CDS-100

Diversity Switch
Installation and Operation Manual

Accessory Product for use only with Comtech EF Data CDM-625/A, CDM-850, CDM-840, CDM-760, CDM-750, CDM-570/A, CDM-570L/AL, CDM-710G, CDM-710GL, CDM-710, and CDM-700 Modems
(Modem Firmware and Hardware Requirements Apply)

IMPORTANT NOTE: The information contained in this document supersedes all previously published information regarding this product. Product specifications are subject to change without prior notice.

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PREFACE

About this Manual

This manual provides installation and operation information for the Comtech EF Data CDS-100 Diversity Switch. This document is intended for anyone who installs or operates the CDS-100.

Related Documents

- CDM-625A Advanced Satellite Modem Installation and Operation Manual
  (CEFD P/N MN-CDM625A)

- CDM-625 Advanced Satellite Modem Installation and Operation Manual
  (CEFD P/N MN-CDM625)

- CDM-850 Remote Router Installation and Operation Manual
  (CEFD P/N MN-CDM850)

- CDM-840 Remote Router Installation and Operation Manual
  (CEFD P/N MN-CDM840)

- CDM-760 Advanced High-Speed Trunking Modem Installation and Operation Manual
  (CEFD P/N MN-CDM760)

- CDM-750 Advanced High-Speed Trunking Modem Installation and Operation Manual
  (CEFD P/N MN-CDM750)

- CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual
  (CEFD P/N MN-CDM570A)

- CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual
  (CEFD P/N MN/CDM570L.IOM)

- CDM-710G/710GL High-Speed Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM710G)

- CDM-710 Broadcast Satellite Modem Installation and Operation Manual
(CEFD P/N MN/CDM710.IOM)

- CDM-700 High-Speed Satellite Modem Installation and Operation Manual
(CEFD P/N MN/CDM700.IOM)

Conventions and References

Patents and Trademarks

See all of Comtech EF Data's Patents and Patents Pending at http://patents.comtechefdata.com.

Comtech EF Data acknowledges that all trademarks are the property of the trademark owners.

Warnings, Cautions and Notes

A <u>WARNING</u> INFORMS YOU ABOUT A POSSIBLE HAZARD THAT MAY CAUSE DEATH OR SERIOUS INJURY.

A <u>CAUTION</u> informs you about a possible hazard that MAY CAUSE INJURY or PROPERTY DAMAGE.

A <u>NOTE</u> gives you important information about a task or the equipment.

A <u>REFERENCE</u> directs you to additional information about a task or the equipment.

Examples of Multi-Hazard Notices
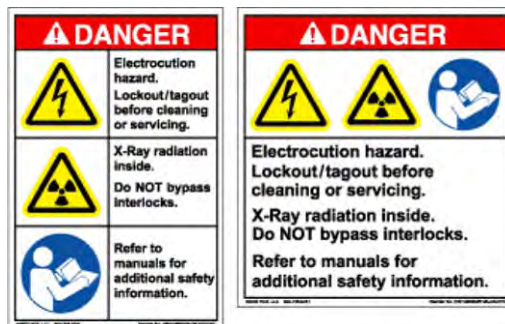
Recommended Standard Designations

The Electronic Industries Association (EIA) designations supersede the Recommended Standard (RS) designations. References to the old designations may be shown when depicting actual text (e.g., RS-232) displayed on the Switch or the individual modem Web Server pages, serial remote

interfaces, Telnet Command Line Interfaces (CLIs), or unit rear panels. All other references in the manual refer to EIA designations.

⚠ **CAUTION – You should carefully review the following information.**

Safety and Compliance

Electrical Safety and Compliance

The unit complies with the **EN 60950 Safety of Information Technology Equipment (Including Electrical Business Machines)** safety standard.

The equipment is rated for operation at ±12 volts DC. It has a maximum power consumption of 4.5 Watts, and draws a maximum of 250 mA at +12 volts DC and 120 mA at -12 volts DC. The power supply current is, in all circumstances, supplied by either a single Comtech EF Data modem, or a pair of these modems.

⚠ **CAUTION – IF THE UNIT IS OPERATED IN A VEHICLE OR MOVABLE INSTALLATION, MAKE SURE THE UNIT IS STABLE. OTHERWISE, EN 60950 SAFETY IS NOT GUARANTEED.**

Electrical Installation

⚠ **CAUTION – CONNECT THE UNIT TO A POWER SYSTEM THAT HAS SEPARATE GROUND, LINE AND NEUTRAL CONDUCTORS. DO NOT CONNECT THE UNIT WITHOUT A DIRECT CONNECTION TO GROUND.**

Operating Environment

⚠ **CAUTION – DO NOT OPERATE THE UNIT IN ANY OF THESE EXTREME OPERATING CONDITIONS:**

- **AMBIENT TEMPERATURES LESS THAN 0° C (32° F) OR MORE THAN 50° C (122° F).**

- **PRECIPITATION, CONDENSATION, OR HUMID ATMOSPHERES OF MORE THAN 95% RELATIVE HUMIDITY.**

- **UNPRESSURIZED ALTITUDES OF MORE THAN 2000 METRES (6561.7 FEET).**

- **EXCESSIVE DUST.**

- **FLAMMABLE GASES.**

- **CORROSIVE OR EXPLOSIVE ATMOSPHERES.**

Equipment Connection

> ⚠️ **THE CDS-100 IS DESIGNED FOR OPERATION ONLY WITH THE COMTECH EF DATA MODEMS LISTED IN THIS MANUAL. THESE MODEMS SUPPLY DC OPERATING CURRENT (ELECTRONICALLY FUSED AND PROTECTED) AND CONTROL SIGNALS FOR THE CORRECT FUNCTIONING OF THIS UNIT. CONNECTION TO OTHER MANUFACTURERS' EQUIPMENT COULD RESULT IN DAMAGE TO THE UNIT. THE CDS-100 IS NOT COMPATIBLE WITH OTHER COMTECH EF DATA MODEMS NOT LISTED IN THIS MANUAL.**

European Union Radio Equipment and Telecommunications Terminal Equipment (R&TTE) Directive (1999/5/EC) and EN 301 489-1

Independent testing verifies that the unit complies with the European Union R&TTE Directive, its reference to EN 301 489-1 (*Electromagnetic compatibility and **R**adio spectrum **M**atters [ERM]; **E**lectro**M**agnetic **C**ompatibility [EMC] standard for radio equipment and services, Part 1: Common technical requirements*), and the Declarations of Conformity for the applicable directives, standards, and practices that follow:

European Union Electromagnetic Compatibility (EMC) Directive (2004/108/EC)

- **Emissions: EN 55022 Class A** – Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

- **Immunity: EN 55024** – Information Technology Equipment: Immunity Characteristics, Limits, and Methods of Measurement.

- **EN 61000-3-2** – Harmonic Currents Emission

- **EN 61000-3-3** – Voltage Fluctuations and Flicker.

- **Federal Communications Commission Federal Code of Regulation FCC Part 15, Subpart B.**

> ⚠️ **CAUTION – TO ENSURE THAT THE UNIT COMPLIES WITH THESE STANDARDS, OBEY THESE INSTRUCTIONS:**

- **Use coaxial cable that is of good quality for connections to the L-Band Type 'N' Rx (receive) female connector.**

- **Use Type 'D' connectors that have back-shells with continuous metallic shielding.**

- **Type 'D' cabling must have a continuous outer shield (either foil or braid, or both). The shield must be bonded to the back-shell.**

- **Operate the Switch and modems with their covers on at all times.**

European Union Low Voltage Directive (LVD) (2006/95/EC)

Symbol	Description
<HAR>	Type of power cord required for use in the European Community.
⚠	**CAUTION**: Double-pole/Neutral Fusing **ACHTUNG**: Zweipolige bzw. Neutralleiter-Sicherung

International Symbols			
Symbol	**Definition**	**Symbol**	**Definition**
∿	Alternating Current	⏚	Protective Earth
⎓	Fuse	⏚	Chassis Ground

For additional symbols, see the Warnings, Cautions and Notes listed earlier in this Preface.

European Union RoHS Directive (2002/95/EC)

This unit satisfies (with exemptions) the requirements specified in the European Union Directive on the Restriction of Hazardous Substances in Electrical and Electronic Equipment (EU RoHS, Directive 2002/95/EC).

European Union Telecommunications Terminal Equipment Directive (91/263/EEC)

In accordance with the European Union Telecommunications Terminal Equipment Directive 91/263/EEC, the unit should not be directly connected to the Public Telecommunications Network.

CE Mark

Comtech EF Data declares that the unit meets the necessary requirements for the CE Mark.

Product Support

For all product support, please call:

+1.240.243.1880

+1.866.472.3963 (toll free USA)

Comtech EF Data Headquarters

http://www.comtechefdata.com

Comtech EF Data Corp.

2114 West 7th Street

Tempe, Arizona USA 85281

+1.480.333.2200

Warranty Policy

Comtech EF Data products are warranted against defects in material and workmanship for a specific period from the date of shipment, and this period varies by product. In most cases, the warranty period is two years. During the warranty period, Comtech EF Data will, at its option, repair or replace products that prove to be defective. Repairs are warranted for the remainder of the original warranty or a 90 day extended warranty, whichever is longer. Contact Comtech EF Data for the warranty period specific to the product purchased.

For equipment under warranty, the owner is responsible for freight to Comtech EF Data and all related customs, taxes, tariffs, insurance, etc. Comtech EF Data is responsible for the freight charges only for return of the equipment from the factory to the owner. Comtech EF Data will return the equipment by the same method (i.e., Air, Express, Surface) as the equipment was sent to Comtech EF Data.

All equipment returned for warranty repair must have a valid RMA number issued prior to return and be marked clearly on the return packaging. Comtech EF Data strongly recommends all equipment be returned in its original packaging.

Comtech EF Data Corporation's obligations under this warranty are limited to repair or replacement of failed parts, and the return shipment to the buyer of the repaired or replaced parts.

Limitations of Warranty

The warranty does not apply to any part of a product that has been installed, altered, repaired, or misused in any way that, in the opinion of Comtech EF Data Corporation, would affect the reliability or detracts from the performance of any part of the product, or is damaged as the result of use in a way or with equipment that had not been previously approved by Comtech EF Data Corporation.

The warranty does not apply to any product or parts thereof where the serial number or the serial number of any of its parts has been altered, defaced, or removed.

The warranty does not cover damage or loss incurred in transportation of the product. The warranty does not cover replacement or repair necessitated by loss or damage from any cause beyond the control of Comtech EF Data Corporation, such as lightning or other natural and weather related events or wartime environments.

The warranty does not cover any labor involved in the removal and or reinstallation of warranted equipment or parts on site, or any labor required to diagnose the necessity for repair or replacement.
The warranty excludes any responsibility by Comtech EF Data Corporation for incidental or consequential damages arising from the use of the equipment or products, or for any inability to use them either separate from or in combination with any other equipment or products.

A fixed charge established for each product will be imposed for all equipment returned for warranty repair where Comtech EF Data Corporation cannot identify the cause of the reported failure.

Exclusive Remedies

Comtech EF Data Corporation's warranty, as stated is in lieu of all other warranties, expressed, implied, or statutory, including those of merchantability and fitness for a particular purpose. The buyer shall pass on to any purchaser, lessee, or other user of Comtech EF Data Corporation's products, the aforementioned warranty, and shall indemnify and hold harmless Comtech EF Data Corporation from any claims or liability of such purchaser, lessee, or user based upon allegations that the buyer, its agents, or employees have made additional warranties or representations as to product preference or use.

The remedies provided herein are the buyer's sole and exclusive remedies. Comtech EF Data shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Notes:

Chapter 1. INTRODUCTION

1.1 Overview

Figure 1-1. CDS-100 Diversity Switch Module

The CDS-100 Diversity Switch Module is designed to support switched diversity applications. **Figure 1-1** shows the Modem Connectors Side (bottom left) and Configuration Side (bottom right) of the module, and as assembled to its available optional rack mounting kit (top).

Switched diversity systems are those employing two (or sometimes more) antennas for the purpose of maintaining a communications link, should the signal from one of those antennas becomes blocked or severely degraded. In satellite communications, a switched diversity system is frequently employed in situations where:

- The ground station is mobile (such as a ship) and direct line-of-sight is blocked by buildings, bridges, fjords, etc.

- The ground station is fixed, but where there is frequent blockage of an antenna (such as an oil drilling platform where helicopter traffic interrupts the line of sight view to the satellite

- The ground station is fixed, but the nature of the communication link is deemed critical so fully redundant communication chains (modems, RF equipment, antenna, and even satellites) are incorporated to provide very high availability.

The CDS-100 is compatible for use with the Comtech EF Data modems listed in **Table 1-1**. This table summarizes the requirements for supporting data switching hardware and software.

Table 1-1. CDS-100 Compatibility Summary

Modem	1:1 Data Switch	Firmware/Hardware Requirement[Note 3]
CDM-625A	Built into the CDM-625A	Firmware Ver. 1.1.1 or higher
CDM-625	Built into the CDM-625	Firmware Ver. 1.1.1 or higher
CDM-850	Built into the CDM-850	Firmware Ver. 1.7.1.X or higher
CDM-840	Built into the CDM-840	Firmware Ver. 1.2.4 or higher
CDM-760	Built into the CDM-760	Firmware Ver. 1.1.1 or higher
CDM-750	Built into the CDM-750	Firmware Ver. 1.1.1 or higher
CDM-570AL	Built into the CDM-570AL	Firmware Ver. 1.1.1 or higher
CDM-570L	Built into the CDM-570L	Firmware Ver. 1.6.7 or higher
CDM-570L w/IP Module	User-provided hub or Layer 2 switch	Firmware Ver. 1.5.4.2 or higher
CDM-570A	Built into the CDM-570A	Firmware Ver. 1.1.1 or higher
CDM-570	Built into the CDM-570	• Firmware 1.6.7 or higher • Hardware Revision 3
CDM-710G/L	Built into the CDM-710G/L	Firmware Ver. 5.1.1 or higher
CDM-710	Built into the CDM-710	• Firmware Ver. 2.4.1 or higher; • Chassis Rev. A or higher
CDM-700	Built into the CDM-700	• Firmware Ver. 1.1.6 or higher; • Chassis Rev. A or higher

Firmware updates are free and may be downloaded from the Comtech EF Data web site (www.comtechefdata.com). If a modem does not meet the hardware requirements, contact Comtech EF Data Product Support – hardware revision upgrades must be performed at CEFD.

1.2   Physical Features

1.2.1   Modem Side Features

🔍   **Chapter 3. CONNECTORS AND PINOUTS**

Figure 1-2 shows the Modem Side of the CDS-100:

- Two 9-pin 'D-sub' male serial connectors are provided for connection to an external control agent such as an Antenna Control Unit (ACU);

- Two 9-pin 'D-sub' female serial connectors provide the necessary external connections between the Switch and its compatible Comtech EF Data modems.
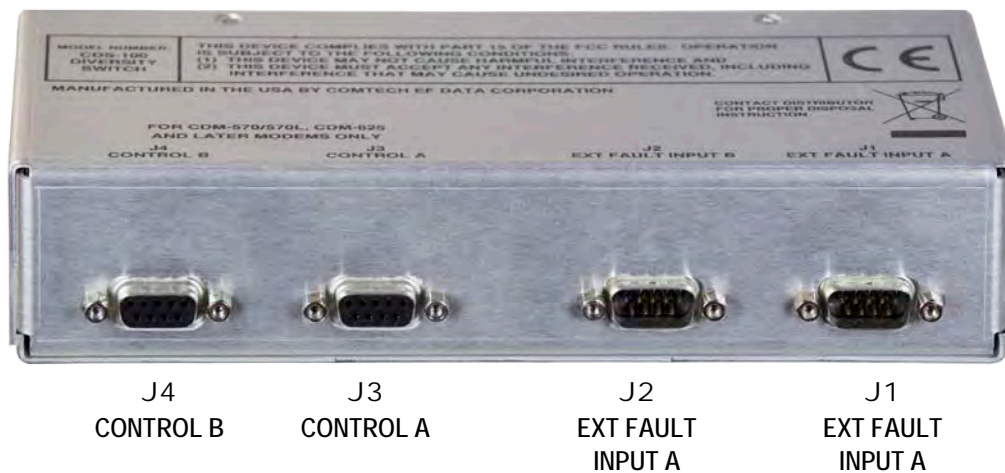
J4	**J3**	**J2**	**J1**
CONTROL B	CONTROL A	EXT FAULT INPUT A	EXT FAULT INPUT A

Ref Des	Name	Connector Type	Function
J1	Ext Fault Input A	Type 'D' 9-pin male (DB-9M)	External input to force 'A' offline
J2	Ext Fault Input B	Type 'D' 9-pin male (DB-9M)	External input to force 'B' offline
J3	Control A	Type 'D' 9-pin female (DB-9F)	Control Interface with Modem 'A'
J4	Control B	Type 'D' 9-pin female (DB-9F)	Control Interface with Modem 'B'

Figure 1-2. CDS-100 – Modem Side Connectors

1.2.2   Configuration Side Features

The Configuration Side provides two sets of DIP switches, which allow the operator to select however the CDS-100 will operate. Two green LED indicators are provided to give visual indication of the Online chain. A ground lug is provided to establish a common ground among equipment.

Figure 1-3 shows these features and the chapters that provide more detailed information.
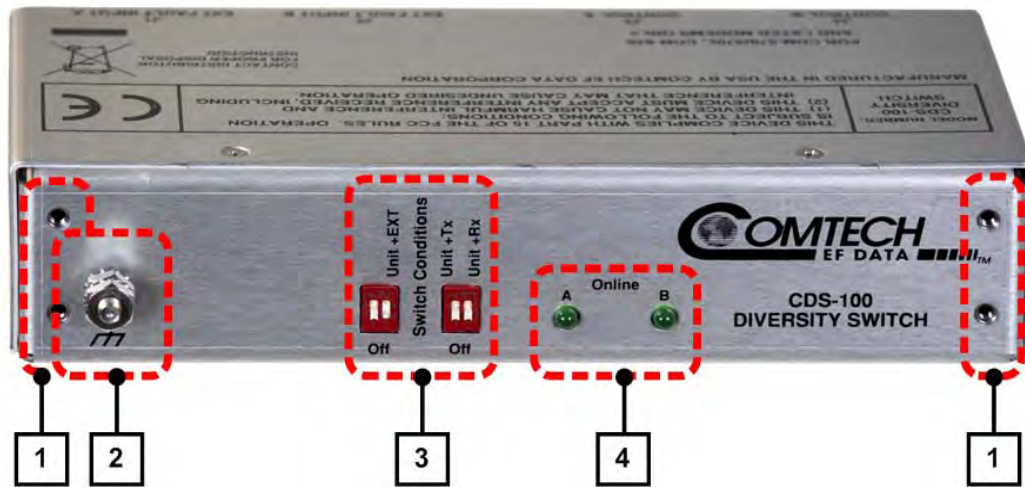
Feature	Description	Chapter Sect.
1	4X #6-32 holes for horizontal rack mounting (used with Switch Mounting Kit KT-0000221)	2.2
2	Ground Stud	2.2, 3.2.2.1
3	"Switch Conditions" DIP Switches	1.3.1, 4.9
4	Online LED Indicators	1.3.1

Figure 1-3. CDS-100 – Configuration Side Features

1.3   Functional Description

The CDS-100 Diversity Switch module does NOT perform any IF or Data switching. Rather, the CDS-100 monitors the status of each modem and monitors the external control interface to determine if it needs to force the Online modem to Offline (and Offline to Online).

1.3.1   Switch / Modem Operation

The CDS-100 is configured with two modems, RF equipment, and antenna to form a complete 'Chain Redundant' communication system. A diversity controller within the CDS-100 continuously monitors the status of faults for both modems to determine which modem should be Online and Offline.

The control cable connection between the modems and the CDS-100 (using the 'J3 | Control A' and 'J4 | Control B' DB-9F female connectors) includes four signal groups:

- **First**, **serial full-duplex communication lines** are routed from one modem to the other modem via the CDS-100. Using these lines, this Online unit can query the Offline unit at regular intervals to determine its configuration. If a difference in configuration is detected, the Online unit will reconfigure the Offline unit so that the configurations are always synchronized. This process is *entirely automatic* – if the Offline unit is replaced, it does not have to be manually reprogrammed to match the Online unit.

- **Second**, the **Modem's Unit, Tx and Rx faults signals** from both modems are routed to the CDS-100. This allows the diversity controller to always know the health status of both modems.

- **Third**, the **online/offline signals** are routed from the CDS-100 to each modem. Based on the modem faults, the CDS-100 will determine which modem should be Online and Offline. In the event that both modems indicate faults through some malfunction, the CDS-100 switch will select, by default, **Modem 'A'**.

- **Fourth, +12V** is routed from each modem to the CDS-100 for operational power. This power from both modems is diode OR'd so that the switch remains active if power is lost from one of the modems.

The CDS-100 provides two DB-9M male connectors – 'J1 | Ext Fault Input A' and 'J2 | Ext Fault Input B' – to allow connection to any electrically compatible external controller. The CDS-100 provides multiple electrical interfaces in support of a variety of user implementations. You may use these connections to manually switch which modem is Online, by using an external input provided by the external controller. To activate the CDS-100's external ports, you must set the 'Unit+EXT' DIP switch to ON. When the External Port DIP switch is in the OFF position, the CDS-100 works identically to the CRS-180 1:1 redundancy switch, but without the RF switching.

Each external port has three control lines: two lines are active LOW and one line is active HIGH. Only one line per External Port may be used at a time. **Minimum pulse width for a valid signal is**

500ms. Note that constant signal level may also be applied. See **Table 1-2** for the definition of each pin assignment.

Table 1-2. CDS-100 – Ext Fault Connector Pin Definition

Pin	Signal Name	Signal Function	Type
1	+5V	+5 VDC output signal, current limited to 2.5 mA	Output
6	Ground	Ground	Passive
2	Control #3 – Active High	Voltage Range +5V to +15V	Input
7	---	Should not be used	No Connect
3	---	Should not be used	No Connect
8	Ground	Ground	Passive
4	Control #2 – Active Low	CMOS logic "0" or Relay closure to ground	Input
9	---	Should not be used	No Connect
5	Control #1 – Active Low	CMOS logic "0" or Relay closure to ground	Input

Chapter 3. CONNECTORS AND PINOUTS

You may enable **Manual Switching** via the Online modem, through its front panel or by remote control.

You may control **Automatic Switching** via setup of the desired switch-over conditions using the DIP switches on the CDS-100. This selection provides a great deal of flexibility in the operation of the switch: you can select between *Modem Unit faults only*; *Modem Unit faults or Receive Traffic faults*; *Modem Unit faults or Transmit Traffic faults*; *Modem Unit faults or External Control*; or all three.
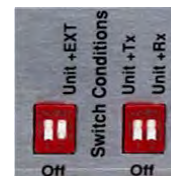
Automatic Switching is assisted by the two green LEDs, located to the right of the DIP switches on the Configuration Side of the CDS-100, indicating which modem is Online.

With the 'bridging' architecture of the CDS-100 (whereby identical terrestrial data traffic signals are routed to both Online and Offline modems), the diversity controller can avoid unnecessary switchovers. By examining the fault status of both modems, it can infer if the fault is external to the system.

For example, you have configured your CDS-100 for switchover following Unit faults or Transmit Traffic faults, and you have configured your modems for external clock operation. Now, suppose that the external equipment (network, multiplex, router, etc.) fails – both the Offline and Online modems will now show a Transmit Traffic fault (No Clock Detected from Terrestrial Port). The CDS-100 Controller State Machine will see that both faults have occurred at the same time (in fact, within a 0.5 second window), and infers that the fault is external. Therefore, no unnecessary switchover is initiated.

1.3.2   Diversity Data Switching

Diversity switching differs from standard modem 1:1 redundancy switching, whereas diversity switching usually means full chain redundancy is in use and, therefore, data and IF switching is handled via equipment external to Comtech EF Data's supplied equipment.

The CDS-100 is designed to provide the system designer with maximum flexibility by allowing the modems to switch autonomously or slaved to an external controller. In most applications, slaved operation is used.

1.3.2.1   Basic Diversity Operation
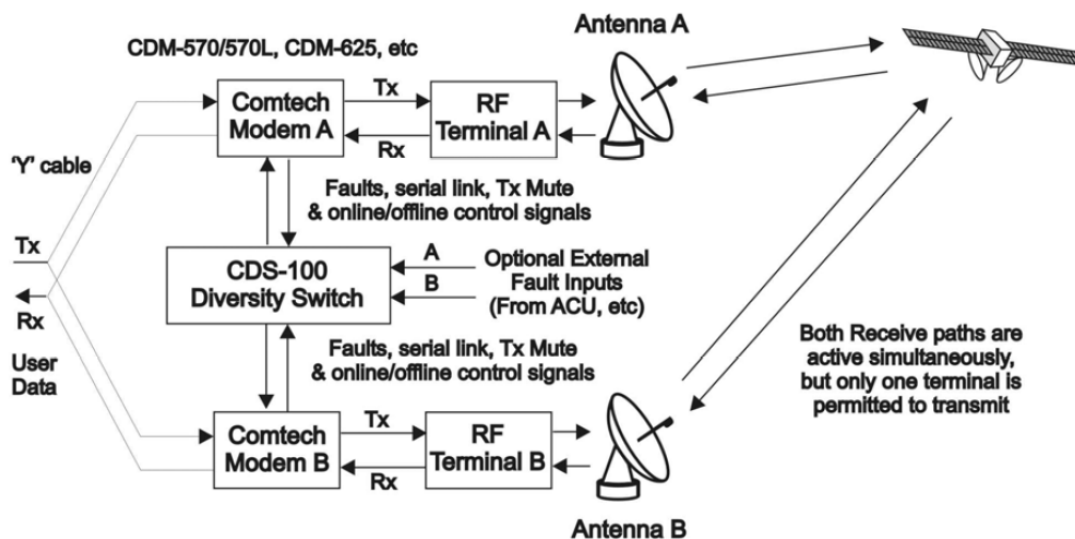
Figure 1-4. Basic Diversity Operation

In most basic diversity configurations, an external control system provides the monitoring and control of both fully redundant communication chains. In such cases, you must configure the CDS-100 to switch only on Unit Fault or Ext Fault. You must provide proper cabling between your 'Controller' and the 'J1' and 'J2' interfaces of the CDS-100.

If Modem Chain 'A' is online, and it is desired to switch to Modem Chain 'B', then your 'Controller' must provide the proper signal activation on the 'J1' interface to force Modem 'A' Offline and Modem 'B' Online. Likewise, if Modem Chain 'B' is online, and it is desired to switch to Modem Chain 'A', then your 'Controller' must provide the proper signal activation on the 'J2' interface to force Modem 'B' Offline and Modem 'A' Online.

1.3.2.2 CDM-625/A with CnC Diversity Operation
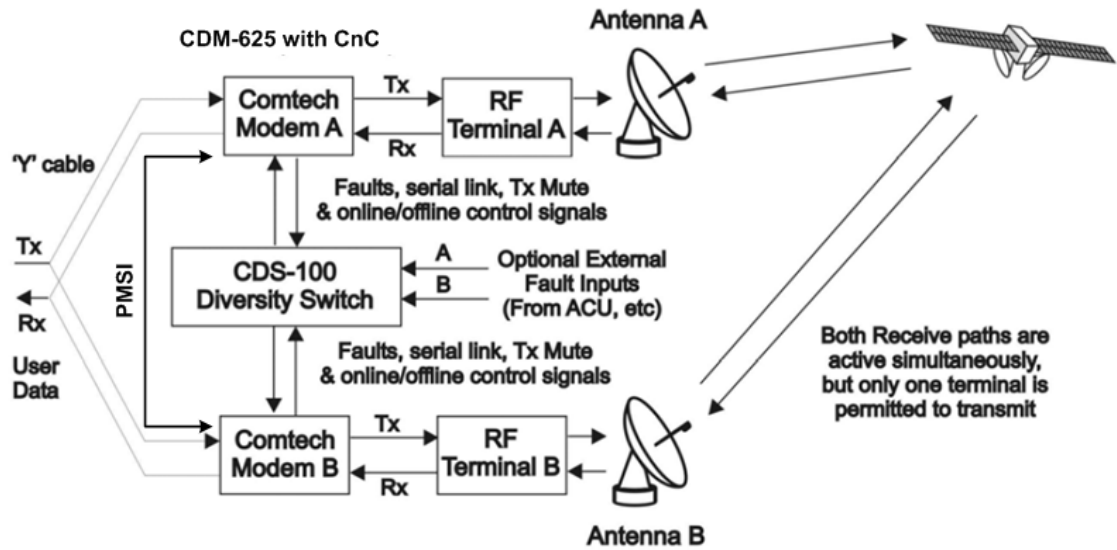
Figure 1-5. CDM-625/A with CnC Diversity Operation

For CDM-625 or CDM-625A with Carrier-In-Carrier operation, diversity operation is identical as described previously, with one additional requirement: You must use the modems' Pre-Mapped Symbol Interface (PMSI) in order to allow the offline modem to demodulate the composite signal.

See the **CDM-625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)** or **CDM-625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)** for a description of the PMSI system and the required tables.

PMSI is protected by U.S. Patent No. 8,022,781

1.4   Summary of Specifications

Equipment Type	Comtech EF Data CDS-100 Diversity Switch
Manufacturer	Comtech EF Data, Tempe, Arizona USA
Comtech EF Data Modems Supported	• CDM-625A Advanced Satellite Modem (18 kbps – 25 Mbps) • CDM-625 Advanced Satellite Modem (18 kbps – 25 Mbps) • CDM-850 Remote Router • CDM-840 Remote Router • CDM-760 Advanced High-Speed Trunking Modem • CDM-750 Advanced High-Speed Trunking Modem • CDM-570AL L-Band Satellite Modem • CDM-570A 70/140 MHz Satellite Modem • CDM-570L L-Band Satellite Modem • CDM-570 70/140 MHz Satellite Modem • CDM-710GL L-Band High-Speed Satellite Modem • CDM-710G 70/140 MHz High-Speed Satellite Modem • CDM-710 L-Band Broadcast Satellite Modem • CDM-710 70/140 MHz Broadcast Satellite Modem • CDM-700 L-Band Satellite Modem • CDM-700 70/140 MHz Satellite Modem
Operating Modes	• Fully Automatic under control of supporting 1:1 switch. • Manual under control of supporting 1:1 switch.
Architecture	• Full bridging architecture with configuration synchronization. • Rx IF signal fed to both Online and Standby units.
Switch Conditions	Tx/Rx switching follows state of supporting data switching via control input from data switch.
Weight	1.1lbs (0.5kg)
Dimensions	1.7 H x 5.7 W x 4.1 D inches (43 H x 143 W x 104 D mm [excluding connectors]) 19-inch rack mounting kit available.
Power requirements	1 Watt maximum +12 volts DC @ 80 mA (max) (Power supplied by modems)
Approvals	'CE' as follows: • EMC • Safety

Notes:

Notes:

Chapter 2. INSTALLATION

2.1 Unpack and Inspect the Shipment

The CDS-100 Diversity Siwitchmodule and its optional Installation and Operation Manual (otherwise available online at http://www.comtechefdata.com) were packaged and shipped in a reusable cardboard carton containing protective foam spacing.

CAUTION – THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD PRECAUTIONARY PROCEDURES WHEN HANDLING THE EQUIPMENT.

Once opened, inspect the shipment:

Step	Task
1	Keep all shipping materials.
2	Check the packing list to make sure the shipment is complete.
3	Inspect the equipment for damage. If damage exists, immediately contact the carrier and Comtech EF Data to submit a damage report.
4	Read the manual.

2.2   Mount the Switch

The CDS-100 switch module's small size and weight allow it to be freestanding. You may choose to let the module hang freely, supported only by the interfacing cables.
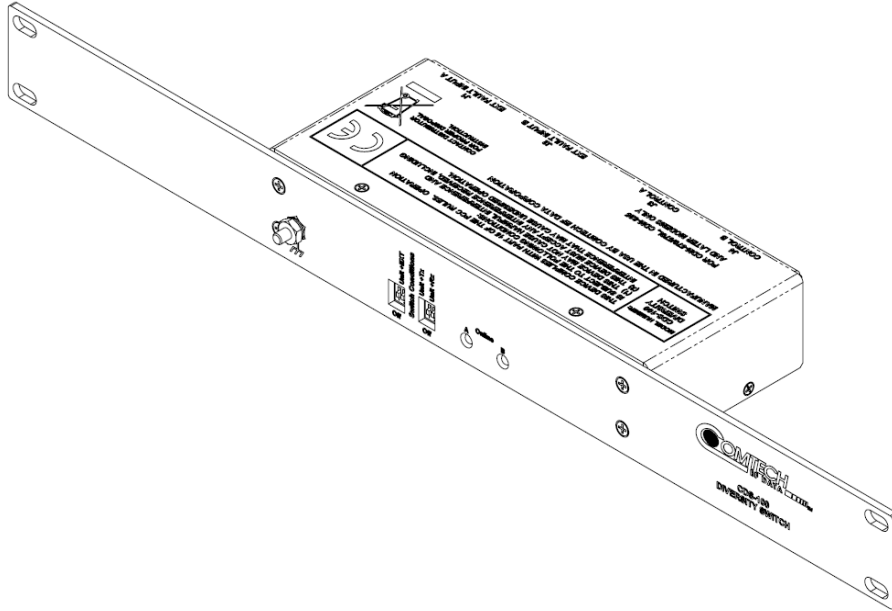
Comtech EF Data KT-0000221 Switch Mounting Kit		
CEFD P/N	Qty	Description
FP-0001112	1	Switch Mounting Panel
HW/632X5/16FHMS	4	#6-32 x 5/16" LG SS Flat Head Machine Screw

Figure 2-1. Optional KT-0000221 Switch Mounting Kit

You may also mount the module into a 1RU space at the front or rear of the rack enclosure that houses the modems. The optional Comtech EF Data KT-0000221 Mounting Panel Kit is available for this purpose. As shown in **Figure 2-1**, the module can be horizontally installed onto the kit's slotted mounting panel. User-supplied screws are then required to secure the assembly to the rack enclosure threaded mounting rails.

⚠ **CAUTION – PROPER GROUNDING PROTECTION IS REQUIRED. The equipment must be connected to the protective earth connection at all times. It is therefore imperative that the Switch and its paired modems are properly grounded – using the ground stud provided on the Switch antenna side panel and the ground studs located on the modem rear panels – during installation, configuration, and operation.**

Chapter 3. SWITCH CONNECTORS AND PINOUTS

3.1 Cabling Connection Types

The cable and connector types described in this section are commonly used in many Comtech EF Data products. Each cable type is typically dedicated to a specific mode of operation.

The CDS-100 Diversity Switch and its compatible modems may not use all of these connector types.

> **The European EMC Directive (EN55022, EN50082-1) requires that you use properly shielded cables for DATA I/O. These cables must be double-shielded from end-to-end, ensuring a continuous ground shield.**

3.1.1 Coaxial Cable Connections

Figure 3-1 show the coaxial cables (plugs) and their mating connectors (jacks/sockets) that Comtech EF Data uses with their products: '**BNC**', '**TNC**', '**N**', '**F**', and '**SMA**'.

Coupling Type	Connector Type	
	Plug (Male)	Jack (Female)
Bayonet (Type 'BNC' shown)		
Threaded (Type 'N' shown)		

Figure 3-1. Coaxial Connector Examples

These connectors are available in two coupling styles – **Bayonet** or **Threaded**:

- **Bayonet Coupling Style** – The jack has a pair of guideposts that accommodate the plug's lockdown slots. This lockdown design provides secure assembly without over-tightening the connection.

- **Threaded Coupling Style** – The jack features external threads. The plug shell features internal threads, and has either a knurled outer surface to permit hand-tightening of the connection, or hex flats to accommodate torqued installation.

Connection Instructions:

- **Bayonet Coupling Connections:** Use the plug slots to guide, then slide the plug onto the jack posts. Then, turn the plug clockwise until the jack posts are fully seated within the plug slot.

- **Threaded Coupling Connections:** Engage the plug onto the jack threads, and then turn the plug clockwise until it is fully threaded onto the jack. Do not over-tighten the connection.

3.1.1.1 Type 'BNC'

BNC connectors feature a **Bayonet Coupling** design.

3.1.1.2 Type 'TNC'

TNC connectors feature a **Threaded Coupling** design similar to Type 'N', Type 'F,' and Type 'SMA' connectors.

3.1.1.3 Type 'N'

Type 'N' connectors feature a **Threaded Coupling** design similar to Type 'TNC', Type 'F', and Type 'SMA' connectors.
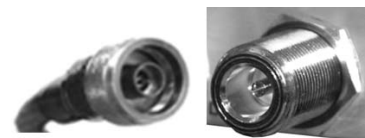
3.1.1.4 Type 'F'

Type 'F' connectors feature a **Threaded Coupling** design similar to Type 'TNC', Type 'N', and Type 'SMA' connectors.

3.1.1.5 Type 'SMA' (Subminiature Version 'A')

Type 'SMA' connectors feature a **Threaded Coupling** design similar to
Type 'TNC', Type 'N', and Type 'F' connectors.

3.1.2 D-Subminiature Cable Connections

Type 'D' Connection Type	Example
Chassis Receptacles: (TOP) Female (BOTTOM) Male	
Type 'D' Cable With Jack Screws (Female Shown)	

Figure 3-2. D-Subminiature Connector Examples

D-Subminiature connectors are also called **Type 'D'** or '**D-Sub**' connectors. The connector pair
features multiple rows of pins (male side) coupled to mating sockets (female side). The cable
plug and chassis receptacle each feature a D-shaped profile that interlock to ensure proper pin
orientation and connector seating.

Either chassis receptacle gender features two jack nuts for secure assembly of the cable plug to
the chassis receptacle.

Whether its gender is male or female, the cable plug features two jack screws for secure
connection to the jack nuts provided on the mating chassis receptacle. The jack screws may be
hand tightened or tightened with a standard flat-blade screwdriver.

Connection Instructions: Orient the plug to the receptacle in the proper position. Press firmly
into place. Use the jack screws to secure the plug to the receptacle jack nuts. Do not over-
tighten.

3.1.3 RJ-45, RJ-48 Cable Connections

The plug for an RJ-45 or RJ-48 cable features a flexible tab. The RJ-45
or RJ-48 jack features a mating slot. This design configuration assures
proper installation and pin orientation.

Connection Instructions: Press down the tab on the cable plug, and then insert the plug into the
RJ-4*x* jack. The connection is complete when the tab 'clicks' into position inside the jack.

3.2　CDS-100 User Connections

3.2.1 CDS-100 Modem Side Features

The CDS-100 Diversity Switch modem side connectors (**Figure 3-3**) provide all necessary external connections between the module and its compatible Comtech EF Data modems**.**
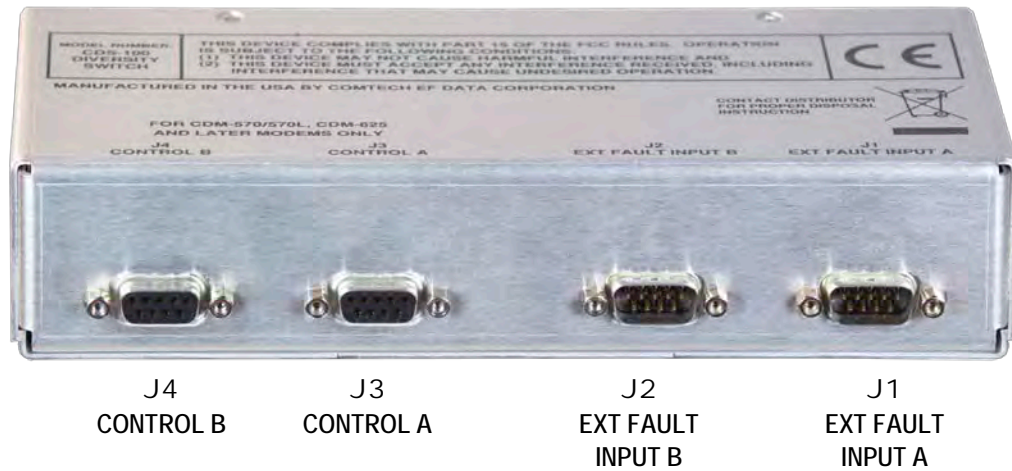
J4	**J3**	**J2**	**J1**
CONTROL B	CONTROL A	EXT FAULT INPUT B	EXT FAULT INPUT A

Ref Des	Name	Connector Type	Function
J1	Ext Fault Input A	Type 'D' 9-pin male (DB-9M)	External input to force 'A' offline
J2	Ext Fault Input B	Type 'D' 9-pin male (DB-9M)	External input to force 'B' offline
J3	Control A	Type 'D' 9-pin female (DB-9F)	Control Interface with Modem 'A'
J4	Control B	Type 'D' 9-pin female (DB-9F)	Control Interface with Modem 'B'

Figure 3-3. CDS-100 – Modem Side Connectors

3.2.1.1 'J1 | Ext Fault Input A' Control Connector (DB-9M, Modem 'A')

The 'J2 | Ext(ernal) Fault Input A' control connector is a 9-pin Type 'D' male interface. Pins 2, 4, and 5 provide optional electrical types for connection to customer supplied external equipment.

Table 3-1. 'J1 | Ext Fault Modem A' Control Connector Pin Assignments

Pin	Signal Name	Signal Function	Type
1	+5V	+5 VDC output signal, current limited to 2.5 mA	Output
6	Ground	Ground	Passive
2	Control #3 – Active High	Voltage Range +5V to +15V	Input
7	---	Should not be used	No Connect
3	---	Should not be used	No Connect
8	Ground	Ground	Passive
4	Control #2 – Active Low	CMOS logic "0" or Relay closure to ground	Input
9	---	Should not be used	No Connect
5	Control #1 – Active Low	CMOS logic "0" or Relay closure to ground	Input

3.2.1.2 'J2 | Ext Fault Input B' Control Connector (DB-9M, Modem 'B')

The 'J2 | Ext(ernal) Fault Input B' control connector is a 9-pin Type 'D' male interface. Pins 2, 4, and 5 provide optional electrical types for connection to customer supplied external equipment.

Table 3-2. 'J2 | Ext Fault Modem B' Control Connector Pin Assignments

Pin	Signal Name	Signal Function	Type
1	+5V	+5 VDC output signal, current limited to 2.5 mA	Output
6	Ground	Ground	Passive
2	Control #3 – Active High	Voltage Range +5V to +15V	Input
7	---	Should not be used	No Connect
3	---	Should not be used	No Connect
8	Ground	Ground	Passive
4	Control #2 – Active Low	CMOS logic "0" or Relay closure to ground	Input
9	---	Should not be used	No Connect
5	Control #1 – Active Low	CMOS logic "0" or Relay closure to ground	Input

3.2.1.3 'J3 | Control A' Connector (DB-9F, Modem 'A')

The 'J3 | Control A' (Modem 'A') control connector is a 9-pin Type 'D' female interface. Pins 2, 3, and 4 carry signals looped through the switch module from Modem 'B' to Modem 'A', while pins 6, 7, and 8 loop the same signals from Modem 'A' through to Modem 'B'. The +12 VDC input, which is diode OR'ed with the corresponding +12 VDC input from Modem 'B', powers the switch module.

Table 3-3. 'J3 | Control A' Connector Pin Assignments

Pin	Signal Name	Signal Function	Direction
5	Ground	Signal Ground	---
9	+12VDC	+12 VDC	In
4	/FAIL_OUT_B	Modem 'B' Fault Indication	Out
8	/FAIL_OUT_A	Modem 'A' Fault Indication	In
3	ONLINE_OUT_B	Modem 'B' Online Indication	Out
7	ONLINE_OUT_A	Modem 'A' Online Indication	In
2	AUX_SER_TX_B	Modem 'B' Serial Tx	Out
6	AUX_SER_TX_A	Modem 'A' Serial Tx	In
1	Ground	Signal Ground	---

3.2.1.4 'J4 | Control B' Connector (DB-9F, Modem 'B')

The 'J4 | Control B' (Modem 'B') control connector is a 9-pin Type 'D' female interface. Pins 2, 3, and 4 carry signals looped through the switch module from Modem 'A' to Modem 'B', while pins 6, 7, and 8 loop the same signals from Modem 'B' through to Modem 'A'. The +12 VDC input, which is diode OR'ed with the corresponding +12 VDC input from Modem 'A', powers the switch module.

Table 3-4. 'J4 | Control B' Connector Pin Assignments

Pin	Signal Name	Signal Function	Direction
5	Ground	Signal Ground	---
9	+12VDC	+12 VDC	In
4	/FAIL_OUT_B	Modem 'A' Fault Indication	Out
8	/FAIL_OUT_A	Modem 'B' Fault Indication	In
3	ONLINE_OUT_B	Modem 'A' Online Indication	Out
7	ONLINE_OUT_A	Modem 'B' Online Indication	In
2	AUX_SER_TX_B	Modem 'A' Serial Tx	Out
6	AUX_SER_TX_A	Modem 'B' Serial Tx	In
1	Ground	Signal Ground	---

3.2.2 CDS-100 Configure Side Features

🔍
- **See Sect. 1.3.1 in Chapter 1. INTRODUCTION for information about the LED Indicators.**

- **See Sect. 1.3.1 in Chapter 1. INTRODUCTION and Sect. 4.9 in Chapter 4. MODEM AND SWITCH CONFIGURATION for information about the "Switch Conditions" DIP Switches.**
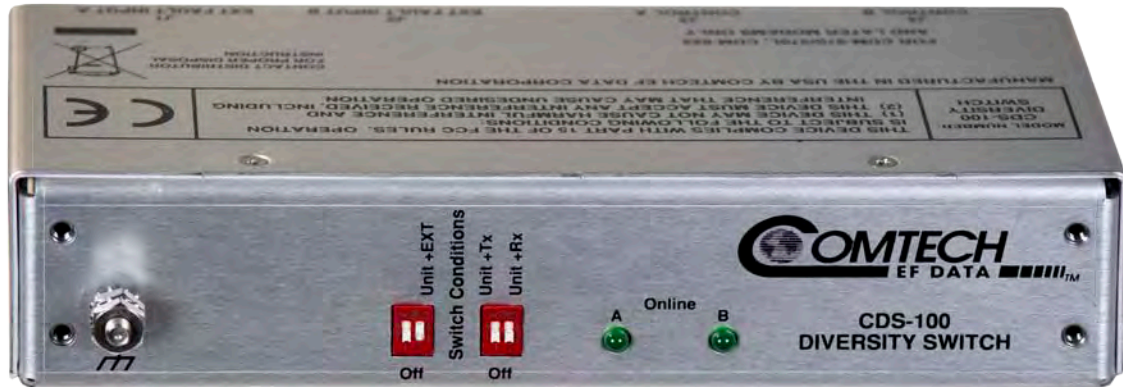
Figure 3-4. CDS-100 – Configure Side Features

3.2.2.1   Ground Stud

⚠️ CAUTION – PROPER GROUNDING PROTECTION IS REQUIRED. THE INSTALLATION INSTRUCTIONS REQUIRE THAT YOU MUST ENSURE THE INTEGRITY OF THE PROTECTIVE EARTH AND THAT YOU MUST MAINTAIN THE EQUIPMENT'S CONNECTION TO THE PROTECTIVE EARTH AT ALL TIMES.

 Use the #10-32 stud provided on the Configure Side of the Switch for connecting a common chassis ground among equipment.

Notes:

Chapter 4. MODEM AND SWITCH CONFIGURATION

4.1 Overview

1) The terms "1:1 Redundant Operation" and "1:1 Redundancy" are interchangeable with the term "Diversity Switching".

2) To avoid damage to the modems and CDS-100 Diversity Switch, it is important to follow this sequence of configuration:

- **First**, configure the modems for diversity switching operation as outlined in this chapter. The modem-specific sections in this chapter identify the required procedure. Specific interface configuration examples are further identified:

For Modem...	See Chapter Sect.
CDM-625/A	4.2
CDM-850 or CDM-840	4.3
CDM-760 or CDM-750	4.4
CDM-570/A, CDM-570L/AL	4.5
CDM-710G/L, CDM-710, or CDM-700	4.6

- **Second**, once the modems have been properly configured for diversity switching operations, set the DIP switches on the CDS-100 to the correct modem selection, as outlined in this chapter in Sect. 4.9 CDS-100 Switch DIP Settings.

- **Third**, once the modem and switches have been properly configured, connect the cables between the **powered OFF** modems and Switch as instructed in Chapter 5. CABLES and CONNECTIONS.

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4.2   Configure the CDM-625/As for Diversity Switching

- **CDM-625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)**

- **CDM-625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)**

The CDM-625A and CDM-625 Advanced Satellite Modems automatically detect connection to a diversity switching system – the steps required to configure both modems are therefore minimal, with some exceptions:

- If the CDM-625/A has the optional IP Packet Processor **_installed_** and **_enabled_**, 1:1 Redundancy is controlled from the CDM-625/A Web Server (HTTP) Interface **Redundancy** page.

    When both the traffic and backup modems are equipped with the optional IP Packet Processor and are connected to the CDS-100 Diversity Switch, there is no need to use the drop-down menu here, as Packet Processor Redundancy is enabled *automatically.*
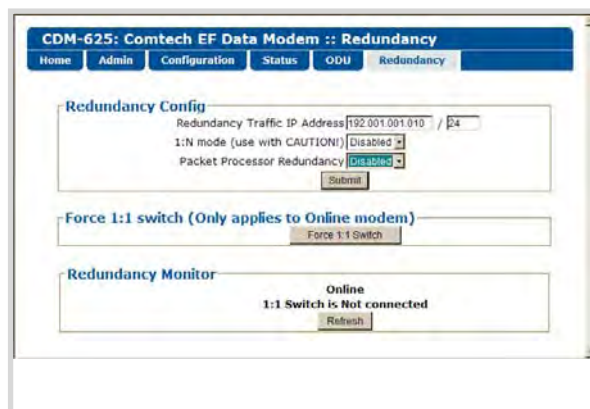
If you wish to operate either modem outside of the redundant setup as a standalone unit, use the drop-down menu to select Packet Processor Redundancy for that specific modem as **Disabled**.

- If terrestrial data is *not* Ethernet and CnC will *not* be used, then no modem 1:1 redundancy configuration is needed. Otherwise, if either apply, refer to the sections that follow.

4.2.1   User Remote Ethernet M&C Interface

You may configure one of the CDM-625/A's four available 10/100 Ethernet ports for M&C Ethernet. As configured in **Dedicated Management Port Mode**, when the modem is offline the *M&C-designated port* remains functional and available for operation, while the three remaining ports are unavailable. Otherwise, if *none* of the 10/100 Ethernet ports are reserved for M&C operation, *all four ports* become unavailable when the modem is offline.

1) **This configuration must be enabled on both modems.**

2) **You may not configure Dedicated Management Port Mode for use when the optional IP Packet Processor is *installed* and *enabled*. With the IP Packet Processor enabled, as a means to avoid Ethernet Networking Loops, only <u>one</u> of the CDM-625/A's four 10/100 Ethernet Ports is used for each modem at any given time**

See the CDM-625A or CDM625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A or MN-CDM625) for instructions to configure one of the four 10/100 Ethernet ports for each modem for remote Ethernet M&C.

4.2.2   Configure Carrier-in-Carrier® for Diversity Switching

The **Pre-Mapped Symbol Interface (PMSI)** is associated with DoubleTalk® Carrier-in-Carrier®. It permits the modulator in a selected unit to provide a direct copy of its output (the outbound interferer) to the second modem. The other modem may then choose to take the PMSI signal and use it for its own CnC reference. In diversity switching, the PMSI is an EIA-485 multi-drop bus system where one device transmits and the other device on the multi-drop bus is configured to receive.

If you use Carrier-in-Carrier® (CnC), you must configure the CnC control setting to **Redundancy** mode using the CDM-625/A front panel menus.

Do these steps to configure the CnC control setting for CDM-625/A Diversity Switching:

Step	Task

1	From the top-level SELECT: menu, use the ◄► arrow and ENTER keys until the PMSI control mode screen appears:
	
	SELECT: Configuration → CnC → PMSI-control
	
	`CnC PMSI mode: Redundancy`
	`    (Idle, Redundancy, Talk, Listen)  (⬍)`
	
	Use the ▲ ▼ arrow keys to select Redundancy, and then press ENTER.

2	The two modems will now need to be connected together via use of a 1:1 PMSI cable (note that this cable bypasses the CDS-100). • **Chapter 5. CABLES AND CONNECTIONS** • **Appendix A. CABLE DRAWINGS**

4.3   CDM-850 or CDM-840 Operation with Diversity Switching

- **CDM-850 Remote Router Installation and Operation Manual
  (CEFD P/N MN-CDM850)**

- **CDM-840 Remote Router Installation and Operation Manual
  (CEFD P/N MN-CDM840)**

The CDM-850 and CDM-840 Remote Routers automatically detect connection to a diversity switching system.

Typical for either product, with both units automatically configured for diversity switching, the Online Unit keeps the Offline Unit updated as Online Unit configuration changes occur.

Use the **Redundancy** section of the CDM-850 or CDM-840 Web Server (HTTP) Interface '**Utility | Utility**' page (similar to the page shown in **Figure 4-1**, but subject to update) to manually force backup of the Online Unit. If the unit is part of a diversity switching pair and this unit is currently *online*, click **[Force Redundancy Switch]** to force the current unit to switch to standby mode.

**Figure 4-1. CDM-850 or CDM-840 Web Server (HTTP) Interface 'Utility' Page
Example (Page Banner, VFP not shown)**

Notes:

Notes:

4.4   CDM-760 or CDM-750 Operation with Diversity Switching

- **CDM-760 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM760)**

- **CDM-750 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM750)**

The CDM-760 and CDM-750 Advanced High-Speed Trunking Modems automatically detect connection to a diversity switching system.

Typical for either product, with both modems automatically configured for diversity switching, the Online Modem keeps the Offline Modem updated as Online Modem configuration changes occur.

You can also manually 'force' backup of the Online Modem. Use the modem front panel to select the **SELECT: Utility ▶ 1:1** screen:

```
Press ENTER key to force Unit into
Standby (1:1 only)
```

If this unit is currently the *Online Unit* in a diversity switching pair, press **ENTER** to force the unit to switch to standby mode.

Notes:

Notes:

4.5   Configure the CDM-570/As, CDM-570L/ALs for Diversity Switching

- **CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM570A)**

- **CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM)**

For correct operation of the CDS-100, the CDM-570/A Satellite Modems must have the following installed:

- **CDM-570A/AL Base Modem Firmware Version 1.1.1 (or higher)**

- **CDM-570/L Base Modem Firmware Version 1.6.7 (or higher)**

- **CDM-570/L IP Module Firmware Version 1.5.4.2 (or higher)**

- **CDM-570/L Hardware Revision 3**

If your modems do not meet this requirement, contact Comtech EF Data Product Support. You may download free firmware updates from the Comtech EF Data web site. Hardware revision upgrades must be performed at Comtech EF Data.

Front Panel
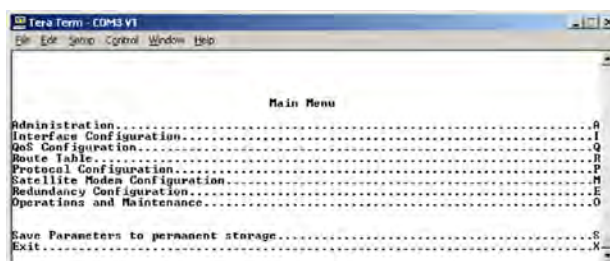
Telnet Command Line Interface (CLI)
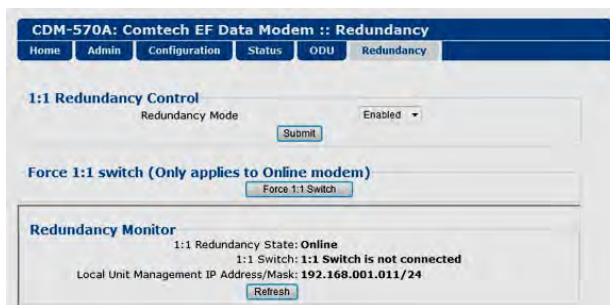
Ethernet Web Server (HTTP) Interface

Figure 4-2. CDM-570/A, CDM-570L/AL Configuration Interface Examples

Because the modem automatically detects if it is connected to a diversity switching system, the steps required to configure both modems are minimal. Modem configuration, monitor and control are possible through **local** or **remote** means (**Figure 4-2**):

- **Local Control –** Use the modem front panel to fully configure, monitor, and control the modem operation:

  o The LEDs indicate, in a summary fashion, the status of the modem.

  o The VFD (Vacuum fluorescent Display) is an active display showing two lines of 24 characters each. It produces a blue light with adjustable brightness. Nested menus display all available options and prompt you to carry out a required action.

  o The keypad comprises six individual keyswitches. The keys have a positive 'click' action that provides tactile feedback. Enter data via the keypad. Data, prompts, and messages are displayed on the VFD.

- **Serial Remote Control –** Configuration, monitoring and control of redundant systems is possible via remote means over an EIA-485 multi-drop bus using the Windows Command Line, where data is transmitted in asynchronous serial form using ASCII characters.

- **Ethernet Remote Control –** Configuration, monitoring and control of redundant systems is possible via remote means over an Ethernet connection using the Telnet Command Line Interface (CLI) or the CDM-570/A or CDM-570L/AL Web Server (HTTP) Interface.

4.5.1 CDM-570/A, CDM-570L/AL Non-IP Configuration for Diversity Switching

Do these steps for setup of CDM-570/A or CDM-570L/AL modems for Diversity Switching, when the terrestrial data type is **non-Ethernet** (i.e. EIA-422, G.703).

Step	Task

1	Enable 1:1 Redundancy on both modems:
	
	• From the CLI Main Menu, press 'E' to open the 1:1 Redundancy Configuration page.
	
	    o From the 1:1 Redundancy Configuration page, press 'R' for Diversity Switching, and then set operation to ENABLE.
	
	    o Press 'S' to ""`Save Parameters to permanent storage`".
	
	• Alternately, using the Web Server (HTTP) Interface REDUNDANCY page: Use the drop-down list in the 1:1 Redundancy Control section of the page to select Enabled.
	
	Click [Submit] to save.

2	Connect the cables to CDS-100. This includes the modem and external controller cables. **Chapter 5. CABLES AND CONNECTIONS**

4.5.2   IP Configuration for Diversity Switching (CDM-570/L ONLY)

Do these steps for setup of a CDM-570/L IP Diversity Switching System:

Step	Task
1	Use a Layer 2 switch (preferred) or hub to establish an Ethernet connection between the two modems.
2	Before you connect the modems to the CDS-100, you must first use the CLI to configure the following CDM-570/L IP Module settings: From the **Main Menu**, navigate to the proper configuration menu: • Redundancy Configuration Menu → 1:1 Redundancy: Set to DISABLED. • Administration Menu → Working Mode: Set both modems to the same Working Mode. • Administration Menu → Features: Both modems must have the same IP Option Feature set.
3	For both modems, use the CLI to enter a unique IP Address that is on the same subnet: • Interface Configuration → Ethernet Interface → IP Address Then, verify that you can ping from one modem to the other: • Operations and Maintenance → Diagnostics → Ping
4	Use the CLI on both modems to set Redundancy Configuration → 1:1 Redundancy to ENABLED. Press 'S' to "**Save Parameters to permanent storage**".
5	Power down both modems.
6	Connect the modems to the CDS-100. 🔍 **CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM): Sect. H.6 Cabling with the CDM-570L.**
7	While monitoring the CLI on both modems, observe the following after powering on both modems at the same time (also observe the CDS-100 Online LEDs to see which modem is the Online modem).
7 (cont)	Online modem CLI displays: 1:1 Redundancy (Auto Detected) Redundancy: PARAM File Connection Established. Redundancy: Sending PARAM File... Offline modem CLI displays: 1:1 Redundancy (Auto Detected) Redundancy: Received PARAM File... Writing 5447 bytes to PARAM file on Flash
8	On the Online modem, select the 1:1 Redundancy Configuration menu (Figure 4-3). Observe that the correct IP Address/Mask is displayed for the Local and Redundant Unit. You will then need to set the Traffic IP Address/Mask (this also needs to be in the same subnet as the Management IP addresses).


```
🖳 Tera Term - COM3 VT                                              _|□|×|
File  Edit  Setup  Control  Window  Help

                      1:1 Redundancy Configuration

1:1 Redundancy.............................[Enabled].......................R

1:1 Redundancy State.....................[Online]

Traffic IP Address.......................[172.18.10.20]................T

Traffic Subnet Prefix Length.............[ 24    ]......................M

Management IP Address (Local Unit)........................[172.18.10.21]

Management Subnet Prefix Length (Local Unit)....................[ 24    ]

Management IP Address (Redundant Unit)....................[172.18.10.22]

Management Subnet Prefix Length (Redundant Unit) ...............[ 24    ]

Force Unit Offline........................................................F

Save Parameters to permanent storage. ...................................S

Exit......................................................................X
```

Figure 4-3. CDM-570/L CLI 1:1 Redundancy Configuration Screen

> All configuration changes can only be made to the Online CDM-570/L and require you to press 'S' to "`Save Parameters to permanent storage`". This ensures that the configuration change is also applied to the Backup CDM-570/L.

4.6   Configure the CDM-710G/Ls, -710s, or -700s for Diversity Switching

- **CDM-710G/710GL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM710G)**

- **CDM-710 Broadcast Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM710.IOM)**

- **CDM-700 Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM700.IOM)**

> **For correct operation of the CDS-100, the CDM-710G/L, -710, and -700 modems must have the following installed:**
>
> - **For the CDM-710G/L:**
>   - **Firmware Version 5.1.1 (or higher)**
>
> - **For the CDM-710:**
>   - **Firmware Version 2.4.1 (or higher)**
>   - **Hardware Revision A (chassis with round-buttoned keypad)**
>
> - **For the CDM-700:**
>   - **Firmware Version 1.1.6 (or higher)**
>   - **Hardware Revision A (chassis with round-buttoned keypad)**
>
> **Note that Hardware upgrades are possible only for the CDM-710 or CDM-700 <u>Rev. A</u> version chassis and <u>later</u> – diversity switching operation is *not* available with hardware versions prior to Rev. A.**
>
> **If your modems do not meet these requirements, contact Comtech EF Data Product Support. You may download free firmware updates from the Comtech EF Data web site. Hardware revision upgrades must be performed at Comtech EF Data.**

Modem configuration, monitor and control are possible through **local** or **remote** means:

- **Local Control –** Use the modem front panel to fully configure, monitor, and control the modem operation:

  - The LEDs indicate, in a summary fashion, the status of the modem.

  - The VFD (Vacuum fluorescent Display) is an active display showing two lines of 24 characters each. It produces a blue light with adjustable brightness. Nested menus display all available options and prompt you to carry out a required action.

o   The keypad comprises six individual keyswitches. The keys have a positive 'click' action
     that provides tactile feedback. Enter data via the keypad. Data, prompts, and messages
     are displayed on the VFD.

- **Serial Remote Control –** Configuration, monitoring and control of redundant systems is
  possible via remote means over an EIA-485 multi-drop bus using the Serial Console
  Command Line Interface (CLI), where data is transmitted in asynchronous serial form using
  ASCII characters.

- **Ethernet Remote Control –** Configuration, monitoring and control of redundant systems is
  possible via remote means over an Ethernet connection using the CDM-7XX Web Server
  (HTTP) Interface.

4.6.1   Non-IP Diversity Switching Configuration

Do these steps for setup of the CDM-710GL, -710, or -700 modems for Diversity Switching when
the terrestrial data type is **non-Ethernet** (e.g., ASI, HSSI, G.703):

Step	Task
1	On both modems, set the redundancy to the Enable state: CONFIG: AUX (Redundancy Mode) → ENA/DIS – set to Enable.
2	Connect all cables to the modems and the CDS-100. This includes the modem and external controller cables. **Chapter 5. CABLES AND CONNECTIONS**

4.6.2   IP Diversity Switching Configuration

Do these steps for setup of the CDM-710GL, -710, or -700 modems for IP Diversity Switching
(i.e., when the terrestrial data type is **Gigabit Ethernet (GigE** or **GbE)**):

Step	Task
1	Before you connect the modems to the CDS-100, you must configure the following CDI-70 IP module settings on the modem. From the modem front panel: CONFIG: AUX (Redundancy Mode) → ENA/DIS set to Disable.
2	On both modems, set the redundancy to the Enable state: CONFIG: AUX (Redundancy Mode) → ENA/DIS set to Enable. Press ENTER to save your settings.
3	Connect all cables to the modems and the CDS-100. This includes the modem and external controller cables. Additionally, you will need an Ethernet connection between the modems via a user-provided Layer 2 switch.

Step	Task
3 (cont.)	Chapter 5. CABLES AND CONNECTIONS
4	Use the front panel LEDs to verify that one modem is ONLINE; also verify that the ONLINE LED for the CDS-100 indicates the same modem online state (e.g., Modem 'A' or 'B').

All configuration changes can only be made to the Online Modem and require you to "`Save Parameters to permanent storage`" to ensure the configuration change is also applied to the Backup Modem.

Notes:

_____

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4.7   CDS-100 DIP Switch Settings

> ⓘ The 'Switch Conditions' DIP switches are set depending upon the type of Tx or Rx traffic conditions resultant of switchover. Some modems have additional settings or alarm masks that affect conditions – refer to the pertinent modem manual for detailed explanations.

Figure 4-4 shows the DIP switches located on the Configure Side of the CDS-100 Diversity Switch. Use these DIP switches with the accompanying table to set the '**Switch Conditions**' that determine switchover functionality for a given diversity switching configuration.
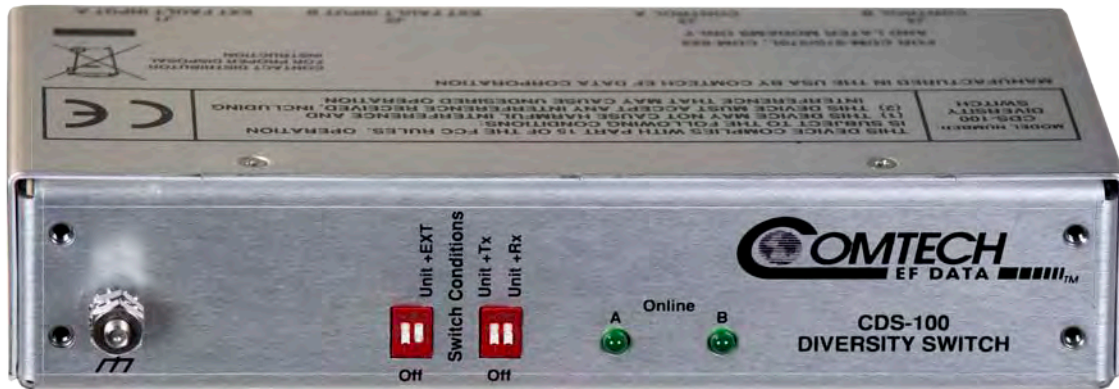
'Switch Conditions' DIP Settings			
Unit+Ext	Unit+Tx	Unit+Rx	Result
Down (Off)	Down (Off)	Down (Off)	Switchover upon a Unit fault Only
Up	Down (Off)	Down (Off)	Switchover upon a Unit or Ext fault
Down (Off)	Up	Down (Off)	Switchover upon a Unit or Tx Traffic fault
Up	Up	Down (Off)	Switchover upon a Unit or Ext or Tx Traffic fault
Down (Off)	Down (Off)	Up	Switchover upon a Unit or Rx Traffic fault
Up	Down (Off)	Up	Switchover upon a Unit or Ext or Rx Traffic fault
Down (Off)	Up	Up	Switchover upon a Unit or Tx or Rx Traffic fault
Up	Up	Up	Switchover upon a Unit or Ext or Tx Traffic or Rx Traffic fault

Figure 4-4. CDS-100 DIP Switch Settings

Notes:

Notes:

Chapter 5. CABLES AND CONNECTIONS

5.1 Overview

This chapter identifies the modem-specific CDS-100 Diversity Switch Kit and the auxiliary data interface cables or kits required for that particular configuration.

1) **The terms "1:1 Redundant Operation" and "1:1 Redundancy" are interchangeable with the term "Diversity Switching".**

2) **The cables required between each modem and Switch should be of shielded, twisted-pair construction, with the grounded shield bonded to the back shell. All data cables should be wired correctly using the pinout and connection information as specified in <u>Appendix A. CABLE DRAWINGS.</u>**

3) **It is physically impossible to connect all available data interface solutions within a single diversity switching system at a given time. For example, when using the CDM-625/A in a Diversity Switching System, you is unable to establish an ASI interface together with a G.703 Unbalanced interface, or an EIA-422/232 interface together with an HSSI interface. Therefore, the quantities of cables and accessories furnished with each kit have been predetermined with this operational limitation taken into consideration.**

4) **The type of 1:1 Y-Splitter cable required for modem-to-user interconnection depends on your data interface. It is essential to ensure that the control connections are made correctly.**

5) **The Electronic Industries Association (EIA) designations supersede the Recommended Standard (RS) designations. References to the old designations may be shown when depicting actual text (e.g., RS-232) displayed on Switch or the individual modem Web Server pages, serial remote interfaces, Telnet Command Line Interfaces (CLIs), or unit rear panels. All other references in the manual refer to EIA designations.**

6) **The sections in this chapter that identify the Diversity Switch Kit required for your modems are as follows:**

- **Sect. 5.2 Common Diversity Switch Kits**

- **Sect. 5.3 Cabling the CDM-625/A**

- **Sect. 5.4 Cabling the CDM-850**

- **Sect. 5.5 Cabling the CDM-840**

- **Sect. 5.6 Cabling the CDM-760 or CDM-750**

- **Sect. 5.7 Cabling the CDM-570/A or CDM-570L/AL**

- **Sect. 5.8 Cabling the CDM-710G or CDM-710GL**

- **Sect. 5.9 Cabling the CDM-710**

- **Sect. 5.10 Cabling the CDM-700**

Separately sold interface kits and cable assemblies are available to facilitate connection from the modems to a variety of user terrestrial data interfaces. Examples of these cabling configurations are further identified throughout this chapter.

5.2   Common CDS-100 Diversity Switch Kits

When assembling a Comtech EF Data Diversity Switching System, in addition to purchasing the desired modem pair (one Online/Traffic Modem, one Offline/Backup Modem), you must purchase a Diversity Switch Kit tailored to your modem choice. Each kit provides the CDS-100 Diversity Switch module and the control cables required for connection of the switch to the modems in the diversity switching configuration.

Kit usage, on a per-modem basis, is as follows:

CDS-100 Diversity Switch Kit	Modem Pair	See...
KT-0000265	CDM-625/A	Figure 5-1
	CDM-850	Figure 5-15
	CDM-840	Figure 5-19
	CDM-760 or CDM-750	Figure 5-22
	CDM-570/L or CDM-570A/AL	Figure 5-27
KT-0020556	CDM-710G/L	Figure 5-33
	CDM-710	Figure 5-38
	CDM-700	Figure 5-43

Separately sold kits are available to facilitate connection from the modem to various user terrestrial data interfaces, excluding Ethernet (which requires user-provided CAT5 Ethernet cables and Layer 2 switches). Examples of such kit usage are provided for each modem in the "Modem-to-User Data Interface Connections and Examples" sections in this chapter.

5.2.1 KT-0000265 Diversity Switch Kit (CDM-625/A, CDM-850, CDM-840, CDM-760, CDM-750, CDM-570/A, CDM-570L/AL)

KT-0000265 Diversity Switch Kit			
CEFD Part No.	Qty	Description	Used For
PL-0001023	1	CDS-100 Switch – Top Assembly	Diversity Switching
CA/WR9378-4*	2	Control Cable – Universal, DB-9M → DB-9M, 4'	Modem → Switch Control

> *** Alternate Cabling Note: CEFD Universal Control Cable CA/WR9378-8 (DB-9M → DB-9M, 8'), sold separately, is available for use in place of CA/WR9378-4**

5.2.2 KT-0020556 Diversity Switch Kit (CDM-710G/L, CDM-710, CDM-700)

KT-0020566 Diversity Switch Kit			
CEFD Part No.	Qty	Description	Used For
PL-0001023	1	CDS-100 Switch – Top Assembly	Diversity Switching
CA/WR12135-1*	2	Cable Assy, Control Adapter RoHS-Compliant, DB-15F → DB-9M, 6'	Modem → Switch Control

> *** Alternate Cabling Notes:**
>
> 1) **To provide User access to modem "Fault Summary Relay," Control 'Y' Cable CA/WR13011-4 (DB-15F → DB-9M [4'], DB-9M [6"]), sold separately, is available for use in place of the CA/WR12135-1 cable.**
>
> 2) **Control Cable CA/WR12135-1 will mute the Offline modem's Tx IF. If this is not desired, then an alternate cable, Control Cable CA-0000187 (DB-15F → DB-9M, 6'), sold separately, is available for use in place of the CA/WR12135-1 cable**

5.3   Cabling to the CDM-625/A

1) For information on the CDM-625/A's 1:1 auto-enable functionality, see:

- **Chapter 4. MODEM AND SWITCH CONFIGURATION**

- **CDM-625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)**

- **CDM-625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)**

2) For information on the cables identified in this section, see Appendix A. CABLE DRAWINGS.

5.3.1   CDS-100→CDM-625/A Control Interface Cabling Using Kit KT-0000265

1) **Excluding modems, the KT-0000265 CDS-100 Diversity Switch Kit (Sect. 5.2.1) provides all components shown in Figure 5-1.**

2) **When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.**

3) **Terrestrial data interface components/kits must be ordered separately. See Sect. 5.3.2 for CDM-625/A terrestrial data interface configuration and connection examples and details.**
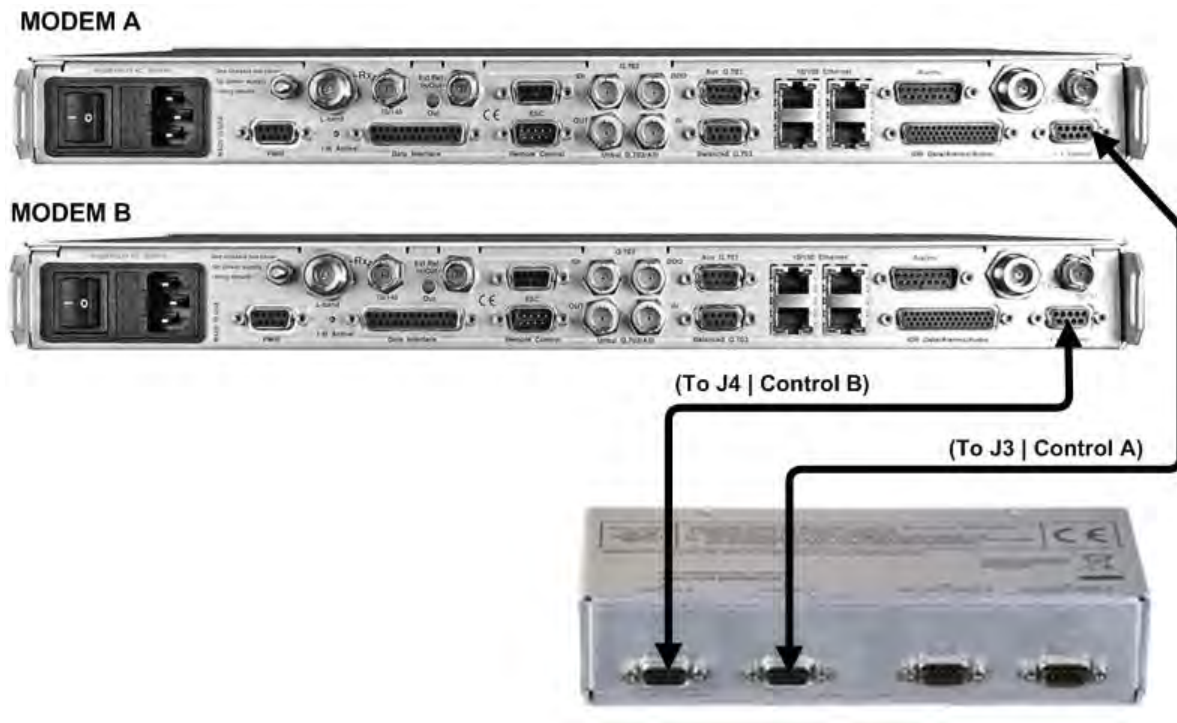
CAUTION – It is ESSENTIAL that you make the control connections <u>correctly</u>.

CEFD Part No.	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-1. CDM-625/A Modem-to-Switch Control Connections (CEFD Kit KT-0000265)

5.3.2   Modem-to-User Data Interface Connections and Examples

5.3.2.1   Modem-to-User Non-IP Data Interface Connections and Examples

> **The data cables and components identified in each of the examples that follow in this section must be purchased separately, as required.**

In addition to the control Modem-to-Switch control cabling shown previously, a number of data interface configurations are available for the CDM-625A and CDM-625 Advanced Satellite Modems. The **Figure 5-2** block diagram is typical for the examples shown in **Sects. 5.3.2.1.1** through **5.3.2.1.8**.

With the exception of the IP (10/100 Ethernet) Interface configurations shown in **Sect. 5.3.2.2** (which use customer-supplied Ethernet cables and Layer 2 switches), you must use one cabling and component kit per modem pair for each user interface (see examples for specific quantities).
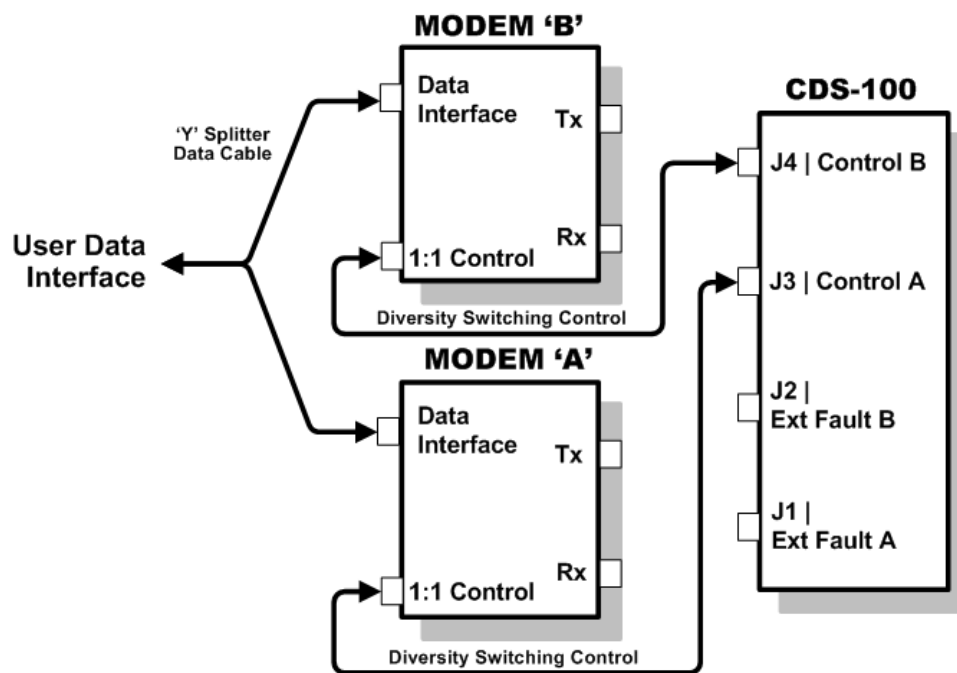
Figure 5-2. CDM-625/A Block Diagram – User→Modem→Switch

5.3.2.1.1 EIA-422, V.35 Interface Example

CEFD Part No.	Qty	Description
CA/RB10461-1	1	Cable – 1:1 'Y' Splitter, (2X) DB-25M⊡DB-25F
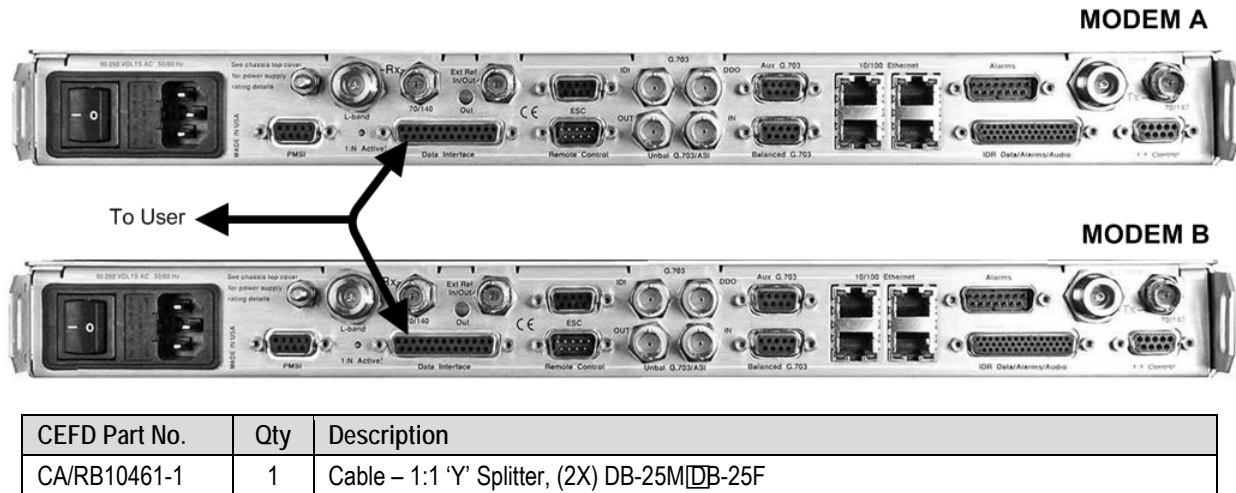
Figure 5-3. CDM-625/A EIA-422, V.35 Interface Example

5.3.2.1.2 HSSI Interface Example

CEFD Part No.	Qty	Description
CA/RB10461-1	1	Cable – 1:1 'Y' Splitter, (2X) DB-25M⊡DB-25F
PL-0000307	1	CIC-60 – Interconnect Converter, DB-25M⊡HD-50F (SCSI-II)
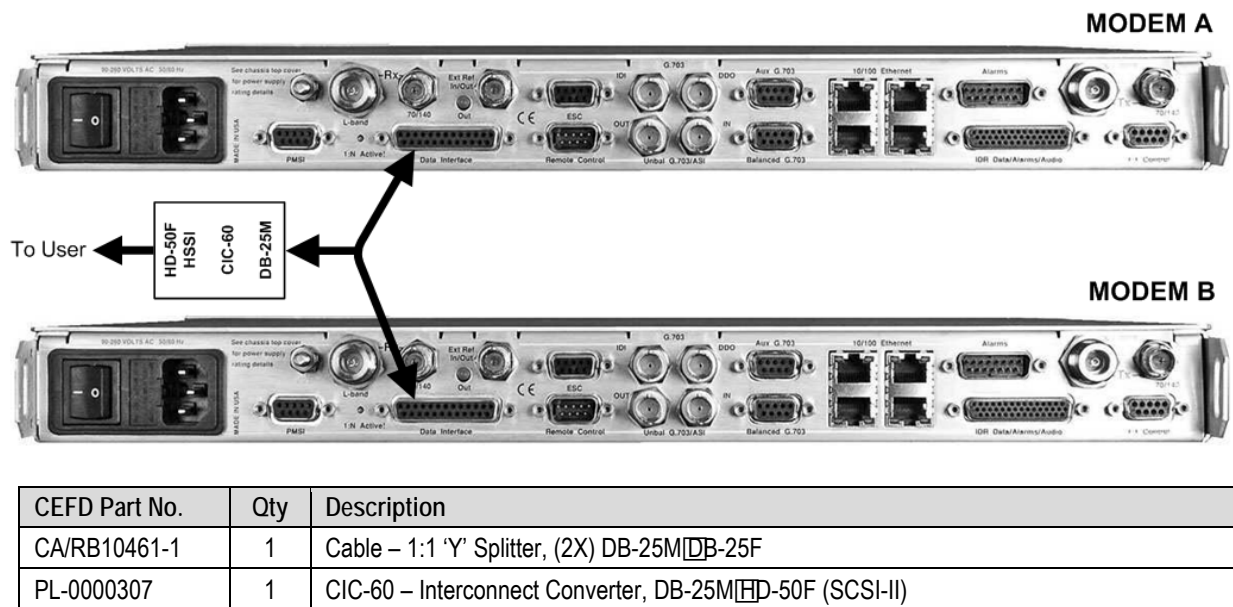
Figure 5-4. CDM-625/A HSSI Interface Example

5.3.2.1.3   Quad E1 Interface Example

Use the individual G.703 Balanced and Auxiliary G.703 DB-9F connectors for Quad E1 operation.

1) **As shown in Figure 5-5, the CA-0000071 'Y' Cable provides for two ports of E1 (i.e., Ports 1/2 -or- Ports 3/4).**

2) **If you desires three or four *separate* ports of E1 (i.e., Port 1 *and* Port 2 -or- Port 3 *and* Port 4), then optional adapter cables may be purchased from Comtech EF Data to adapt the G.703 Balanced and Auxiliary G.703 DB-9F single connector pairs to outgoing Quad E1 connector pairs as follows:**

Cable (CEFD Part No.)	Converts (1) 9-pin Type 'D' (DB-9F) paired connection (e.g., MODEM A *AND* MODEM B G.703 Balanced connector pair –or– MODEM A *AND* MODEM B Auxiliary G.703 connector pair) to:	App. A Fig.
CA-0000163	(2) 15-pin Type 'D' (DB-15F) connectors	A-8
CA-0000164	(2) RJ-48 female connectors	A-9
KT-0000122	(4) BNC 75Ω female connectors – (2) Tx, (2) Rx	A-10

All three cabling options plug into the single 'To User' connector side of each CA-0000071 'Y' Splitter cable used.

CEFD Part No.	Qty	Description
CA-0000071	2 Note 1	Cable – 1:1 'Y' Splitter, (2X) DB-9M → DB-9F, 8"
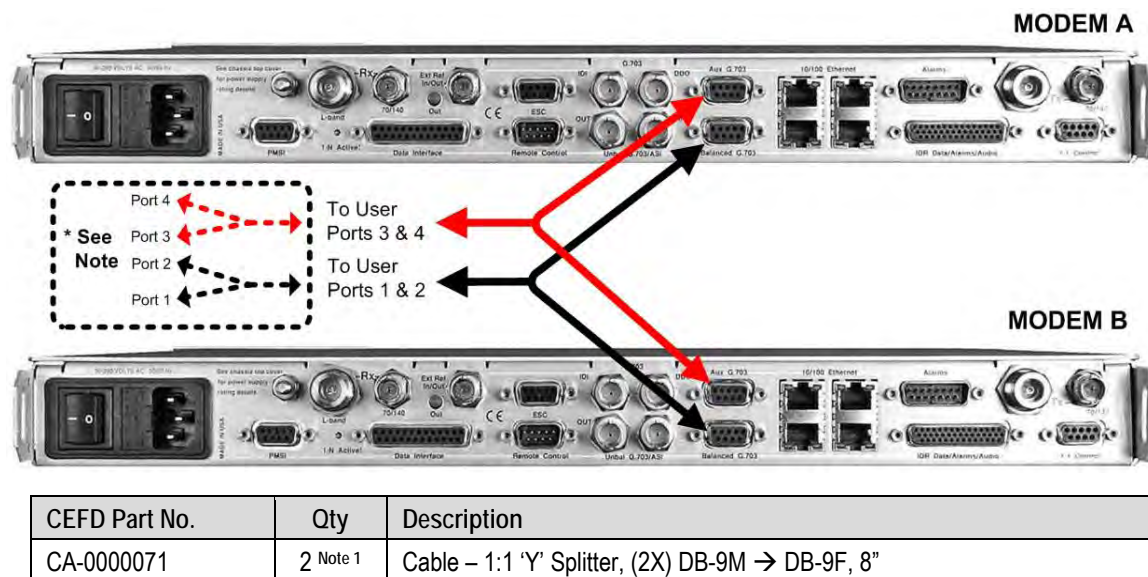
Figure 5-5. CDM-625/A Quad E1 Interface Example

5.3.2.1.4 G.703 Balanced Interface Example
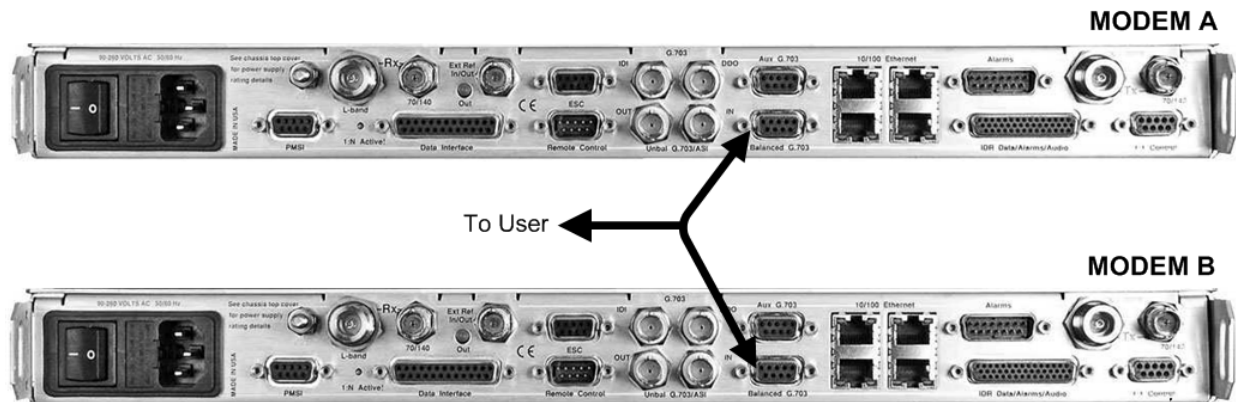
CEFD Part No.	Qty	Description
CA-0000071	1	Cable – 1:1 'Y' Splitter, (2X) DB-9M☐DB-9F, 8"

Figure 5-6. CDM-625/A G.703 Balanced Interface Example

5.3.2.1.5 G.703 Unbalanced Interface Example
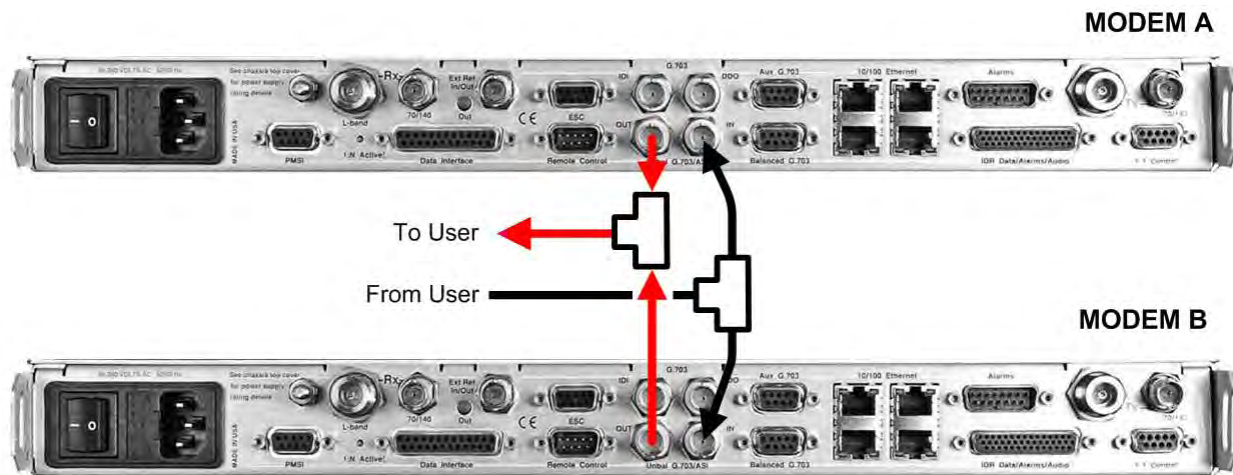
KT/10553-1 G.703 Unbalanced Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 1'
CN/BNC-TEE-JPJ	2	T-Adapter, 50Ω BNC

Figure 5-7. CDM-625/A G.703 Unbalanced Interface Example

5.3.2.1.6   ASI Interface Example
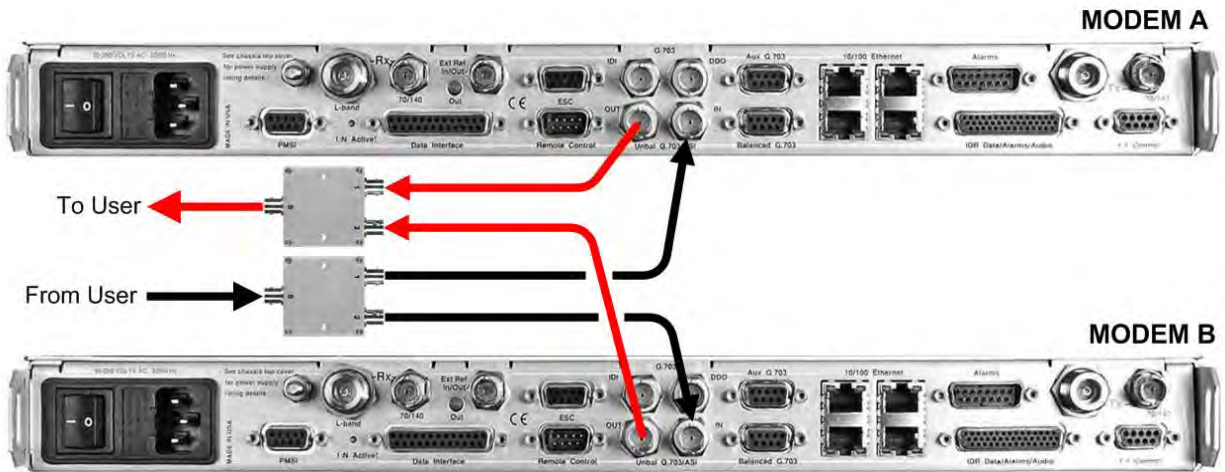
KT/12579 ASI 75Ω Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

Figure 5-8. CDM-625/A ASI Interface Example

5.3.2.1.7   Overhead Interface Example
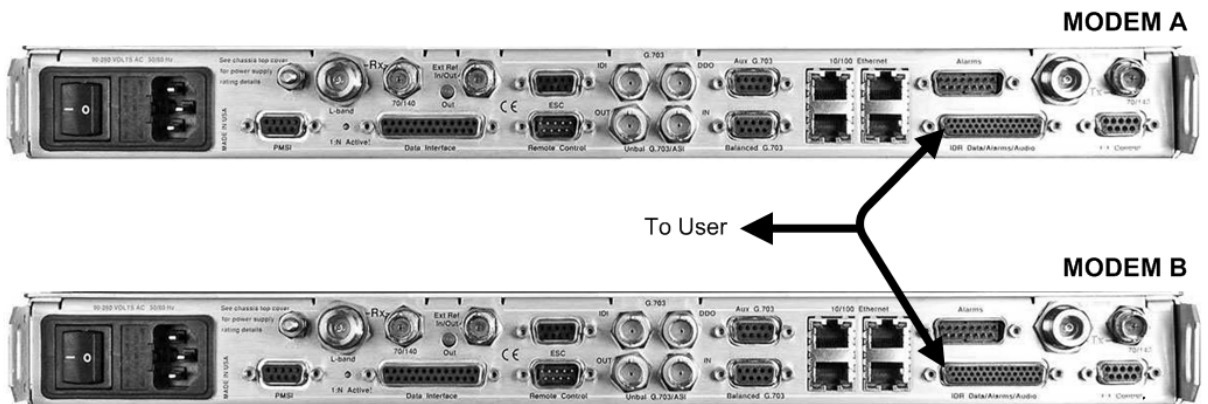
CEFD Part No.	Qty	Description
CA-0000070	1	Cable – 1:1 'Y' Splitter, (2X) HD-44M☐HD-44F, 8"

Figure 5-9. CDM-625/A Overhead Interface Example

5.3.2.1.8 Engineering Service Channel (ESC) Interface Example

CEFD Part No.	Qty	Description
CA-0000071	1	Cable – 1:1 'Y' Splitter, (2X) DB-9M DB-9F, 8"

Figure 5-10. CDM-625/A ESC Interface Example

Notes:

5.3.2.2   Modem-to-User IP (10/100 Ethernet) Interface Examples

5.3.2.2.1   Data Interface Connections using IP Sub-Mux

- **Chapter 15. IP SUB-MUX in CDM-625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)**

- **Appendix N. IP SUB-MUX in CDM-625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)**

Subsystem Multiplex – referred to by CEFD as Sub-Mux – is a secondary framing structure that combines one to four ports of IP (10/100 Ethernet) traffic (see **Figure 5-11**) with any currently available combination of framing and interface type (see **Figure 5-3** through **Figure 5-10**) – excluding IP itself. The composite data rate to the modulator and from the demodulator is referenced to the primary, non-IP data interface rate by a specific user-selected ratio.

5.3.2.2.2   Managed Switch Mode (with/without IP Packet Processor)

Figure 5-11 shows the block diagram for the CDM-625/A diversity switching configuration using the IP (10/100 Ethernet) Interface in Managed Switch (Ethernet Bridge) Mode. **Figure 5-12** shows the cabling example for this setup.

This configuration requires no cabling kit – you must use user-provided Ethernet cables and Layer 2 switches for direct connection to the modem via *one to four* RJ-45 ports. This cabling example shows use of all four Ethernet ports.
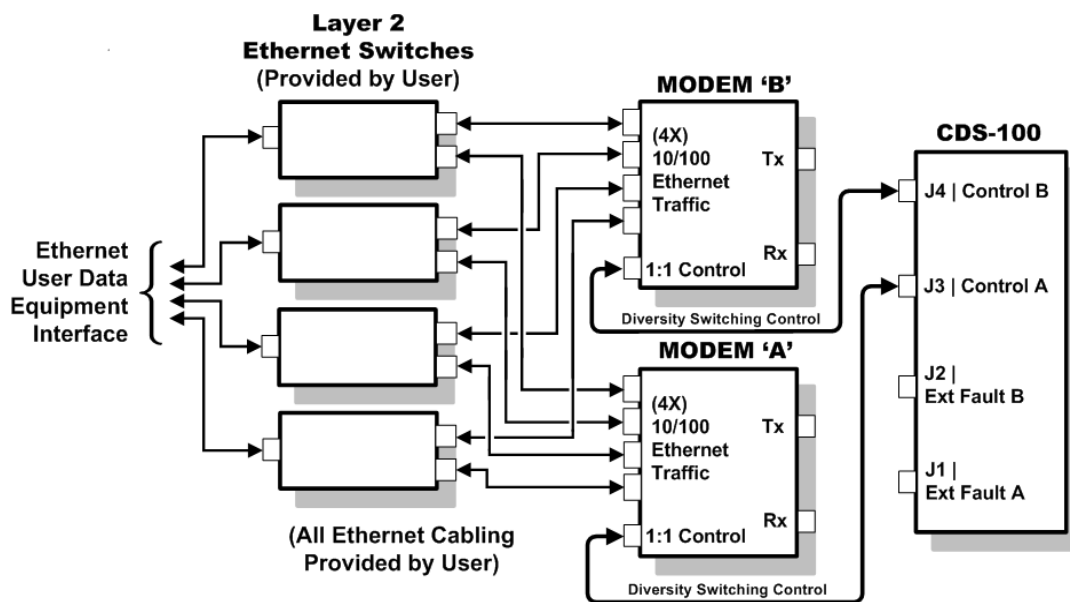
Figure 5-11. CDM-625/A Block Diagram – 10/100 Ethernet Managed Switch Mode
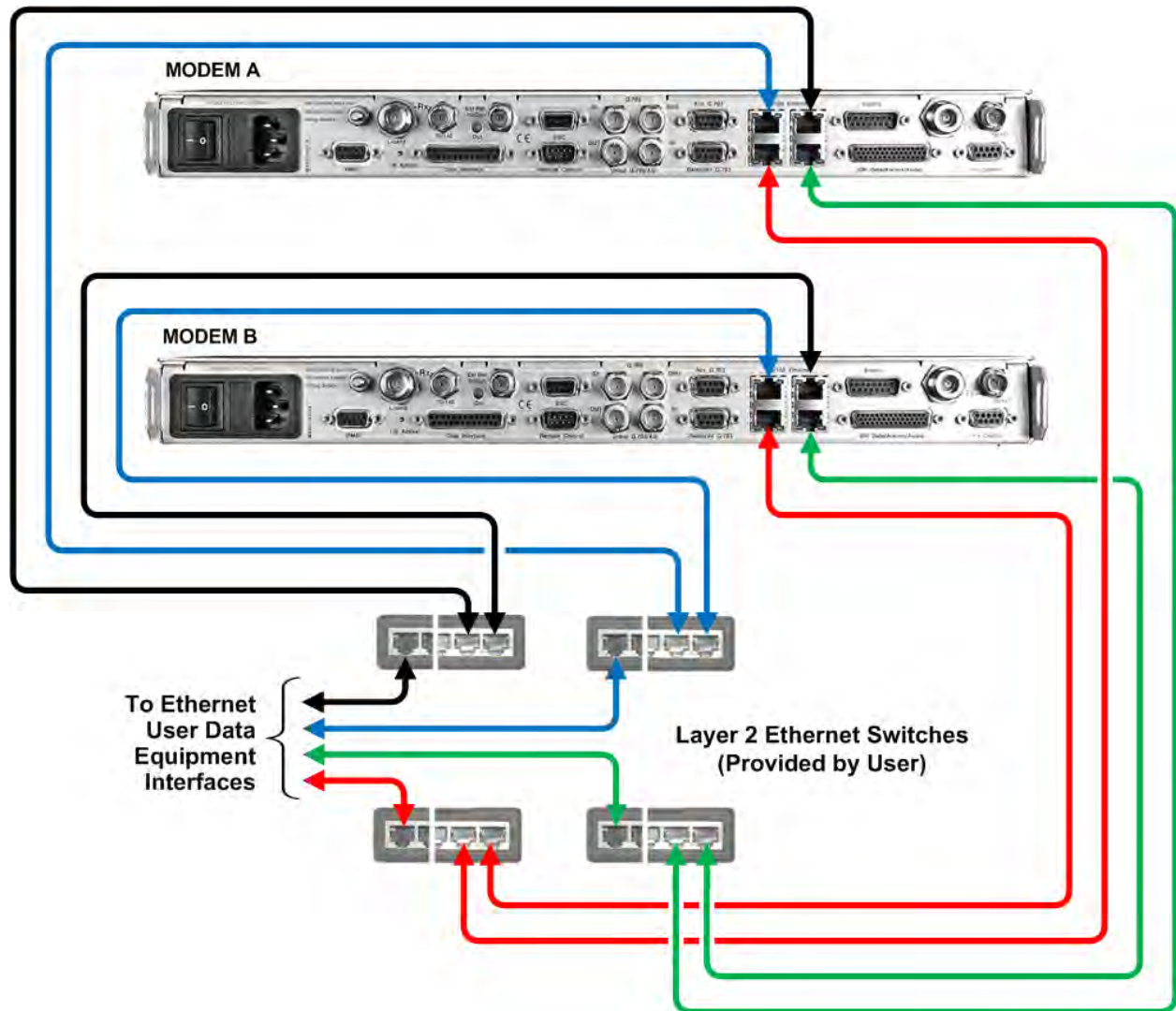
Figure 5-12. CDM-625/A 10/100 Ethernet Interface Example – Managed Switch Mode

5.3.2.2.3   Router Mode (Optional IP Packet Processor Required)

Figure 5-13 shows the block diagram and cabling example for a CDM-625/A diversity switching configuration using the IP (10/100 Ethernet) Interface in Router Mode, with the optional IP Packet Processor **_installed and enabled_**.

This configuration requires no cabling kit – you must use user-provided Ethernet cables and Layer 2 switch for direct connection to the modem via **_only one of four_** RJ-45 ports.
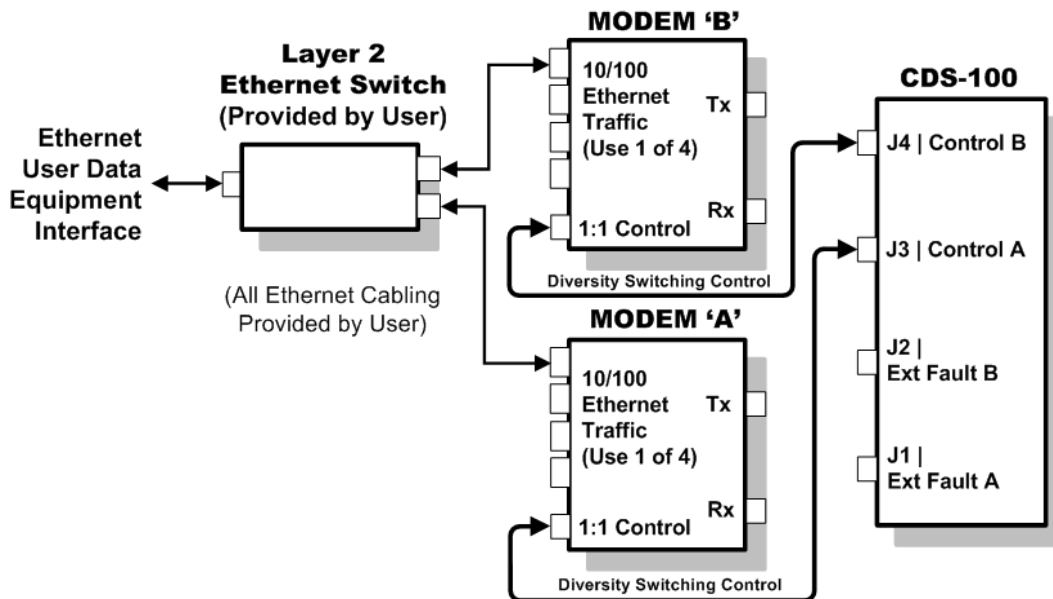
CDM-625/A Block Diagram – 10/100 Ethernet Router Mode
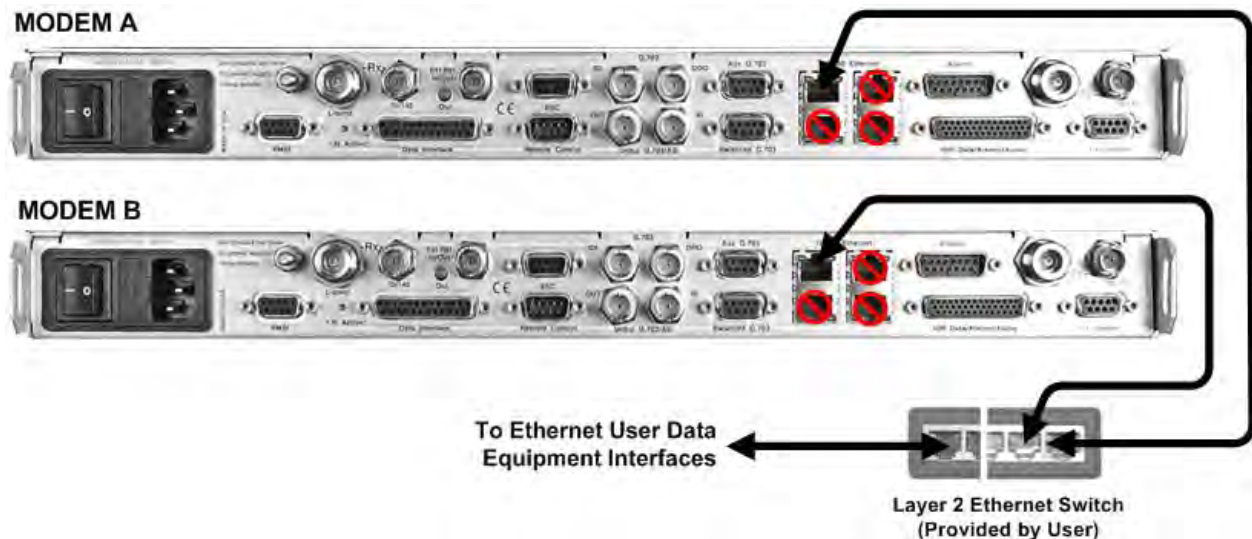
Figure 5-13. CDM-625/A 10/100 Ethernet Interface Example – Router Mode

5.3.2.3 PMSI Interface Example

The **Pre-Mapped Symbol Interface (PMSI)** is an EIA-485 point-to-point bus system where one device transmits, and the other device on the bus is configured to receive. It is a function associated with DoubleTalk® Carrier-in-Carrier® (CnC®) that permits the modulator in a selected unit to provide a direct copy of its output (the outbound interferer) to the offline modem in a 1:1 pair. The offline modem then takes the PMSI signal and uses it for its own CnC® reference.

You must take specific configuration steps to enable CnC® in your CDM-625/A 1:1 pair before you can make any switch configurations, This ensures proper operation of the pair within a configured CDS-100 1:1 Redundancy System.

Chapter 4. MODEM AND SWITCH CONFIGURATION

Use of PMSI requires that you connect and secure the CDM-625/A Multi-drop CnC® Plus 1:1 Cable CA-0000276 (2X DB-9M, 1') between the Backup Modem and the Traffic Modem *__using CnC__*. See **Figure 5-14.**

The CA-0000276 Multi-Drop CnC PLUS 1:1 Cable bypasses the CDS-100 Diversity Switch.

CEFD Part No.	Qty	Description
CA-0000276	1	CDM-625/A Data Cable – Shielded, Multi-drop CnC® Plus, 1:1, (2X) DB-9M, 1'
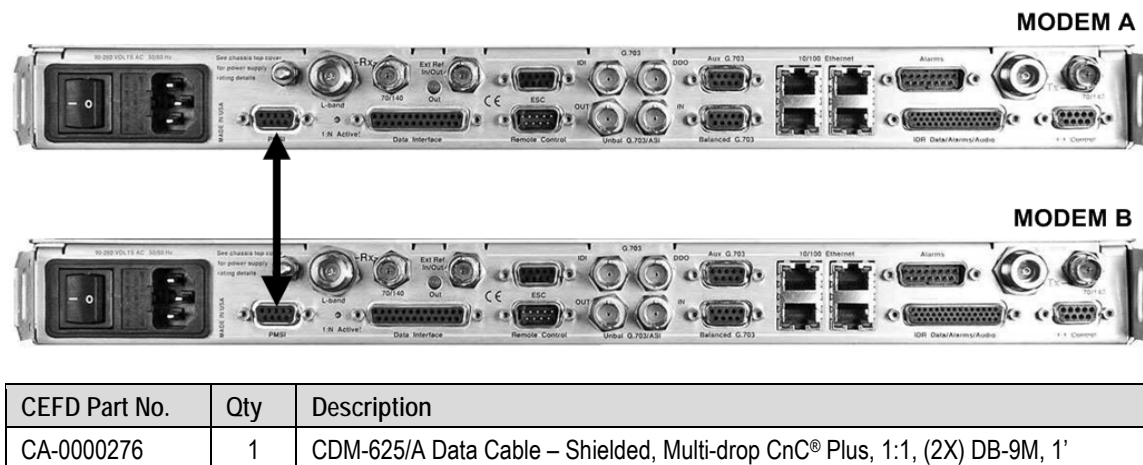
Figure 5-14. CDM-625/A PMSI Interface Example

5.4   Cabling to the CDM-850

1) For information on the CDM-850's 1:1 auto-enable functionality, see:

- **Chapter 4. MODEM AND SWITCH CONFIGURATION**

- **CDM-850 Remote Router Installation and Operation Manual (CEFD Part No. MN-CDM850)**

2) For information on the cables and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS.

5.4.1   CDS-100 → CDM-850 Control Interface Cabling Using Kit KT-0000265

1) Excluding modems, the KT-0000265 CDS-100 Diversity Switch Kit (Sect. 5.2.1) provides all components shown in Figure 5-15.

2) When you connect the Control Interface cables between the CDS-100 and the CDM-850s, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.

3) The CDM-850 employs 10/100/1000 Ethernet (Gigabit Ethernet, also referred to throughout this chapter as GigE or GbE) as its sole terrestrial data interface. All cables and switches must be user-supplied. See Sect. 5.4.2 for the CDM-850 Gigabit Ethernet terrestrial data interface configuration and connection examples and details.
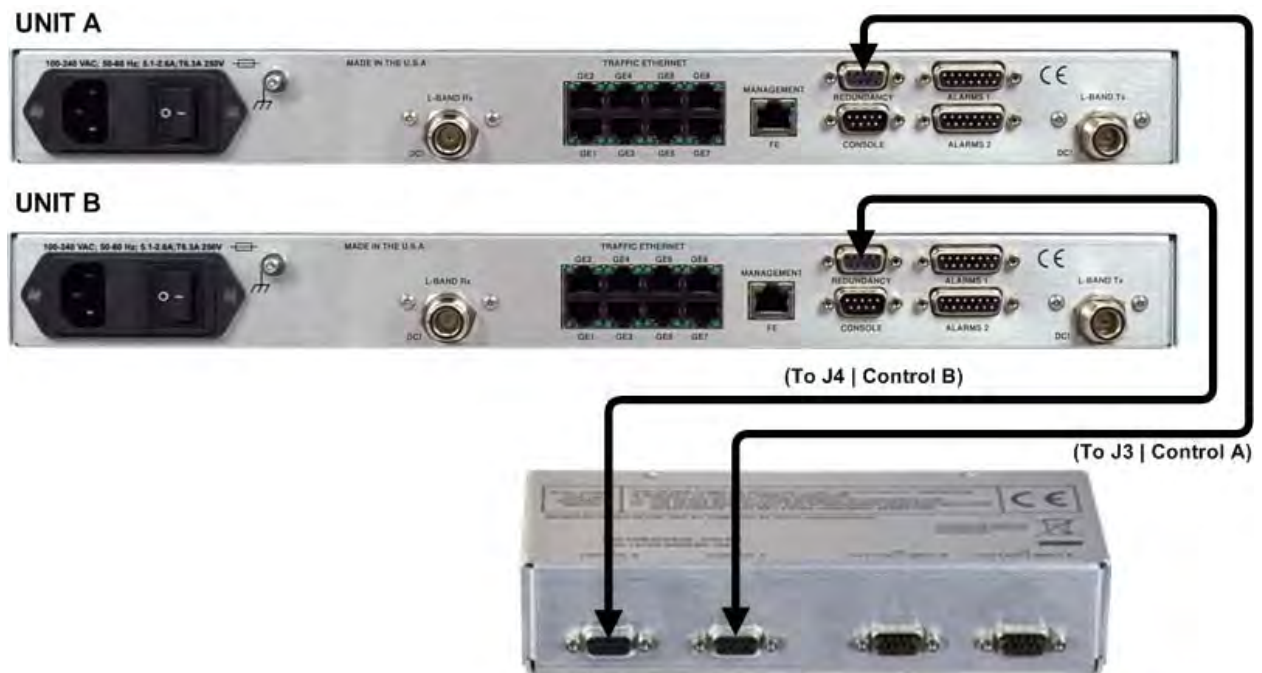
CAUTION – It is ESSENTIAL that you make the control connections <u>correctly</u>.

CEFD Part No.	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-15. CDM-850 Unit-to-Switch Control Connections (CEFD Kit KT-0000265)

5.4.2   Unit-to-User Data Interface Connections and Examples

In addition to the Unit-to-Switch control cabling shown previously, the CDM-850 features an eight-port 10/100/1000 Gigabit Ethernet data interface.

5.4.2.1   CDM-850 Managed Switch (Ethernet Bridge) Mode

Figure 5-16 shows the block diagram for a CDM-850 1:1 redundant configuration in Managed Switch (Ethernet Bridge) Mode. **Figure 5-17** shows the cabling example for this setup. This configuration requires no cabling kit – you must use user-provided Ethernet cables and Layer 2 switches for direct connection to the modem via *one to eight* RJ-45 ports. Both figures depict all eight ports used.
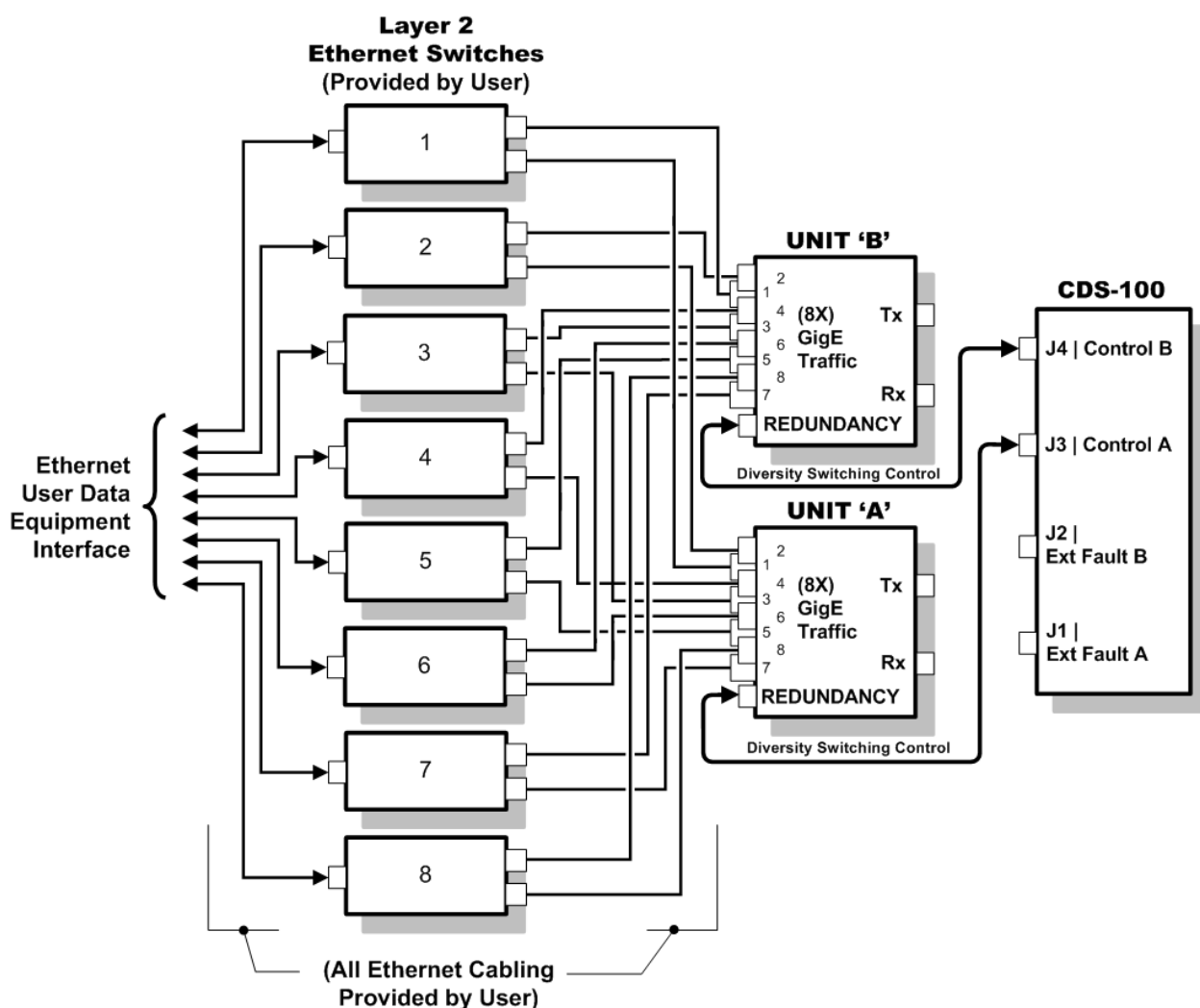
Figure 5-16. CDM-850 Block Diagram – Gigabit Ethernet Managed Switch Mode
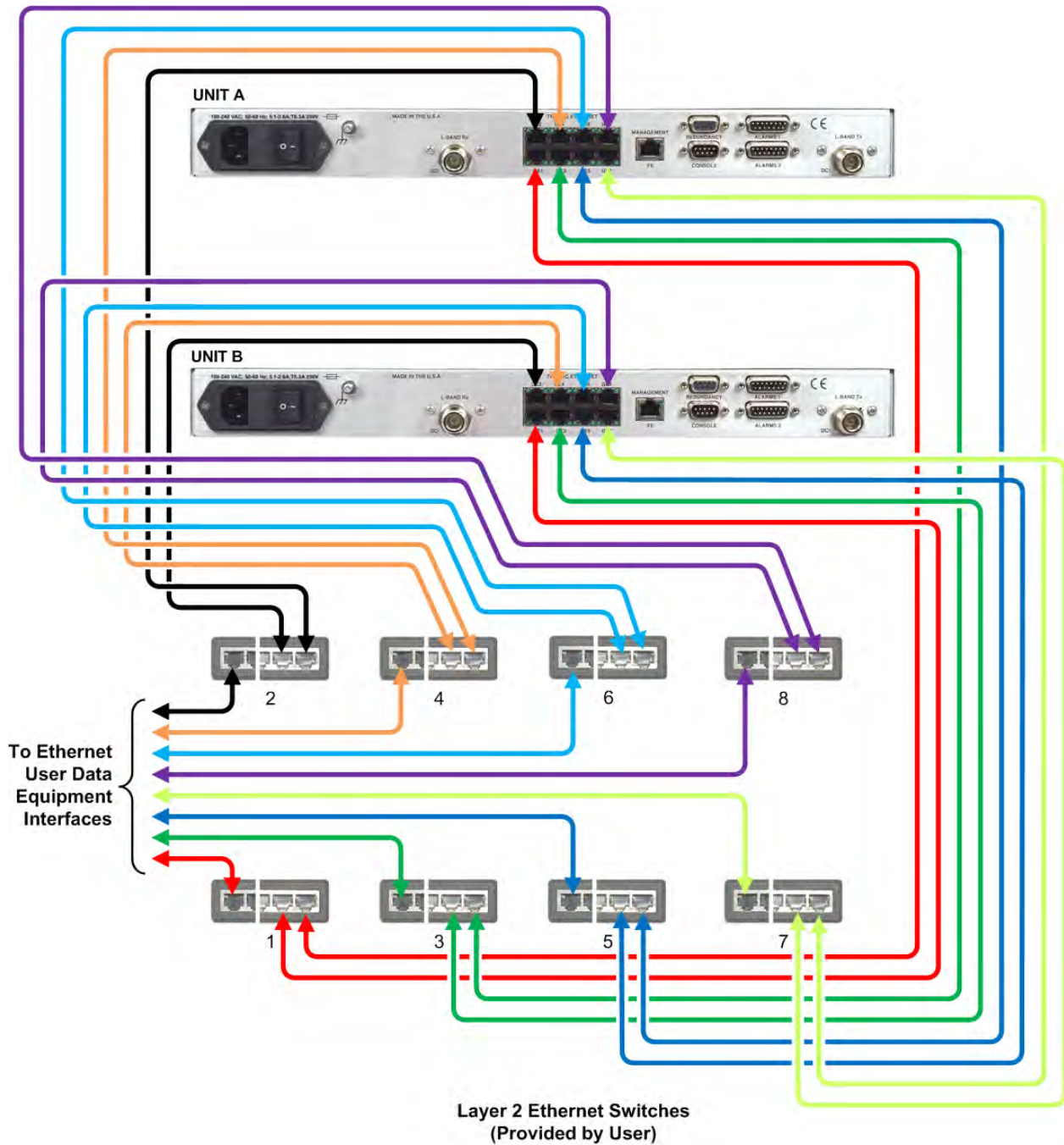
Figure 5-17. CDM-850 Gigabit Ethernet Interface Example – Managed Switch Mode

5.4.2.2   CDM-850 Router Mode

Figure 5-18 shows the block diagram and cabling example for a CDM-850 diversity switching configuration using the Gigabit Ethernet Interface in Router Mode. This configuration requires no cabling kit – you must use user-provided Ethernet cables and Layer 2 switch for direct connection to the modem via *only one of eight* RJ-45 ports. Both details depict the use of Port 'GE1'.
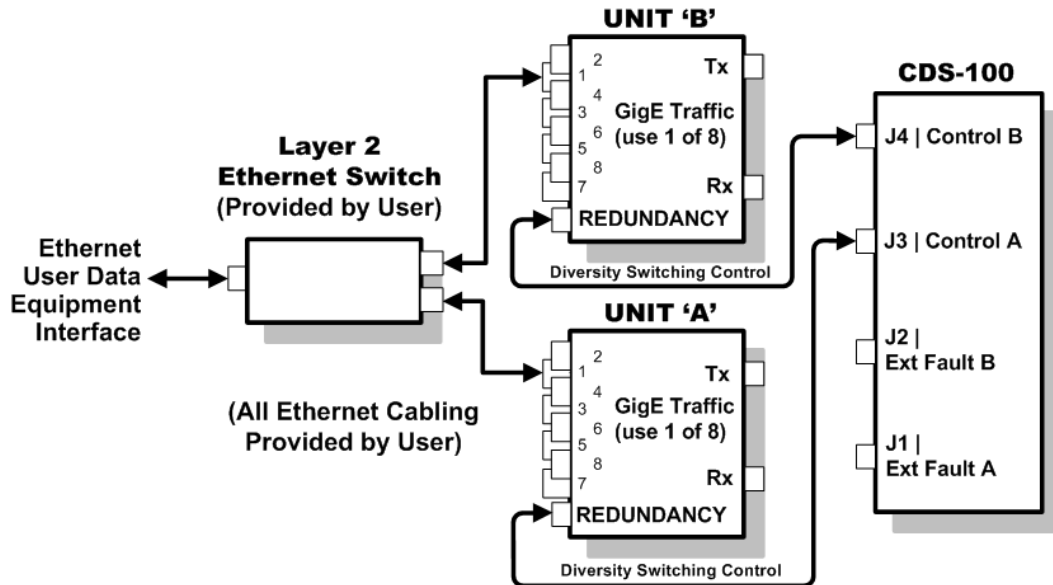
CDM-850 Block Diagram – Gigabit Ethernet Router Mode
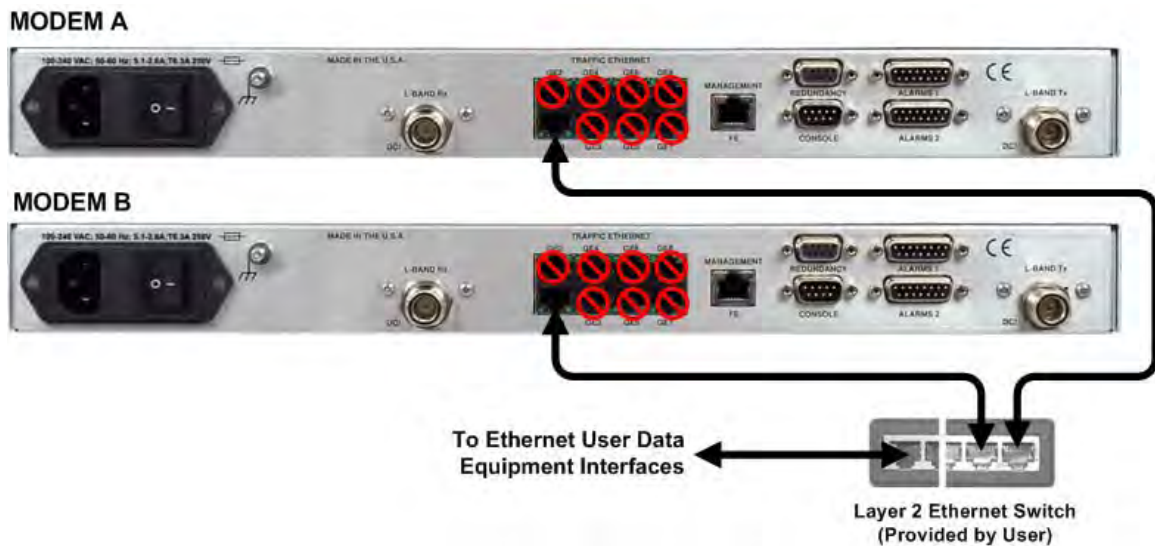
Figure 5-18. CDM-850 Gigabit Ethernet Interface Example – Router Mode

Notes:

Notes:

5.5   Cabling to the CDM-840

1) **For information on the CDM-840's 1:1 auto-enable functionality, see:**

    - **Chapter 3. MODEM AND SWITCH CONFIGURATION**

    - **CDM-840 Remote Router Installation and Operation Manual (CEFD P/N MN-CDM840)**

2) **For information on the cables and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS.**

5.5.1   CDS-100→CDM-840 Control Interface Cabling Using Kit KT-0000265

1) **Excluding modems, the KT-0000265 CDS-100 Diversity Switch Kit (see Sect. 5.2.1) provides all components shown in Figure 5-19.**

2) **When you connect the Control Interface cables between the CDS-100 and the CDM-840s, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.**

3) **Terrestrial data interface cables, components or kits must be purchased separately. See Sect. 5.5.2 for the terrestrial data interface configuration and connection examples and details.**
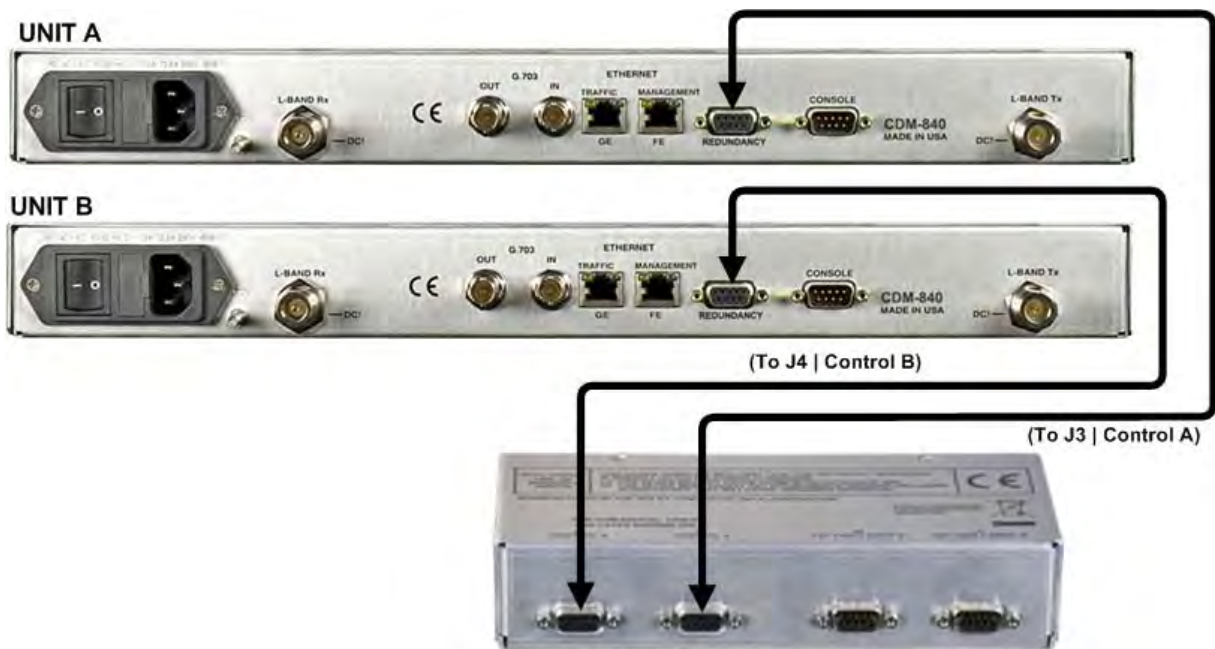
CAUTION – It is ESSENTIAL that you make the control connections correctly.

CEFD Part No.	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-19. CDM-840 Unit-to-Switch Control Connections (CEFD Kit KT-0000265)

5.5.2   Unit-to-User Data Interface Connections and Examples

In addition to the Unit-to-Switch control cabling shown previously, the CDM-840 features a single 10/100/1000 Gigabit Ethernet RJ-45 data interface port, and a G.703 Unbalanced E1 data interface for use with the CDM-840's optional E1 Interface/RAN Optimization Hardware/FAST Feature upgrade.

With the exception of the 10/100/1000 Gigabit Ethernet Interface configuration shown in **Sect. 5.5.2.1**, which requires user-provided Ethernet cables and a Layer 2 switch, you will need one cable and component kit per 1:1 unit pair for each user interface (see examples for specified quantities).

5.5.2.1   RJ-45 Gigabit Ethernet Data Interface Example

Figure 5-20 shows the block diagram and cabling example for a CDM-840 diversity switching configuration using the RJ-45 10/100/1000 Gigabit Ethernet port. This configuration requires no cabling and component kit – you must make a direct connection with user-provided Ethernet cables and a Layer 2 switch.

CDM-840 Gigabit Ethernet Block Diagram – User→Modem→Switch
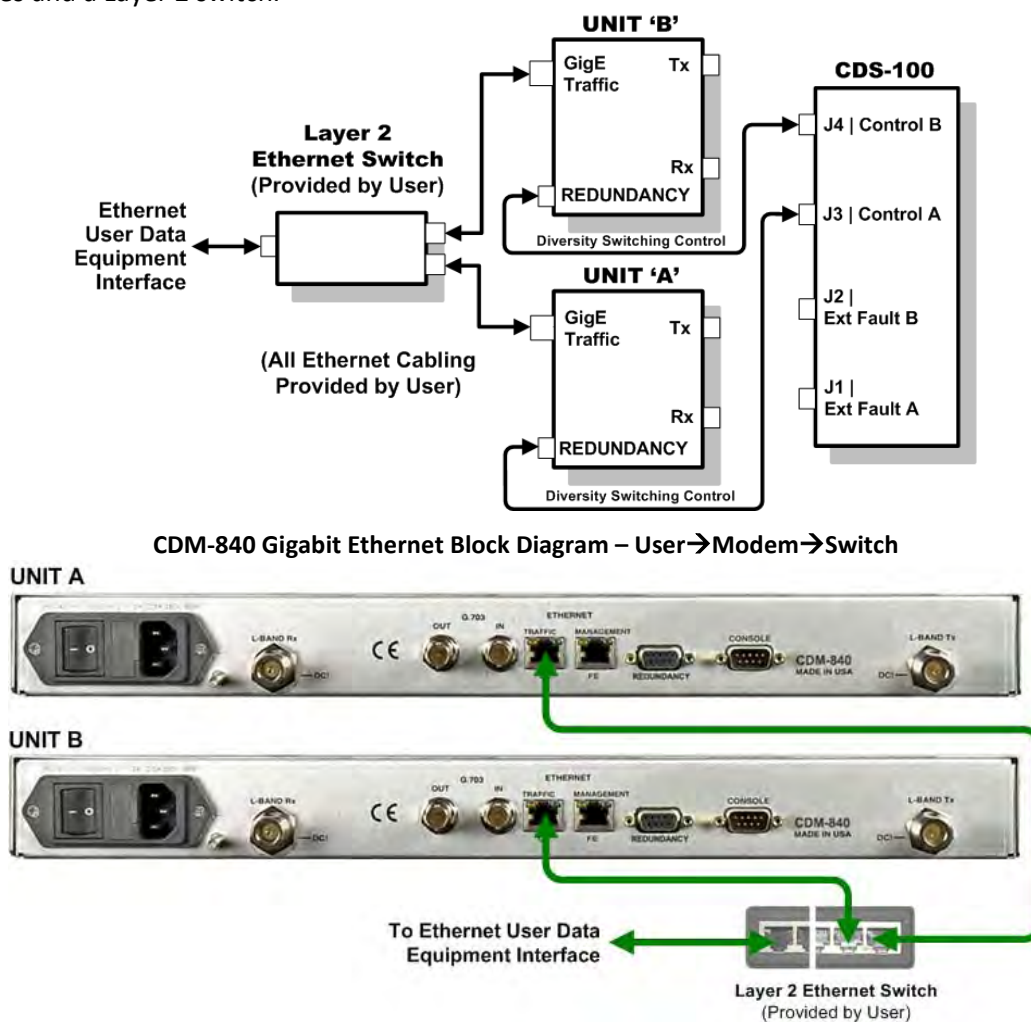
Figure 5-20. CDM-840 Gigabit Ethernet Interface Example

5.5.2.2   KT/12542 G.703 75Ω Data Interface Kit (for G.703 Unbalanced E1)

Figure 5-21 shows the block diagram and a cabling example for a CDM-840 diversity switching configuration for the G.703 Unbalanced E1 data interface. You must use the KT/12542 interface kit with the CDM-840's optional E1 Interface/RAN Optimization Hardware/FAST Feature upgrade.
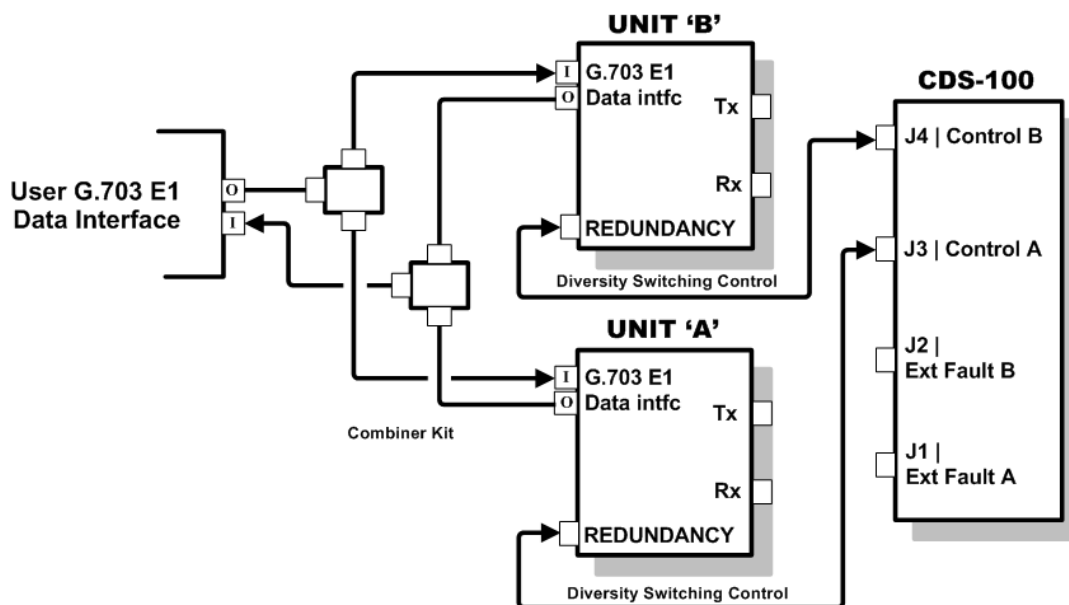
CDM-840 G.703 Unbalanced E1 Data Block Diagram – User→Modem→Switch
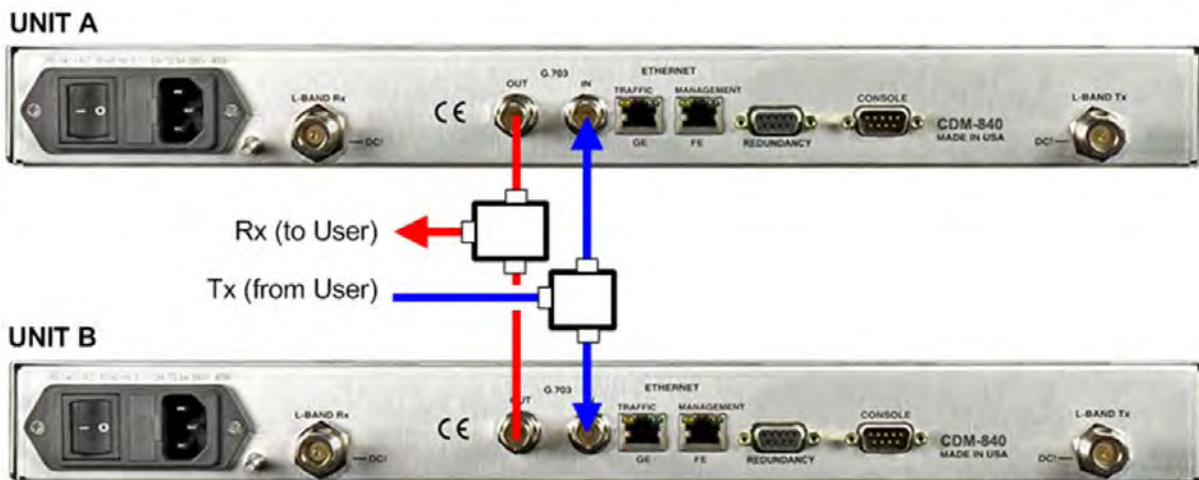
KT/12542 G.703 75Ω Interface Cabling Kit (for G.703 Unbalanced E1 traffic)		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF, BNC 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-Way w/Bracket, 0.25-300 MHz, BNC 75Ω

Figure 5-21. CDM-840 G.703 Unbalanced 75Ω Interface Kit (CEFD Kit KT/12542)

5.6   Cabling to the CDM-760 or CDM-750

1) **For information on the CDM-760 or CDM-750's 1:1 auto-enable functionality, see:**

   • **Chapter 4. MODEM and SWITCH CONFIGURATION**

   • **CDM-760 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM760)**

   • **CDM-750 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM750)**

2) **For information on the cables and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS.**

5.6.1   CDS-100 → CDM-760, CDM-750 Control Interface Cabling Using Kit KT-0000265

1) **Excluding modems, the KT-0000265 CDS-100 Diversity Switch Kit (Sect. 5.2.1) provides all components shown in Figure 5-22.**

2) **When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.**

3) **Terrestrial data interface components/kits must be ordered separately. See Sect. 5.6.2 for CDM-760/-750 terrestrial data interface configuration and connection examples and details.**
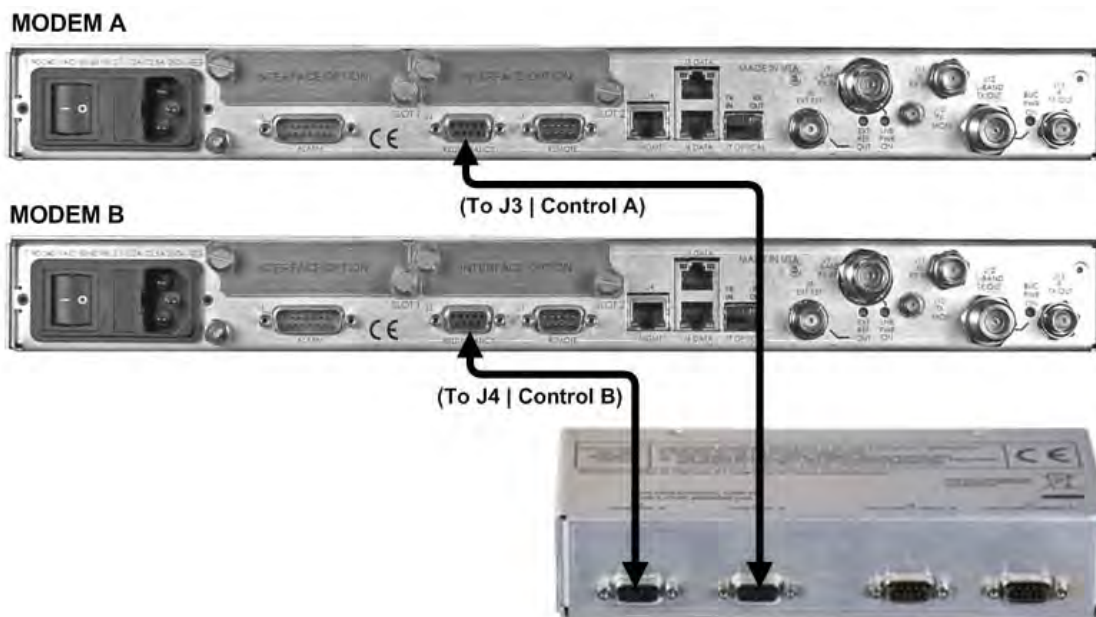
CEFD Part No.	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

**Figure 5-22. CDM-760/-750 Modem-to-Switch Control Connections (CEFD Kit KT-0000265)**

5.6.2 Modem-to-User Data Interface Connections and Examples

In addition to the Modem-to-Switch control cabling shown previously, a number of data interface configuration kits are available for use with the CDM-760 and CDM-750 High-Speed Trunking Modems.

5.6.2.1 RJ-45 Gigabit Ethernet Data Interface Example

The CDM-760/-750 provides a 'J7 | OPTICAL' port and two Plug-In Interface Card (PIIC) slots for optional data traffic handling. Both modems otherwise feature two 10/100/1000 Gigabit Ethernet RJ-45 data interface ports by default. **Figure 5-23** shows the block diagram and a cabling example for a CDM-760/-750 diversity switching configuration using these RJ-45 ports (this example shows use of both ports). This configuration requires no cabling and component kit – you must use user-provided Ethernet cables and Layer 2 switches for direct connection to the modems.
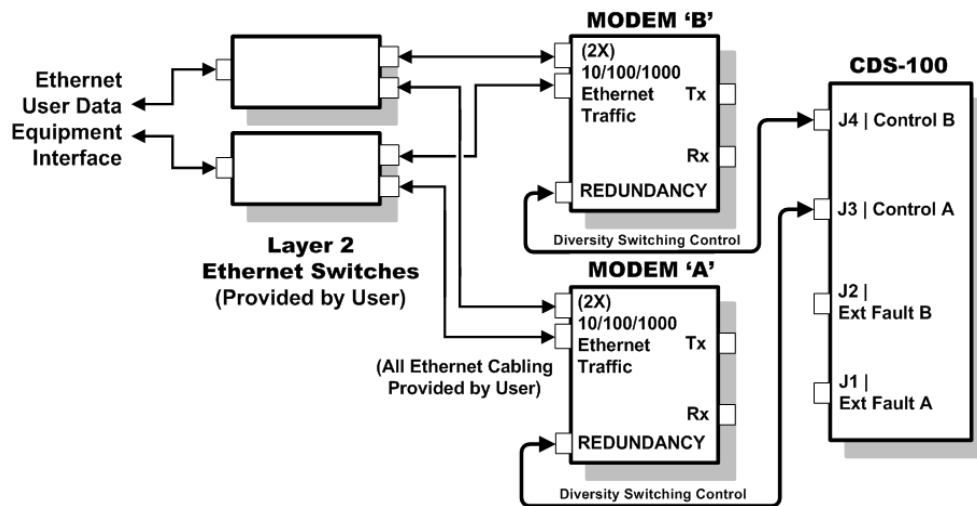

CDM-760/-750 Gigabit Ethernet Block Diagram – User→Modem→Switch
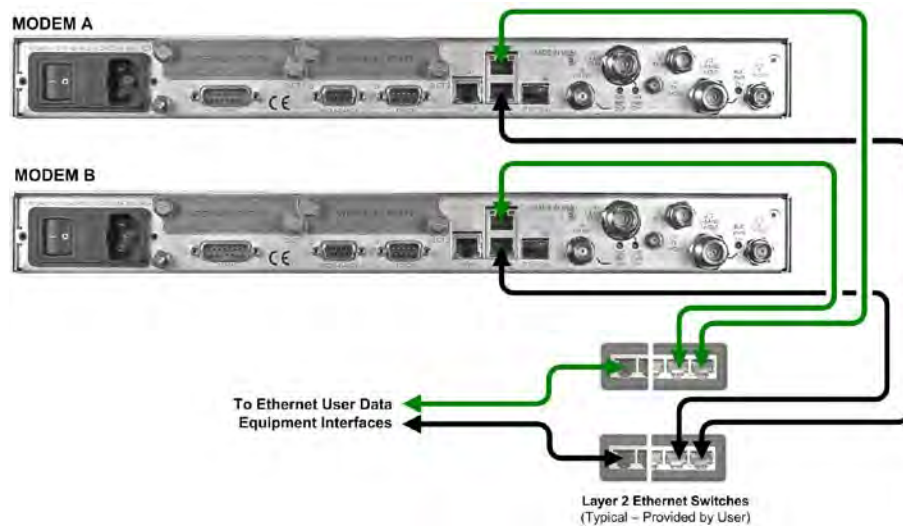
Figure 5-23. CDM-760/-750 RJ-45 Gigabit Ethernet Interface Example

5.6.2.2   Optical Gigabit Ethernet Interface Option Example

Figure 5-24 shows a CDM-760/-750 diversity switching configuration that uses the FAST-activated 'J7 | OPTICAL' SFP port with the optional Optical Gigabit Ethernet Interface module (CEFD P/N IC-0000058).

You must use the cable assembly that is specific to *Single Mode* or *Multi Mode* operation:

* The CA-0000560 Optical Single-Mode Y-Cable set features **yellow** cables.

* The CA-0000559 Multi-Mode Y-Cable set features **orange** cables.
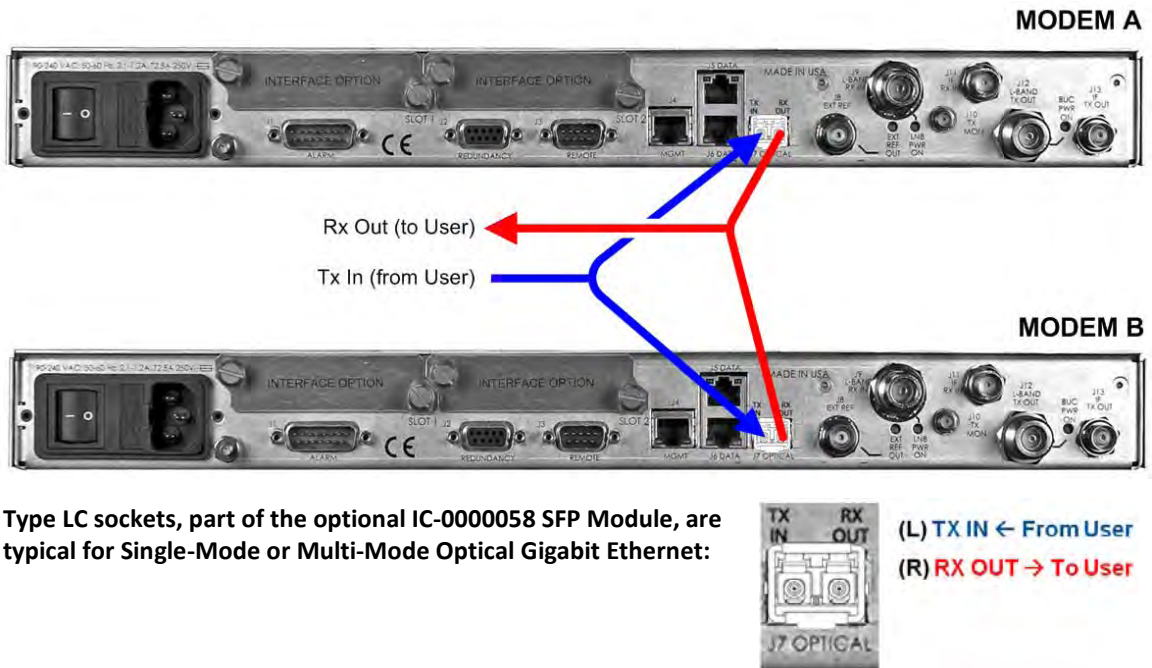
Type LC sockets, part of the optional IC-0000058 SFP Module, are typical for Single-Mode or Multi-Mode Optical Gigabit Ethernet:

CEFD Part No.	Qty	Description
CA-0000560	1	'Y' Cable Assy – RoHS-Compliant, Single-Mode Optical, LC Connectors

-OR-

CEFD Part No.	Qty	Description
CA-0000559	1	Y' Cable Assy – RoHS-Compliant, Multi-Mode 'Optical, LC Connectors

Figure 5-24. CDM-760, CDM-750 Optical Gigabit Ethernet Interface Option Example

5.6.2.3 Non-IP Data Interface Kit and Connection Examples

⚠️ **While different data interface cards may be installed into both PIIC (Plug-In Interface Card) slots, only one data interface type is operable at a given time. The data interface combinations allowable in the CDM-760/-750 chassis PIIC Slots 1 and 2 are as follows:**

PIIC Slot 1	PIIC Slot 2
G.703 E3/T3	None
None	G.703 E3/T3

You will need separate cabling kits for each CDM-760/-750 non-IP data interface configuration. Each user data interface requires one interface kit per modem pair. For example, **Figure 5-26** in **Sect. 5.6.2.3.1** identifies the interface kit and its quantities that you will use for the G.703 PIIC data interface.

Figure 5-25 shows the block diagram that is typical for the kits shown in this section. Note that this diagram does not apply to the default Gigabit Ethernet data interface configuration (**Figure 5-23**), which requires user-provided Ethernet cables and Layer 2 switches.
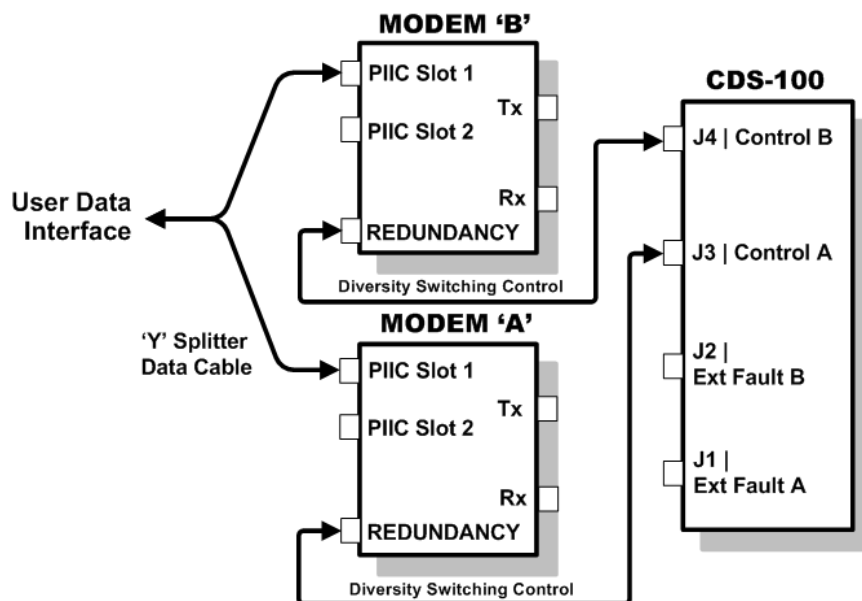
Figure 5-25. CDM-760, CDM-750 Block Diagram – User→Modem→Switch

5.6.2.3.1   KT/12542 G.703 75Ω Data Interface Kit (for Single G.703 E3/T3 PIIC)
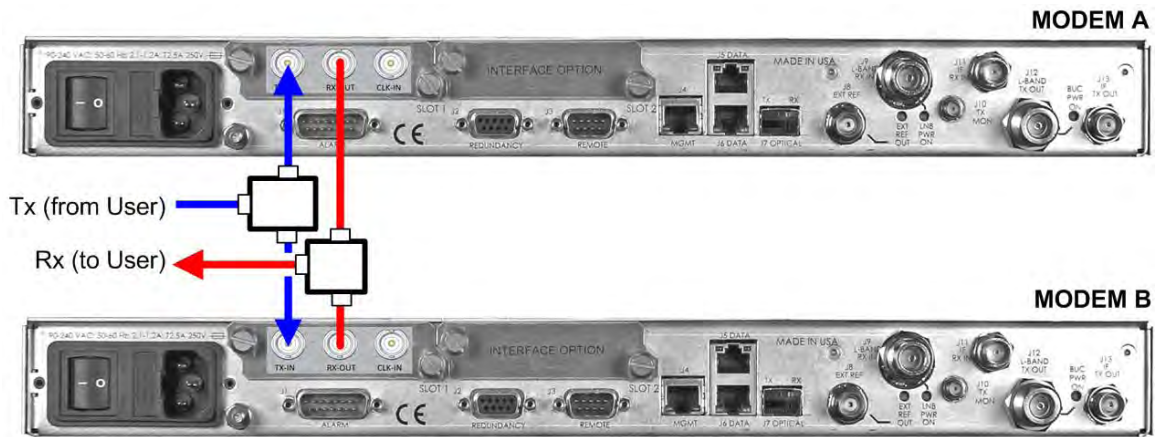
KT/12542 G.703 75Ω Interface Cabling Kit (for Single G.703 E3/T3 PIIC)		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF, BNC 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-Way w/Bracket, 0.25-300 MHz, BNC 75Ω

Figure 5-26. CDM-760, CDM-750 G.703 E3/T3 PIIC Interface Kit KT/12542

5.7   Cabling to the CDM-570/A and CDM-570L/AL

1) For information on the CDM-570/A and CDM-570L/AL's 1:1 auto-enable functionality, see:

- **Chapter 4. MODEM AND SWITCH CONFIGURATION**

- **CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM570A)**

- **CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM)**

2) For detailed information about the cables and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS.

5.7.1 CDS-100→CDM-570/A, CDM-570L/AL Control Interface Cabling Using Kit KT-0000265

1) Excluding modems, the KT-0000265 CDS-100 Diversity Switch Kit (Sect. 5.2.1) provides all components shown in Figure 5-27.

2) When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.

3) Terrestrial data interface components/kits must be ordered separately. See Sect. for CDM-625/A terrestrial data interface configuration and connection examples and details.
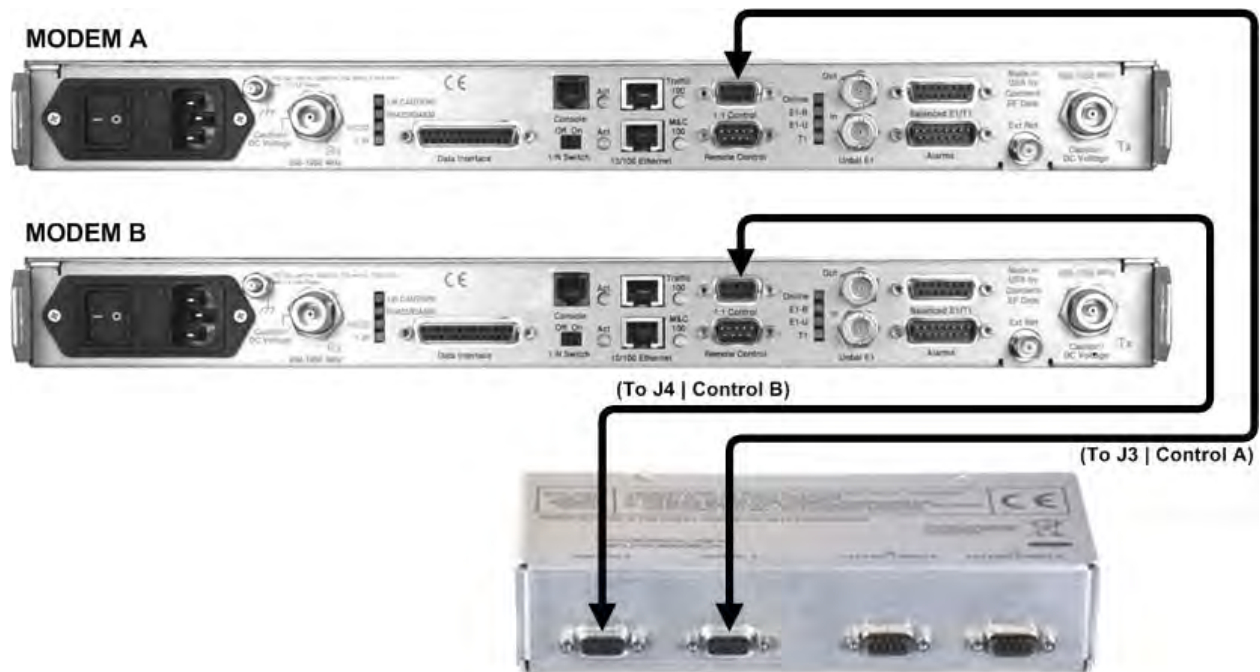
CAUTION – It is ESSENTIAL that you make the control connections <u>correctly</u>.

CEFD Part No.	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-27. CDM-570/A, CDM-570L/AL Modem-to-Switch Control Connections (CEFD Kit KT-0000265)

5.7.2   Modem-to-User Data Interface Connections and Examples

> **(!)** **The data cables and components identified in each of the examples that follow in this section must be purchased separately, as required.**

In addition to the Modem-to-Switch control cabling shown previously, a number of data interface configurations are available for the CDM-570/A and CDM-570L/AL Satellite Modems.

5.7.2.1   Non-IP Modem-to-User Data Interface Connections and Examples

The block diagram shown in **Figure 5-28** is typical for the examples shown in **Sects. 5.7.2.1.1** through **5.7.2.1.3**.

With the exception of the CDM-570/L ONLY IP (10/100 Ethernet) Interface configuration shown in **Sect. 5.7.2.2**, where you must use user-provided Ethernet cables and hub, you will need one cable and component set per modem pair for each user interface (see examples for specific quantities).
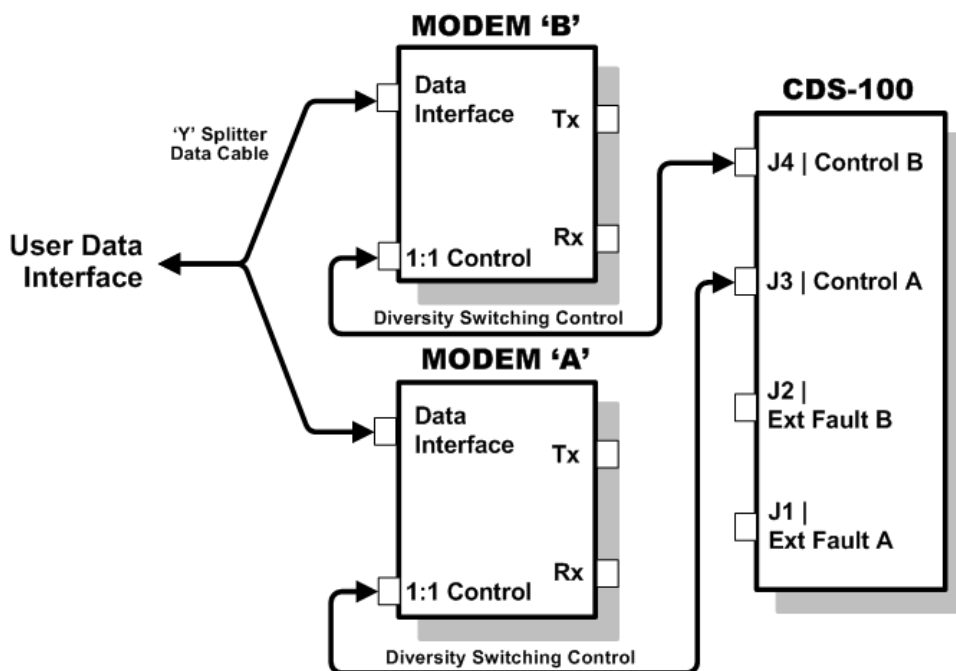
Figure 5-28. CDM-570/A, CDM-570L/AL Block Diagram – User→Modem→Switch

5.7.2.1.1   EIA-422, V.35 Interface Example
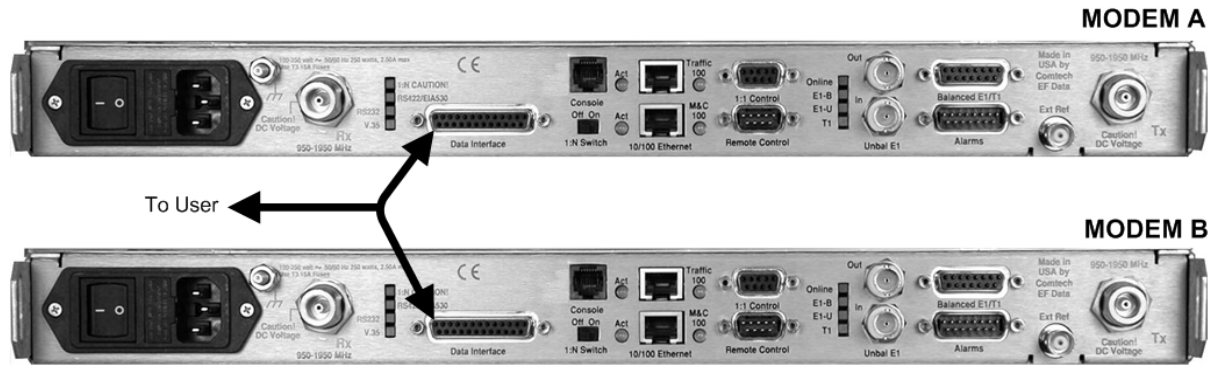
CEFD Part No.	Qty	Description
CA/RB10461-1	1	Cable – 1:1 'Y' Splitter, (2X) DB-25M□DB-25F

Figure 5-29. CDM-570/A, CDM-570L/AL EIA-422, V.35 Interface Example

5.7.2.1.2   G.703 Balanced Interface Example
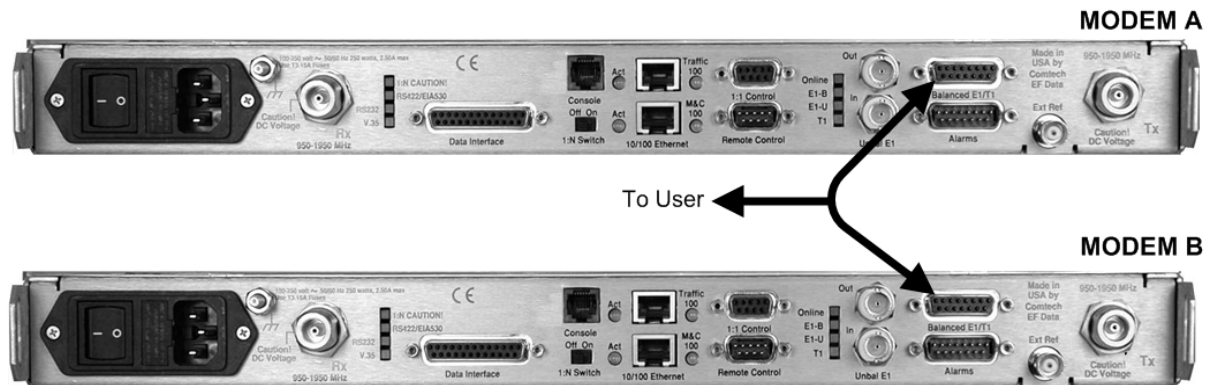
CEFD Part No.	Qty	Description
CA/WR10522-1	1	Cable – 1:1 'Y' Splitter, (2X) DB-15M□DB-15F

Figure 5-30. CDM-570/A, CDM-570L/AL G.703 Balanced Interface Example

5.7.2.1.3 G.703 Unbalanced Interface Example
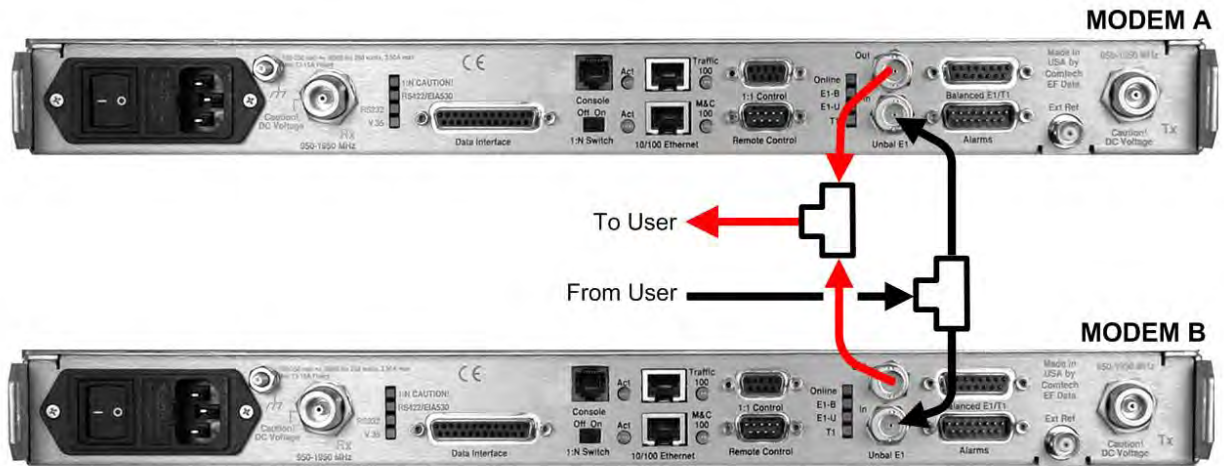
G.703 Unbalanced 1:1 Interface Kit KT/10553-1		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 1'
CN/BNC-TEE-JPJ	2	T-Adapter, 50Ω BNC

Figure 5-31. CDM-570/A, CDM-570L/AL G.703 Unbalanced Interface Example

5.7.2.2   IP (10/100 Ethernet) Interface Example (CDM-570/L ONLY)

Figure 5-32 shows the block diagram and cabling example for a CDM-570/L ONLY diversity switching configuration using the IP (10/100 Ethernet) Interface. This configuration requires no cabling kit – you must use user-provided Ethernet cables and hub for direct connection to the modems.

> **For the CDM-570L in Managed Switch (Ethernet Bridge) Mode, you MUST use an external Ethernet hub to insure that traffic will continue after a switchover. If an Ethernet switch is used, there could be a several minute outage while the Ethernet Switch "re-learns" the correct output Ethernet port. Using a "dumb" Ethernet hub allows LAN to WAN traffic to continue even after a switchover occurs since both modems will be receiving the LAN traffic.**
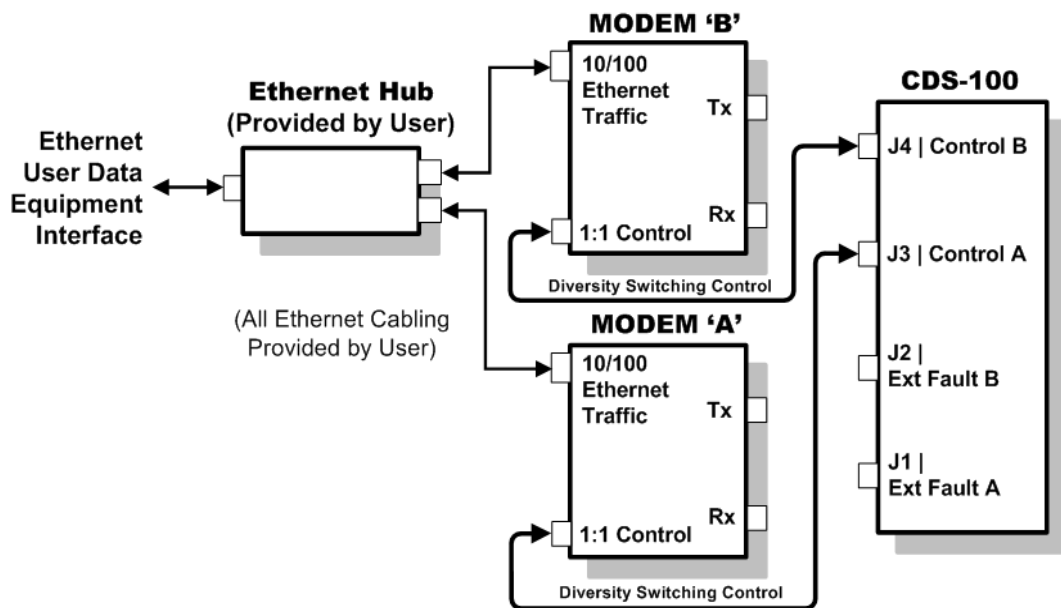
CDM-570/L ONLY IP (10/100 Ethernet) Block Diagram – User→Modem→Switch
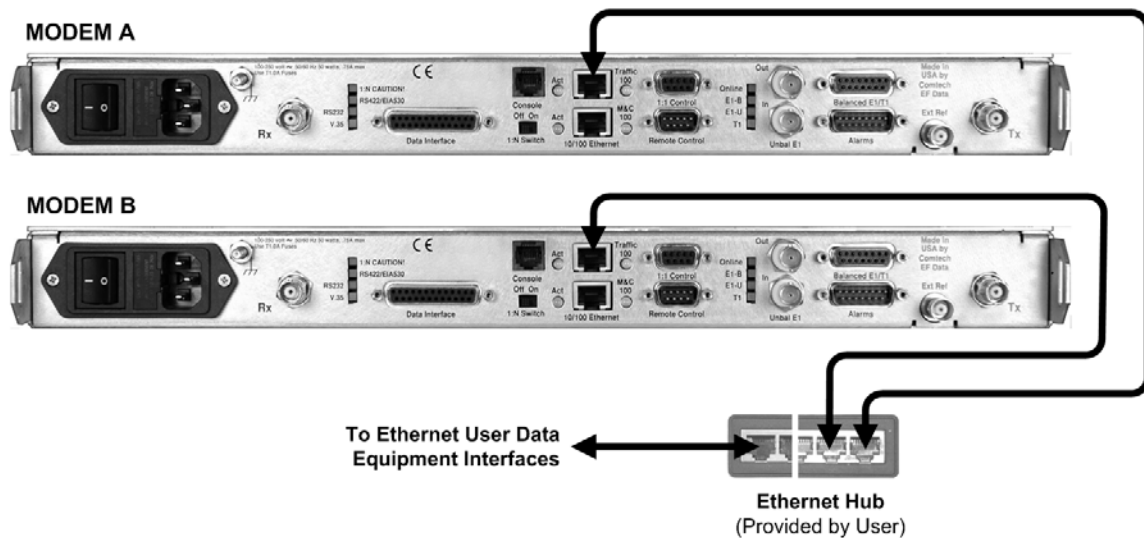
Figure 5-32. CDM-570/L ONLY 10/100 Ethernet Interface Example

5.8   Cabling to the CDM-710G or CDM-710GL

1) **For information on configuring the CDS-100 Diversity Switch with the CDM-710G/L High-Speed Satellite Modems for 1:1 (diversity switching) operation, see:**

    - **Chapter 4. MODEM AND SWITCH CONFIGURATION**

    - **CDM-710G/710GL High-Speed Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM710G)**

2) **For information on the cables identified in this section, see Appendix A. CABLE DRAWINGS.**

5.8.1   CDS-100→CDM-710G/L Control Interface Cabling Using Kit KT-0020556

1) **Excluding modems, the KT-0020556 CDS-100 Diversity Switch Kit (Sect. 5.2.2) provides all components shown in Figure 5-33.**

2) **When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.**

3) **Terrestrial data interface components/kits must be ordered separately. See Sect. 5.8.2 for CDM-710G/L terrestrial data interface configuration and connection examples and details.**

CEFD Part No.	Qty	Description
CA/WR12135-1 See Notes	2	Control Cable – Universal, DB-9M, 4'

FIGURE NOTES:

1) **To provide user access to the modem "Fault Summary Relay," Control 'Y' Cable (CEFD P/N CA/WR13011-4), sold separately, is available for use in place of the CA/WR12135-1 Control Cable.**

2) **The CA/WR12135-1 Control Cable will mute the Offline modem's Tx IF. If this is not desired, then an alternate Control Cable (CEFD P/N CA-0000187), sold separately, is available for use instead.**

CAUTION – It is ESSENTIAL that you make the control connections <u>correctly</u>.

Figure 5-33. CDM-710G/L Modem-to-Switch Control Connections (CEFD Kit KT-0020556)

5.8.2   Modem-to-User Data Interface Kit and Connection Examples

In addition to the Modem-to-Switch control cabling shown previously, a number of data interface configuration kits are available for use with the CDM-710G/L High-Speed Satellite Modem. **Separate cabling kits are needed for these CDM-710G/L data interfaces.**

⚠ **While different data interface cards may be installed into both Interface slots, only one data interface type is operable at a given time. The data interface combinations allowable in the CDM-710G/L chassis Interface Slots 1 and 2 are as follows:**

Interface Slot 1	Interface Slot 2
Single G.703 (CDI-10-1)	None
HSSI (CDI-60)	None
None	GigE (CDI-70)

5.8.2.1   Non-IP Modem-to-User Data Interface Kit and Connection Examples
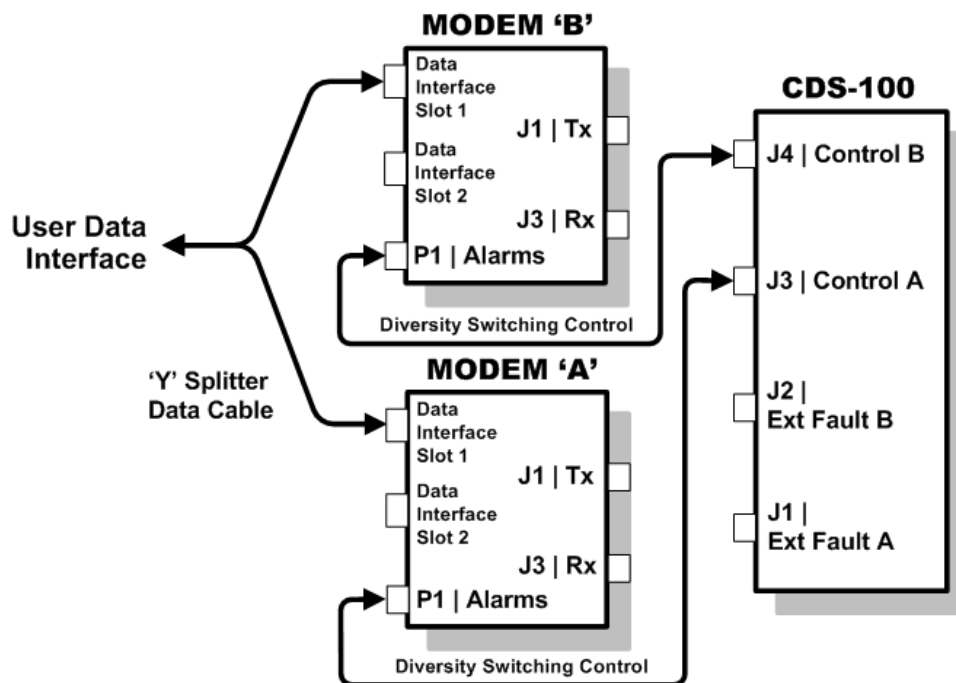
Figure 5-34. CDM-710G/L Block Diagram – User→Modem→Switch

Figure 5-34 shows the block diagram typical for the kits shown in **Sects. 5.8.2.1.1** and **Sect. 5.8.2.1.2**. For example, **Sect. 5.8.2.1.1** identifies the interface kit used with the CDI-10-1 Single G.703 data interface.

With the exception of the CDI-70 Gigabit Ethernet data interface configuration shown in **Sect. 5.8.2.2**, which uses user-provided Ethernet cables and Layer 2 Switch, you must use one interface kit per modem pair for each interface (see examples for specific quantities).

5.8.2.1.1 Single G.703 E3/T3/STS-1 75Ω Data Interface (CDI-10-1) Kit KT/12583

Figure 5-35 shows an example for a CDM-710G/L diversity switching configuration with the CDI-10-1 Single G.703 data interface installed in Slot 1, and with Slot 2 empty. The figure shows installation of one KT/12583 Single G.703 Interface Kit.
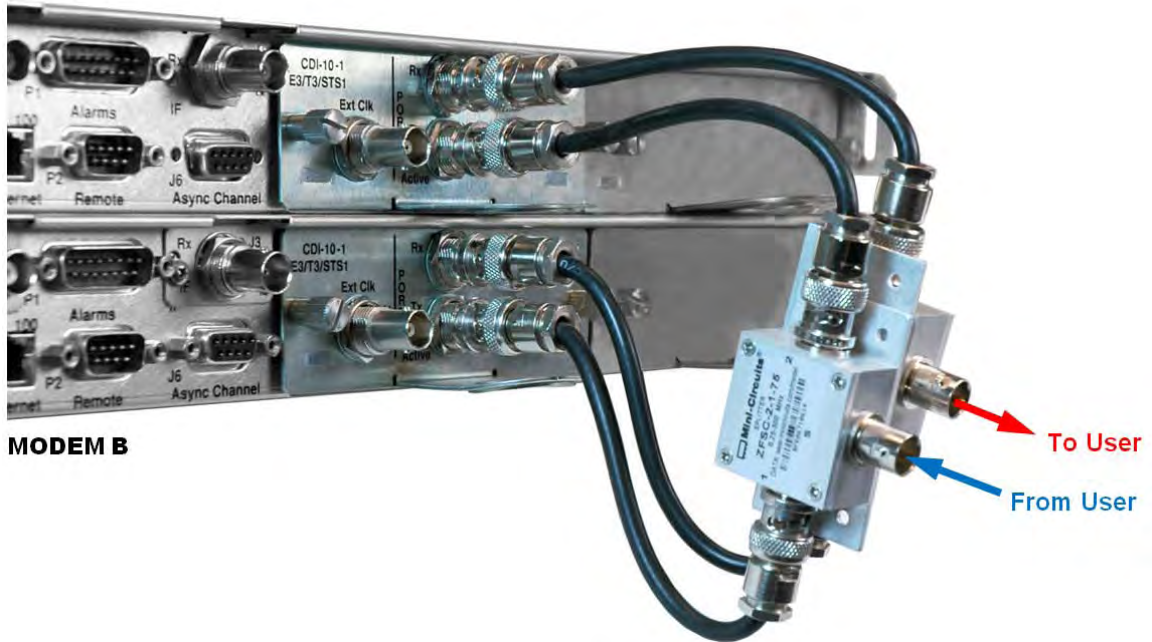
KT/12583 Single G.703 (CDI-10-1) 75Ω Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

Figure 5-35. CDM-710G/L Single G.703 E3/T3/STS-1 Interface Example

5.8.2.1.2   HSSI Data Interface (CDI-60) Kit KT/12586

Figure 5-36 shows an example for a CDM-710G/L diversity switching configuration with the CDI-60 HSSI data interface installed in Slot 1, and with Slot 2 empty. The figure shows installation of one KT/12586 HSSI Interface Kit.

KT/12586 HSSI (CDI-60) Interface Kit		
CEFD Part No.	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M☐H50F, 3"

Figure 5-36. CDM-710G/L HSSI Interface Example

5.8.2.2   Gigabit Ethernet Interface (CDI-70) Example

> 🔍 **See CEFD White Paper "Bridged Ethernet Interface Redundancy" available for download from Comtech EF Data's Web site (www.comtechefdata.com).**

Figure 5-37 shows the block diagram and cabling example for a CDM-710G/L diversity switching configuration with the CDI-70 Gigabit Ethernet data interface installed in Slot 2, and with Slot 1 empty. This setup requires no cabling and component kit – you must use user-provided Ethernet cables and Layer 2 Switch for direct connection to the CDI-70.
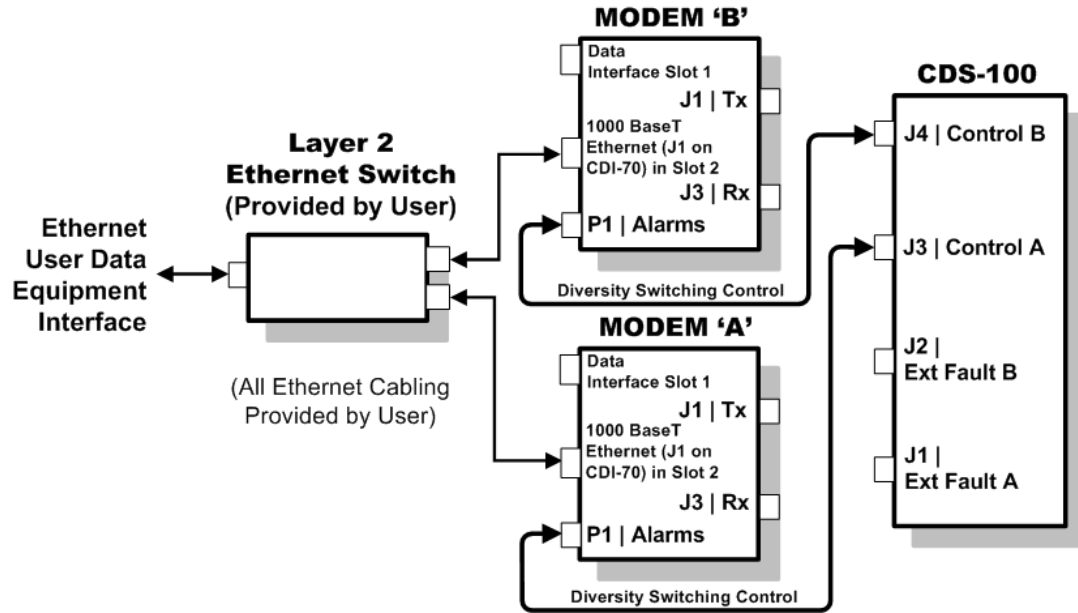
CDM-710G/L Gigabit Ethernet Block Diagram – User➔Modem➔Switch
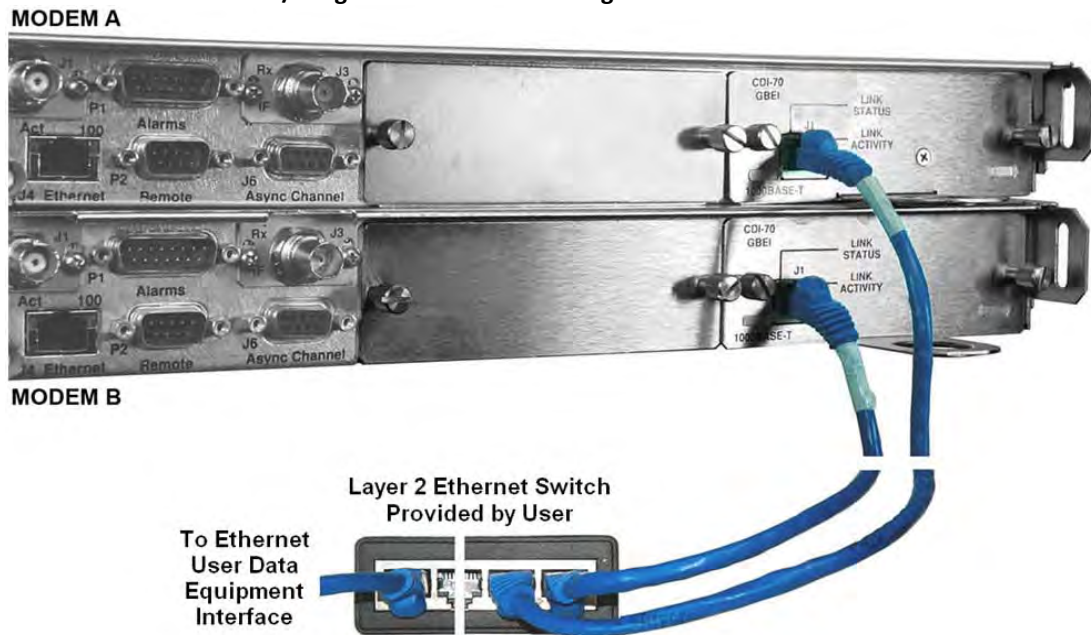
Figure 5-37. CDM-710G/L Gigabit Ethernet Interface Example

5.9   Cabling to the CDM-710

1) **For information on configuring the CDS-100 Diversity Switch with the CDM-710 Broadcast Satellite Modems for 1:1 (diversity switching) operation, see:**

   - **Chapter 4. MODEM AND SWITCH CONFIGURATION**

   - **CDM-710 Broadcast Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM710.IOM)**

2) **For information on the cables identified in this section, see Appendix A. CABLE DRAWINGS.**

5.9.1   CDS-100→CDM-710 Control Interface Cabling Using Kit KT-0020556

1) **Excluding modems, the KT-0020556 CDS-100 Diversity Switch Kit (Sect. 5.2.2) provides all components shown in Figure 5-38.**

2) **When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.**

3) **Terrestrial data interface components/kits must be ordered separately. See Sect. 5.9.2 for CDM-710 terrestrial data interface configuration and connection examples and details.**

CEFD Part No.	Qty	Description
CA/WR12135-1 See Notes	2	Control Cable – Universal, DB-9M, 4'

FIGURE NOTES:

1) **To provide user access to the modem "Fault Summary Relay," Control 'Y' Cable (CEFD P/N CA/WR13011-4), sold separately, is available for use in place of the CA/WR12135-1 Control Cable.**

2) **The CA/WR12135-1 Control Cable will mute the Offline modem's Tx IF. If this is not desired, then an alternate Control Cable (CEFD P/N CA-0000187), sold separately, is available for use instead.**

CAUTION – It is ESSENTIAL that you make the control connections <u>correctly</u>.

Figure 5-38. CDM-710 Modem-to-Switch Control Connections (CEFD Kit KT-0020556)

5.9.2   Modem-to-User Data Interface Kit and Connection Examples

In addition to the Modem-to-Switch control cabling shown previously, a number of data interface configuration kits are available for use with the CDM-710 Broadcast Satellite Modem. **Separate cabling kits are needed for these data interfaces.**

⚠ **While different data interface cards may be installed into both Interface slots, only one data interface type is operable at a given time. The data interface combinations allowable in the CDM-710 chassis Interface Slots 1 and 2 are as follows:**

Interface Slot 1	Interface Slot 2
ASI (CDI-40)	None
HSSI (CDI-60)	None
None	GigE (CDI-70)

5.9.2.1   Non-IP Modem-to-User Data Interface Kit and Connection Examples
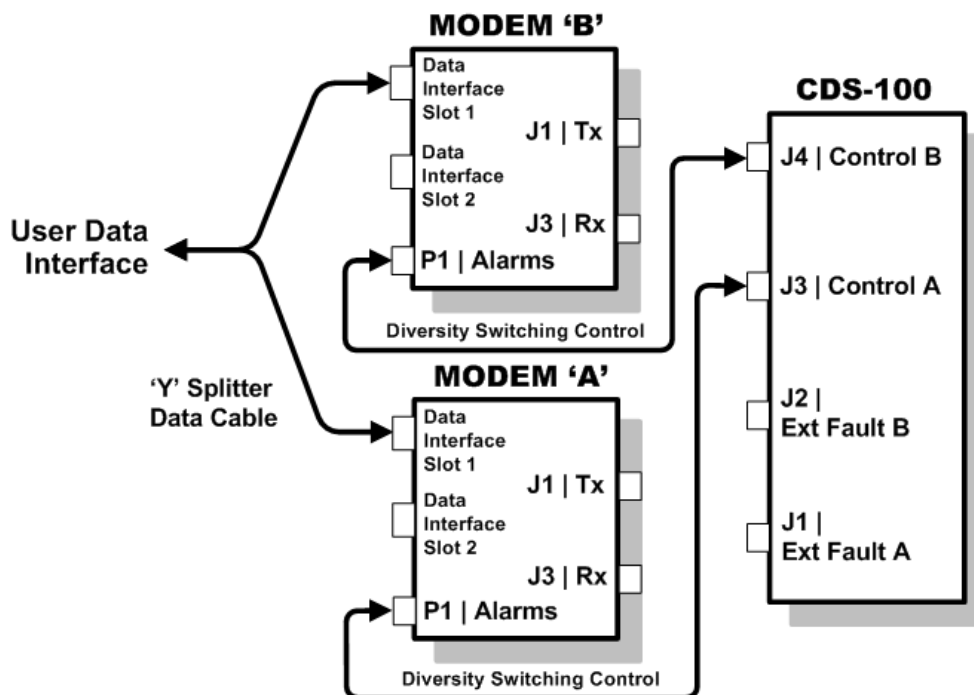
Figure 5-39. CDM-710 Block Diagram – User→Modem→Switch

Figure 5-39 shows the block diagram typical for the kits shown in **Sects. 5.9.2.1.1** and **5.9.2.1.2**. For example, **Sect. 5.9.2.1.1** identifies the interface kit used with the CDI-40 ASI 75Ω data interface.

With the exception of the CDI-70 Gigabit Ethernet data interface configuration shown in **Sect. 5.9.2.2**, which uses user-provided Ethernet cables and Layer 2 Switch, you must use one interface kit per modem pair for each interface (see examples for specific quantities).

5.9.2.1.1   ASI 75Ω Data Interface (CDI-40) Kit KT/12579

Figure 5-40 shows an example for a CDM-710 diversity switching configuration with the CDI-40 ASI data interface installed in Slot 1, and with Slot 2 empty. The figure shows installation of one KT/12579 ASI Interface Kit.
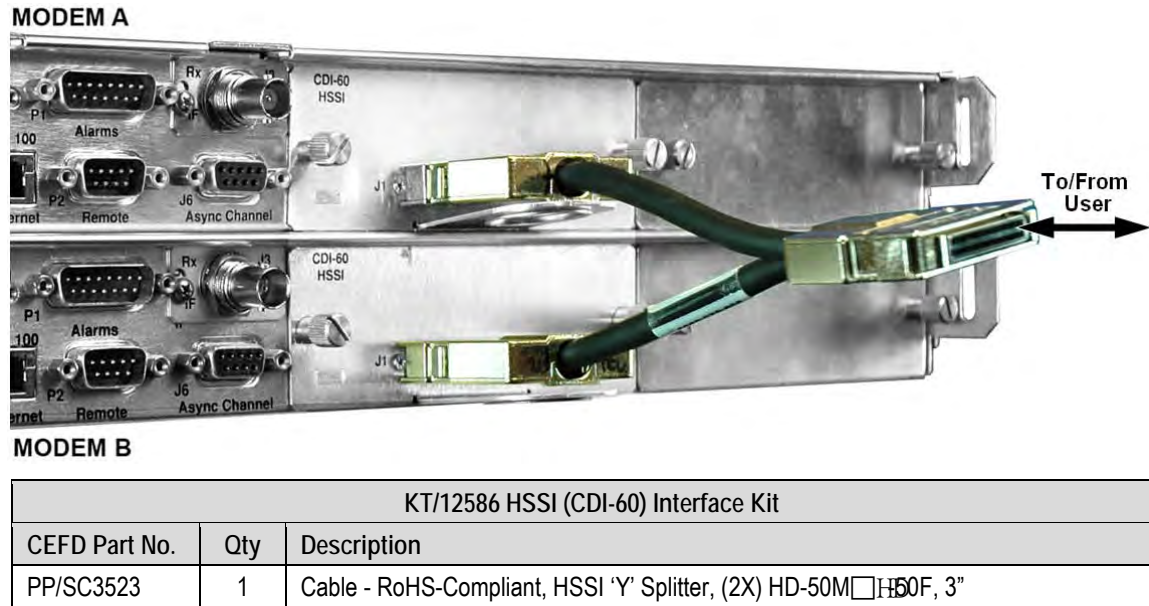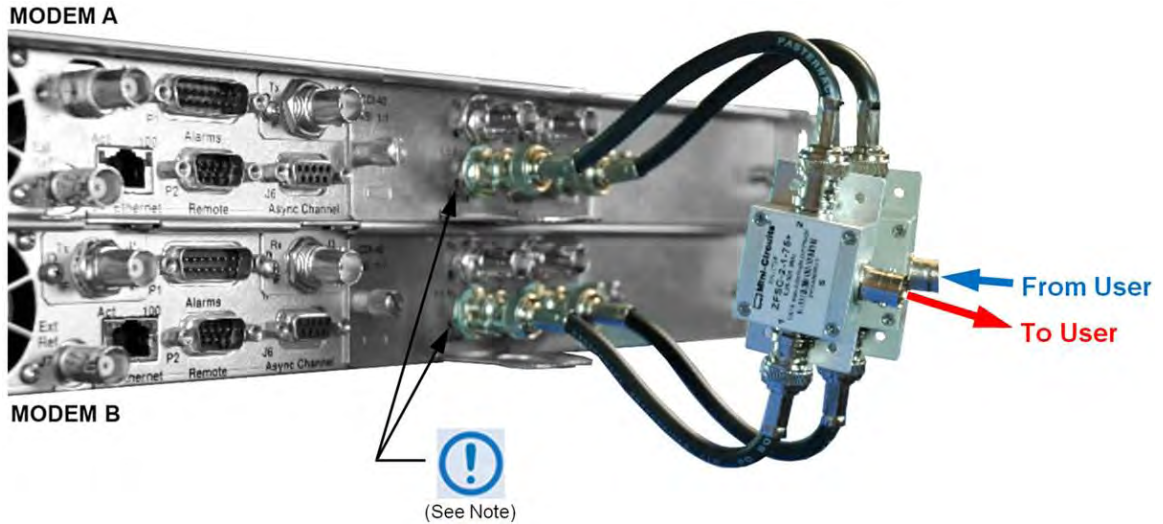

Be sure to connect to the <u>lower</u> BNC connector pair labeled "1:1" on the CDI-40 ASI data interface. The Rx port on each interface has been tuned to be 3 dB higher amplitude to compensate for the presence of the RF/SA32KC-IN/OUT 2-way combiner.

KT/12579 ASI (CDI-40) 75Ω Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

Figure 5-40. CDM-710 ASI Interface Example

5.9.2.1.2   HSSI Data Interface (CDI-60) Interface Kit KT/12578

Figure 5-41 shows an example for a CDM-710 diversity switching configuration with the CDI-60 HSSI data interface installed in Slot 1, and with Slot 2 empty. The figure shows installation of one KT/12578 HSSI Interface Kit.
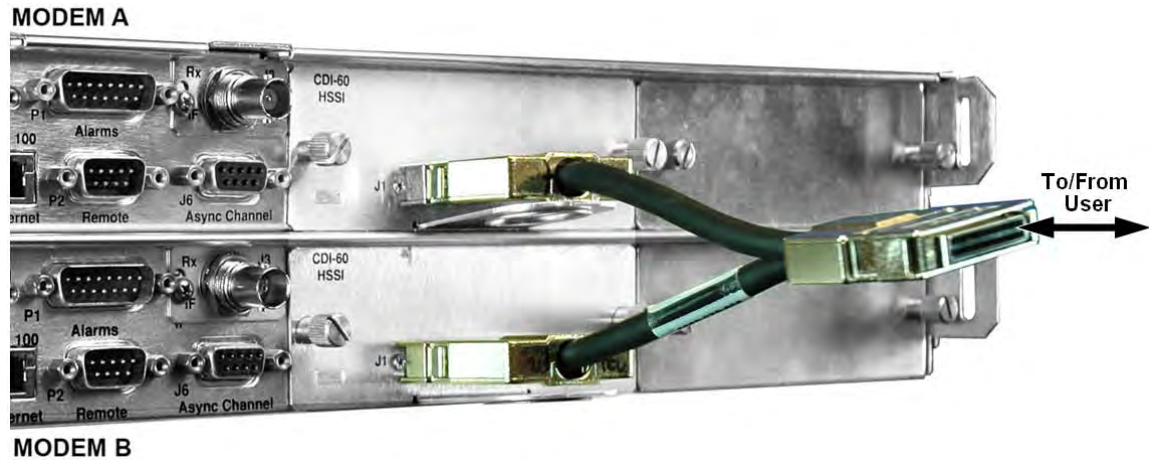
KT/12578 HSSI (CDI-60) Interface Kit		
CEFD Part No.	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M□H50F, 3"

Figure 5-41. CDM-710 HSSI Interface Example

5.9.2.2   Gigabit Ethernet Data Interface (CDI-70) Example

> **See CEFD White Paper "Bridged Ethernet Interface Redundancy" available for download from Comtech EF Data's Web site (www.comtechefdata.com).**

Figure 5-37 shows the block diagram and cabling example for a CDM-710 diversity switching configuration with the CDI-70 Gigabit Ethernet data interface installed in Slot 2, and with Slot 1 empty. This setup requires no cabling and component kit – you must use user-provided Ethernet cables and Layer 2 Switch for direct connection to the CDI-70.
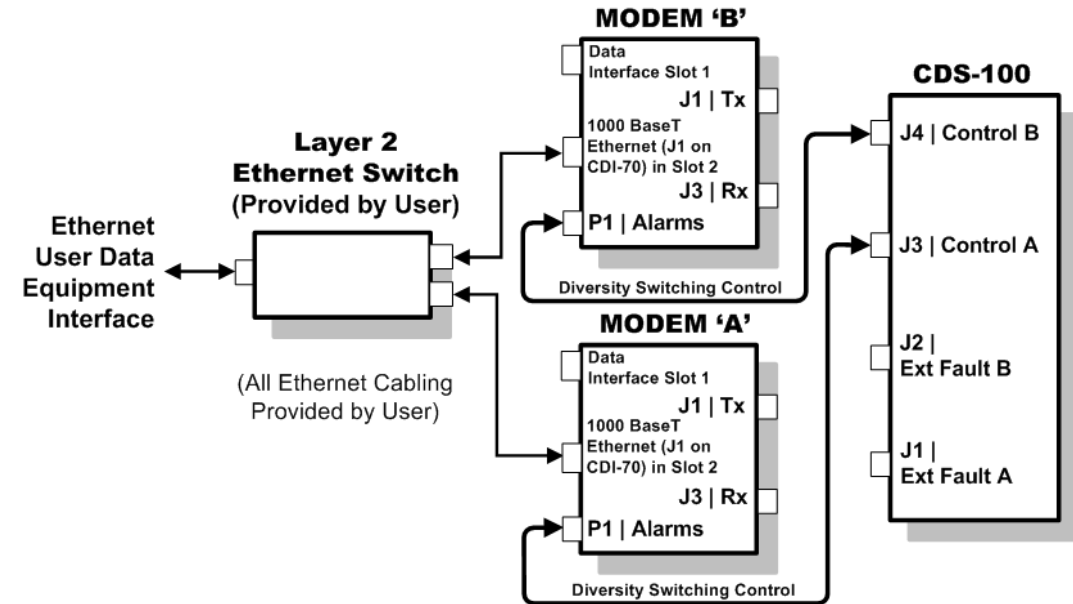
CDM-710 Gigabit Ethernet Block Diagram – User→Modem→Switch
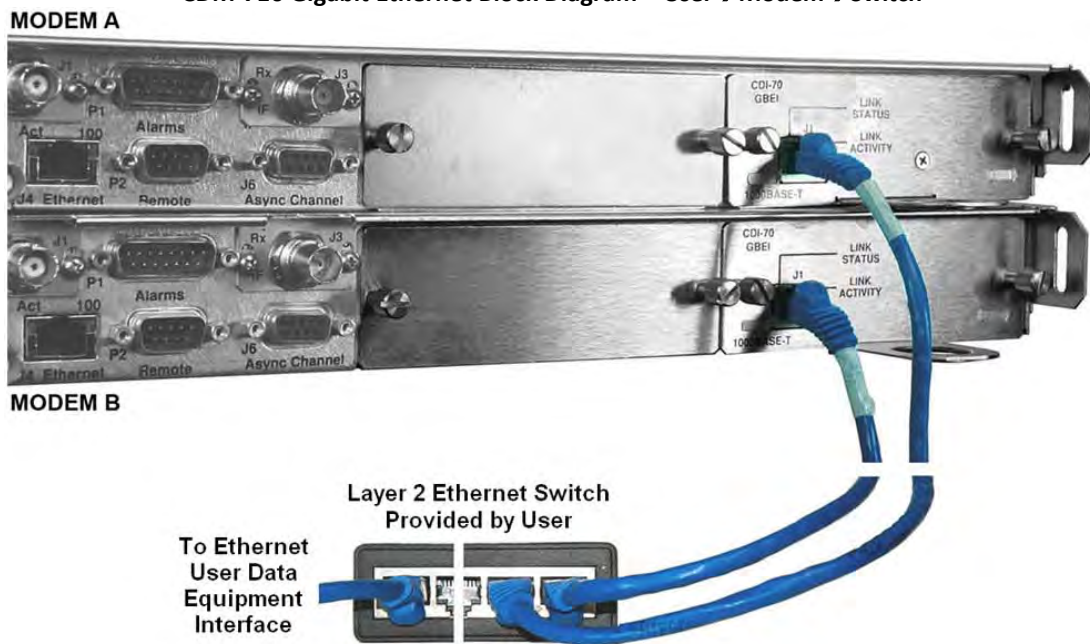
Figure 5-42. CDM-710 Gigabit Ethernet Interface Example

5.10   Cabling to the CDM-700

1) For information on configuring the CDS-100 Diversity Switch with the CDM-700 Broadcast Satellite Modems for 1:1 (diversity switching) operation, see:

- **Chapter 4. MODEM AND SWITCH CONFIGURATION**

- **CDM-700 Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM700.IOM)**

2) For information on the cables identified in this section, see Appendix A. CABLE DRAWINGS.

5.10.1   CDS-100→CDM-700 Control Interface Cabling Using Kit KT-0020556

1) Excluding modems, the KT-0020556 CDS-100 Diversity Switch Kit (Sect. 5.2.2) provides all components shown in Figure 5-43.

2) When you connect the Control Interface cables between the CDS-100 and the modems, make sure that you securely fasten the screw locks on the Type 'D' connectors. This prevents accidental disconnection of the cables, particularly when you are removing and replacing a backup unit.

3) Terrestrial data interface components/kits must be ordered separately. See Sect. 5.10.2 for CDM-700 terrestrial data interface configuration and connection examples and details.

CEFD Part No.	Qty	Description
CA/WR12135-1 See Notes	2	Control Cable – Universal, DB-9M, 4'

FIGURE NOTES:

1) **To provide user access to the modem "Fault Summary Relay," Control 'Y' Cable (CEFD P/N CA/WR13011-4), sold separately, is available for use in place of the CA/WR12135-1 Control Cable.**

2) **The CA/WR12135-1 Control Cable will mute the Offline modem's Tx IF. If this is not desired, then an alternate Control Cable (CEFD P/N CA-0000187), sold separately, is available for use instead.**

CAUTION – It is ESSENTIAL that you make the control connections correctly.

Figure 5-43. CDM-700 Modem-to-Switch Control Connections (CEFD Kit KT-0020556)

5.10.2 Modem-to-User Data Interface Kit and Connection Examples

In addition to the Modem-to-Switch control cabling shown previously, a number of data interface configuration kits are available for use with the CDM-700 Satellite Modem. **Separate cabling kits are needed for these data interfaces.**

⚠️ **The data interface combinations allowable in the CDM-700 chassis Interface Slots 1 and 2 are as follows:**

Interface Slot 1	Interface Slot 2
Dual G.703 (CDI-10)	None
	Dual G.703 (CDI-10)
	HSSI (CDI-60)
	GigE (CDI-70)
OC3 Optical (CDI-50-1) Single Mode	None
155MB Copper (CDI-50-1)	
HSSI (CDI-60)	None
	HSSI (CDI-60
	GigE (CDI-70)
GigE (CDI-70)	None
	GigE (CDI-70)
None	Dual G.703 (CDI-10)
	HSSI (CDI-60)
	GigE (CDI-70)

5.10.2.1 Non-IP Modem-to-User Data Interface Kit and Connection Examples

Figure 5-44 shows the block diagram typical for the kits shown in **Sects. 5.10.2.1.1** through **5.10.2.1.3**. For example, **Sect. 5.10.2.1.1** identifies the interface kit used with the CDI-10 Dual G.703 E3/T3/STS-1 and CDI-60 HSSI data interfaces.
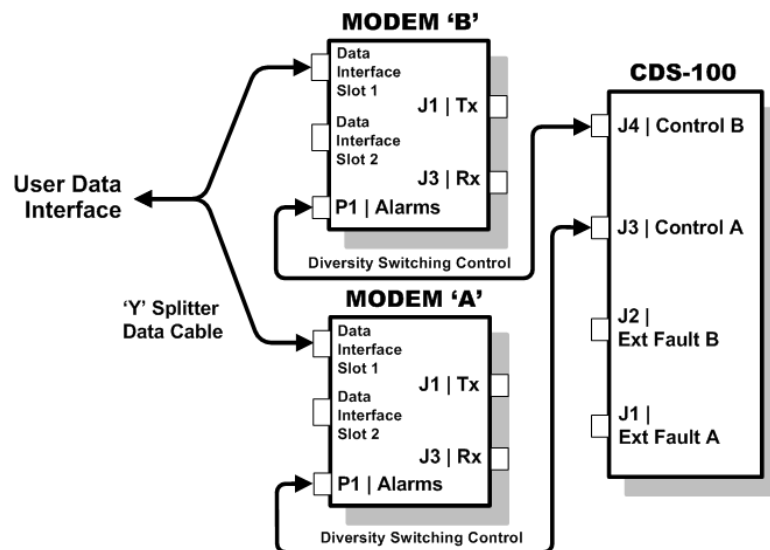
Figure 5-44. CDM-700 Block Diagram – User→Modem→Switch

With the exception of the CDI-70 Gigabit Ethernet data interface configuration shown in **Sect. 5.10.2.2**, which uses user-provided Ethernet cables and Layer 2 Switch, you must use one interface kit per modem pair for each interface (see examples for specific quantities).

5.10.2.1.1 Dual G.703 E3/T3/STS-1 75Ω Data Interface (CDI-10) Kit KT/12582 and HSSI Data Interface (CDI-60) Kit KT/12586

Figure 5-45 shows an example of a CDM-700 diversity switching configuration with the CDI-10 Dual G.703 Data Interface installed in Slot 1, and the CDI-60 HSSI Data Interface installed in Slot 2. The figure depicts installation of one KT/12582 Dual G.703 Interface Kit (each kit can supply one or two CDI-10 interfaces), and one KT/12586 HSSI Interface Kit.
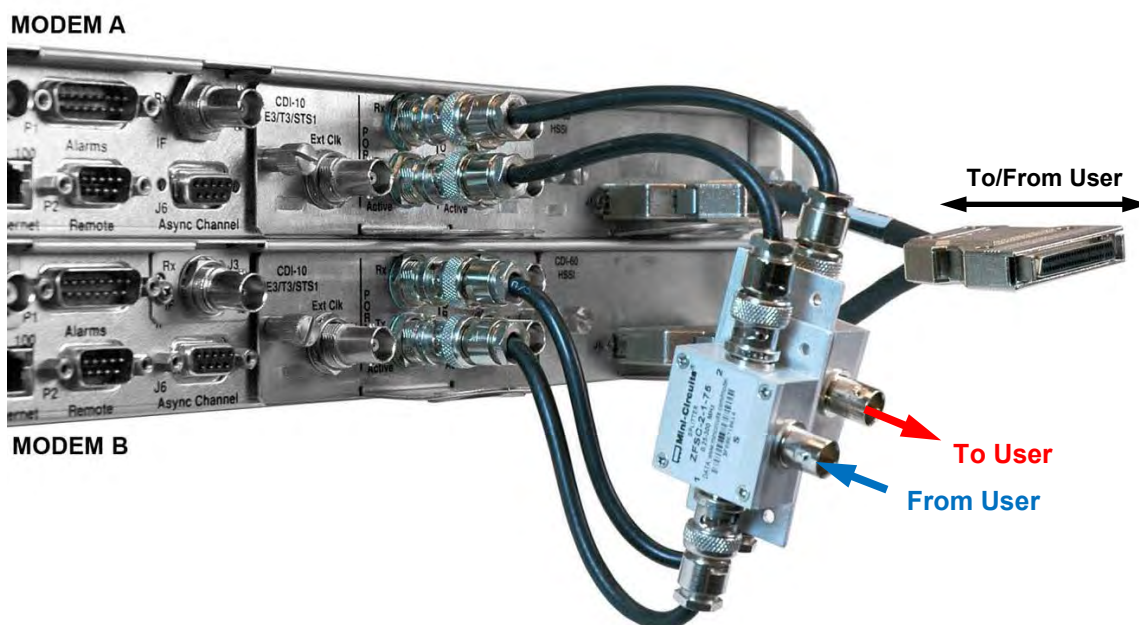
KT/12582 G.703 (CDI-10) 75Ω Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	8	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	4	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

KT/12586 HSSI (CDI-60) Interface Kit		
CEFD Part No.	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M → HD-50F, 3"

Figure 5-45. CDM-700 G.703 E3/T3/STS-1 and HSSI Interface Example

5.10.2.1.2   155MB Copper Data Interface (CDI-50) Kit KT/12583

Figure 5-46 shows an example for a CDM-700 diversity switching configuration with a CDI-50 data interface installed in Slot 1 for use with 155MB Copper data, and with Slot 2 empty. This figure shows installation of one KT/12583 155MB Copper Interface Kit – each kit can supply one or two CDI-50 interfaces.

KT/12583 155MB Copper (CDI-50) Interface Kit		
CEFD Part No.	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

Figure 5-46. CDM-700 155MB Copper Interface Example

5.10.2.1.3 OC-3 Data Interface (CDI-50) Kits KT/12585 (Single-Mode) or KT/12584 (Multi-Mode)

Figure 5-47 shows a CDM-700 diversity switching configuration with installation of one CDI-50 data interface installed in Slot 1 for use with OC-3 data, and with Slot 2 empty. This figure shows installation of one KT/12585 OC-3 Single-Mode Interface Kit. Multi-Mode configurations use the KT/12584 OC-3 Multi-Mode Interface kit. You must use the cable kit that is specific to *Single Mode* or *Multi Mode* operation:

- The KT/12585 OC-3 Single-Mode Interface Kit features **yellow** cables.

- The KT/12584 OC-3 Multi-Mode Interface Kit features **orange** cables.
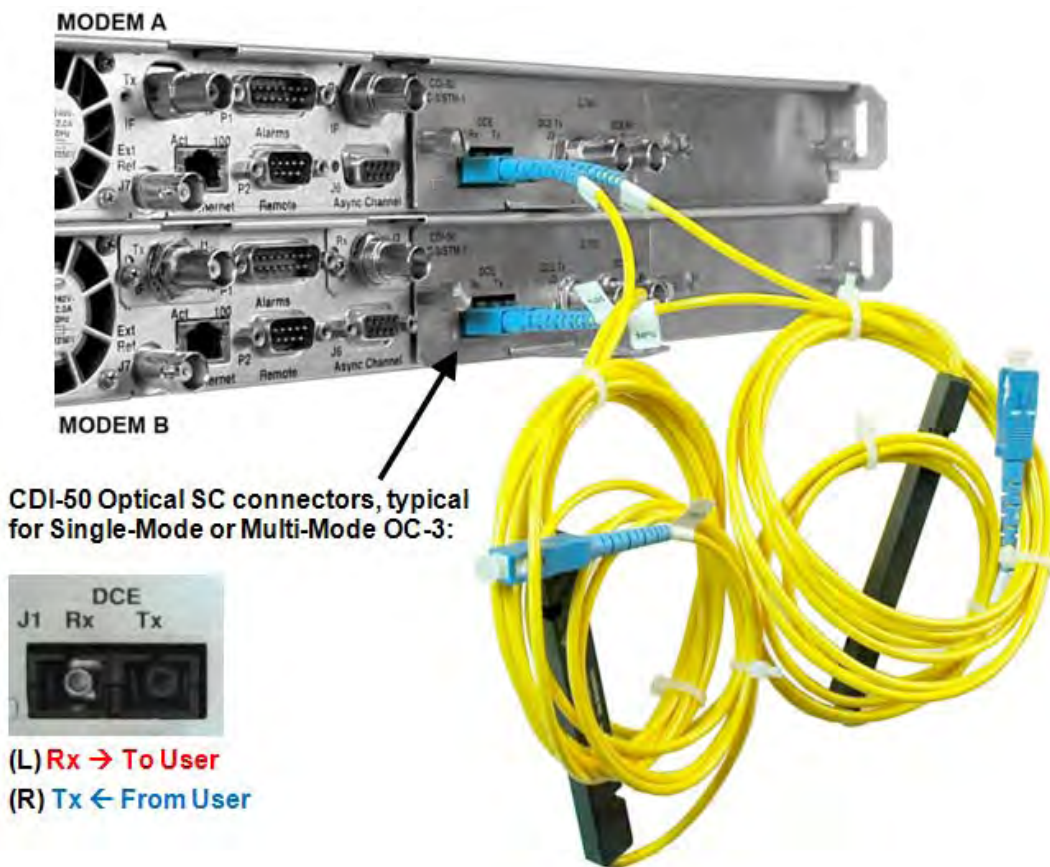
KT/12585 OC-3 Single-Mode (CDI-50) Interface Kit		
CEFD Part No.	Qty	Description
PP/CPS2A12501	2	Cable Assy – RoHS-Compliant, Optical Coupler, SC/UPC Connectors

OR

KT/12584 OC-3 Multi-Mode (CDI-50) Interface Kit		
CEFD Part No.	Qty	Description
PP/CPM6A1250	2	Cable Assy – RoHS-Compliant, Optical Coupler, SC/UPC Connectors

Figure 5-47. CDM-700 OC-3 Interface Example (Single-Mode shown)

5.10.2.2 Gigabit Ethernet Data Interface (CDI-70) Example

> 🔍 **See CEFD White Paper "Bridged Ethernet Interface Redundancy" available for download from Comtech EF Data's Web site (www.comtechefdata.com).**

Figure 5-48 shows the block diagram and cabling example for a CDM-700 diversity switching configuration with the CDI-70 Gigabit Ethernet data interface installed in Slot 1, and with Slot 2 empty. This setup requires no cabling and component kit – you must use user-provided Ethernet cables and Layer 2 Switch for direct connection to the CDI-70.
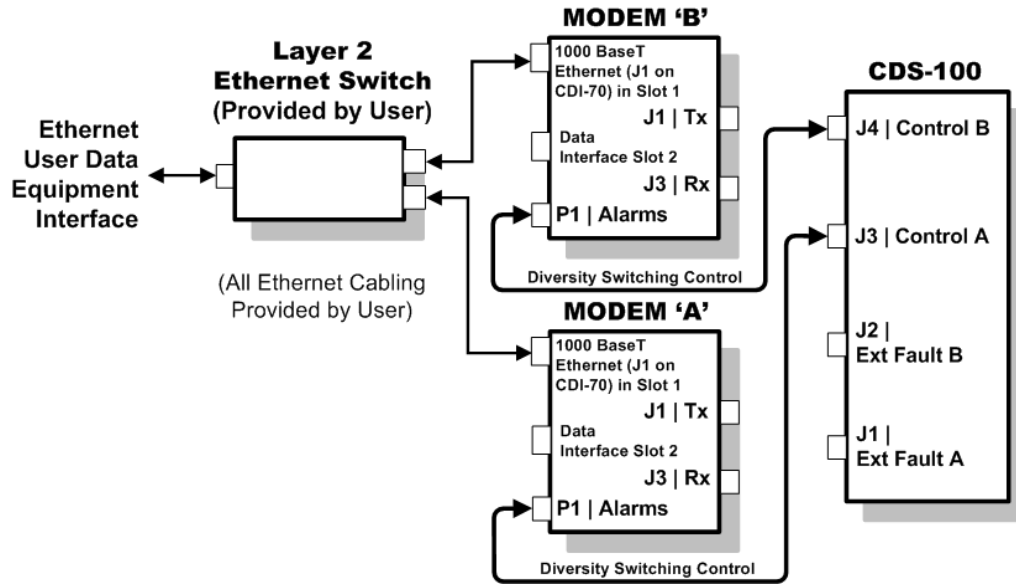
CDM-710 Gigabit Ethernet Block Diagram – User→Modem→Switch
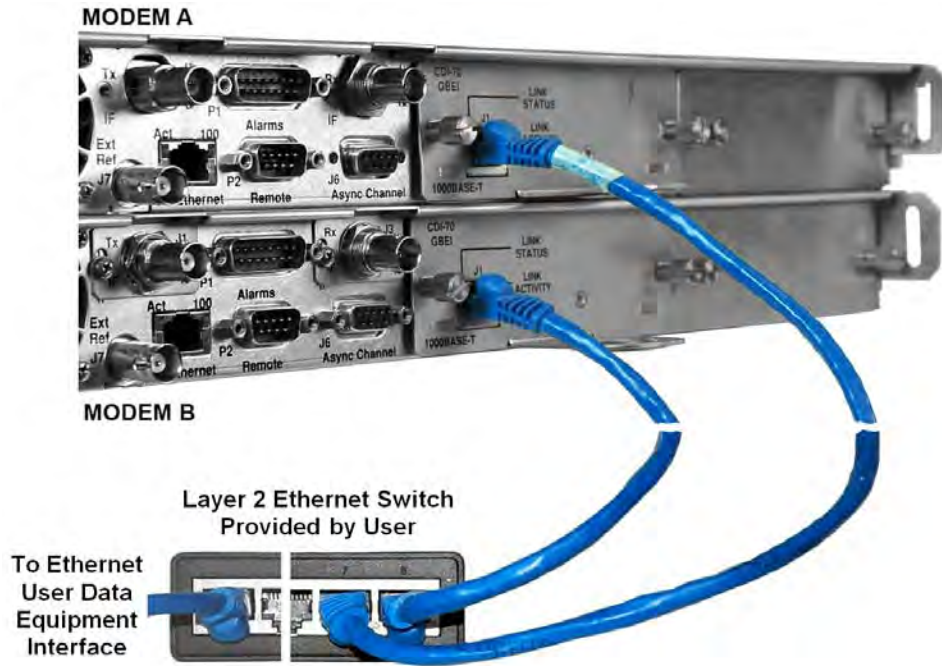
Figure 5-48. CDM-700 Gigabit Ethernet Interface Example

Notes:

Notes:

Appendix A. CABLE DRAWINGS

A.1 Overview

This appendix contains drawings of cables used with the CDS-100 Diversity Switch. These cable details are grouped into two categories – **Control Interface Cables (Sect. A.2)**, and **Data Interface Cables (Sect. A.3)**.

The European EMC Directive (EN55022, EN50082-1) requires that you use properly shielded cables for DATA I/O. These cables must be double-shielded from end-to-end, ensuring a continuous ground shield.

The tables in Sections A.2 and A.3 cross-reference the modem-specific cabling figures featured in Chapter 5. CABLES AND CONNECTIONS.

A.2   Control Interface Cables

App. A FIG	CABLE CEFD P/N	DESCRIPTION	USED FOR (TYPE)	USED WITH CDS-100 →	REF Ch. 5 FIG
A-1	CA/WR9378-4	Universal Cable, Control DB-9M → DB-9M, 4'	1:1 Control	CDM-625/A	5-1
				CDM-850	5-15
				CDM-840	5-19
				CDM-760, CDM-750	5-22
				CDM-570/A, CDM-570L/AL	5-27
A-2	CA/WR12135-1	Adapter Cable, Control, RoHS, DB-15F → DB-9M, 6'	1:1 Control	CDM-710G/L	5-33
				CDM-710	5-38
				CDM-700	5-43
A-3	CA/WR13011-4	Optional Adapter Cable, Control 'Y' Splitter, DB-15F →DB-9M (4'), DB-9M (6") (Alternate to CA/WR12135-1)	1:1 Control, Summary Fault Relay	CDM-710G/L	5-33
				CDM-710	5-38
				CDM-700	5-43
A-4	CA-0000187	Optional Cable, Control, Non-muting, DB-15F → DB-9M, 6' (Alternate to CA/WR12135-1)	1:1 Control (Non-mute Tx IF)	CDM-710G/L	5-33
				CDM-710	5-38
				CDM-700	5-43

A.2.1   Switch-to-Modem, Universal Control Cable, DB-9M→DB-9M

> **(!)** **Alternate Cabling Note: CEFD Universal Control Cable CA/WR9378-8 (DB-9M → DB-9M, 8'), sold separately, is available for use in place of CA/WR9378-4**

Figure A-1. Universal Control Cable (CA/WR9378-4)

A.2.2 Switch-to-Modem, Adapter Control Cable, RoHS, DB-9M→DB-15F
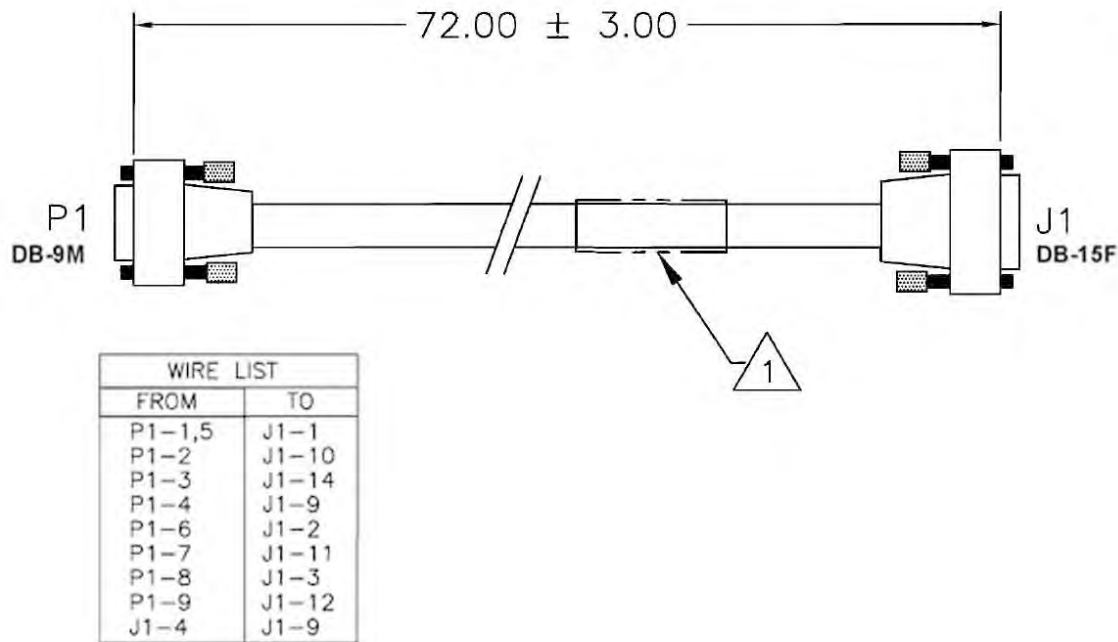
NOTES: UNLESS OTHERWISE SPECIFIED:

1. APPLY CABLE PART NUMBER AND THE BOM REV LETTER TO LABEL IN .12 HIGH CHARACTERS, USING PERMANENT MARKING, COLOR BLACK, LOCATE APPROXIMATELY WHERE SHOWN.

2. STRIP AND/OR TIN WIRES AS REQUIRED FOR INSTALLING TERMINALS OR CONNECTORS USING MANUFACTURERS INSTALLATION PROCEDURE.

3. ALL WIRE TERMINATIONS SHALL HAVE A MINIMUM OF .25 INCH OF HEAT SHRINK OVER EACH SOLDER JOINT.

4. FOLD BACK FOIL AND BRAID FROM CABLE, ITEM 1, OVER GROMMET AND SEAL WITH COPPER TAPE

5. ALL SOLDER AND OTHER PROCESS RELATED MATERIALS MUST BE RoHS COMPLIANT IN ACCORDANCE WITH DIRECTIVE 2002/95/EC.

WIRE LIST

FROM	TO
P1-1,5	J1-1
P1-2	J1-10
P1-3	J1-14
P1-4	J1-9
P1-6	J1-2
P1-7	J1-11
P1-8	J1-3
P1-9	J1-12
J1-4	J1-9

Figure A-2. Adapter Control Cable (CA/WR12135-1)

A.2.3   Switch-to-Modem, Optional 'Y' Splitter Adapter Control Cable, (2X) DB-9M→DB-15F

You may purchase this optional CA/WR13011-4 'Y' Splitter Adapter Control Cable as a replacement for the CA/WA12135-1 cable. This cable permits user access to the Summary Fault Relay.

User Access Connection Wire List		
From	To	Signal Name*
P2-4	J1-7	COM
P2-5	J1-8	NO
P2-9	J1-15	NC

*Note: Signal Names refer to "No Fault" (Normal) condition

Switch-Modem Connection Wire List	
From	To
P1-1,5	J1-1
P1-2	J1-10
P1-3	J1-14
P1-4	J1-9
P1-6	J1-2
P1-7	J1-11
P1-8	J1-3
P1-9	J1-12
J1-4	J1-9

Figure A-3. Optional 'Y' Splitter Adapter Control Cable (CA/WR13011-4)

A.2.4   Switch-to-Modem, Optional Control Cable, Non-muting, DB-9M→DB-15F

You may purchase this optional CA-0000187 Control Cable as a replacement for the CA/WA12135-1 cable. This cable keeps the offline modem's Tx IF-enabled.

Figure A-4. Optional Control Cable (CA-0000187)

Notes:

A.3   Data Interface Cables

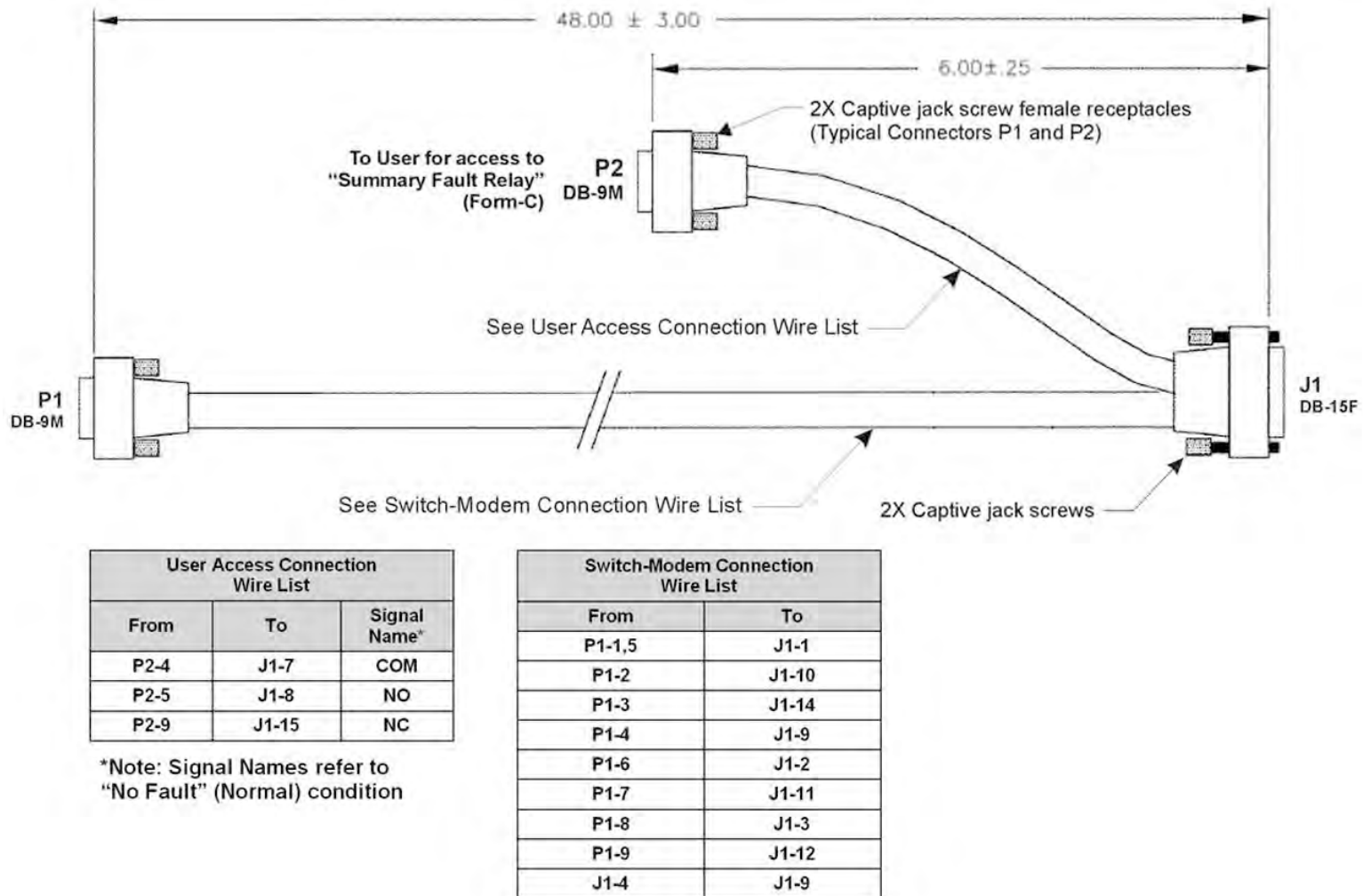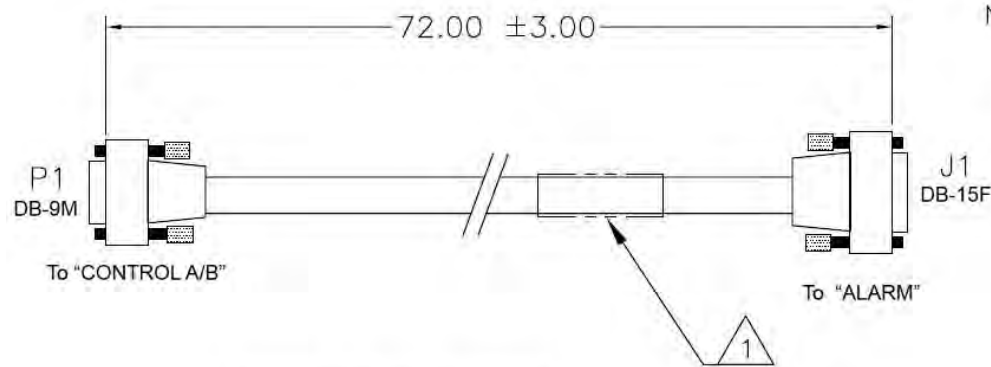| App. A FIG	CEFD CABLE P/N	DESCRIPTION	USED FOR (DATA INTERFACE TYPE)	USED WITH CDS-100→	REF Ch. 5 FIG
A-5	CA/RB10461-1	Cable – 1:1 Y-Splitter, DB-25F (1")→ (2X) DB-25M (4")	EIA-422, V.35	CDM-625/A	5-3
			HSSI	CDM-625/A	5-4
			EIA-422, V.35	CDM-570	5-29
A-6	CA/BNC75OHM	Cable – RoHS, Coax Type 'BNC' 75Ω, 1'	ASI	CDM-625/A	5-8
			G.703 Unbalanced	CDM-625/A	5-7
			G.703 Unbalanced	CDM-840	5-21
			Single G.703 E3/T3 PIIC	CDM-760, CDM-750	5-26
			G.703 Unbalanced	CDM-570/A, CDM-570A/AL	5-31
			Single G.703 E3/T3/STS-1	CDM-710G/L	5-35
			ASI	CDM-710	5-40
			Dual G.703 E3/T3/STS-1	CDM-700	5-45
			155MB Copper	CDM-700	5-46
A-7	CA-0000071	Cable – 1:1 'Y' Splitter, (2X) DB-9M → DB-9F, 8"	Quad E1	CDM-625/A	5-5
			G.703 Balanced	CDM-625/A	5-6
			ESC	CDM-625/A	5-10
A-8	CA-0000163	Optional Cable – 1:1 'Y' Splitter, (2X) DB-15F → DB-9M, 6"	Quad E1	CDM-625/A	5-5
A-9	CA-0000164	Optional Cable – 1:1 'Y' Splitter, (2X) RJ-48F → DB-9M, 6"			
A-10	KT-0000122	Optional Cable Assy – 1:1 'Y' Splitter, (4X) BNC → DB-9M, 6"			
A-11	CA-0000070	Cable – 1:1 'Y' Splitter, (2X) HD-44M → HD-44F, 8"	Overhead	CDM-625/A	5-9
A-12	CA-0000276	Cable – Shielded, Multi-drop CnC® Plus, 1:1, DB-9M → DB-9M, 1'	PMSI/CnC®	CDM-625/A	5-14
A-13	CA-0000560	Cable Assy – RoHS-Compliant, Optical Coupler, 2m (6.56'), LC Connectors	Optical Gigabit Ethernet Single-Mode	CDM-760, CDM-750	5-24
	CA-0000559	Cable Assy – RoHS-Compliant, Optical Coupler, 2m (6.56'), LC Connectors	Optical Gigabit Ethernet Multi-Mode		

App. A FIG	CEFD CABLE P/N	DESCRIPTION	USED FOR (DATA INTERFACE TYPE)	USED WITH CDS-100→	REF Ch. 5 FIG
A-14	CA/WR10522-1	Cable – 1:1 'Y' Splitter, (2X) DB-15M → DB-15F, 5"	G.703 Balanced	CDM-570/A, CDM-570L/AL	5-30
A-15	PP/SC3523	Cable Assy – RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M → HD-50F, 3"	HSSI	CDM-710G/L	5-36
				CDM-710	5-41
				CDM-700	5-45
A-16	PP/CPS2A12501	Cable Assy – RoHS-Compliant, Optical Coupler, 7' Type 'SC/UPC' Connectors	OC-3 Single-Mode	CDM-700	5-47
	PP/CPM6A1250	Cable Assy – RoHS-Compliant, Optical Coupler, 7' Type 'SC/UPC' Connectors	OC-3 Multi-Mode		

A.3.1   Modem-to-User, Splitter Cable, (2X) DB-25M → DB-25F
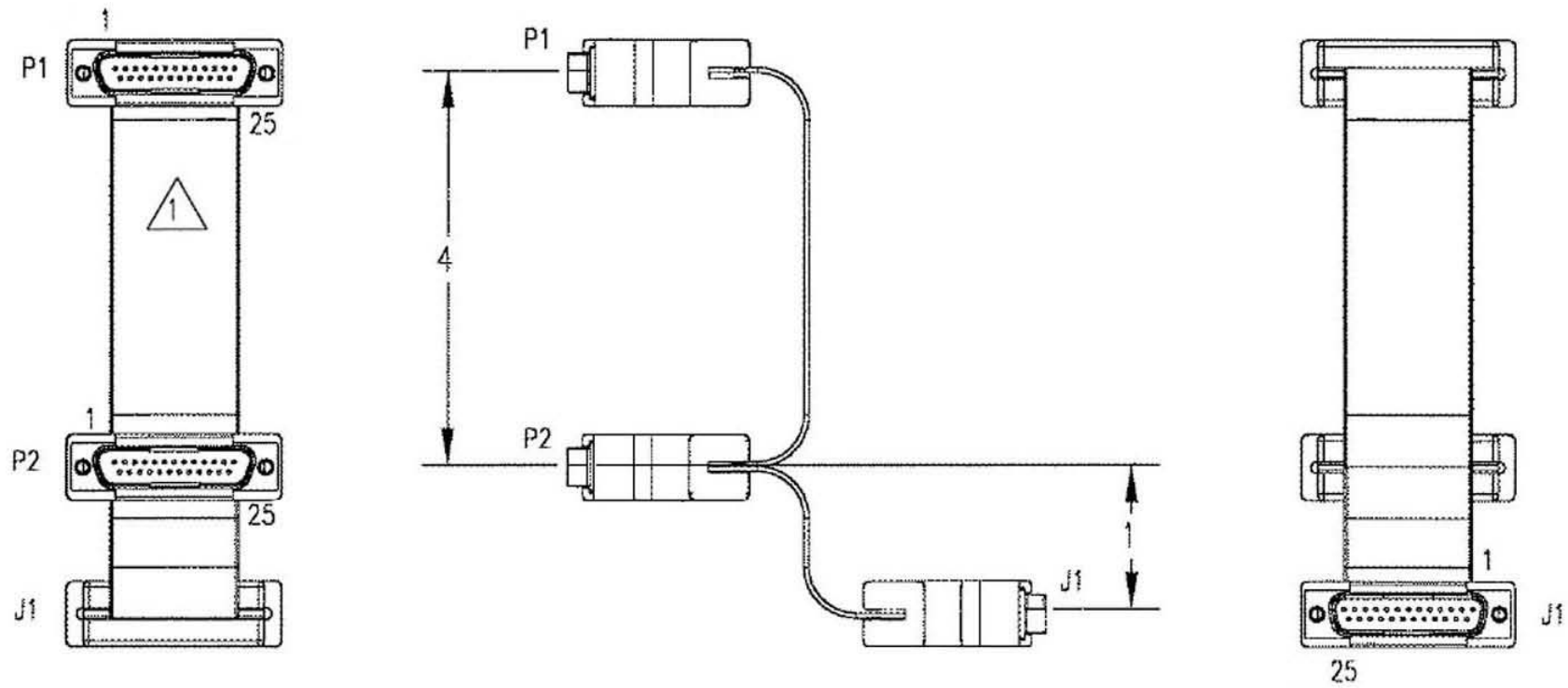
NOTES: UNLESS OTHERWISE SPECIFIED.

⚠ 1 APPLY CABLE PART NUMBER AND REVISION
LEVEL FROM PARTS LIST IN .12 HIGH
CHARACTERS USING PERMANENT MARKING.
LOCATE APPROX. WHERE SHOWN.

2. ALL SOLDER AND OTHER PROCESS RELATED
MATERIALS MUST BE RoHS COMPLIANT
PER DIRECTIVE 2002/95/EC.

Figure A-5. 1:1 User Data Splitter Cable (CA/RB10461-1)

A.3.2   Modem-to-User, 70/140 MHz Coaxial Cable, RoHS, Type 'BNC' 75Ω
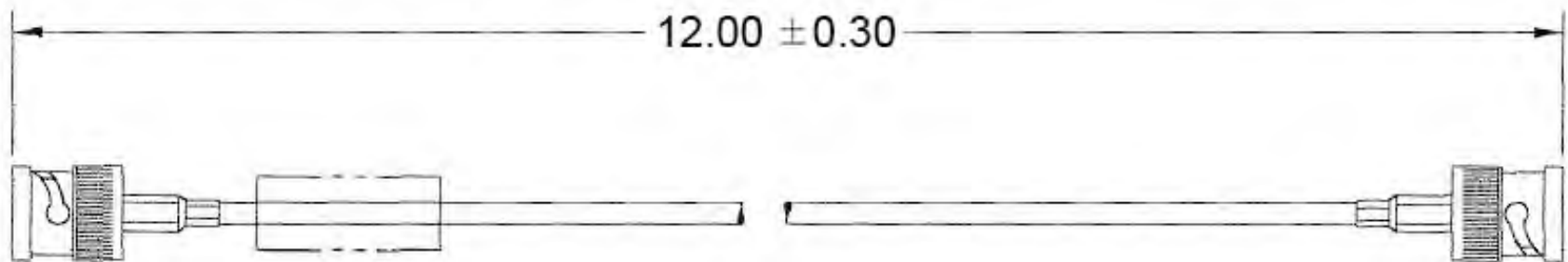
Figure A-6. 75Ω Type 'BNC' User Data Coaxial Cable (CA/BNC75OHM)

A.3.3   Modem-to-User, CDM-625/A Data 'Y' Splitter Cable, (2X) DB-9M → DB-9F

WIRE LIST		
FROM	TO	COMMENTS
J1-1	P2-1, P3-1	TWISTED PAIR
J1-6	P2-6, P3-6	
J1-2	P2-2, P3-2	TWISTED PAIR
J1-7	P2-7, P3-7	
J1-4	P2-4, P3-4	TWISTED PAIR
J1-8	P2-8, P3-8	
J1-5	P2-5, P3-5	TWISTED PAIR
J1-9	P2-9, P3-9	
J1-3	P2-3, P3-3	SHIELD

Figure A-7. 1:1 User Data 'Y' Splitter Cable (CA-0000071)

A.3.4   Modem-to-User, Quad E1 'Y' Splitter Adapter Cable, (2X) DB-15F → DB-9M

This optional adapter cable may be purchased from Comtech EF Data to adapt the Balanced G.703 or Auxiliary G.703 DB-9F modem connections to a DB-15F connector pair. The DB-9M end of this cable plugs into the 'To User' connector side (DB-9F) of the CA-0000071 'Y' Splitter cable shown in **Figure A-8**.

P1	J1	J2	Twisted Pair	Signal Function
5	9		X	Port 1 or 3 Tx In +
9	1			Port 1 or 3 Tx In -
4	11		X	Port 1 or 3 Rx In +
8	3			Port 1 or 3 Rx In -
7		9	X	Port 2 or 4 Tx In +
2		1		Port 2 of 4 Tx In -
6		11	X	Port 2 or 4 Rx In +
1		3		Port 2 or 4 Rx In -
3	2	2	-	GND
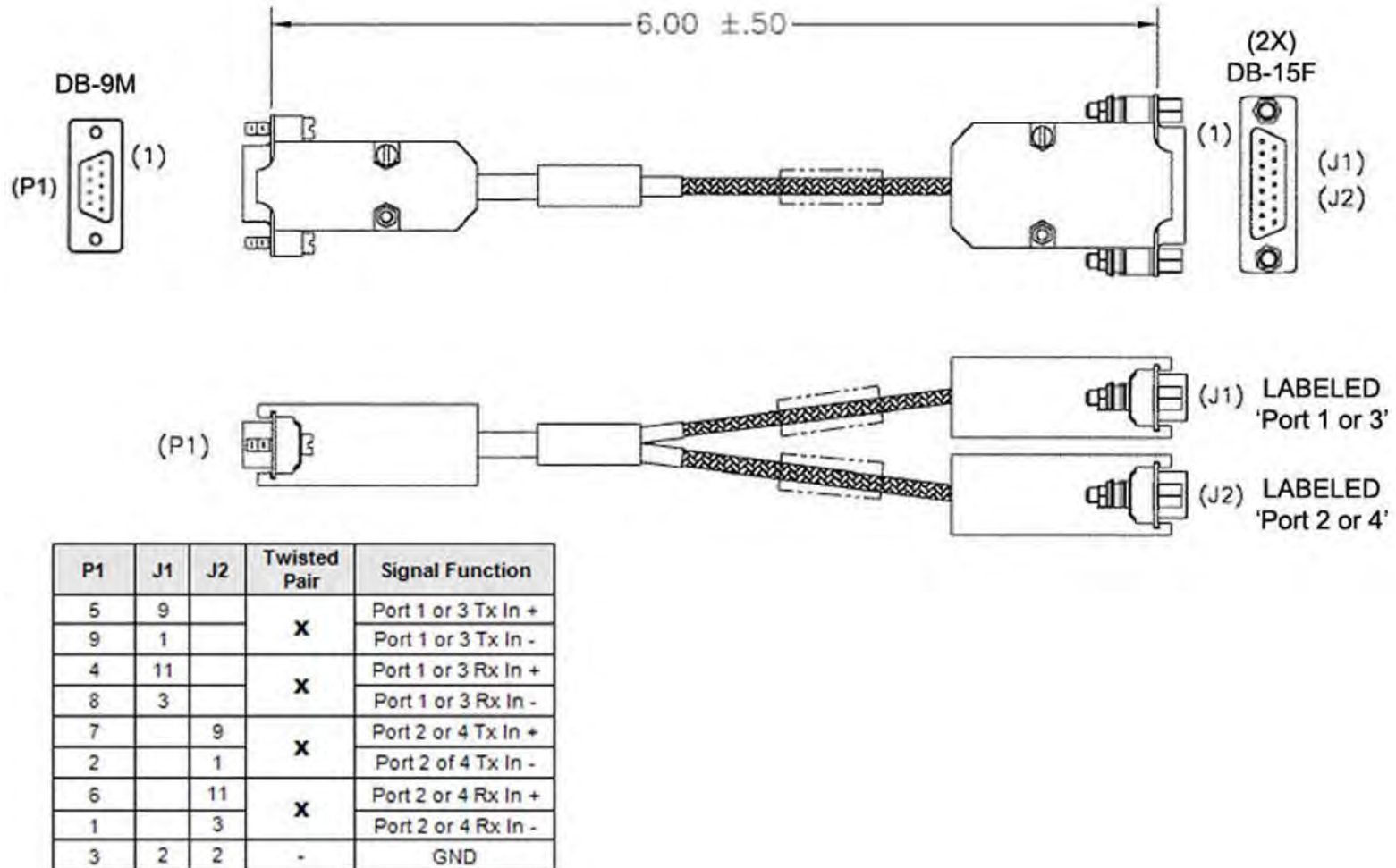
Figure A-8. 1:1 Quad E1 User Data 'Y' Splitter Adapter Cable (CA-0000163)

A.3.5   Modem-to-User, Quad E1 'Y' Splitter Adapter Cable, (2X) RJ-48F → DB-9M

This optional adapter cable may be purchased from Comtech EF Data to adapt the Balanced G.703 or Auxiliary G.703 DB-9F modem connections to a RJ-48F connector pair. The DB-9M end of this cable plugs into the 'To User' connector side (DB-9F) of the CA-0000071 'Y' Splitter cable shown in **Figure A-8**.

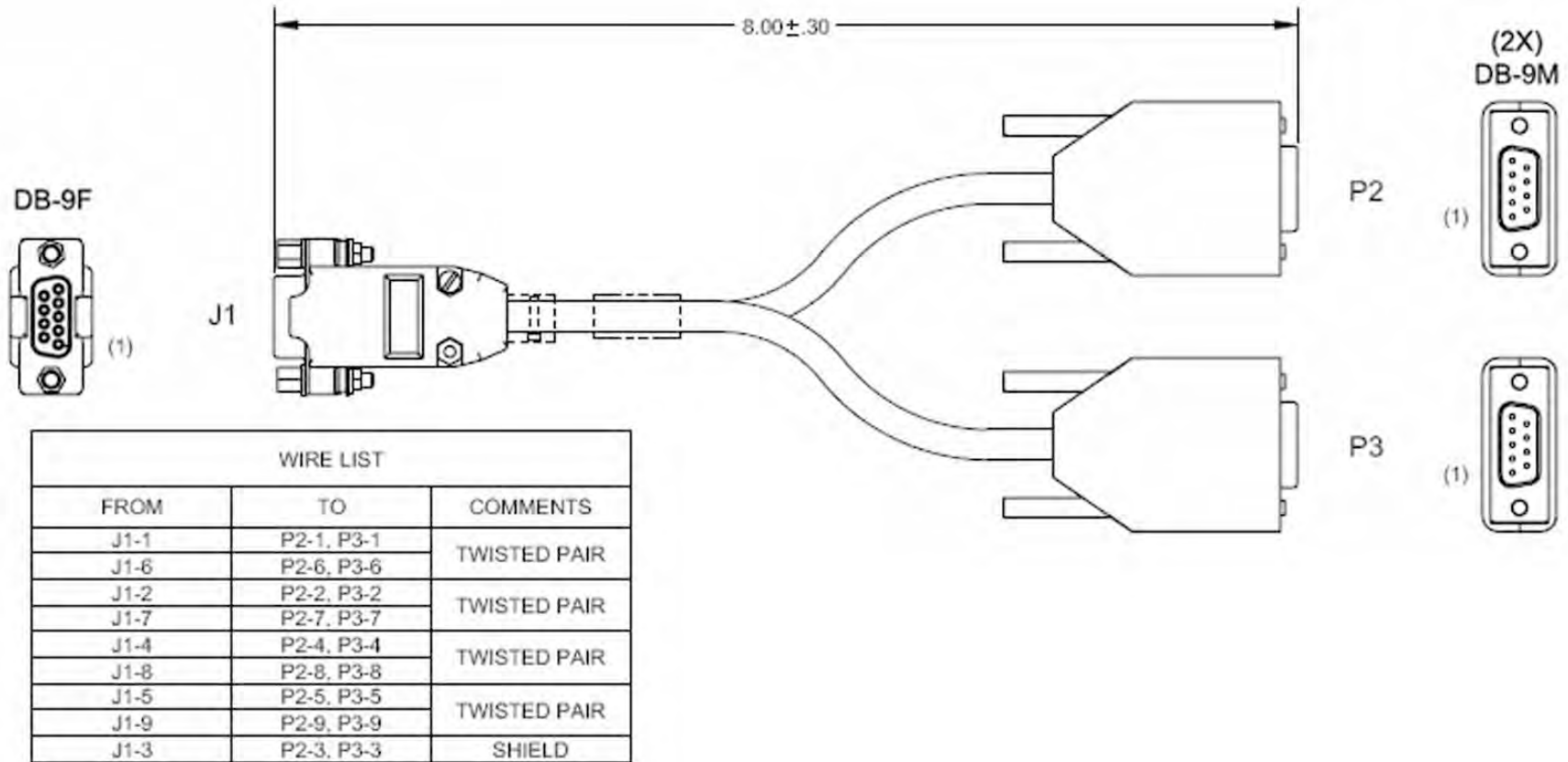| P1	J1	J2	Twisted Pair	Signal Function
5	1		X	Port 1 or 3 Tx In +
9	2			Port 1 or 3 Tx In -
4	4		X	Port 1 or 3 Rx In +
8	5			Port 1 or 3 Rx In -
7		1	X	Port 2 or 4 Tx In +
2		2		Port 2 of 4 Tx In -
6		4	X	Port 2 or 4 Rx In +
1		5		Port 2 or 4 Rx In -
3	3	3	-	GND
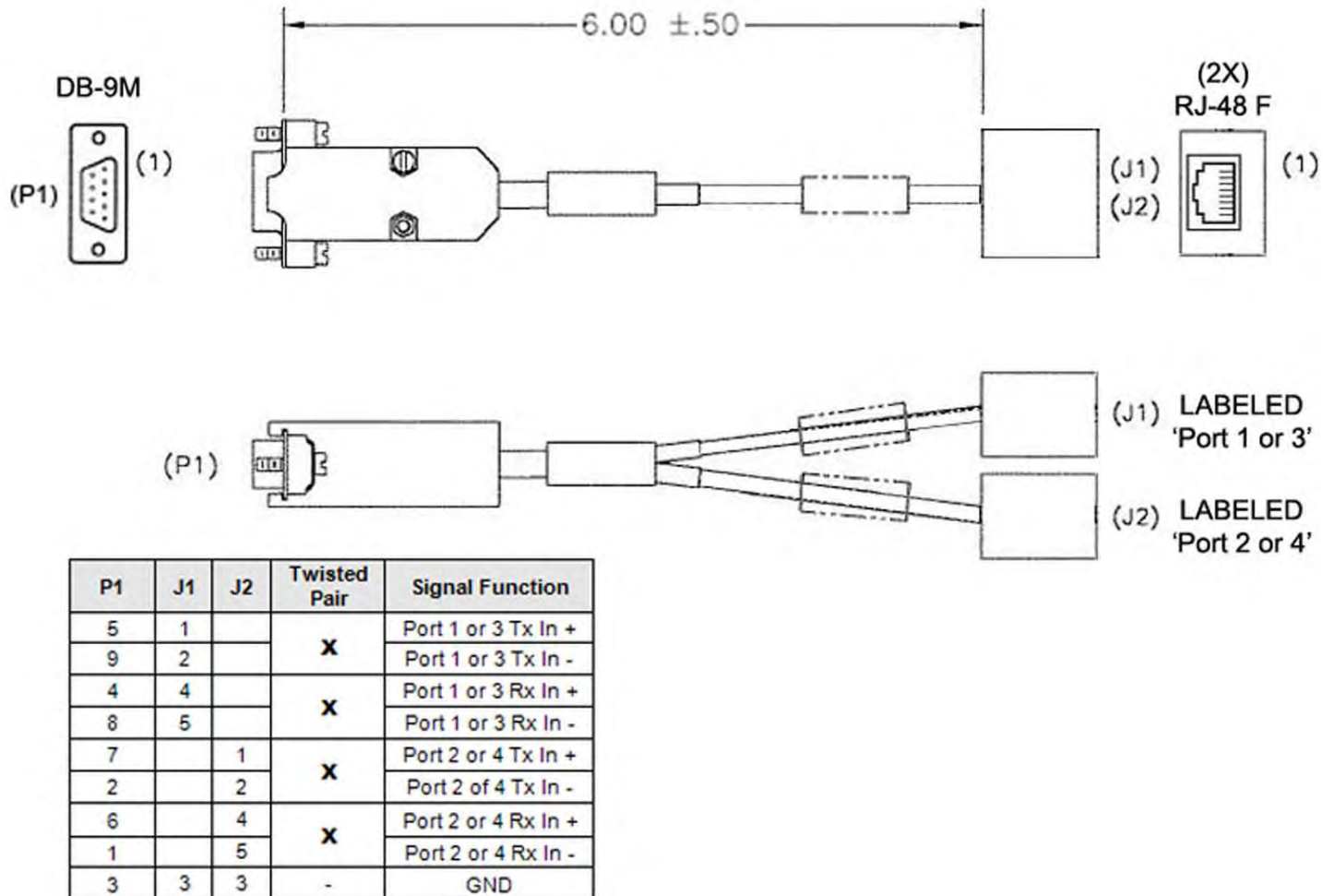
Figure A-9. Quad E1 User Data 'Y' Splitter Adapter Cable (CA-0000164)

A.3.6   Modem-to-User, Quad E1 'Y' Splitter Adapter Cable Kit (KT-0000122)
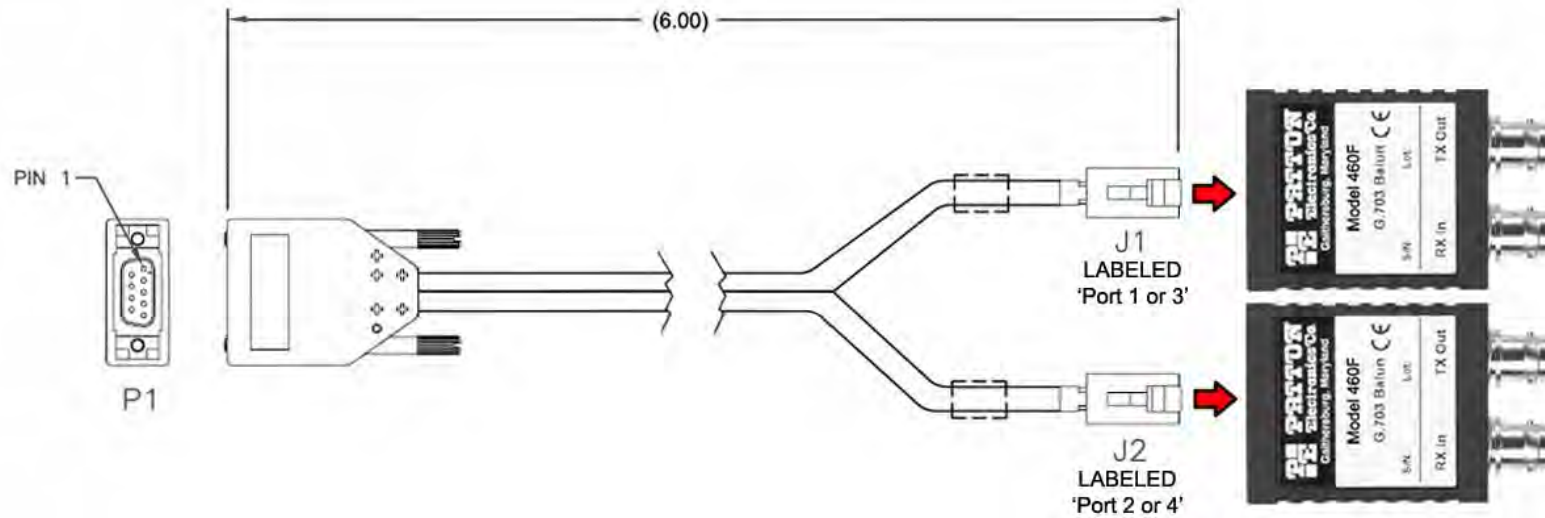
KT-0000122 Quad E1 Balanced/Unbalanced Adapter Kit		
QTY	CEFD P/N	DESCRIPTION
1	CA-0000347	'Y' Cable Assy: DB-9M → 2X RJ-48 Male
2	502-0532-001	Bolun Adapter, 2X RJ-48 Female → 2X BNC 75Ω Female

CA-0000347 Connector Pinouts						
P1 PINOUTS					J1/ J2 TYPICAL WIRE CHART	
P1	J1	J2	Twisted Pair	Signal Function	PIN	WIRE COLOR
5	1		X	Port 1 or 3 Tx In +	1	WHITE / ORANGE STRIPE
9	2			Port 1 or 3 Tx In -	2	ORANGE
4	4		X	Port 1 or 3 Rx In +	3	WHITE / GREEN STRIPE
8	5			Port 1 or 3 Rx In -	4	BLUE
7		1	X	Port 2 or 4 Tx In +	5	WHITE / BLUE STRIPE
2		2		Port 2 of 4 Tx In -	6	GREEN
6		4	X	Port 2 or 4 Rx In +	7	WHITE / BROWN STRIPE
1		5		Port 2 or 4 Rx In -	8	BROWN
3	3	3	–	GND		

Figure A-10. Quad E1 User Data 'Y' Splitter Adapter Cable Kit (KT-0000122)

A.3.7 Modem-to-User, Overhead User Data 'Y' Splitter Cable, (2X) HD-44M → HD-44F
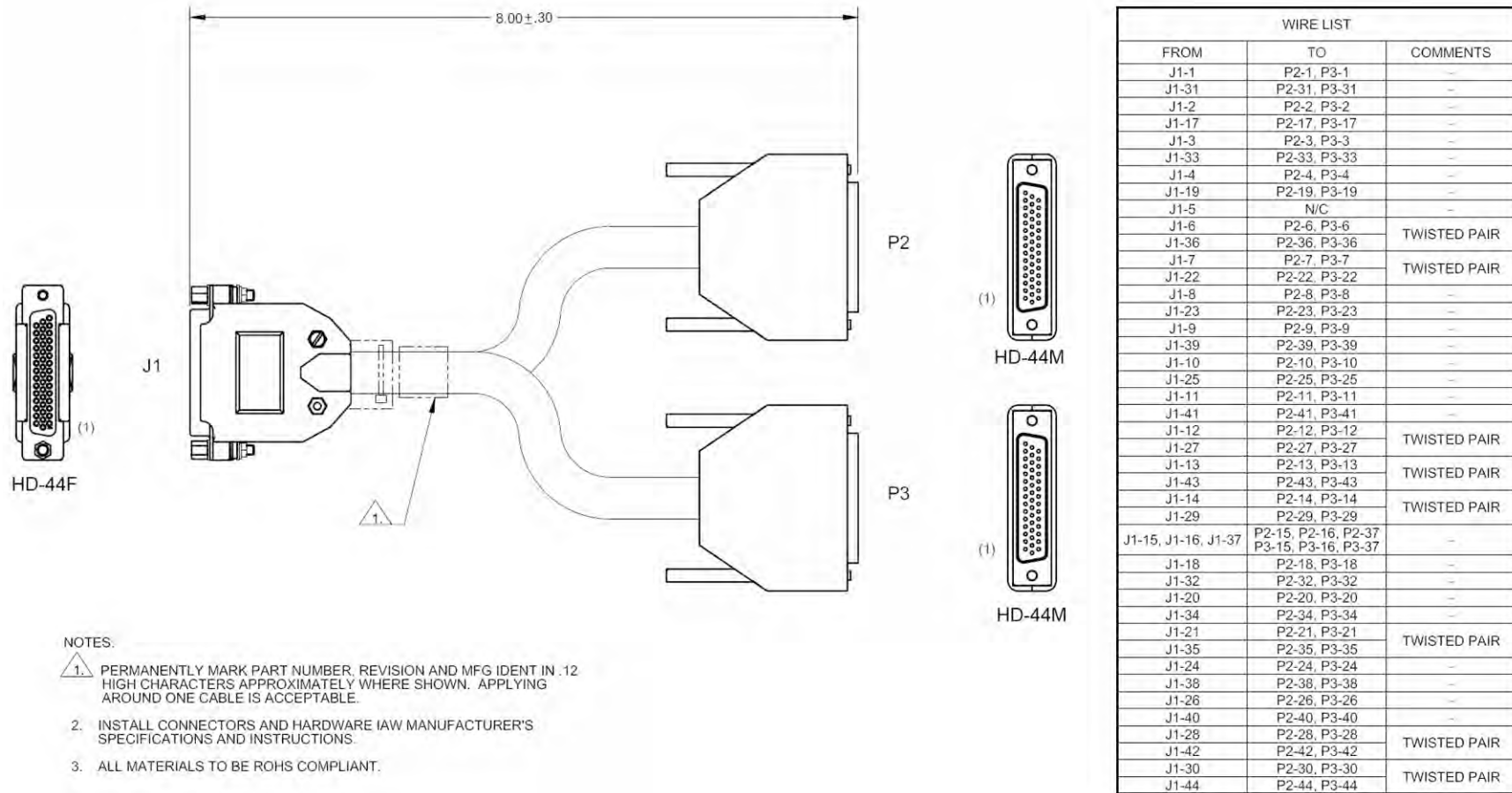

Figure A-11. Overhead User Data 'Y' Splitter Cable (CA-0000070)

A.3.8 Modem-to-Modem, CDM-625/A Shielded Multi-drop CnC® Plus Cable, DB-9M → DB-9M
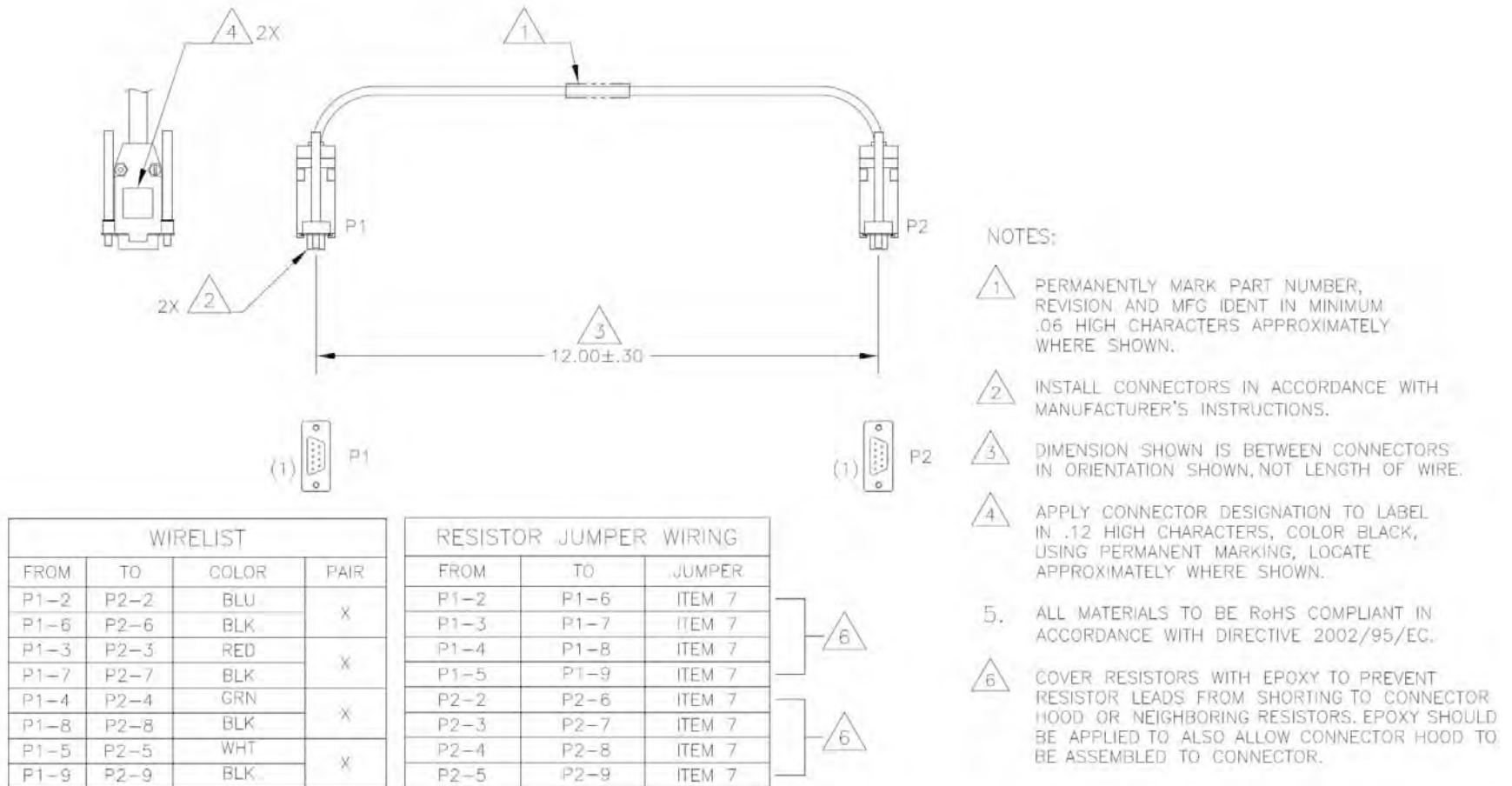
Figure A-12. CDM-625/A Modem-to-Modem Shielded Multi-drop CnC® Plus Cable (CA-0000276)

A.3.9 Modem-to-User, Optical Gigabit Ethernet Single-Mode OR Multi-Mode Cable Assemblies, (2X) Type 'LC' → (4X) Type 'LC'
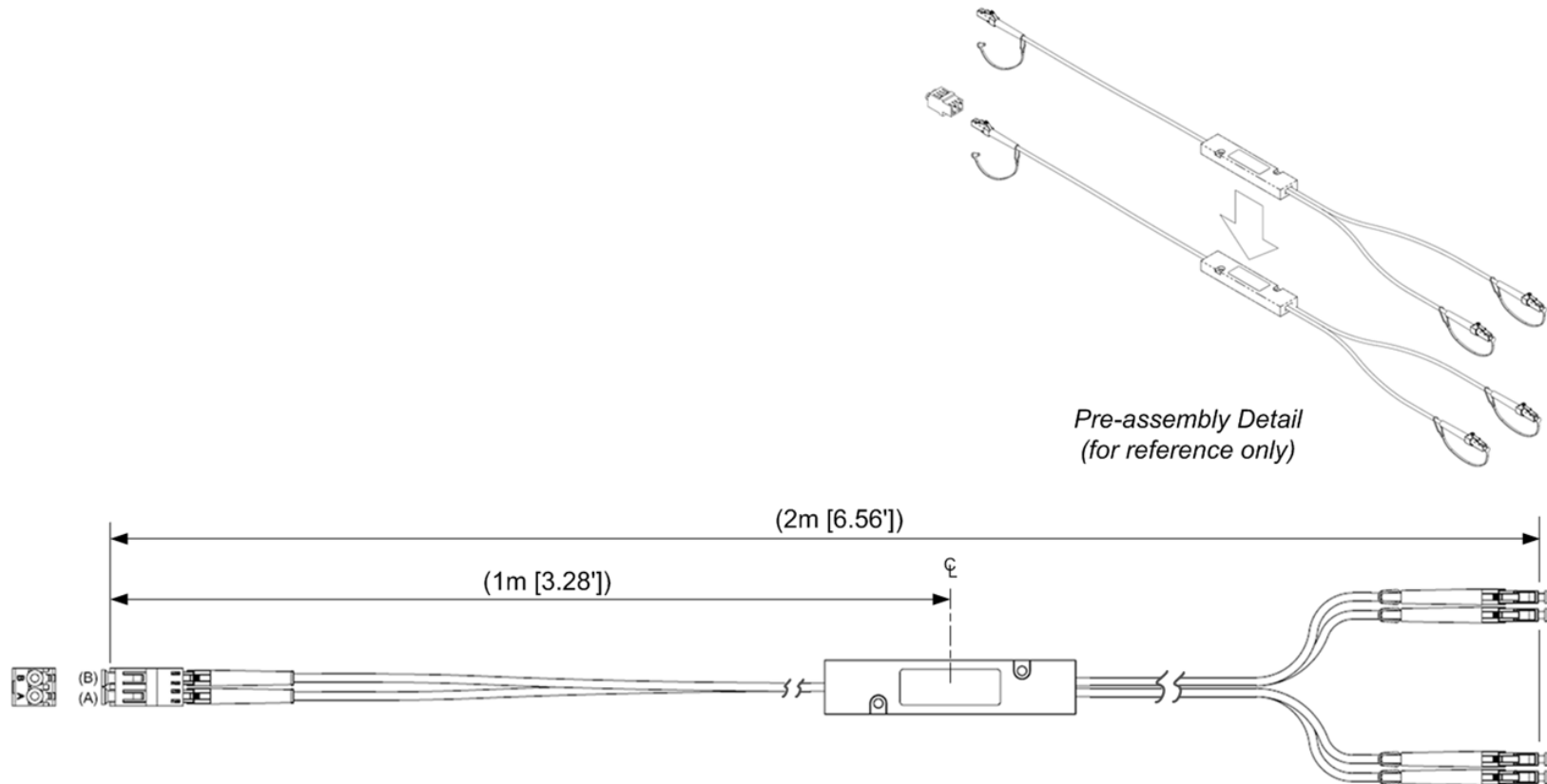
CEFD P/N	Description	Comments
CA-0000560	Single-Mode 'Y' Cable Assy – RoHS-Compliant, Optical Coupler, 2m (6.56'), Type 'LC' Connectors	For CDM-760 or CDM-750 Single-Mode Optical Gigabit Ethernet Interface; Cables are YELLOW
CA-0000559	Multi-Mode 'Y' Cable Assy – RoHS-Compliant, Optical Coupler, 2m (6.56'), Type LC' Connectors	For CDM-760 or CDM-750 Multi-Mode Gigabit Ethernet Interface; Cables are ORANGE

Figure A-13. Optical Gigabit Ethernet User Data Cable Assembly (See Table for CEFD P/N)

A.3.10   Modem-to-User, G.703 Balanced User Data 'Y' Splitter Cable, (2X) DB-15M → DB-15M
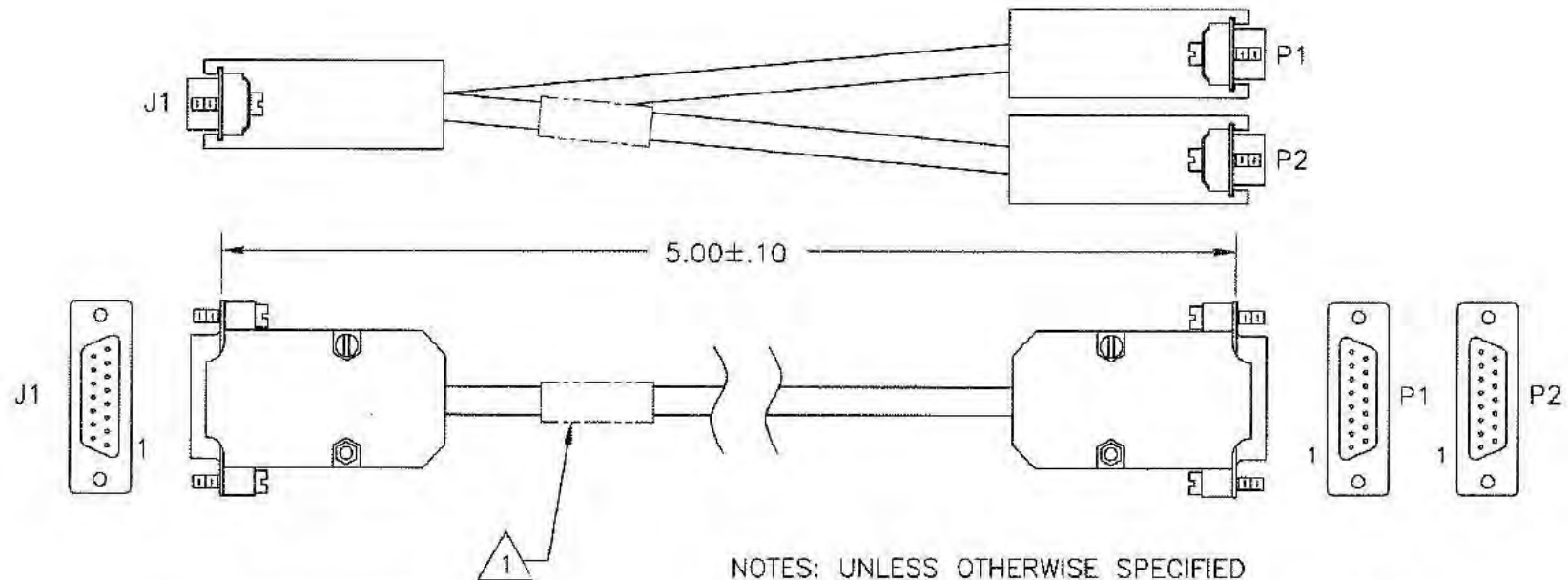
WIRE LIST

FROM	TO	TO	SIGNAL	PAIR
J1-3	P1-3	P2-3	OUT+	X
J1-11	P.1-11	P2-11	OUT-	
J1-1	P1-1	P2-1	IN+	X
J1-9	P1-9	P2-9	IN-	

NOTES: UNLESS OTHERWISE SPECIFIED

1. APPLY CABLE PART NUMBER AND THE BOM REV LETTER TO LABEL, ITEM 5, IN .12 HIGH CHARACTERS, USING PERMANENT MARKING, COLOR BLACK, LOCATE APPROXIMATELY WHERE SHOWN.

2. STRIP AND/OR TIN WIRES AS REQUIRED FOR INSTALLING TERMINALS OR CONNECTORS USING MANUFACTURER'S INSTALLATION PROCEDURE.

3. ALL WIRE TERMINATIONS SHALL HAVE A MINIMUM OF .25 INCH OF HEAT SHRINK OVER EACH SOLDER JOINT.

4. FOLD BACK FOIL, BRAID AND DRAIN FROM CABLE OVER GROMMET AND SEAL WITH COPPER TAPE

Figure A-14. G.703 Balanced User Data 'Y' Splitter Cable (CA/WR10522-1)

A.3.11   Modem-to-User, HSSI User Data 'Y' Splitter Cable, (2X) HD-50M → HD-50F

FROM		TO	SIGNAL / GND	COLOR / DRAIN	PAIR
P1-1	P1-1	P2-1	SIG GND	BLK	X
P1-26	P1-26	P2-26		RED	
P1-2	P1-2	P2-2	RT	BLK	X
P1-27	P1-27	P2-27		WHT	
P1-3	P1-3	P2-3	CA	BLK	X
P1-28	P1-28	P2-28		GRN	
P1-4	P1-4	P2-4	RD	BLK	X
P1-29	P1-29	P2-29		BLU	
P1-5	P1-5	P2-5	OPEN	BLK	X
P1-30	P1-30	P2-30		YEL	
P1-6	P1-6	P2-6	ST	BLK	X
P1-31	P1-31	P2-31		BRN	
P1-7	P1-7	P2-7	SG	BLK	X
P1-32	P1-32	P2-32		ORG	
P1-8	P1-8	P2-8	TA	RED	X
P1-33	P1-33	P2-33		WHT	
P1-9	P1-9	P2-9	TT	RED	X
P1-34	P1-34	P2-34		GRN	
P1-10	P1-10	P2-10	LA	RED	X
P1-35	P1-35	P2-35		BLU	
P1-11	P1-11	P2-11	SD	RED	X
P1-36	P1-36	P2-36		YEL	
P1-12	P1-12	P2-12	LB	RED	X
P1-37	P1-37	P2-37		BRN	
P1-13	P1-13	P2-13	SG	RED	X
P1-38	P1-38	P2-38		ORG	
P1-14	P1-14	P2-14	OPEN	GRN	X
P1-39	P1-39	P2-39		WHT	
P1-15	P1-15	P2-15	OPEN	GRN	X
P1-40	P1-40	P2-40		BLU	
P1-16	P1-16	P2-16	OPEN	GRN	X
P1-41	P1-41	P2-41		YEL	
P1-17	P1-17	P2-17	OPEN	GRN	X
P1-42	P1-42	P2-42		BRN	
P1-18	P1-18	P2-18	OPEN	GRN	X
P1-43	P1-43	P2-43		ORG	
P1-19	P1-19	P2-19	SIG GND	WHT	X
P1-44	P1-44	P2-44		BLU	
P1-20	P1-20	P2-20	OPEN	WHT	X
P1-45	P1-45	P2-45		YEL	
P1-21	P1-21	P2-21	OPEN	WHT	X
P1-46	P1-46	P2-46		BRN	
P1-22	P1-22	P2-22	OPEN	WHT	X
P1-47	P1-47	P2-47		ORG	
P1-23	P1-23	P2-23	OPEN	BLU	X
P1-48	P1-48	P2-48		YEL	
P1-24	P1-24	P2-24	OPEN	BLU	X
P1-49	P1-49	P2-49		BRN	
P1-25	P1-25	P2-25	SIG GND	BLU	X
P1-50	P1-50	P2-50		ORG	

HD-50M
P1
P1
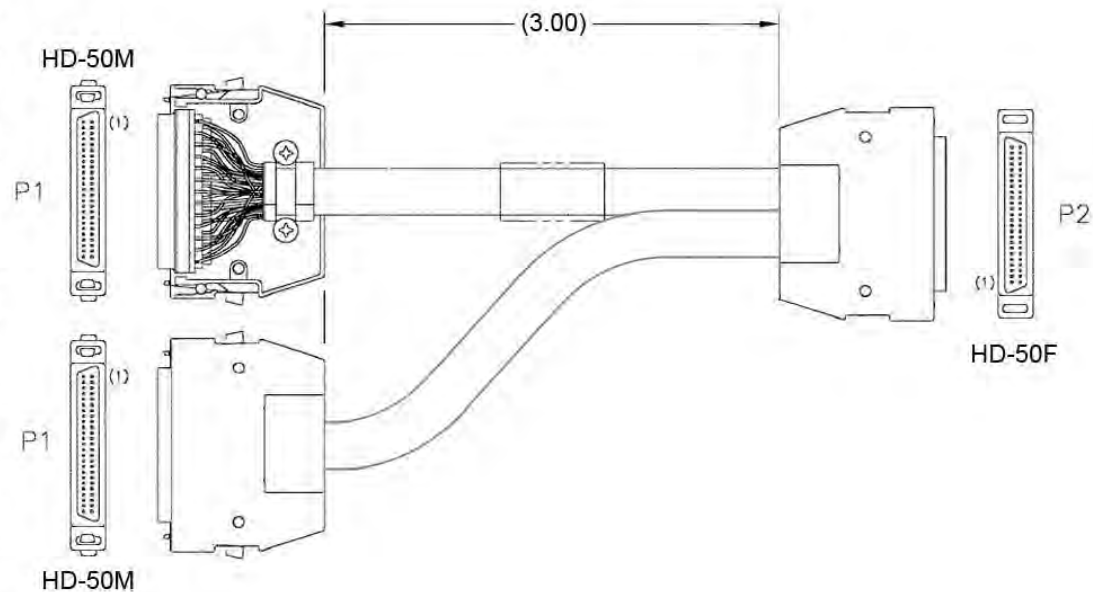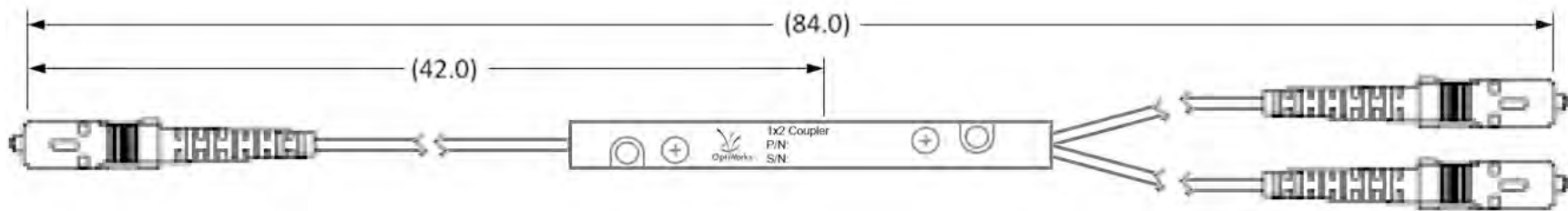HD-50M
(3.00)
P2
HD-50F

Figure A-15. HSSI User Data 'Y' Splitter Cable (PP/SC3523)

A.3.12 Modem-to-User, OC-3 Single-Mode OR Multi-Mode Cable Assemblies, Type 'SC/UPC' → (2X) Type 'SC/UPC'

CEFD P/N	Description	Comments
PP/CPS2A12501	'Y' Cable Assy – RoHS-Compliant, Optical Coupler (Single- or Multi-Mode), 7', Type 'SC/UPC' Connectors	For CDM-700 Single-Mode OC-3 Interface; Cables are YELLOW
PP/CPM6A1250	'Y' Cable Assy – RoHS-Compliant, Optical Coupler (Single- or Multi-Mode), 7', Type 'SC/UPC' Connectors	For CDM-700 Multi-Mode OC-3 Interface; Cables are ORANGE

Figure A-16. OC-3 User Data Cable Assembly (See Table for CEFD P/N)

Notes:

2114 WEST 7TH STREET TEMPE ARIZONA 85281 USA
480 • 333 • 2200 PHONE
480 • 333 • 2161 FAX