



DIGITAL WAN Modular Interface TI

DELDI-UI Local Management Guide

DIGITAL WAN Modular Interface T1

DELDI-UI Local Management Guide

Part Number: 9032612

September 1998

This guide describes how to use Local Management to set up the DIGITAL WAN Modular Interface Drop and Insert DELDI-UI.

Revision/Update Information: This is a new document.

Cabletron Systems reserves the right to make changes in specifications and other information contained in this document without prior notice. The reader should in all cases consult Cabletron Systems to determine whether any such changes have been made.

The hardware, firmware, or software described in this manual is subject to change without notice.

IN NO EVENT SHALL CABLETRON SYSTEMS BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING BUT NOT LIMITED TO LOST PROFITS) ARISING OUT OF OR RELATED TO THIS MANUAL OR THE INFORMATION CONTAINED IN IT, EVEN IF CABLETRON SYSTEMS HAS BEEN ADVISED OF, KNOWN, OR SHOULD HAVE KNOWN, THE POSSIBILITY OF SUCH DAMAGES.

© Copyright 1998 by Cabletron Systems, Inc., P.O. Box 5005, Rochester, NH 03866-5005

All Rights Reserved

Printed in the United States of America

Cabletron Systems is a registered trademark and **WPIM** is a trademark of Cabletron Systems, Inc.

DIGITAL and the DIGITAL logo are trademarks of Digital Equipment Corporation.

All other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies.

UNITED STATES GOVERNMENT RESTRICTED RIGHTS

The enclosed product (a) was developed solely at private expense; (b) contains "restricted computer software" submitted with restricted rights in accordance with Section 52227-19 (a) through (d) of the Commercial Computer Software - Restricted Rights Clause and its successors, and (c) in all respects is proprietary data belonging to Cabletron and/or its suppliers.

For Department of Defense units, the product is licensed with "Restricted Rights" as defined in the DoD Supplement to the Federal Acquisition Regulations, Section 52.227-7013 (c) (1) (ii) and its successors, and use, duplication, disclosure by the Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at 252.227-7013. Cabletron Systems, Inc., 35 Industrial Way, Rochester, New Hampshire 03867-0505.

FCC Notice — Class A Computing Device:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Any modifications to this device - unless expressly approved by the manufacturer - can void the user's authority to operate this equipment under part 15 of the FCC rules.

Industry Canada Notice — Class A Computing Device:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

VCCI Notice — Class A Computing Device:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Taiwanese Notice — Class A Computing Device:

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

CE Notice — Class A Computing Device:

Warning!

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Avertissement!

Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

CABLETRON SYSTEMS, INC. PROGRAM LICENSE AGREEMENT

IMPORTANT: Before utilizing this product, carefully read this License Agreement.

This document is an agreement between you, the end user, and Cabletron Systems, Inc. (“Cabletron”) that sets forth your rights and obligations with respect to the Cabletron software program (the “Program”) contained in this package. The Program may be contained in firmware, chips or other media. BY UTILIZING THE ENCLOSED PRODUCT, YOU ARE AGREEING TO BECOME BOUND BY THE TERMS OF THIS AGREEMENT, WHICH INCLUDES THE LICENSE AND THE LIMITATION OF WARRANTY AND DISCLAIMER OF LIABILITY. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN THE UNUSED PRODUCT TO THE PLACE OF PURCHASE FOR A FULL REFUND.

CABLETRON SOFTWARE PROGRAM LICENSE

1. LICENSE. You have the right to use only the one (1) copy of the Program provided in this package subject to the terms and conditions of this License Agreement.

You may not copy, reproduce or transmit any part of the Program except as permitted by the Copyright Act of the United States or as authorized in writing by Cabletron.
2. OTHER RESTRICTIONS. You may not reverse engineer, decompile, or disassemble the Program.
3. APPLICABLE LAW. This License Agreement shall be interpreted and governed under the laws and in the state and federal courts of New Hampshire. You accept the personal jurisdiction and venue of the New Hampshire courts.

EXCLUSION OF WARRANTY AND DISCLAIMER OF LIABILITY

1. EXCLUSION OF WARRANTY. Except as may be specifically provided by Cabletron in writing, Cabletron makes no warranty, expressed or implied, concerning the Program (including its documentation and media).

CABLETRON DISCLAIMS ALL WARRANTIES, OTHER THAN THOSE SUPPLIED TO YOU BY CABLETRON IN WRITING, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE PROGRAM, THE ACCOMPANYING WRITTEN MATERIALS, AND ANY ACCOMPANYING HARDWARE.

2. NO LIABILITY FOR CONSEQUENTIAL DAMAGES. IN NO EVENT SHALL CABLETRON OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS, PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR RELIANCE DAMAGES, OR OTHER LOSS) ARISING OUT OF THE USE OR INABILITY TO USE THIS CABLETRON PRODUCT, EVEN IF CABLETRON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, OR ON THE DURATION OR LIMITATION OF IMPLIED WARRANTIES, IN SOME INSTANCES THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU.

DECLARATION OF CONFORMITY

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

Mr. Ronald Fotino

Full Name

Principal Compliance Engineer

Title

Rochester, NH, USA

Location

Legal Representative in Europe

Mr. J. Solari

Full Name

Managing Director - E.M.E.A.

Title

Newbury, Berkshire, England

Location

CONTENTS

PREFACE

Using This Guide	ix
Purpose of This Guide	ix
Intended Audience	ix
Structure of this Guide	x
Document Conventions	x
Related Documentation	xi
Correspondence	xi
Documentation Comments	xi
World Wide Web	xi
Getting Help	xii

CHAPTER 1 INTRODUCTION

1.1 DELDI-UI Features	1-1
-----------------------------	-----

CHAPTER 2 LOCAL MANAGEMENT

2.1 The WAN Physical Configuration Screen	2-2
2.1.1 WAN Physical Configuration Screen Fields	2-2
2.1.2 DELDI-UI Line Configuration Fields	2-3
2.1.2.1 DELDI-UI Timeslot Configuration Table	2-5
2.2 The WAN Interface Configuration Screen	2-9
2.2.1 WAN Interface Configuration Screen Fields	2-11
2.3 DELDI-UI Configuration	2-13
2.3.1 DELDI-UI Physical Configuration	2-14
2.3.2 DELDI-UI Interface Configuration	2-16

APPENDIX A DELDI-UI SPECIFICATIONS

A.1 DELDI-UI Specifications	A-1
A.2 DELDI-UI Interface Cables	A-2
A.3 Cable Assemblies and Pinouts	A-2

APPENDIX B TYPICAL CONFIGURATIONS

B.1 Telco Timing B-1
B.2 Tail Circuit Timing B-1
B.3 Internal Timing B-2

APPENDIX C FCC PART 68 - USER'S INFORMATION

APPENDIX D WAN TERMS AND ACRONYMS

PREFACE

Welcome to the *DIGITAL WAN Modular Interface T1 DELDI-UI Local Management Guide*. This guide describes how to use Local Management to set up the DIGITAL DELDI-UI WAN Modular Interface T1.

USING THIS GUIDE

Read through this guide completely to become familiar with the content and to gain an understanding of the features and capabilities of the DELDI-UI. You should have a general working knowledge of the following data communications networks and their physical layer components before using the DELDI-UI.

- WAN
- Ethernet and IEEE 802.3

INTENDED AUDIENCE

This guide is intended for use by the personnel who will set up the DELDI-UI WAN Port Interface Module T1.

STRUCTURE OF THIS GUIDE

The following briefly summarizes each chapter of the DELDI-UI manual:

Chapter 1, **Introduction**, provides a description of the DELDI-UI features.

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

Appendix A, **DELDI-UI Specifications**, provides specifications for the DELDI-UI and also gives Cabletron Systems part numbers and connector information for DELDI-UI interface cables.

Appendix B, **Typical Configurations**, presents common configurations for the DELDI-UI.

Appendix C, **FCC Part 68 - User's Information**, explains the FCC rules governing the DELDI-UI.

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

DOCUMENT CONVENTIONS

The following conventions are used throughout this guide:



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

Navigate through the DELDI-UI 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 across within the screen.

RELATED DOCUMENTATION

Refer to the manual included with the host Wide Area Network device to supplement the procedures and other technical data provided in this manual. Refer to the standalone device or module User's Guides and the 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 guide, send them to the DIGITAL Network Products Group.

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 geographic locations:

Americas:	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 modes 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 serial and revision numbers of all products in the network
- The device history, (i.e., have you returned the device before, is this a recurring problem, etc.)

CHAPTER 1

INTRODUCTION

The DELDI-UI resides in and provides connectivity/functionality to DIGITAL Wide Area Network (WAN) modules.

Before using this guide you must perform the following:

- Install the DELDI-UI in a Wide Area Network module. Refer to the appropriate manual for installation and troubleshooting procedures.
- Set up and access Local Management. Refer to the appropriate standalone hub or module User's Guide for instructions on setting up and accessing Local Management.

1.1 DELDI-UI FEATURES

The DELDI-UI extends the functionality of a Wide Area Network module to allow remote connectivity using WAN services, such as T-1, or Fractional T-1.

The DELDI-UI provides a T-1 interface that includes a built-in Channel Service Unit/Digital Service Unit (CSU/DSU) for direct connection to a T-1 line. This WPIM (WAN Physical Interface Module) supports both Full T-1 or Fractional T-1 using 56 or 64 Kbps timeslots.

The DELDI-UI also provides a Drop and Insert (DI) interface which allows for a second WAN module (e.g., DELT1-UI, the DIGITAL WAN Modular Interface FT1, T1) to utilize any timeslots that are not used for host data. The DELDI-UI is capable of T1 multiframe alignment.

WAN Protocols

The module in which the DELDI-UI is installed supports the following WAN protocols (refer to the Release Notes included with the host module or standalone device 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 host or standalone device for a list of all MIBs supported by the DELDI-UI. For information about how to extract and compile individual MIBs, contact your DIGITAL representative.

CHAPTER 2

LOCAL MANAGEMENT

This chapter explains how to configure the DELDI-UI WAN Modular Interface T1 through Local Management. The **WAN Physical Configuration** screen and the **WAN Interface Configuration** screen appear as Local Management menu selections in a host device, when the DELDI-UI is installed into a host device. Refer to the appropriate host device technical documentation for instructions about how to set up and access Local Management.

This chapter contains the following sections:

- The WAN Physical Configuration Screen 2.1
- The WAN Interface Configuration Screen 2.2
- DELDI-UI Configuration 2.3

Read Section 2.1 and Section 2.2 to gain an understanding of the DELDI-UI Local Management screens. Section 2.3 provides instructions for setting up the DELDI-UI for full or fractional T-1 in a PPP (LEX or BNCP) environment, or for configuring the DELDI-UI for Frame Relay.



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

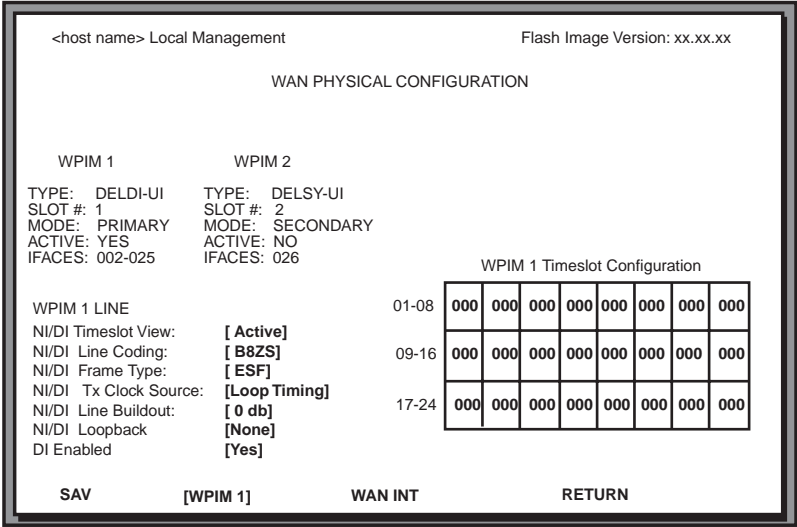
SPACE bar to toggle between selections in a field.

ENTER (RETURN) to implement a selection.

Arrow keys to move up, down or across within the screen.

2.1 THE WAN PHYSICAL CONFIGURATION SCREEN

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



LKG-10980A-98A

Figure 2-1 WAN Physical Configuration Screen

2.1.1 WAN Physical Configuration Screen Fields

The following sections describe the WAN Physical Configuration screen fields and the instructions for setting them. The WAN Physical Configuration screen allows the user to configure the WPIM or “Physical Interface.”

DIGITAL offers a variety of WPIMs. The Physical Configuration screen example (Figure 2-1) shows what the screen would look like for the DELDI-UI and the DIGITAL WAN Modular Interface Synchronous DELSY-UI. 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 Physical 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. This field 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. This field displays YES for active WPIMs and NO for inactive WPIMs.

IFACES

Displays the interfaces available to each WPIM.

2.1.2 DELDI-UI Line Configuration Fields

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



The service provider (i.e., AT&T, Sprint, MCI, NYNEX, etc.) determines the settings for the following fields. Consult the service provider for the correct settings.

NI/DI Timeslot View

Displays the status of the Timeslot Configuration table. The selections for this field toggle between Active and New. The Active setting displays current Timeslot Configuration table settings. The New setting allows you to change Timeslot Configuration table settings. The default setting is **Active**. The default setting for the Timeslot Configuration table is all Timeslots not assigned (**000**).

NI/DI Line Coding

Displays the line coding for the physical T-1 line. The selections toggle between B8ZS and AMI. The default setting for this field is **B8ZS**.

NI/DI Frame Type

Displays the T-1 Frame type. The selections toggle between ESF and D4. The default setting for this field is **ESF**.

NI/DI Tx Clock Source

Displays the T-1 Transmit Clock Source. The selections for this field toggle between Loop Timing (Extracted Line Data) and Local Timing (Internal Clock). The default setting for this field is **Loop Timing**. If the DI Enabled field is set to diDataEnable, Local timing cannot be selected as a choice.

NI/DI Line Buildout

Displays the line coding for the physical T-1 line. Set this to 0 dB unless the service provider recommends another setting. The default setting is **0 dB**. This field steps between the following levels:

- 0 db
- -7.5 db
- -15 db
- -22.5 db

NI/DI Loopback

Displays the loopback for the DELDI-UI. Loopback is a testing procedure that segments the line and allows the user to isolate faults. This field toggles between **None** and **Line-Loop**. In **Line-Loop** the entire T-1 is looped back. In **Payload-Loop** only the 24 timeslots are looped back. The NI/DI Tx Clock Source must be in **Loop Timing** mode to use this option. The default setting is **None**.

DI Enabled

Displays the status of the Drop-and-Insert function of the DELDI-UI. This field steps between **On**, **Off**, and **diDataEnable**. Choosing **On** allows another device (e.g., DELT1-UI) that is connected to the DI interface of the DELDI-UI to use any timeslots that the DELDI-UI is not using (**Drop and Insert** is enabled between the two ports). The data from the host device passes through the NI port. Choosing **Off** allows the Network Interface to be used as a standard T-1 port. Choosing **diDataEnable** enables **Drop and Insert**, and data from the host device will pass through the DI port. The default setting is **On**.



When the **diDataEnable** option is selected in the **DI Enabled** field, data from the host device passes through the DI port and not the NI port on the DELDI-UI.

2.1.2.1 DELDI-UI Timeslot Configuration Table

The WPIM Timeslot Configuration table allows you to configure the way in which the WAN module uses the T-1 line. The configuration table consists of 24 Timeslots. You must assign each Timeslot an Interface number (for example, 002 for an active Interface number or 000 if the Timeslot is not used). When you lease an entire T-1 line, you can use all 24 Timeslots (the full T-1 bandwidth). If you lease only a fraction of the T-1, the service provider tells you which Timeslots to use.

The DELDI-UI supports Time Division Multiplexing (TDM) allowing channelization of circuits (Timeslots) within the public network. You can use Timeslots any way you choose. When using the DELDI-UI, you have the option of implementing all the available leased Timeslots with the DELDI-UI, or you may map any of the available Timeslots to another WAN module through the DI interface.

For example, if your WAN module has access to a full T-1 (24 Timeslots), and you want to communicate with two other sites through the DELDI-UI, your configuration might look like the sample configuration shown in Figure 2-2.

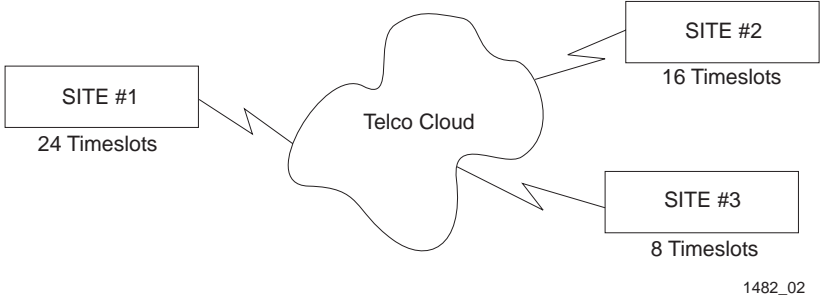


Figure 2-2 Sample Network Configuration

Figure 2-3 shows a sample Timeslot configuration for three sites shown in Figure 2-2. Of the 24 Timeslots, Site #1 uses 16 to communicate with Site #2 and the remaining 8 to communicate with Site #3. This configuration varies tremendously depending on how the service provider maps out the T-1 Timeslots. Your service provider will tell you which Timeslots are active.

01-08	005	005	005	005	005	005	005	005	005
09-16	005	005	005	005	005	005	005	005	005
17-24	006	006	006	006	006	006	006	006	006

SITE #1

01-08	005	005	005	005	005	005	005	005
09-16	005	005	005	005	005	005	005	005
17-24	000	000	000	000	000	000	000	000

SITE #2

01-08	006	006	006	006	006	006	006	006
09-16	000	000	000	000	000	000	000	000
17-24	000	000	000	000	000	000	000	000

SITE #3

1482_03

Figure 2-3 Sample Timeslot Configuration

Site #1 is using the full T-1, so all the Timeslots must have an Interface assignment. Site #2 and Site #3 only use a fraction of the T-1, but the total quantity of Timeslots must match those of Site #1. Unused Timeslots receive an Interface number of 000.



The Interface numbers of Site #1, Site #2 and Site #3 do not have to match. Only the **quantity** of Timeslots must match (the service provider assigns the Timeslots).

Mapping Unused Timeslots

In the previous example, the DELDI-UI made use of all 24 timeslots. None of the timeslots were mapped to another device and the Drop and Insert function was not used. If, however, you wanted another WAN device (e.g., a DELT1-UI) at the same site as the DELDI-UI to be able to communicate with SITE #3, your configuration might look like the sample configuration shown in Figure 2-4.

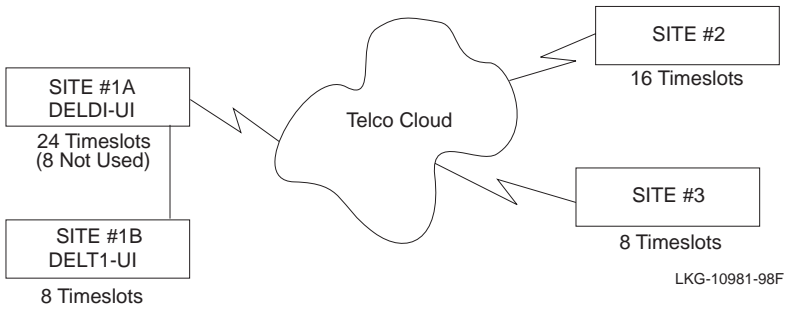


Figure 2-4 Sample Network Configuration

Figure 2-5 shows a sample timeslot configuration for the network shown in Figure 2-4. Of the 24 Timeslots, the DELDI-UI at Site #1A uses 16 to communicate with Site #2 and the remaining 8 are mapped to the DELT1-UI at Site #1B. The DELT1-UI at Site #1B uses these to communicate with Site #3. This configuration varies tremendously depending on how the service provider maps out the T-1 Timeslots. Your service provider will tell you which Timeslots are active.

SITE #1A							
01-08	005	005	005	005	005	005	005
09-16	005	005	005	005	005	005	005
17-24	000	000	000	000	000	000	000

SITE #2							
01-08	005	005	005	005	005	005	005
09-16	005	005	005	005	005	005	005
17-24	000	000	000	000	000	000	000

SITE #1 B							
01-08	000	000	000	000	000	000	000
09-16	000	000	000	000	000	000	000
17-24	006	006	006	006	006	006	006

SITE #3							
01-08	006	006	006	006	006	006	006
09-16	000	000	000	000	000	000	000
17-24	000	000	000	000	000	000	000

1482_03

Figure 2-5 Sample Timeslot Configuration

Site #1 is using the full T-1, so all the Timeslots must have an Interface assignment. Site #2 and Site #3 only use a fraction of the T-1, but the total quantity of Timeslots must match those of Site #1. Unused Timeslots receive an Interface number of 000.



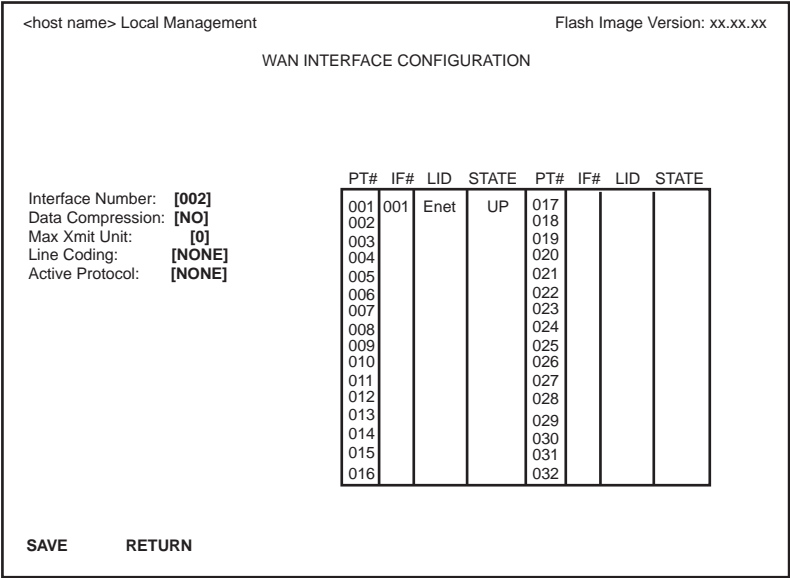
When the DELDI-UI Physical Configuration screen is saved and the Drop-and-Insert function is enabled, any timeslots initially set to 000 in the Timeslot Configuration Table change to DI to reflect that these timeslots are mapped to the DI interface.

In order to map unused timeslots to another device connected to the DI port of the DELDI-UI, the DI Enable option on the WAN Physical Configuration screen must be set to **On**

For block diagrams of typical supported configurations, see Appendix B.

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** option at the bottom of the Physical Configuration screen, then press ENTER. The WAN Interface Configuration screen shown in Figure 2-6 appears.



148204

Figure 2-6 WAN Interface Configuration Screen

2.2.1 WAN Interface Configuration Screen Fields

This section describes the WAN Interface Configuration screen fields.

Interface Number

Displays the active Interface Numbers. Use this field to configure the Interface Numbers assigned to the Timeslots 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 PPP (Point-to-Point), FR (Frame Relay), or NONE. The default setting is **NONE**.

If **PPP** is selected, the following field appears:

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

If **FR** is selected, 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 **T1.617-D**.

If **NO LMI** is selected for FR LMP, 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 Data Link Connection Identifiers (DLCI) addresses. The values 16-991 are typically used for virtual circuits.

Circuit State: Steps between Active, Inactive and Invalid. The default setting is **Active**.

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.

You can assign WAN application ports to the 24 interfaces for the PPP configuration that suits your needs. In a Frame Relay configuration, you can assign all WAN application ports to one interface. In this example, the remaining 23 interfaces would not have WAN application ports available.

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 (LMP).

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 Disabled (for no LMI). If the active protocol is PPP, this field displays UP (for active) or DOWN (for inactive).

2.3 DELDI-UI CONFIGURATION

This section provides step-by-step instructions for configuring the DELDI-UI to use a full or fractional T-1 circuit in a PPP or Frame Relay environment. This simplified example assumes the setup shown in Figure 2-7 using two host devices containing a DELDI-UI at Site #1 and a DELDI-UI at Site #2. Configurations may vary depending on the hub.

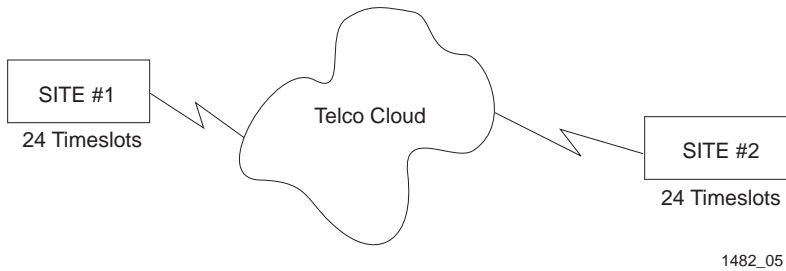


Figure 2-7 Full T-1 Configuration

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
Line Coding	B8ZS or AMI
Frame Type	ESF or D4
Clock Source	Loop Timing or Local Timing
DS0 (Timeslots)	Timeslots being used for each end of the circuit

2.3.1 DELDI-UI Physical Configuration

Begin the DELDI-UI configuration by accessing the WAN Physical Configuration screen (Figure 2-1) through Local Management. To access the WAN Physical Configuration screen from the Setup Menu screen, use the arrow keys to highlight the **WAN Setup** 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 **NI/DI Timeslot View**. Press the SPACE bar to select **New**, then press ENTER. The cursor moves to Timeslot #1 of the Timeslot Configuration table.
3. Insert an interface number (refer to the NOTE below) into every Timeslot. Type the number, press ENTER, then use the arrow keys to highlight the next Timeslot field. Exit this field by using the arrow keys. The cursor automatically moves to the **NI/DI Line Coding** field.



The value assigned to the Timeslots is the interface being used for WAN communication. The available interface range is displayed on the WAN Physical Configuration screen (see Figure 2-1). You may insert any of the available interface numbers into the Timeslots.

Any timeslots that are given a value of 000 are either not used (DI Enabled set to Off) or are mapped to another WAN module (e.g., DELT1-UI) that is connected to the DI interface (DI Enabled set to On).

When DI Enabled is set to diDataEnable, the timeslot view changes to view data from DI instead of NI. Host data passes through the DI interface and slots that are marked DI are mapped to the NI interface.

The following four steps are based on information supplied by the service provider. Consult the service provider for the correct settings.

4. Use the arrow keys to highlight **NI/DI Line Coding**. Press the SPACE bar to select **B8ZS** or **AMI**, then press ENTER.
5. Use the arrow keys to highlight **NI/DI Frame Type**. Press the SPACE bar to select **ESF** or **D4**, then press ENTER.
6. Use the arrow keys to highlight **NI/DI TX Clock Source**. Press the SPACE bar to select **Local Timing** (no clock source provided by telephone company) or **Loop Timing** (clock source provided by telephone company), then press ENTER.



If you are using a Local clock source, set only one end of the circuit for Local Timing, the other end must be set for Loop Timing.

7. Use the arrow keys to highlight **NI/DI Line Buildout (LBO)**. Press the SPACE bar to select **0 db** unless the service provider recommends another setting, then press ENTER.
8. Use the arrow keys to highlight **NI/DI Loopback**. Press the SPACE bar to select **None**, then press ENTER.

9. Use the arrow keys to highlight **DI Enabled**. Press the SPACE bar to select **On** (Drop and Insert function enabled), or **Off** (Drop and Insert function disabled), or **diDataEnable** (Drop and Insert is enabled and the data that comes to the host goes to the DI port), then press ENTER.
10. 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.
11. Access the WAN Interface Configuration screen by using the arrow keys to highlight the **WAN INT CONFIG** option, then press ENTER.

2.3.2 DELDI-UI Interface Configuration

This screen is accessed through the WAN Physical Configuration screen. Refer to Figure 2-6 and proceed with the following steps to configure the WAN Interface through Local Management.

1. Set the WAN connection Interface Number by typing the same number into the **Interface Number** field that was input into the Timeslots in the WAN Physical Configuration screen, then press ENTER.
2. Unless the user sets the Max Xmit Unit, the DELDI-UI automatically sets the **Max Xmit Unit** to the default after the active protocol (PPP or FR) is selected.
3. Use the arrow keys to highlight **Line Coding**.
 - a. If the DELDI-UI is being configured for Frame Relay or if the NI/DI Line Coding is **B8ZS** on the previous screen, press the SPACE bar to select **NONE**, then press ENTER.
 - b. If the DELDI-UI is being configured for PPP and the NI/DI Line Coding is **AMI** on the previous screen, press the SPACE bar to select **INV-HDLC**, then press ENTER.

4. Use the arrow keys to highlight **Active Protocol**. Press the SPACE bar to select **PPP** (for PPP or LEX) or **FR** (for Frame Relay), then press ENTER.
 - a. If you selected **PPP** in step 4, use the arrow keys to highlight **PPP Type**. Press the SPACE bar to select **BNCP** (for PPP) or **LEX**, then press ENTER.
 - b. If you selected **FR** in step 4, use the arrow keys to highlight **FR LMP**. Press the SPACE bar to select **T1.617-D**, 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.



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.

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

DELDI-UI SPECIFICATIONS

This appendix provides operating specifications for the DELDI-UI and also provides the part number and connector information for the DELDI-UI Interface Cables.

A.1 DELDI-UI SPECIFICATIONS

This section describes the environmental specifications and safety and approval requirements for the DELDI-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)

Storage Temperature: -30° to +73°C (-22° to 164°F)

Relative Humidity: 15% to 95% (non-condensing)

Safety

This unit meets the safety requirements of UL1950, CSA C22.2 No. 950, EN60950, IEC 950, and 73/23/EEC.

EMI

This unit meets the EMI requirements of FCC Part 15 Class A, VCCI Class I, EN 55022 Class A, and 89/336/EEC.

EMC

This unit meets the EMC requirements of EN 50082-1 and 89/336/EEC.

TELECOM

The DELDI-UI meets FCC Part 68 (refer to Appendix C) and CS-03.

A.2 DELDI-UI INTERFACE CABLES

Table A-1 lists Cabletron Systems part numbers for the interface cables for the DELDI-UI. A standard 20-foot cable is available or the customer may specify the length of cable when ordering.

Table A-1 DELDI-UI Interface Cable Part Numbers

Interface Cable	Cabletron Part Number
T1 Line Interface Cable	9372094-20 ^a
T1 Line Interface Cable	9372094-L ^b

- a. Standard 20-foot T1 Line Interface Cable.
- b. (L denotes length required in feet or meters). For example: 9372094-3 denotes a 3-foot cable; 9372094-3M denotes a 3-meter cable.

A.3 CABLE ASSEMBLIES AND PINOUTS

The following section provides connector information for the DELDI-UI interface cable.

Table A-2 DELDI-UI Connector Information

Connector 1 (Network)	RJ48
Connector 2 (Drop and Insert)	RJ48

Table A-3 DELDI-UI Network Interface RJ48 Connector Pin Assignments

Pin	Signal
1	Receive Ring
2	Receive Tip
3	AC Coupled Ground
4	Transmit Ring
5	Transmit Tip
6	AC Coupled Ground
7	AC Coupled Ground
8	AC Coupled Ground

Table A-4 DELDI-UI Drop and Insert Interface RJ48 Connector Pin Assignments

Pin	Signal
1	Transmit Ring
2	Transmit Tip
3	AC Coupled Ground
4	Receive Ring
5	Receive Tip
6	AC Coupled Ground
7	AC Coupled Ground
8	AC Coupled Ground

APPENDIX B

TYPICAL CONFIGURATIONS

B.1 TELCO TIMING

The following configuration is a typical setup. The system clock source is supplied by the Telco between the two sites. The DI Enabled feature on the DELDI-UI is configured as On for both DELDI-UIs, and data from the host device passes through the NI port in both DELDI-UIs.

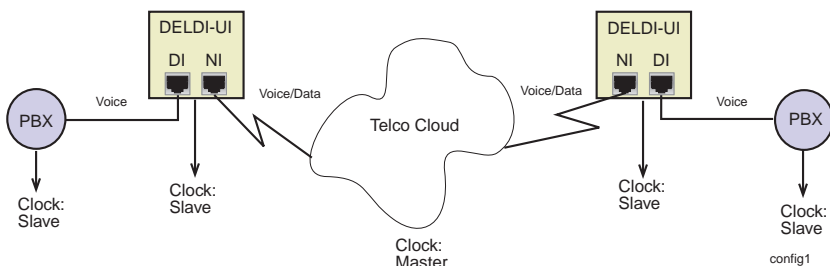


Figure B-1 Telco Timing Configuration

B.2 TAIL CIRCUIT TIMING

The Tail Circuit has the PBX as its timing source in site #1. Data from the host device passes through the DI port in site #1, because the DI Enabled option is set to diDataEnable. Data from the host device passes through the NI port in site #2, because DI Enabled is configured On for the DELDI-UI.

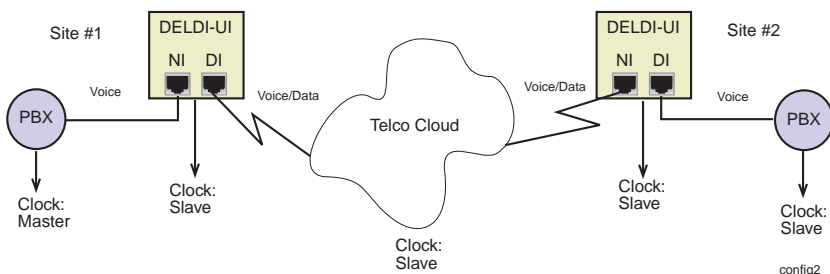


Figure B-2 Tail Circuit Timing Configuration

B.3 INTERNAL TIMING

For the internal timing configuration, the clock source is the DELDI-UI. Data from the host device passes through the NI port in both sites, as the DI Enabled option is set to On.

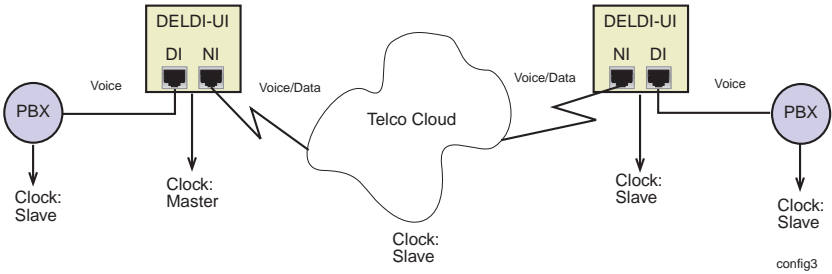


Figure B-3 Internal Timing Configuration

APPENDIX C

FCC PART 68 - USER'S INFORMATION

The following instructions are to ensure compliance with the Federal Communications Commission (FCC) Rules, Part 68.

1. All direct connections to T1 lines must be made using standard plugs and jacks.
2. Before connecting the unit, inform the local telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
DELDI-UI	6.0N	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN 04DU9-1ZN	RJ48C

3. If the unit appears to be malfunctioning, disconnect it from the telephone lines until you learn if the equipment or the telephone line is the source of the trouble. If the equipment needs repair, do not reconnect the equipment until it is repaired.
4. The CSU/DSU has been designed to prevent harm to the T1 network. If the telephone company finds that the equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give advance notice if possible.
5. Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
6. If the telephone company alters their equipment in a manner that will affect use of this device, they must give the user advance warning so as to give the opportunity for uninterrupted service. The user will be advised of the right to file a complaint with the FCC.

7. The attached affidavit must be completed by the installer.
8. In the event of equipment malfunction, all repairs should be performed by DIGITAL or an authorized agent. It is the responsibility of the users requiring service to report the need for service to DIGITAL or to an authorized DIGITAL agent.

Service can be obtained by contacting your DIGITAL representative.

**AFFIDAVIT FOR THE CONNECTION OF
CUSTOMER EQUIPMENT TO 1.544 MBPS AND/OR
SUBRATE DIGITAL SERVICES**

For the work to be performed in the certified territory of

Telco's name: _____

State of: _____

Country of: _____

I, _____, of _____
(Name of Authorized Representative) (Customer Name)

_____, _____
(Customer's Address) (Telephone Number)

being duly sworn, state:

I have 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 Commission's rules except for the encoded analog content and billing protection specifications. 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 encoded billing information continuously complies with Part 68 of the FCC's Rules and Regulations.
- The digital CPE does not transmit digital signals containing encoded analog or billing information which is intended to be decoded within the telecommunications network.
- The encoded analog 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 completing one of the following: Check appropriate one(s).

- 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 _____ above.

I agree to provide _____ with proper documentation
(Telco's Name)

to demonstrate compliance with the information as provided in the proceeding paragraph, if so requested.

_____ (Signature)

_____ (Title)

_____ (Date)

Subscribed and sworn to me this _____ day of _____, 19____.

My commission expires: _____

(Notary Public)

APPENDIX D

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, line coding utilized with ESF (Expanded Super Frame). Insures 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).
BRIM	Bridge Router Interface Module. A special implementation of a HSIM that extends the functions within a module to include bridge routing.
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.
D4	D4 Framing, a popular framing format in T-1. Uses 12 T-1 Frames to identify both the channel and the signaling bit.
DI	Drop and Insert, a function provided on the DIGITAL DELDI-UI which allows the user to map timeslots that are not being used to another WAN device.
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, converts RS-232 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, layer 2 (link layer) full-duplex protocol derived from SDLC.
HSIM	High Speed Interface Module. Provides additional connectivity and functionality to various DIGITAL interface modules and standalone hubs.
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, 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.
NI	Network Interface.
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, modules that provide connectivity/functionality for WAN modules.

digital