



**HOTWIRE  
MODEL 7914 AND 7915  
T1 AND E1 SDSL NEST CARD  
TERMINATION UNITS**

**USER'S GUIDE**

Document No. 7910-A2-GB20-10

January 1998

---

**Copyright © 1998 Paradyne Corporation.**  
**All rights reserved.**  
**Printed in U.S.A.**

## **Notice**

This publication is protected by federal copyright law. No part of this publication may be copied or distributed, transmitted, transcribed, stored in a retrieval system, or translated into any human or computer language in any form or by any means, electronic, mechanical, magnetic, manual or otherwise, or disclosed to third parties without the express written permission of Paradyne Corporation, 8545 126th Avenue North, P.O. Box 2826, Largo, Florida 33779-2826.

Paradyne Corporation makes no representation or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose. Further, Paradyne Corporation reserves the right to revise this publication and to make changes from time to time in the contents hereof without obligation of Paradyne Corporation to notify any person of such revision or changes.

Changes and enhancements to the product and to the information herein will be documented and issued as a new release to this manual.

## **Trademarks**

All products and services mentioned herein are the trademarks, service marks, registered trademarks or registered service marks of their respective owners.

## **Warranty, Sales, and Service Information**

Contact your sales or service representative directly for any help needed. For additional information concerning warranty, sales, service, repair, installation, documentation, or training, use one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at <http://www.paradyne.com>
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - Within the U.S.A., call 1-800-870-2221
  - International, call 727-530-2340



Printed on recycled paper

## Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
3. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
4. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
5. General purpose cables are provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
6. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
7. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
  - Never install telephone wiring during a lightning storm.
  - Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
  - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
  - Use caution when installing or modifying telephone lines.
  - Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
  - Do not use the telephone to report a gas leak in the vicinity of the leak.

## EMI Warnings

### **WARNING:**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

### **WARNING:**

To Users of Digital Apparatus in Canada:

This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.

## CE Mark

When the product is marked with the CE mark, this mark has been affixed to demonstrate full compliance with the following European Directives:

- Directive 73/23/EEC – Council Directive of 19 February 1973 on the harmonisation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits, **as amended by Directive 93/68/EEC.**
- Directive 89/336/EEC – Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to Electro-Magnetic Compatibility (EMC), **as amended by Directive 93/68/EEC.**

---

# Contents

---

## About This Guide

- Document Purpose and Intended Audience ..... iii
- Document Summary ..... iii
- Product-Related Documents ..... iv

## 1 About Hotwire 7914 and 7915 Nest Card Termination Units

- Hotwire 7914 and 7915 Features ..... 1-1
  - Hotwire Model 7914 ..... 1-1
  - Hotwire Model 7915 ..... 1-2
- Hotwire Model 7914 Typical Configurations ..... 1-2
- Hotwire Model 7915 Typical Configurations ..... 1-4
- Nest Card Termination Unit User Interfaces ..... 1-5

## 2 Installing Hotwire Nest Card Termination Units

- Overview ..... 2-1
- Packaging Checklist ..... 2-1
- Planning for Your SDSL Application ..... 2-2
- Installing Nest Card Termination Units ..... 2-3
- Installing Nest Filler Panels ..... 2-4

## 3 Customizing Hotwire 7914 Nest Card Termination Units

- Changing Your Configuration Options ..... 3-1
- Switchpack and Jumper Locations ..... 3-2
- Switchpack Definitions ..... 3-3
  - Configuring a Starting Time Slot  
(DSX-1-to-V.35/V.11 Configuration) ..... 3-3
- Line Build Out ..... 3-5

<b>4</b>	<b>Customizing Hotwire 7915 Nest Card Termination Units</b>	
	■ Changing Your Configuration Options .....	4-1
	■ Switchpack and Jumper Locations .....	4-2
	■ Switchpack Definitions .....	4-3
	Configuring a Starting Time Slot (G.703-to-V.35/V.11 Configuration) .....	4-3
<b>5</b>	<b>Monitoring Nest Card Termination Units</b>	
	■ What to Monitor .....	5-1
	■ Front Panel LEDs .....	5-2
<b>A</b>	<b>Hotwire Model 7914 Worksheets</b>	
	■ Overview .....	A-1
	■ DSX-1-to-DSX-1 Configuration .....	A-1
	■ DSX-1 Nest (CO)-to-V.35 Standalone (CP) Configuration .....	A-2
	Configuring DSX-1-to-V.35 Starting Time Slot and Payload Rate ...	A-3
	■ Hotwire 7914 Nest Card Configuration Worksheet .....	A-4
<b>B</b>	<b>Hotwire Model 7915 Worksheets</b>	
	■ Overview .....	B-1
	■ G.703-to-G.703 Configuration .....	B-1
	■ G.703 Nest Card (CO)-to-V.35 Standalone (CP) Configuration .....	B-2
	■ Hotwire 7915 Nest Card Configuration Worksheet .....	B-2

## Glossary

## Index

---

# About This Guide

---

## Document Purpose and Intended Audience

This guide describes the configuration, installation, and maintenance procedures for Hotwire Model 7914 T1 and 7915 E1 SDSL Nest Card Termination Units.

It is expected that readers of this document are central-site or service installation technicians or network engineers who have an understanding of digital subscriber line systems and Symmetric Digital Subscriber Line (SDSL) transmission systems plus the deployment of such systems in a telephone company or private network environment.

## Document Summary

Section	Description
Chapter 1	<i>About Hotwire 7914 and 7915 Nest Card Termination Units.</i> Describes the features of Hotwire Model 7914 and 7915 termination units and provides typical configurations.
Chapter 2	<i>Installing Hotwire Nest Card Termination Units.</i> Describes the procedures for installing the Hotwire Model 7900 Nest Card Termination Units and Nest Filler Panels.
Chapter 3	<i>Customizing Hotwire 7914 Nest Card Termination Units.</i> Provides procedures for modifying configuration options by using the switchpack and Jumper located on the nest card.
Chapter 4	<i>Customizing Hotwire 7915 Nest Card Termination Units.</i> Provides procedures for modifying configuration options by using the switchpack located on the nest card.
Chapter 5	<i>Monitoring Nest Card Termination Units.</i> Describes how to monitor and interpret nest card front panel LEDs and network status.
Appendix A	<i>Hotwire Model 7914 Worksheets.</i> Contains configuration options and settings.

<b>Section</b>	<b>Description</b>
<b>Appendix B</b>	<i>Hotwire Model 7915 Worksheets</i> . Contains configuration options and settings.
<b>Glossary</b>	Defines the acronyms and terms used in this document.
<b>Index</b>	Lists the key terms, acronyms, and concepts, in alphabetical order.

## Product-Related Documents

<b>Document Number</b>	<b>Document Title</b>
7900-A2-GB20	<i>Hotwire Model 7900 Basic Maintenance Processor User's Guide</i>
7900-A2-GN20	<i>Hotwire Model 7900 Nest and Options Installation Guide</i>
7914-A2-GB20	<i>Hotwire Model 7914 Standalone T1 SDSL Termination Unit User's Guide</i>
7915-A2-GB20	<i>Hotwire Model 7915 Standalone E1 SDSL Termination Unit User's Guide</i>
7920-A2-GN20	<i>Hotwire Model 7924 and 7925 E1 and T1 Nest Card Termination Units</i>

Contact your sales or service representative to order additional product documentation.

Paradyne documents are also available on the World Wide Web at:

<http://www.paradyne.com>

Select *Service & Support* → *Technical Manuals*

---

# About Hotwire 7914 and 7915 Nest Card Termination Units

# 1

---

## Hotwire 7914 and 7915 Features

Products in the Hotwire 7900 family provide “last mile/last kilometer” transport of T1- and E1-compatible circuits between customer facilities and central-site equipment over 2-wire copper lines. These termination units can be used over distances substantially exceeding traditional T1 and E1 spans and European Telecommunications Standards Institute (ETSI) loop standards.

This chapter provides a general overview of the Hotwire Models 7914 and 7915 termination units, including standalone and nest-mounted termination units.

### Hotwire Model 7914

Hotwire 7914 features include:

- DSX-1 and V.35 (standalone unit only) interface
- Meets the requirements of repeaterless T1 transmission on loops exceeding standard specifications
- Local and remote alarm surveillance
- Local and remote T1 and DSL performance monitoring

## Hotwire Model 7915

Hotwire 7915 features include:

- G.703 and V.35 (standalone unit only) interface
- Meets the requirements of repeaterless E1 transmission on loops exceeding standard specifications (up to 10 km on a 0.9 mm wire)
- Local and remote alarm surveillance
- Local and remote E1 and DSL performance monitoring

You can order Hotwire 7914 and 7915 products as standalone units (7914-A1/7915-A1) or as nest-mounted circuit card assemblies (7914-B1/7915-B1) that fit in the Hotwire Model 7900 Nest. This guide describes the installation and maintenance procedures for the nest-card termination units, Models 7914-B1 and 7915-B1. See *Product-Related Documents* in *About This Guide* for information on user manuals for the standalone units.

## Hotwire Model 7914 Typical Configurations

Figure 1-1 shows a central-site application with a Hotwire 7900 Nest containing Hotwire Model 7914 Nest Card Termination Units. Each nest card terminates a single subscriber line in the central site. Each line is then converted to a DSX-1 interface for connection to other central-site equipment, such as a digital cross-connect system (DCS).

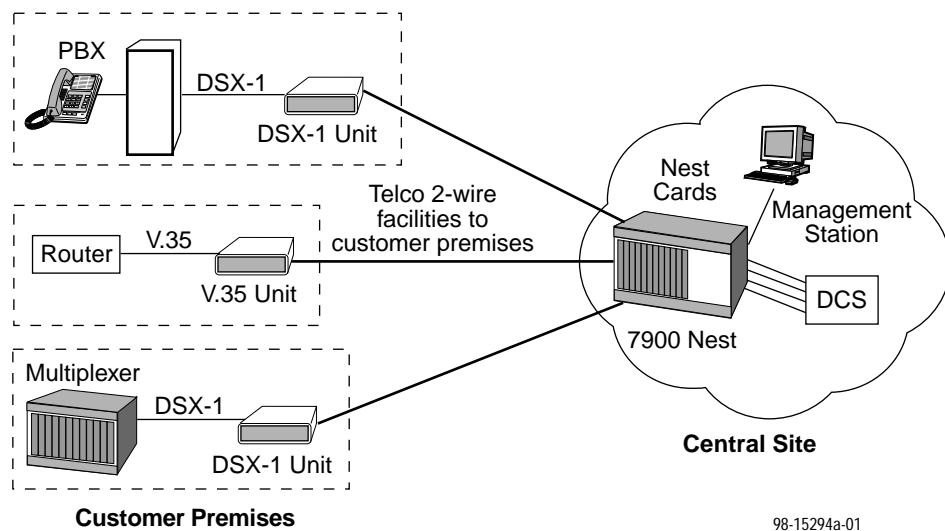


Figure 1-1. T1 Extension to Customer Premises

Cellular network providers must lease large numbers of T1 circuits in order to connect remote cell sites to mobile telephone switching offices (MTSOs). Hotwire Model 7914 products provide an alternative to standard repeated T1 services. Figure 1-2 depicts a typical cellular network access application.

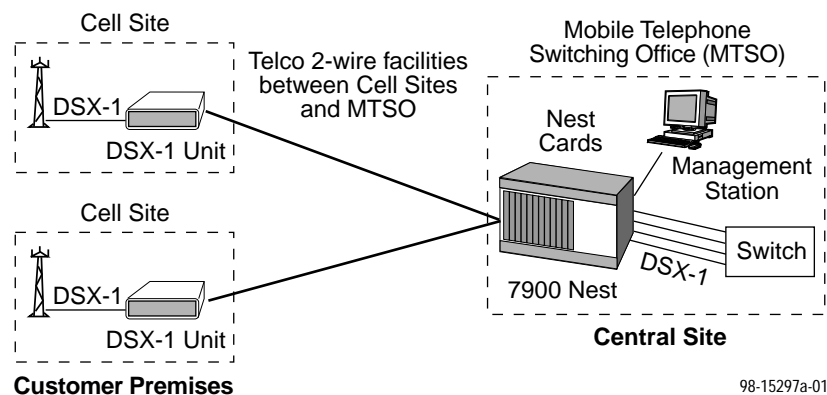


Figure 1-2. Cellular Network Access

Hotwire Model 7914 termination units can be used in campus applications where long loop distances normally require the campus to contract with local telephone exchange carriers to deliver private-line services across the campus.

Figure 1-3 shows a typical campus application where multiplexers are interconnected across a campus using two Hotwire Model 7914 standalone units. In each pair, one unit is configured as a central site and the other as the remote customer premises.

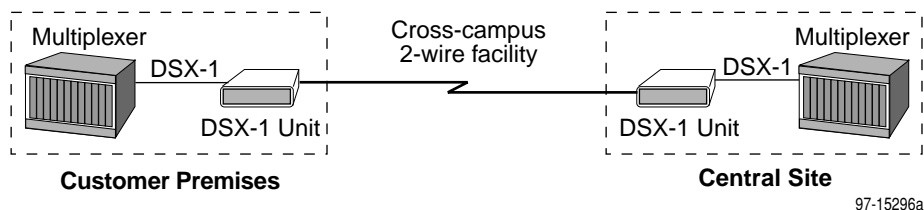


Figure 1-3. Campus Network Applications

Hotwire Model 7914 standalone units are ideal for delivering T1 services from a central site to the customer premises over long loop distances without repeaters.

## Hotwire Model 7915 Typical Configurations

Figure 1-4 shows a central-site application with a Hotwire 7900 Nest containing Hotwire Model 7915 nest cards. Each nest card terminates a single subscriber line in the central site. The subscriber line is then converted to a G.703 interface for connection to other central-site equipment, such as a digital cross-connect system (DCS).

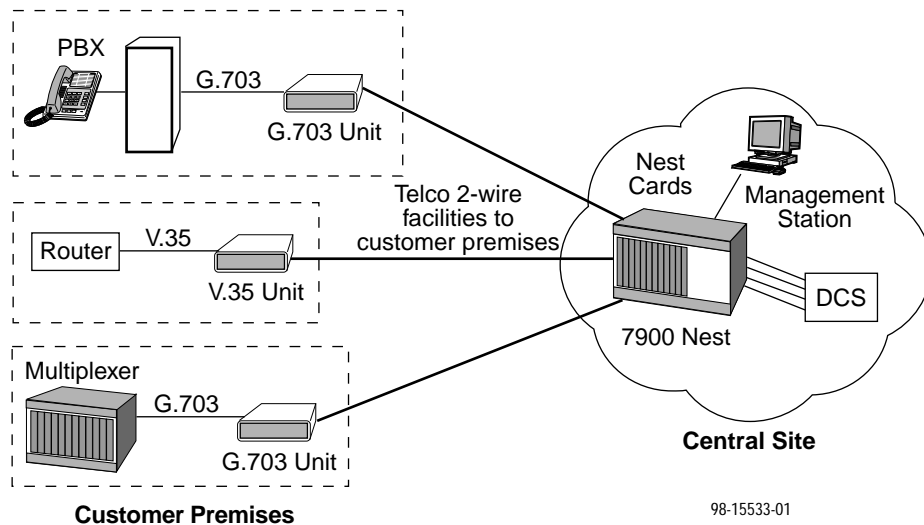


Figure 1-4. E1 Extension to Customer Premises

Cellular network providers must lease large numbers of E1 circuits in order to connect remote cell sites to mobile telephone switching offices (MTSOs). Hotwire Model 7915 products provide an alternative to standard repeated E1 services. Figure 1-5 depicts a typical G.703 cellular network access application.

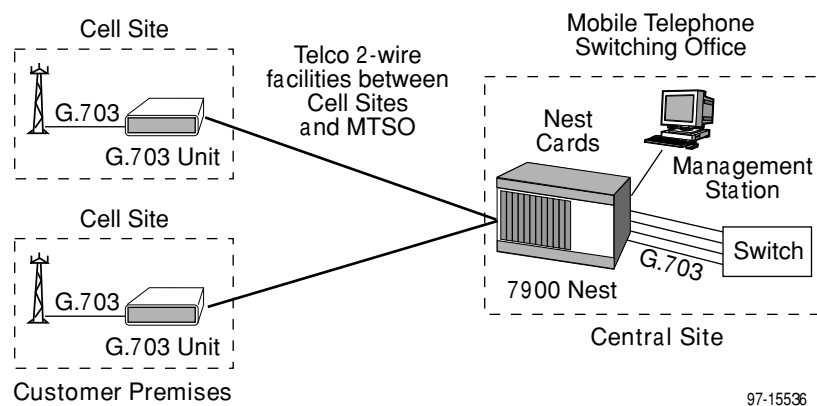
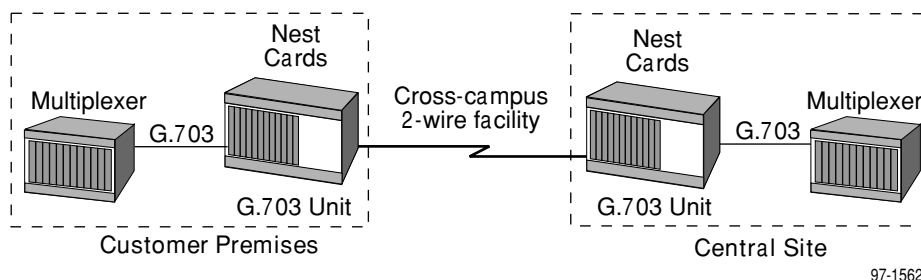


Figure 1-5. Cellular Network Access

Hotwire Model 7915 units can be used in campus applications where long loop distances normally require the campus to contract with the local telephone exchange carrier to deliver private line services across the campus. **Figure 1-6** shows a typical campus application where a multiplexer is interconnected across a campus using two Hotwire Model 7915 units. In each pair, one unit is configured as a central site and the other is the remote customer premises.



**Figure 1-6. Campus Network Application**

Hotwire Model 7915 units are ideal for delivering E1 services from a central site to the customer premises over long loop distances without repeaters.

Hotwire Model 7914 and 7915 Nest Card Termination Units are configured at the factory to operate at the central site of an E1 SDSL connection. However, you may reconfigure the units for customer premises operation if required.

## Nest Card Termination Unit User Interfaces

There are two types of user interfaces to the nest card termination units:

- Configuration switches (switchpacks) and jumpers (refer to [Chapter 3, Customizing Hotwire 7914 Nest Card Termination Units](#) and [Chapter 4, Customizing Hotwire 7915 Nest Card Termination Units](#))
- Front Panel LED status indicators (refer to [Chapter 5, Monitoring the Unit](#))

If you have an Hotwire Model 7900 Basic Maintenance Processor (MTU-M), you can also monitor nest card termination units and network status using:

- The MTU-M front panel LEDs
- A VT100-compatible system terminal connected to the MTU-M front panel or nest rear panel.

---

# Installing Hotwire Nest Card Termination Units

# 2

---

## Overview

This chapter describes the procedure for installing nest card termination units and nest filler panels into a Hotwire 7900 Nest.

## Packaging Checklist

Verify that your package contains the following:

- The correct number of Hotwire Model 7914 or 7915 nest card termination units (verify this with your packing list)
- Warranty card

## Planning for Your SDSL Application

A pair of Hotwire 7914 or 7915 Termination Units operates on a single standard twisted-pair phone line. Observe the following restrictions for a successful installation:

- Use only twisted pair. Any flat cable has a major negative affect on the loop length that can be supported.
- Use only Category 5 cable for all user connections.
- When possible plan the phone line to be dedicated to SDSL. The same phone line used for the Termination Unit pair **cannot** also be used at the same time to carry other voice or data services. This is because the SDSL frequency spectrum overlaps with the voice band (including voice, fax and analog modems), as well as the higher spectrums of digital services including ADSL, HDSL or ISDN.
- Actual loop length can be supported will vary, depending on:
  - The loop cable gauge
  - Noise introduced from neighboring phone lines in the same binder group or cable
  - Noise introduced at either termination unit, such as interference from a PC monitor if the phone line is too close

### **NOTE:**

Keep the cover on the termination unit for performance and safety reasons.

- Handle the termination unit with care and use it in the proper environment.

## Installing Nest Card Termination Units

It is assumed that you have already installed the Hotwire Model 7900 Nest and any associated equipment in a standard equipment rack, and that all network connections have been made. Installation of the optional Hotwire 7900 Basic Maintenance Processor (MTU-M) is described in a separate user's guide. Refer to *Product-Related Documents* on page iv in *About This Guide*.

### ► Procedure

To install nest card termination units:

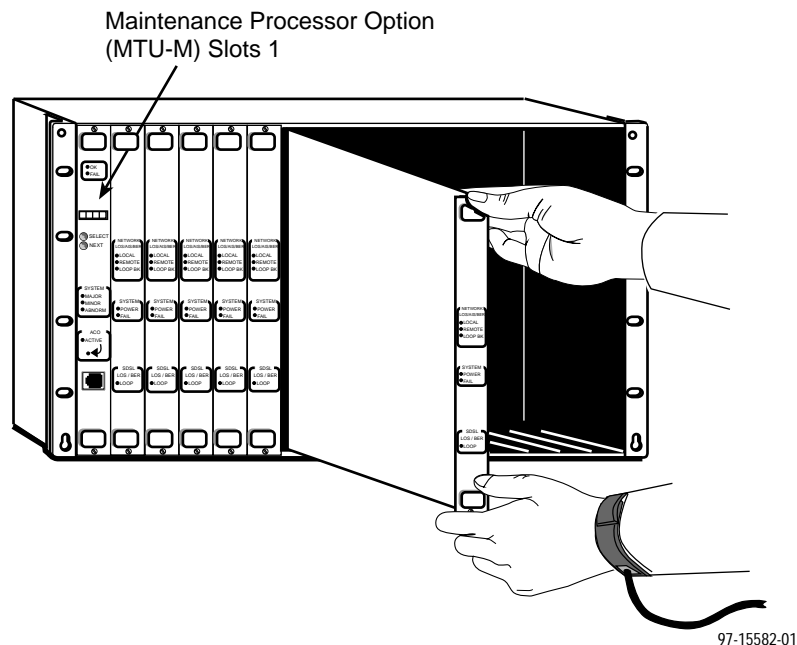
Use electrostatic discharge (ESD) protection when handling electronic components.

1. Remove the card from any protective packaging.

#### NOTE:

Nest card termination unit jumpers and switchpacks are configured at the factory. Always verify jumper and switchpack settings prior to installing the unit.

2. Configure unit as required. Refer to Chapter 3, *Configuring Hotwire 7914 Nest Card Termination Units* and Chapter 4, *Configuring Hotwire 7915 Nest Card Termination Units*.
3. Align the circuit board with the top and bottom card guides of the next available card slot:
  - Slot 1 if no maintenance processor option is installed
  - Slot 2 if the MTU-M maintenance processor option is installed in Slot 1



4. Slide the nest card into the slot until the backplane connector plug is seated firmly into the backplane.
5. Tighten retaining screws at the top and bottom of the front panel.
6. Cover all empty slots with nest filler panels. Refer to *Installing Nest Filler Panel*.

## Installing Nest Filler Panels

There are four nest filler panels provided with each Hotwire 7900 Nest. Each nest filler panel covers 1, 2, 4, or 8 slots on the nest. Use any combination of nest filler panels to cover slots that do not contain nest cards.

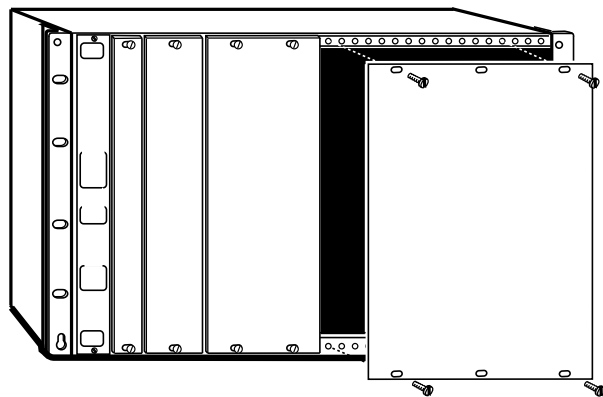
### **⚠ WARNING:**

**Front Panel Fillers are required for EMI safety purposes. Install nest filler panels to cover all nest card slots that do not contain nest cards termination units.**

### **► Procedure**

To install nest filler panels:

1. Align the filler panel with the retaining screw holes located at the top and bottom of the nest.
2. Attach a filler panel with the retaining screws provided.
3. Repeat until all empty nest card slots are covered.



97-15774

---

# Customizing Hotwire 7914 Nest Card Termination Units

# 3

---

## Changing Your Configuration Options

This chapter provides instructions on how to change or verify configuration options for Hotwire 7914 nest card termination units. Chapter 4 provides configuration options for Hotwire 7915 E1 nest card termination units.

Configuration option settings determine how the unit operates. You can change the unit's configuration options by changing switchpack and jumper settings on the nest card.

### ► Procedure

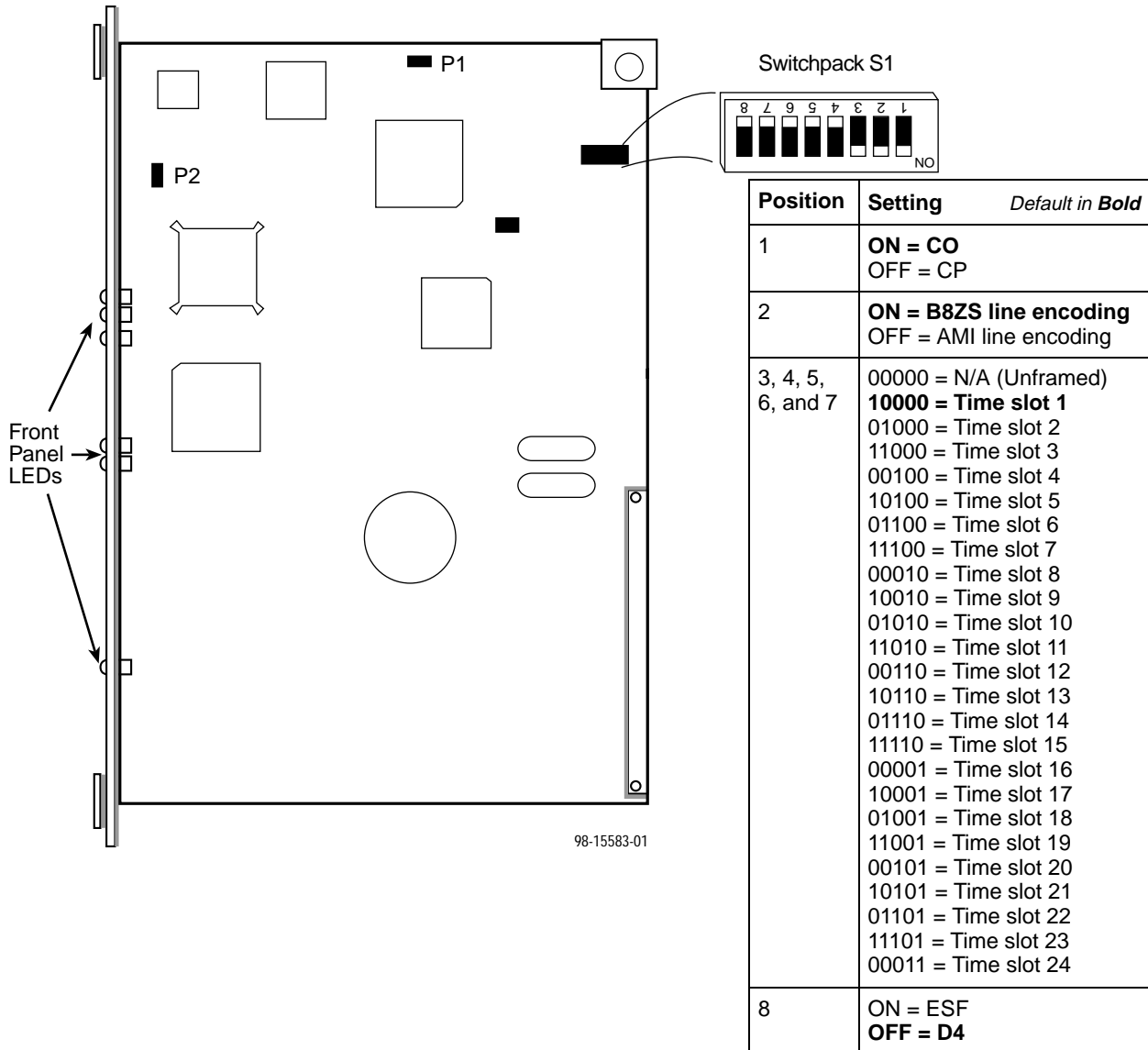
To change or verify configuration options:

Use electrostatic discharge (ESD) protection when handling electronic components.

1. Loosen the retaining screws at the top and bottom of the nest card.
2. Remove the card from the nest.
3. Find switchpack S1. See *Switchpack and Jumper Locations* on page 3-2.
4. Place each switch on the switchpack in the ON or OFF position for the desired configuration option. For example, to change a unit's card type from CO to CP, move DIP switch 1 on switchpack S1 to the OFF position.
5. Return the card to the nest.
6. Tighten retaining screws at the top and bottom of the nest card.

## Switchpack and Jumper Locations

Use the following figure to locate switchpack S1 and jumper J1.



98-15583-01

### Hotwire 7914 Nest Card Switchpack and Jumper Locations

- The ON position is labeled on the switchpack.
- P1 is sent jumpered pin 1–2 (Line build out 0–133 ft). To change line build out to 533–655 ft place P1 in the 2–3 position.

## Switchpack Definitions

Change configuration options by moving switchpack S1 DIP switches on the nest card hardware.

Switchpack S1 Definitions	
Switch # . . .	Allows you to . . . <span style="float: right;"><i>Default in <b>Bold</b></i></span>
1	Control whether the board is an STU-C (CO) or an STU-R (CP).  <b>ON = CO</b> OFF = CP
2	Control enabling and disabling of zeros suppression in the line code.  <b>ON = B8ZS line encoding</b> OFF = AMI line encoding
3, 4, 5, 6, 7	Select framed or unframed operation for DSX-1 to DSX-1 applications using <b>SWITCH 3 ONLY</b> .  <b>ON = Framed</b> OFF = Unframed  For DSX-1 to V.35/V.11 applications, use switches 3–7 to configure the starting time slot (DS0). Refer to <i>Configuring a Starting Time Slot</i> on page 3-3.
8	Control whether data is transmitted with D4 or ESF framing.  ON = ESF <b>OFF = D4</b>  <b>NOTE:</b> Configure your Hotwire equipment to match the T1 network. If your T1 service is framed (ESF or D4), configure your Hotwire 7900 nest cards as framed. If your T1 service is unframed, configure your Hotwire 7900 nest cards as unframed.

### Configuring a Starting Time Slot (DSX-1-to-V.35/V.11 Configuration)

When operating DSX-1 to V.35/V.11, at a payload rate less than 1544 kbps, switches 3–7 on switchpack S1 determine the starting time slot, as shown in Table 3-1.

If the payload rate is *less than* 1544 kbps, use switches 3–7 to select a starting time slot (DS0). Switches 3, 4, 5, 6, and 7 form a five-digit binary number where the ON position represents a value of 1 and OFF represents represents a value of 0. For example, set 3, 4, 5 ON and 6 ,7 OFF (11100) for a starting time slot of 7. Setting any one of these switches to the ON position enables switch 8 (framing).

Make sure that there are enough subsequent time slots to accommodate the V.35/V.11 payload rate (refer to the last column in Table 3-1). Contact your network administrator to verify your starting time slot selection, as some time slots may already be in use.

**NOTE:**

After selecting a starting time slot, select D4 or ESF framing by placing switch 8 in the OFF (D4) position or ON (ESF).

**Table 3-1. Starting Time Slot: Switches 3 – 7 on Switchpack S1 (1 of 2)**

Starting Time Slot	Switch Position					Maximum Payload Rate
	3	4	5	6	7	
Not Applicable	OFF	OFF	OFF	OFF	OFF	1544 kbps (Unframed)
<b>1</b>	<b>ON</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>1536 kbps (24 x 64)</b>
2	OFF	ON	OFF	OFF	OFF	1472 kbps (23 x 64)
3	ON	ON	OFF	OFF	OFF	1408 kbps (22 x 64)
4	OFF	OFF	ON	OFF	OFF	1344 kbps (21 x 64)
5	ON	OFF	ON	OFF	OFF	1280 kbps (20 x 64)
6	OFF	ON	ON	OFF	OFF	1216 kbps (19 x 64)
7	ON	ON	ON	OFF	OFF	1152 kbps (18 x 64)
8	OFF	OFF	OFF	ON	OFF	1088 kbps (17 x 64)
9	ON	OFF	OFF	ON	OFF	1024 kbps (16 x 64)
10	OFF	ON	OFF	ON	OFF	960 kbps (15 x 64)
11	ON	ON	OFF	ON	OFF	896 kbps (14 x 64)
12	OFF	OFF	ON	ON	OFF	832 kbps (13 x 64)
13	ON	OFF	ON	ON	OFF	768 kbps (12 x 64)
14	OFF	ON	ON	ON	OFF	704 kbps (11 x 64)
15	ON	ON	ON	ON	OFF	640 kbps (10 x 64)
16	OFF	OFF	OFF	OFF	ON	576 kbps (9 x 64)
17	ON	OFF	OFF	OFF	ON	512 kbps (8 x 64)
18	OFF	ON	OFF	OFF	ON	448 kbps (7 x 64)
19	ON	ON	OFF	OFF	ON	384 kbps (6 x 64)
20	OFF	OFF	ON	OFF	ON	320 kbps (5 x 64)
21	ON	OFF	ON	OFF	ON	256 kbps (4 x 64)
22	OFF	ON	ON	OFF	ON	192 kbps (3 x 64)
23	ON	ON	ON	OFF	ON	128 kbps (2 x 64)

**Table 3-1. Starting Time Slot: Switches 3 – 7 on Switchpack S1 (2 of 2)**

Starting Time Slot	Switch Position					Maximum Payload Rate
	3	4	5	6	7	
24	OFF	OFF	OFF	ON	ON	64 kbps (1 x 64)
	ON	OFF	OFF	ON	ON	
	OFF	ON	OFF	ON	ON	
	ON	ON	OFF	ON	ON	
	OFF	OFF	ON	ON	ON	
	ON	OFF	ON	ON	ON	
	OFF	ON	ON	ON	ON	
	ON	ON	ON	ON	ON	
						Disable Switchpack (not used)

## Line Build Out

To change the line build-out length move the jumper on J1 as follows:

- Place P1 in the 1–2 position for a line build out of 0–133 ft.
- Place P1 in the 2–3 position for a line build out of 533–655 ft.

---

# Customizing Hotwire 7915 Nest Card Termination Units

# 4

---

## Changing Your Configuration Options

This chapter provides instructions on how to change or verify configuration options for Hotwire 7915 E1 Nest Card Termination Units. [Chapter 3](#) provides configuration options for Hotwire 7914 T1 nest card termination units.

Configuration option settings determine how the unit operates. You can change the unit's configuration options by changing switchpack settings on the nest card.

### ► Procedure

To change or verify configuration options:

Use electrostatic discharge (ESD) protection when handling electronic components.

1. Loosen the retaining screws at the top and bottom of the nest card.
2. Remove the card from the nest.
3. Find switchpack S1. See [Switchpack and Jumper Locations](#) on page 4-2.
4. Place each switch on the switchpack in the ON or OFF position for the desired configuration option. For example, to change a unit's card type from CO to CP, move DIP switch 1 on switchpack S1 to the OFF position.

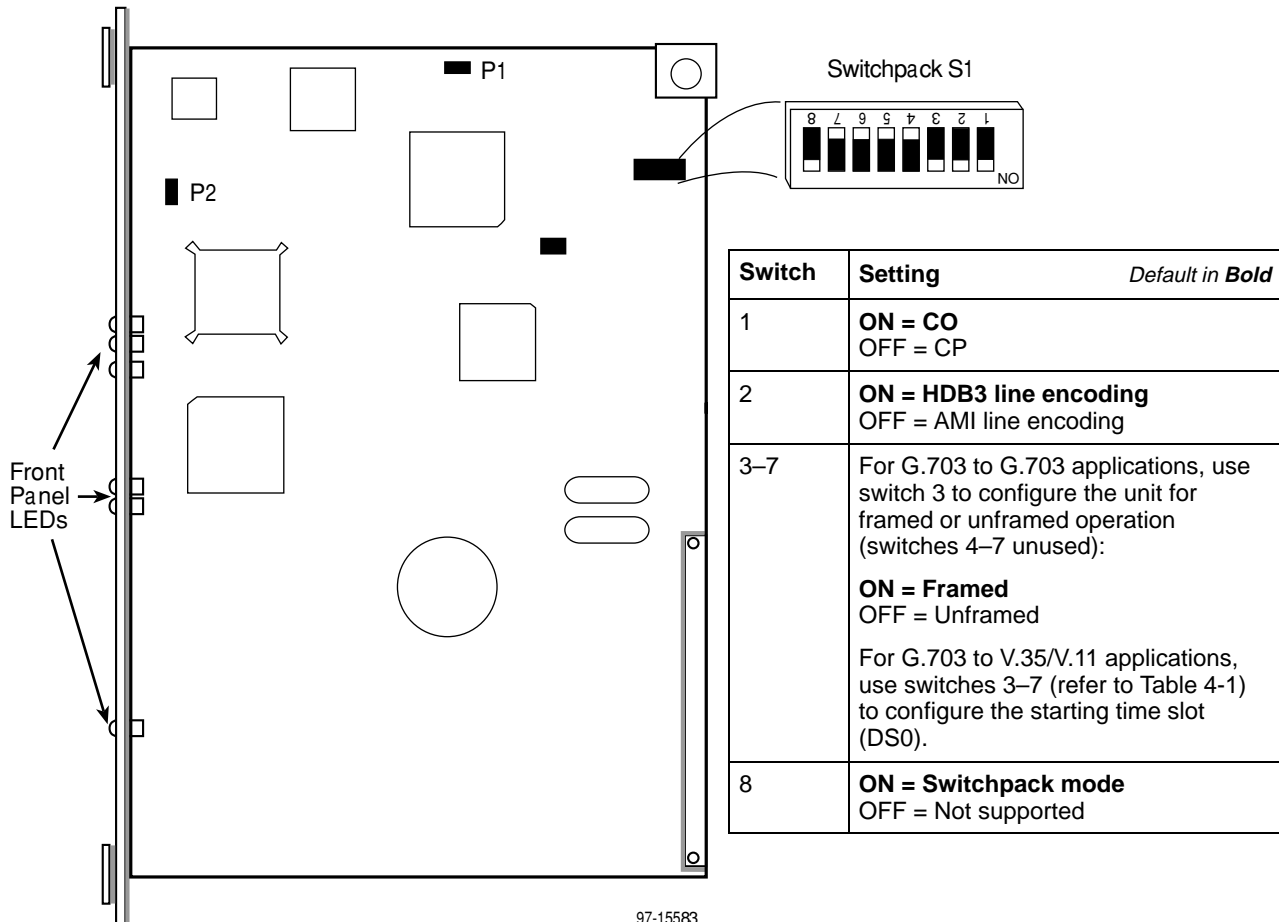
#### **NOTE:**

Switchpack S1 switch 8 must be ON to enable switchpack S1.

5. Return the card to the nest.
6. Tighten the retaining screws at the top and bottom of the nest card.

## Switchpack and Jumper Locations

Use the following figure to locate switchpack S1.



### Hotwire 7915 Nest Card Switchpack and Jumper Locations

- P1 is jumpered 1-2
- There is no jumper on P2
- The ON position is labeled on switchpack S1

## Switchpack Definitions

Change configuration options by moving switchpack S1 DIP switches on the nest card hardware.

Switchpack S1 Definitions	
Switch # . . .	Allows you to . . . <span style="float: right;"><i>Default in <b>Bold</b></i></span>
1	Control whether the board is an STU-C (CO) or an STU-R (CP).  <b>ON = CO</b> OFF = CP
2	Control enabling and disabling of zeros suppression in the line code.  <b>ON = HDB3 line encoding</b> OFF = AMI line encoding
3, 4, 5, 6, 7	Select framed or unframed operation for G.703 to G.703 applications using switch 3 only.  <b>ON = Framed</b> OFF = Unframed  For G.703 to V.35/V.11 applications, use switches 3–7 (refer to Table 4-1) to configure the starting time slot (DS0).
8	Enable switchpack S1.  <b>ON = Enable switchpack</b> OFF = Not supported

### Configuring a Starting Time Slot (G.703-to-V.35/V.11 Configuration)

When operating G.703 to V.35/V.11 at a payload rate less than 2048 kbps, switches 3–7 on switchpack S1 determine the starting time slot, as shown in Table 4-1.

A starting time slot of zero (0, unframed) should only be selected when operating G.703 to V.35/V.11 at the full E1 rate of 2048 kbps.

If the payload rate is *less than* 2048 kbps, use switches 3–7 to select a starting time slot (DS0). Make sure that there are enough subsequent time slots to accommodate the V.35/V.11 payload rate (refer to column three in Table 4-1). Contact your network administrator to verify your starting time slot selection, as some time slots may already be in use.

**Table 4-1. Starting Time Slot Switches 3-7 on Switchpack S1**

Starting Time Slot	Switch Position					Maximum Payload Rate
	3	4	5	6	7	
0	OFF	OFF	OFF	OFF	OFF	2048 kbps (unframed)
1	<b>ON</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>1984 kbps (31 x 64)</b>
2	OFF	ON	OFF	OFF	OFF	1920 kbps (30 x 64)
3	ON	ON	OFF	OFF	OFF	1856 kbps (29 x 64)
4	OFF	OFF	ON	OFF	OFF	1792 kbps (28 x 64)
5	ON	OFF	ON	OFF	OFF	1728 kbps (27 x 64)
6	OFF	ON	ON	OFF	OFF	1664 kbps (26 x 64)
7	ON	ON	ON	OFF	OFF	1600 kbps (25 x 64)
8	OFF	OFF	OFF	ON	OFF	1536 kbps (24 x 64)
9	ON	OFF	OFF	ON	OFF	1472 kbps (23 x 64)
10	OFF	ON	OFF	ON	OFF	1408 kbps (22 x 64)
11	ON	ON	OFF	ON	OFF	1344 kbps (21 x 64)
12	OFF	OFF	ON	ON	OFF	1280 kbps (20 x 64)
13	ON	OFF	ON	ON	OFF	1216 kbps (19 x 64)
14	OFF	ON	ON	ON	OFF	1152 kbps (18 x 64)
15	ON	ON	ON	ON	OFF	1088 kbps (17 x 64)
16	OFF	OFF	OFF	OFF	ON	1024 kbps (16 x 64)
17	ON	OFF	OFF	OFF	ON	960 kbps (15 x 64)
18	OFF	ON	OFF	OFF	ON	896 kbps (14 x 64)
19	ON	ON	OFF	OFF	ON	832 kbps (13 x 64)
20	OFF	OFF	ON	OFF	ON	768 kbps (12 x 64)
21	ON	OFF	ON	OFF	ON	704 kbps (11 x 64)
22	OFF	ON	ON	OFF	ON	640 kbps (10 x 64)
23	ON	ON	ON	OFF	ON	576 kbps (9 x 64)
24	OFF	OFF	OFF	ON	ON	512 kbps (8 x 64)
25	ON	OFF	OFF	ON	ON	448 kbps (7 x 64)
26	OFF	ON	OFF	ON	ON	384 kbps (6 x 64)
27	ON	ON	OFF	ON	ON	320 kbps (5 x 64)
28	OFF	OFF	ON	ON	ON	256 kbps (4 x 64)
29	ON	OFF	ON	ON	ON	192 kbps (3 x 64)
30	OFF	ON	ON	ON	ON	128 kbps (2 x 64)
31	ON	ON	ON	ON	ON	64 kbps (1 x 64)

---

# Monitoring Nest Card Termination Units

# 5

---

## What to Monitor

Front panel LEDs on each Hotwire Model 7914 and 7915 Nest Card Termination Unit provide status information about the nest card, SDSL local loop, and the T1 or E1 network interface. This chapter presents information on how to monitor and interpret the Hotwire 7914 and 7915 nest card termination unit front panel LEDs.

You can also monitor loop status, change operational parameters, or initiate loopback testing using a Hotwire 7900 Basic Maintenance Processor (MTU-M).

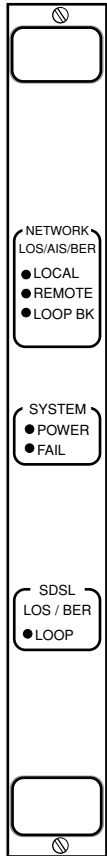
The MTU-M maintenance processor:

- Monitors the status of up to 63 nest card termination units
- Stores the performance history of individual circuits and network status
- Displays individual circuit and loop status on the VT100-compatible terminal
- Interfaces with and reports circuit status to your Network Management System using Simple Network Management Protocol (SNMP)

For further information on the MTU-M, refer to the *Hotwire Model 7900 Maintenance Processor User's Guide*.

## Front Panel LEDs

When power is applied to a nest card, the top three LEDs (LOCAL, REMOTE, and LOOP BK) blink once in sequence and then remain off, indicating a successful start configuration.

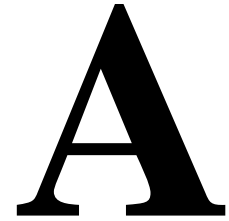


97-15581

LED	Meaning
LOCAL	The local T1 or E1 interface has a loss of signal.
REMOTE	The remote T1 or E1 interface has a loss of signal.
LOOP BK	A loopback has been initiated for testing the equipment connected to this unit.
POWER	Power is applied to the unit.
FAIL	The processor has halted and repairs are required.
LOOP	The SDSL loop has failed. (The LED will blink at board power up until the loop has been synchronized.)

---

# Hotwire Model 7914 Worksheets



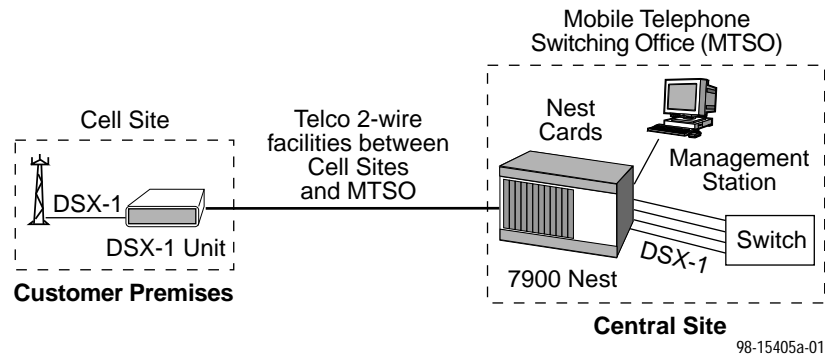
---

## Overview

This appendix provides the configuration settings based on the types of units (DSX-1 or V.35V/11) on either end of the SDSL connection. There are two possible combinations of 7914 nest card and standalone termination units:

- DSX-1-compatible units on both ends
- DSX-1-compatible unit on the CO end, V.35-compatible unit on the CP end

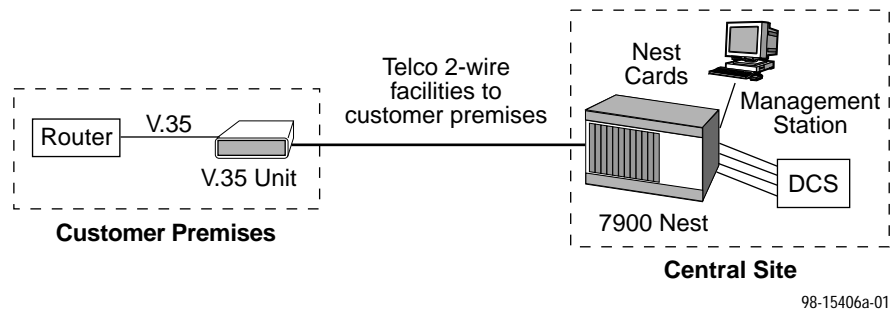
## DSX-1-to-DSX-1 Configuration



To connect two DSX-1-compatible units, configure the units as follows:

Configuration Option	DSX-1-Compatible Unit (Customer Premises)	DSX-1-Compatible Unit (Central Site)
Card Type	CP (default)	CO
Framing	D4, Extended Superframe, or Unframed	Must be same as CP side
Line Build-Out	0 to 133 ft, 533 to 655 ft	0 to 133 ft, 533 to 655 ft
T1 Line Encode	B8ZS or AMI	Must be same as CP side

## DSX-1 Nest (CO)-to-V.35 Standalone (CP) Configuration



To connect a DSX-1-compatible nest unit on the CO side and a V.35-compatible standalone unit on the CP side, configure the units as follows:

Configuration Option	DSX-1-Compatible Unit (Central Site)	V.35-Compatible Unit (Customer Premises)
Card Type	CO	CP
Payload Rate	N/A	See <i>Configuring DSX-1 to V.35 Starting Time Slot and Payload Rates</i> on page A-4.
Starting time Slot	See <i>Configuring DSX-1 to V.35 Starting Time Slot and Payload Rates</i> on page A-4.	N/A
Framing	If the payload rate is 1544 kbps, use unframed. If the payload rate is less than 1544 kbps, use D4 or ESF.	N/A
T1 Line Encode	B8ZS or AMI	N/A
Line Build-Out	0 to 133 feet, 533 to 655 feet	N/A

## Configuring DSX-1-to-V.35 Starting Time Slot and Payload Rate

For DSX-1-to-V.35 Configuration the following table provides information on how to set switches 3–7 in order to select either unframed operation (for a 1544 kbps payload rate) or a starting time slot (when the payload rate is less than 1544 kbps).

### NOTE:

After selecting a starting time slot, select D4 or ESF framing by placing switch 8 in the OFF (D4) position or ON (ESF).

### Starting Time Slot: Switches 3 – 7 on Switchpack S1 (1 of 2)

Starting Time Slot	Switch Position					Maximum Payload Rate
	3	4	5	6	7	
Not Applicable	OFF	OFF	OFF	OFF	OFF	1544 kbps (Unframed)
<b>1</b>	<b>ON</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>OFF</b>	<b>1536 kbps (24 x 64)</b>
2	OFF	ON	OFF	OFF	OFF	1472 kbps (23 x 64)
3	ON	ON	OFF	OFF	OFF	1408 kbps (22 x 64)
4	OFF	OFF	ON	OFF	OFF	1344 kbps (21 x 64)
5	ON	OFF	ON	OFF	OFF	1280 kbps (20 x 64)
6	OFF	ON	ON	OFF	OFF	1216 kbps (19 x 64)
7	ON	ON	ON	OFF	OFF	1152 kbps (18 x 64)
8	OFF	OFF	OFF	ON	OFF	1088 kbps (17 x 64)
9	ON	OFF	OFF	ON	OFF	1024 kbps (16 x 64)
10	OFF	ON	OFF	ON	OFF	960 kbps (15 x 64)
11	ON	ON	OFF	ON	OFF	896 kbps (14 x 64)
12	OFF	OFF	ON	ON	OFF	832 kbps (13 x 64)
13	ON	OFF	ON	ON	OFF	768 kbps (12 x 64)
14	OFF	ON	ON	ON	OFF	704 kbps (11 x 64)
15	ON	ON	ON	ON	OFF	640 kbps (10 x 64)
16	OFF	OFF	OFF	OFF	ON	576 kbps (9 x 64)
17	ON	OFF	OFF	OFF	ON	512 kbps (8 x 64)
18	OFF	ON	OFF	OFF	ON	448 kbps (7 x 64)
19	ON	ON	OFF	OFF	ON	384 kbps (6 x 64)
20	OFF	OFF	ON	OFF	ON	320 kbps (5 x 64)
21	ON	OFF	ON	OFF	ON	256 kbps (4 x 64)
22	OFF	ON	ON	OFF	ON	192 kbps (3 x 64)
23	ON	ON	ON	OFF	ON	128 kbps (2 x 64)

**Starting Time Slot: Switches 3 – 7 on Switchpack S1 (2 of 2)**

Starting Time Slot	Switch Position					Maximum Payload Rate
	3	4	5	6	7	
24	OFF	OFF	OFF	ON	ON	64 kbps (1 x 64)
	ON	OFF	OFF	ON	ON	
	OFF	ON	OFF	ON	ON	
	ON	ON	OFF	ON	ON	
	OFF	OFF	ON	ON	ON	
	ON	OFF	ON	ON	ON	
	OFF	ON	ON	ON	ON	
	ON	ON	ON	ON	ON	
						Disable Switchpack (not used)

## Hotwire 7914 Nest Card Configuration Worksheet

Nest Card Configuration <sup>1</sup>	
Configuration Option	Settings <i>Default in Bold</i>
HDSL Card Type	<b>CO</b> , CP
T1 Line Encode	<b>B8ZS</b> , AMI
Starting Time Slot	Unframed, <b>1</b> – 24
Framing	<b>D4</b> , Extended Super Frame
<sup>1</sup> Refer to Chapter 3, <i>Customizing Hotwire 7915 Nest Card Termination Units</i> for information on switchpack location and configuration options.	

Nest Card Jumper Configuration		
Jumper	Position	Setting <i>Default in Bold</i>
P1 (Line Build-Out)	(1, 2)	<b>0 to 133 feet</b>
	(2, 3)	533 to 655 feet

---

# Hotwire Model 7915 Worksheets

# B

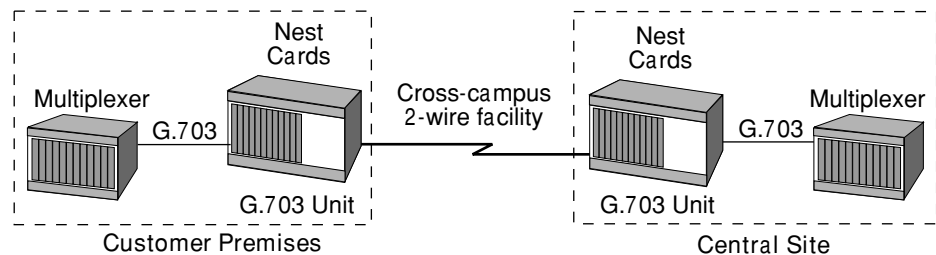
---

## Overview

This appendix provides the configuration settings based on the types of units (G.703 or V.35V/11) on either end of the SDSL connection. There are two possible combinations of 7915 nest card and standalone termination units:

- G.703-compatible units on both ends
- G.703 CO termination unit connected to a V.35/V.11 CP unit

## G.703-to-G.703 Configuration



97-15622

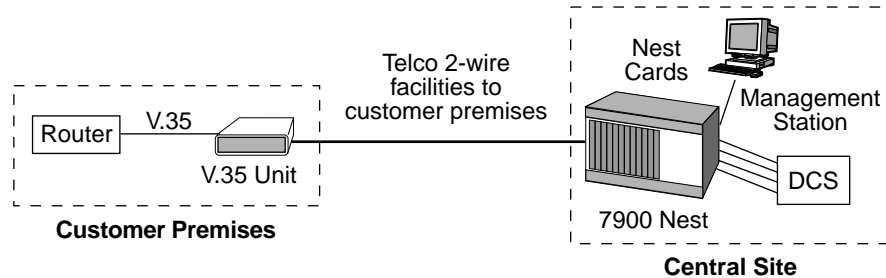
To connect two G.703 termination units, configure the units as follows:

Configuration Option	G.703 Standalone or Nest Unit (Customer Premises)	G.703 Nest Card Unit (Central Site) <sup>1</sup>
Card Type	CP	CO
E1 Line Encode	HDB3 or AMI	Must be same as CP side
Framing	Framed or Unframed (must be the same)	Framed or Unframed (must be the same)

<sup>1</sup> Refer to Chapter 3, *Customizing Hotwire 7915 Nest Card Termination Units* for information on switchpack location and configuration options.

## G.703 Nest Card (CO)-to-V.35 Standalone (CP) Configuration

To connect a G.703 nest card termination unit on the CO side and a V.35-compatible standalone unit on the CP side, configure the units as follows:



98-15406a-01

Configuration Option	V.35 Standalone Unit (Customer Premises)	G.703 Nest Card Unit (Central Site) <sup>1</sup>
Card Type	CP	CO
Payload Rate	1 – 32 (64 – 2048 kbps)	N/A
Framing, Starting Time Slot	N/A	If the payload rate is less than 2048 kbps, select a starting time slot appropriate for the payload rate from Table 4-1.  If the payload rate is 2048 kbps, use Unframed.
E1 Line Code	N/A	HDB3 or AMI
<sup>1</sup> Refer to Chapter 4, <i>Customizing Hotwire 7915 Nest Card Termination Units</i> for information on switchpack location and configuration options.		

## Hotwire 7915 Nest Card Configuration Worksheet

Nest Card Configuration <sup>1</sup>	
Configuration Option	Settings <i>Default in Bold</i>
SDSL Card Type	CP, <b>CO</b>
E1 Line Encoding	<b>HDB3</b> , AMI
Framing	<b>Framed</b> , Unframed, or Select a starting time slot appropriate for the payload rate from Table 4-1.
<sup>1</sup> Refer to Chapter 4, <i>Customizing Hotwire 7915 Nest Card Termination Units</i> for information on switchpack location and configuration options.	

---

# Glossary

---

<b>AMI</b>	Alternate Mark Inversion coding format.
<b>BPV</b>	Bipolar Violation. A type of error detected by using a modified bipolar signaling method in which a control code is inserted. Used with AMI coding format.
<b>Bridged tap</b>	A section of cable that was used to provide phone service to a home or business that is connected to a live copper wire but is not terminated.
<b>CD</b>	Carrier Detect. A signal indicating that energy exists on the transmission circuit. Associated with Pin 8 on an EIA-232 interface.
<b>Champ connector</b>	64-pin connector used to connect the E1/T1 network or local loop to the HotWire 7900 Nest connectors J5, J6, and J7.
<b>CO</b>	Central Office.
<b>COM port</b>	Communications port. A computer's serial communications port used to transmit to and receive data from a DCE. The DCE connects directly to this port.
<b>CP</b>	Customer Premises.
<b>CPE</b>	Customer Premises Equipment. Terminating equipment supplied by either the customer or some other supplier that is connected to the telecommunications network (e.g., DSUs, terminals, phones, routers, modems).
<b>CRC</b>	Cyclic Redundancy Check. A commonly used method of error detection.
<b>CTS</b>	Clear to Send. An EIA-lead standard for V.24 circuit CT 106; an output signal (DCE-to-DTE).
<b>CV</b>	Code Violation. This is equivalent to a BPV. Used with HDB3 coding format.
<b>DCE</b>	Data Communications Equipment. The equipment that provides the functions required to establish, maintain, and end a connection. It also provides the signal conversion required for communication between the DTE and the network.
<b>DSR</b>	Data Set Ready. An EIA-lead standard for V.24 circuit CT 107; an output signal (DCE-to-DTE).
<b>DSX-1</b>	Transmission standard at T1 speeds, 1.544 Mbps.
<b>DTE</b>	Data Terminal Equipment. The equipment, such as computers, printers, and routers, that provide or create data.
<b>DTR</b>	Data Terminal Ready. An EIA-lead standard for V.24 circuit CT 108; an input signal (DTE-to-DCE).
<b>E1</b>	A data signaling rate common outside the United States. A wideband interface operating at 2.048 Mbps defined by CCITT standards G.703 and G.704.
<b>ETSI</b>	European Telecommunications Standards Institute. A European standards body established in 1988 by a decision of the CEPT (Conference of European Postal and Telecommunications Administrations).
<b>factory defaults</b>	A predetermined set of configuration options for general operation.
<b>FAS</b>	Frame Alignment Signal. A loss of signal (LOS) error detection.

<b>FAW</b>	Frame Alignment Word. A loss of synchronization error detection.
<b>FCC</b>	Federal Communications Commission. Board of Commissioners that regulates all U.S. interstate, intrastate, and foreign electrical communication systems that originate from the United States.
<b>FEBE</b>	Far End Bit Error. Number of errors reported by the remote equipment.
<b>G.703</b>	ITU-TS standard for covering transmission facilities.
<b>HDB3</b>	High Density Bipolar 3 coding format.
<b>HDSL</b>	High-bit-rate Digital Subscriber Loop. Provides high bandwidth, bi-directional transmission over copper wire for both T1 and E1 services.
<b>HTU</b>	Host Termination Unit. A generic reference to either an HTU-C or HTU-R module.
<b>HTU-C</b>	Host Termination Unit – Central. The module at the CO (central office) or central site end of an HDSL connection. Also known as a Line Termination Unit (LTU).
<b>HTU-M</b>	Host Termination Unit – Maintenance. A carrier-mounted module used to perform maintenance operations on one or more HTU-R and HTU-C modules.
<b>HTU-R</b>	Host Termination Unit – Remote. The module at the CP (customer premises) end of an HDSL connection. Also known as a Network Termination Unit (NTU).
<b>HTU-S</b>	Host Termination Unit – SNMP. The SNMP-compatible version of the Maintenance Processor.
<b>LED</b>	Light Emitting Diode. A status indicator that responds to the presence of a certain conditions.
<b>loopback</b>	Used to test various portions of a data link in order to isolate an equipment or data line problem. A diagnostic procedure that sends a test message back to its origination point.
<b>MTSO</b>	Mobile Telephone Switching Office.
<b>OOF</b>	Out Of Frame. An error condition in which frame synchronization bits are in error. A network-reported condition.
<b>reset</b>	A reinitialization of the device that occurs at power-up or in response to a reset command.
<b>RTS</b>	Request to Send. An EIA-lead standard for V.24 circuit CT 105; an input signal (DTE-to-DCE).
<b>RXD</b>	Received Data. An EIA-lead standard for V.24 circuit CT 104; an output signal (DCE-to-DTE).
<b>SDSL</b>	Symmetric Digital Subscriber Line. Provides symmetrical bi-directional transmission over copper wire for both T1 and E1 services.
<b>SNMP</b>	Simple Network Management Protocol. Allows multi-vendor networking devices to be managed more easily with common management tools.
<b>STU</b>	SDSL Termination Unit. A generic reference to either an STU-C or STU-R module.
<b>STU-C</b>	SDSL Termination Unit – Central. The module at the CO (central office) or central site end of an HDSL connection. Also known as a Line Termination Unit (LTU).
<b>STU-R</b>	SDSL Termination Unit – Remote. The module at the CP (customer premises) end of an HDSL connection. Also known as a Network Termination Unit (NTU).
<b>STU-S</b>	SDSL Termination Unit – SNMP. The SNMP-compatible version of the Maintenance Processor.

<b>TXD</b>	Transmit Data. An EIA-lead standard for V.24 circuit CT 103; an input signal (DTE-to-DCE).
<b>T1</b>	A data signaling rate common in the United States. A term for a digital carrier facility used to transmit a DS1 formatted signal of 1.544 Mbps.
<b>V.11</b>	ITU-T standard for a high-speed, 34-pin, DCE/DTE interface. Similar to V.35, but used for longer cable distances where V.35 is not appropriate.
<b>V.35</b>	ITU-T standard for a high-speed, 34-pin, DCE/DTE interface.

---

# Index

---

## A

AMI line encoding, 3-3, 4-3

## B

B8ZS line encoding, 3-3

## C

cables, restrictions, 2-2

CE Mark, C

Component location

Model 7915 Jumpers, 4-2

Model 7915 Switchpack S1, 4-2

Model 7914 jumpers, 3-2

Model 7914 switchpack S1, 3-2

Configuration options, 3-1, 4-1

Model 7914 T1 nest cards, 3-1

G.703-to-G.703, B-1

G.703-to-V.35 configuration, B-2

Model 7915 E1 nest cards, 4-1

Configuration Options Table, Model 7915 E1 (G.703 to V.35/V.11), B-2

configuration options table, Model 7914, A-4

Configuration overview, A-1

7914 Configurations, 1-2

7915 configurations, 1-4

DSX-1 Nest-to-V.35 Standalone, A-2

DSX-1 to DSX-1 Configuration, A-1

Configuration overviews, 1-2

Configuration Worksheets, Model 7915 E1, B-2

configuration worksheets, Model 7914, A-4

## D

Document purpose, iii

Document summary, iii

DS0 selection, 3-3, 4-3

## E

EMI Warnings, C

## F

Features

7914 Features, 1-1

7915 Features, 1-1

7914 Features, 1-1

7915 Features, 1-2

## G

glossary, GL-1–GL-4

## H

HDB3 line encoding, 4-3

## I

Installation procedures

nest card termination units, 2-3

Nest filler panels, 2-4

Intended audience, iii

Interfaces, 1-5

Internet address, A

## L

LEDs, 5-2

line build out, 3-5

line build-out, A-4

loop length, 2-2

## **M**

model 7914 worksheet, A-1  
model 7915 worksheet, B-1  
Monitoring HDSL Termination Units, What to Monitor,  
5-1  
Monitoring SDSL Termination Units, 5-1  
    Front Panel LEDs, 5-2  
MTU-M maintenance processor, 5-1

## **N**

Nest filler panels, 2-4

## **P**

Package checklist, 2-1  
payload rate, A-3  
planning, 2-2

## **R**

Related documents, iv

## **S**

Safety instructions, B  
Sales information, A  
Service information, A  
starting time slot, 3-4, A-3  
    Hotwire 7914 T1 units, 3-3  
    Hotwire 7915 T1 units, 4-3  
Switchpack definitions, 3-3, 4-3  
    Model 7914 switchpack S1 definitions, 3-3, 4-3  
Switchpack locations, 4-2  
    Model 7914 switchpack S1 , 3-2  
    Model 7915 switchpack S1, 4-2

## **W**

Warranty information, A