digital

DIGITAL
WAN Modular Interface DDS

DELDS-UI
Local Management Guide

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This manual explains how to use Local Management to control and manage the DIGITAL DELDS-UI.

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Application of Council Directive(s):	**89/336/EEC** **73/23/EEC**
Manufacturer's Name:	**Cabletron Systems, Inc.**
Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
European Representative Name:	**Mr. J. Solari**
European Representative Address:	**Cabletron Systems Limited** **Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG13 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EC Directive 73/23/EEC** **EN 55022** **EN 50082-1** **EN 60950**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

Manufacturer	Legal Representative in Europe
Mr. Ronald Fotino	Mr. J. Solari
Full Name	Full Name
Principal Compliance Engineer	Managing Director - E.M.E.A.
Title	Title
Rochester, NH, USA	Newbury, Berkshire, England
Location	Location

CONTENTS

PREFACE

Welcome to the *DIGITAL WAN Modular Interface DDS DELDS-UI Local Management Guide*. This manual explains how to use Local Management to control and manage the DIGITAL WAN Modular Interface (DELDS-UI).

USING THIS GUIDE

Read through this manual completely to familiarize yourself with its content and to gain an understanding of the features and capabilities of the DELDS-UI. You should have a general working knowledge of the following data communications networks and their physical layer components before using the DELDS-UI:

- WAN
- Ethernet and IEEE 802.3

In this document, the DELDS-UI is also referred to as a WPIM (WAN Physical Interface Module).

STRUCTURE OF THIS GUIDE

The following list briefly explains each chapter of the DELDS-UI manual:

Chapter 1, **Introduction**, describes DELDS-UI features and lists specifications.

Chapter 2, **Local Management**, describes how to use Local Management to set up the DELDS-UI.

Appendix A, **WAN Terms and Acronyms**, contains a brief glossary of the terms used in this book.

DOCUMENT CONVENTIONS

Throughout this guide, the following symbol is used to call attention to information:

Note symbol. Calls the reader's attention to any item of information that may be of special importance.

Navigate through the WPIM Local Management Screens by using the following keyboard commands:

- SPACE bar to toggle between selections in a field.
- ENTER (RETURN) to implement a selection.
- Arrow keys to move up, down or sideways within the screen.

USING THE DELDS-UI MANUAL SET

Other manuals have been developed for the interface modules that can be installed in the DELDS-UI chassis. These manuals explain how to install the modules into the DELDS-UI, how to attach cable segments to the modules, and how to configure the modules using Local Management after installation is complete. Specifications for all modules are included in each manual.

Each manual in this set assumes that the qualified personnel installing the module has a general working knowledge of data communications networks and their physical layer components.

RELATED DOCUMENTATION

Refer to the manual included with the host Wide Area Network module to supplement the procedures and other technical data provided in this manual. Refer to the standalone hub or module User's Guides and/or Local Management Guides for local management setup information. This manual references procedures in these manuals, where appropriate, but does not repeat them.

CORRESPONDENCE

Documentation Comments

If you have comments or suggestions about this manual, send them to DIGITAL Network Products:

Attn.:	Documentation Project Manager
E-MAIL:	doc_quality@lkg.mts.dec.com

World Wide Web

To locate product-specific information, refer to the DIGITAL Network products Home Page on the World Wide Web at the following locations:

North America:	http://www.networks.digital.com
Europe:	http://www.networks.europe.digital.com
Asia Pacific:	http://www.networks.digital.com.au

GETTING HELP

Contact your DIGITAL representative for technical support. Before calling, have the following information ready:

- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)

CHAPTER 1

INTRODUCTION

1.1 DELDS-UI FEATURES

The DELDS-UI extends the functionality of the Wide Area Network module to allow remote connectivity using Digital Data Service (DDS).

The DELDS-UI provides a DDS interface that includes a built-in Channel Service Unit/Digital Service Unit (CSU/DSU) for direct connection to a DDS line.

Diagnostic Loopback

The DELDS-UI supports remote CSU diagnostic loopback and Non-Latching remote DSU diagnostic loopback.

WAN Protocols

As of this printing, the module in which the DELDS-UI is installed supports the following WAN protocols (refer to the Release Notes included with the standalone hub for a list of current protocols):

- Point to Point Protocol (LCP) as defined by RFC 1661
- Point to Point Protocol (BNCP) as defined by RFC 1638
- Point to Point Protocol LAN Extender (PPP/LEX)
- Frame Relay as defined by RFC 1490

MIB Support

Refer to the Release Notes included with the standalone hub for a list of all MIBs supported by the DELDS-UI. For information about how to extract and compile individual MIBs, contact your DIGITAL representative.

1.2 DELDS-UI PORT ASSIGNMENTS

The DELDS-UI features one RJ45 port to enable any DIGITAL product supporting the WPIM architecture to connect directly to a single Digital Data Service (DDS) circuit. The pinout information for the port is shown in Table 1-1, below. Table 1-2 lists the Cabletron Systems cable number for the interface cable for the DELDS-UI.

Table 1-1 Network Pinout Assignments

PIN	SIGNAL	PIN	SIGNAL
1	Transmit Ring	5	Not Used
2	Transmit Tip	6	Not Used
3	Not Used	7	Receive Tip
4	Not Used	8	Receive Ring

Table 1-2 DDS Interface Cable Part Number

Interface Cable	Cabletron Systems Cable Number
DDS Line Interface Cable	9360119-x

1.3 DELDS-UI SPECIFICATIONS

This section describes the environmental specifications and safety and approval requirements for the DELDS-UI. Cabletron Systems reserves the right to change these specifications at any time without notice.

Environmental Requirements

Operating Temperature:	5° to 40°C (41° to 104°F)
Non-operating Temperature:	-30° to +90°C (-22° to 194°F)
Operating Humidity:	5% to 95% (non-condensing)

Safety

This unit meets the safety requirements of UL1950, CSA C22.2 No. 950, EN 60950, and 73/23/EEC.

EMC

This unit meets the EMC requirements of FCC Part 15 Class A, EN 55022 Class A, VCCI Class A, EN 50082-1, and 89/336/EEC.

CHAPTER 2
LOCAL MANAGEMENT

This chapter explains how to configure the DELDS-UI through local management. The WAN Physical Configuration screen and the WAN Interface Configuration screen appear as local management menu selections after you install the DELDS-UI into a WAN high-speed interface module and then install the high-speed interface module into the host module. Refer to the appropriate module's User's Guide for instructions about how to set up and access local management.

Sections of this chapter include the following:

- The WAN Physical Configuration Screen
- The WAN Interface Configuration Screen
- DELDS-UI Configuration

Read **Section 2.1** and **Section 2.2** to gain an understanding of the DELDS-UI Local Management screens. **Section 2.3** provides examples for setting up the DELDS-UI in a PPP (LEX or BNCP) or Frame Relay environment.

2.1 THE WAN PHYSICAL CONFIGURATION SCREEN

To access the WAN Physical Configuration screen from the Feature Selection screen, use the arrow keys to highlight the **WAN Configuration** option, then press ENTER. The screen shown in Figure 2-1 appears.

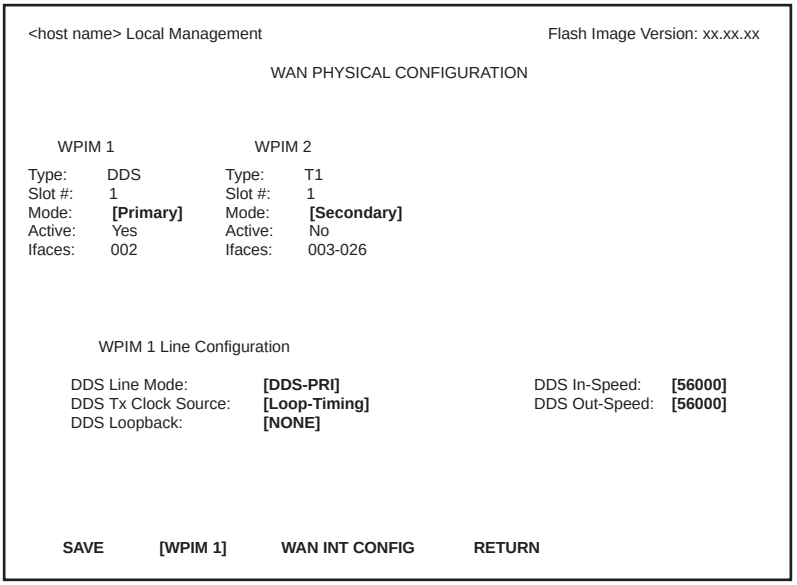

Figure 2-1 WAN Physical Configuration Screen

2.1.1 WAN Physical Configuration Screen Fields

The following sections describe WAN Physical Configuration screen fields and instructions for setting them. The WAN Physical Configuration screen lets you configure the WPIM or "Physical Interface."

DIGITAL offers a variety of WPIMs. Select the WPIM you wish to configure by using the arrow keys to highlight the **WPIM** command field at the bottom of the screen. Use the SPACE bar to select the appropriate WPIM, then press ENTER. The WAN Configuration screen automatically displays unique configuration fields for each WPIM as shown in **Figure 2-1**.

The WAN Physical Configuration screen displays the following information for each WPIM.

WPIM *1-4*
Displays configuration information for as many as four WPIMs.

TYPE
Displays the WPIM type.

Slot#
Displays the slot in which the WPIM resides.

MODE
Displays the WPIM mode. Toggles between PRIMARY and SECONDARY. In a device where two WPIMs are utilized, but only one can be active at a given time, the second WPIM installed or recognized defaults to **SECONDARY**.

ACTIVE
Displays the status of the WPIM, Yes (active) or No.

INTERFACES
Displays the interfaces available to each WPIM.

2.1.2 DELDS-UI Configuration Fields

The configuration fields displayed on the Physical Configuration screen shown in **Figure 2-1** vary depending on the type of WPIM. The examples in this Guide cover the DELDS-UI. Each DIGITAL WPIM has a Local Management Guide that provides specific configuration guidelines.

DDS Line Mode
Displays the DDS Line Mode. The selections toggle between DDS-PRI (primary) and DDS-CC (clear channel). This field should be set according to the instruction of your service provider. The default setting for this field is **DDS-PRI**.

DDS Tx Clock Source

Displays the clock source as either Loop or Local. The Loop setting allows the DELDS-UI to receive its timing information from the service provider and the Local setting allows the DELDS-UI to receive its timing information internally. If DDS-CC is chosen for the DDS Line Mode then this field must be set to Loop. The default setting is **Loop**.

DDS Loopback

Displays the internal Loopback as either Line or None. Line loopback is reserved for network diagnostics only. The default is **None**.

DDS In-Speed

Informational purposes only. Displays 56000 (bps) for Primary DDS Line Mode and 64000 (bps) for Clear Channel DDS Line Mode upon startup.

DDS Out-Speed

Informational purposes only. Displays 56000 (bps) for Primary DDS Line Mode and 64000 (bps) for Clear Channel DDS Line Mode upon startup.

2.2 THE WAN INTERFACE CONFIGURATION SCREEN

This section describes the features of the WAN Interface Configuration screen. Access the screen by using the arrow keys to highlight the **WAN INT CONFIG** command field at the bottom of the Physical Configuration screen, then press ENTER. The WAN Interface Configuration screen shown in **Figure 2-2** appears.

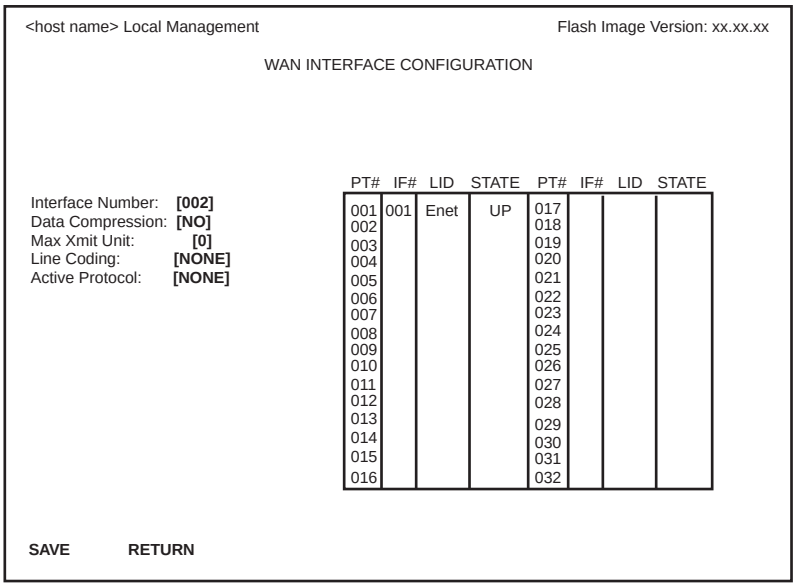

Figure 2-2 WAN Interface Configuration Screen

2.2.1 WAN Interface Configuration Screen Fields

The following sections describe WAN Interface Configuration screen fields.

Interface Number

Displays active Interface Number. Use this field to configure the Interface Number assigned to the WPIM on the WAN Physical Configuration screen.

Data Compression

Displays the status of Data Compression. This field displays YES or NO. The default setting is **NO**.

Max Xmit Unit

User configured field that displays the maximum packet size that can be transmitted on the selected interface. The default settings for this field are 8191 for PPP and 4095 for Frame Relay.

Line Coding

Displays the Line Coding for timeslots associated with this interface. This field displays JBZS, INV-HDLC, or NONE. The default setting for this field is **NONE**.

Active Protocol

Displays the active OSI Layer protocol. This field displays NONE, FR (Frame Relay), or PPP (Point-to-Point). The default setting is **NONE**.

If you select **PPP**, the following field appears:

PPP Type: This field displays BNCP or LEX. The default setting is BNCP.

If you select **FR**, the following field appears:

FR LMP: This field displays the Link Management Protocol NO LMI, Q.933-A or T1.617-D. The default setting is TL617-D.

If **NO LMI** is selected, the following fields are displayed:

DLCI Address: This field can be set to values from 0–1023. The values 0–15 and 1008–1022 are reserved DLCI (Data Link Connection Identifiers) addresses. The values 16–991 are typically used for virtual circuits.

Circuit State: Toggles between Active, Inactive and Invalid.

PT#

Displays the application ports (bridge ports) available from the host platform to the WAN. If the active protocol is PPP, Local Management assigns only one application port per interface number (IF#). If the active protocol is Frame Relay, Local Management assigns the available WAN bridge ports from the host platform, one per DLCI.

The quantity of application ports for a Frame Relay network is determined by the quantity of DLCIs assigned to that Interface. This is determined either manually or by the Link Management Protocol.

IF#
Displays the Interface that is associated with the application port.

LID
Displays the Link Identifier. If the active protocol is Frame Relay, the Data Link Connection Identifier is displayed. If the active protocol for this interface is PPP, then PPP appears in this field.

STATE
Displays the status of the application port. If the active protocol is Frame Relay, this field displays the status as Active, Inactive, or Invalid (no LMI). If the active protocol is PPP, this field displays UP (active) or DOWN (inactive).

2.3 DELDS-UI CONFIGURATION

This section provides step-by-step instructions for connecting the DELDS-UI to a Digital Data Service circuit in a PPP or Frame Relay environment. This example assumes the setup shown in **Figure 2-3** using two hubs with DELDS-UI modules installed in each bridge router interface module.

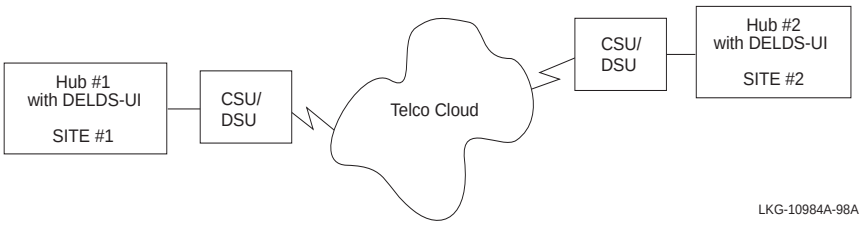

Figure 2-3 DELDS-UI Interface Configuration for PPP

The line configuration information shown in **Table 2-1**, must be supplied by the service provider.

Table 2-1 Telco Configuration Information

Configuration Information Required By User	Configuration Information Supplied By Service Provider
Clock Source	Telco provided or no clock source
Line Mode	Primary or Clear Channel
FR-LMP (Frame Relay Only)	Telco provided or user requested

2.3.1 DELDS-UI Physical Configuration

Begin the DELDS-UI configuration by accessing the WAN Physical Configuration screen through Local Management. To access the WAN Physical Configuration screen from the Feature Selection screen, use the arrow keys to highlight the **WAN Configuration** option, then press ENTER. The screen shown in **Figure 2-1** appears. Proceed with the following steps:

1. Use the arrow keys to highlight the **[WPIM]** field at the bottom of the screen. Press the SPACE bar to select the WPIM being configured, then press ENTER.
2. Use the arrow keys to highlight **DDS Line Mode**. Press the SPACE bar to set the DDS Line Mode to DDS-PRI or DDS-CC, then press ENTER.
3. Use the arrow keys to highlight **DDS Tx Clock Source**. Press the SPACE bar to set to Loop, then press ENTER.
4. Use the arrow keys to highlight **DDS Loopback**. Press the SPACE bar to set to NONE, then press ENTER.
5. Use the arrow keys to highlight the **SAVE** command. Then press ENTER. The message “Save Done!” appears and Local Management saves the changes to memory.

Access the WAN Interface Configuration screen (**Figure 2-2**) by using the arrow keys to highlight the **WAN INT CONFIG** option, then press ENTER.

2.3.2 DELDS-UI Interface Configuration

This screen is accessed through the WAN Physical Configuration screen. Refer to **Figure 2-2** and proceed with the following steps to configure the WAN Interface through Local Management.

1. Use the arrow keys to highlight **Interface Number**. Set the WAN connection Interface Number by typing the same number found in the Interfaces field on the WAN Physical Configuration screen into the Interface Number field, then press ENTER. In this example, the Physical Configuration screen shown in **Figure 2-1** uses Interface 002 for the DELDS-UI WAN connection.
2. Use the arrow keys to highlight **Line Coding**. Press the SPACE bar to select None, then press ENTER.
3. Use the arrow keys to highlight **Active Protocol**. Press the SPACE bar to select PPP or FR, then press ENTER.
   a. If you selected PPP, use the arrow keys to highlight **PPP Type**. Press the SPACE bar to select BNCP or LEX, then press ENTER. Go to Step 4.
   b. If you selected FR, use the arrow keys to highlight **FR LMP**. Press the SPACE bar to select T1.617-D, Q.933-A, or NO LMI, then press ENTER.

      If you selected NO LMI, complete the following:

      - Use the arrow keys to highlight **DLCI Address**. This field can be set to values from 0-1023. The values 16-991 are typically used for virtual circuits.
      - Use the arrow keys to highlight **Circuit State**. Press the SPACE bar to select Active, then press ENTER.
4. Use the arrow keys to highlight the **SAVE** command. Press ENTER. The message “Save Done!” appears and Local Management saves the changes to memory.

Upon saving this screen, the interface just configured is assigned to an application port (PT#) in the table on the right hand side of the screen once the device starts communicating with the service provider’s switch.

The WAN configuration is complete. It takes up to 60 seconds for the WAN Interface to come out of standby and for communications to begin.

APPENDIX A

WAN TERMS AND ACRONYMS

This appendix provides definitions for WAN terms and acronyms.

AMI	Alternate Mark Inversion. Line coding used with both E-1 and T-1. A digital 1 is encoded as a “mark” (pulse) and a 0 is encoded as a “space.” The marks alternate polarity.
ANSI	American National Standards Institute. The US member of the ISO.
Bearer (B) Channel	A 64 Kbps channel used with BRI and PRI ISDN services.
Bipolar Violation	The occurrence of two successive pulses of the same polarity in a bipolar signal.
B8ZS	Binary 8-Zero Substitution. A type of line coding utilized with ESF (Extended Super Frame). Ensures the ones density requirement for digital T-carrier facilities in the public network, while allowing 64 Kbps clear data per channel. This encoding method is not supported by some Telcos.
BRI	Basic Rate Interface, minimum rate ISDN subscriber interface, provides 2 B + 1 D channels (two 64 Kbps “B” (Bearer) channels and one 16 Kbps “D” (Data) signaling channel for a total of 144 Kbps).
Clear Channel	A 64 Kbps digital circuit where no framing or control bits are required, thus making the full bandwidth available for data communications.
CRC	Cyclic Redundancy Check. An algorithm or process used to identify corrupted packets in the transmission link.

CSU	Channel Service Unit. A device that terminates the local loop/digital channel on a customer's (DSU) premises. The CSU connects to a DSX-1 interface on the CPE.
DCE	Data Communications Equipment. A device such as a modem that connects the communications circuit with the end device (see DTE).
Data (D) Channel	A 16 Kbps channel used with BRI and PRI services for signaling and control.
DDS	Digital Data System. A private line digital data service with a typical data rate of 56 Kbps.
D4	D4 Framing. A popular framing format in T-1. Uses 12 T-1 Frames to identify both the channel and the signaling bit.
DLCI	Data Link Connection Identifier. A unique virtual circuit identifier used in Frame Relay. Identifies a given frame as being from a particular logical link. The DLCI has only local significance.
DSU	Digital Service Unit. A device which converts RS232 or other terminal interfaces to DSX-1 (T-1) interface.
DS-0	Digital Signal, level 0. A standard 64,000 bit/second channel. Synonymous with "Timeslot."
DTE	Data Terminal Equipment. Equipment that originates and terminates data transmission such as a computer or printer (see DCE).
E-1	European digital signal level 1. Similar to T-1 but provides 32 channels (2.048 Mbps) instead of 24 channels (1.544 Mbps).
ESF	Extended Super Frame. A new T-1 framing standard (see D4 framing) that uses 24 T-1 frames, thus allowing individual identification of the channel and signaling bits.
Fractional T-1	Use of a portion (less than the full 24 channels) of a T-1 line.
Frame Relay	A network protocol that allows for many point-to-point virtual connections over a single access channel.
HDB3	High Density Bipolar 3. Used with E-1, a bipolar coding method that does not allow more than 3 consecutive zeros.

HDLC High-Level Data Link Control. A layer 2 (link layer) full-duplex protocol derived from SDLC.

INV-HDLC A form of zero suppression in which all zeros in the HDLC packet are changed to ones and all ones are changed to zeros.

ISDN Integrated Services Digital Network. Allows point-to-point connections at 64 Kbps or 128 Kbps when necessary and disconnects the line when not in use. With this service the user only pays for the time connected.

JBZS Jam Bit-Zero Suppression. A form of zero suppression that places a one in the seventh bit of a timeslot. Reduces the effective throughput to 56 Kbps.

LEX LAN Extender. A Cisco Systems protocol used to internetwork a host-based router with a remote switch.

LMP Link Management Protocol. A protocol used in Frame Relay. Allows the device to gather information about the DLCIs (Data Link Connection Identifiers). See T1.617-D, Q.933-A.

Local Timing Timing for digital transmission circuit is internally generated by a source within the equipment. Usually used for short haul private lines. In this case one CSU must be set for Local (internal) timing and the CSU at the other end of the line must be set for Loop (recovered) timing to create a master-slave situation.

Loop Timing Timing for digital transmission circuit is recovered from the received data, not generated internally by a source within the equipment. This is the typical situation when using public lines.

MUX Multiplexer. An electronic device that allows two or more signals to pass over one communications circuit.

PPP Point-to-Point Protocol. Provides a method for transmitting datagrams over serial point-to-point links.

PRI Primary Rate Interface. An ISDN service providing 23 “B” (Bearer) channels of 64 Kbps and one 64 Kbps “D” (Data) channel for signaling and control.

PVC Permanent Virtual Circuit. A virtual circuit that provides the equivalent of a dedicated private line service.

Q.933-A	Q.933 Annex A. An ITU link management protocol specification used in Frame Relay.
SDLC	Synchronous Data Link Control. Layer 2 (link layer) protocol developed by IBM for SNA connectivity. Basis for HDLC.
SNA	Systems Network Architecture. Data communication network architecture developed by IBM in the 1970s.
T-1	A Bell System term that refers to the physical carrier used to transmit a digital signal at 1.544 Mbps.
T1.617-D	T1.617 Annex D. An ANSI link management protocol specification used in Frame Relay.
TDM	Time Division Multiplexing. A technique in which separate data or voice signals are transmitted simultaneously over a single communications medium based on time interleaving.
Timeslot	A standard 64,000 bit/second channel. Synonymous with DS-0 (Digital Signal, level 0).
WAN	Wide Area Network. A network spanning a large geographic area.
WPIM	WAN Physical Interface Module, provides connectivity/functionality for WAN modules.

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