

WPIM-RT1

User's Guide





Only qualified personnel should perform installation procedures.

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Application of Council Directive(s): **89/336/EEC
73/23/EEC**

Manufacturer's Name: **Cabletron Systems, Inc.**

Manufacturer's Address: **35 Industrial Way
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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

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Title

Rochester, NH, USA

Location

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INTRODUCTION

Welcome to the Cabletron Systems WPIM-RT1 User's Guide. This manual provides hardware information, and explains the use of Local Management to control and manage the Cabletron Systems WPIM-RT1.

The WPIM-RT1 is installed in and provides full or fractional T1 to the Cabletron Systems CSX400, HSIM-W6, and the HSIM-SSA710. Refer to [Chapter 1](#) for more detailed information on the WPIM-RT1 capabilities.



The hub or module in which the WPIM-RT1 is to be installed may be referred to as the host platform in this document.

USING THIS MANUAL

Read through this manual completely to familiarize yourself with its content and to gain an understanding of the features and capabilities of the WPIM-RT1. You should have a general working knowledge of the following data communications networks and their physical layer components before using the WPIM-RT1:

- WAN
- Ethernet and IEEE 802.3

STRUCTURE OF THIS GUIDE

The following list briefly explains each chapter of this manual:

[Chapter 1, Overview](#), describes WPIM-RT1 features and protocols, and steps to successful operation of the WPIM-RT1.

[Chapter 2, Setup and Installation](#), directs the user to appropriate documentation in order to prepare the WPIM-RT1 for installation, and describes the cable setup.

[Chapter 3, Local Management](#), describes how to use Local Management to set up T1 service with the WPIM-RT1.

[Appendix A, Specifications](#), provides information on physical properties, environmental requirements, regulatory compliance, and pinouts.

Appendix B, **FCC Part 68 - User's Information**, explains the FCC Rules for the WPIM-RT1.

RELATED MANUALS

Refer to the manual included with the host platform in which the WPIM-RT1 is installed to supplement the procedures and other technical data provided in this manual. This manual references procedures in these manuals, where appropriate, but does not repeat them.

The following manuals may help the user to set up and manage the WPIM-RT1:

Cabletron Systems *WPIM Setup Guide*

Cabletron Systems *HSIM-W6 Installation Guide*

Cabletron Systems *QuickSET Configuration Guide*

Cabletron Systems *HSIM-SSA710 User's Guide*

Cabletron Systems *HSIM-SSA710 Quick START*

Cabletron Systems *Cyberswitch CSX400 and CSX400-DC Installation Guide*

Cabletron Systems *Local Management for CSX400, CSX400-DC, CSX500, HSIM-W6 and HSIM-W84*

The manuals referenced above can be obtained on the World Wide Web in Adobe Acrobat Portable Document Format (PDF) at the following site:

<http://www.cabletron.com/>



Manuals for the WAN host platforms can also be found on the QuickSet CD-ROM that is included with the host platform.

DOCUMENT CONVENTIONS

The following conventions are used throughout this document:



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



Tip symbol. Conveys helpful hints concerning procedures or actions.



Caution symbol. Contains information essential to avoid damage to the equipment.



Electrical Hazard Warning symbol. Warns against an action that could result in personal injury or death due to an electrical hazard.

bold type	Bold type can denote either a user input or a highlighted screen selection.
RETURN	Indicates either the ENTER or RETURN key, depending on your keyboard.
ESC	Indicates the keyboard Escape key.
SPACE bar	Indicates the keyboard space bar key.
BACKSPACE	Indicates the keyboard backspace key.
arrow keys	Refers to the four keyboard arrow keys.
[-]	Indicates the keyboard – key.
DEL	Indicates the keyboard delete key.
<i>italic type</i>	Emphasizes important information, indicates variables, and indicates complete document titles.
n.nn	A period in numerals signals the decimal point indicator. (e.g., 1.75 equals one and three fourths, or the Decimal Dotted Notation (DDN) for an IP address.

Introduction

- x Indicates the generic use of a letter (e.g., xxx indicates any combination of three alphabetic characters).
- n Indicates the generic use of a number (e.g., $19nn$ indicates a four-digit number in which the last two digits are unknown).
- [] In the Local Management screens, the brackets indicate that a value may be entered or selected. In the format descriptions in the Network Tools section, required arguments are enclosed in [].
- $\langle \rangle$ In the format descriptions in the Network Tools section, optional arguments are enclosed in $\langle \rangle$.

GETTING HELP

For additional support related to this device or document, contact Cabletron Systems using one of the following methods:

World Wide Web	http://www.cabletron.com/
Phone	(603) 332-9400
Internet mail	support@cabletron.com
FTP	ftp://ftp.cabletron.com/
Login	<i>anonymous</i>
Password	<i>your email address</i>
To send comments or suggestions concerning this document, contact the Cabletron Systems Technical Writing Department via the following email address: TechWriting@cabletron.com <i>Make sure to include the document Part Number in the email message.</i>	

Before calling Cabletron Systems, have the following information ready:

- Your Cabletron Systems service contract number
- 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.)
- The serial and revision numbers of all involved Cabletron Systems products in the network
- 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.)
- Any previous Return Material Authorization (RMA) numbers

CHAPTER 1

OVERVIEW

This chapter describes steps for operation of the WPIM-RT1. It also briefly explains WPIM-RT1 features, ISDN, and indicates where to find the WAN protocols supported by the WPIM-RT1.

Some of the steps for successful operation of this device are:

- Install the WPIM-RT1 in a Wide Area Network host platform. Refer to [Chapter 2](#) for direction on installation procedures. Refer to the appropriate host platform manual (i.e., the Cabletron Systems *CyberSwitch CSX400 and CSX400-DC Installation Guide*) for other installation and troubleshooting procedures.
- Set up and access Local Management. Refer to the appropriate host platform User's Guide for instructions on setting up and accessing Local Management. Refer to [Chapter 3](#) for Local Management information for the HSIM-W6 and the CSX400. Refer to the Cabletron Systems *HSIM-SSA710 User's Guide* for information on setting up the WPIM-RT1 using management with the HSIM-SSA710.
- Configure the device. Due to the automation of setup features, it is strongly recommended to use the Graphical User Interface QuickSET.



The device in which the WPIM-RT1 is to be installed may be referred to as the host platform in this documentation.

QuickSET is the desired method for configuring the WPIM-RT1. Check the Release Notes for the availability of QuickSET for configuration.

Refer to [Chapter 3](#) to use Local Management to configure the WPIM-RT1 for the CSX400 and the HSIM-W6, if QuickSET is not available. Refer to the Cabletron Systems *HSIM-SSA710 User's Guide* to configure the WPIM-RT1 if the HSIM-SSA710 is the host platform.

1.1 WPIM-RT1 FEATURES

The WPIM-RT1 extends the functionality of the Wide Area Network host platform to provide a full or fractional T1 interface for the CSX400, HSIM-W6, or the HSIM-SSA710. The WPIM-RT1 provides a T1 interface that includes a built-in Channel Service Unit/Digital Service Unit (CSU/DSU) for direct connection to a T1 line.

1.2 WAN PROTOCOLS

The WAN protocols that are supported are determined by the host platform in which the WPIM-RT1 is installed. Refer to the host platform manual to find the protocols supported.

1.3 ISDN

ISDN provides inexpensive switched digital access to remote sites. The ISDN BRI standard provides for two high speed 64 Kbps bearer (B) channels used for voice or data connections and one 16 Kbps signaling data (D) channel used for call setup, signaling and other information. ISDN allows all types of information to be transmitted including voice, data, fax and video. Multiple devices can be linked to a single ISDN connection, each having their own telephone number. Two or more channels can be combined into a single larger transmission pipe offering variable transmission speeds.

1.4 MIB SUPPORT

Refer to the Release Notes included with the host platform for a list of all MIBs supported by the WPIM-RT1. For information about how to extract and compile individual MIBs, contact Cabletron Systems (see [Getting Help](#)).

CHAPTER 2

SETUP AND INSTALLATION



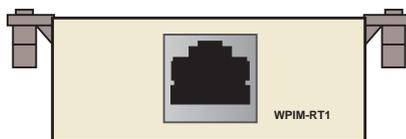
Only qualified personnel should install the WPIM-RT1. This User's Guide is intended for the experienced network equipment installer.

The following information in this chapter details the set up and installation of the WPIM-RT1 into a host platform.



QuickSET or Local Management must be used to set up the WPIM-RT1 in management before any connections are made to the WAN. Follow the directions in this chapter carefully in order to connect the WAN cable at the proper time.

2.1 INSTALLING THE WPIM-RT1



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Figure 2-1 WPIM-RT1

For additional support related to the WPIM-RT1, refer to the host platform manual into which the WPIM-RT1 is being installed. Locate the guide by clicking on the Cabletron Systems QuickSET program group icon after installing the QuickSET CD on your computer, or see [Related Manuals](#) in the [Introduction](#).



Some WPIMs require version 1.02 or greater of QuickSET to participate and function correctly in your network. Contact Cabletron Systems to obtain the latest version of QuickSET.

The information in this note does not apply if the WPIM-RT1 is being installed into the HSI-M-SSA710. Please refer to the documentation for the HSI-M-SSA710 if the WPIM-RT1 is being installed in an HSI-M-SSA710.

2.1.1 Unpacking the WPIM-RT1



Both the WPIM and the host platform in which the WPIM is installed are static sensitive devices. Use an antistatic strap and follow all static safe precautions during installation. Failure to do so could result in damage to the WPIM and the host platform receiving it.

1. Carefully remove the WPIM-RT1 from the shipping box.
2. Visually inspect the WPIM-RT1. If there are any signs of damage, contact Cabletron Systems immediately. Refer to [Getting Help](#).

2.1.2 Pre-Installation

To prepare the host platform for the WPIM-RT1, proceed as follows:

1. Turn off and disconnect the host platform from the power source.
2. Mark all network cables attached to the host platform for ease of re-installation.
3. Disconnect all network cables attached to the host platform.
4. Refer to detailed instructions contained in the host platform's user guides to remove the chassis cover, if applicable. Power must be unplugged from the chassis before removing the cover.

2.1.3 Installing the WPIM-RT1

To install the WPIM-RT1 into the device, refer to [Figure 2-2](#) and complete the following steps:



When removing an existing WPIM, pull the module straight up to avoid damaging the connector.

1. Remove the blank faceplate from the appropriate WAN slot by removing the three WPIM screws that secure it to the standoffs.
2. Orient the WPIM-RT1 as shown in [Figure 2-2](#).
3. Carefully insert the WPIM-RT1 connector into the WPIM connector pins on the device.

4. Press down firmly on the WPIM-RT1 until the pins slide all the way into the connector. Ensure that the WPIM-RT1 seats flush on the standoffs.
5. Secure the WPIM-RT1 to the three standoffs with the WPIM screws.

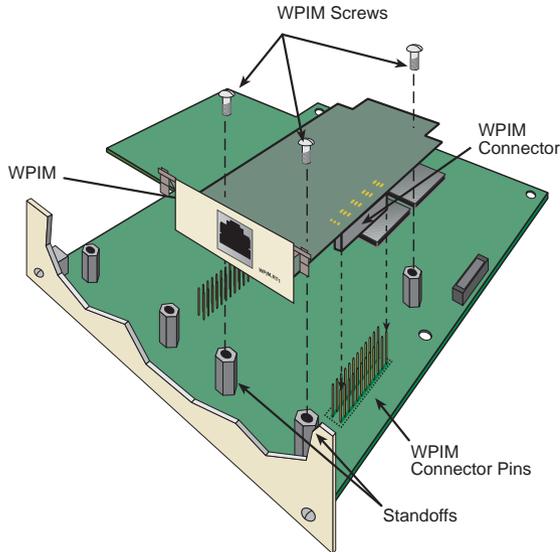


Figure 2-2 Installing the WPIM-RT1

2.1.4 Post-Installation

1. Reinstall the cover if applicable.
2. Refer to the host platform user's guide to reinstall the network cables and refer to [Appendix A](#) for cabling information for the WPIM-RT1. Do **not** connect the WAN cable at this point.
3. Refer to instructions contained in the host platform user's guide to reapply power.
4. After reapplying power, check the LEDs for the following conditions:
 - Verify that the **PWR** LED is on, indicating that the device is receiving power.
 - After the host platform runs a self test, the **CPU** LED blinks green indicating normal operation.
 - If the **CPU** LED remains red, contact Cabletron Systems.

2.2 HOST PLATFORM LEDs

The host platform displays LED indications of the WPIM-RT1's operation. For more information on LED indications, refer to the host platform manual.

2.3 REQUIRED MANAGEMENT OPERATIONS

Before the WAN cable can be connected to the WPIM-RT1, you must use QuickSET software or Local Management to configure the WPIM-RT1. Refer to the QuickSET manual or [Chapter 3](#) for specific instructions on how to access the Wide Area configuration for the WPIM-RT1 for the CSX400 and HSI-M-W6 host platforms, and the *HSIM-SSA710 User's Guide* for the HSI-M-SSA710 as the host platform.

The WAN configuration **must** be completed before proceeding to the next step.

2.4 CONNECTING THE WAN CABLE TO THE WPIM-RT1

Before connecting any cabling to the WPIM-RT1, refer to the host platform manual for WAN setup instructions. Only **after** completing the WAN setup from the host platform manual, for Local Management or from QuickSET, can this section ([Section 2.4](#)) of the manual be completed.



DO NOT plug the WAN cable into the external WAN connection until you have properly completed the WAN setup in software. If this cable is plugged in prematurely, before the host unit is configured, the telephone company can disable the WAN line for a period of time. The cable will be plugged in as a final step once you run the QuickSET configuration, or the Local Management configuration.

The RJ45 cable from the WPIM-RT1 must be plugged into the WAN connection wall jack (see [Figure 2-3](#), below). The cable is not supplied with the WPIM-RT1, but may be ordered separately from Cabletron Systems, cable part number 9372094. Refer to [Appendix A](#) for details.

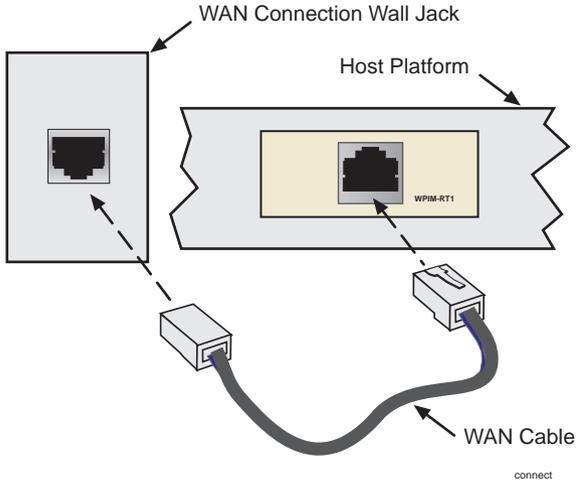


Figure 2-3 WAN Connection to the WPIM-RT1

CHAPTER 3

LOCAL MANAGEMENT

This chapter explains how to configure the WPIM-RT1 through Local Management for T1 service on the CSX400 or the HSIM-W6. Refer to the Cabletron Systems *HSIM-SSA710 User's Guide* for information on Local Management for the HSIM-SSA710.

The **WAN Physical Configuration screen** and the **WAN Interface Configuration screen** appear as Local Management menu selections when you install the WPIM-RT1 into a host module. Refer to the host platform User's Guide for instructions about how to set up and access Local Management.

Sections of this chapter include:

- The WAN Physical Configuration screen, [Section 3.1](#)
- The WAN Interface Configuration screen, [Section 3.2](#)
- Full T1 Configuration using PPP (Point-to-Point Protocol), [Section 3.3](#)
- Fractional T1 Configuration using PPP, [Section 3.4](#)
- Frame Relay Configuration, [Section 3.5](#)

Read [Section 3.1](#) and [Section 3.2](#) to gain an understanding of the WPIM-RT1 Local Management screens for T1. [Section 3.3](#) through [Section 3.5](#) provide examples for setting up the WPIM-RT1 for full or fractional T1 in a PPP environment, or for configuring the WPIM-RT1 for Frame Relay in the T1 mode.



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

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

SPACE bar to toggle between selections in a field.

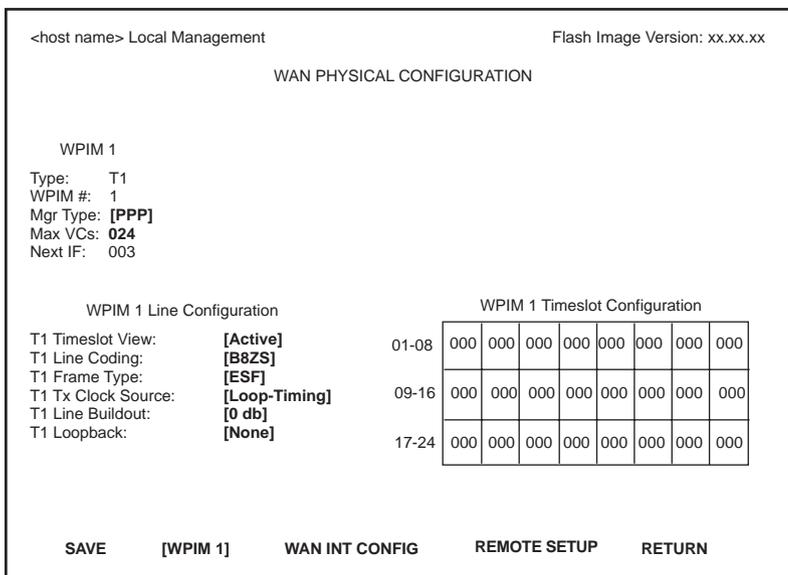
ENTER (RETURN) to implement a selection.

3.1 THE WAN PHYSICAL CONFIGURATION SCREEN

To access the WAN Physical Configuration screen, use the arrow keys to highlight the **WAN SETUP** menu item, then press ENTER. The screen shown in Figure 3-1 displays.



When there is more than one WPIM installed into the host platform, information for the second WPIM will display next to WPIM 1. The Line Configuration fields display for the selected WPIM.



275002

Figure 3-1 WAN Physical Configuration Screen

3.1.1 WAN Physical Configuration Screen Fields

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

To select the WPIM you wish to configure, proceed as follows:

1. Use the arrow keys to highlight the **WPIM X** command field at the bottom of the screen.

2. Use the SPACE bar to select the appropriate WPIM, then press ENTER. The WAN Configuration screen automatically displays unique configuration fields for each WPIM as shown in [Figure 3-1](#).

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

WPIM 1-2 (Read-Only)

Displays configuration information for up to two different WPIMs.

Type (Read-Only)

Displays the type of WPIM installed. For the WPIM-RT1, the Type field displays T1, for T1 service.

WPIM # (Read-Only)

Displays the number of the slot in which the WPIM resides.

Mgr Type (Selectable)

Used to select the type of protocol manager. The available options are PPP, FR PtoMP, FR PtoP, HDLC and NONE. The field defaults to NONE.

Max VCs (Modifiable)

Displays the maximum number of virtual circuits (interfaces) available to be configured. The default number displayed depends on the Protocol Manager chosen.

Next IF (Read-Only)

Displays the next interface available to be used.

SAVE (Command)

Saves the chosen configuration.

[WPIM X] (Toggle)

Enables the user to select the WPIM to be configured. Once it is selected, the user can enter the screens of the WPIM selected to modify the data.

WAN INT CONFIG (Command)

When this field is highlighted and the ENTER key is pressed, the WAN Interface Configuration screen displays. Refer to [Section 3.2](#) for details.

REMOTE SETUP (Command)

Used to access and modify remote profiles information.

RETURN (Command)

Returns user to the previous screen in the hierarchy.

3.1.2 WPIM Line Configuration Fields

The configuration fields displayed on the WAN Physical Configuration screen shown in [Figure 3-1](#) are specific to the T1 mode of the WPIM-RT1.



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

T1 Timeslot View (Toggle)

Displays the status of the Timeslot Configuration Table. This field toggles between Active and New. The field comes up with the default setting **Active**. The Active setting displays current Timeslot Configuration table settings. The New setting allows you to change Timeslot Configuration table settings. The default setting for the Timeslot Configuration table is all Timeslots not assigned (**000**).

T1 Line Coding (Toggle)

Displays the line coding for the physical T1 line. This field toggles between B8ZS and AMI. The default setting is **B8ZS**.

T1 Frame Type (Toggle)

Displays the T1 Frame type. This field toggles between ESF and D4. The default setting is **ESF**.

T1 Tx Clock Source (Toggle)

Displays the T1 Transmit Clock Source. This field toggles between Loop-Timing (Extracted Line Data) and Local-Timing (Internal Clock). The default setting is **Loop-Timing**.

T1 Line Buildout (Selectable)

Displays the line coding for the physical T1 line. Set this to 0 dB unless the service provider recommends another setting. The default setting for this field is **0 dB**. The following settings are available in this field:

- 0 dB
- -7.5 dB
- -15 dB
- -22.5 dB
- 133-266 Ft

- 267-399 Ft
- 400-533 Ft
- 534-655 Ft

T1 Loopback (Selectable)

Network Loopback is a testing procedure that segments the line and allows the user to isolate faults. The selections for this field are None, Line-Loop, and Payload-Loop. In Line-Loop the entire T-1 line is looped back, including the framing bits, CRC, and the facility data link. This happens before the framer. In Payload-Loop, only the 24 time slots are looped back, which happens behind the framer, and does not include the framing bits, CRC, and facility data link. The WPIM-RT1 must be in Loop-Timing mode to use this option. The default setting is **None**.

3.1.3 WPIM Timeslot Configuration Table

The WPIM Timeslot Configuration table allows the user to configure the way in which the Cabletron WAN module uses the T1 line. The configuration table consists of 24 Timeslots. Each Timeslot must be assigned an **Interface** number (for example, 002 for an active Interface number or 000 if the Timeslot is not used). When an entire T1 line is leased, all 24 Timeslots (the full T1 bandwidth) can be used. If only a fraction of the T1 line is leased, the service provider indicates which Timeslots to use.

Timeslots can be utilized in any way chosen. The WPIM-RT1 supports Time Division Multiplexing (TDM) allowing channelization of circuits (Timeslots) within the public network. For example, if the WPIM-RT1 has access to a full T1 (24 Timeslots), and the user wants to communicate with two other sites, the configuration might look like the one shown in [Figure 3-2](#).

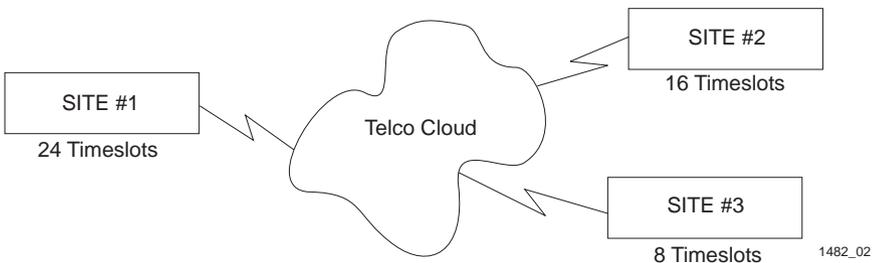


Figure 3-2 Sample Timeslot Configuration

Figure 3-3 shows a sample configuration for three sites. 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 T1 Timeslots. The service provider indicates which Timeslots are active.

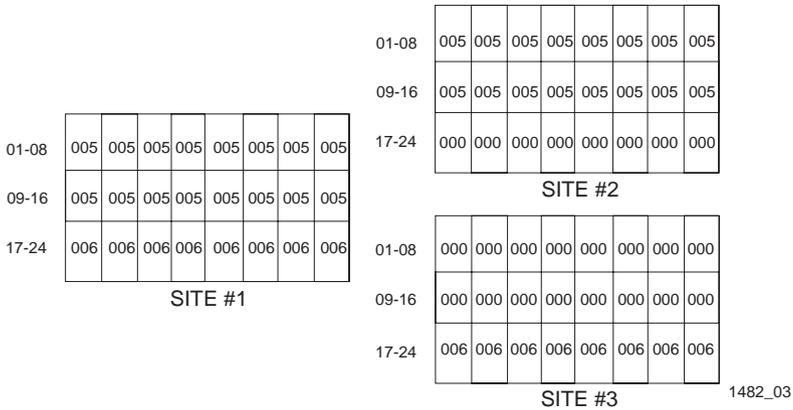


Figure 3-3 Sample Configuration

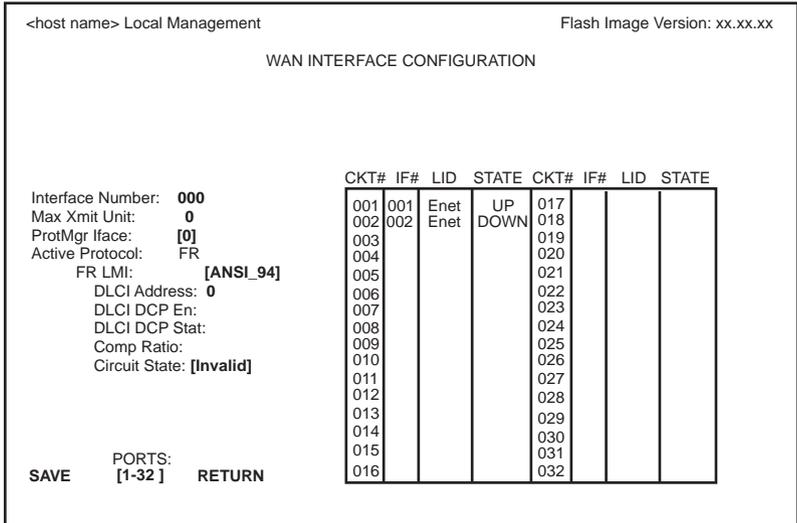
Site #1 is using the full T1, so all the Timeslots must have an Interface assignment. Site #2 and Site #3 use only a fraction of the T1, but the total quantity of Timeslots must match those of Site #1. Unused Timeslots receive an Interface number of 000.



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

3.2 THE WAN INTERFACE CONFIGURATION SCREEN

This section describes the features of the WAN Interface Configuration screen. Access the screen by using the arrow keys to highlight the **WAN INT CONFIG** command field at the bottom of the WAN Physical Configuration screen, then press ENTER. The WAN Interface Configuration screen displays, as shown in Figure 3-4.



2750_04

Figure 3-4 WAN Interface Configuration Screen

3.2.1 WAN Interface Configuration Screen Fields

This section describes the WAN Interface Configuration screen fields.

Interface Number (Modifiable)

Displays the active Interface Numbers. Used to configure the Interface Numbers that were assigned to the Timeslots on the WAN Physical Configuration screen.

Max Xmit Unit (Modifiable)

Displays the maximum packet size that can be transmitted on the selected interface. The default settings for this field depend on the Protocol Manager chosen.

ProtMgr Iface (Modifiable)

Interface number utilized for the Protocol Manager chosen.

Active Protocol (Read-Only)

Displays the active OSI layer protocol (Protocol Manager) chosen for the WPIM-RT1. There is one set of parameters displayed for FR, and one set for PPP. Refer to [Section 3.2.1.1](#) for information on the Active Protocol set to Frame Relay, and [Section 3.2.1.2](#) for PPP information.

3.2.1.1 Frame Relay as the Protocol Manager

Refer to [Figure 3-4](#) for the following parameters displayed for FR.

FR LMI (Selectable)

Frame Relay Link Management Interface. This field displays ANSI_94, NO LMI, T1.617-D or Q.933-A. The NO LMI setting is for specialized applications in which no Frame Relay Link Management is available or required.

DLCI Address (Modifiable)

Data Link Connection Identifier given by the Service Provider. Can be set to values from 0-1023, depending on the protocol, when available for modification with certain protocol modes. The values 0-15 and 1008-1022 are reserved DLCI addresses. When using FR PtoMP as the Protocol Manager, the WPIM-RT1 can learn the DLCIs dynamically from the switch.

DLCI DCP En (Toggle)

Enables the user to turn Data Compression Protocol On or Off on an application port per application port basis when available. The DLCI port must be entered to change compression.

DLCI DCP Stat (Read-Only)

Displays the current negotiated status of compression.

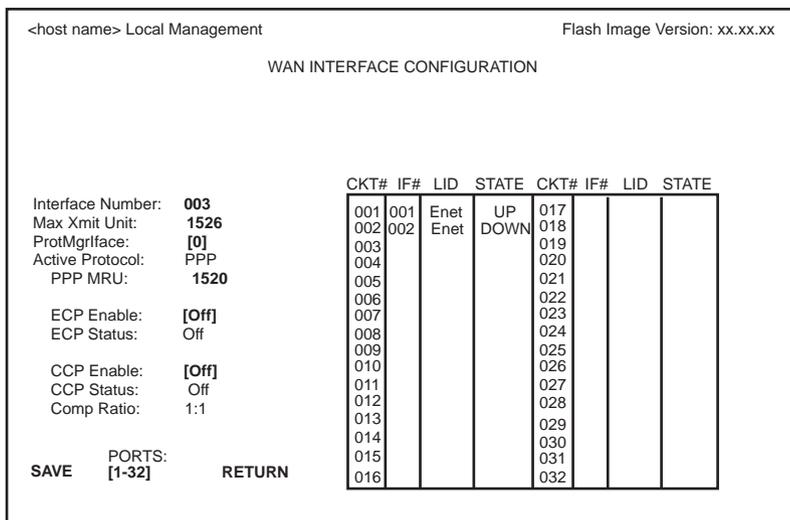
Comp Ratio (Read-Only)

Displays the Compression Ratio, which is the ratio of uncompressed to compressed data.

Circuit State (Selectable)

The field initially displays the state of the DLCI circuit, and can be modified. Steps through Active, Inactive and Invalid.

3.2.1.2 PPP as the Protocol Manager



2750_02

Figure 3-5 WAN Interface Configuration Screen (PPP)

Refer to [Figure 3-5](#) for the following parameters displayed for PPP.

PPP MRU (Modifiable)

Displays the Maximum Receive Units that PPP can handle, modifiable by the user.

ECP Enable (Toggle)

Field toggles between On and Off to enable or disable encryption.

ECP Status (Read-Only)

Displays the status of encryption.

CCP Enable (Toggle)

Field toggles between On and Off to enable or disable compression.

CCP Status (Read-Only)

Displays the status of compression.

Comp Ratio (Read-Only)

Displays the Compression Ratio, the ratio of uncompressed to compressed data.

3.2.1.3 Command Fields and Interface Table Fields

SAVE (Command)

Used to save the configuration changes.

PORTS: [1-32] (Command)

Interface table displays the range of circuits shown in the command field. The SPACE bar and either the BACKSPACE or DELETE key is used to step through the displays.

RETURN (Command)

Used to return to the previous screen.

CKT# (Read-Only)

Displays the circuit number of the application ports available from the host platform. If the active protocol is PPP or FR PtoP, only one application port per interface number (IF#) is assigned. If the active protocol is FR PtoMP, the available WAN ports from the host platform may be assigned, one per DLCI.

IF# (Read-Only)

Displays the MIB II Interface number that is associated with the application port (CKT#).

LID (Read-Only)

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. For Ethernet ports, Enet is displayed.

STATE (Read-Only)

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 or Ethernet, this field displays UP (active) or DOWN (inactive).

3.3 FULL T1 CONFIGURATION USING PPP

This section provides step-by-step instructions for configuring the WPIM-RT1 to use a full T1 circuit in a PPP environment. This simplified example assumes the setup shown in Figure 3-6 using a CSX400 with a WPIM-RT1 installed at Site #1. Configurations may vary depending on the host platform.

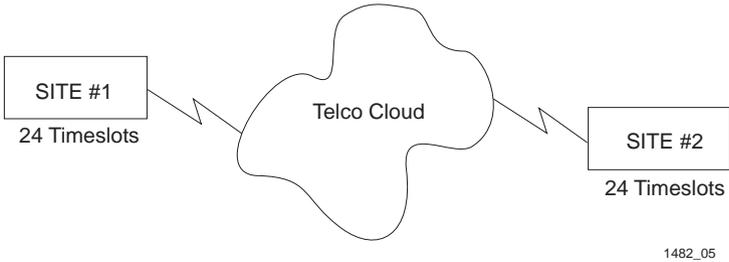


Figure 3-6 Full T1 Configuration

The line configuration information shown in Table 3-1 must be supplied by the service provider.

Table 3-1 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

3.3.1 T1 Physical Configuration

Begin the T1 configuration by accessing the WAN Physical Configuration screen through Local Management (Figure 3-1). Access the WAN Physical Configuration screen from the WAN SETUP menu item in the host platform.

Proceed with the following steps:

1. Use the arrow keys to highlight the **[WPIM X]** field at the bottom of the screen. Press the SPACE bar to select the number of the WPIM to be configured, then press ENTER.
2. Use the arrow keys to highlight **MgrType**. Select PPP.



When changing from one protocol to another on a WPIM-RT1 that has been operational, save NONE as the protocol before changing to another protocol.

3. Use the arrow keys to highlight **Timeslot View**. Press the SPACE bar to select **New**, then press ENTER. The cursor moves to Timeslot #1 of the Timeslot Configuration Table.
4. Insert an interface number into every timeslot as needed (refer to the note below). 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 **T1 Line Coding** field.



The value assigned to the timeslots is the interface being used for WAN communication. The next available interface is displayed on the WAN Physical Configuration screen in the Next IF field (see Figure 3-1). The Next IF number shown must be used to add a new interface. The Next IF will increment as interfaces are added. The previously entered interfaces can be modified by entering the interface number.

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

5. Use the arrow keys to highlight **T1 Line Coding**. Press the SPACE bar to select **B8ZS** or **AMI**, then press ENTER.
6. Use the arrow keys to highlight **T1 Frame Type**. Press the SPACE bar to select **ESF** or **D4**, then press ENTER.

7. Use the arrow keys to highlight **T1 TX Clock Source**. Press the SPACE bar to select **Local** (no clock source provided by telephone company) or **Loop** (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, and the other end must be set for Loop.

8. Use the arrow keys to highlight **T1 Line Buildout (LBO)**. Press the SPACE bar to select **0 dB** unless the service provider recommends another setting, then press ENTER.
9. Use the arrow keys to highlight **T1 Network Loopback**. Press the SPACE bar to select **None**, then press ENTER.
10. Use the arrow keys to highlight the **SAVE** command, then press ENTER. The message “SAVE DONE!” displays and Local Management saves the changes to memory. “REBOOT IN PROGRESS.....” displays and the host platform reboots. Re-entry to management is necessary for any further configuration.
11. Proceed to [Section 3.3.2](#) to continue configuration.

3.3.2 T1 Interface Configuration

The WAN Interface Configuration screen is accessed through the WAN Physical Configuration screen. Access the WAN Interface Configuration screen by using the arrow keys to highlight the WAN INT CONFIG command and press ENTER. Refer to [Figure 3-4](#) and proceed with the following steps to configure the WAN Interface.

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 (see the Notes on [page 3-12](#)).
2. Unless the user sets the Max Xmit Unit, the WPIM-RT1 automatically sets the **Max Xmit Unit** to **1526** (default for PPP) after the protocol manager type is selected.
3. Make any changes to the available settings as desired.

- 4. Use the arrow keys to highlight the **SAVE** command, then press ENTER. The message “SAVE DONE!” displays and Local Management saves the changes to memory.

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.

3.4 FRACTIONAL T1 CONFIGURATION USING PPP

This section provides step-by-step instructions for configuring the WPIM-RT1 to use a fractional T1 circuit in a PPP environment. This example assumes the setup shown in Figure 3-7 using two CSX400s with each containing a WPIM-RT1. Configurations may vary depending on the host platform. In a fractional T1 setup, only a portion of the 24 Timeslots or DS-0s are used.



The terms DS-0 (Digital Signal, level 0) and Timeslot are used synonymously in this guide to represent a standard 64,000 bps channel.

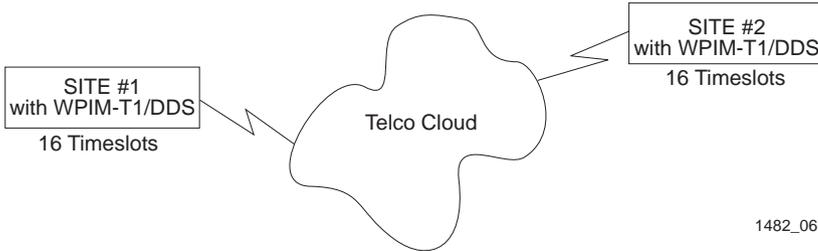


Figure 3-7 Fractional T1 Configuration

The line configuration information shown in Table 3-2 must be supplied by the service provider.

Table 3-2 Telco Configuration Information

Configuration Information Required by User	Information Supplied by Service Provider
Line Coding	B8ZS or AMI
Frame Type	ESF or D4
Clock Source	Loop Timing or Local Timing
DS-0s (Timeslots)	Timeslots being used for each end of the circuit

3.4.1 T1 Physical Configuration

Begin the WPIM-RT1 physical configuration by accessing the **WAN Physical Configuration** screen through Local Management (Figure 3-1).

Proceed with the following steps:

1. Use the arrow keys to highlight the **[WPIM X]** field at the bottom of the screen. Press the SPACE bar to select the number of the WPIM being configured, then press ENTER.
2. Use the arrow keys to highlight **MgrType**. Select **PPP**.



When changing from one protocol to another on a WPIM-RT1 that has been operational, save NONE as the protocol before changing to another protocol.

3. Use the arrow keys to highlight **Timeslot View**. Press the SPACE bar to select **New**, then press ENTER. The cursor moves to Timeslot #1 of the Timeslot Configuration Table.
4. Insert an interface number (see the Notes on page 3-16) into every Timeslot being used (in the example shown in Figure 3-7, 16 Timeslots are used, the rest have zeros in them). 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 **T1 Line Coding** field.



The value assigned to the timeslots is the interface being used for WAN communication. The next available interface is displayed on the WAN Physical Configuration screen in the Next IF field (see [Figure 3-1](#)). The Next IF number shown must be used to add a new interface. The Next IF will increment as interfaces are added. The previously entered interfaces can be modified by entering the interface number.

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

5. Use the arrow keys to highlight **T1 Line Coding**. Use the SPACE bar to select **B8ZS** or **AMI**, then press ENTER.
6. Use the arrow keys to highlight **T1 Frame Type**. Use the SPACE bar to select **ESF** or **D4**, then press ENTER.
7. Use the arrow keys to highlight **T1 Tx Clock Source**. Use the SPACE bar to select **Local** (no clock source provided by telephone company) or **Loop** (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, the other end must be set for Loop.

8. Use the arrow keys to highlight **T1 Line Buildout (LBO)**. Press the SPACE bar to select **0 dB** unless the service provider recommends another setting, then press ENTER.
9. Use the arrow keys to highlight **T1 Network Loopback**. Press the SPACE bar to select **None**, then press ENTER.
10. Use the arrow keys to highlight the **SAVE** command, then press ENTER. The message “SAVE DONE!” displays and Local Management saves the changes to memory. The host platform reboots, and re-entry to Local Management is necessary for any further configuration.
11. Proceed to the [Section 3.4.2](#) to continue configuration.

3.4.2 T1 Interface Configuration

The WAN Interface Configuration screen is accessed through the WAN Physical Configuration screen. Access the WAN Interface Configuration screen by using the arrow keys to highlight the **WAN INT CONFIG** command and press ENTER. Refer to [Figure 3-4](#) and proceed with the following steps to configure the WAN Interface.

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 (see the Notes on [page 3-16](#)).
2. Unless the user sets the Max Xmit Unit, the WPIM-RT1 automatically sets the **Max Xmit Unit** to **1526** (default) after the active protocol (PPP) is selected.
3. Make any changes to the available settings as desired.
4. Use the arrow keys to highlight the **SAVE** command, then press ENTER. The message ““SAVE DONE!”” displays and Local Management saves the changes to memory.

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.

3.5 FRAME RELAY CONFIGURATION

This section provides step-by-step instructions for configuring the WPIM-RT1 to use a T1 circuit in a Frame Relay environment. This example assumes the setup shown in [Figure 3-8](#) using two CSX400s, each with a WPIM-RT1 installed. Configurations may vary depending on the host platform.

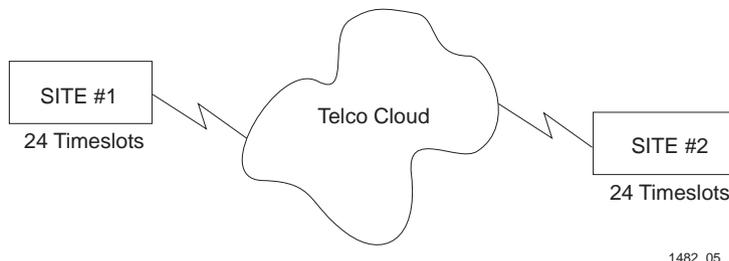


Figure 3-8 Frame Relay Configuration

The line configuration information shown in [Table 3-3](#) must be supplied by the service provider.

Table 3-3 Telco Configuration Information

Configuration Information Required by Customer	Information Supplied by Service Provider
Line Coding	B8ZS or AMI
Frame Type	ESF or D4
Clock Source	Loop Timing or Local Timing
DS-0s (Timeslots)	Timeslots being used for each end of the circuit

3.5.1 Frame Relay Physical Configuration

Begin the WPIM-RT1 physical configuration by accessing the **WAN Physical Configuration** screen through Local Management ([Figure 3-1](#)). Proceed with the following steps:

1. Use the arrow keys to highlight the **[WPIM X]** field at the bottom of the screen. Press the SPACE bar to select the number of the WPIM to be configured, then press ENTER.

Use the arrow keys to highlight the **MgrType** field. Configure Protocol Manager Type as either FR PtoMP or FR PtoP. There are two settings for Frame Relay, Point-to-Point (FR PtoP) and Point-to-Multipoint (PtoMP). Frame Relay Point-to-Point has one Interface per DLCI assigned when DLCIs are created by the Service Provider. In Frame Relay Point-to-Multipoint, there is one interface to multiple DLCIs, and the DLCIs are dynamically learned. Backup can only be run on FR PtoP, not FR PtoMP.



When changing from one protocol to another on a WPIM-RT1 that has been operational, save NONE as the protocol before changing to another protocol.

2. Use the arrow keys to highlight **Timeslot View**. Press the SPACE bar to select **New**, then press ENTER. The cursor moves to the first timeslot available in the Timeslot Configuration Table.

3. Insert the interface number (refer to NOTE below) into the timeslot being used. Type the number, press ENTER, then exit this field by using the arrow keys. The cursor automatically moves to the **T1 Line Coding** field.



The value assigned to the timeslots is the interface being used for WAN communication. Only one interface can be assigned to the timeslot when running Frame Relay.

The next 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 **T1 Line Coding**. Press the SPACE bar to select **B8ZS** or **AMI**, then press ENTER.
5. Use the arrow keys to highlight **T1 Frame Type**. Press the SPACE bar to select **ESF** or **D4**, then press ENTER.
6. Use the arrow keys to highlight **T1 Tx Clock Source**. Press the SPACE bar to select **Local** (no clock source provided by telephone company) or **Loop** (clock source provided by telephone company), then press ENTER.
7. Use the arrow keys to highlight **T1 Line Buildout (LBO)**. Press the SPACE bar to select to **0 dB** unless the service provider recommends another setting, then press ENTER.
8. Use the arrow keys to highlight the **SAVE** command, then press ENTER. The message “SAVE DONE!” displays and Local Management saves the changes to memory. “REBOOT IN PROGRESS.....” displays and the host platform reboots. Re-entry to management is necessary for any further configuration.
9. Proceed to [Section 3.5.2](#) to continue the configuration.

3.5.2 Frame Relay Interface Configuration

Access the WAN Interface Configuration screen through the WAN Physical Configuration screen, by using the arrow keys to highlight the **WAN INT CONFIG** command, then press ENTER. Proceed with the following steps to configure the WAN Interface.

1. Set the Interface Number that is being used for the WAN connection 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 (see the Notes on page 3-19). For Frame Relay PtoP: The interfaces are assigned when DLCIs are created (in this case a zero needs to be entered in this field).
2. Use the arrow keys to highlight **FR LMI**. Press the SPACE bar to select **ANSI_94**, **T1.617-D** or **Q.933-A**, then press ENTER.



The choice NO LMI under FR LMI is a test mode only and should not be used in a practical application.

3. Make any changes to the available settings as desired.
4. Use the arrow keys to highlight **SAVE**, then press ENTER. The message “SAVE DONE!” displays and Local Management saves the changes to memory.

In FR PtoP, the DLCIs must be entered statically, as they will not come up dynamically as in FR PtoMP.

In FR PtoMP, there is an option to statically enter the DLCIs in association with a Protocol Manager, the physical port and MIB II, using the DLCI field in the Interface screen. If the DLCI is not static, it will be deleted if the Frame Relay switch determines that the DLCI has been eliminated. If the Frame Relay switch previously reported status on a DLCI, when it does not report the status of the DLCI, the DLCI and its associated information is deleted from the platform. Static entries are never deleted automatically. They must be deliberately deleted by the user. To enter a DLCI, it is set to “Inactive” and saved, but to delete a DLCI, it must be accessed and entered as “Invalid” and saved.

The WAN configuration is complete. Communications between the WPIM-RT1 and the service provider's switch takes approximately one or two minutes to complete. A status of **Inactive** displays on a DLCI per DLCI basis by default until both ends of the DLCI are configured correctly. Once both end devices have negotiated link management with the switches, and are configured correctly on a DLCI per DLCI basis, the status field displays **Active**.

APPENDIX A

SPECIFICATIONS

This appendix provides operating specifications and cabling information for the Cabletron Systems WPIM-RT1. Cabletron Systems reserves the right to change these specifications at any time without notice.

A.1 PHYSICAL PROPERTIES

Dimensions	1.94 H x 6.2 W x 15.06 D (cm) .762 H x 2.44 W x 5.93 D (in)
Weight	113.6 g (4 ounces)
MTBF (Predicted)	200,000 hours

A.2 ENVIRONMENTAL REQUIREMENTS

Operating Temperature	5°C to 40°C (41°F to 104°F)
Storage Temperature	-30°C to 73°C (-22°F to 164°F)
Relative Humidity	5% to 90% (non-condensing)

A.3 REGULATORY COMPLIANCE

This equipment meets the following safety and electromagnetic compatibility (EMC) requirements:

Safety	UL 1950, CSA C22.2 No. 950, EN 60950, IEC 950 73/23/EEC
Electromagnetic Compatibility (EMC)	FCC Part 15, EN 55022, VCCI V-3, CSA/08.8, EN 50082-1, AS/NZS 354, 89/336/EEC
Telecommunications	FCC CFR47 Part 68, CS-03

A.4 T1 INTERFACE CABLING

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

Table A-1 Cabletron T1 Cable Part Numbers

Interface Cable	Cabletron Part Number
T1 Line Interface Cable	9372094-20 ¹
	9372094-L ²

1. Standard 20-foot T1 Line Interface Cable.
2. 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.4.1 Cable Assemblies and Pinouts

The following section provides connector information for the T1 interface cable.

Table A-2 T1 Connector Information

Cabletron interface cable part number	9372094
Description	T1 line interface cable
Connector 1	RJ48C
Connector 2	RJ48C

Table A-3 T1 RJ48 Connector Pin Assignments

Pin	Signal
1	Receive Ring
2	Receive Tip
3	Not Used
4	Transmit Ring
5	Transmit Tip
6	Not Used
7	Shield Ground
8	Shield Ground

APPENDIX B

FCC PART 68 - USER'S INFORMATION

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

1. This device must only be connected to the ISDN Basic Rate network behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.
 - a. All direct connections to T1 lines must be made using standard plugs and jacks.
 - b. All direct connections to DDS lines must be made using standard plugs and jacks.
2. Before connecting your unit, you must inform the telephone company of the following information:

Port ID	REN/SOC	FIC	USOC
WPIM-RT1	6.0N	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN 04DU9-1ZN	RJ48C

3. If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.
4. 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 you 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 you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your 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 our Company or an authorized agent. It is the responsibility of the users requiring service to report the need for service to our Company or to one of our authorized agents.

Service can be obtained at Cabletron Systems Technical Support:

Address: Cabletron Systems, Inc.
35 Industrial Way,
Rochester, NH 03867-0505

Phone: (603) 332-9400

Internet mail: support@cabletron.com

**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 _____ 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.

Appendix B: FCC Part 68 - User's Information

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____.

(Notary Public)

My commission expires: _____