IQ Probe

Frame Relay Monitoring Probe
Part Number 1200214L1
Document Number 61200214L1-20A

January 2001

IQ Probe Unit	1200214L1
4-wire SW56 DBU Card	1204001L1
V.34 DBU Card	1204002L1
ISDN DBU Card	1204004L1
External DCE Card	1204006L1
V.34 DBU Card	1204002L2

ADTRAN

Trademarks:
OpenView is a registered trademark of Hewlett-Packard Company.
SunNet Manager is a registered trademark of Sun Microsystems, Inc.
Netview is a registered trademark of IBM.
IQ View is a trademark of ADTRAN, Inc.

This product includes software developed by the University of California, Berkeley, and its contributors.

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
(256) 963-8000

The following conventions are used in this manual.

Notes provide additional useful information.

Cautions signify information that could prevent service interruption.

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

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

> **NOTE** *The IQ Probe, M/N 1200214L1, does not connect to the network and is not FCC Part 68 registered. However some modules for the IQ Probe do connect to the network and they are FCC Part 68 registered.*

1. This equipment complies with Part 68 of the FCC rules. On the bottom of the equipment housing is a label that shows the FCC registration number and Ringer Equivalence Number (REN) for this equipment, if applicable. If required, this information must be given to the telephone company.

2. The following information may be required when applying to the local telephone company for leased line facilities.
3. An FCC compliant telephone cord with a modular plug may be provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack, which is FCC Part 68 compliant. See installation instructions for details.
4. 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.
5. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment. If this happens, the telephone company will provide advance notification and the opportunity to make the necessary modifications to maintain uninterrupted service.
6. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. If the equipment is causing harm to the network, the telephone company may request this equipment to be disconnected from the network until the problem is resolved or it is certain that the equipment is not malfunctioning.
7. This unit contains no user serviceable parts.
8. The FCC recommends that the AC outlet, to which equipment requiring AC power is to be installed, is provided with an AC surge arrester

Affidavit for Connection of Customer Premises Equipment to 1.544 MBPS and/or Subrate Digital Services

For the work to be performed in the certified territory of _____ (telco name)

State of _____

County of _____

I, _____ (name), _____ (business address), _____ (telephone number) being duly sworn, state:

I have the responsibility for the operation and maintenance of the terminal equipment to be connected to 1.544 Mbps and / or _____ subrate digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specification.

With respect to encoded analog content and billing protection:

( ) I attest that all operations associated with the establishment, maintenance and adjustment of the digital CPE with respect to encoded analog content and billing protection information continuously complies with Part 68 of the FCC rules and Regulations.

( ) The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.

( ) The encoded analog content and billing protection is factory set and is not under the control of the customer.

I attest that the operator(s) maintainer(s) of the digital CPE responsible for the establishment, maintenance and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):

( ) A. A training course provided by the manufacturer / grantee of the equipment used to encode analog signals; or

( ) B. A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer / grantee of the equipment used to encode analog signals; or

( ) C. An independent training course (e.g., trade school or technical institution) recognized by the manufacturer / grantee of the equipment used to encode analog signals; or

( ) D. In lieu of the proceeding training requirements, the operator(s) / maintainer(S) is (are) under the control of a supervisor trained in accordance with _____ (circle one) above.

I agree to provide _____ (telco's name) with proper documentation to demonstrate compliance with the information in the preceding paragraph, if so requested.

_____ Signature

_____ Title

_____ Date

Subscribed and sworn to before me

This _____ day of _____, 20__

_____
Notary Public

My commission expires: _____

Affidavit Requirements for Connection to Digital Services

- An affidavit is required to be given to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voice band analog signal and transmitted on the network.
- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the output of the device meets Part 68 encoded analog content or billing protection specification.
- End use/customer will be responsible to file an affidavit with the local exchange carrier when connecting unprotected CPE to a 1.544 Mbps or subrate digital service.
- Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirements for subrate services are waived.

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 in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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.

Changes or modifications to this unit not expressly approved by ADTRAN will 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 nuerique respecte les limites de bruits radioelectriques applicables aux appareils numeriques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numeriques," NMB-003 edictee 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, 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). 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.

WARNING *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 funtionality 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:

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

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

For service offered from an Lucent 5ESS, request 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, Funtional*
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)*

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:

- 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.

- Avoid using a telephone (other than a cordless-type) during an electrical storm. There is a remote risk of shock from lightning.

- Do not use the telephone to report a gas leak in the vicinity of the leak.

- 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 local codes for any special disposal instructions.

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 in the back of this manual.

LIMITED PRODUCT WARRANTY

ADTRAN warrants that for ten (10) years from the date of shipment to Customer, all products manufactured by ADTRAN will be free from defects in materials and workmanship. ADTRAN also warrants that products will conform to the applicable specifications and drawings for such products, as contained in the Product Manual or in ADTRAN's internal specifications and drawings for such products (which may or may not be reflected in the Product Manual). This warranty only applies if Customer gives ADTRAN written notice of defects during the warranty period. Upon such notice, ADTRAN will, at its option, either repair or replace the defective item. If ADTRAN is unable, in a reasonable time, to repair or replace any equipment to a condition as warranted, Customer is entitled to a full refund of the purchase price upon return of the equipment to ADTRAN. This warranty applies only to the original purchaser and is not transferable without ADTRAN's express written permission. This warranty becomes null and void if Customer modifies or alters the equipment in any way, other than as specifically authorized by ADTRAN.

EXCEPT FOR THE LIMITED WARRANTY DESCRIBED ABOVE, THE FOREGOING CONSTITUTES THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER AND THE EXCLUSIVE LIABILITY OF ADTRAN AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES (EXPRESSED OR IMPLIED). ADTRAN SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING (WITHOUT LIMITATION), ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THIS EXCLUSION MAY NOT APPLY TO CUSTOMER.

In no event will ADTRAN or its suppliers be liable to Customer for any incidental, special, punitive, exemplary or consequential damages experienced by either Customer or a third party (including, but not limited to, loss of data or information, loss of profits, or loss of use). ADTRAN is not liable for damages for any cause whatsoever (whether based in contract, tort, or otherwise) in excess of the amount paid for the item. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to Customer.

Table of Contents

Chapter 7. Configuring the DCE Port

Chapter 10. Statistics

List of Figures

List of Tables

Chapter 1 Introduction

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 an 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, SLIP / PPP, or integrated 10BaseT ethernet port

- Control port provides SLIP and async PPP access to SNMP or VT-100 terminal configuration
- Dial backup (DBU) available with 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 ANSI 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. 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 log-in 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 provide single or multiple site backup. The IQ Probe can be configured to originate a call based on physical layer conditions (i.e., port failures) and/or PVC outages. 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 dial backup operation.

In the case of PVC outages (not physical layer port failure), the IQ Probe's two-port design allows the IQ Probe receiving the call to continue to use the T1 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 IQ Probe's unique DBU cards are field-installable by the customer. See *Installation* on page 2-1 for information on installing DBU cards. The DBU cards are compatible with other ADTRAN products supporting DBU. The backup options are described in the following section, *Interface Card Options*. Contact the local telco provider to determine which services are available in your area. See *Applications* on page 4-1 for more information, including an example of a dial backup application.

INTERFACE 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.

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.

Chapter 2 Installation

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-9 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.

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

- 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* on page 2-3.

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 *Pinouts* on page A-1 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.

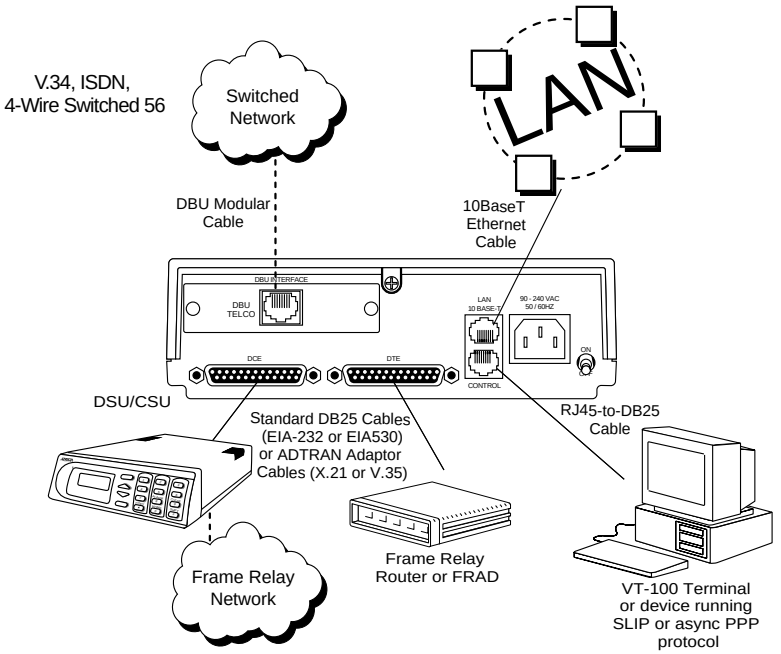
Power to the IQ Probe must be provided from a grounded 90-240 VAC, 50/60 Hz receptacle.

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 *Pinouts* on page A-1. The IQ Probe rear panel is shown in Figure 2-1 on page 2-4 with an optional DBU card installed. The connectors are described in the sections following the figure.



Item	Function
DBU Interface Card Slot	Houses an 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

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

DBU Interface Card Slot

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

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.

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 *Pinouts* on page A-1.

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 as-

signments for this connector and for the adapter cables are listed in *Pinouts* on page A-1.

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. 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 *Pinouts* on page A-1 for the control port pin assignments. The operation of this port is described in *Operation* on page 3-1.

Chapter 3 Operation

FRONT PANEL

The IQ Probe faceplate is shown in Figure 3-1 on page 3-3. 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 sub-menu 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

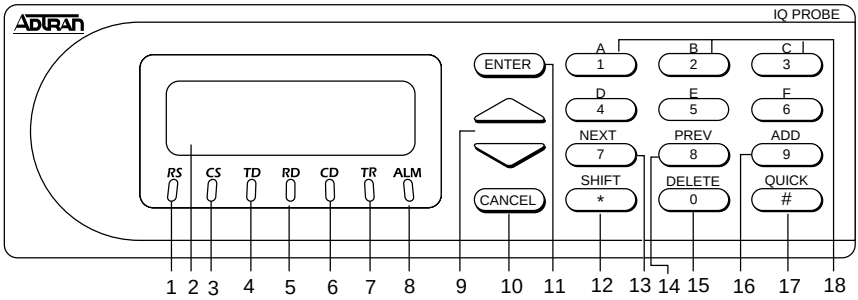
The numeric keypad contains the numbers **0** through **9** and alpha characters **A** through **F**, which are used to activate menu items and enter information such as the IP address.

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 *Configuring the DCE Port* on page 7-1 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**.



Number	Description
1	RS LED
2	LCD Window
3	CS LED
4	TD LED
5	RD LED
6	CD LED
7	TR LED
8	ALM LED
9	Up and Down Arrows
10	Cancel
11	Enter
12	Shift
13	Next Key
14	Prev Key
15	Delete Key
16	Add Key
17	Quick Key
18	Numeric Keypad

Figure 3-1. IQ Probe Front Panel

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**.

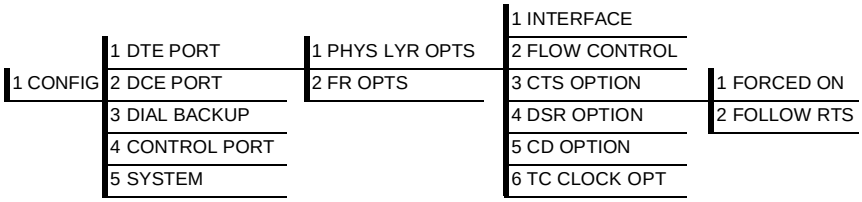


Figure 3-2. Example of Basic Front Panel Menu Navigation

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 on page 3-7).
4. Select **LOCAL LOGIN** to configure the IQ Probe unit connected to the terminal.
5. Select **REMOTE LOGIN** to configure a remotely located IQ Probe unit.
6. 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.
7. 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.*

8. Enter the password. The factory default password is **adtran**. The main menu will appear (Figure 3-4 on page 3-7).
9. 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 on page 3-7.

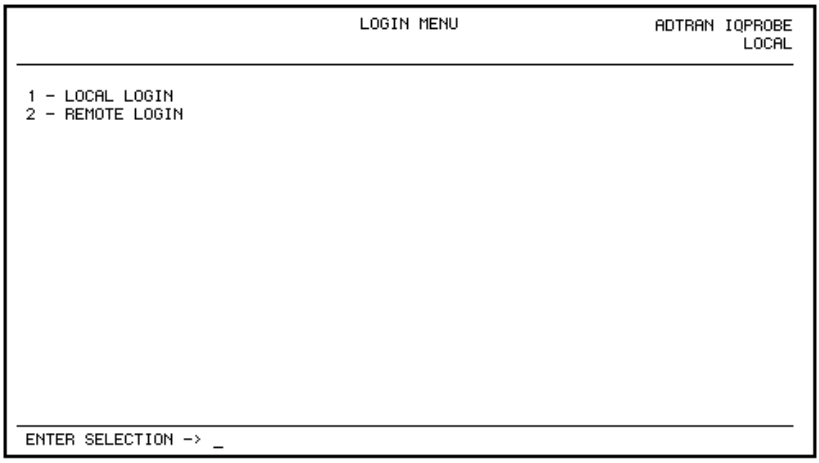


Figure 3-3. Terminal Login Menu

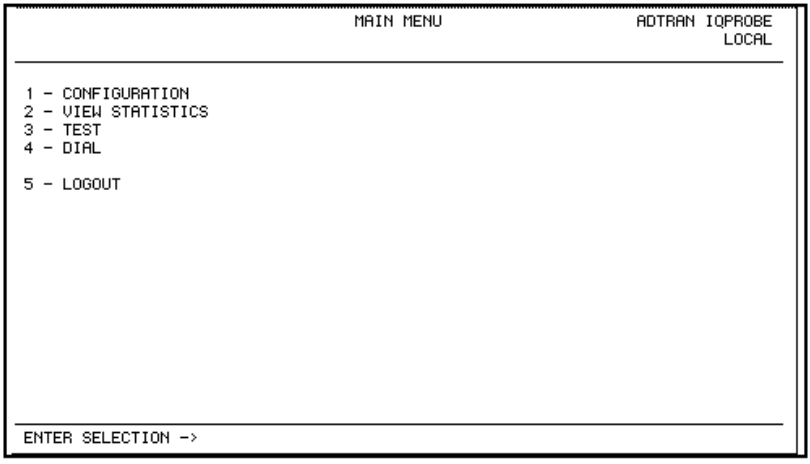


Figure 3-4. Terminal Main Menu

TELNET

Local Login Via Telnet

Before you begin, please note the following:

> **NOTE** *Only one Telnet session can be active at one time.*

> **NOTE** *The Telnet session will time-out after 5 minutes of inactivity.*

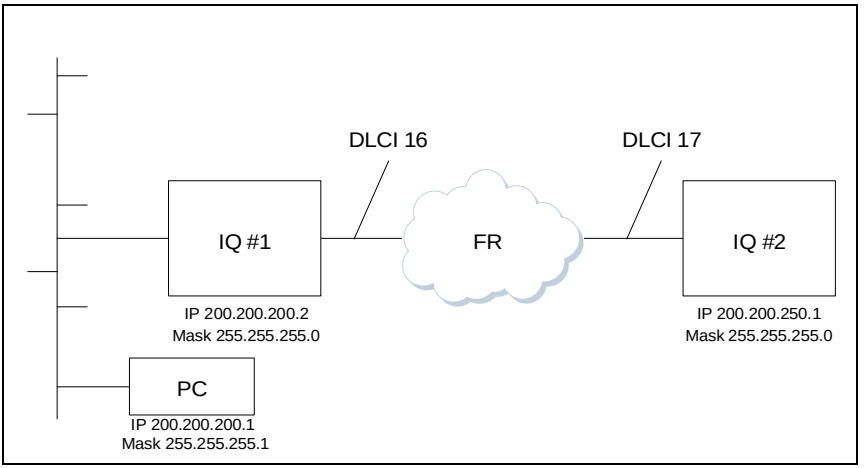


Figure 3-5. PC Connected to Local and Remote IQs

Local login via telnet is defined as telnetting from the PC into IQ #1 and then choosing **LOCAL LOGIN** to enter the main menu of IQ #1 to configure that unit, as shown in Figure 3-5.

To connect to the TSU IQ(s) viaTelnet, follow these steps.

1. Before attempting to connect via Telnet to IQ unit #1, first define the **IP ADDRESS**, the **GATEWAY IP ADDRESS**, and the **SUBNET MASK** using the front panel. These options are under **SYSTEM CONFIG**.
2. When you begin the local login via Telnet session into IQ #1, you will see the following screen (Figure 3-6).

Figure 3-6. IQ Probe Login Screen (Local)

3. Press the **Enter** key. The **TELNET LOGIN MENU** screen will appear as shown in Figure 3-7.

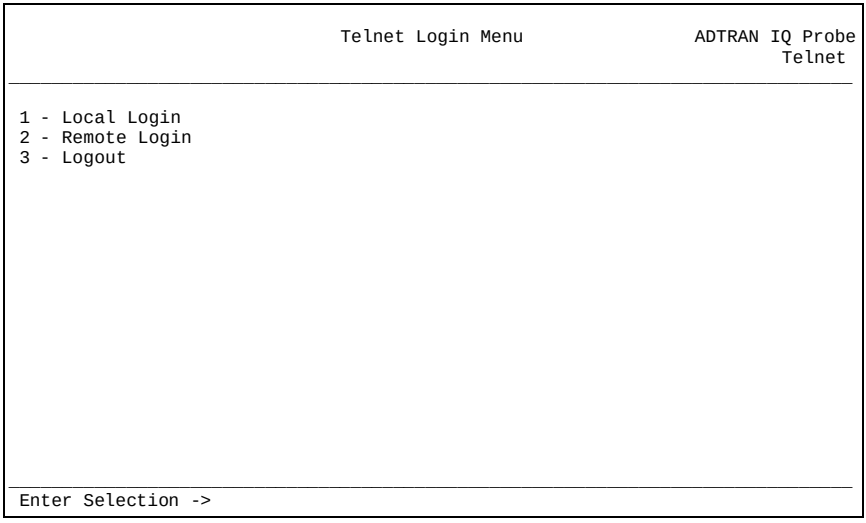


Figure 3-7. Telnet Login Menu Screen (Local)

4. To log-in to the local unit (i.e., the unit you are telnetted into), choose **1** for **LOCAL LOGIN** and press **Enter**.

5. Next you will be prompted for a password. The default password is **adtran**.

> NOTE *You can change this password using the **SYSTEM CONFIG** sub-menu. This option is available only via the terminal.*

6. Enter the password. The **MAIN MENU** screen of the unit will appear as shown in Figure 3-8.

```
                              Main Menu                    ADTRAN IQ Probe
                                                              Telnet

1 - Configuration
2 - View Statistics
3 - Test

4 - Logout

Enter Selection ->
```

Figure 3-8. IQ Probe Main Menu Screen

7. Notice that when you are telnetted into the local unit, the word **Telnet** appears in the upper right-hand corner.

Remote Login Via Telnet

Before you begin, please note the following:

> NOTE *Only one Telnet session can be active at one time.*

> NOTE *The Telnet session will time-out after 5 minutes of inactivity.*

Remote login via telnet is defined as telnetting from the PC into IQ #1 and then choosing **REMOTE LOGIN** to enter the main menu of IQ #2 to configure that unit.

1. Before attempting to connect via Telnet to IQ Unit #2, first define the **IP ADDRESS**, the **GATEWAY IP ADDRESS**, and the **SUBNET MASK** using the front panel. These options are under **SYSTEM CONFIG**.
2. When you begin the Telnet session, you will see the following screen (Figure 3-9).

```
ADTRAN IQ Probe VER 3.31  4EB2

Enter to continue…
```

Figure 3-9. IQ Probe Login Screen (Remote)

3. Press **Enter** to continue. The **TELNET LOGIN MENU** will appear (Figure 3-10).

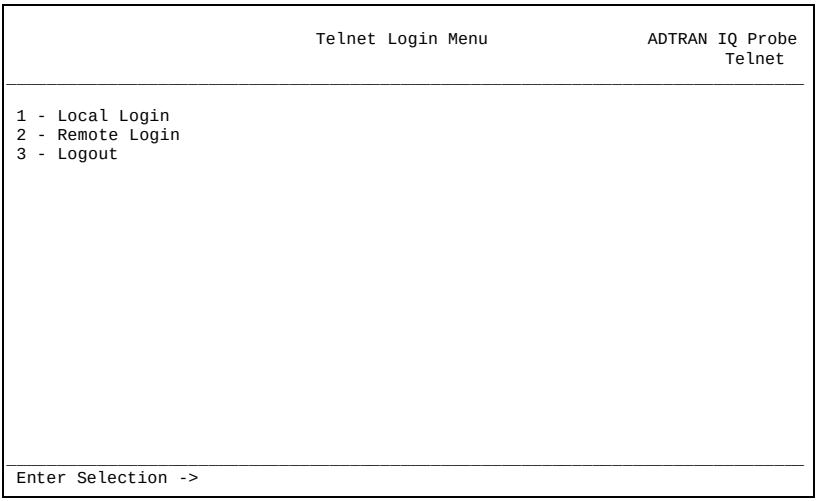


Figure 3-10. Telnet Login Menu Screen (Remote)

4. To login to the remote unit (not the unit you are telnetted into), choose **2** for **REMOTE LOGIN** and press **Enter**.

The **REMOTE LOGIN** screen will appear. See Figure 3-11.

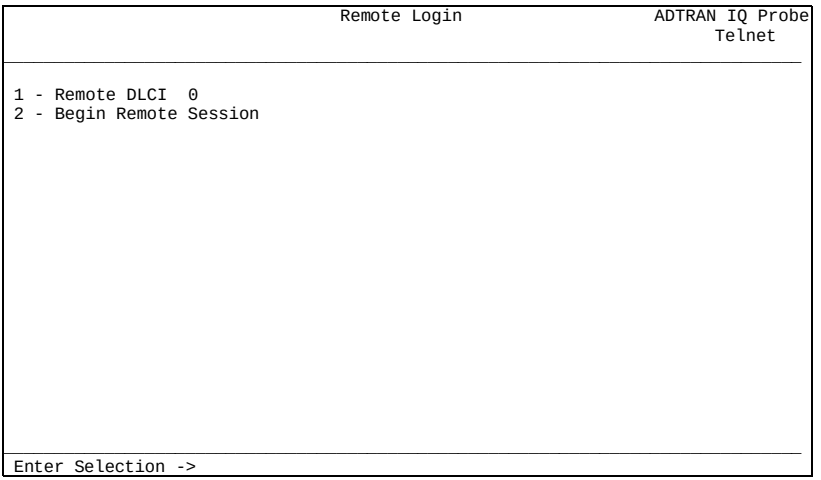


Figure 3-11. IQ Probe Remote Login Screen

5. At the remote DLCI prompt, enter the outgoing DLCI by pressing **1**, **Enter**, the **DLCI NUMBER**, and **Enter** again (see the following note).

> NOTE
>
> *When entering the DLCI for a remote application, enter the DLCI associated with the local unit that you are telnetted into (not the far end DLCI).*
>
> *In this example, if you are telnetted into IQ #1 and choose **REMOTE LOGIN**, the remote DLCI entered would be **16**.*

6. Next, select **BEGIN A REMOTE SESSION** by pressing **2** and **Enter**. The following screen will appear as shown in Figure 3-12.

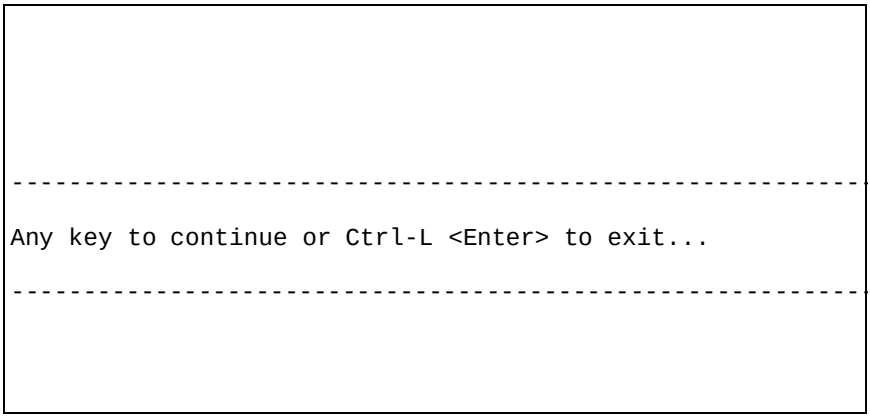


Figure 3-12. Continue/Exit Screen

7. Press **Enter** or any key to continue.

> NOTE
>
> *If the wrong DLCI is entered or a network problem exists, the screen freezes at the **ANY KEY TO CONTINUE** prompt. Press **CNTL+L** to terminate the Telnet session.*

8. Next, you will be prompted for a password. The default password is **adtran**.

> NOTE
>
> *You can change this password using the **SYSTEM CONFIG** submenu. This option is only available via the terminal.*

9. Enter the password. The **MAIN MENU** of the remote unit will appear as shown in Figure 3-13.

```
                                Main Menu                    ADTRAN IQ Probe
                                                                     Remote
_____________________________________________________________________________

 1 - Configuration
 2 - View Statistics
 3 - Test

 4 - Logout

_____________________________________________________________________________
 Enter Selection ->
```

Figure 3-13. Remote Main Menu Screen

10. Notice when you are telnetted into the remote unit, the word **Remote** appears in the upper right-hand corner.

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 on page 3-7. Each main menu item has several functions and submenus to identify and access specific parameters.

> NOTE
>
> *The **LOGOUT** selection is only available on the terminal interface. The **DIAL** selection is only available when an 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* on page 5-1, *DTE Port Configuration* on page 6-1, *Configuring the DCE Port* on page 7-1, *Dial Backup Configuration* on page 8-1, and *System Configuration* on page 9-1.

View Statistics (STATS)

This selection displays statistical information for the DTE port, DCE port, dial backup port, and the system. See *Statistics* on page 10-1 for more information.

Test

TEST options allow you to perform ping and PVC loopback tests. See *Testing* on page 11-1 for more information.

Dial (with DBU card installed)

This selection allows you to access manual dialing capabilities. See *Activating Dial Backup Options* on page 12-1 for more information.

Logout (terminal menu only)

This parameter logs out of the system.

Chapter 4 Applications

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.

> NOTE
>
> *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 on page 4-2 gives an example of a VT-100 application.

NOTE

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

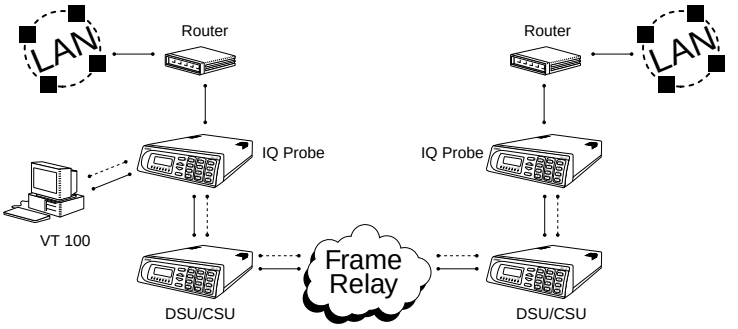


Figure 4-1. VT-100 Management Application Example

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 though an established Telnet session or an SNMP-based network manager like HP OpenView®, IBM Netview®, or SunNet Manager®.

> **NOTE** *The ADTRAN IQ Probe MIB is available in the support section of the ADTRAN Web page at 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.

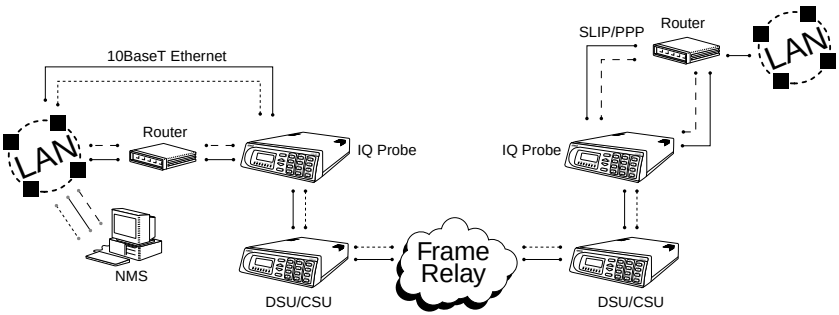


Figure 4-2. Out-of-Band Management Application Example

Minimum System Configuration Requirements

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 on page 4-6), **shared** (see Figure 4-4 on page 4-8), and **dedicated PVC management** (see Figure 4-5 on page 4-10). All three types support complete SNMP management as well as Telnet capabilities.

NOTE

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 re-

sponds 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.

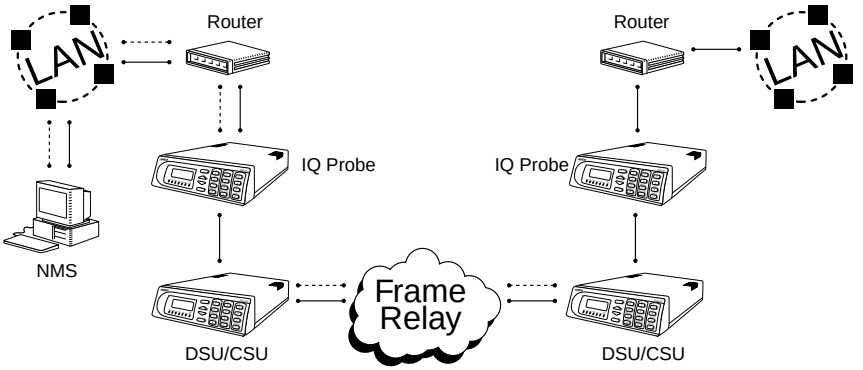


Figure 4-3. Local PVC Management Application

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.

*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.

> *By setting a local PVC management and shared PVC management on the remote IQ Probe, its IP address can be found through Inverse ARP.*
>
> NOTE
>
> *Since the unit is set up for shared PVC management, all management traffic will be intercepted prior to reaching the remote router.*

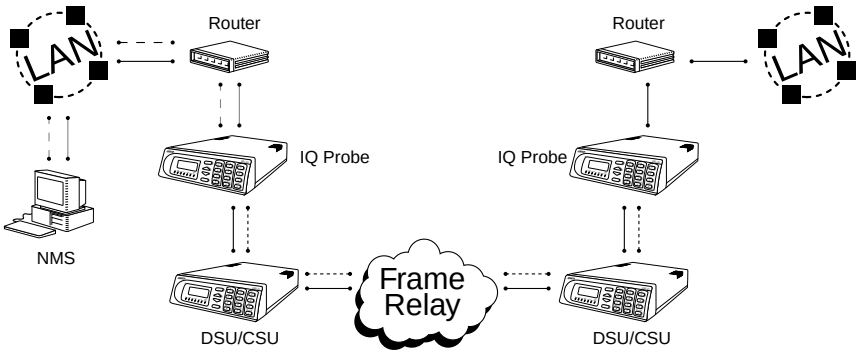


Figure 4-4. Shared PVC Management Application

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.

NOTE

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.

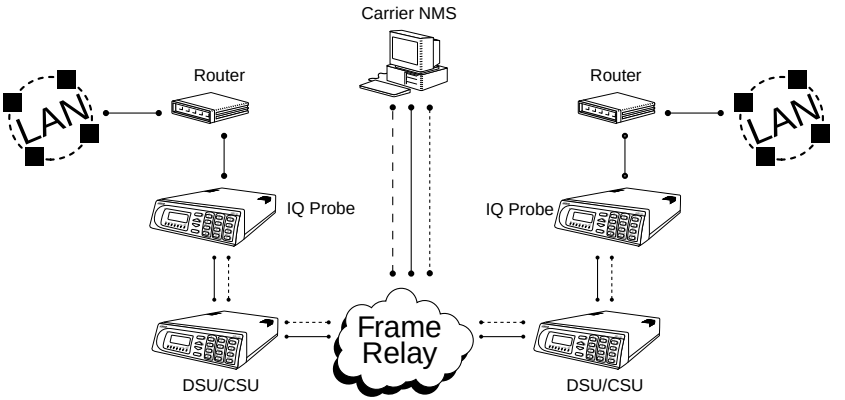


Figure 4-5. Dedicated PVC Management Application

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* on page 4-8, for more information.

DIAL BACKUP APPLICATION

The IQ Probe dial backup (DBU) option cards provide single site backup. The IQ Probe can be configured to originate a call based on physical layer conditions (i.e., port failures) and/or PVC outages. Once the criteria are met, the IQ Probe establishes a call to the configured phone number (see Table 4-1 on page 4-12) and the connection is used to carry traffic for the PVC(s) configured for DBU operation.

In the case of PVC outages (not physical layer port failure), the IQ Probe's two-port design allows the IQ Probe receiving the call to continue to use the T1 frame relay circuit for PVCs that are not affected by 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. The other PVCs to other sites in this scenario will be inactive.

Information entered into the **PVC CONFIGURATION** table (see Table 4-2 on page 4-13) 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 PHONE NUMBER** field set for a null entry. Enter a space character from the VT-100 terminal to create a null entry for **DBU PHONE NUMBER** field.

Since the IQ Probe can only make one call at a time, only one backup PVC will be active.

The **DBU PHONE NUMBER** is only required for the IQ Probe originating the call.

Dial Backup Example Application

Figure 4-6 shows an example of a dial backup application.

> **NOTE** *The configuration selections given may need modification based on your network configuration.*

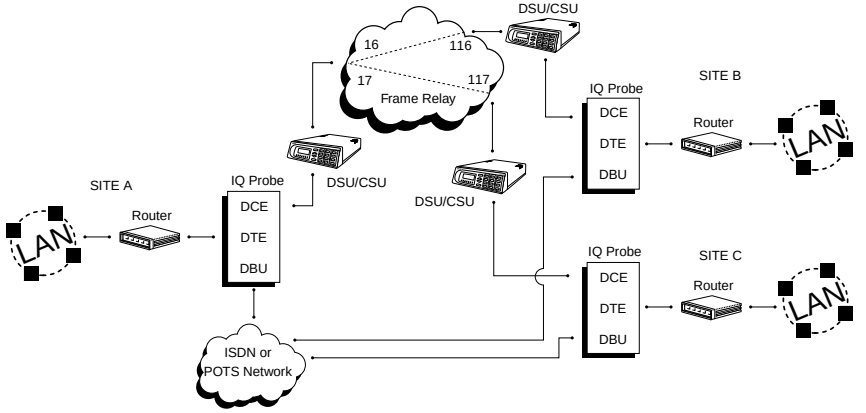


Figure 4-6. Dial Backup Application

Table 4-1 shows an example setup for the **DBU OPTIONS** (**CONFIG** ->**DIAL BACKUP**).

Table 4-1. Example Settings for Dial Backup Options

AUTO DBU	Enable
DBU Criteria	With Network Fail: Enable With PVC Inactive: Enable

Table 4-2 on page 4-13 **PVC CONFIGURATION TABLE** (**CONFIG** ->**NETWORK PORT** ->**PVC CONFIG**).

Table 4-2. Example Settings for PVC Configuration Table

	SITE A (ENTRY #1)	SITE A (ENTRY #2)	SITE B	SITE C
DLCI	16	17	116	117
DBU DLCI*	116	117	16	17
DBU Phone #**	Site B #	Site C #	Site A #	Site A #
DBU Call Order #	1	2	None	None
DBU On Inactive***	Enable	Enable	Enable	Enable

* DBU DLCIs and DBU phone numbers must be entered to provide dial backup for a DLCI.

** DBU Phone # - All DLCIs to the same site should have the same phone number.

*** See *DBU on Inactive* on page 7-6.

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 *Operation* on page 3-1 for information on selecting **LOCAL** or **REMOTE** operation.

The **CONFIGURATION** menu shown in Figure 5-1 on page 5-2 consists of submenus relating to specific interfaces or functions of the IQ Probe requiring setup:

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

For detailed information on configuration, see the chapters *DTE Port Configuration* on page 6-1, *Configuring the DCE Port* on page 7-1, *Dial Backup Configuration* on page 8-1, and *System Configuration* on page 9-1.

The **DTE PORT** configuration menu tree is shown in Figure 5-2 on page 5-3, the **DCE PORT** configuration menu tree is shown in Figure 5-3 on page 5-4, and the **SYSTEM** configuration menu tree is shown in Figure 5-4 on page 5-5. The **DIAL BACKUP** menu tree is shown in Figure 8-2 on page 8-2.

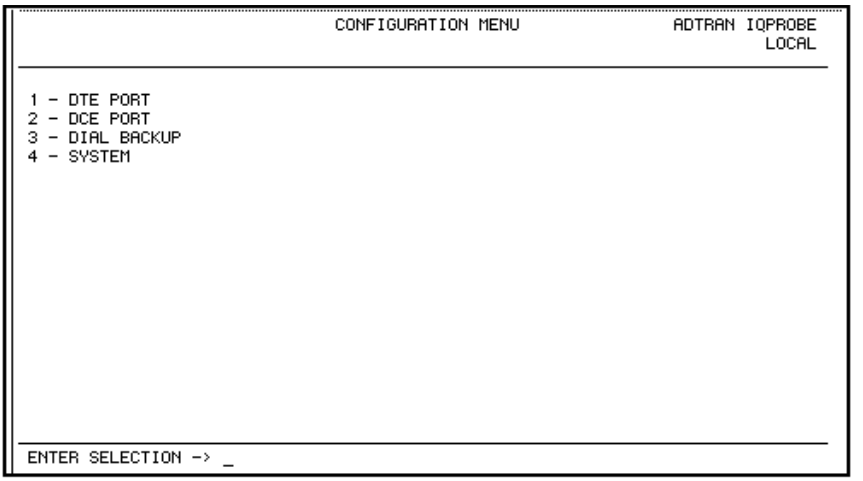


Figure 5-1. Terminal Configuration Menu

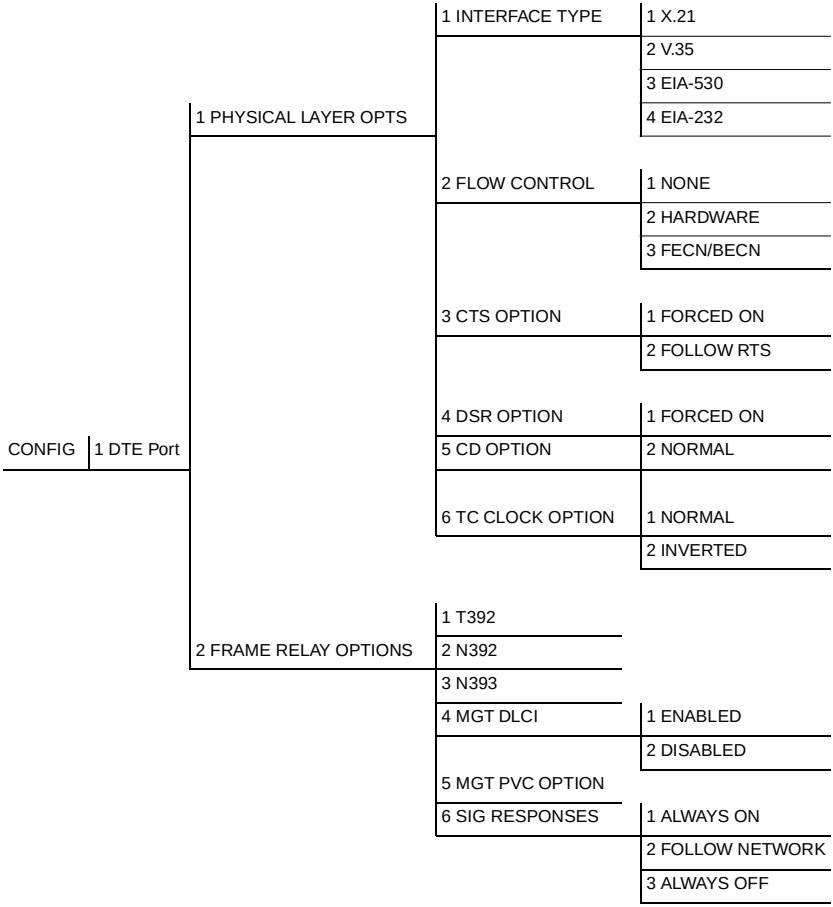


Figure 5-2. Configuration Menu Tree for DTE Port

				1 X.21
				2 V.35
		1 PHYSICAL LAYER OPTS	1 INTERFACE TYPE	3 EIA-530
			2 SERIAL BIT RATE (kbps)	4 EIA-232
CONFIG	2 DCE PORT	2 FRAME RELAY OPTIONS	1 SIGNAL TYPE	1 NONE
		3 MGT DLCI 1	2 T391	2 LMI
		4 MGT DLCI 2	3 N391	3 ANSI T1.617-D
			4 N392	4 ITU-T Q.933-A
			5 N393	5 AUTO
		5 MGT DLCI MODE 1	1 SHARED	1 DLCI
		6 MGT DLCI MODE 2	2 DEDICATED	2 DBU DLCI*
		7 MAX PVC COUNT		3 DBU PHONE #
		8 HISTORY INTERVAL CT		4 DBU ON INACTIVE
		9 PVC OPTIONS		5 DBU CALL ORDER #
				6 CIR (kbps)
				7 SEQ NUMBER
				8 PVC DELAY
	3 DIAL BACKUP * See Chapter 8 for this portion of the menu tree			9 STATS OPTION
				10 NEXT
				11 PREVIOUS
				12 ADD
				13 DELETE

*Available only if a DBU card is installed.

Figure 5-3. Configuration Menu Tree for DCE Port

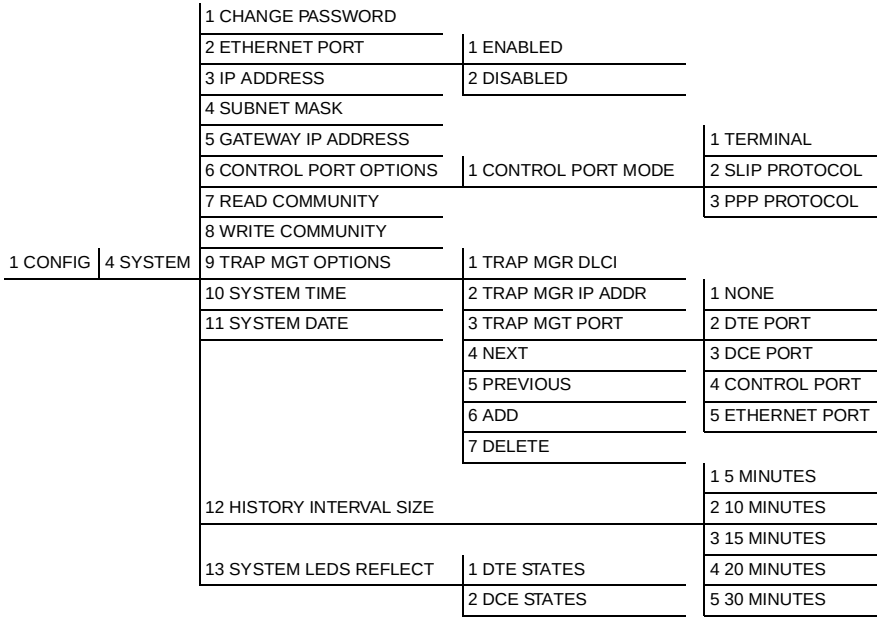


Figure 5-4. Configuration Menu Tree for System Configuration

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 on page 6-2 shows the choices available in this menu.

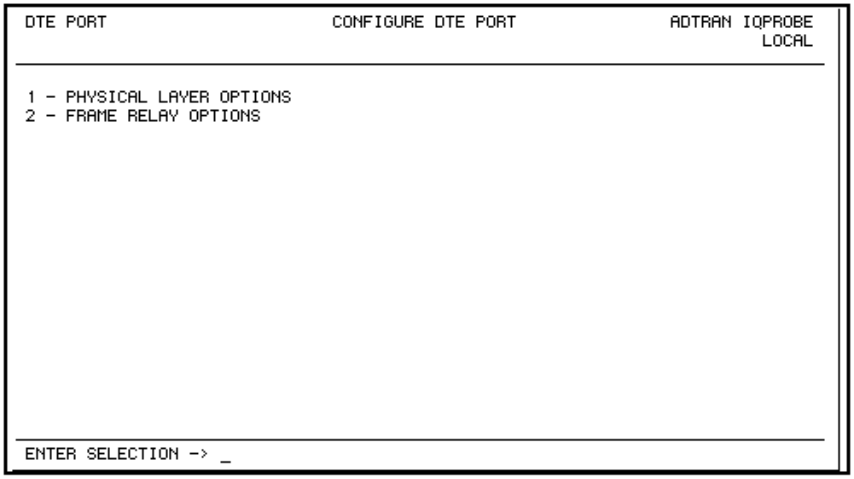


Figure 6-1. Terminal DTE Port Configuration Menu

NOTE

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

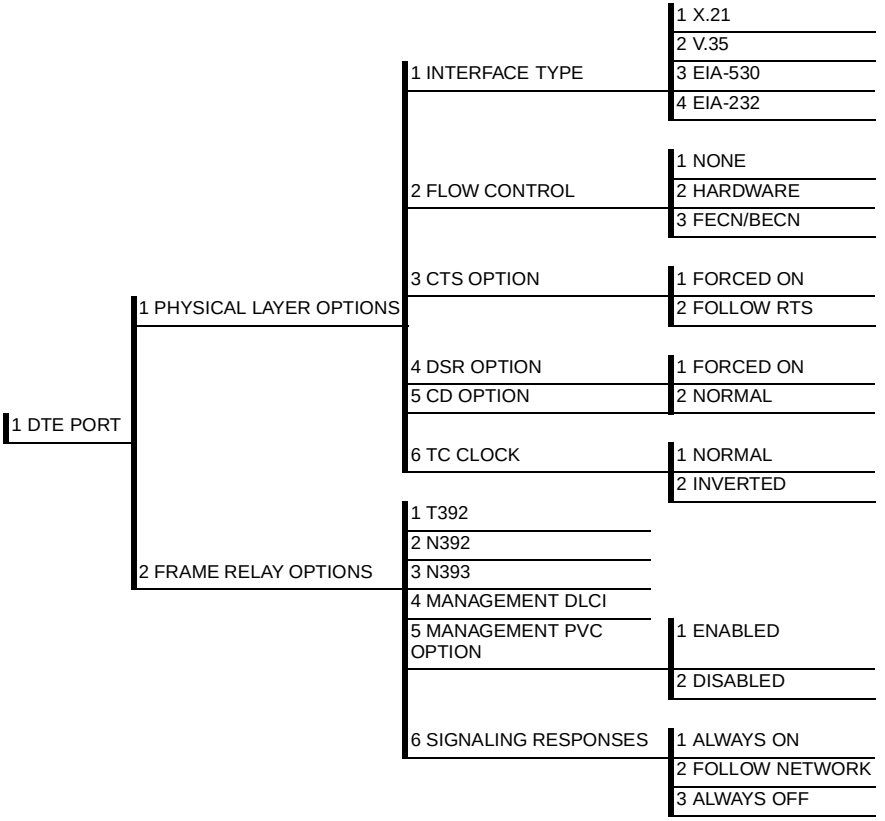


Figure 6-2. DTE Port Menu Tree

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 dial backup operation.

None
No flow control is used and the IQ Probe drops frames during severe congestion while in dial backup operation.

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

FECN/BECN
While in a congested state during dial backup 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.

Always Off

If **ENABLED**, PVC signaling responses are NOT sent to the router, regardless of the network signaling state. Enable this option to simulate a PVC failure 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 on the enclosed insert. 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 on page 7-2 will display when **DCE PORT** is selected.

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

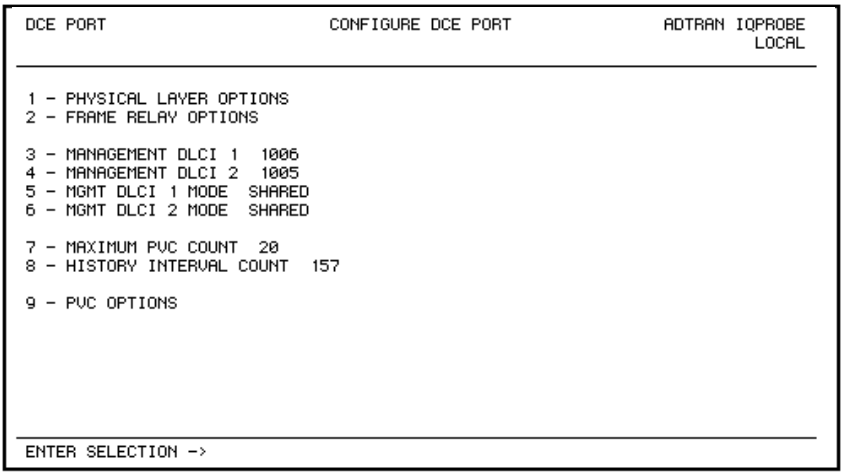


Figure 7-1. Terminal DCE Port Configuration Menu

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.

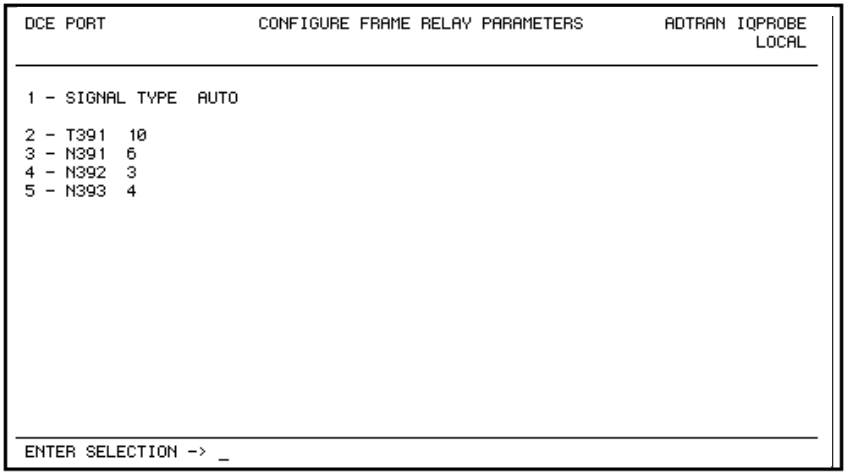


Figure 7-2. Terminal DCE Port Frame Relay Options Menu

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

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 *History Interval Size (HIS INT SIZE)* on page 9-6 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 committed information rates (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 Operation on page 3-1 for more information on front panel operation.*

DLCI
Enter the DCE port's DLCI. Range is 16 to 1007.

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. Range is 16 to 1007.

DBU Phone Number
The phone number entry stores the phone number that is used when the IQ Probe triggers auto dial backup in case of port or PVC failure. The phone number should correspond to a location that is equipped with an "Adtran Safety Net" device that is capable of restoring the PVC which is designated by the **DBU DLCI** element.

If auto DBU is triggered by port failure, then the **DBU CALL ORDER** element determines the order of a dialing list for alternate backup locations.

DBU on Inactive
This option works in conjunction with the dial backup criteria option **WITH PVC INACTIVE.** For **DBU ON INACTIVE** option to have an effect on auto DBU operation, the **WITH PVC INACTIVE** option must be set to **ENABLE**. See *Dial Backup Configuration* on page 8-1.

If **DBU ON INACTIVE** is set for **ENABLED** and the PVC designated by the DLCI element in the table entry goes to an inactive or unknown state, the IQ Probe will dial the phone number designated by the **DBU PHONE NUMBER** element in the table entry.

GROUP is a special case in which all PVCs that are part of a group must be inactive or unknown before the auto DBU process is triggered. This special case is treated as a port failure in which **DBU CALL ORDER** entry applies.

DBU Call Order Number

This determines the order in which a list of backup locations will be dialed. This applies only to auto DBU processes that are triggered by port failure. If all **DBU CALL ORDER** entries are set to **NONE**, then the first entry with a **DBU PHONE NUMBER** will be used.

CIR (Kbps)

Enter the CIR 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.

Stats Option (STATS OPT)

This option prioritizes PVCs for **STATISTICS** counts. The IQ Probe tracks statistics for a limited number of the PVCs that pass through. This number is determined in the **MAX PVC COUNT** field (see *Maximum PVC Count (MAX PVC COUNT)* on page 7-5). The three choices for this field are described below.

Auto

If set to **AUTO**, then statistics will be logged for this PVC if the **MAX PVC COUNT** has not been exceeded. The **AUTO** selection designates a PVC as second priority to a PVC set to **ENABLED**.

Enabled

If set to **ENABLED**, then statistics will be logged for this PVC if the **MAX PVC COUNT** has not been exceeded. A PVC set to **ENABLED** is designated as a higher priority than one set to **AUTO**.

Disabled
If set to **DISABLED**, then statistics will not be logged for this PVC at any time.

If the IQ Probe *encounters a PVC that has not been entered into the* **PVC OPTIONS** *table, the PVC is set to* **AUTO** *by default.*

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 Dial Backup Configuration

DIAL BACKUP OPTIONS

The **DIAL BACKUP CONFIGURATION** menu (Figure 8-1) is available only when an optional dial backup card is installed in the IQ Probe. Use this menu to configure dial backup options such as **AUTO DBU CAPABILITY**, **DBU CRITERIA**, **DBU TIMER FUNCTIONS**, and **DBU PHONE NUMBERS**. See Figure 8-2 on page 8-2 for a complete menu tree of the dial backup selections.

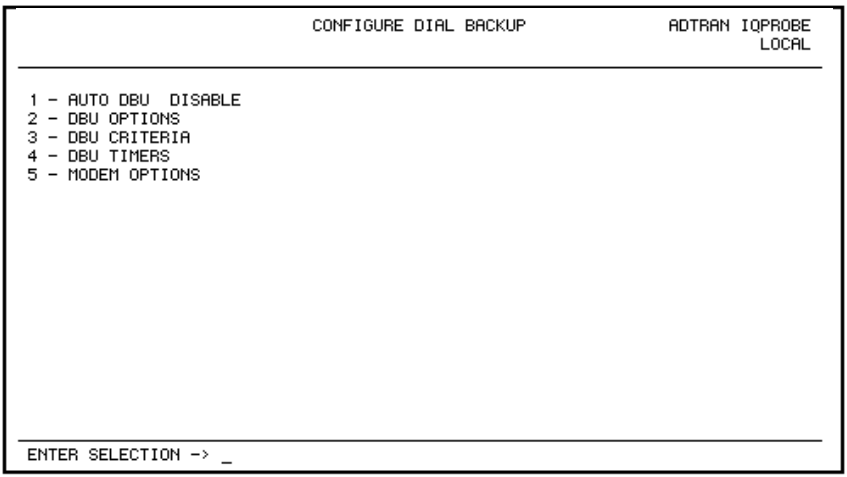


Figure 8-1. DBU Options Menu (with V.34 DBU Card Installed)

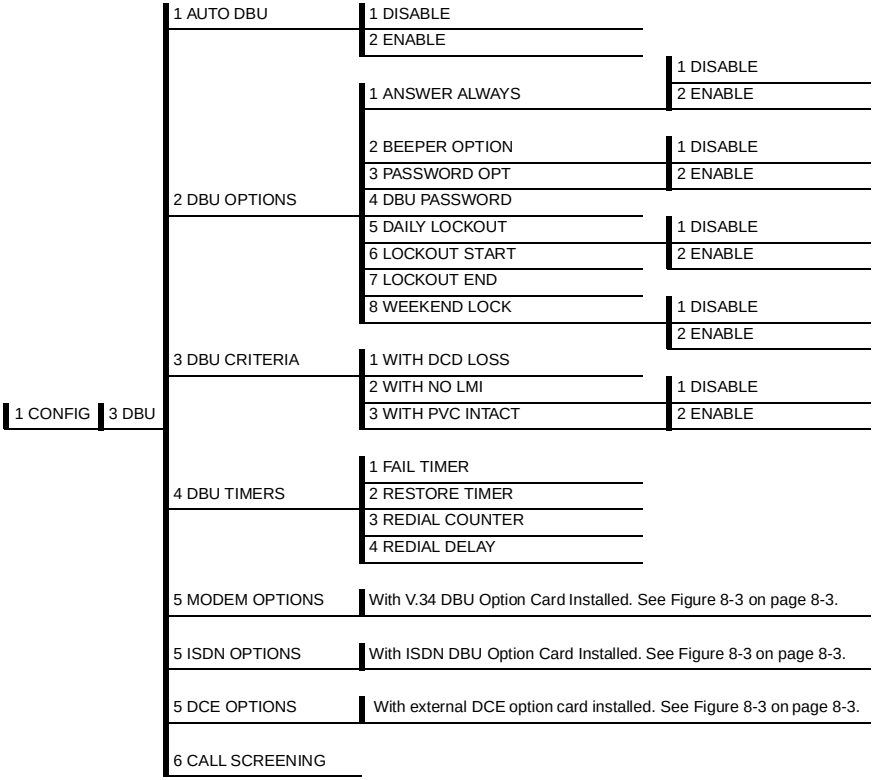


Figure 8-2. Dial Backup Menu Tree

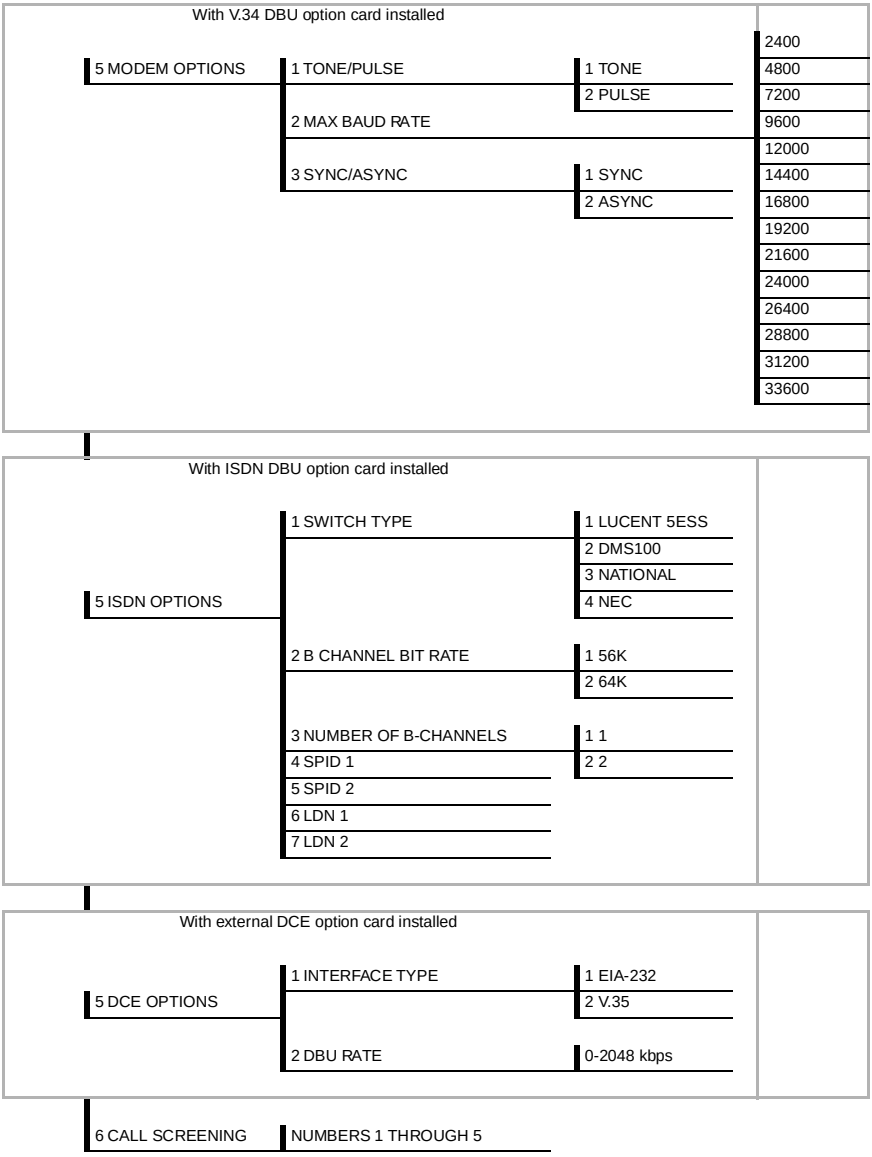


Figure 8-3. Dial Backup Menu Tree with Option Modules

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

Auto DBU

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

Answer Always

If this feature is enabled, the unit will answer a call. If disabled, it will not answer a call. However, the **ANSWER ALWAYS** option must work in conjunction with the **AUTO DBU** and **ORIGINATE/ANSWER** options. The **AUTO DBU** option is the controlling option and if it is disabled, the unit *will not answer* the call regardless of how **ANSWER ALWAYS** is set, except for the DTE DBU which *will answer* the call regardless of the **AUTO DBU** setting. The **ORIGINATE/ANSWER** feature only appears when the unit is programmed for a nonframe-relay circuit (signaling none). If both **ANSWER ALWAYS** and **AUTO DBU** are enabled, the unit will answer the call even if it is set to **ORIGINATE**.

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 *Using the Front Panel* on page 9-6 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**.

With PVC Inactive

This option works in conjunction with the **DBU ON INACTIVE** option in the PVC configuration table. The **WITH PVC INACTIVE** option acts as a master switch for Auto DBU operation based on the PVC state.

If set to **ENABLED**, each **DBU ON INACTIVE** option applies.

If set to **DISABLE**, each **DBU ON INACTIVE** option is disabled. See *Configuring the DCE Port* on page 7-1.

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.

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 DBU card installed (if any). If no card is installed or if the 4-Wire SW56 card is installed, the selections in this section do not appear.

Modem Options

The **MODEM OPTIONS** field is available when the V.34 DBU card is installed.

Tone/Pulse

Select the dialing method for the dial backup service.

Max Baud Rate

This sets the maximum rate at which the call will connect.
Choices: 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 26400, 28800, 31200, 33600.

Sync/ Async

Set to **SYNC** if the unit is connecting to another IQ unit. Set to **ASYNC** if the unit is connecting to an ATLAS.

ISDN Options

The **ISDN OPTIONS** field is available when the ISDN DBU card is installed.

Switch Type

Select which type of telco 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 and 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 and 2

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

DCE Options

The **DCE OPTIONS** field is available when the 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.

Call Screening

If **CALL SCREENING** is set to **ENABLE**, the IQ Probe will accept only incoming calls from the numbers entered in the number 1 through 5 fields. Calls from any other number or from an unidentifiable number are rejected.

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 on the enclosed insert. The **TERMINAL SYSTEM** configuration menu is shown in Figure 9-1 on page 9-2.

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

Change Password

Enter a new password of ten characters or less. The default password is **adtran** (not available on the front panel).

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.

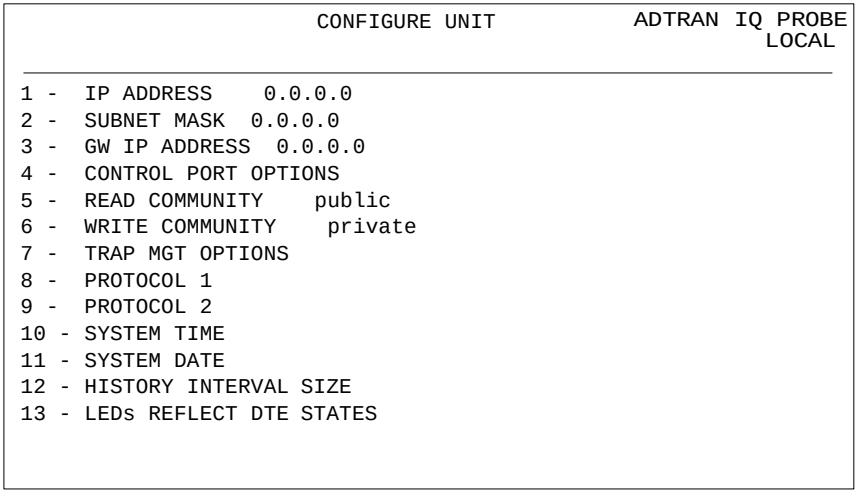


Figure 9-1. System Configuration Menu

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 *Using the Front Panel* on page 9-6 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 *Using the Front Panel* on page 9-6 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.

Protocols 1 and 2

These selections allow you to arm the IQ Probe to gather statistics for particular protocols. Select the protocol types most commonly found on your network. If you have only one type, set **PROTOCOL 1** for that type, and set **PROTOCOL 2** for **UNKNOWN**. The information is displayed in the **LAYER 3** portion of the **STATISTICS** menu (see *Layer 3 Statistics* on page 10-12).

Descriptions for each of the six selections follow:

None	Statistics are not gathered for that protocol number.
IP	Statistical information for all IP protocol traffic (both routed and bridged) is gathered and displayed in the **LAYER 3** portion of the **STATISTICS** menu.
IPx	Statistical information for all IPx protocol traffic (both routed and bridged) is gathered and displayed in the **LAYER 3** portion of the **STATISTICS** menu.
ARP	Statistical information for all ARP protocol traffic is gathered and displayed in the **LAYER 3** portion of the **STATISTICS** menu.
SNA	Statistical information for all SNA protocol traffic is gathered and displayed in the **LAYER 3** portion of the **STATISTICS** menu. All ten SNA types defined in FRF-3 are supported.
Unknown	Statistical information for all other protocols (not selected in the other protocol field) is gathered and displayed in the **LAYER 3** portion of the **STATISTICS** menu.

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.

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.

LEDs Reflect

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

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 **Enter** 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)* on page 10-27.

VIEWING STATISTICAL INFORMATION (TERMINAL INTERFACE)

Select **VIEW STATISTICS** from the main menu to access the **VIEW STATISTICS MENU** shown in Figure 10-1 on page 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.

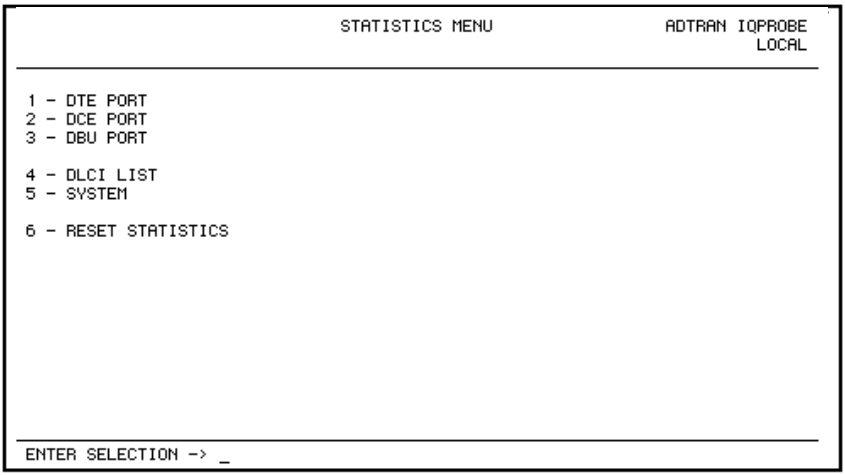


Figure 10-1. View Statistics Menu

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 **VIEW STATISTICS** menu (shown in Figure 10-1 on page 10-1).

D=DLCI

When viewing **DCE** port statistics, press **D** to view the **DLCI STATISTICS** menu shown in Figure 10-9 on page 10-21.

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.*

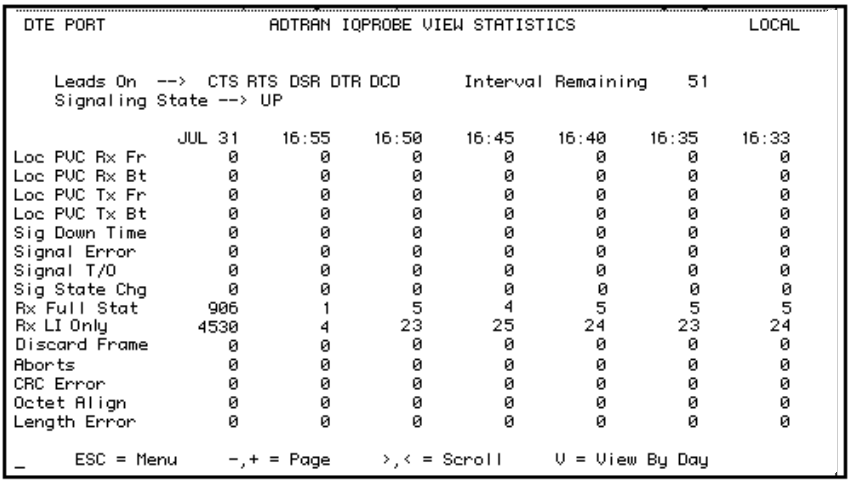
V=View by Day/View by Interval

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 Figure 10-2 on page 10-4 and Figure 10-3 on page 10-5 for the two **DTE PORT STATISTICS** screen formats.



```
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 PVC Rx Fr        0        0        0        0        0        0        0
Loc PVC Rx Bt        0        0        0        0        0        0        0
Loc PVC Tx Fr        0        0        0        0        0        0        0
Loc PVC Tx Bt        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
Signal T/O           0        0        0        0        0        0        0
Sig State Chg        0        0        0        0        0        0        0
Rx Full Stat       906        1        5        4        5        5        5
Rx LI Only        4530        4       23       25       24       23       24
Discard Frame        0        0        0        0        0        0        0
Aborts               0        0        0        0        0        0        0
CRC Error            0        0        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     -,+ = Page     >,< = Scroll     V = View By Day
```

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

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 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 V = View Intervals

Figure 10-3. DTE Port Statistics (View by Intervals)

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 Figure 10-4 on page 10-9 and Figure 10-5 on page 10-10 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 a dial backup 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.

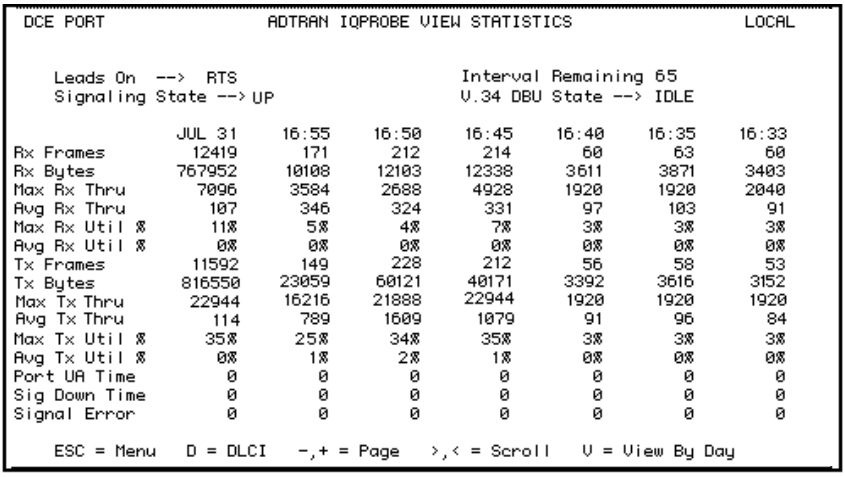


Figure 10-4. DCE Port Statistics with DBU Card Installed

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 V.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 V = View Intervals

Figure 10-5. DCE Port Statistics (View by Interval)

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 FRAME** field.

If both management DLCIs are shared, the **ENCAPSULATION ERROR** *field is N/A. See the section Management DLCI 1 and 2 (DLCI 1 and 2) on page 7-4 in Chapter 7, 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 1 and 2 Mode on page 7-4 in Chapter 7, Configuring the DCE Port for more information.*

Layer 3 Statistics

Layer 3 statistical information provides you with a better understanding of the type of traffic occupying your bandwidth. Configure this menu specifically for your setup by selecting the two protocol types most commonly found in your network.

The selections are called **PROTOCOL 1** and **PROTOCOL 2** and are found in the **SYSTEM** portion of the **CONFIGURATION** menu (see *Protocols 1 and 2* on page 9-5). Layer 3 tracking supports the following four protocols:

- **IP (routed and bridged)**
- **IPX (routed and bridged)**
- **SNA (ten SNA types as defined in FRF-3)**

  SNA-Subarea (FID4) with Layer 2 (LLC2)
  SNA-Peripheral (FID2) with Layer 2 (LLC2)
  SNA-APPN with Layer 2 (LLC2)
  SNA-HPR with Layer 2 (LLC2)
  SNA-Netbios with Layer 2 (LLC2)
  SNA-Subarea (FID4) without Layer 2 (LLC2)
  SNA-Peripheral (FID2) without Layer 2 (LLC2)
  SNA-APPN without Layer 2 (LLC2)
  SNA-Netbios without Layer 2 (LLC2)
  SNA-HPR without Layer 2 (LLC2)
- **ARP**

For Layer 3 tracking to function, the data must be RFC-1490 encapsulated data or RFC-2427 encapsulated data (RFC-2427 superseded RFC-1490).

For an IP packet to be recognized, it must be carried by an RFC-2427 IP header or an RFC-2427 SNAP header for bridged ethernet. If the SNAP header is carrying a bridged ethernet packet, the MAC header is examined for the protocol type.

SNAP headers are also examined for IPX and ARP traffic.

The ARP option actually tracks inverse ARP where addresses are resolved across the WAN link. SNA traffic is recognized by its RFC-2427 header.

Information is gathered for the two protocol types you choose and is displayed with **P1** representing information for **PROTOCOL 1** and **P2** representing information for **PROTOCOL 2**.

There are four different views of the Layer 3 Statistics:

- Network Port, View by Interval
- Network Port, View by Day
- DLCI, View by Interval
- DLCI, View by Day

Descriptions of the fields found in these menus follow. Field descriptions are the same for both protocol selections, so "x" represents the protocol number.

Px Type (current)
The protocol type currently selected in the **CONFIGURATION** menu is displayed in this field.

Interval Remaining
Number of seconds remaining in the current timed interval.

Px Type (listed for each interval)
The protocol type being examined for the given interval is displayed in this field. When the **PROTOCOL** type selection is changed (see *Protocols 1 and 2* on page 9-5), the new selection is not accepted by the IQ Probe until the end of the current timed interval.

For example, if the IQ Probe is configured for 5-minute timed intervals, and the **PROTOCOL** type selection is changed at 12:25, the change will not be recognized until 12:30. This allows the unit to display an accurate interval history of the **PROTOCOL TYPE** field.

When the **PROTOCOL** *type selection is changed, the* **PROTOCOL TYPE** *field (***P1 TYPE** *or* **P2 TYPE***) for the current day total (left-most column on the* **VIEW BY INTERVAL** *screens) displays* **MIXED***, indicating that the displayed information represents more than one protocol type. Mixed is also displayed for the day total on the* **VIEW BY DAY** *screen once the 24 hour period is complete.*

Px Rx Frames

In the Network Port view, this is the number of frames received on the network port that match the selected protocol type. In the DLCI view, this is the number of frames received on a particular DLCI that match the selected protocol type.

Px Rx Bytes

In the Network Port view, this is the number of bytes received on the network port that match the selected protocol type. In the DLCI view, this is the number of bytes received on a particular DLCI that match the selected protocol type.

Px Rx Dist%

The distribution percentages show what portion of the data can be attributed to the protocols being tracked.

Px Tx Frames

In the Network Port view, this is the number of frames transmitted on the network port that match the selected protocol type. In the DLCI view, this is the number of frames transmitted on a particular DLCI that match the selected protocol type.

Px Tx Bytes

In the Network Port view, this is the number of bytes transmitted on the network port that match the selected protocol type. In the DLCI view, this is the number of bytes transmitted on a particular DLCI that match the selected protocol type.

Px Tx Dist%

The distribution percentages show what portion of the data can be attributed to the protocols being tracked.

Top Talker

The **TOP TALKERS STATISTICS** menu provides information regarding the top five talkers in each direction (Rx and Tx) based on their source IP addresses. This information is useful in diagnosing network problems. If a user is experiencing slow response times, this screen shows whether the problem is the result of the line not having enough total bandwidth to support the number of users, or if a small number of users are using excessive amounts of bandwidth. Lower distribution percentages indicate that there are too many users for that line. High distribution percentages indicate that some users may be using an excessive amount of bandwidth (possibly due to the type of applications they are using). See Figure 10-6 for an example of a **TOP TALKERS** menu.

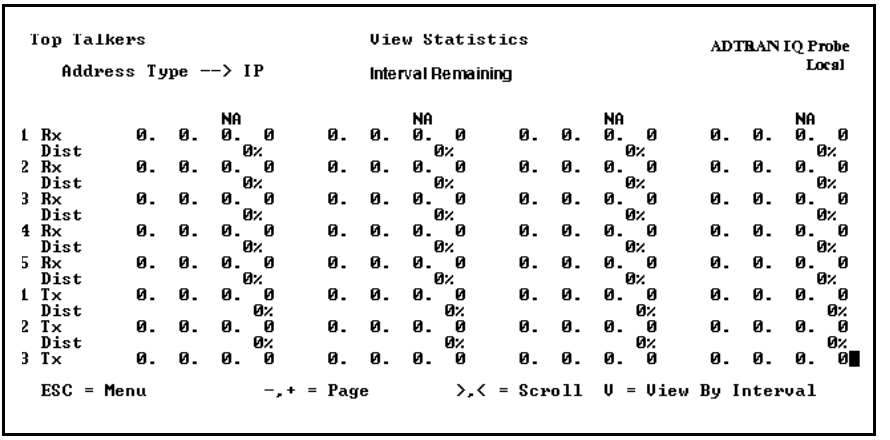


Figure 10-6. Top Talkers Statistics Menu

Address Type

The **ADDRESS TYPE** field displays **IP**, indicating that the **TOP TALKERS** feature is tracking IP (routed and bridged) data.

Interval Remaining

Number of seconds remaining in the current timed interval (only shown in the **VIEW BY INTERVAL** screen).

Rx Distribution

Displays what percentage of the IP traffic received on the network port is from the given source address.

Tx Distribution

Displays what percentage of the IP traffic transmitted from the network port went to the given source address.

DBU Port Statistics

Information given is for the dial backup port since the last reset. These menus are only available if an DBU card is installed. See Figure 10-7 and Figure 10-8 on page 10-18 for both formats of the **DBU PORT STATISTIC** screens.

```
 DBU PORT                  ADTRAN IQPROBE VIEW STATISTICS                  LOCAL

    V.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     V = View By Day
```

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

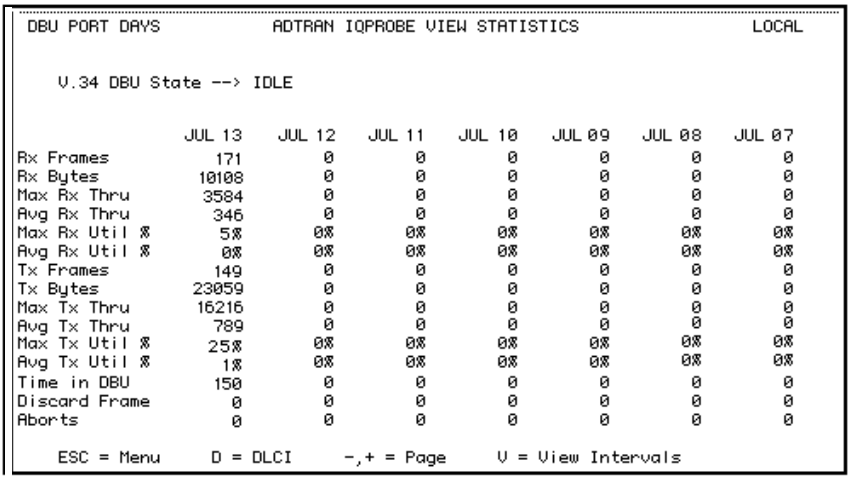


Figure 10-8. DBU Port Statistics (View by Interval)

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.

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.

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 1 and 2 (DLCI 1 and 2) on page 7-4 in 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.

> **NOTE**
>
> *If both management DLCIs are shared, the* **UNROUTEABLE** *field is \ not applicable. See the section Management DLCI 1 and 2 Mode on page 7-4 in Chapter 7, 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 on page 10-1. Figure 10-9 on page 10-21 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 V = View By Day

Figure 10-9. DLCI Statistics for a Specific DLCI (View by Day)

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 10-10. 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.

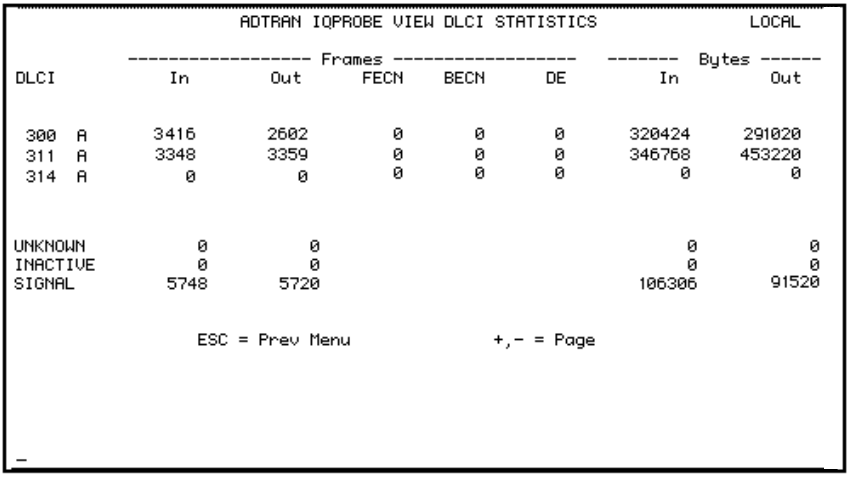


Figure 10-10. DLCI Statistics Summary for All Available DLCIs

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 re-start) is given in seconds. The buffer information provided in this menu is used mainly by ADTRAN technical support in troubleshooting situations. See Figure 10-11.

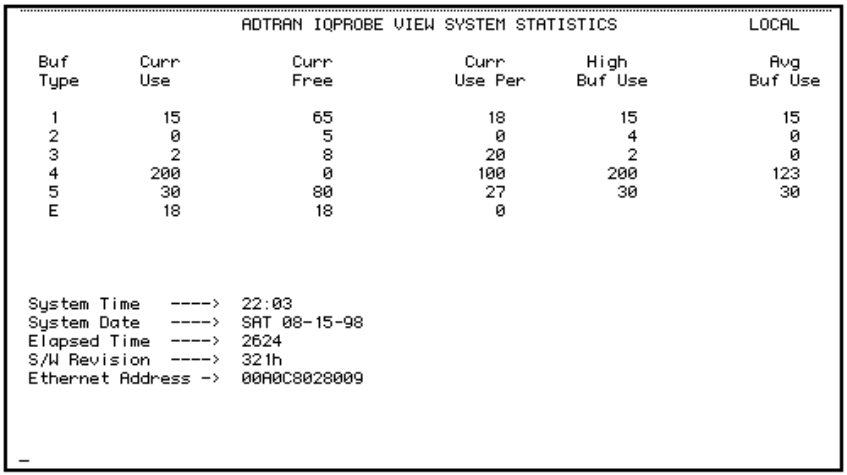


Figure 10-11. System Statistics Screen

VIEWING STATISTICAL INFORMATION (FRONT PANEL)

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 10-12.

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

Figure 10-12. Control Signal Status Screen

Signal State

Current signaling state of DTE port (up or down). See Figure 10-13.

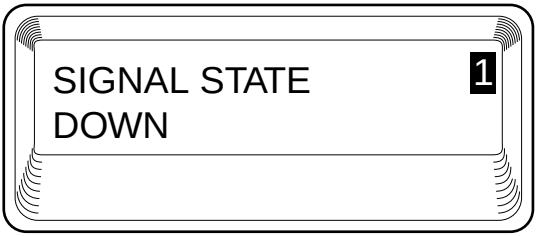


Figure 10-13. Signal State Screen

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 a dial backup 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 a dial backup 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 10-14. Use the arrow keys to scroll through the information. Press **Cancel** to return to the **STATS** menu.

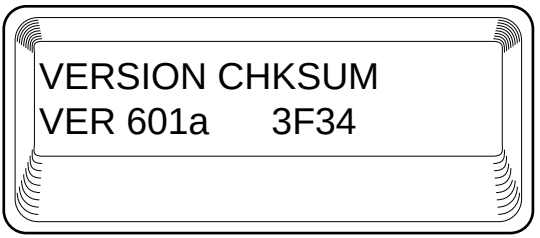


Figure 10-14. System Statistics Screen

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 on page 11-2 for the Front Panel menu tree.

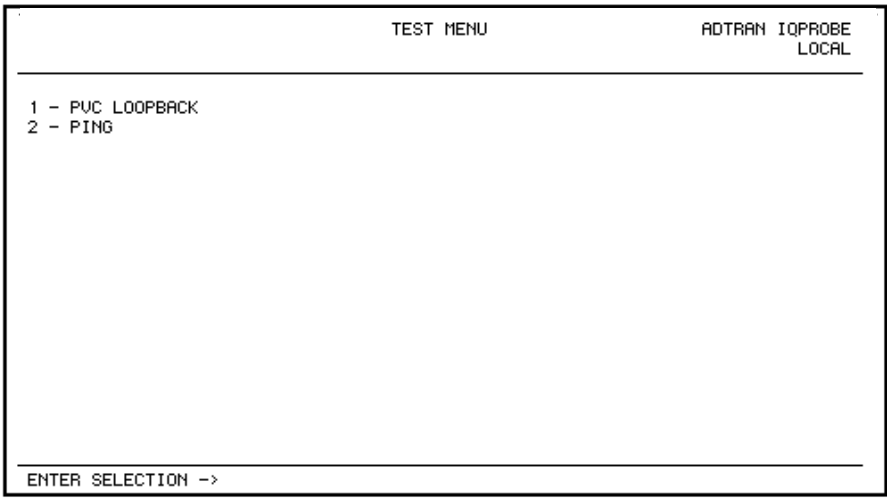


Figure 11-1. Terminal Test Menu

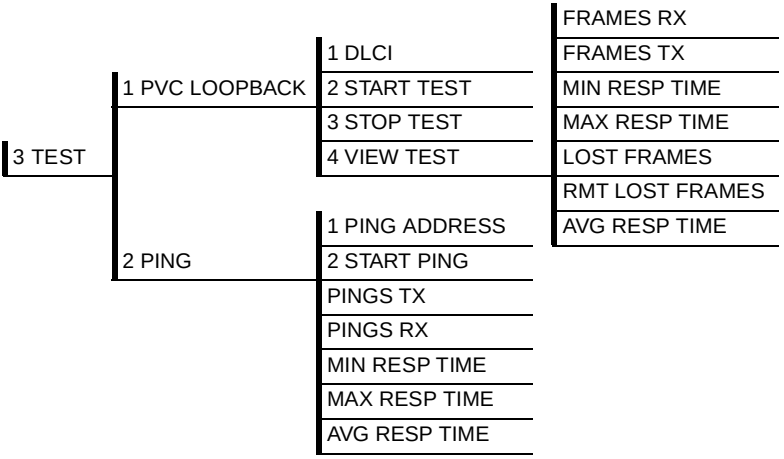


Figure 11-2. Front Panel Test Menu

In this chapter, the terminal selections are listed first followed by the Front Panel selections in parentheses (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 on page 11-3 for the terminal menu.

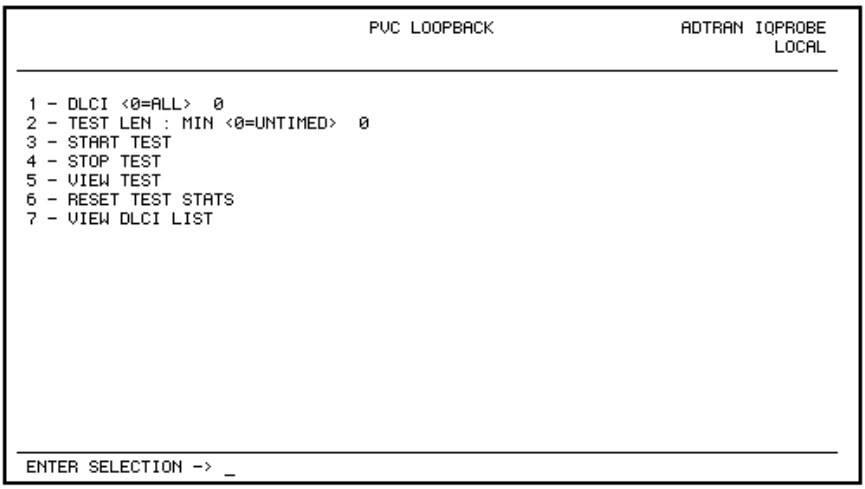


Figure 11-3. PVC Loopback Menu

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 the figure.

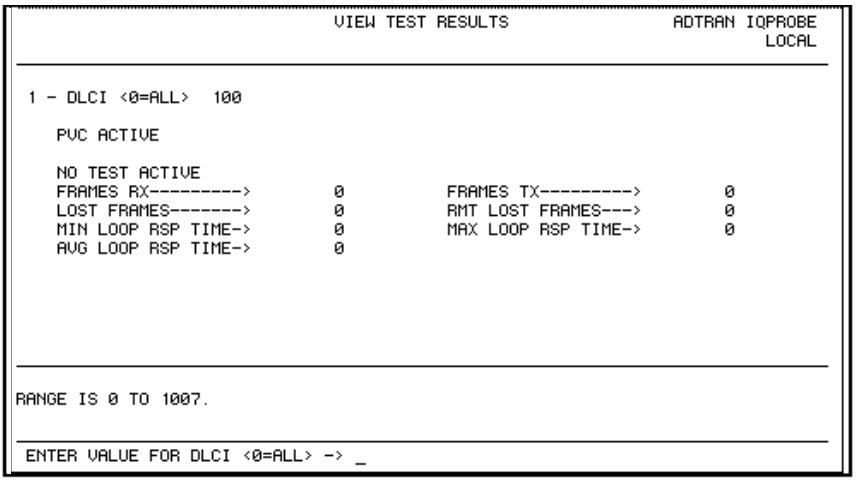


Figure 11-4. Test Status Screen

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.

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* on page 10-26 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 a dial backup card is installed.

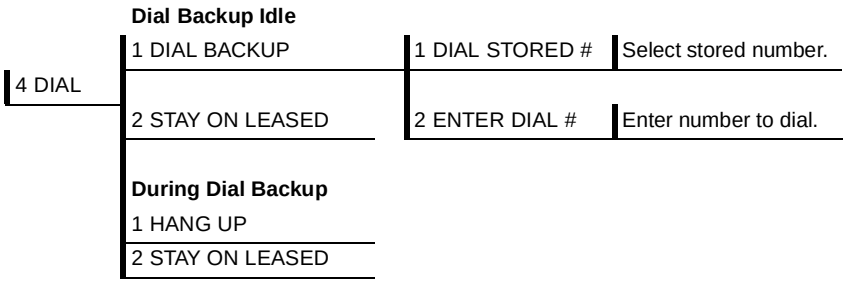


Figure 12-1. Dial Options Menu

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

The IQ Probe prompts you to enter a number to dial for dial backup, or to hang up an existing call. When hang-up is selected, the dial backup connection is terminated and the unit attempts to reestablish communication on the T1 line.

Appendix A Pinouts

The following tables give the pin assignments for the IQ Probe connectors, adapter cables, and card options. For more information, see *Installation* on page 2-1.

Table A-1. 10BaseT Connector Pinouts

Pin	Name	Description
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-2. Control Connector Pinouts

RJ Pin #	Function	Direction
1	GND	
2	RTS	|
3	TD	|
4	DSR	O
5	RD	O
6	CTS*	O
7	DTR	|
8	DCD	O
* Used for hardware flow control.		

Table A-3. EIA-232 Connector Pinouts

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-4. EIA-530 Connector Pinouts

Pin	EIA	Description
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 Inidcator
23	AC	DTE Ready (return)
24	DA	Transmit Signal Element Timing (DTE source)
25	TM	Test Mode

Table A-5. DB-25 to X.21 (DB-15) Adapter Cable Pinouts

DB25 Pin #	X.21 Pin #	Function
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-6. DB-25 to V.35 Adapter Cable Pinouts (rear panel)

DB25 Pin #	V.35 Pin #	Description	CCITT
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 RX 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-7. DB-25 to V.35 Adapter Cable Pinouts (DCE card)

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

Table A-8. Dial Backup Card Connectors

Pin	Name	Description
4-Wire Switched 56		
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
V.34 and 2B+D ISDN		
1-3	-	not used
4	T	Network-Tip
5	R	Network-Ring
6-8	-	not used

Appendix B Specifications Summary

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 3rd edition

Physical

Operating temperature: 0 to 50 ^{o}C (32 to 122 ^{o}F)
Storage: -20 to 7 ^{o}C (-4 to 158 ^{o}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

Appendix C 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
DSU	data service unit
DTE	data terminal equipment
DTR	data terminal ready
EA	extended address
EBCDIC	extended binary coded decimal interexchange code

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

Appendix D Glossary

ANSI

American National Standards Institute. Devises 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 rely 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 end-points 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.

Index

R

S

T

V

W

X

Product Support Information

Presales 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 an 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 (below address), and return to the following address:

ADTRAN, Inc.
CaPS Department
6767 Old Madison Pike
Progress Center
Building #6, Suite 690
Huntsville, AL 35807

RMA # _____

Notes