digital

DIGITAL WAN Modular Interface Synchronous

DELSY-UI Local Management Guide

DIGITAL
WAN Modular Interface
Synchronous

DELSY-UI
Local Management Guide

Part Number: 9032622

October 1998

This manual explains how to use Local Management to control and manage the DIGITAL WAN Modular Interface Synchronous DELSY-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

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.

DOC 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:

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	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 Synchronous DELSY-UI Local Management Guide*. This manual explains how to use Local Management to control and manage the DELSY-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 DELSY-UI. You should have a general working knowledge of the following data communications networks and their physical layer components before using the DELSY-UI.

- WAN
- Ethernet and IEEE 802.3
- Token Ring and 802.5

In this document, the WAN Modular Interface Synchronous is referred to as either the “DELSY-UI” or “WPIM” (WAN Physical Interface Module).

STRUCTURE OF THIS GUIDE

This guide is organized as follows:

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

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

Appendix A, **WAN Interface Cable Pinouts**, provides Cabletron part numbers, and detailed connector and pinout information for the interface cables used with the DELSY-UI.

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

DOCUMENT CONVENTIONS

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

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

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 DELSY-UI FEATURES

The WAN Modular Interface Synchronous (DELSY-UI) provides a synchronous serial connection to external communications equipment (e.g., a multiplexer or CSU/DSU). The DELSY-UI uses a subminiature 26-pin connector that supports the following electrical signal interfaces:

- EIA-RS232D 1.2 Kbps - 19.2 Kbps
- EIA-RS449 1.2 Kbps - 2.048 Mbps
- EIA-RS530 1.2 Kbps - 2.048 Mbps
- X.21 1.2 Kbps - 2.048 Mbps
- V.35 1.2 Kbps - 2.048 Mbps
- EIA-530A 1.2 Kbps - 2.048 Mbps

Table 1-1 lists the available Cabletron Interface Cable part numbers. Appendix A provides complete part number and cable pinout information.

Table 1-1. Cabletron Interface Cables

Interface Type	Electrical Type	Cable Type	Cabletron Part Number
RS449	RS422	RS449	9380120
V.35	V.35	V.35	9380121
RS232	RS232	RS232	9380122
X.21	X.21	X.21	9380123
RS530	RS422	RS530	9380124
RS530A	RS422	RS530A	9380126

Table 1-1. Cabletron Interface Cables

Interface Type	Electrical Type	Cable Type	Cabletron Part Number
RS530 ALT A	RS422	RS530 ALT A	9380125
RS530A ALT A	RS422	RS530 A ALT A	9380127

WAN Protocols

As of this printing, the module in which the DELSY-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 host or standalone hub for a list of all MIBs supported by the DELSY-UI. For information about how to extract and compile individual MIBs, contact your DIGITAL Representative.

1.2 DELSY-UI SPECIFICATIONS

This section describes the environmental specifications and safety and approval requirements for the DELSY-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 (without D3 deviations), CSA C22.2 No. 950, and EN60950.

EMI

This unit meets the EMI requirements of FCC Part 15 Class A, EN55022 Class A and VCCI Class A.

EMC

This unit meets the EMC requirements of EN50082-1 including: IEC 801-2 (ESD), IEC 801-3 (Radiated Susceptibility), and IEC 801-4 (EFT/B).

NEBS

This unit has been tested by Bellcore and found to comply with the following Bellcore standards:

TR-NWT-000063 Network Equipment Building System (NEBS) Generic Equipment Requirements.

GR-1089-CORE EMC and Electrical Safety Generic Criteria for Network Telecommunications Equipment.

It is the responsibility of the person who sells the system to which the DELSY-UI will be a part to ensure that the total system meets allowed limits of conducted and radiated emissions.

CHAPTER 2

LOCAL MANAGEMENT

This chapter explains how to configure the DELSY-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 DELSY-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:

Read Sections 2.1 and 2.2 to gain an understanding of the DELSY-UI Local Management screens. Sections 2.3 through 2.5 provide examples for setting up the DELSY-UI in a PPP (LEX or BNCP) or Frame Relay environment.

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

SPACEBAR to toggle between selections in a field.

ENTER (RETURN) to implement a selection.

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

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

.

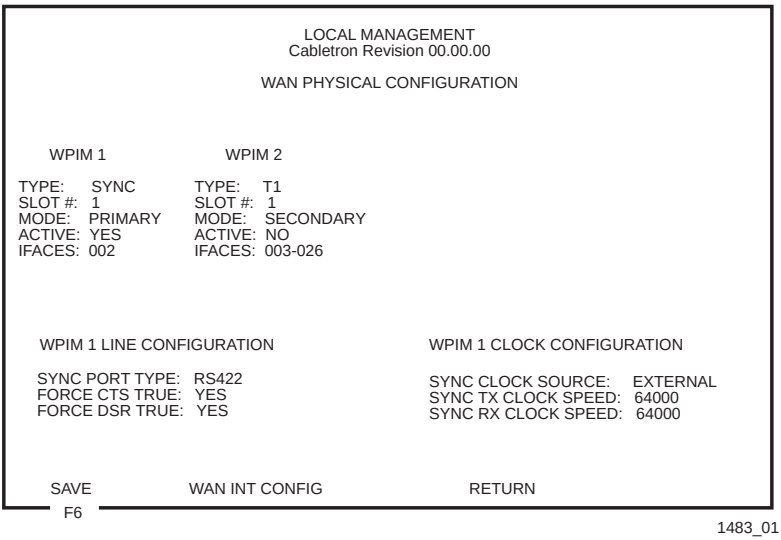

Figure 2-1. WAN Physical Configuration Screen

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. The following Physical Configuration screen examples show the DELSY-UI and the DELT1-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 SPACEBAR 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.

IFACES
Displays the interfaces available to each WPIM.

2.1.2 DELSY-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 DELSY-UI. Each DIGITAL WPIM has a Local Management Guide that provides specific configuration guidelines.

SY Port Type

Displays the Synchronous port electrical interface type. The selections toggle between V.35, RS422, RS232, X.21, and None. This field always displays a Synchronous Port Type, even if the Synchronous Port is not the active WAN port. The default setting for this field is **V.35**. **APPENDIX A** lists Cabletron Interface Cable part numbers and connector pinouts.

Force CTS True

Displays the source of the Clear To Send (CTS) signal. The CTS signal is an input to the DELSY-UI. The DELSY-UI can either use or ignore the CTS signal. You can toggle the selections between Yes and No. The Yes (On) setting indicates that the DELSY-UI ignores the CTS signal from an external DCE (Data Communications Equipment) and forces the signal high. The No (Off) setting indicates that the CTS signal is received from an external DCE. The default setting is **No**.

Force DSR True

Displays the source of the Data Set Ready (DSR) signal. You can toggle the selections between Yes and No. The Yes (On) setting indicates that the DSR is internally "Forced True." The No (Off) setting indicates that the DSR signal is received from an external DCE. The default setting is **No**.

Sync Clock Source

Displays the clock source as External, Internal or Split. The default setting is **External**. The Internal and Split settings are for DIGITAL testing purposes only. Always set this field to External.

Sync Tx Clock Speed

DIGITAL testing purposes only. Displays 64000 (Kbps) upon startup.

Sync Rx Clock Speed
This field displays the manually inputted receive clock speed. The default setting for this field is **64000** (Kbps). The information for this field is normally supplied by the Service Provider.

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 2-2 appears.

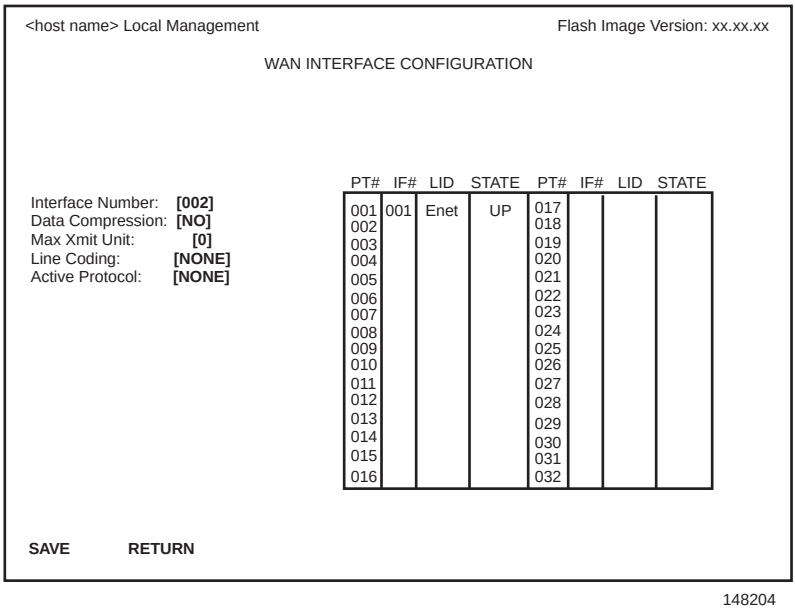

Figure 2-2. WAN Interface Configuration Screen

2.2.1 WAN Interface Configuration Screen Fields

The following sections describe WAN Interface Configuration screen fields.

Interface Number
Displays active Interface Numbers. Use this field to configure the Interface Numbers you 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 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.

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

FR LMP: This field displays NO LMI Q.933-A or T1.617-D. Set this field to **T1.617-D**. The NO LMI setting is for specialized applications in which no Frame Relay Link Management is available or required.

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 addresses.

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 (Data Link Connection Identifiers) assigned to that Interface. This is determined either manually or by the Local Management Interface.

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 PPP CONFIGURATION

This section provides step-by-step instructions for connecting the DELSY-UI to a DDS (Digital Data System) circuit in a PPP environment. This example assumes the setup shown in Figure 2-3 using two hubs with DELSY-UI modules installed in each HSIM.

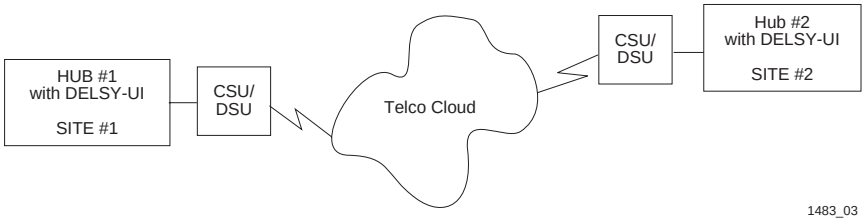

Figure 2-3. DELSY-UI Interface Configuration for PPP

The line configuration information shown in Table 2-1, "Telco Configuration Information," 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
Circuit Speed	64K, V.35, RS-422, RS-232, etc.

2.3.1 DELSY-UI Physical Configuration

Begin the DELSY-UI configuration by accessing the WAN Configuration screen through Local Management (Figure 2-1). Access the WAN Physical Configuration screen from the Feature Selection screen that first appears when you enter Local Management. 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 SPACEBAR to select the WPIM being configured, then press ENTER.

2. Use the arrow keys to highlight **SYNC PORT TYPE**. Press the SPACEBAR to set the Sync Port Type to V.35, RS422, RS232, or X.21, then press ENTER.

3. Use the arrow keys to highlight **FORCE CTS**. Press the SPACEBAR to set to **NO,** then press ENTER.

4. Use the arrow keys to highlight **FORCE DSR**. Press the SPACEBAR to set to **NO,** then press ENTER.

Set **FORCE CTS** and **FORCE DSR** to YES only if the CSU/DSU does not support these flow control terms.

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.

6. Access the WAN Interface Configuration screen by using the arrow keys to highlight the **WAN Int Config** option, then press ENTER.

2.3.2 DELSY-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 DELSY-UI WAN connection.

2. Use the arrow keys to highlight **Line Coding**. Press the SPACEBAR to select **None**, then press ENTER.

3. Use the arrow keys to highlight **Active Protocol**. Press the SPACEBAR to select **PPP**, then press ENTER.

4. Use the arrow keys to highlight **PPP Type**. Press the SPACEBAR to select **BNCP**, then press ENTER.

5. 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.

2.4 LEX CONFIGURATION

This section provides step-by-step instructions for connecting the DELSY-UI to a DDS (Digital Data System) circuit in a LEX environment.

The line configuration information shown in Table 2-1, “Telco

Configuration Information," must be supplied by the service provider.

Table 2-2. Telco Configuration Information

Configuration Information Required By User	Configuration Information Supplied By Service Provider
Clock Source	Telco provided or no clock source
Circuit Speed	64K, V.35, RS-422, RS-232, etc.

2.4.1 DELSY-UI Physical Configuration

Begin the DELSY-UI configuration by accessing the WAN Configuration screen through Local Management (Figure 2-1). Access the WAN Physical Configuration screen from the Feature Selection screen that first appears when you enter Local Management. 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 SPACEBAR to select the WPIM being configured, then press ENTER.

2. Use the arrow keys to highlight **SYNC PORT TYPE**. Press the SPACEBAR to set the Sync Port Type to V.35, RS422, RS232, or X.21, then press ENTER.

3. Use the arrow keys to highlight **FORCE CTS**. Press the SPACEBAR to set to **NO,** then press ENTER.

4. Use the arrow keys to highlight **FORCE DSR**. Press the SPACEBAR to set to **NO,** then press ENTER.

Set **FORCE CTS** and **FORCE DSR** to YES only if the CSU/DSU does not support these flow control terms.

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.

6. Access the WAN Interface Configuration screen by using the arrow keys to highlight the **WAN Int Config** option, then press ENTER.

2.4.2 DELSY-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 DELSY-UI WAN connection.

2. Use the arrow keys to highlight **Line Coding**. Press the SPACEBAR to select **None**, then press ENTER.

3. Use the arrow keys to highlight **Active Protocol**. Press the SPACEBAR to select **PPP**, then press ENTER.

4. Use the arrow keys to highlight **PPP Type**. Press the SPACEBAR to select **LEX**, then press ENTER.

5. 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.

2.5 FRAME RELAY CONFIGURATION

This section provides instructions for connecting the DELSY-UI to a DDS (Digital Data System) circuit in a Frame Relay environment. This example assumes the setup shown in Figure 2-4 using two hubs with DELSY-UI modules installed in each HSIM.

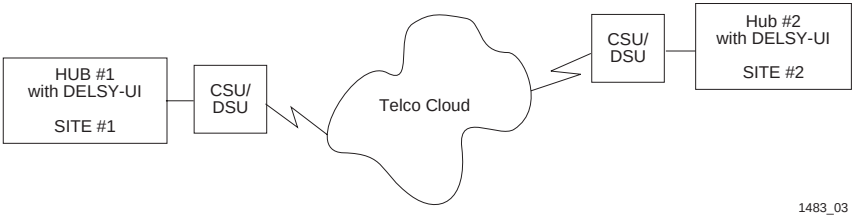

Figure 2-4. DELSY-UI Interface Configuration for Frame Relay

The line configuration information shown in Table 2-1, “Telco Configuration Information,” must be supplied by the service provider.

Table 2-3. Telco Configuration Information

Configuration Information Required By User	Configuration Information Supplied By Service Provider
Clock Source	Telco provided or no clock source
Circuit Speed	64K, V.35, RS-422, RS-232, etc.

2.5.1 DELSY-UI Physical Configuration

Begin the DELSY-UI configuration by accessing the WAN Configuration screen through Local Management (Figure 2-1). Access the WAN Physical Configuration screen from the Feature Selection screen that first appears when you enter Local Management. 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 SPACEBAR to select the WPIM being configured, then press ENTER.

2. Use the arrow keys to highlight **SYNC PORT TYPE**. Press the SPACEBAR to set the Sync Port Type to V.35, RS422, RS232, or X.21, then press ENTER.

3. Use the arrow keys to highlight **FORCE CTS**. Press the SPACEBAR to set to **NO,** then press ENTER.

4. Use the arrow keys to highlight **FORCE DSR**. Press the SPACEBAR to set to **NO,** then press ENTER.

Set **FORCE CTS** and **FORCE DSR** to YES only if the CSU/DSU does not support these flow control terms.

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.

6. Access the WAN Interface Configuration screen by using the arrow keys to highlight the **WAN Int Config** option, then press ENTER.

2.5.2 DELSY-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 DELSY-UI WAN connection.

2. Use the arrow keys to highlight **Line Coding**. Press the SPACEBAR to select **None**, then press ENTER.

3. Use the arrow keys to highlight **Active Protocol**. Press the SPACEBAR to select **FR**, then press ENTER.

4. Use the arrow keys to highlight **FR LMP**. Press the SPACEBAR to select **T1.617-D**, then press ENTER.

5. 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. Communications between the DELSY-UI and the service provider’s switch takes approximately 1 to 2 minutes to begin. A status of **Inactive** appears until both ends of the PVC (Permanent Virtual Circuit) are configured. Once both end devices have negotiated link management with the switches, the status field reads **Active**.

APPENDIX A

WAN INTERFACE CABLE PINOUTS

This appendix provides Cabletron Systems part numbers and connector pinouts for the following interface cables:

- EIA-530A ALT A to EIA-449 Section **A.1.1**.
- EIA-530A ALT A to CCITT V.35 Section **A.1.2**.
- EIA-530A ALT A to EIA-232 Section **A.1.3**.
- EIA-530A ALT A to CCITT X21 Section **A.1.4**.
- EIA-530A ALT A to EIA-530 Section **A.1.5**.
- EIA-530A ALT A to EIA-530 ALT A Section **A.1.6**.
- EIA-530A ALT A to EIA-530A Section **A.1.7**.
- EIA-530A ALT A to EIA-530A ALT A Section **A.1.8**.

A.1 SERIAL CABLES ASSEMBLIES AND PINOUTS

This section provides connector information and pinouts for EIA-449, V35, EIA-232, X.21, EIA-530, EIA-530 ALT A, EIA-530A, and EIA-530A ALT A.

Table A-1 lists part numbers for the interface cables for the DELSY-UI.

Table A-1. Cabletron Interface Cables

Interface Type	Electrical Type	Cable Type	Cabletron Part Number
RS449	RS422	RS449	9380120
V.35	V.35	V.35	9380121
RS232	RS232	RS232	9380122
X.21	X.21	X.21	9380123
RS530	RS422	RS530	9380124
RS530 ALT A	RS422	RS530 ALT A	9380125
RS530A	RS422	RS530A	9380126
RS530A ALT A	RS422	RS530 A ALT A	9380127

A.1.1 EIA-449

Table A-2 provides connector descriptions and Table A-3 provides pinouts for the EIA-449 interface cable.

Table A-2. EIA-449 Interface

Cabletron interface cable part number	9380120
Description	EIA-530A ALT A to EIA-449
Connector 1	Sub DB 26 pin male connector
Connector 2	DB 37 pin male connector

Table A-3. Cable Pinout for EIA-449

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 EIA-449			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	4	Send Data A	DCE	SD
BA	DCE	Transmit Data B	14		22	Send Data B	DCE	SD
BB	DTE	Receive Data A	3	B	6	Receive Data A	DTE	RD
BB	DTE	Receive Data B	16		24	Receive Data B	DTE	RD
CB	DTE	Clear to Send A	5	C	9	Clear to Send A	DTE	CS
CB	DTE	Clear to Send B	13		27	Clear to Send B	DTE	CS
CA	DCE	Request to Send A	4	D	7	Request to Send A	DCE	RS
CA	DCE	Request to Send B	19		25	Request to Send B	DCE	RS
DB	DTE	Transmit Signal Timing A	15	E	5	Send Timing A	DTE	ST
DB	DTE	Transmit Signal Timing B	12		23	Send Timing B	DTE	ST
DD	DTE	Receive Signal Timing A	17	F	8	Receive Timing A	DTE	RT
DD	DTE	Receive Signal Timing B	9		26	Receive Timing B	DTE	RT
DA	DCE	Transmit Signal Timing A	24	G	17	Terminal Timing A	DCE	TT
DA	DCE	Transmit Signal Timing B	11		35	Terminal Timing B	DCE	TT
CE	DTE	Ring Indicator	22		15	Incoming Call	DTE	IC
TM	DTE	Test Mode	25		18	Test Mode	DTE	TM
CC	DTE	DCE Ready	6		11	Data Mode	DTE	DM
CD	DCE	DTE Ready	20		12	Terminal Ready	DCE	TR
-		SHIELD	1					
AC		Signal Common	23		20	Receive Common		RC
AB		Signal Common	7		19, 30, 37	Send Common, Terminal Ready B, Signal Ground		SG, TR_B, SC

A.1.2 V.35

Table A-4 provides connector descriptions and Table A-5 provides pinouts for the V.35 interface cable.

Table A-4. V.35 Interface

Cabletron interface cable part number	9380121
Description	EIA-530A ALT A to V.35
Connector 1	Sub DB 26 pin male connector
Connector 2	M Series 34 pin male connector

Table A-5. Cable Pinout for V.35

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 CCITT V.35			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	P	Transmit Data A	DCE	103
BA	DCE	Transmit Data B	14		S	Transmit Data B	DCE	103
BB	DTE	Receive Data A	3	B	R	Receive Data A	DTE	104
BB	DTE	Receive Data B	16		T	Receive Data B	DTE	104
CB	DTE	Clear to Send A	5	C	D	Ready for Sending A	DTE	106
CA	DCE	Request to Send A	4	D	C	Request to Send A	DCE	105
DB	DTE	Transmit Signal Timing A	15	E	Y	Transmitter Signal Timing A	DTE	114
DB	DTE	Transmit Signal Timing B	12		AA	Transmitter Signal Timing B	DTE	114
DD	DTE	Receive Signal Timing A	17	F	V	Receiver Signal Timing A	DTE	115
DD	DTE	Receive Signal Timing B	9		X	Receiver Signal Timing B	DTE	115
DA	DCE	Transmit Signal Timing A	24	G	U	Transmitter Signal Timing A	DCE	113
DA	DCE	Transmit Signal Timing B	11		W	Transmitter Signal Timing B	DCE	113
CE	DTE	Ring Indicator	22		J	Calling Indicator	DTE	125
RL	DCE	Remote Loopback	21		N	Loopback/Maintenance	DCE	140
LL	DCE	Local Loopback	18		L	Local Loopback	DCE	141
TM	DTE	Test Mode	25		NN	Test Indicator	DTE	142
CC	DTE	DCE Ready	6		E	Data Set Ready	DTE	107
CD	DCE	DTE Ready	20		H	Data Terminal Ready	DCE	108
		SHIELD	1	DRAIN				
AC		Signal Common	23		B	Signal Common		102
AB		Signal Common	7		B	Signal Common		102

A.1.3 EIA-232

Table A-6 provides connector descriptions and Table A-7 provides pinouts for the EIA-232 interface cable.

Table A-6. EIA-232 Interface

Cabletron interface cable part number	9380122
Description	EIA-530A ALT A to EIA-232
Connector 1	Sub DB 26 pin male connector
Connector 2	DB 25 pin male connector

Table A-7. Cable Pinout for EIA-232

CONNECTOR 1 EIA-530A ALT A					CONNECTOR 2 EIA-232			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data	2		2	Transmit Data	DCE	BA
BB	DTE	Receive Data	3		3	Receive Data	DTE	BB
CB	DTE	Clear to Send	5		5	Clear to Send	DTE	CB
CA	DCE	Request to Send	4		4	Request to Send	DCE	CA
DB	DTE	Transmit Signal Timing	15		15	Transmitter Signal Timing	DTE	DB
DD	DTE	Receive Signal Timing	17		17	Receiver Signal Timing	DTE	DD
DA	DCE	Transmit Signal Timing	24		24	Transmitter Signal Timing	DCE	DA
CE	DTE	Ring Indicator	22		22	Ring Indicator	DTE	CE
RL	DCE	Remote Loopback	21		21	Loopback/Maintenance	DCE	RL
LL	DCE	Local Loopback	18		18	Local Loopback	DCE	LL
TM	DTE	Test Mode	25		25	Test Indicator	DTE	TM
CC	DTE	DCE Ready	6		6	DCE Ready	DTE	CC
CD	DCE	DTE Ready	20		20	DTE Ready	DCE	CD
-		SHIELD	1		DRAIN			
AC		Signal Common	23		7	Signal Common		AB
AB		Signal Common	7		7	Signal Common		AB

A.1.4 X.21

Table A-8 provides connector descriptions and Table A-9 provides pinouts for the X.21 interface cable.

Table A-8. X.21 Interface

Cabletron interface cable part number	9380123
Description	EIA-530A ALT A to X.21
Connector 1	Sub DB 26 pin male connector
Connector 2	DB 15 pin male connector

Table A-9. Cable Pinout for X.21

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 CCITT X.21			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	2	Transmit A	DCE	T
BA	DCE	Transmit Data B	14		9	Transmit B	DCE	T
BB	DTE	Receive Data A	3	B	4	Receive A	DTE	R
BB	DTE	Receive Data B	16		11	Receive B	DTE	R
CB	DTE	Clear to Send A	5	C	5	Indication A	DTE	I
CB	DTE	Clear to Send B	13		12	Indication B	DTE	I
CA	DCE	Request to Send A	4	D	3	Control A	DCE	C
CA	DCE	Request to Send B	19		10	Control B	DCE	C
DB	DTE	Transmit Signal Timing A Receive Signal Timing A	17, 15	E	6	Signal Element Timing A	DTE	S
DB	DTE	Transmit Signal Timing B Receive Signal Timing B	9, 12		13	Signal Element Timing B	DTE	S
-		SHIELD	1	DRAIN				
AC		DTE Common	7		8	Signal Ground		G
AB		DCE Common	23		8	Signal Ground		G

A.1.5 EIA-530

Table A-10 provides connector descriptions and Table A-11 provides pinouts for the EIA-530 interface cable.

Table A-10. EIA-530 Interface

Cabletron interface cable part number	9380124
Description	EIA-530A ALT A to EIA-530
Connector 1	Sub DB 26 pin male connector
Connector 2	DB 25 pin male connector

Table A-11. Cable Pinout for EIA-530

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 EIA-530			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	2	Transmit Data A	DCE	BA
BA	DCE	Transmit Data B	14		14	Transmit Data B	DCE	BA
BB	DTE	Receive Data A	3	B	3	Receive Data A	DTE	BB
BB	DTE	Receive Data B	16		16	Receive Data B	DTE	BB
CB	DTE	Clear to Send A	5	C	5	Clear to Send A	DTE	CB
CB	DTE	Clear to Send B	13		13	Clear to Send B	DTE	CB
CA	DCE	Request to Send A	4	D	4	Request to Send A	DCE	CA
CA	DCE	Request to Send B	19		19	Request to Send B	DCE	CA
DB	DTE	Transmit Signal Timing A	15	E	15	Transmit Signal Timing A	DTE	DB
DB	DTE	Transmit Signal Timing B	12		12	Transmit Signal Timing B	DTE	DB
DD	DTE	Receive Signal Timing A	17	F	17	Receive Signal Timing A	DTE	DD
DD	DTE	Receive Signal Timing B	9		9	Receive Signal Timing B	DTE	DD
DA	DCE	Transmit Signal Timing A	24	G	24	Transmit Signal Timing A	DCE	DA
DA	DCE	Transmit Signal Timing B	11		11	Transmit Signal Timing B	DCE	DA
RL	DCE	Remote Loopback	21		21	Remote Loopback	DCE	RL
LL	DCE	Local Loopback	18		18	Local Loopback	DCE	LL
TM	DTE	Test Mode	25		25	Test Mode	DTE	TM
CC	DTE	DCE Ready	6		6	DCE Ready	DTE	CC
CD	DCE	DTE Ready	20		20	DTE Ready	DCE	CD
-		SHIELD	1	DRAIN				
AC		Signal Common	23		7	Signal Common		AC
AB		Signal Common	7		7	Signal Common		AB

A.1.6 EIA-530 ALT A

Table A-12 provides connector descriptions and Table A-13 provides pinouts for the EIA-530 ALT A interface cable.

Table A-12. EIA-530 ALT A Interface

Cabletron interface cable part number	9380125
Description	EIA-530A ALT A to EIA-530 ALT A
Connector 1	Sub DB 26 pin male connector
Connector 2	Sub DB 26 pin male connector

Table A-13. Cable Pinout for EIA-530 ALT A

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 EIA-530 ALT A			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	2	Transmit Data A	DCE	BA
BA	DCE	Transmit Data B	14		14	Transmit Data B	DCE	BA
BB	DTE	Receive Data A	3	B	3	Receive Data A	DTE	BB
BB	DTE	Receive Data B	16		16	Receive Data B	DTE	BB
CB	DTE	Clear to Send A	5	C	5	Clear to Send A	DTE	CB
CB	DTE	Clear to Send B	13		13	Clear to Send B	DTE	CB
CA	DCE	Request to Send A	4	D	4	Request to Send A	DCE	CA
CA	DCE	Request to Send B	19		19	Request to Send B	DCE	CA
DB	DTE	Transmit Signal Timing A	15	E	15	Transmit Signal Timing A	DTE	DB
DB	DTE	Transmit Signal Timing B	12		12	Transmit Signal Timing B	DTE	DB
DD	DTE	Receive Signal Timing A	17	F	17	Receive Signal Timing A	DTE	DD
DD	DTE	Receive Signal Timing B	9		9	Receive Signal Timing B	DTE	DD
DA	DCE	Transmit Signal Timing A	24	G	24	Transmit Signal Timing A	DCE	DA
DA	DCE	Transmit Signal Timing B	11		11	Transmit Signal Timing B	DCE	DA
RL	DCE	Remote Loopback	21		21	Remote Loopback	DCE	RL
LL	DCE	Local Loopback	18		18	Local Loopback	DCE	LL
TM	DTE	Test Mode	25		25	Test Mode	DTE	TM
CC	DTE	DCE Ready	6		6	DCE Ready	DTE	CC
CD	DCE	DTE Ready	20		20	DTE Ready	DCE	CD
-		SHIELD	1	DRAIN				
AC		Signal Common	23		7	Signal Common		AC
AB		Signal Common	7		7	Signal Common		AB

A.1.7 EIA-530A

Table A-14 provides connector descriptions and Table A-15 provides pinouts for the EIA-530A interface cable.

Table A-14. EIA-530A Interface

Cabletron interface cable part number	9380126
Description	EIA-530A ALT A to EIA-530A
Connector 1	Sub DB 26 pin male connector
Connector 2	DB 25 pin male connector

Table A-15. Cable Pinout for EIA-530A

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 EIA-530A			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	2	Transmit Data A	DCE	BA
BA	DCE	Transmit Data B	14		14	Transmit Data B	DCE	BA
BB	DTE	Receive Data A	3	B	3	Receive Data A	DTE	BB
BB	DTE	Receive Data B	16		16	Receive Data B	DTE	BB
CB	DTE	Clear to Send A	5	C	5	Clear to Send A	DTE	CB
CB	DTE	Clear to Send B	13		13	Clear to Send B	DTE	CB
CA	DCE	Request to Send A	4	D	4	Request to Send A	DCE	CA
CA	DCE	Request to Send B	19		19	Request to Send B	DCE	CA
DB	DTE	Transmit Signal Timing A	15	E	15	Transmit Signal Timing A	DTE	DB
DB	DTE	Transmit Signal Timing B	12		12	Transmit Signal Timing B	DTE	DB
DD	DTE	Receive Signal Timing A	17	F	17	Receive Signal Timing A	DTE	DD
DD	DTE	Receive Signal Timing B	9		9	Receive Signal Timing B	DTE	DD
DA	DCE	Transmit Signal Timing A	24	G	24	Transmit Signal Timing A	DCE	DA
DA	DCE	Transmit Signal Timing B	11		11	Transmit Signal Timing B	DCE	DA
CE	DTE	Ring Indicator	22		22	Ring Indicator	DTE	CE
RL	DCE	Remote Loopback	21		21	Remote Loopback	DCE	RL
LL	DCE	Local Loopback	18		18	Local Loopback	DCE	LL
TM	DTE	Test Mode	25		25	Test Mode	DTE	TM
CC	DTE	DCE Ready	6		6	DCE Ready	DTE	CC
CD	DCE	DTE Ready	20		20	DTE Ready	DCE	CD
-		SHIELD	1	DRAIN				
AC		Signal Common	23		23	Signal Common		AC
AB		Signal Common	7		7	Signal Common		AB

A.1.8 EIA-530A ALT A

Table A-16 provides connector descriptions and Table A-17 provides pinouts for the EIA-530A ALT A interface cable.

Table A-16. EIA-530A ALT A Interface

Cabletron interface cable part number	9380127
Description	EIA-530A ALT A to EIA-530A ALT A
Connector 1	Sub DB 26 pin male connector
Connector 2	Sub DB 26 pin male connector

Table A-17. Cable Pinout for EIA-530A ALT A

CONNECTOR 1 EIA-530A ALT A				PAIR	CONNECTOR 2 EIA-530A ALT A			
MNEMONIC	Dir to	NAME	Pin #		Pin #	NAME	Dir to	MNEMONIC
BA	DCE	Transmit Data A	2	A	2	Transmit Data A	DCE	BA
BA	DCE	Transmit Data B	14		14	Transmit Data B	DCE	BA
BB	DTE	Receive Data A	3	B	3	Receive Data A	DTE	BB
BB	DTE	Receive Data B	16		16	Receive Data B	DTE	BB
CB	DTE	Clear to Send A	5	C	5	Clear to Send A	DTE	CB
CB	DTE	Clear to Send B	13		13	Clear to Send B	DTE	CB
CA	DCE	Request to Send A	4	D	4	Request to Send A	DCE	CA
CA	DCE	Request to Send B	19		19	Request to Send B	DCE	CA
DB	DTE	Transmit Signal Timing A	15	E	15	Transmit Signal Timing A	DTE	DB
DB	DTE	Transmit Signal Timing B	12		12	Transmit Signal Timing B	DTE	DB
DD	DTE	Receive Signal Timing A	17	F	17	Receive Signal Timing A	DTE	DD
DD	DTE	Receive Signal Timing B	9		9	Receive Signal Timing B	DTE	DD
DA	DCE	Transmit Signal Timing A	24	G	24	Transmit Signal Timing A	DCE	DA
DA	DCE	Transmit Signal Timing B	11		11	Transmit Signal Timing B	DCE	DA
CE	DTE	Ring Indicator	22		22	Ring Indicator	DTE	CE
RL	DCE	Remote Loopback	21		21	Remote Loopback	DCE	RL
LL	DCE	Local Loopback	18		18	Local Loopback	DCE	LL
TM	DTE	Test Mode	25		25	Test Mode	DTE	TM
CC	DTE	DCE Ready	6		6	DCE Ready	DTE	CC
CD	DCE	DTE Ready	20		20	DTE Ready	DCE	CD
-		SHIELD	1	DRAIN				
AC		Signal Common	23		23	Signal Common		AC
AB		Signal Common	7		7	Signal Common		AB

APPENDIX B

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).
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.
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.
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.

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 1970's.
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.

9032622 Printed in U.S.A.