4	T	Network-Tip
5	R	Network-Ring
6 - 8	-	Not Used



# Appendix B

## Specifications Summary

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### **SPECIFICATIONS AND FEATURES**

This appendix provides the standard specifications and features of the IQ Probe.

#### **Operating Modes**

100 DLCIs supported

Frame relay using EIA-232, V.35, EIA-530, X.21 interface protocols

#### **DTE/DCE Data Rates**

Frame relay 56 kbps to 2.048 Mbps synchronous

#### **DTE/DCE Interface**

Standard DB-25 for EIA-530 and EIA-232

Adapter cable for V.35 and X.21

#### **Configuration**

Front panel

Local and remote VT 100 terminal via the Control port

Remote via frame relay network connection

TELNET and SNMP

#### **Control Port Interface**

Electrical: EIA-232

Physical: RJ-48S (female DB-25 adapter provided)

Data rates: Async 9.6 to 38.4 kbps

**SLIP/PPP Port Interface**

Electrical: EIA-232

Physical: female DB-25 (provided female DB-25 adapter)

Data rates: Async 9.6 to 38.4 kbps

**Diagnostics**

IP Ping mode

PVC testing with test patterns

PVC round trip delay

**SNMP/TELNET**

Integrated SLIP/PPP (async) port

RJ-48S and DB-25 access

10baseT interface

MIB II RFC 1315 compliant

ADTRAN Enterprise MIB for frame monitoring and control

**Agency Approvals**

FCC Part 15, Class A

UL 1950 3<sup>rd</sup> edition

**Physical**

Operating temperature: 0 to 50 °C (32 to 122 °F)

Storage: -20 to 70 °C (-4 to 158 °F)

Relative humidity: Up to 95%, non-condensing

Dimensions: 2.4"H, 8.0"W, 10.4"D

Weight: 4.5 lbs

Power: 90-240 VAC, 50/60 Hz, 7 W

# Acronyms and Abbreviations

---

ACK .....	acknowledgment
ALM .....	alarm
ANSI .....	American National Standards Institute
ARP .....	address resolution protocol
ASCII .....	American National Standards Code for Information Interchange
async .....	asynchronous
BECN .....	backward explicit congestion notification
bps .....	bits per second
CCITT .....	Consultive Committee for International Telephony and Telegraphy
CD .....	carrier detect
CIR .....	committed information rate
CO .....	central office
CPE .....	customer premise equipment
CR, C/R.....	command response
CRC .....	cyclic redundancy check
CS .....	clear to send
CSU .....	channel service unit
CTS .....	clear to send
dB .....	decibel
DBU .....	dial backup
DCD .....	data carrier detect
DCE.....	data communications equipment
DDS .....	digital data service
DE.....	discard eligible
DLCI .....	data link connection identifier
DSR .....	data set ready

## Acronyms and Abbreviations

---

DSU .....	data service unit
DTE .....	data terminal equipment
DTR .....	data terminal ready
EA .....	extended address
EBCDIC .....	extended binary coded decimal interexchange code
ESP .....	embedded SNMP
FECN .....	forward explicit congestion notification
FEP .....	front end processor
FIFO .....	first in first out
FR .....	frame relay
FRAD .....	frame relay access device
FRF .....	frame relay forum
FSU .....	frame relay service unit
GUI .....	graphical user interface
HDLC .....	high-speed data link control
IA .....	inactive
IP .....	internet protocol
ISDN .....	integrated services digital network
ITU .....	International Telecommunications Union
IXC .....	interexchange carrier
KA .....	keep alive
kbps .....	kilobits per second
LAN .....	local area network
LEC .....	local exchange carrier
LED .....	light emitting diode
LI .....	link integrity
LMI .....	local management interface
MIB .....	management information base
ms .....	millisecond
NI .....	network interface
OCU .....	office channel unit
POP .....	point-of-presence
PPP .....	point-to-point protocol
PU .....	physical unit
PVC .....	permanent virtual circuit
RD .....	receive data
RDL .....	remote digital loopback
RFC .....	request for comments
RFECN .....	remote forward explicit congestion notification

RIP .....	routing information protocol
RMA.....	return material authorization
RS .....	request to send; also recommended standard
RTS .....	request to send
Rx .....	receive
SAP .....	service access point
SDLC .....	synchronous data link control
SLIP .....	serial line internet protocol
SNA.....	systems network architecture
SNMP .....	simple network management protocol
SR .....	data set ready
SVC .....	switched virtual circuit
SW56 .....	switched 56
sync .....	synchronous
TD.....	transmit data
telco.....	telephone company
TR .....	data terminal ready
Tx.....	transmit
UA .....	unavailable
UNI .....	user-to-network interface
VRC.....	vertical redundancy check
WAN .....	wide area network

## Acronyms and Abbreviations

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# Glossary

---

***ANSI***

American National Standards Institute. Develops and proposes recommendations for international communications standards.

***ASCII***

American National Standard Code for Information Interchange. The standard and predominant 7-bit (8-bit with parity) character code used for data communications and data processing.

***asynchronous***

A method of data transmission which allows characters to be sent at irregular intervals by preceding each character with a start bit, followed by a stop bit.

***attenuation***

The loss of signal amplitude during transmission. The received signal is lower in signal amplitude than the transmitted signal due to losses in the transmission medium (resistance in the cable). Attenuation is measured in decibels.

***bandwidth***

The bandwidth determines the rate at which information can be sent through a channel (the greater the bandwidth, the more information that can be sent in a given amount of time).

***BECN***

backward explicit congestion notification. A bit set by a frame relay network to notify an interface device (DTE) that congestion avoidance procedures should be initiated by the sending device.

**bit**

A binary digit. A signal, wave, or state is represented as either a binary 0 or 1.

**bits per second (bps)**

The number of bits passing a specific point per second. Examples of common rates are:

- A Kilobit is one thousand bits per second (kbps)
- A Megabit is one million bits per second (Mbps)

**bridge**

A device that supports LAN-to-LAN communications. Bridges may be equipped to provide frame relay support to the LAN devices they serve. A frame relay capable bridge encapsulates LAN frames in frame relay frames and feeds them to a frame relay switch for transmission across the network. A frame relay capable bridge also receives frame relay frames from the network, strips the frame relay frame off each LAN frame, and passes the LAN frame on to the end device. Bridges are generally used to connect LAN segments to other LAN segments or to a WAN. They route traffic on the level 2 LAN protocol (e.g. the Media Access Control address), which occupies the lower sub-layer of the LAN OSI data link layer. See also *router*.

**byte**

Generally, an 8-bit quantity of information, used mainly in referring to parallel data transfer, semiconductor capacity, and data storage. Also, it is generally referred to in data communications as an octet or character.

**carrier**

The provider of the data service to the customer site. Carriers can be local telephone companies, regional telephone companies or any inter-exchange carrier such as AT&T, Sprint, or MCI.

**CD**

carrier detect. A signal generated by a modem or DSU/CSU. CD indicates the presence of a carrier signal on a communications link.

**channel bank**

Equipment in a telephone central office or customer premises that performs multiplexing of lower speed digital channels into a higher speed composite channel. The channel bank also detects and transmits signalling information for each channel; thereby transmitting framing information so that time slots allocated to each channel can be identified by the receiver.

**CIR**

committed information rate. Less than or equal to the access rate, the CIR is used by the service provider for rate enforcement when the network is congested. When rates exceed the CIR, frames may be discarded.

**clocking**

An oscillator-generated signal that provides a timing reference for a transmission link. A clock provides signals used in a transmission system to control the timing of certain functions. The clock has two functions: (1) to generate periodic signals for synchronization and (2) to provide a time base.

**control port**

The electrical interface between the IQ Probe unit and a control terminal. The control terminal is used to communicate commands to the unit.

**CPE**

customer premise equipment. All telecommunications terminal equipment located on the customer premises including telephone sets, private branch exchanges (PBXs), data terminals, and customer-owned coin-operated telephones.

**C/R bit**

In the Q.921 protocols, a bit that identifies a data-link-layer frame as either a command or a response.

**CRC**

cyclic redundancy check. A computational means to ensure the accuracy of frames transmitted between devices in a frame relay network. The mathematical function is computed, before the frame is transmitted, at the originating device. Its numerical value is computed based on the content of the frame. This value is compared with a recomputed value of the function at the destination device.

**CS**

See *CTS*.

**CSU**

channel service unit. A device used to connect a digital phone line coming in from the phone company to either a multiplexer, channel bank, or directly to another device producing a digital signal (for example: a digital PBX, a PC, or data communications device). A CSU performs certain line-conditioning and equalization functions and responds to loopback commands sent from the central

office. A CSU regenerates digital signals. It monitors them for problems, and provides a way of testing the digital circuit.

**CTS**

clear to send. A signal on the DTE interface indicating that the DCE is clear to send data.

**dB**

The standard abbreviation for decibel. A decibel is a unit of measure for signal. A decibel is usually the relation between a transmitted signal and a standard signal source. Therefore, 6 dB of loss would mean that there is a 6 dB difference between what arrives down a communications circuit and what was transmitted by a standard signal generator.

**DCE**

data communications equipment. A device that provides all the functions required for connection to telephone company lines and for converting signals between telephone lines and DTE. Also see *DTE*.

**DDS**

digital data service. AT&T private line service for transmitting data over a digital system. The digital transmission system transmits electrical signals directly, instead of translating the signals into tone of varied frequencies as with traditional analog transmission systems. Digital techniques provide more efficient use of transmission facilities, resulting in lower error rates and costs than analog systems.

**DE**

discard eligibility. A user-set bit indicating that a frame may be discarded in preference to other frames if congestion occurs, to maintain the committed quality of service within the network. Frames with the DE bit set are considered Be excess data.

**DLCI**

data link connection identifier. A unique number assigned to a PVC end point in a frame relay network. Identifies a particular PVC endpoint within a user's access channel in a frame relay network and has local significance only to that channel.

**DSU**

data service unit. A device designed to transmit and receive digital data on digital transmission facilities.

**DTE**

data terminal equipment. The end-user terminal or computer that plugs into the termination point (DCE) of a communications circuit. The main difference between the DCE and the DTE is that pins two and three are reversed.

**encapsulation**

A process by which an interface device places an end device's protocol-specific frames inside a frame relay frame. The network accepts only frames formatted specifically for frame relay; therefore interface devices acting as interfaces to a frame relay network must perform encapsulation. See also *interface device* and *frame-relay-capable interface device*.

**end device**

The ultimate source or destination of data flowing through a frame relay network sometimes referred to as DTE. As a source device, it sends data to an interface device for encapsulation in a frame relay frame. As a destination device, it receives de-encapsulated data (i.e., the frame relay frame is stripped off, leaving only the user's data) from the interface device.

**far end**

The unit or units not on-site (at the customer's premises or the other end of the data link).

**FECN**

forward explicit congestion notification. A bit set by a frame relay network to notify an interface device (DTE) that congestion avoidance procedures should be initiated by the receiving device. See also *BECN*.

**file server**

In the context of frame relay network supporting LAN-to-LAN communications, a device connecting a series of workstations within a given LAN. The device performs error recovery and flow control functions as well as end-to-end acknowledgment of data during data transfer, thereby significantly reducing overhead within the frame relay network.

***frame-relay-capable interface device***

A communications device that performs encapsulation. Frame-relay-capable routers and bridges are examples of interface devices used to interface the customer's equipment to frame relay network. See also *interface device* and *encapsulation*.

***frame relay frame***

A variable-length unit of data, in frame-relay format that is transmitted through a frame relay network as pure data. Contrast with *packet*.

***frame relay network***

A telecommunications network based on frame relay technology. Data is multiplexed. Contrast with *packet switching network*.

***gateway***

A device which enables information to be exchanged between two dissimilar systems or networks.

***HDLC***

high level data link control. A generic link-level communications protocol developed by the International Organization for Standardization (ISO). HDLC manages synchronous code-transparent, serial information transfer over a link connection. See also *SDLC*.

***host computer***

The primary or controlling computer in a multiple computer operation.

***in-band***

Signaling (dialing, diagnostics, management, configuration, etc.) over the same channel used for data.

***ingress***

Frame relay frames leaving from an access device in a direction toward the frame relay network.

***interface device***

Provides the interface between the end device(s) and a frame relay network by encapsulating the user's native protocol in frame relay frames and sending the frames across the frame relay backbone. See also *encapsulation* and *frame-relay-capable interface device*.

**IP**

internet protocol. A protocol which provides for transmitting blocks of data between hosts identified by fixed-length addresses.

**ISDN**

integrated services digital network. A network architecture that enables end-to-end digital connections. The network supports diverse services through integrated access arrangements and defines a limited set of standard, multipurpose interfaces for equipment vendors, network providers, and customers. Interworking with a public switched telephone network is retained.

**LAN**

local area network. A privately owned network that offers high-speed communications channels to connect information processing equipment in a limited geographic area.

**MIB**

management information base. A database of network management information used by SNMP.

**modem**

The equipment that connects DTE to an analog (voice) communications.

**near end**

The unit on-site.

**network interface (NI)**

The point of interconnection between the IQ Probe unit and the carrier's frame relay network.

**out-of-band**

Signaling that is separated from the channel carrying information (voice, data, video, etc.). Typically the separation is accomplished by a filter. The signaling includes dialing and other supervisory signals.

**packet**

A message containing both control information and data. The control information is used for routing the packet through a network to its final destination. Contrast with *frame relay frame*.

***packet-switching network***

A telecommunications network based on packet-switching technology, wherein a transmission channel is occupied only for the duration of the transmission of the packet. Contrast with *frame relay network*.

***parameter***

A numerical code that controls an aspect of terminal and/or network operation. Parameters control such aspects as page size, data transmission speed, and timing options.

***ping***

An internet protocol standard that provides loopback on demand for any device in an IP network. One device "pings" another by sending a loopback request to the device's IP address.

***point-to-point***

Type of communications link that connects a single device to another single device, such as a remote terminal to a host computer.

***PVC***

permanent virtual circuit. A frame relay logical link, whose endpoints and class of service are defined by network management. Analogous to an X.25 permanent virtual circuit, a PVC consists of the originating frame relay network element address, originating data link control identifier, terminating frame relay network element address, and termination data link control identifier. Originating refers to the access interface from which the PVC is initiated. Terminating refers to the access interface at which the PVC stops. Many data network customers require a PVC between two points. Data terminating equipment with a need for continuous communion use PVCs. See also *DLCI*.

***remote configuration***

A feature designed into ADTRAN products that allows remote units to be configured from a local unit or VT 100 compatible terminal.

***router***

A device that supports LAN-to-LAN communications. Routers may be equipped to provide frame relay support to the LAN devices they serve. A frame-relay-capable router encapsulates LAN frames into frame relay frames and feeds those frame relay frames to a frame relay switch for transmission across the network. A frame-relay-capable router also receives frame relay frames from the network,



strips the frame relay frame off of each frame to produce the original LAN frame, and passes the LAN frame on to the end device. Routers connect multiple LAN segments to each other or to a WAN. Routers route traffic on the Level 3 LAN protocol (e.g., the internet protocol address). See also *bridge*.

**SDLC**

synchronous data link control. A link-level communications protocol used in an IBM systems network architecture (SNA) network that manages synchronous, code-transparent, serial information transfer over a link connection. SDLC is a subset of the HDLC protocol developed by ISO.

**service**

The provision of telecommunications to customers by a common carrier, administration, or private operating agency using voice, data, and/or video technologies.

**SNA**

systems network architecture. The IBM protocol group which governs mainframe communication.

**SNMP**

simple network management protocol. A control and reporting scheme widely used to manage devices from different vendors. SNMP operates on top of the internet protocol.

**SR**

data set ready. A signal on the DTE interface that indicates if the communications is connected and ready to start handshaking control signals so communications can begin.

**statistical multiplexing**

Interleaving the data input of two or more devices on a single channel or access line for transmission through a frame relay network. Interleaving of data is accomplished using the DLCI.

**switched network**

The network of dial-up telephone lines using circuit switching to provide communications services to network users.

***synchronizing bits (sync bits)***

A fixed pattern in synchronous transmission used to identify the boundaries of frames.

***synchronous***

Communications in which the timing is achieved by sharing a single clock. Each end of the transmission synchronizes itself with the use of clocks and information sent along with the transmitted data.

***TELNET***

The standard TCP/IP remote login protocol specified in RFC-854.

***transmission***

The dispatching of a signal, message, or other form of intelligence by wire, radio, telegraphy, telephony, facsimile, or other means. A series of characters, messages, or blocks including control information and user data. The signalling of data over communications channels.

***VT 100***

A non-intelligent terminal or terminal emulation mode used for asynchronous communications. Used to configure the IQ Probe.

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## **Product Support Information**

### **Pre-Sales Inquiries and Applications Support**

Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering (800) 615-1176  
Sales (800) 827-0807

### **Post-Sale Support**

Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support (888) 4ADTRAN

### **Repair and Return**

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Customer and Product Service (CAPS) department to issue a Return Material Authorization (RMA) number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department (256) 963-8722

Identify the RMA number clearly on the package, and return to the following address:

ADTRAN, Inc.  
CAPS Department  
6767 Old Madison Pike  
Building #6 Suite 690  
Huntsville, Alabama 35807