



CRS-180

70/140 MHz IF 1:1 Redundancy Switch Installation and Operation Manual

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

Part Number MN/CRS180.IOM / CD-CRS180
Revision 11

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 CRS-180 70/140 MHz IF 1:1 Redundancy Switch. This document is intended for anyone who installs or operates the CRS-180.

Related Documents

- Comtech EF Data CDM-625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)
- Comtech EF Data CDM-625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)
- Comtech EF Data CDM-760 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM760)
- Comtech EF Data CDM-750 Advanced High-Speed Trunking Modem Installation and Operation Manual (CEFD P/N MN-CDM750)
- Comtech EF Data CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM570A)
- Comtech EF Data CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM)
- Comtech EF Data CDM-710G/710GL High-Speed Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM710G)
- Comtech EF Data CDM-710 Broadcast Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM710.IOM)
- Comtech EF Data CDM-710 Broadcast Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM710.IOM)

- Comtech EF Data 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 **WARNING** informs you about a possible hazard that may cause death or serious injury.



A **CAUTION** informs you about a possible hazard that may cause injury or property damage.

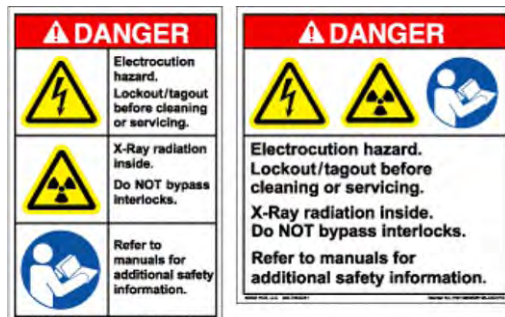


A **NOTE** gives you important information about a task or the equipment.



A **REFERENCE** 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 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 – THIS SWITCH IS DESIGNED TO WORK WITH MODEMS THAT MUST BE CONNECTED TO A POWER SYSTEM THAT HAS SEPARATE GROUND, LINE, AND NEUTRAL CONDUCTORS. DO NOT OPERATE 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 CRS-180 IS DESIGNED FOR OPERATION ONLY WITH THE COMTECH EF DATA PRODUCTS LISTED IN THIS MANUAL UNDER 'RELATED DOCUMENTS'. THESE PRODUCTS SUPPLY DC OPERATING CURRENT (ELECTRONICALLY FUSED AND PROTECTED) AND CONTROL SIGNALS FOR THE CORRECT FUNCTIONING OF THIS SWITCH. CONNECTION TO OTHER MANUFACTURERS' EQUIPMENT COULD RESULT IN DAMAGE TO THE SWITCH. THE CRS-180 IS NOT COMPATIBLE WITH OTHER COMTECH EF DATA MODEMS OR PRODUCTS 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 Radio spectrum Matters [ERM]; ElectroMagnetic Compatibility [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.

Chapter 1. INTRODUCTION

1.1 Overview



Figure 1-1. CRS-180 70/140 MHz IF 1:1 Redundancy Switch Module

The CRS-180 70/140 MHz IF 1:1 Redundancy Switch module (**Figure 1-1**) is a 50Ω, 70/140 MHz Tx-Rx IF signal switch designed for use with Comtech EF Data IF satellite modems in a 1:1 configuration.

The Tx side switches the **Online** unit onto the transmit coaxial cable. The Rx side of the CRS-180 uses power dividers to provide both demodulators with the same IF signal from the LNB, thus reducing switching time.

The CRS-180 supports 1:1 redundancy for the Comtech EF Data modems summarized in **Table 1-1**. This table also specifies the modem minimum firmware and hardware requirements for data switching support.

Table 1-1. CRS-180 Compatibility Summary

Modem	1:1 Data Switch	Firmware/Hardware Requirement*
CDM-625/A	Built into the CDM-625/A	Firmware Ver. 1.1.1 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-570A	Built into the CDM-570A	Firmware Ver. 1.1.1 or higher
CDM-570A with Optional IP Packet Processor	User-provided Layer 2 switch or hub	Firmware Ver. 1.2.1 or higher
CDM-570	Built into the CDM-570	<ul style="list-style-type: none"> • Firmware Ver. 1.6.7 or higher • Hardware Revision 3
CDM-570 with Optional IP Module	User-provided Layer 2 switch or hub	Firmware Ver. 1.5.4.2 or higher
CDM-710G	Built into the CDM-710G	Firmware Ver. 5.1.1 or higher
CDM-710	Built into the CDM-710	<ul style="list-style-type: none"> • Firmware Ver. 2.4.1 or higher • Hardware Revision 3
CDM-700	Built into the CDM-700	<ul style="list-style-type: none"> • Firmware Ver. 1.1.6 or higher • Hardware Revision 3

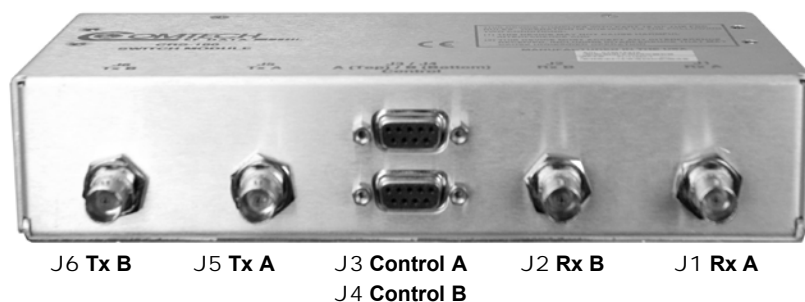


* Firmware updates are free and may be downloaded from the Comtech EF Data web site (<http://www.comtechefdata.com>). If a modem does not meet the hardware requirements, contact Comtech EF Data Product Support. Hardware revision upgrades must be performed at CEFD.

1.2 Physical Features

1.2.1 Modem Side Features

Figure 1-2 shows the modem side of the CRS-180. The connectors provided here facilitate all necessary external connections between the CRS-180 and the compatible Comtech EF Data modems.

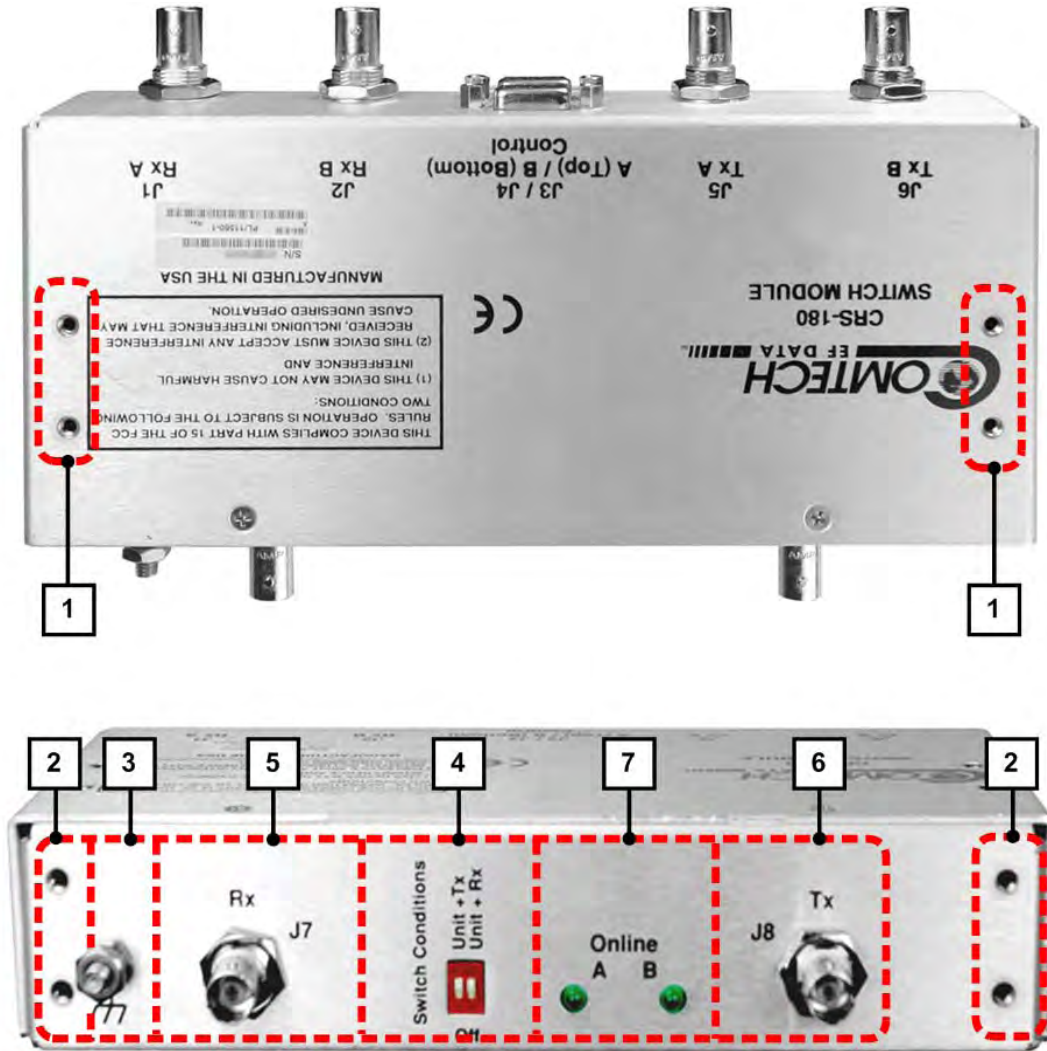


Ref Des	Name	Connector Type	Function	Chapter Sect.
J1	Rx A	BNC	IF Input to Modem 'A'	3.2.1.1
J2	Rx B	BNC	IF Input to Modem 'B'	3.2.1.1
J3	Control A	DB-9F 9-pin Type 'D' female	Modem 'A' Control Interface	3.2.1.2
J4	Control B	DB-9F 9-pin Type 'D' female	Modem 'B' Control Interface	3.2.1.3
J5	Tx A	BNC	IF Output from Modem 'A'	3.2.1.1
J6	Tx B	BNC	IF Output from Modem 'B'	3.2.1.1

Figure 1-2. CRS-180 – Modem Side Features

1.2.2 Top and Antenna Side Features

Figure 1-3 shows the CRS-180 top and antenna side features and the chapters that provide more detailed information.



Feature	Description	Chapter Sect.
1	4X #6-32 holes for vertical rack mounting (used for Switch Mounting Kit KT/11708)	2.2
2	4X #6-32 holes for horizontal rack mounting (used for Switch Mounting Kit KT/11708)	2.2
3	Ground Stud	2.2, 3.2.2.2
4	“Switch Conditions” DIP Switches	1.3.1, 4.6
5	J7 Rx BNC Input Connector	3.2.2.1
6	J8 Tx BNC Output Connector	3.2.2.1
7	Online LED Indicators	1.3.1

Figure 1-3. CRS-180 – Top and Antenna Side Features

1.3 Functional Description

The CRS-180 performs the Tx and Rx coaxial switching required for redundant modem operation with an outdoor BUC and LNB.

1.3.1 Switch Operation with CDM-625/A, -760, -750, -570/A, -710G, -710, or -700 Modems

The CRS-180 is configured with two modems to form a complete 1:1 redundant modem system. Within the CRS-180, a redundancy controller continually monitors the status of faults for both modems to determine which modem should be **Online** and **Offline**. The control cables between the modems and the CRS-180 include four signal groups:

- **First**, serial full-duplex communication lines are routed from one modem to the other modem via the CRS-180. Using these lines, this **Online** modem can interrogate the **Offline** modem at regular intervals to determine its configuration. If a difference in configuration is detected, the **Online** modem will reconfigure the **Offline** modem so that the configurations are always synchronized. This process is *entirely automatic* – if the **Offline** modem is replaced, it does not have to be manually reprogrammed to match the **Online** modem.
- **Second**, the Modem's Unit, Tx and Rx faults signals from both modems are routed to the CRS-180. This allows the redundancy controller to always know the health status of both modems.
- **Third**, the **Online/Offline** signals are routed from the CRS-180 to each modem. Based on the modem faults, the CRS-180 will determine which modem should be **Online** and **Offline**. In the event that both modems indicate faults through some malfunction, the CRS-180 will select, by default, **Modem 'A'**.
- **Fourth**, +12V is routed from each modem to the CRS-180 for operational power. This power from both modems is diode OR'd so that the CRS-180 remains active if power is lost from one of the modems.

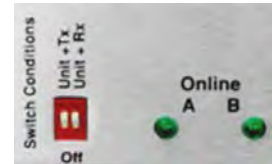
IF Switching – The CRS-180 provides IF redundancy, but when switching occurs, it accommodates more than just the IF signals. On the Rx side, the Rx IF signal from the LNB is split in a power divider to continuously drive both the **Online** and **Offline** demodulator. The **Offline** demodulator can then maintain lock so that it is ready to quickly assume **Online** status for receive traffic when a switchover is required.

Data Switching is accomplished inside each modem, in the data interface itself. A 'Y' cable connects both the **Online** modem and the **Offline** modem to the terrestrial data source. Transmit data drives both modems in parallel so that the standby modulator is always ready to come **Online**. Termination impedance for the modem line receivers is active in the **Online** modem. On the Rx side of the interface, TRI-STATE[®] control of the **Offline** modem line drivers

keeps the **Offline** modem from interfering with the Rx data traffic. Send timing output from the **Offline** modem is also TRI-STATE¹.

Manual Switching is user-enabled via the **Online** modem; locally using the modem's front panel, or remotely using serial remote control or the modem's Web Server (HTTP) Interface.

Automatic Switching Selection is user-controlled via the **Online** modem. Use the CRS-180 **Switch Conditions Unit+Tx** and **Unit+Rx** DIP switches, located on the antenna side of the CRS-180, to configure the conditions that cause an automatic switchover. These settings provide a great deal of flexibility in CRS-180 operation: you can select between *Modem Unit faults only*; *Modem Unit faults or Receive Traffic faults*; *Modem Unit faults or Transmit Traffic faults*; or all three.



Sect. 4.6 Configure Switch DIP Settings

Two green LEDs, located on the antenna side of the CRS-180, indicate which modem is **Online**.

With the 'bridging' architecture of the CRS-180 (whereby identical terrestrial data traffic signals are routed to both **Online** and **Offline** modems), the redundancy 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, the CRS-180 has been configured to switch following Unit faults or Transmit Traffic faults, and the modems have been configured 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 CRS-180 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.

1.3.1.1 1:1 IP Redundancy Data Switching

1.3.1.1.1 CDM-625/A, -760, -750, -710G, -710, -700 Managed Switch Mode

A standard, user-provided Ethernet Layer 2 switch is needed when a CDM-625/A, CDM-750, CDM-760, CDM-710G, CDM-710 or CDM-700 modem is configured for Managed Switch Mode (also known as "Ethernet Bridge Mode") terrestrial traffic.

A Layer 2 switch is designed to limit the traffic that egresses each port by only sending Ethernet packets out the port that the destination network device is located. The switch maintains a table - known as the dynamic Content-Addressable Memory (CAM) table - that maps MAC addresses to switch ports. When a packet arrives, in which an entry for that specific destination MAC is unknown to the switch, it sends the packet out all ports and waits for response packets in an attempt to identify which port that particular MAC resides. Once the device responds, the switch is able to map the MAC to the port in the CAM table.

¹ TRI-STATE is a registered trademark of National Semiconductor.

Any new arriving packets destined for that MAC address will be forwarded only out the port identified in the CAM table. Most switch CAM tables do have a flush or timeout value, but is normally set to a very high number to limit the amount of times the switch has to broadcast a packet out all ports. It is also important to note that CAM entries for a specific port are cleared when a port link goes down.

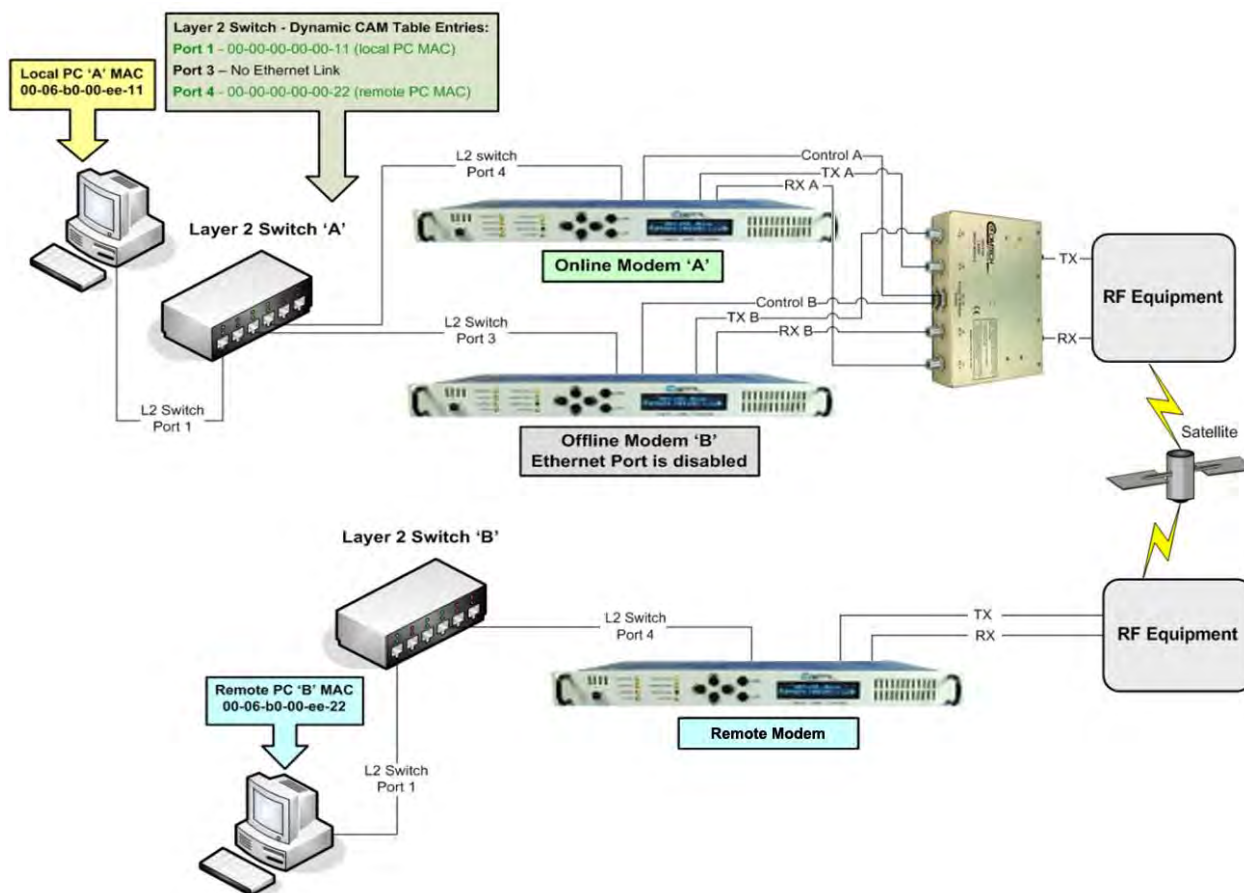


Figure 1-4. CDM-625/A, -760, -750, -710G, -710, -700 1:1 IP Redundancy Managed Switch Mode

Figure 1-4 shows a Managed Switch Mode 1:1 IP Redundancy setup with the Ethernet data interface of both modems connected to a Layer 2 switch. Both modems are operational – Modem ‘A’ is **Online** and connected to Port 4 of the Layer 2 switch. Modem ‘B’ is **Offline** and connected to Port 3 of the Layer 2 switch, but the Ethernet link is not active because only the **Online** modem will have an active Ethernet data interface. Also, Local PC ‘A’ is connected to Port 1 of the Layer 2 switch.

When Ethernet traffic is sent from Local PC ‘A’ across the satellite link to remote PC ‘B’, the Layer 2 switch will “learn” the MAC addresses of both PCs and will have these dynamic entries in its CAM Table:

- Port 1** MAC 00-00-00-00-00-11 (Local PC ‘A’)
- Port 3** No entries, port down
- Port 4** MAC 00-00-00-00-00-22 (Remote PC ‘B’)

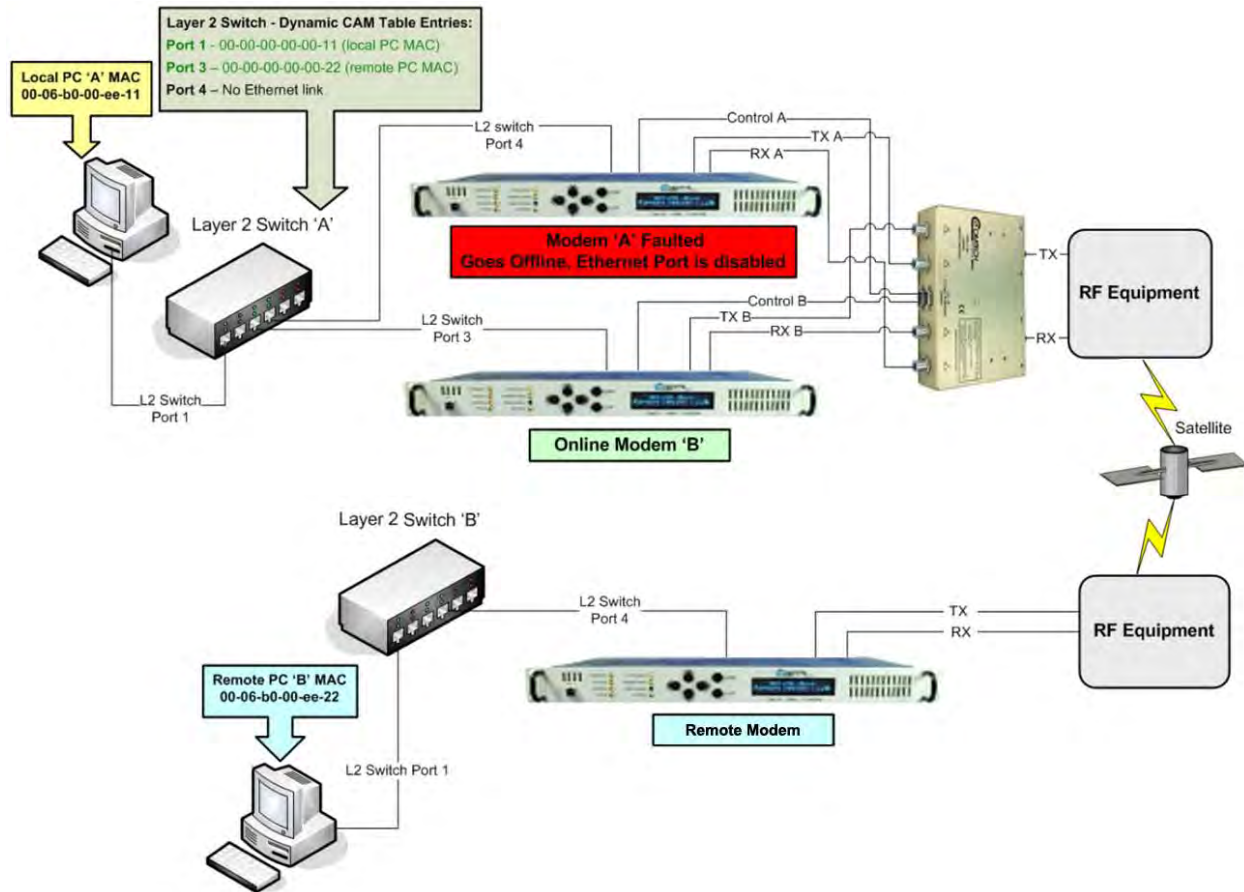


Figure 1-5. CDM-625/A, -760, -750, -710G, -710, -700 1:1 IP Redundancy Managed Switch Mode – Switchover

As shown in **Figure 1-5**, in the event of a fault occurring on the **Online Modem 'A'**, the following will occur:

- Modem 'A' goes **Offline** and disables its Ethernet data interface.
- Simultaneously, Modem 'B' goes **Online** and enables its Ethernet data interface.
- Layer 2 switch 'A' senses that Port 4 is no longer active and clears the CAM table entries for that port.
- When the next Ethernet packet from Local PC 'A' destined for Remote PC 'B' arrives at Switch 'A', there is no CAM entry for the PC 'B' MAC, so it will be broadcast to all active ports.
- When the next Ethernet packet from Remote PC 'B' arrives at Switch 'A', Switch 'A' dynamically adds the PC 'B' MAC to the CAM table for Port 3.

Note the following:

- 1) The Managed Switch Mode method of redundancy is intended to be equivalent to pulling the Ethernet cable from one port and putting it into a different port on the same switch.
- 2) **For CDM-625/A modems:** 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**.



This configuration must be enabled on both modems.

See the **CDM-625** or **CDM-625A Advanced Satellite Modem Installation and Operation Manual** for instructions to configure one of the four 10/100 Ethernet ports for each modem for remote Ethernet M&C.



Dedicated Management Port Mode is not configurable 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 one of the CDM-625/A's four 10/100 Ethernet Ports is used for each modem at any given time.

- 3) **For CDM-760, -750, -710G, -710, -700 modems:** When the modem is **Offline**, although all GigE port(s) are unavailable, the M&C Ethernet port remains functional and available for operation.
- 4) Installation must use a true switching device, not a hub device.

1.3.1.1.2 CDM-625/A (with Optional IP Packet Processor) – Router Mode



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

For the CDM-625/A with the optional IP Packet Processor **installed and enabled** and the configuration set for Router Mode, you need to provide an external Ethernet switch.

In Router Mode, both modems must be assigned a unique Management IP address on the same subnet (172.18.10.21/24 and 172.18.10.22/24 as shown in **Figure 1-6** and **Figure 1-7**). This is used to share the param file. A Traffic IP address on the subnet must also be assigned (172.18.10.20/24) in the **Online** modem.



The Traffic IP Address must be different from either Management IP Address.

Whichever modem is **Online** will assume the Traffic IP. When there is a switchover to the backup modem, this modem will now assume the Traffic IP. Per **Figure 1-7**, the backup modem

will also broadcast a “gratuitous ARP” which will tell all local devices to now associate a new MAC address for the Traffic IP 172.18.10.20. Each device will update their ARP tables and traffic will resume virtually instantaneously.

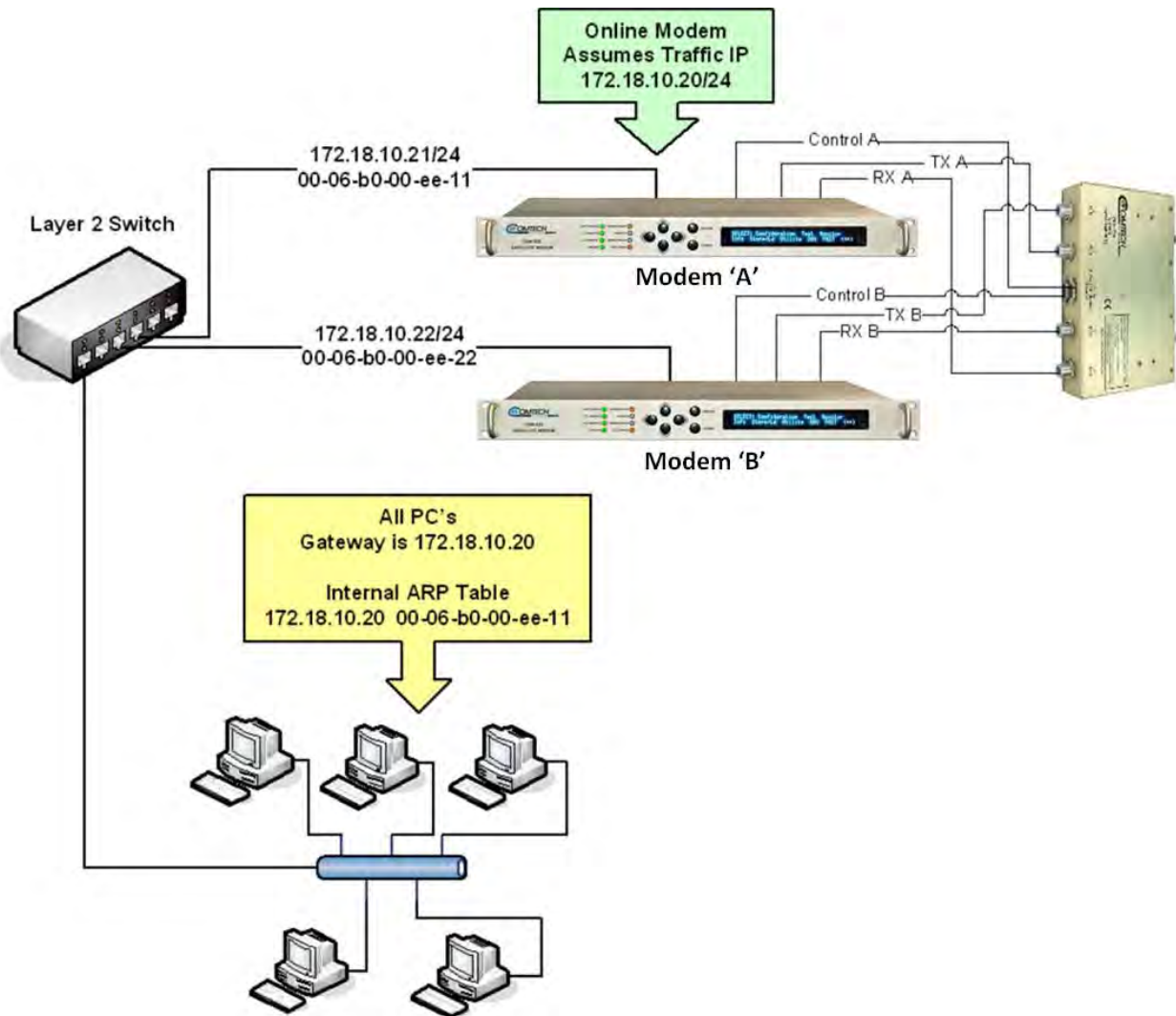


Figure 1-6. CDM-625/A 1:1 IP Redundancy Router Mode ('A' Online)

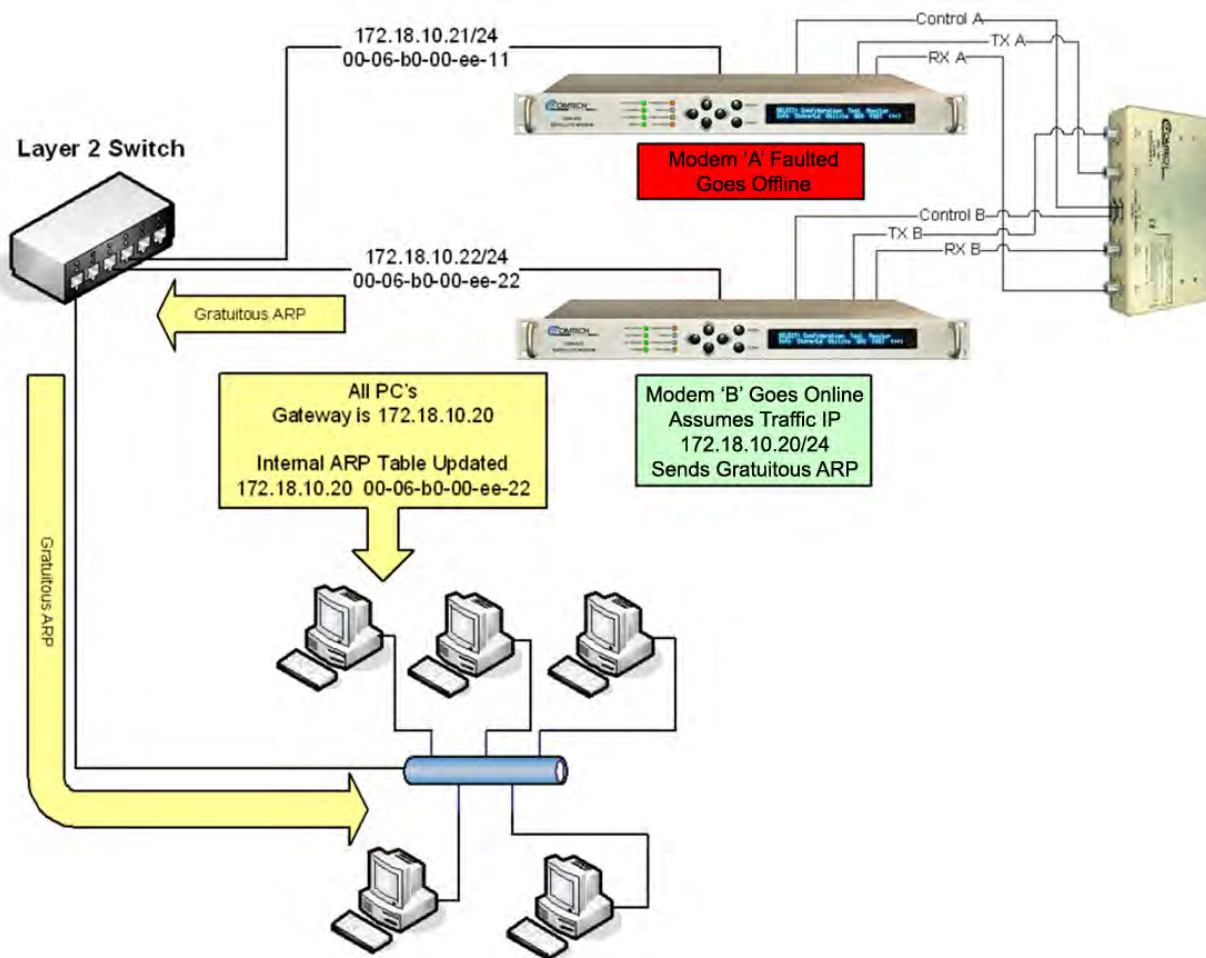


Figure 1-7. CDM-625/A 1:1 IP Redundancy Router Mode – Switchover ('B' Online)

1.3.1.1.3 CDM-570/A (with optional IP Module or Packet Processor) Managed Switch or Router Modes



- Do not use the M&C Ethernet port (bottom RJ-45 connector) when the optional IP Module (CDM-570) or IP Packet Processor (CDM-570A) is installed.
- When using the modem Command Line Interface (CLI) it is important to remember that all configuration changes can only be made to the Online Modem. Make sure to press 'S' to "Save Parameters to permanent storage" any time you make a change to a configuration page, to ensure the configuration change is also applied to the Backup Modem.

Managed Switch (Ethernet Bridge) Mode: For the CDM-570/A in Managed Switch Mode (also known as "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.

In Managed Switch Mode, both modems should be assigned a unique Management IP address on the same subnet in order to share the parameter file.

Router Mode: For the CDM-570/A in Router Mode, you should use an external Ethernet switch. Router mode does not require a “dumb” hub as with Managed Switch Mode and, for performance reasons, an Ethernet switch is highly recommended.

In Router Mode, both modems must be assigned a unique Management IP address on the same subnet (172.18.10.21/24 and 172.18.10.22/24 as shown in **Figure 1-8** and **Figure 1-9**). This is used to share the param file. A Traffic IP address on the subnet must also be assigned (172.18.10.20/24) in the **Online** modem.

Whichever modem is **Online** will assume the Traffic IP. When there is a switchover to the backup modem, this modem will now assume the Traffic IP. As shown in **Figure 1-9**, the backup modem will also broadcast a “gratuitous ARP” that will tell all local devices to now associate a new MAC address for the Traffic IP 172.18.10.20. Each device will update their ARP tables and traffic will resume virtually instantaneously.

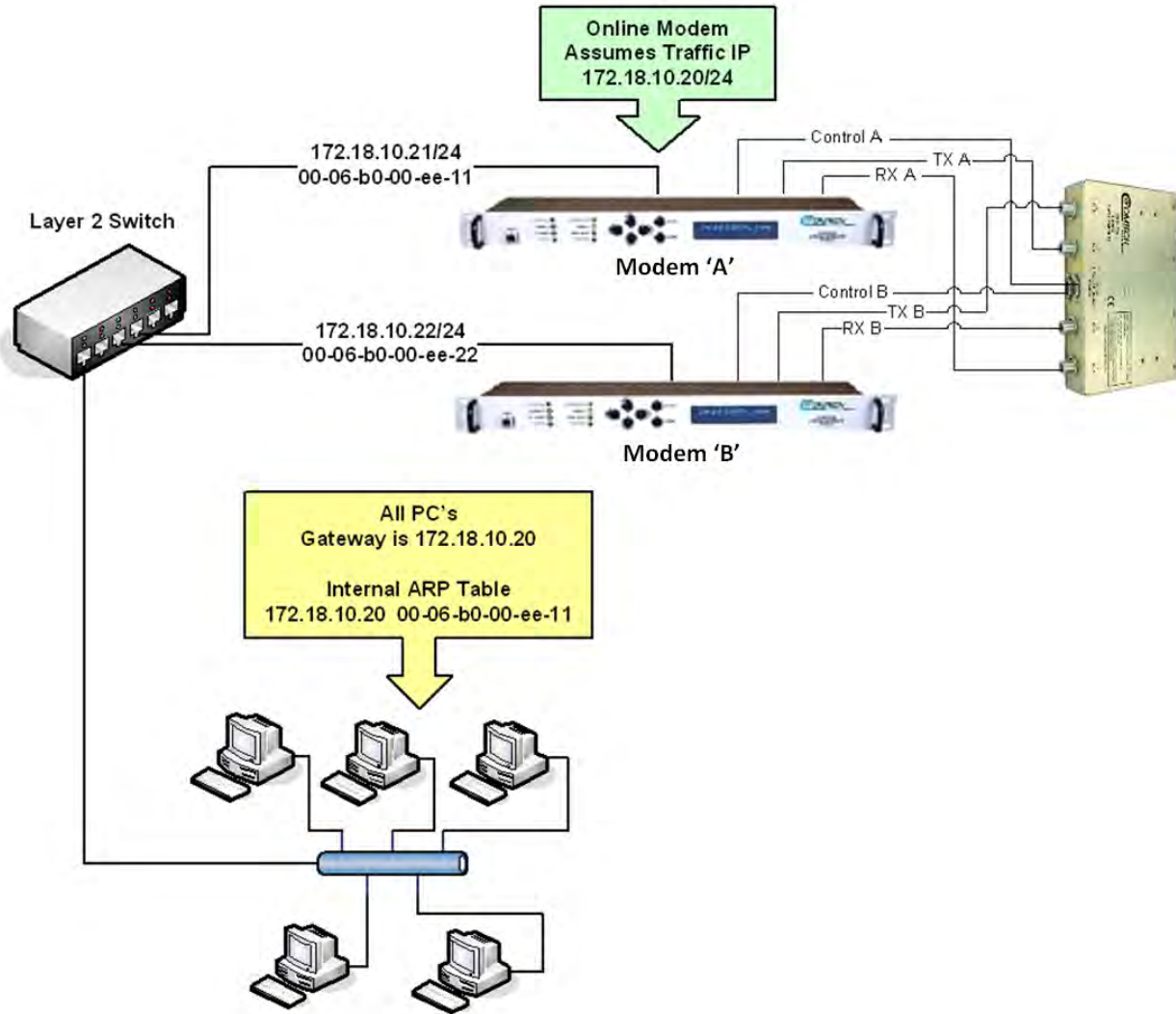


Figure 1-8. CDM-570/A 1:1 IP Redundancy Router Mode – 'A' Online

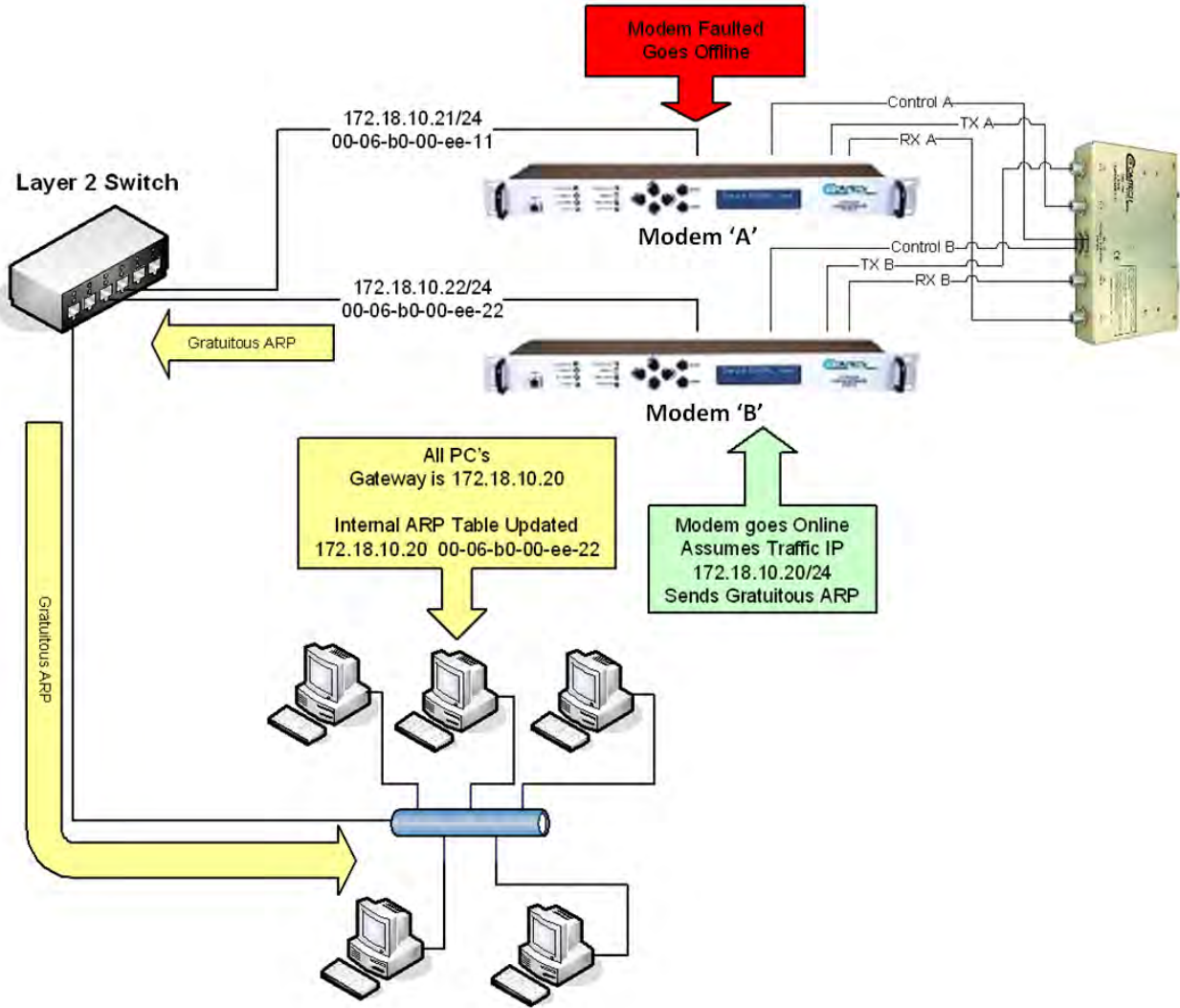


Figure 1-9. CDM-570/A 1:1 IP Redundancy Router Mode – Switchover ('B' Online)

1.4 Summary of Specifications

Equipment Type	IF 1:1 Redundancy Switch
Manufacturer	Comtech EF Data, Tempe, Arizona
Comtech EF Data Modems Supported	<ul style="list-style-type: none"> • CDM-625A Advanced Satellite Modem • CDM-625 Advanced Satellite Modem • CDM-760 Advanced High-Speed Trunking Modem • CDM-750 Advanced High-Speed Trunking Modem • CDM-570A 70/140 MHz Satellite Modem (with/without Optional IP Packet Processor) • CDM-570 70/140 MHz Satellite Modem (with/without Optional IP Module) • CDM-710G 70/140 MHz High-Speed Satellite Modem • CDM-710 70/140 MHz Broadcast Satellite Modem • CDM-700 70/140 MHz Satellite Modem
Operating Modes	<ul style="list-style-type: none"> • Fully Automatic under control of supporting 1:1 switch. • Manual under control of supporting 1:1 switch.
Architecture	<ul style="list-style-type: none"> • Full bridging architecture with configuration synchronization. • Tx switching guarantees the Offline modem is muted at least 60 dB down. • 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.
IF Switching/ Splitting	<ul style="list-style-type: none"> • Tx IF: Switched by RF relay (1.5 dB max loss, 40 dB min ON/OFF isolation) • Rx IF: Passive power splitting (4dB max loss)
Tx-Rx Isolation	40 dB min, 50 - 190 MHz
IF Impedance	Optimized for 50Ω (> 10 dB return loss on external IF ports), 75Ω supported with the use of external RF transformers (included).
IF Connectors	50Ω BNC Female
IF Frequency Range	50 to 190 MHz
Weight	1.1lbs (0.5kg)
Dimensions	Excluding connectors: 1.7 H x 5.7 W x 4.1 D inches (43 H x 143 W x 104 D mm) Optional 19-inch rack mounting kit available (CEFD P/N KT/11708)
Power requirements	1 Watt maximum +12 volts DC @ 80 mA (max) (Power supplied by modems)
Approvals	'CE' as follows: <ul style="list-style-type: none"> • EMC • Safety

Chapter 2. INSTALLATION

2.1 Unpack and Inspect the Shipment

The CRS-180 70/140 MHz IF 1:1 Redundancy Switch module 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.

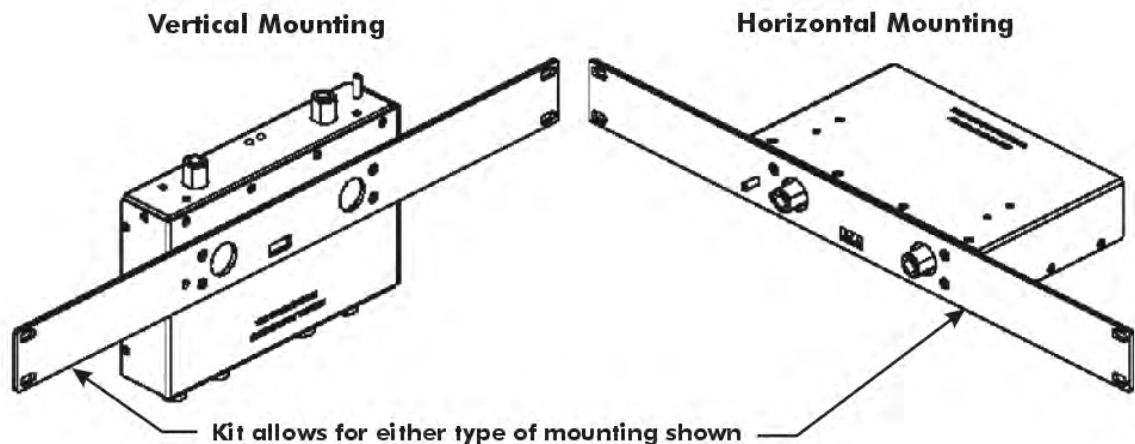


Once opened, inspect the shipment:

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 CRS-180 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/11708 Switch Mounting Kit		
CEFD P/N	Qty	Description
FP/PN11575-1	1	Switch Mounting Panel
HW/6-32X3/8FLT	4	#6-32 x 3/8" LG SS Flat Head Machine Screw

Figure 2-1. Optional Switch Mounting Kit (CEFD P/N KT/11708)

You may also mount the module in a 1RU space at the front or rear of the rack enclosure that houses the modems. The optional Comtech EF Data KT/11708 Mounting Panel Kit is available for this purpose. As shown in **Figure 2-1**, the module can be vertically or horizontally oriented to the kit's slotted mounting panel. User-supplied screws are then required to secure the panel 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 CRS-180 70/140 MHz IF 1:1 Redundancy Switch and its compatible Traffic and Redundant 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.



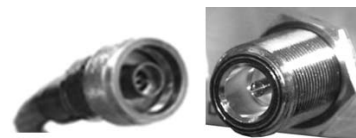
3.1.1.2 Type ‘TNC’

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.



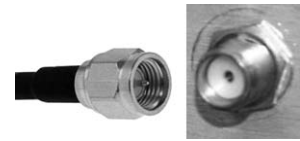
3.1.1.4 Type ‘F’

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
<p>Chassis Receptacles: (TOP) Female (BOTTOM) Male</p>	
<p>Type 'D' Cable With Jack Screws (Female Shown)</p>	

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.

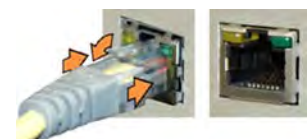
Whether its gender is male or female, the cable plug features two jack screws for secure connection to the jack nuts provided on the mating chassis receptacle. The jack screws may be hand tightened or tightened with a standard flat-blade screwdriver.

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.

About connector pinout tables: Figure 3-2 identifies the Pin 1 location for either gender connector. Unless noted otherwise, the connector pinout tables provided in this manual arrange/order information (i.e., the Pin # column/row) based on this orientation.

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-4x jack. The connection is complete when the tab ‘clicks’ into position inside the jack.

3.2 CRS-180 User Connectors

3.2.1 Modem Side Connectors

The modem side connectors (**Figure 3-3**) provide all necessary external connections between the CRS-180 and the compatible Comtech EF Data modems.

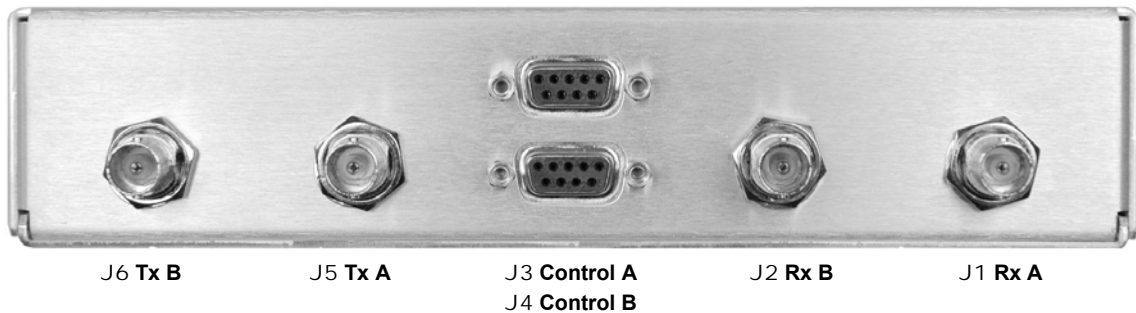


Figure 3-3. CRS-180 – Modem Side Connectors

3.2.1.1 IF Connectors (50Ω BNC)



Four 50Ω BNC female connectors are provided on the modem side of the CRS-180.

Table 3-1. Modem Side Type ‘BNC’ Connectors

Ref Des	Name	Connector Type	Function
J1	Rx A	BNC	IF Input to Modem ‘A’
J2	Rx B	BNC	IF Input to Modem ‘B’
J5	Tx A	BNC	IF Output from Modem ‘A’
J6	Tx B	BNC	IF Output from Modem ‘B’

3.2.1.2 'J3 | Control A' Connector (Top) – Modem 'A' (DB-9F)



The **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 12VDC input, which is diode OR'ed with the corresponding 12VDC input from **Modem 'B'**, powers the switch module.

Table 3-2. 'J3 | Control A' Modem Connector Pinouts

Pin	Signal Name	Signal Function	Direction
5	Ground	Signal Ground	-
9	+12VDC	+12 VDC	In
4	ONLINE_OUT_B	Modem 'B' Online 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	-

3.2.1.3 'J4 | Control B' Connector (Bottom) – Modem 'B' (DB-9F)



The **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 12VDC input, which is diode OR'ed with the corresponding 12VDC input from **Modem 'A'**, powers the switch module.

Table 3-3. 'J4 | Control B' Modem Connector Pinouts

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

3.2.2 Antenna Side Connectors

Two 50Ω female BNC connectors on the antenna side of the CRS-180 (**Figure 3-4**) provide the coaxial cable connections to the outdoor transmit and receive equipment.

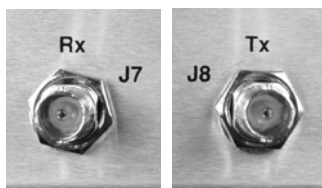


- See Sect. 1.3.1 in Chapter 1. INTRODUCTION for information about the LED Indicators.
- See Sect. 1.3.1 in Chapter 1. INTRODUCTION and Sect. 4.6 in Chapter 4. MODEM AND SWITCH CONFIGURATION for information about the “Switch Conditions” DIP Switches.



Figure 3-4. CRS-180 – Antenna Side Connectors and Ground Stud

3.2.2.1 IF Connectors (50Ω BNC)



The 50Ω Type ‘BNC’ female connectors on the antenna side of the CRS-180 provide the coaxial cable connections to the outdoor receive and transmit equipment.

Table 3-4. J7 (Rx) and J8 (Tx) Type ‘BNC’ Connectors

Ref Des	Name	Connector Type	Function
J7	Rx	BNC	RF Input
J8	Tx	BNC	RF Output

3.2.2.2 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 antenna side of the Switch for connecting a common chassis ground among equipment.

Chapter 4. MODEM AND SWITCH CONFIGURATION

4.1 Overview



To avoid damage to either the modem pair or the CRS-180 switch, it is important that you follow this sequence of configuration:

- **First**, configure both modems for 1:1 redundant operation as directed in this chapter. This chapter organizes the modem-specific sections and any specific interface configuration examples as follows:

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

- **Second**, once you properly configure both modems for 1:1 redundant operation, set the DIP switches on the CRS-180 to the correct modem selection. See Sect. 4.6 CRS-180 Switch DIP Settings for details.
- **Third**, once you properly configure both modems and the DIP switches, connect the control and IF cables between the powered OFF modems and switch. See Chapter 5. CABLES and CONNECTIONS for details.

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4.2 Configure the CDM-625/As for 1:1 Redundancy

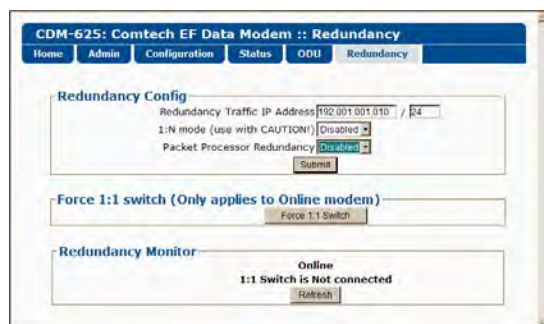


- **CDM625A Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A)**
- **CDM625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625)**

The CDM-625/A Advanced Satellite Modems automatically detect connection to a 1:1 redundancy system. Typical for either product, 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 Interface **Redundancy** page.

When both the traffic and backup modems are equipped with the optional IP Packet Processor and are connected to the CRS-180 L-Band 1:1 Redundancy Switch, there is no need to use the drop-down menus 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 is *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 CDM-625/A Remote User M&C Ethernet Interface

4.2.1.1 For CDM-625/As Without the Optional IP Packet Processor

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 in the offline state.



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 as the Dedicated Management Port for remote Ethernet M&C.



TO AVOID ETHERNET NETWORKING LOOPS – If you configure more than one Ethernet port for Ethernet traffic, you must use separate Layer 2 switches unless the Layer 2 switch in use isolates these ports from one another.

4.2.1.2 For CDM-625/As Equipped With the Optional IP Packet Processor

You may **not** configure your modem for Dedicated Management Port Mode when the optional IP Packet Processor is **installed and enabled**. Under such functionality, in 1:1 redundancy Port 1 is available *only* for M&C on both modems, while Ports 2, 3, and 4 are disabled when a modem is in the Offline state.




TO AVOID ETHERNET NETWORKING LOOPS – While in 1:1 Redundancy mode, with the optional IP Packet Processors enabled and both units operating in Managed Switch Mode, the Port 1 M&C Ethernet must be isolated from the Ethernet Traffic. Also, if you use more than one of the Traffic Ports (Ports 2, 3, or 4), you must use separate Layer 2 switches unless the Layer 2 switch in use isolates these ports from one another.

4.2.2 Configure Carrier-in-Carrier® for Redundancy Operation

The **Pre-Mapped Symbol Interface (PMSI)** is a function associated with DoubleTalk® Carrier-in-Carrier® that 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 this 1:1 redundancy, the PMSI is an RS-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 modems' front panel menus.

Do these steps to configure the CnC control setting for CDM-625/A 1:1 Redundancy:

Step	Task
1	<p>From the modem front panel top-level SELECT: menu – Use the ◀▶ arrow and ENTER keys to select the PMSI control mode menu: SELECT: Configuration → CnC → PMSI-control</p> <div data-bbox="456 827 1224 911" style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> <p>CnC PMSI mode: Redundancy (Idle, Redundancy, Talk, Listen) (⬆)</p> </div> <p>Use the ▲ ▼ arrow keys to select Redundancy, and then press ENTER.</p>
2	<p>You will now need to connect the two modems together via use of a 1:1 PMSI cable (note that this cable bypasses the CRS-180).</p> <div data-bbox="399 1079 488 1163" style="float: left; margin-right: 10px;">  </div> <ul style="list-style-type: none"> • Chapter 5. CABLES AND CONNECTIONS • Appendix A. CABLE DRAWINGS

4.3 CDM-760 or CDM-750 Operation in 1:1 Redundancy



- **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 1:1 redundancy system. Typical for either product, with both modems automatically configured for 1:1 operation, 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 `Utility ▶ 1:1` screen:

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

If the unit is part of a 1:1 redundant pair and this unit is currently *online*, press **ENTER** to force the current unit to switch to standby mode.

4.4 Configure the CDM-570/As for 1:1 Redundancy



- CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM)
- CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM570A)



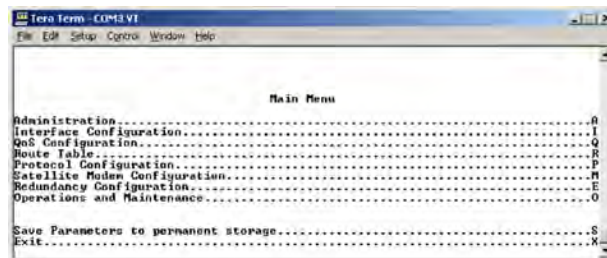
For correct operation of the CRS-180, the CDM-570/A Satellite Modems must have the following installed:

- CDM-570A Base Modem Firmware Version 1.1.1 (or higher)
- CDM-570AL with Optional IP Packet Processor Firmware Version 1.2.1 (or higher)
- CDM-570 Base Modem Firmware Version 1.6.7 (or higher)
- CDM-570 IP Module Firmware Version 1.5.4.2 (or higher)
- CDM-570 Hardware Revision 3
- This manual also presumes that the CDM-570/A has been factory-configured for 50Ω Rx and Tx operation.

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 HTTP (Web Server) Interface



Figure 4-1. CDM-570/A Configuration Interface Examples

Because the modem automatically detects if it is connected to a 1:1 redundancy system, the steps required to configure both modems are minimal. Modem configuration, monitor and control are possible through **local** or **remote** means (**Figure 4-1**):

- **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.
 - 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 RS-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-570L/AL HTTP (Web Server) Interface.

4.4.1 CDM-570/A Non-IP Redundancy Configuration

Do these steps for setup of CDM-570/A modems for 1:1 Redundancy, when the terrestrial data type is **non-Ethernet** (i.e. RS422, G.703):

Step	Task
1	<p>Enable 1:1 Redundancy on both modems:</p> <ul style="list-style-type: none">• From the CLI Main Menu, press 'E' to open the 1:1 Redundancy Configuration page.<ul style="list-style-type: none">○ Press 'R' to toggle 1:1 Redundancy as [Enabled].○ Press 'S' to "Save Parameters to permanent storage".• Alternately, using the HTTP (Web Server) Interface 'REDUNDANCY' page:<ul style="list-style-type: none">○ Use the drop-down list in the 1:1 Redundancy Control section of this page to select Enabled.○ Click [Submit] to save. <p> If you submit any changes to this web page when the CDM-570A optional IP Packet Processor is INSTALLED, you must also open the 'Admin Pap Save' page and immediately click [Save PaP Parameters].</p>
2	<p>Connect all cables to the modems and the CRS-180. This includes the control cable, IF cable and data 'Y' cables.</p> <p> Chapter 5. CABLES AND CONNECTIONS</p>

4.4.2 IP Redundancy Configuration



Before continuing you must remember that, when you use the Command Line Interface (CLI), you can make configuration changes to the Online modem only. Make sure to press 'S' to "Save Parameters to permanent storage" after making any changes to an active CLI page. This ensures that the configuration change is also applied to the Backup modem.

Do these steps for setup of a CDM-570/A 1:1 IP Redundancy System:

Step	Task
1	Use a Layer 2 switch (preferred) or hub to establish an Ethernet connection between the two modems.
2	<p>Before you connect the modems to the CRS-180, you must first use the modem CLI to configure the following CDM-570LAL IP operation settings:</p> <ul style="list-style-type: none"> • Disable 1:1 Redundancy operation – From the Main Menu, press 'E' to open the 1:1 Redundancy Configuration page. <ul style="list-style-type: none"> ○ Press 'R' to toggle 1:1 Redundancy as [Disabled]. • From the Main Menu, press 'A' to open the Administration page. <ul style="list-style-type: none"> ○ Press 'W' (Administration → Working Mode) and set both modems to the same Working Mode. ○ Press 'F' (Administration → Feature Configuration) and make sure to configure, using all applicable submenus, both modems to have the same IP-related operability and settings.
3	<p>For each modem, use the CLI to enter a unique IP Address that is on the same subnet:</p> <ul style="list-style-type: none"> • From the Main Menu, press 'I' to open the Interface Configuration page. • Press 'E' to open the Ethernet Interface page (Interface Configuration → Ethernet Interface): • Press 'I' to enter the IP Address.
4	<p>Verify that you can ping from one modem to the other:</p> <ul style="list-style-type: none"> • From the Main Menu, press 'O' to open the Operations and Maintenance page. • Press 'G' to open the Diagnostics page (Operations and Maintenance → Diagnostics): • Press 'P' and then enter the IP Address of the other modem in the redundant pair.
5	<p>Re-enable 1:1 Redundancy operation – From the Main Menu, press 'E' to open the 1:1 Redundancy Configuration page.</p> <ul style="list-style-type: none"> • Press 'R' to toggle 1:1 Redundancy as [Enabled].
6	Power down both modems.
7	<p>Connect the modems to the CRS-180.</p> <div style="display: flex; align-items: center;"> <p>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.</p> </div>

4.5 Configure the CDM-710G, -710, or -700s for 1:1 Redundancy



- 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 CRS-180, the CDM-710G, -710, or -700 modems must have the following installed:

- For the CDM-710G:
 - 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 Rev. A version chassis and later – 1:1 redundancy 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.
 - 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 RS-485 multi-drop bus using 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 CDM-7XX HTTP (Web Server) Interface.

4.5.1 Non-IP Redundancy Configuration

Do these steps for setup of the CDM-710G, -710, or -700 modems for 1:1 Redundancy, when the terrestrial data type is **non-Ethernet** (i.e. HSSI, G.703):

Step	Task
1	Enable the redundancy state for both modems. From the modem front panel: CONFIG: AUX (Redundancy Mode) → ENA/DIS – set to Enable.
2	Connect all cables – including the control cable, IF cable and data cables – to the modems and the CRS-180.




Chapter 5. CABLES AND CONNECTIONS

4.5.2 IP Redundancy Configuration

Do these steps for setup of the CDM-710G, -710, or -700 modems for 1:1 IP Redundancy (i.e., when the terrestrial data type is **Gigabit Ethernet (GigE or GbE)**):

Step	Task
1	Before connecting the modems to the CRS-180, you must first configure the following IP module settings on each modem. From the modem front panel: CONFIG: AUX (Redundancy Mode) → ENA/DIS set to Disable.
2	Enable the redundancy state for both modems. From the modem front panel: CONFIG: AUX (Redundancy Mode) → ENA/DIS set to Enable. Press ENTER to save your settings.
3	Connect all cables – including the control cable, IF cable and data cables – to the modems and the CRS-180. Additionally, you must use a Layer 2 switch to establish an Ethernet connection between each modem.



Chapter 5. CABLES AND CONNECTIONS

4	Verify that the ONLINE LEDs for the CRS-180 indicate the same online state as displayed by the modems' front panel LEDs.
---	---

4.6 Configure Switch DIP Settings



The “Switch Conditions” DIP switches are set depending upon the type of Tx or Rx traffic conditions that are resultant of switchover. Some modems have additional settings or alarm masks that affect conditions – see your pertinent modem Installation and Operation Manual for detailed explanations.

Figure 4-3 shows the DIP switches located on the antenna side of the CRS-180. The table provided here shows the settings that determine “Switch Conditions” – the switchover functionality for a given redundancy configuration.



“Switch Conditions” DIP Settings			
DIP	Left Switch	Right Switch	Result
	Down (Off)	Down	Switchover upon a Unit fault
	Up	Down	Switchover upon a Unit or Tx Traffic fault
	Down	Up	Switchover upon a Unit or Rx Traffic fault
	Up	Up	Switchover upon a Unit or Tx Traffic or Rx Traffic fault

Figure 4-3. CRS-180 “Switch Conditions” DIP Switches

Chapter 5. CABLES AND CONNECTIONS

5.1 Overview

When assembling a Comtech EF Data 1:1 Redundancy System, in addition to purchasing the desired modem pair (one Redundant Modem, one Traffic Modem), you must also purchase a redundancy kit tailored to that modem choice. Each kit provides the CRS-180 70/140 MHz IF 1:1 Redundancy Switch module, plus all cables and components required for interconnection of the redundant configuration to various interfaces (i.e., control, IF, and data) excluding Ethernet, which requires user-provided cables and Layer 2 switching.



- 1) **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 Appendix A. CABLE DRAWINGS.**
- 2) **It is physically impossible to connect all available data interface solutions within a single 1:1 redundancy system at a given time. For example, when using the CDM-625/A in a 1:1 system, you are 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 redundancy kit have been predetermined with this operational limitation taken into consideration.**
- 3) **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 and IF connections, both Rx and Tx, are made correctly.**
- 4) **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.**

5) The modem-specific sections in this chapter identify the required redundancy kit. Specific interface cabling examples are further identified:

- **Sect. 5.2 Cabling to the CDM-625 or CDM-625A**
- **Sect. 5.3 Cabling to the CDM-760 or CDM-750**
- **Sect. 5.4 Cabling to the CDM-570 or CDM-570A**
- **Sect. 5.5 Cabling to the CDM-710G**
- **Sect. 5.6 Cabling to the CDM-710**
- **Sect. 5.7 Cabling to 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 Cabling to the CDM-625 or CDM-625A



- 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 and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS

5.2.1 CRS-180→CDM-625/A Control and IF Interface Connections Using Cabling Kit KT-0000159



You must order terrestrial data interface components/kits separately. See Sect. 5.2.2 for CDM-625/A terrestrial data interface configuration and connection examples and details.

You must use the Comtech EF Data KT-0000159 1:1 Redundancy Control/IF Interface Cabling Kit for your control and IF switch-to-modem cabling connections:

KT-0000159 1:1 Redundancy Control / IF Interface Cabling Kit (CRS-180→CDM-625/A)				
CEFD P/N	Qty	Description	Used For	Ch. 5 Fig
PL/11560-1	1	CRS-180 Switch – Top Assembly	1:1 Redundancy	5-1 5-2
CA/WR9378-4*	2	Control Cable – Universal, DB-9M→DB-9M, 4'	Modem→Switch Control	5-1
PL/0946-1	4	IF (Tx/Rx) Coax Cable – 50Ω Type 'BNC', 4'	Modem→Switch IF Interface	5-2
XF/BNC-MF-50-75	2	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F	User→Switch IF Interface	5-2



* 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

See Sect. 5.2.1.1 for the CDM-625/A Switch-to-Modem Control Interface connection, and Sect. 5.2.1.2 and for the CDM-625/A Switch-to-Modem IF Interface connections. The table that accompanies each figure lists all cables and components needed from the KT-0000159 kit for this initial switch-to-modem setup.

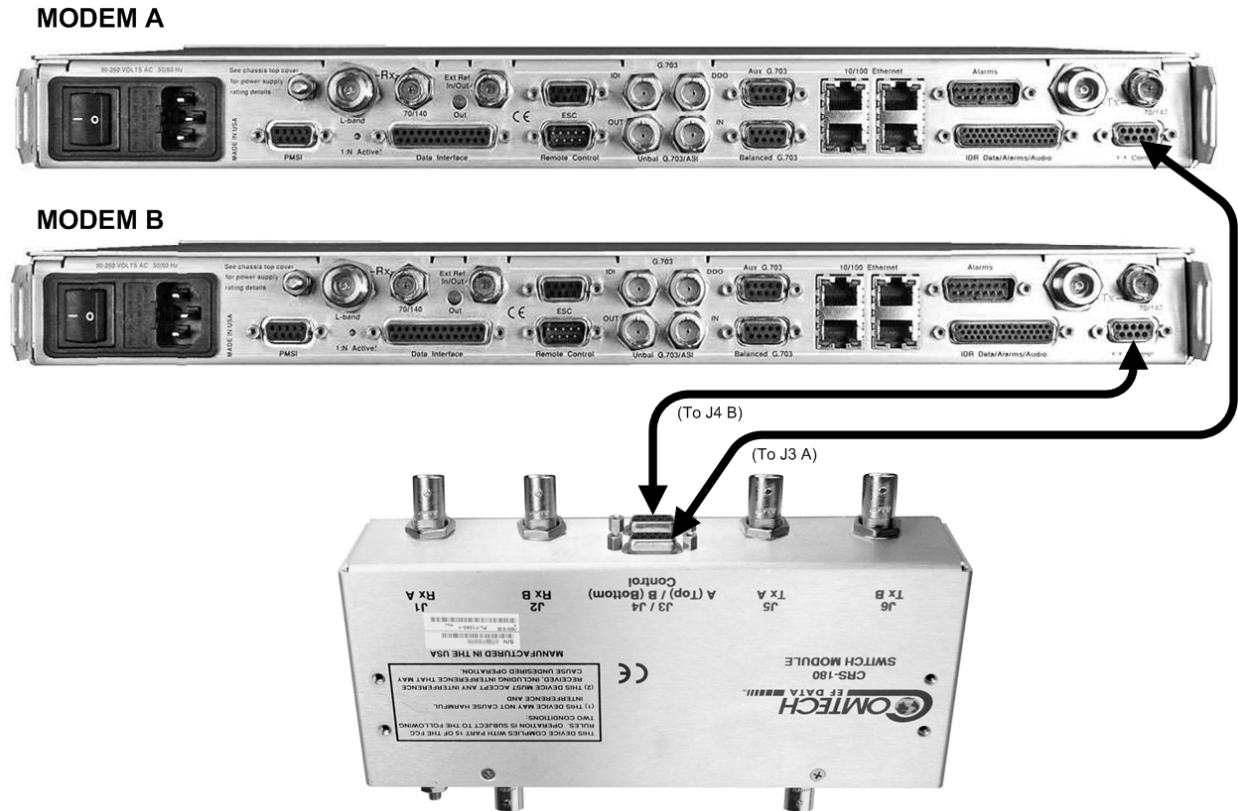


CAUTION – It is **ESSENTIAL** that you make the control and the IF Rx and Tx connections correctly.

5.2.1.1 Switch-to-Modem Control Interface Connection



- 1) Excluding modems, the KT-0000159 1:1 Redundancy Kit (see Sect. 5.2.1) provides all components shown in Figure 5-1.
- 2) When you connect the Control Interface cable between the CRS-180 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 standby unit.



CEFD P/N	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-1. CDM-625/A Switch-to-Modem Control Connections (CEFD Kit KT-0000159)

5.2.1.2 Switch-to-Modem IF Interface Connection

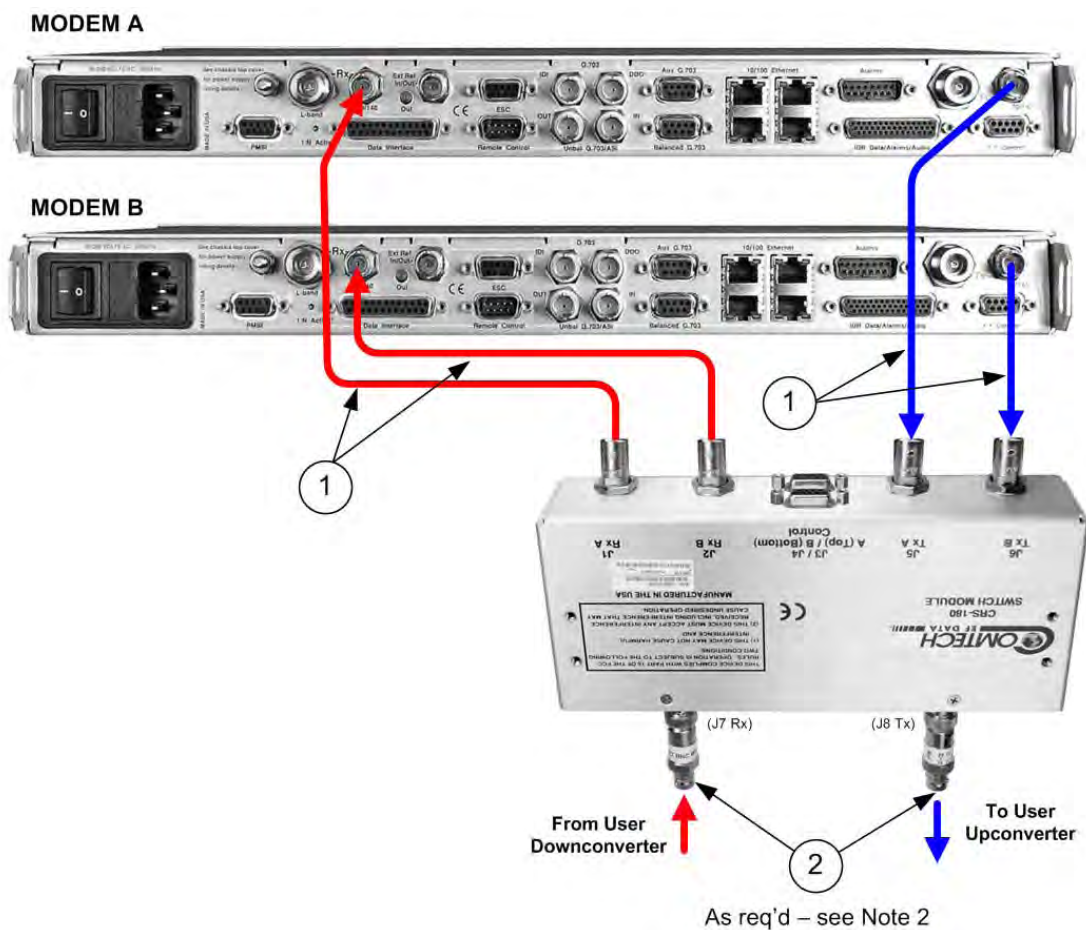


Excluding modems, the KT-0000159 1:1 Redundancy Kit (see Sect. 5.2.1) provides all components shown in Figure 5-2.



EXAMPLE: The Tx IF from 'MODEM A' connects to the Tx IF port 'J5 | Tx A' on the CRS-180; similarly, the Tx IF from 'MODEM B' connects to the Tx IF port 'J6 | Tx B' on the CRS-180.

The same logic applies for the Rx IF connections. It is important to note that failure to observe this requirement will result in system malfunction.



As req'd – see Note 2

Item	CEFD P/N	Qty	Description
1	PL/0946-1	4	IF Coax Cable, 50Ω
2	XF/BNC-MF-50-75	2	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F

Figure 5-2. CDM-625/A Switch-to-Modem 70/140 MHz IF Connections (CEFD Kit KT-0000159)

5.2.2 Modem-to-User Data Interface Connections and Examples

5.2.2.1 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 and IF Modem-to-Switch cabling shown previously, a number of data interface configurations are available for the CDM-625A and CDM-625 Advanced Satellite Modems. The **Figure 5-3** block diagram is typical for the examples shown in **Sects. 5.2.2.1.1** through **5.2.2.1.3**.

With the exception of the 10/100 Ethernet Interface configuration shown in **Figure 5-13** (which uses customer-supplied Ethernet cables and Layer 2 switches), you must use one cabling and component set per 1:1 modem pair for each user interface. See the examples for specific quantities.

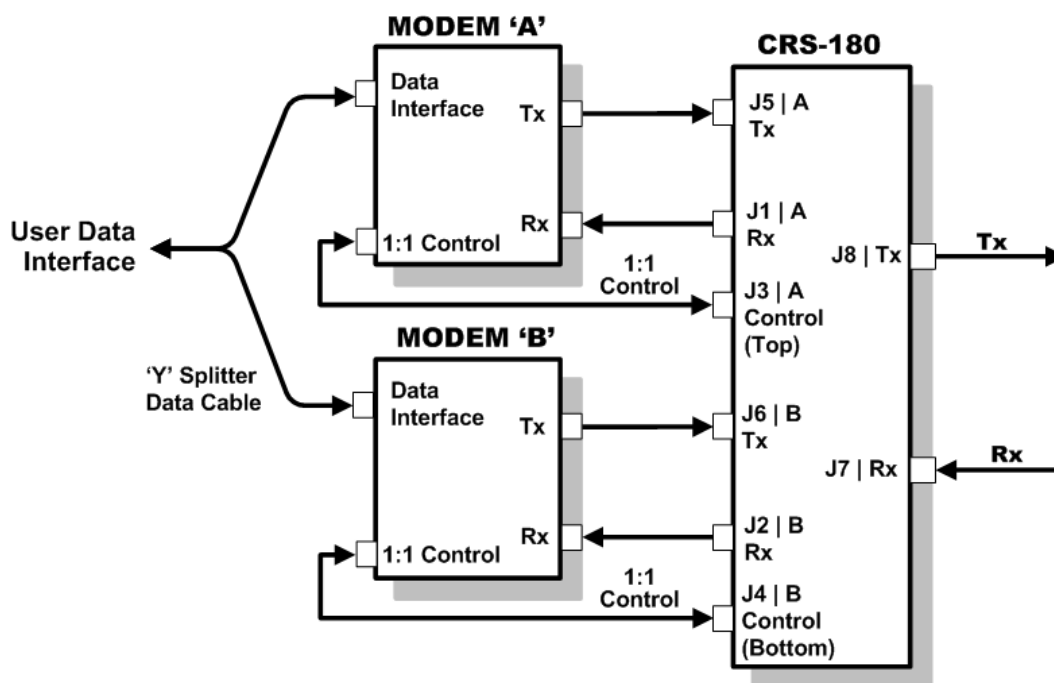


Figure 5-3. CDM-625/A Block Diagram – User→Modem→Switch→Traffic

5.2.2.1.1 EIA-422/232 Interface Example

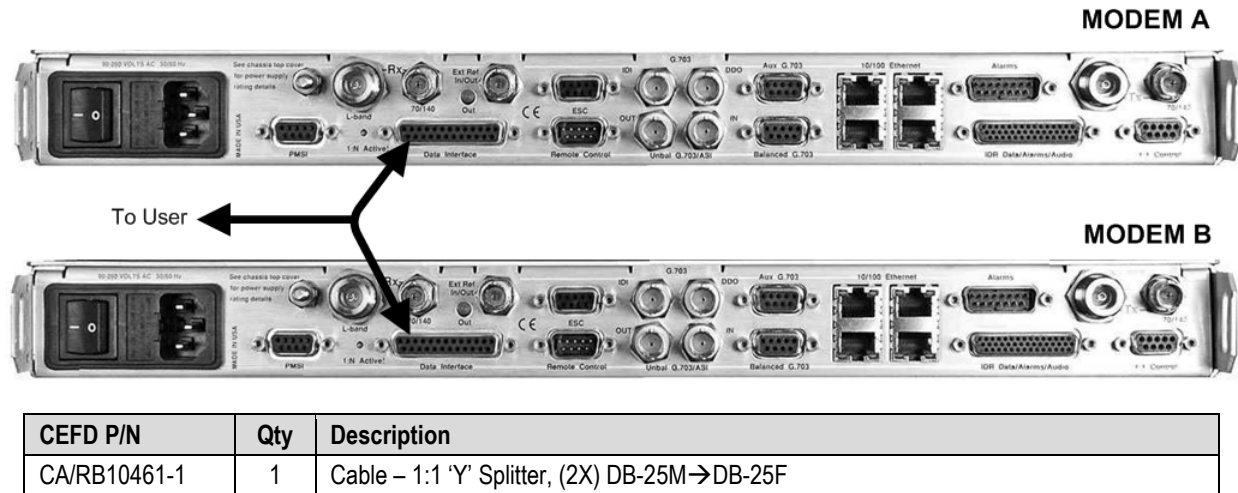


Figure 5-4. CDM-625/A EIA-422/232 1:1 Example

5.2.2.1.2 HSSI Interface Example

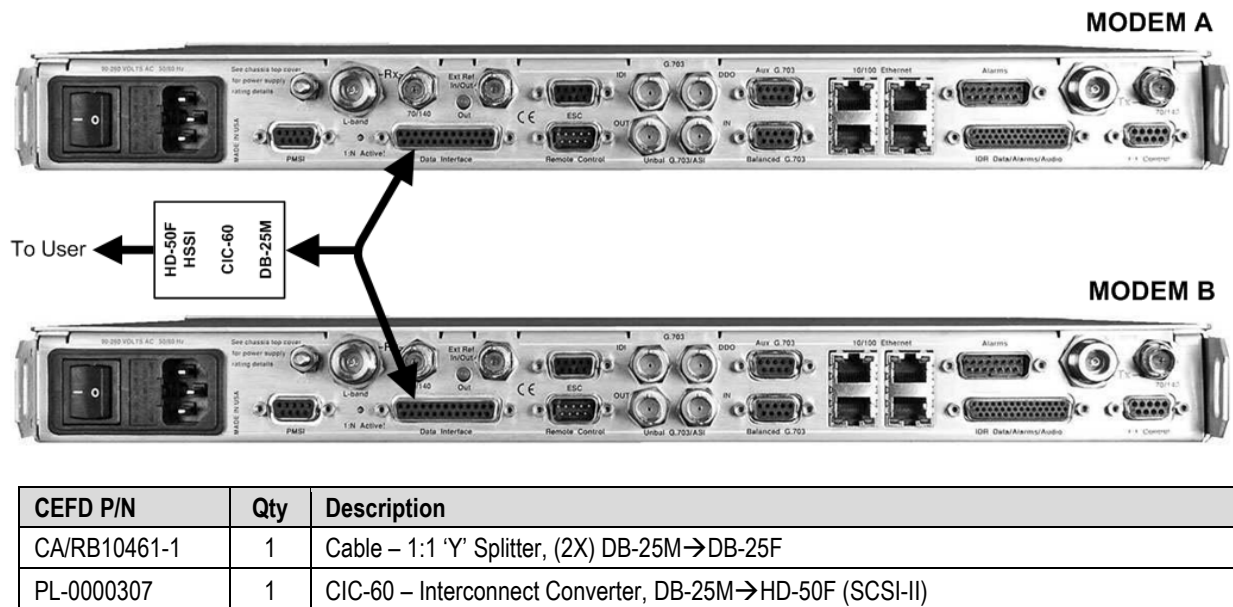


Figure 5-5. CDM-625/A HSSI 1:1 Example

5.2.2.1.3 Quad E1 Interface Example

The G.703 Balanced and Auxiliary G.703 DB-9F single connectors are used for Quad E1 operation.



- 1) As shown in Figure 5-6, 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 P/N	Converts (1) 9-pin Type 'D' (DB-9F) paired connection (e.g., Modem A <i>AND</i> Modem B G.703 Balanced connector pair -or- Modem A <i>AND</i> Modem B Auxiliary G.703 connector pair) to:	See App. A Fig.
CA-0000163	(2) 15-pin Type 'D' (DB-15F) connectors	A-9
CA-0000164	(2) RJ-48 female connectors	A-10
KT-0000122	(4) BNC 75Ω female connectors – (2) Tx, (2) Rx	A-11

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

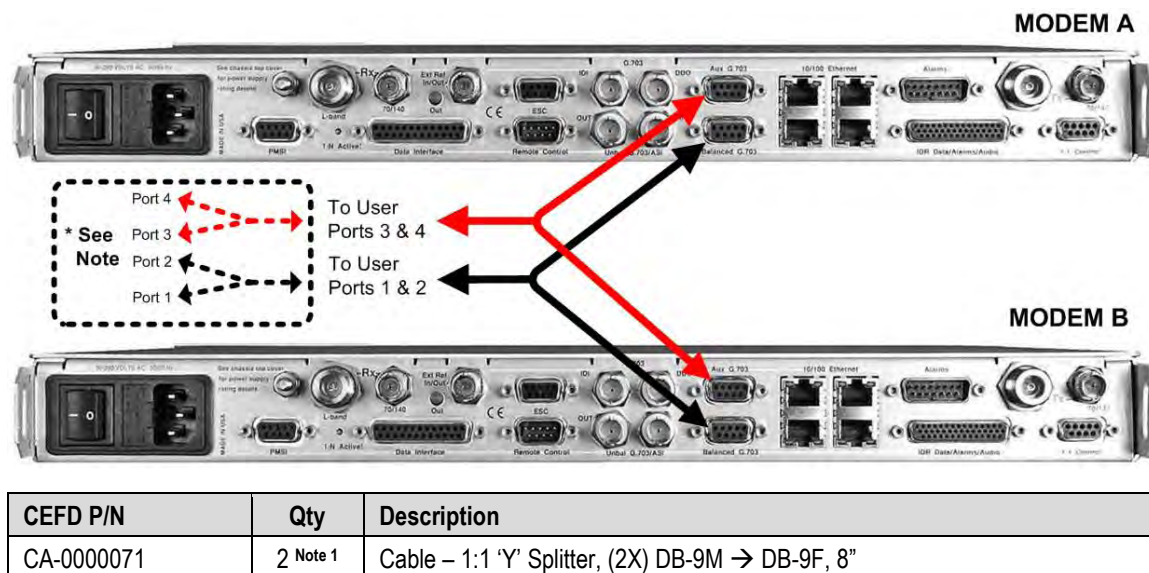
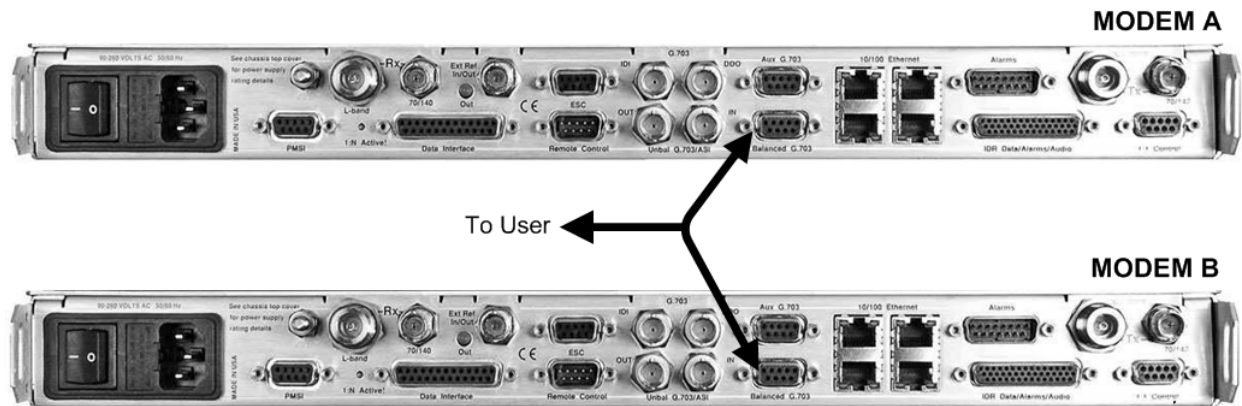


Figure 5-6. CDM-625/A Quad E1 1:1 Example

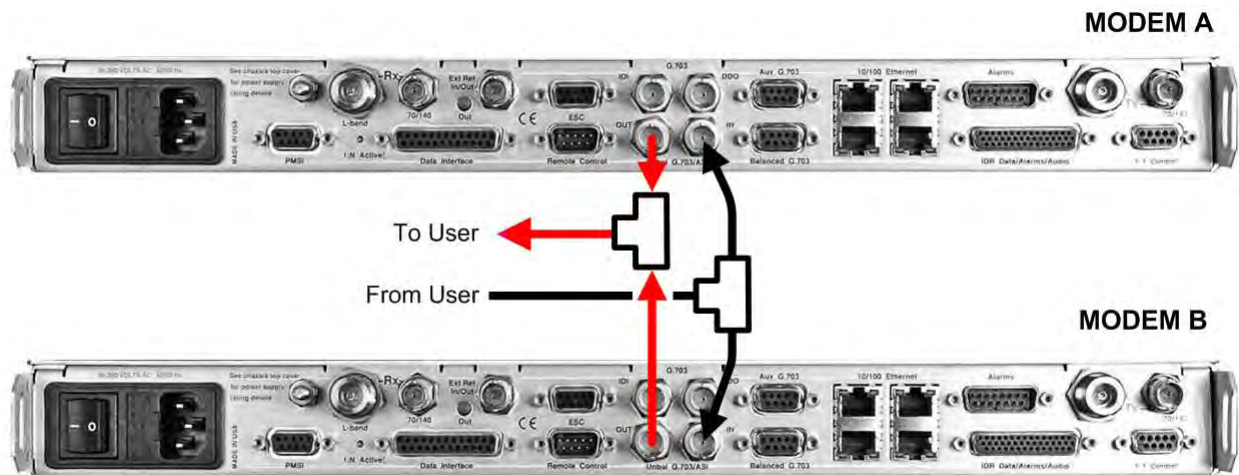
5.2.2.1.4 G.703 Balanced Interface Example



CEFD P/N	Qty	Description
CA-0000071	1	Cable – 1:1 'Y' Splitter, (2X) DB-9M→DB-9F, 8"

Figure 5-7. CDM-625/A G.703 Balanced 1:1 Example

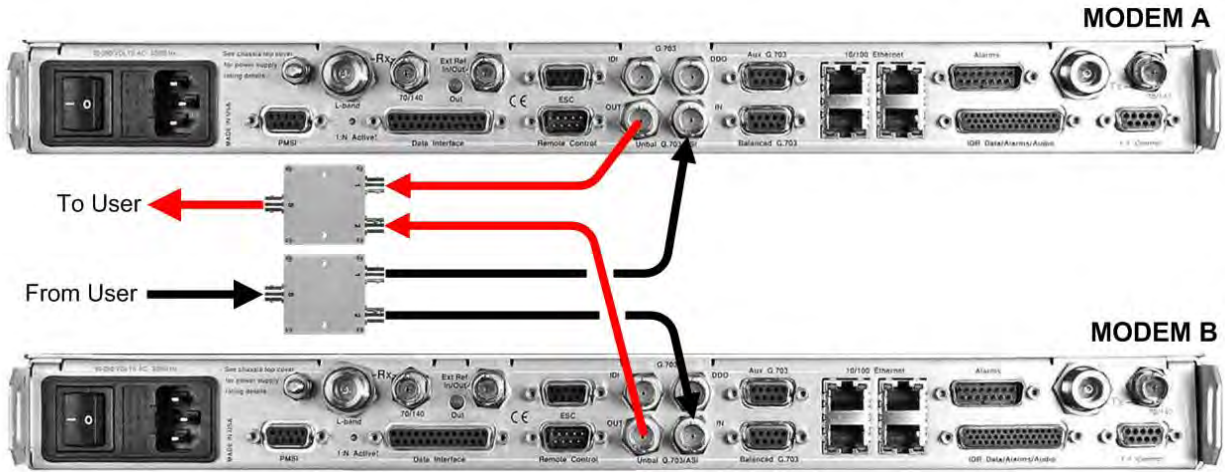
5.2.2.1.5 G.703 Unbalanced Data Interface Example



KT/10553-1 G.703 Unbalanced Interface Kit		
CEFD P/N	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 1'
CN/BNC-TEE-JPJ	2	T-Adapter, 50Ω BNC

Figure 5-8. CDM-625/A G.703 Unbalanced 1:1 Example

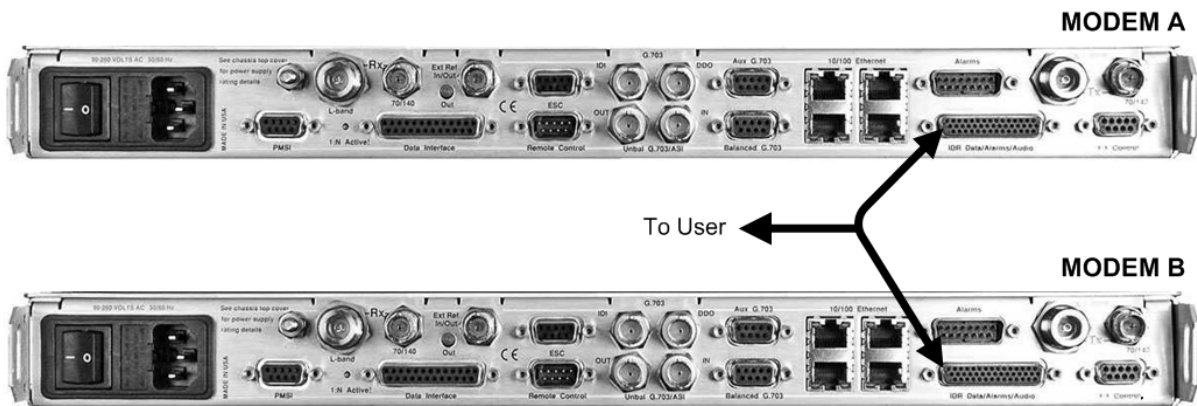
5.2.2.1.6 ASI Interface Example



KT/12579 ASI 75Ω Interface Kit		
CEFD P/N	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 5-9. CDM-625/A ASI 1:1 Example

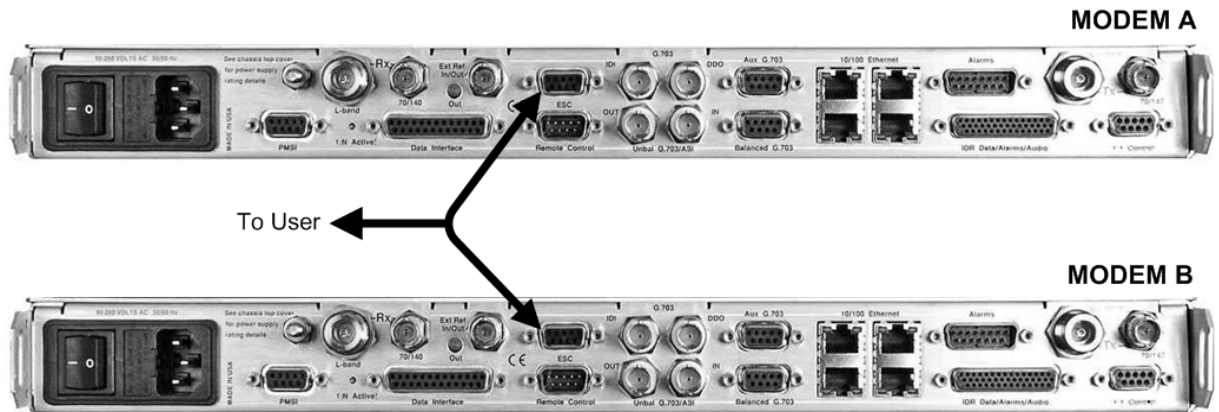
5.2.2.1.7 Overhead Interface Example



CEFD P/N	Qty	Description
CA-0000070	1	Cable – 1:1 'Y' Splitter, (2X) HD-44M→HD-44F, 8"

Figure 5-10. CDM-625/A Overhead 1:1 Example

5.2.2.1.8 Engineering Service Channel (ESC) Interface Example



CEFD P/N	Qty	Description
CA-0000071	1	Cable – 1:1 'Y' Splitter, (2X) DB-9M→DB-9F, 8"

Figure 5-11. CDM-625/A ESC 1:1 Example

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

5.2.2.2.1 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 5-12**) with any currently available combination of framing and interface type (see **Figure 5-4** through **Figure 5-11**) – 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.

5.2.2.2.2 Managed Switch Mode (with/without Optional IP Packet Processor)

Figure 5-12 shows the block diagram for the CDM-625/A 1:1 modem configuration using the IP (10/100 Ethernet) Interface in Managed Switch (Ethernet Bridge) Mode. **Figure 5-13** 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.



- 1) **When in Managed Switch Mode with the Packet Processor either not installed or installed but disabled, all Ethernet ports on the Offline modem will be disabled. The exception is if one of the ports has been set to be the Dedicated Management Port.**

See the CDM-625A or CDM625 Advanced Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM625A or MN-CDM625) for instructions on configuring one of the four 10/100 Ethernet ports as the Dedicated Management Port for remote Ethernet M&C (Dedicated Management Port is available only without the optional IP Packet Processor).

- 2) **When in Managed Switch Mode with the optional IP Packet Processor installed and enabled, only Port 1 of the Offline modem is enabled, while Ports 2, 3, and 4 on the Offline modem are disabled.**
- 3) **TO AVOID ETHERNET NETWORKING LOOPS – When in Managed Switch Mode and using more than one Ethernet port, the ports must not be connected to the same Layer 2 Switch unless they are isolated from one another. The ports can be isolated by connecting each port to a separate Layer 2 Switch (see Figure 5-13) or by configuring separate VLAN's for each port on a single Layer 2 Switch.**

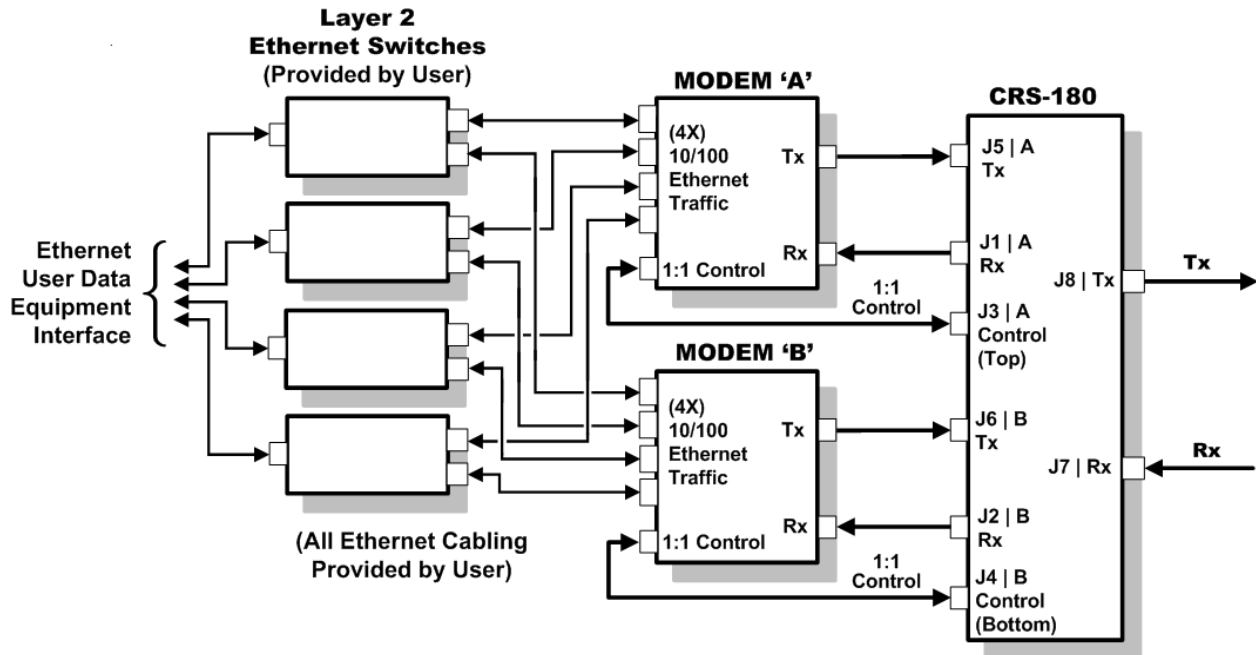


Figure 5-12. CDM-625/A Block Diagram – 10/100 Ethernet Interface Managed Switch Mode

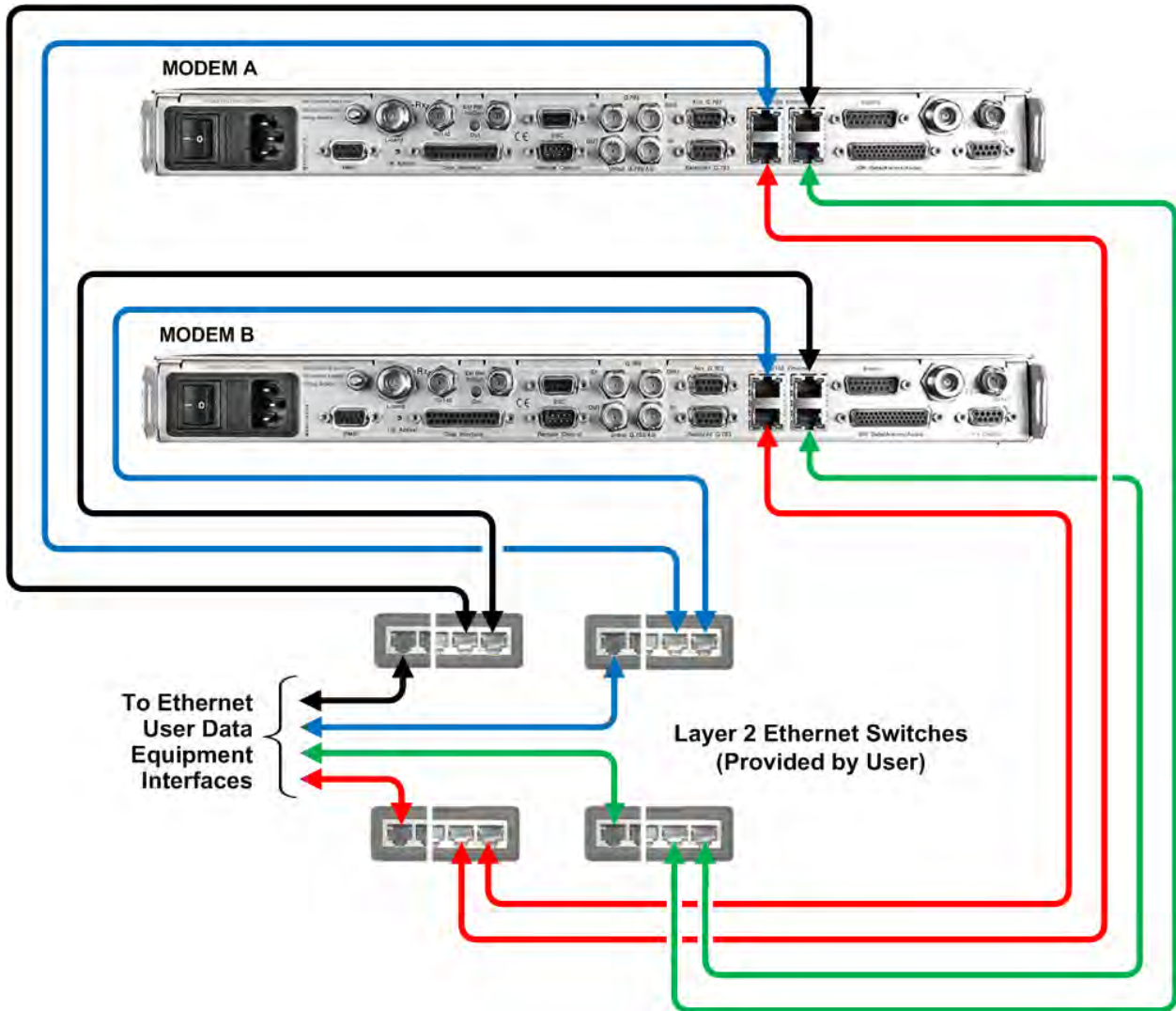


Figure 5-13. CDM-625/A 10/100 Ethernet 1:1 Example – Managed Switch Mode
(with/without Dedicated Management Port)

5.2.2.2.3 Router Mode (Requires Optional IP Packet Processor)



When the optional IP Packet Processor is installed and enabled, you should use Port 1 of each modem for M&C purposes only. Reserve use of Port 2, 3, or 4 for each modem for Ethernet traffic only.

TO AVOID ETHERNET NETWORKING LOOPS – Make sure to connect Port 1 (M&C) and the designated Traffic Port to separate Layer 2 Switches, unless your Layer 2 Switch is configured to isolate these ports by using VLANs.

Figure 5-14 shows the block diagram for a CDM-625/A 1:1 modem configuration using the IP (10/100 Ethernet) Interface in Router Mode, with the optional IP Packet Processor installed and enabled. The Figure 5-15 cabling example shows Ethernet Port 2 as the designated Ethernet traffic connection.

This configuration requires no cabling kit – you must use user-provided Ethernet cables and Layer 2 switch(es) for direct connection to the modem.

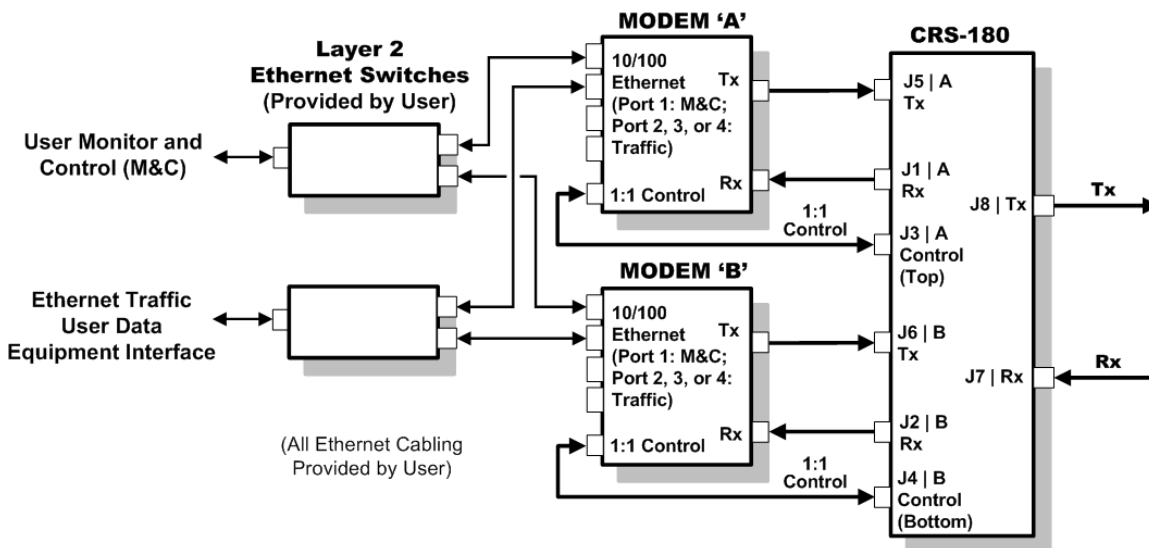


Figure 5-14. CDM-625/A Block Diagram 10/100 Ethernet 1:1 Example – Router Mode

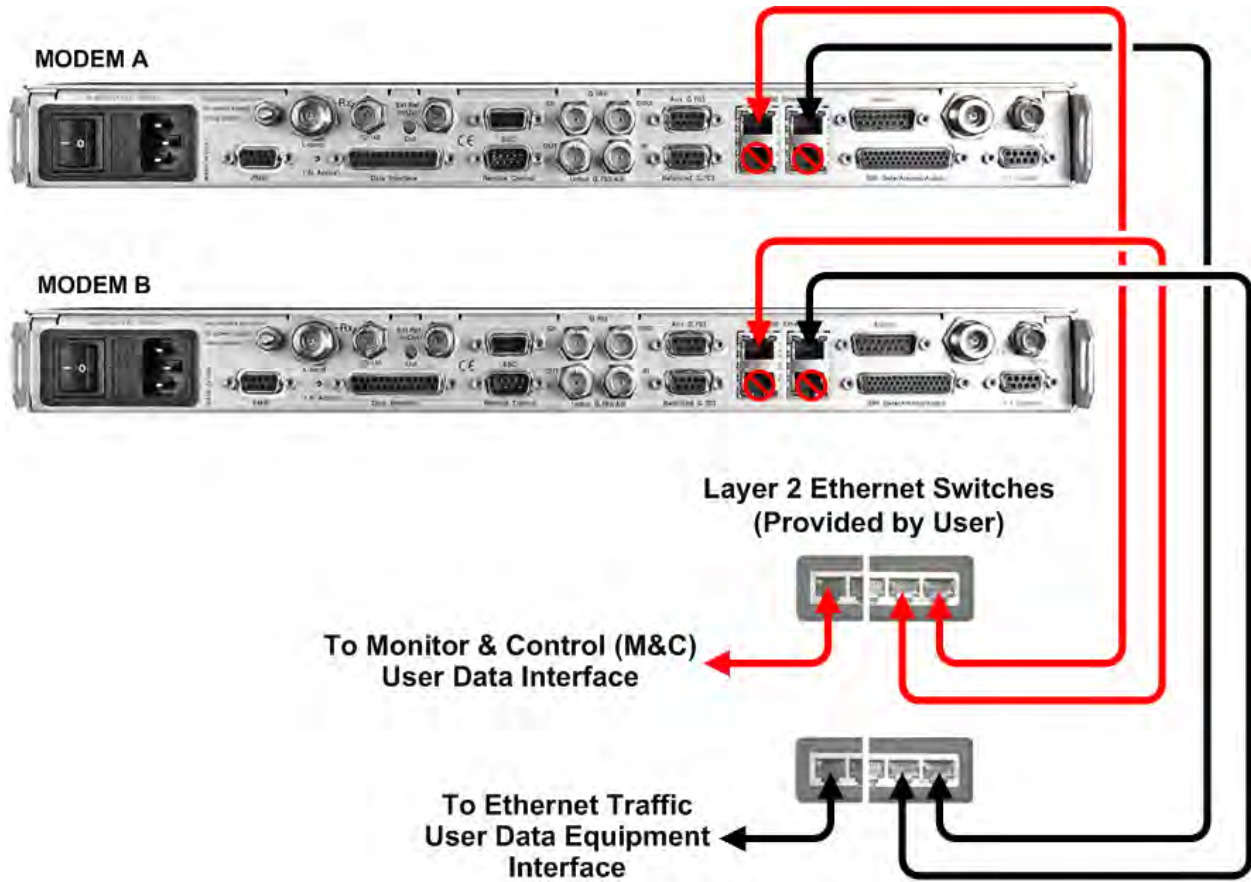


Figure 5-15. CDM-625/A 10/100 Ethernet Cabling 1:1 Example – Router Mode

5.2.2.3 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 CRS-180 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 Redundant Modem and the Traffic Modem **using CnC**. See **Figure 5-16**.



The CA-0000276 Multi-Drop CnC PLUS 1:1 Cable bypasses the CRS-180 L-Band 1:1 Redundancy Switch.

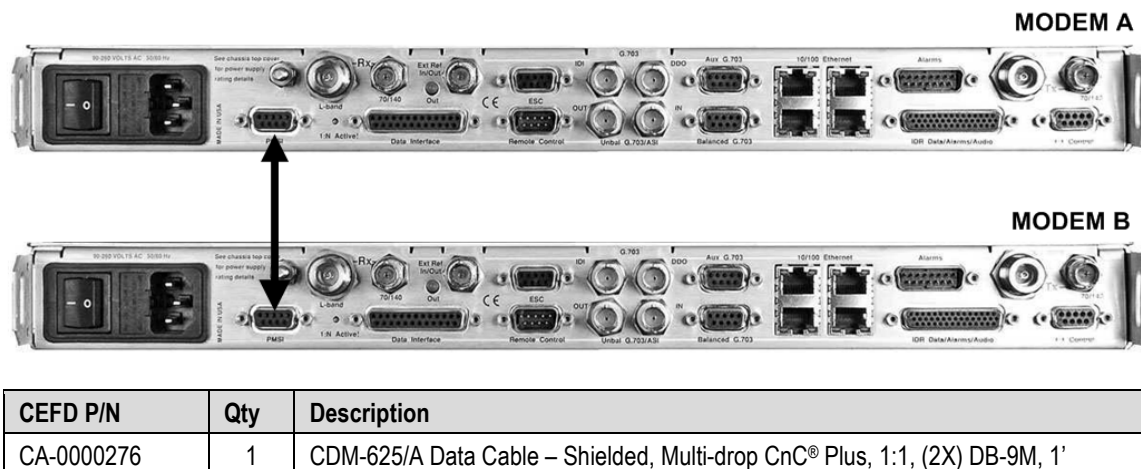


Figure 5-16. CDM-625/A PMSI 1:1 Example

5.3 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

5.3.1 CRS-180→CDM-760/-750 Control and IF Interface Connections Using Cabling Kit KT-0000177



You must order terrestrial data interface components/kits separately. See Sect. 5.3.2 for CDM-760/-750 terrestrial data interface configuration and connection examples and details.

You must use the Comtech EF Data KT-0000177 1:1 Redundancy Control/IF Interface Cabling Kit for your control and IF switch-to-modem cabling connections. **Figure 5-17** shows the kit parts list and connection details. Excluding the modems, the KT-0000177 kit provides all components shown here.

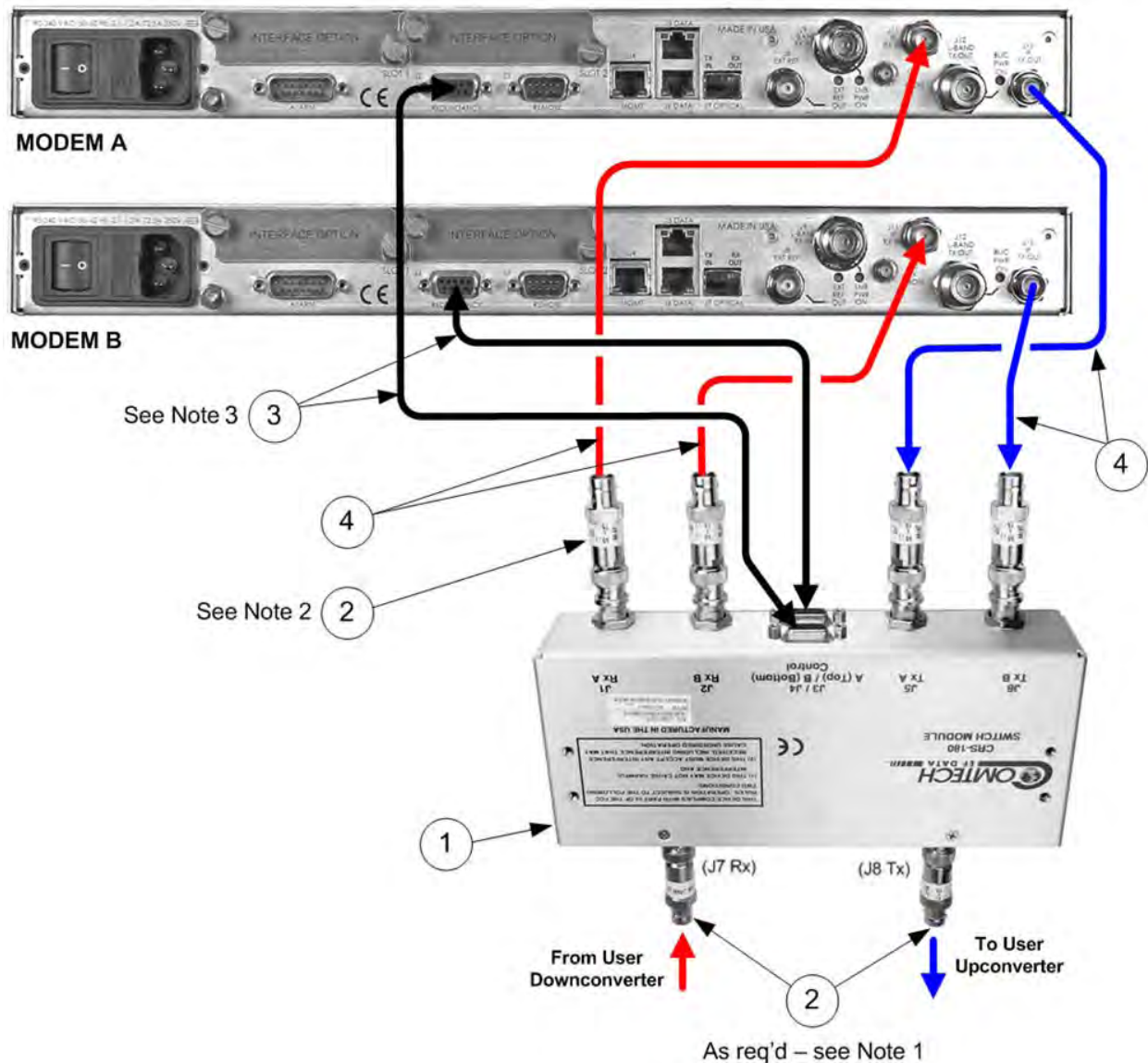


CAUTION – It is **ESSENTIAL** that you make the control and the IF Rx and Tx connections correctly.



Figure 5-17 NOTES:

- 1) You must use the XF/BNC-MF-50-75 transformers (Item 2) on the antenna side 'J7 | Rx' and 'J8 | Tx' connectors *only* when you supply a 75Ω Rx/Tx antenna connection.
- 2) You must *always* use the XF/BNC-MF-50-75 transformers (Item 2) on the switch-to-modem side Rx ('J1', 'J2') and Tx ('J5', 'J6') connectors in order to accommodate the modem's 75Ω Rx/Tx operability.
- 3) 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.



KT-0000177 70/140 MHz IF 1:1 Redundancy Kit (CRS-180 → CDM-760, CDM-750)			
Item	CEFD P/N	Qty	Description
1	PL/11560-1	1	Top Assy, CRS-180 70/140 MHz IF 1:1 Redundancy Switch
2	XF/BNC-MF-50-75 ^{Notes 1,2}	6	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F
3	CA/WR9378-4 ^{Note 3}	2	Control Cable, Universal, DB-9M, 4'
4	PL/0813-4	4	Cable, Special, 75Ω IF BNC, 4'

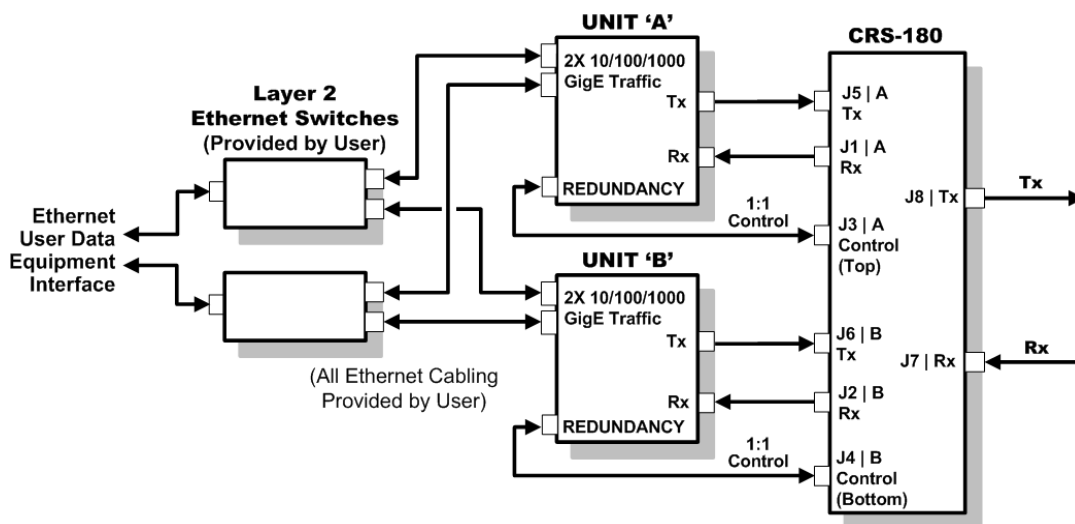
Figure 5-17. CDM-760 or CDM-750 Switch-to-Modem Control & IF Connections (CEFD KIT KT-0000177)

5.3.2 Modem-to-User Data Interface Connections and Examples

In addition to the control and IF switch-to-modem cabling shown in the previous section, a number of data interface configuration kits are available for use with the CDM-760 or CDM-750.

5.3.2.1 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 5-18** shows a block diagram and cabling example for a CDM-760/-750 1:1 modem 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 or CDM-750 Block Diagram – 10/100/1000 Gigabit Ethernet Interface

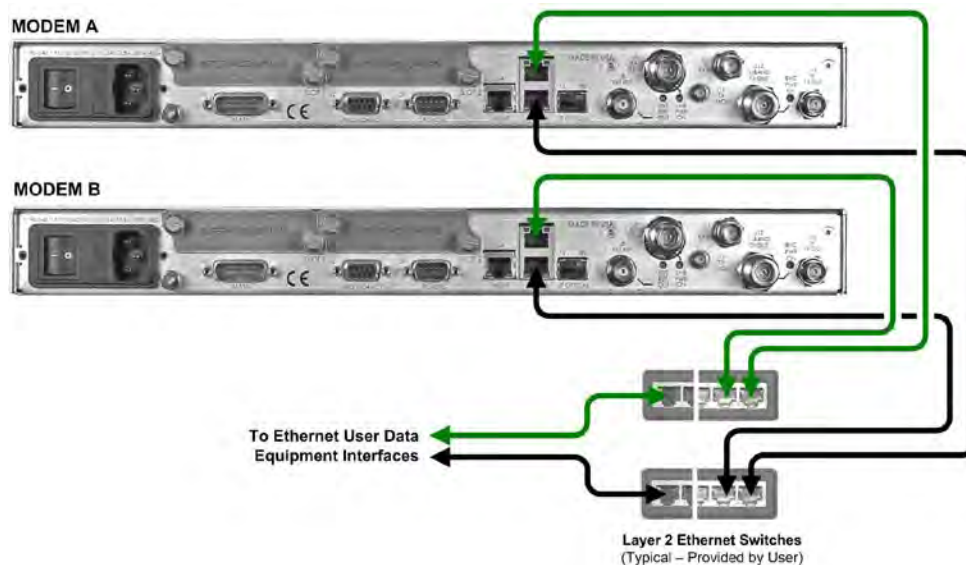


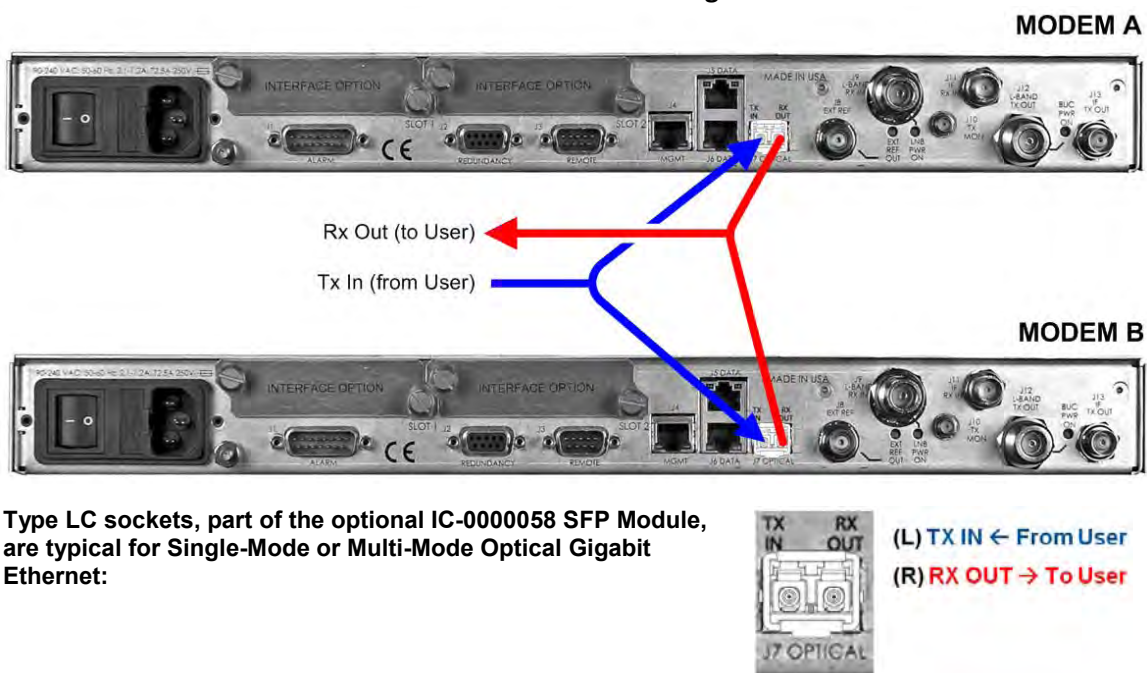
Figure 5-18. CDM-760 or CDM-750 Gigabit Ethernet 1:1 Example

5.3.2.2 Optional Optical Gigabit Ethernet Interface Example

Figure 5-19 shows a CDM-760/-750 1:1 modem 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 P/N	Qty	Description
CA-0000560	1	'Y' Cable Assy – RoHS-Compliant, Single-Mode Optical, LC Connectors

- OR -

CEFD P/N	Qty	Description
CA-0000559	1	'Y' Cable Assy – RoHS-Compliant, Multi-Mode Optical, LC Connectors

Figure 5-19. CDM-760 or CDM-750 Optional Optical Gigabit Ethernet 1:1 Example

5.3.2.3 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 1:1 modem pair. For example, **Figure 5-21** in **Sect. 5.3.2.3.1** identifies the interface kit and its quantities that you will use for the G.703 PIIC data interface.

Figure 5-20 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 5-18**), which requires user-provided Ethernet cables and Layer 2 switches.

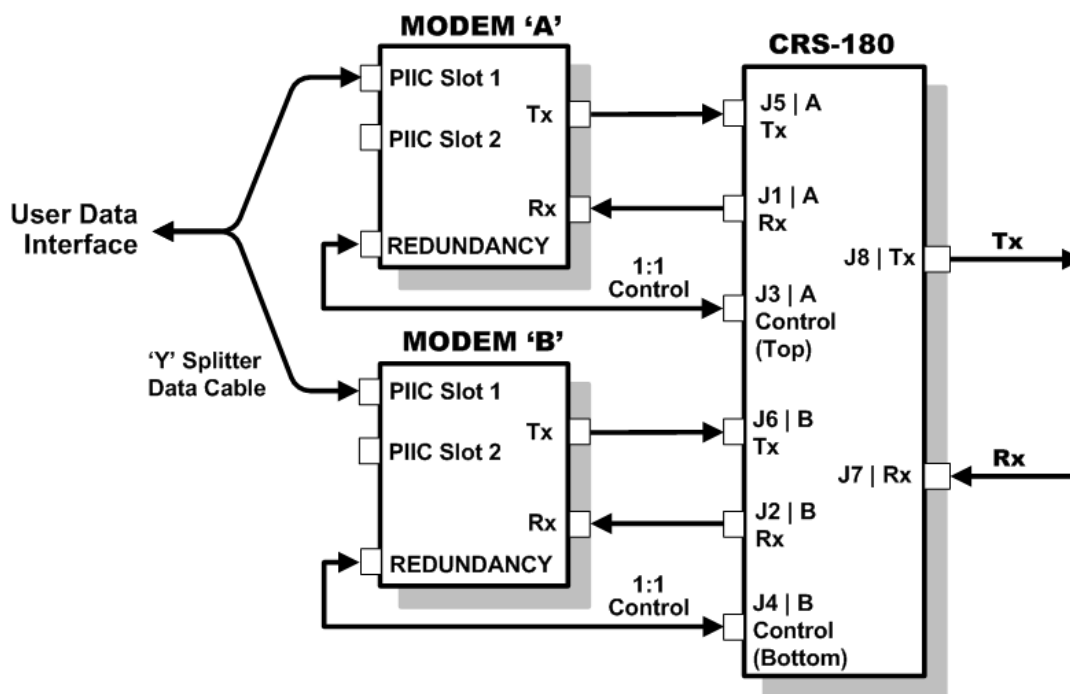
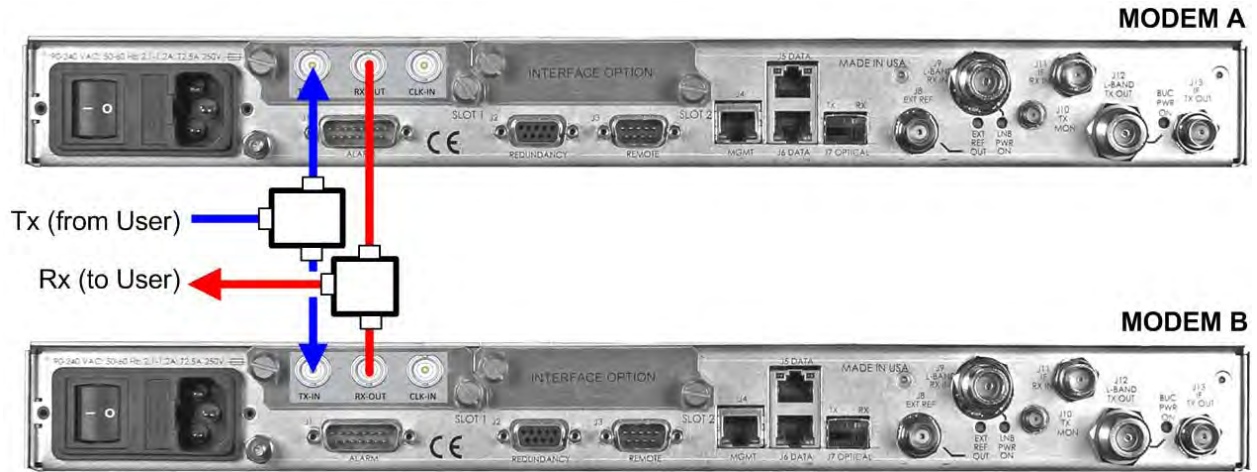


Figure 5-20. CDM-760 or CDM-750 Block Diagram – User→Modem→Switch→Traffic

5.3.2.3.1 PIIC KT/12542 Single G.703 E3/T3 75Ω Interface Kit



KT/12542 Single G.703 E3/T3 75Ω Interface Cabling Kit (G.703 E3/T3 75Ω PIIC)		
CEFD P/N	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-760 or CDM-750 PIIC G.703 E3/T3 Interface Kit – KT/12542

5.4 Cabling to the CDM-570 or CDM-570A



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

- **Chapter 4. MODEM AND SWITCH CONFIGURATION**
- **CDM-570/CDM-570L/CDMR-570L Satellite Modem Installation and Operation Manual (CEFD P/N MN/CDM570L.IOM)**
- **CDM-570A/CDM-570AL/CDMR-570AL Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM570A)**

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

5.4.1 CRS-180→CDM-570/A Control and IF Interface Connections Using Cabling Kit KT/11599

You must use the Comtech EF Data KT/11599 1:1 Redundancy Control/IF Interface Cabling Kit for all possible CDM-570/A NON-IP data interface configurations:

KT/11599 1:1 Redundancy Control/IF Interface Cabling Kit (CRS-180→CDM-570/A)				
CEFD P/N	Qty/Kit (REF)	Description	Used For	Ch. 5 Fig
PL/11560-1	1	CRS-180 Switch – Top Assembly	1:1 Redundancy	5-36 5-37
PL/0946-1	4	IF (Tx/Rx) Coax Cable, 50Ω Type 'BNC', 4'	Modem→Switch IF Interface	5-37
CA/WR9378-4*	2	Control Cable – Universal, DB-9M→DB-9M, 4'	Modem→Switch Control	5-36
XF/BNC-MF-50-75	2	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F	User IF Tx/Rx Interface	5-37
CA/RB10461-1	1	Cable – 1:1 Y-Splitter, (2X) DB-25M→DB-25F	EIA-422/232 Interface	5-39
CA/WR10522-1	1	Cable – 1:1 Y-Splitter, (2X) DB-15M→DB-15F	G.703 Balanced	5-40
KT/10553-1	1	G.703 Unbalanced Interface Kit containing: (Qty 4) CA/BNC75OHM Cable – IF BNC, 1' (Qty 2) CN/BNC-Tee-JPJ T-Adapter, 50Ω BNC	G.703 Unbalanced	5-41



*** 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 5-22 and **Figure 5-23** show how to connect a pair of CDM-570/A modems together with the CRS-180; the table for each figure lists the cable assemblies provided in the KT/11599 kit for this initial setup. See **Sect. 5.4.1.1** for the CDM-570/A Modem-to-Switch Control Interface connection, and **Sect. 5.4.1.2** for the CDM-570/A Modem-to-Switch IF Interface connection.



CAUTION – It is **ESSENTIAL** that you make the control and the IF Rx and Tx connections correctly.

5.4.1.1 Switch-to-Modem Control Interface Connection



- 1) Excluding the modems, the KT/11599 1:1 Redundancy Control/IF Interface Cabling Kit (see Sect.5.4.1) provides all components shown in Figure 5-22.
- 2) When you connect the Control Interface cables between the CRS-180 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 standby unit.



CEFD P/N	Qty	Description
CA/WR9378-4	2	Control Cable – Universal, DB-9M, 4'

Figure 5-22. CDM-570/A Switch-to-Modem Control Connections (CEFD Kit KT/11599)

5.4.1.2 Switch-to-Modem IF Interface Connection



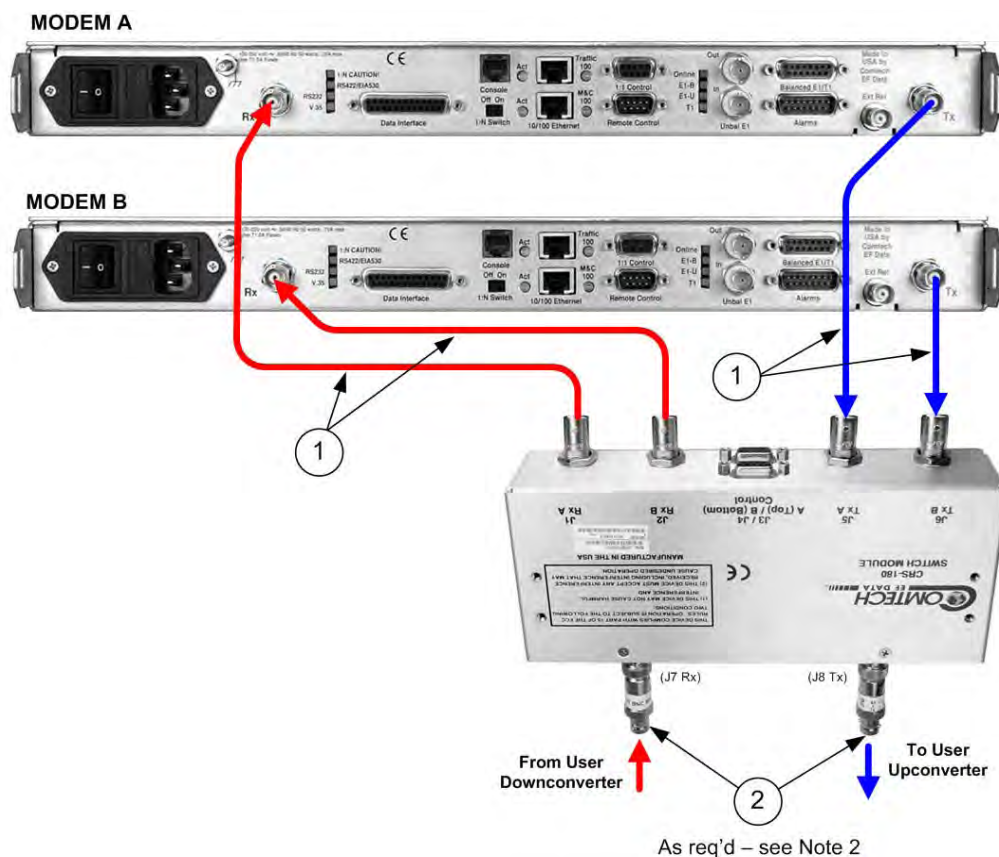
EXAMPLE: The Tx IF from 'MODEM A' connects to the Tx IF port 'J5 | Tx A' on the CRS-180; similarly, the Tx IF from 'MODEM B' connects to the Tx IF port 'J6 | Tx B' on the CRS-180.

The same logic applies for the Rx IF connections. It is important to note that failure to observe this requirement will result in system malfunction.



Figure 5-23 NOTES:

- 1) Excluding the modems, the KT/11599 1:1 Redundancy Control/IF Interface Cabling Kit (see Sect.5.4.1) provides all components shown in Figure 5-23.
- 2) 50-75Ω transformers (Item 2) are required on the 'J7 | Rx' and 'J8 | Tx' connectors, located on the antenna side of the switch, when you supply a 75Ω Rx/Tx connection.



Item	CEFD P/N	Qty	Description
1	PL/0946-1	4	IF Coax Cable, 50Ω
2	XF/BNC-MF-50-75	2	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F

Figure 5-23. CDM-570/A Switch-to-Modem 70/140 MHz IF Connections (CEFD Kit KT/11599)

5.4.2 Modem-to-User Data Interface Connections and Examples

In addition to the control and IF switch-to-modem cabling shown previously, a number of data interface configurations are available for the CDM-570/A.

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

The block diagram shown in **Figure 5-24** is typical for the examples shown in **Sects. 5.4.2.1.1** through **5.4.2.1.3**.

With the exception of the CDM-570/A 10/100 Ethernet Interface configuration shown in **Sect. 5.4.2.2**, where user-provided Ethernet cables and hub are used, one cable/component set per 1:1 modem pair is required for each user interface (see examples for specific quantities).

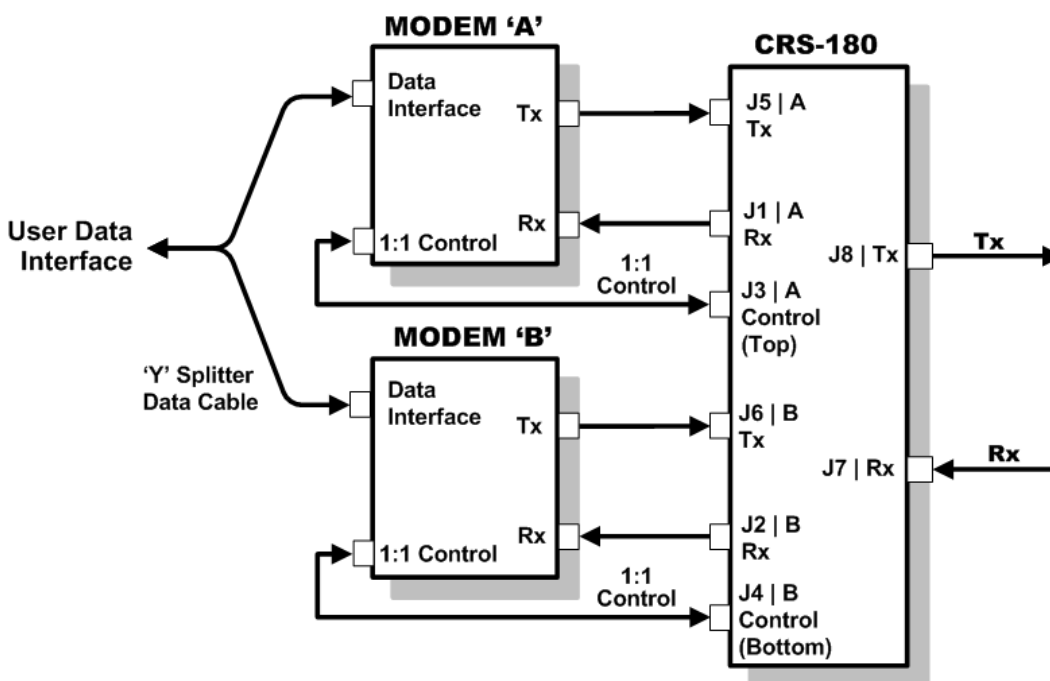


Figure 5-24. CDM-570/A Block Diagram – User→Modem→Switch→Traffic



Unless otherwise specified, the interface cables and components identified in each of the examples that follow are provided in the KT/11599 1:1 Redundancy Control/IF Interface Cabling Kit (see Sect. 5.4.1).

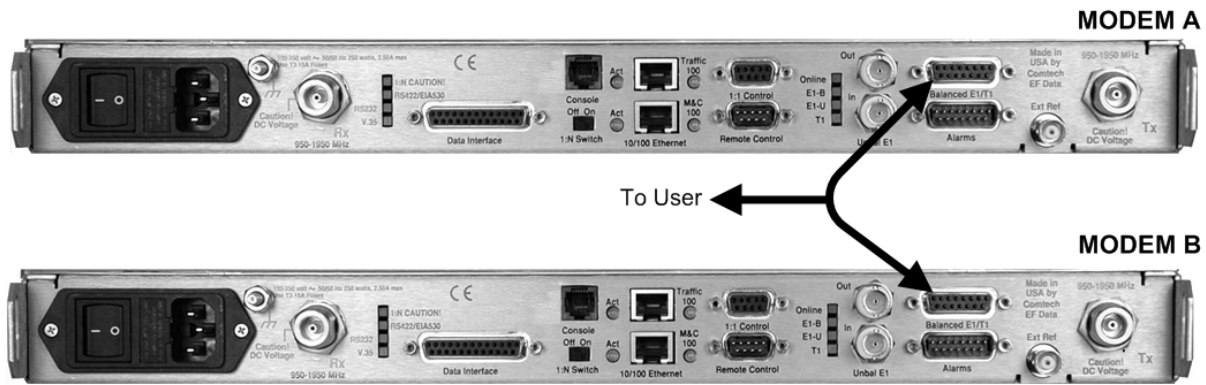
5.4.2.1.1 EIA-422/232 Interface Example



CEFD P/N	Qty	Description
CA/RB10461-1	1	Cable – 1:1 ‘Y’ Splitter, (2X) DB-25M→DB-25F

Figure 5-25. CDM-570/A EIA-422/232 1:1 Example

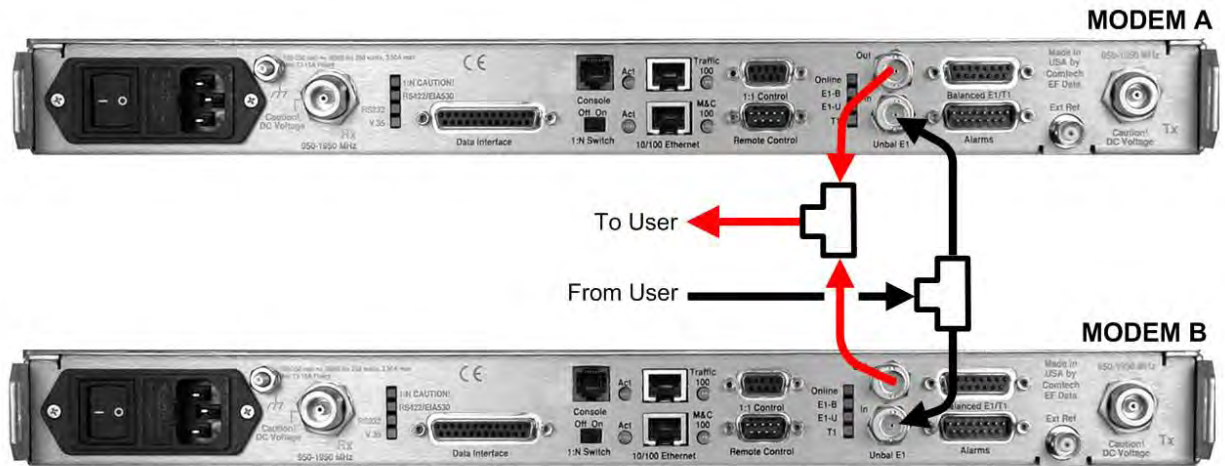
5.4.2.1.2 G.703 Balanced Interface Example



CEFD P/N	Qty	Description
CA/WR10522-1	1	Cable – 1:1 ‘Y’ Splitter, (2X) DB-15M→DB-15F

Figure 5-26. CDM-570/A G.703 Balanced 1:1 Example

5.4.2.1.3 G.703 Unbalanced Interface Example



G.703 Unbalanced 1:1 Interface Kit KT/10553-1		
CEFD P/N	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 1'
CN/BNC-TEE-JPJ	2	T-Adapter, 50Ω BNC

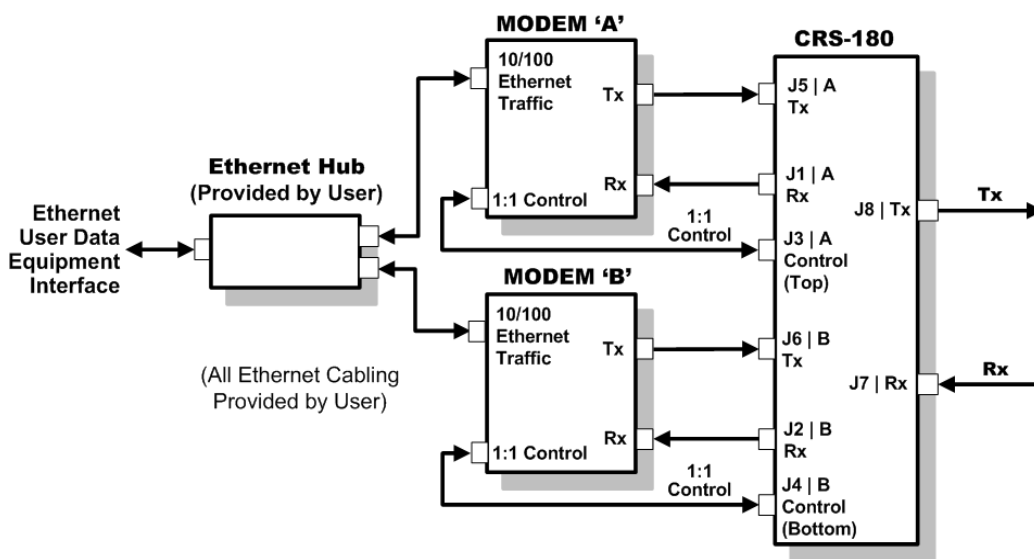
Figure 5-27. CDM-570/A G.703 Unbalanced 1:1 Example

5.4.2.2 Modem-to-User IP (10/100 Ethernet) Interface Example

Figure 5-28 shows the block diagram and cabling example of a CDM-570/A 1:1 modem configuration using the optional IP (10/100 Ethernet) Module (CDM-570) or Packet Processor (CDM-570A) interface. This configuration requires no cabling kit – you must use user-provided Ethernet cables and hub for direct connection to the ports.



For the CDM-570/A in Managed Switch (Ethernet Bridge) Mode, you **MUST** use an external Ethernet hub to ensure 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/A Block Diagram – 10/100 Ethernet Interface in Managed Switch Mode

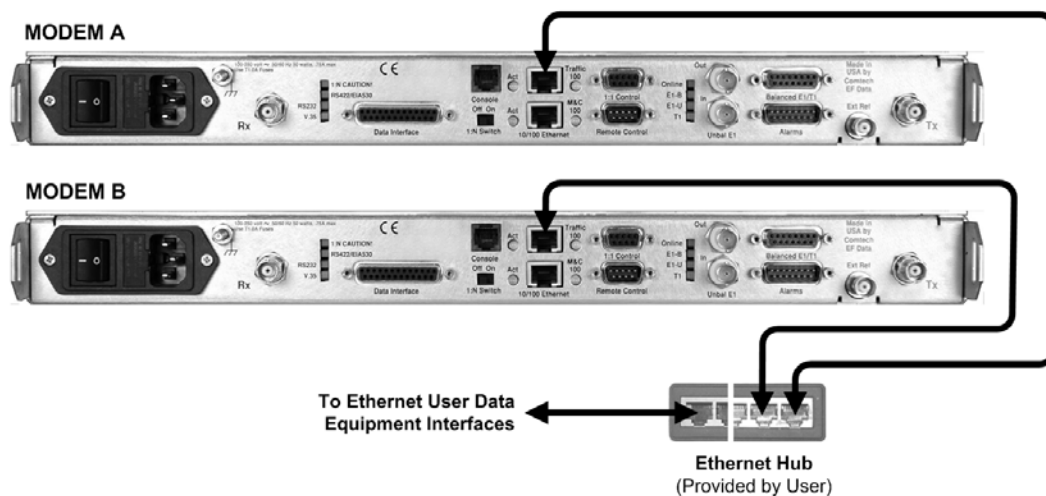


Figure 5-28. CDM-570/A 10/100 Ethernet 1:1 Example – Managed Switch Mode

5.5 Cabling to the CDM-710G



1) For information on configuring the CRS-180 70/140 MHz 1:1 Redundancy Switch with the CDM-710G High-Speed Satellite Modems for 1:1 operation, see:

- Chapter 4. MODEM AND SWITCH CONFIGURATION
- CDM-710G High-Speed Satellite Modem Installation and Operation Manual (CEFD P/N MN-CDM710G)

2) For information on the cables and cable assemblies specified in this section, see:

- Appendix A. CABLE DRAWINGS

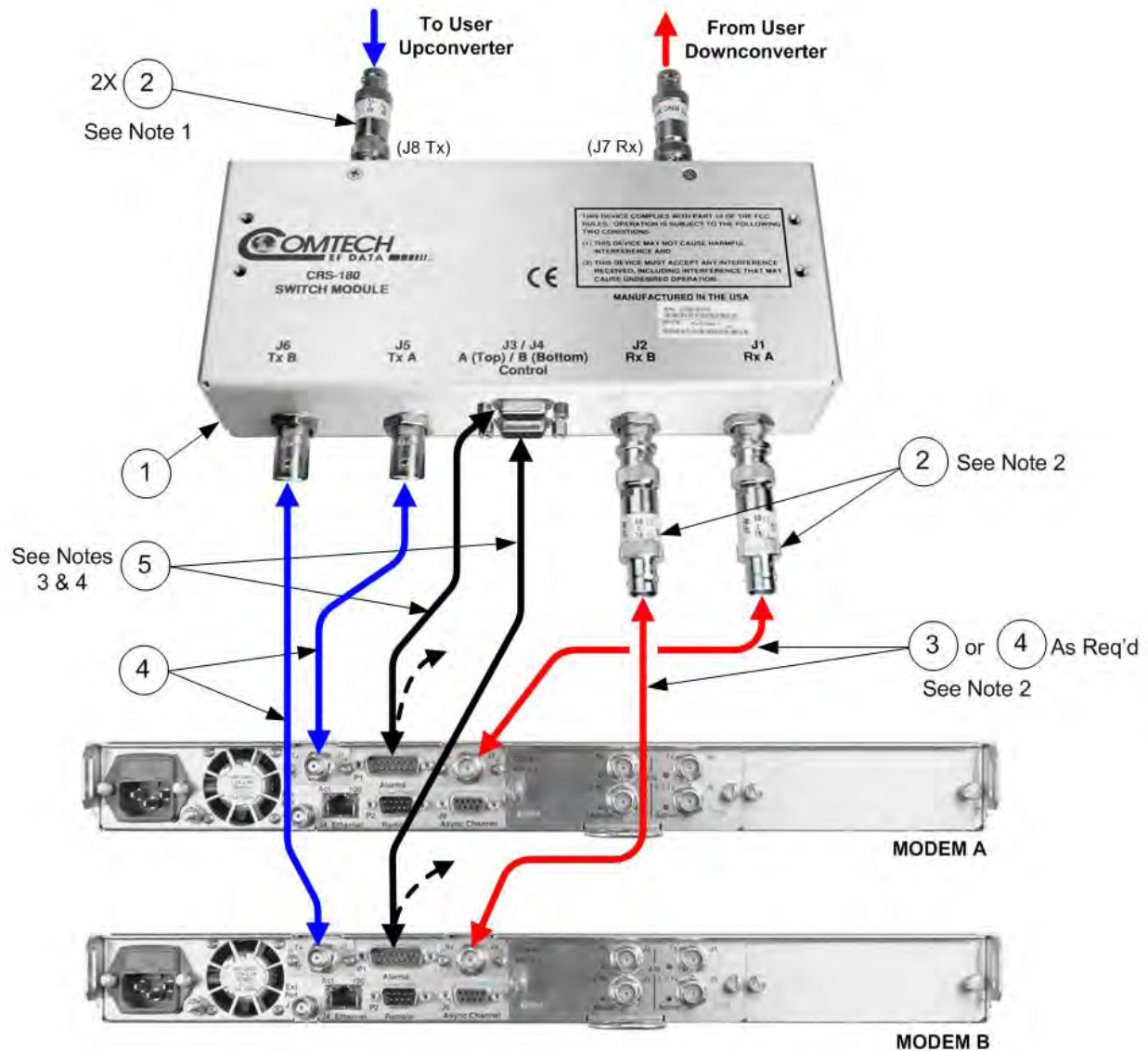
5.5.1 CRS-180→CDM-710G Control and IF Interface Connections Using Cabling Kit KT/12554

Figure 5-29 shows the CRS-180-to-CDM-710G control and IF interface connections. The Comtech EF Data KT/12554 CRS-180 70/140 MHz IF 1:1 Redundancy Kit provides all control and IF connection components.



Figure 5-29 NOTES:

- 1) Use of the XF/BNC-MF-50-75 transformers (Item 2) is required on the 'J7 | Rx' and 'J8 | Tx connectors, located on the antenna side of the switch, when you supply a 75Ω Rx/Tx connection.
- 2) Use of the XF/BNC-MF-50-75 transformers (Item 2) on the Rx A and Rx B ports, located on the modem side of the switch, is dependent on the CDM-710G's factory configuration for 50Ω or 75Ω Rx operability. If the modems in use are configured as 50Ω Rx units, the transformers will not be used on the Rx side and the 50Ω cable (Item 4) will be used in place of the 75Ω cable (Item 3).
- 3) To provide User access to modem "Fault Summary Relay," Control 'Y' Cable CA/WR13011-4, sold separately, is available for use in place of the CA/WR12135-1 cable.
- 4) 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, sold separately, is available for use in place of the CA/WR12135-1 cable.
- 5) You must order terrestrial data interface components/kits separately. See Sect. 5.5.2 for CDM-710G terrestrial data interface configuration and connection examples and details.



CAUTION – It is **ESSENTIAL** that you make the control and the IF Rx and Tx connections correctly.

KT/12554 70/140 MHz IF 1:1 Redundancy Kit (CRS180→CDM-7190G)			
Item	CEFD P/N	Qty	Description
1	PL/11560-1	1	Top Assy, CRS-180 70/140 MHz IF 1:1 Redundancy Switch
2	XF/BNC-MF-50-75 Notes 1,2	4	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F
3	PL/0813-4 Note 2	2	Cable, Special, IF BNC, 75Ω
4	PL/0946-1 Note 2	4	Cable, Special, IF BNC, 50Ω
5	CA/WR12135-1 Notes 3,4	2	Cable Assy, Control Adapter RoHS-Compliant

Figure 5-29. CDM-710G Switch-to-Modem Control & IF Connections (CEFD Kit KT/12554)

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

In addition to the basic Modem-to-Switch cabling shown previously, a number of data interface configuration kits are available for use with the CDM-710G High-Speed Satellite Modem.

Separate cabling kits are needed for these CDM-710G 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 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)

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

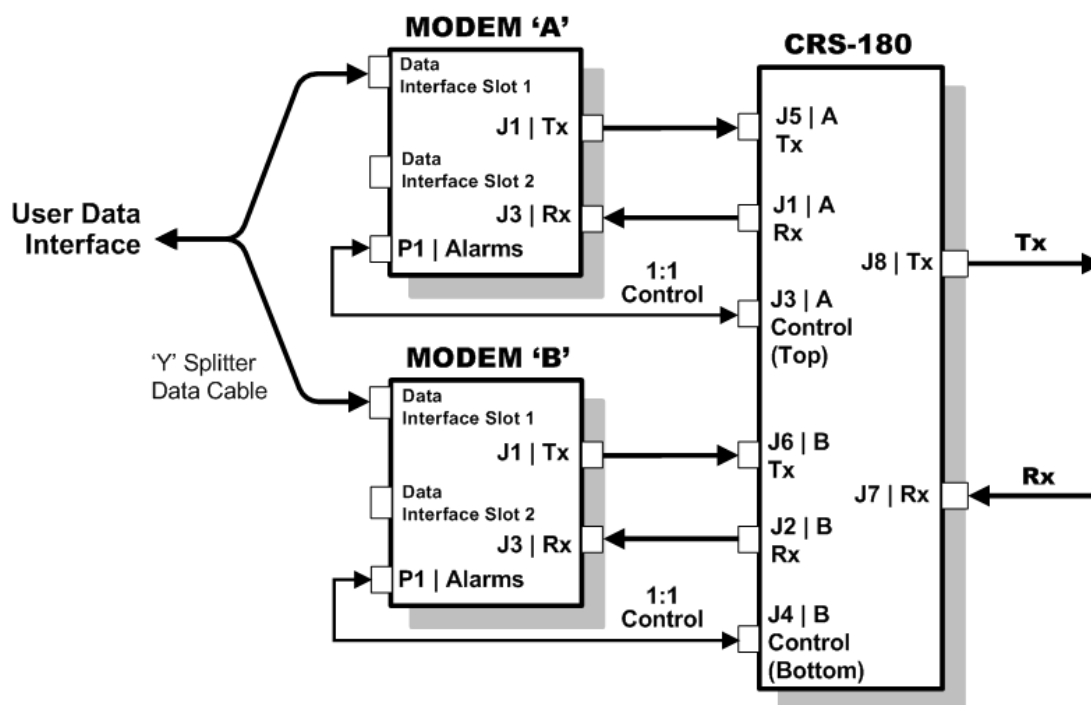


Figure 5-30. CDM-710G Block Diagram – User→Modem→Switch→Traffic

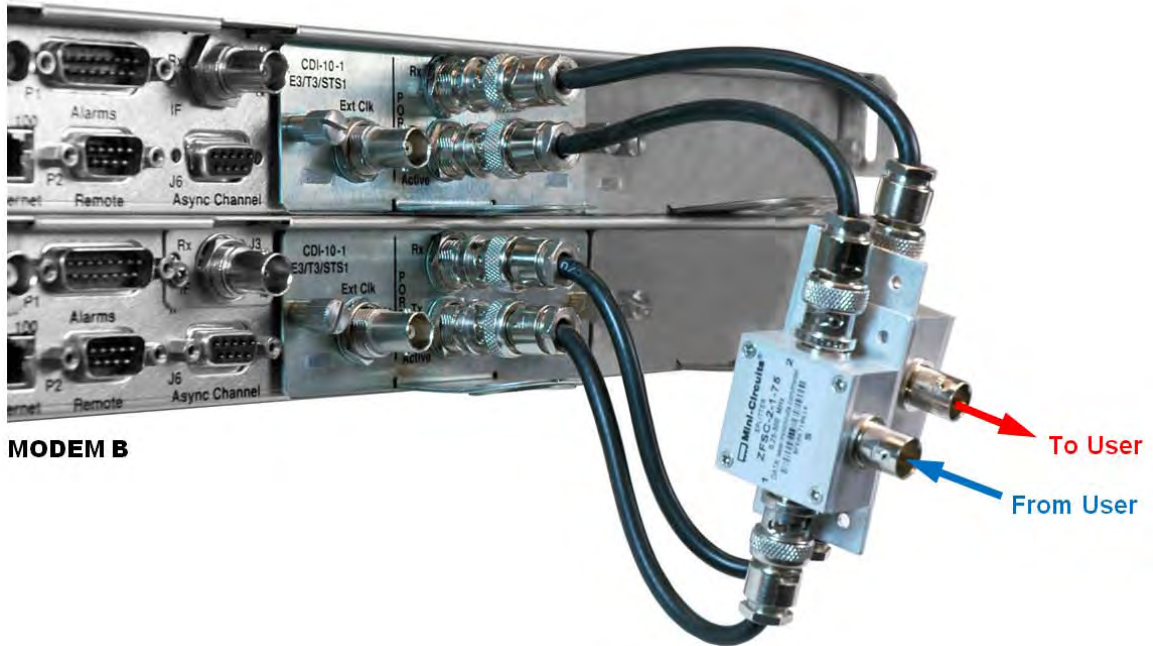
Figure 5-30 shows the block diagram typical for the kits shown in Sects. 5.5.2.1.1 and Sect. 5.5.2.1.2. For example, Sect. 5.5.2.1.1 identifies the interface kit used with the CDI-10-1 Single G.703 data interface.

With the exception of the CDI-70 Gigabit Ethernet data interface configuration shown in Sect. 5.5.2.2, which uses user-provided Ethernet cables and Layer 2 Switch, you must use one interface kit per 1:1 modem pair for each interface (see examples for specific quantities).

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

Figure 5-31 shows an example of a CDM-710G 1:1 modem configuration with the CDI-10-1 Single G.703 Data Interface installed in Slot 1, with Slot 2 empty. The figure depicts installation of one KT/12583 Single G.703 Interface Kit.

MODEM A



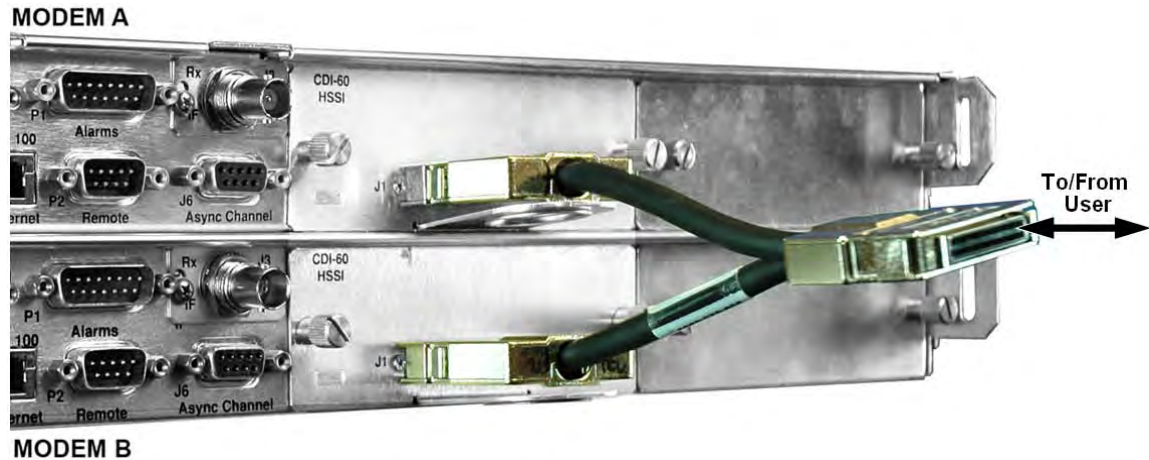
MODEM B

KT/12583 Single G.703 (CDI-10-1) 75Ω Interface Kit		
CEFD P/N	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 5-31. CDM-710G Single G.703 E3/T3/STS-1 1:1 Example

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

Figure 5-32 shows an example of a CDM-710G 1:1 modem configuration with the CDI-60 HSSI Data Interface installed in Slot 1, with Slot 2 empty. The figure depicts installation of one KT/12586 HSSI Interface Kit.



KT/12586 HSSI (CDI-60) Interface Kit		
CEFD P/N	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M→HD-50F, 3"

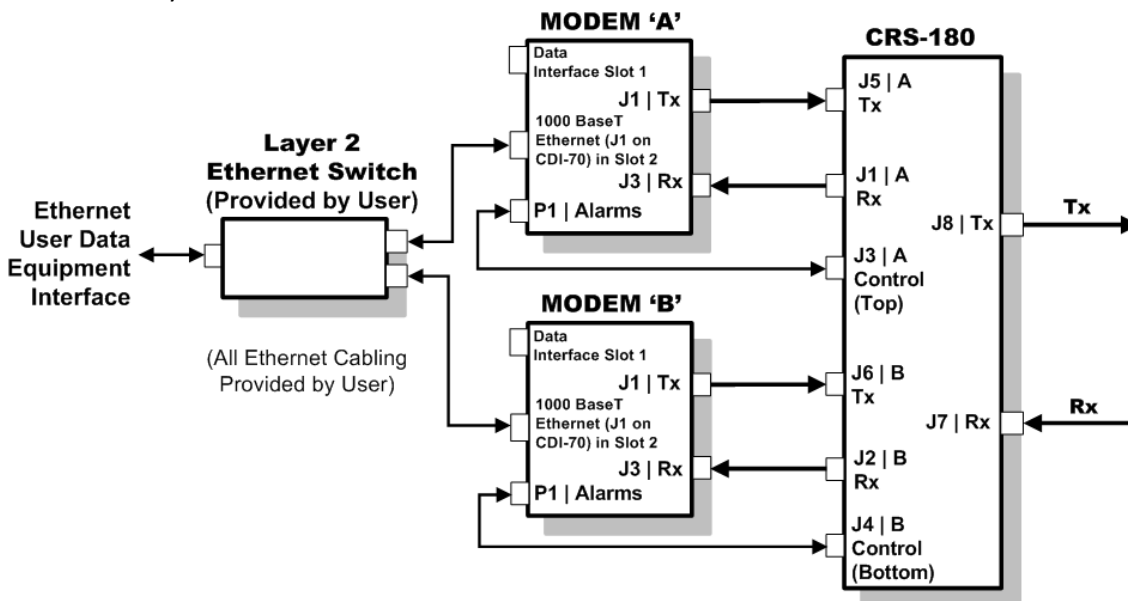
Figure 5-32. CDM-710G HSSI 1:1 Example

5.5.2.2 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 5-33 shows the block diagram and cabling example for a CDM-710G 1:1 modem configuration with the CDI-70 Gigabit Ethernet Data Interface installed in Slot 2, 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 Block Diagram – Gigabit Ethernet (GigE) Interface

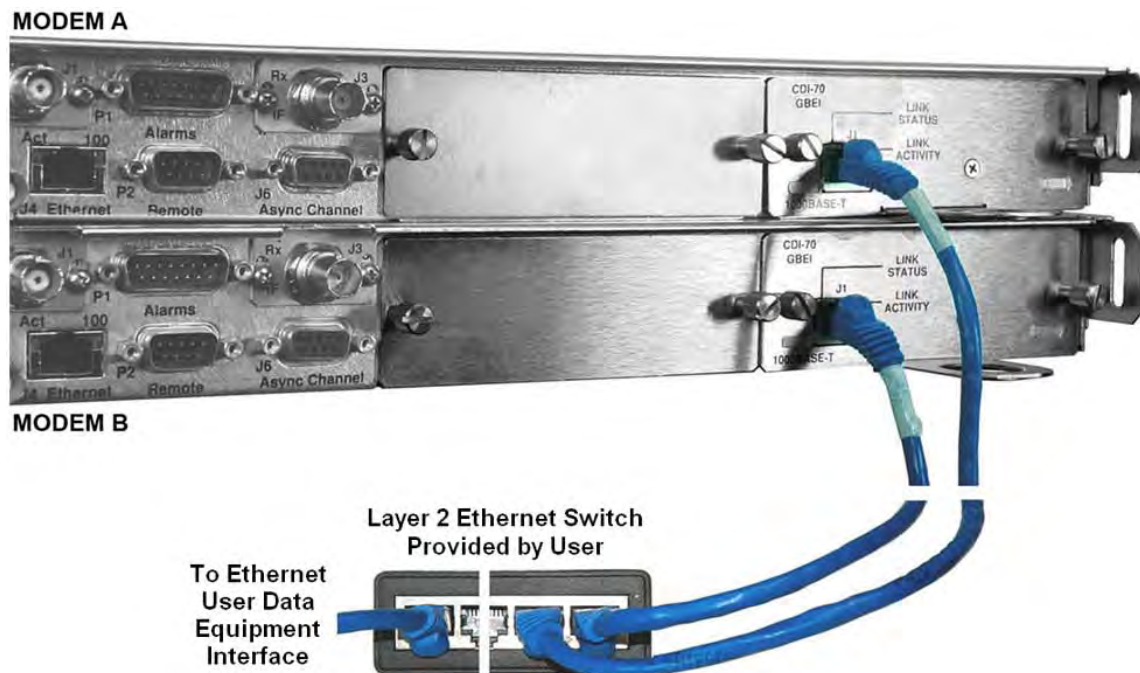


Figure 5-33. CDM-710G CDI-70 Gigabit Ethernet (GigE) 1:1 Example

5.6 Cabling to the CDM-710



1) For information on configuring the CRS-180 70/140 MHz 1:1 Redundancy Switch with the CDM-710 Broadcast Satellite Modems for 1:1 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 and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS

5.6.1 CRS-180 → CDM-710 Control and IF Interface Connections Using Cabling Kit KT/12551



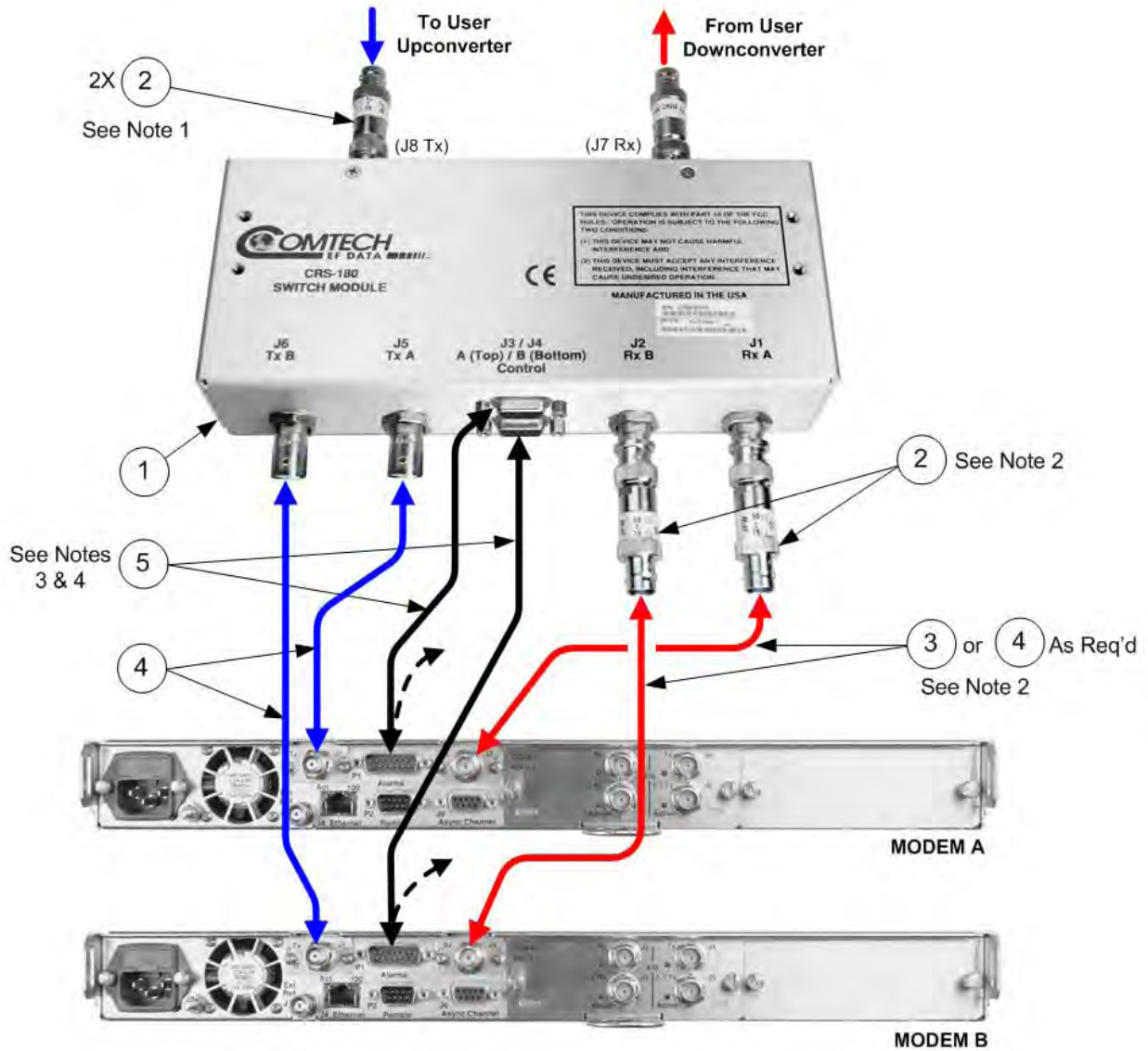
You must order terrestrial data interface components/kits separately. See Sect. 5.6.2 for more information.

You must use the Comtech EF Data KT/12551 CRS-180 70/140 MHz IF 1:1 Redundancy Kit for all control and IF connections. **Figure 5-34** shows these Switch-to-Modem control and IF interface connections.



Figure 5-34 NOTES:

- 1) Use of the XF/BNC-MF-50-75 transformers (Item 2) is required on the 'J7 | Rx' and 'J8 | Tx' connectors, located on the antenna side of the switch, when you supply a 75Ω Rx/Tx connection.
- 2) Use of the XF/BNC-MF-50-75 transformers (Item 2) on the Rx 'A' and Rx 'B' ports, located on the modem side of the switch, is dependent on the CDM-710's factory configuration for 50Ω or 75Ω Rx operability. If the modems in use are configured as 50Ω Rx units, the transformers will not be used on the Rx side and the 50Ω cable (Item 4) will be used in place of the 75Ω cable (Item 3).
- 3) To provide User access to modem "Fault Summary Relay," Control 'Y' Cable CA/WR13011-4, sold separately, is available for use in place of the CA/WR12135-1 cable.
- 4) 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, sold separately, is available for use in place of the CA/WR12135-1 cable.



KT/12554 70/140 MHz IF 1:1 Redundancy Kit			
Item	CEFD P/N	Qty	Description
1	PL/11560-1	1	Top Assy, CRS-180 70/140 MHz IF 1:1 Redundancy Switch
2	XF/BNC-MF-50-75 Notes 1,2	4	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F
3	PL/0813-4 Note 2	2	Cable, Special, IF BNC, 75Ω
4	PL/0946-1 Note 2	4	Cable, Special, IF BNC, 50Ω
5	CA/WR12135-1 Notes 3, 4	2	Cable Assy, Control Adapter RoHS-Compliant

Figure 5-34. CDM-710 Switch-to-Modem Control & IF Connections – KT/12554

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

In addition to the basic Modem-to-Switch 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 CDM-710 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	GbE (CDI-70)

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

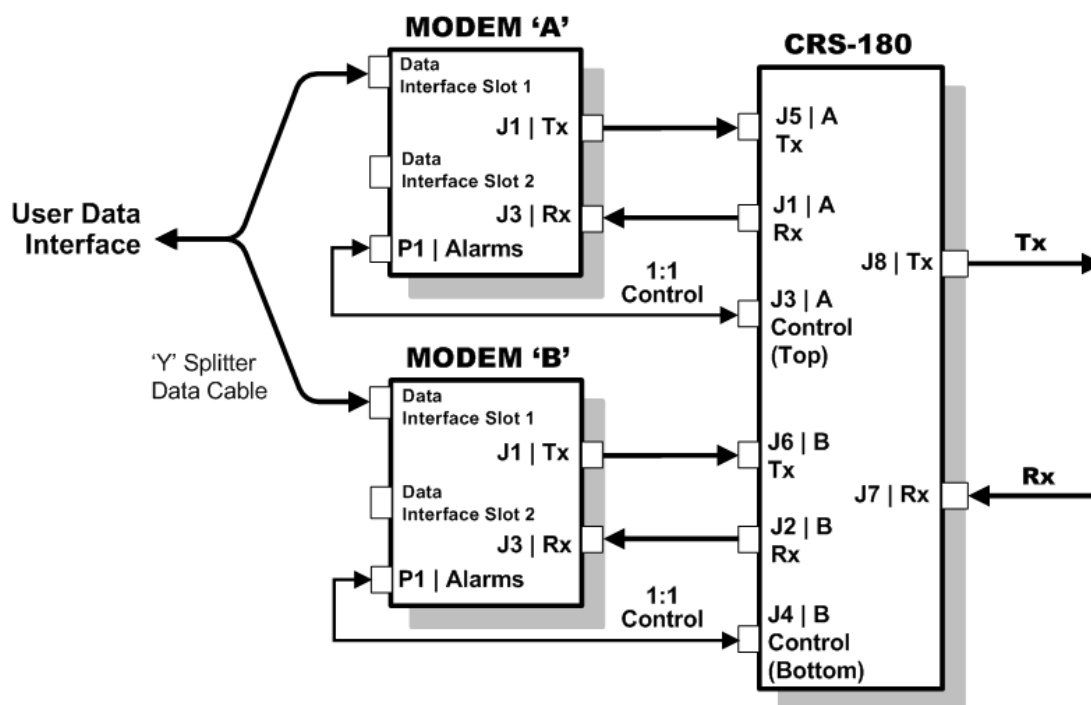


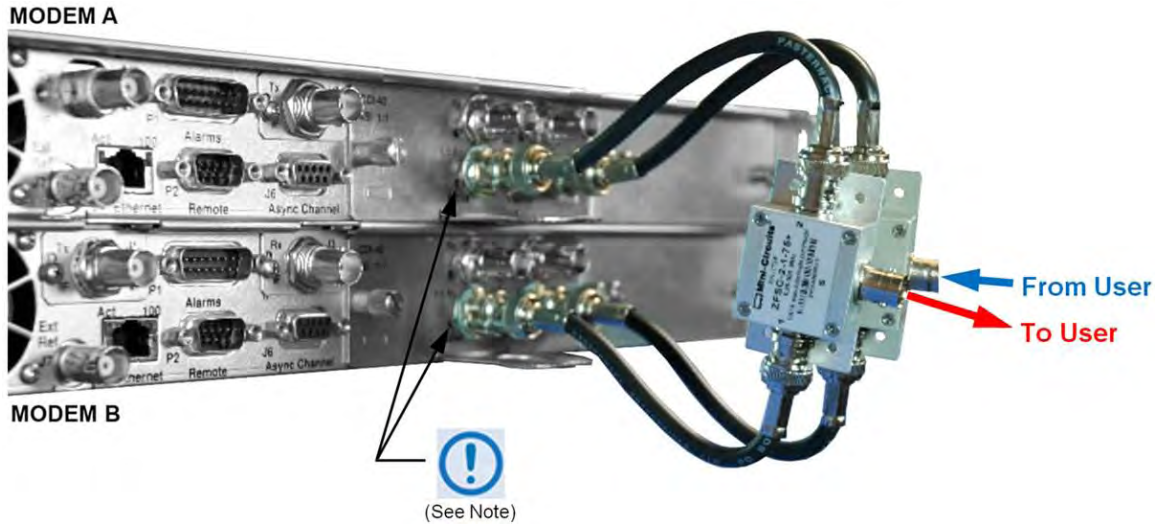
Figure 5-35. CDM-710 Block Diagram – User→Modem→Switch→Traffic

Figure 5-35 shows the block diagram typical for the kits shown in Sects. 5.6.2.1.1 and 5.6.2.1.2. **Separate cabling kits are needed for these CDM-710 data interfaces.** For example, Sect. 5.6.2.1.1 identifies the interface kit used with the CDI-40 ASI Data Interface.

With the exception of the CDI-70 Gigabit Ethernet data interface configuration shown in Sect. 5.5.2.2, which uses user-provided Ethernet cables and Layer 2 Switch, you must use one interface kit per 1:1 modem pair for each interface (see examples for specific quantities).

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

Figure 5-36 shows an example of a CDM-710 1:1 modem configuration with the CDI-40 ASI Data Interface installed in Slot 1, with Slot 2 empty. The figure depicts installation of one KT/12579 ASI Interface Kit.



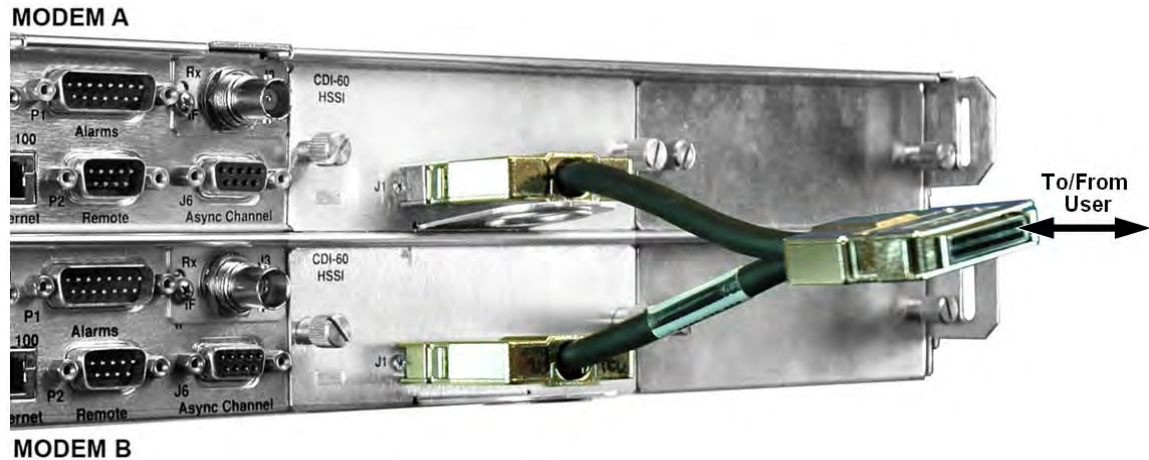
Be sure to connect to the lower BNC connector pair labeled “1:1” on the CDI-40 ASI Data Interface. The Rx port on each interface has been tuned to be 3 dB higher amplitude to compensate for the presence of the RF/SA32KC-IN/OUT 2-way combiner.

KT/12579 ASI (CDI-40) 75Ω Interface Kit		
CEFD P/N	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 5-36. CDM-710 CDI-40 ASI 1:1 Example

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

Figure 5-37 shows an example of a CDM-710 1:1 modem configuration with the CDI-60 HSSI Data Interface installed in Slot 1, with Slot 2 empty. The figure depicts installation of one KT/12578 HSSI Interface Kit.



KT/12578 HSSI (CDI-60) Interface Kit		
CEFD P/N	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M→HD-50F, 3"

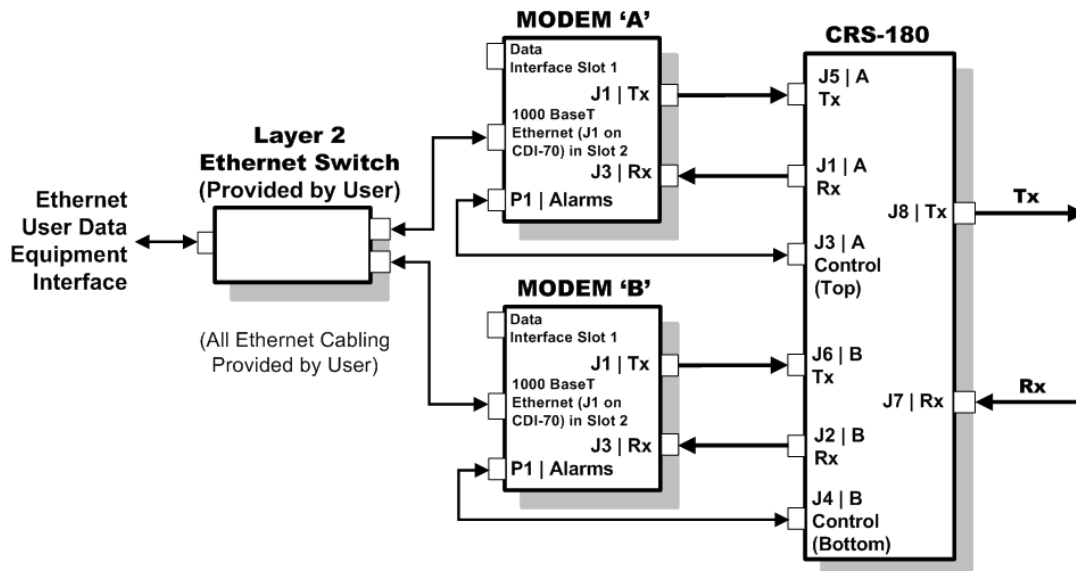
Figure 5-37. CDM-710 CDI-60 HSSI 1:1 Example

5.6.2.2 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.comtecheftdata.com).

Figure 5-38 shows the block diagram and cabling example of a CDM-710 1:1 modem configuration with a CDI-70 Gigabit Ethernet Data Interface in Slot 2, 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 Block Diagram – Gigabit Ethernet (GigE) Interface User→Modem→Switch→Traffic

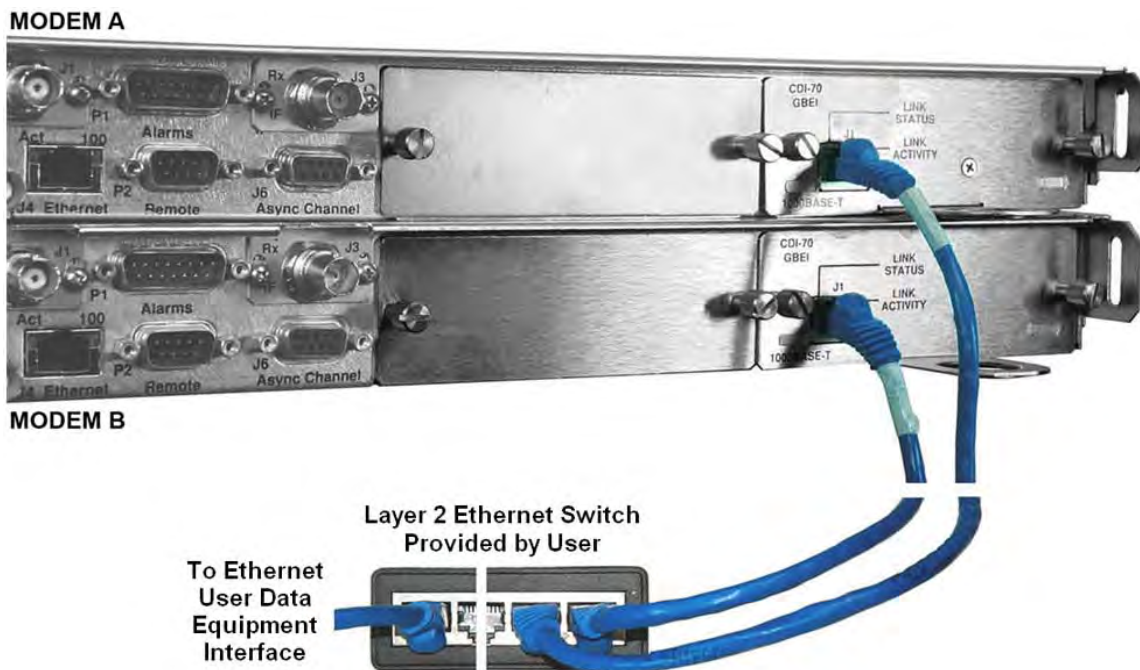


Figure 5-38. CDM-710 CDI-70 Gigabit Ethernet (GigE) 1:1 Example

5.7 Cabling to the CDM-700



1) For information on configuring the CRS-180 70/140 MHz IF 1:1 Redundancy Switch with the CDM-700 Satellite Modems for 1:1 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 and cable assemblies specified in this section, see Appendix A. CABLE DRAWINGS

5.7.1 CRS-180 → CDM-700 Control and IF Interface Connections Using Cabling Kit KT/12554



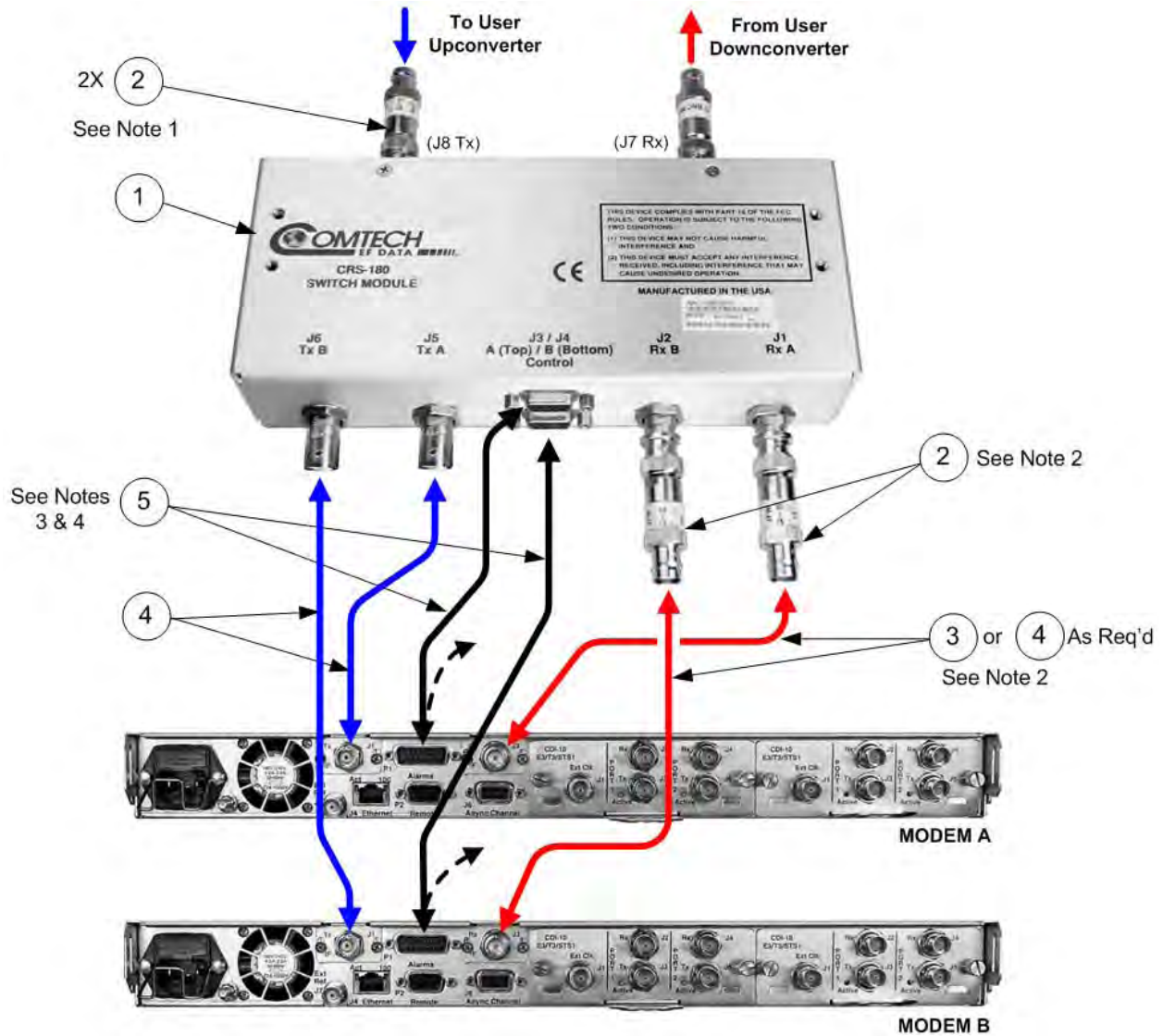
You must order terrestrial data interface components/kits separately. See Sect. 5.7.2 for more information.

You must use the Comtech EF Data KT/12554 CRS-180 70/140 MHz IF 1:1 Redundancy Kit for your control and IF connections. **Figure 5-39** shows these Switch-to-Modem control and IF interface connections.



Figure 5-39 NOTES:

- 1) Use of the XF/BNC-MF-50-75 transformers (Item 2) is required on the 'J7 | Rx' and 'J8 | Tx' connectors, located on the antenna side of the switch, when you supply a 75Ω Rx/Tx connection.
- 2) Use of the XF/BNC-MF-50-75 transformers (Item 2) on the Rx A and Rx B ports, located on the modem side of the switch, is dependent on the CDM-700's factory configuration for 50Ω or 75Ω Rx operability. If the modems in use are configured as 50Ω Rx units, the transformers will not be used on the Rx side and the 50Ω cable (Item 4) will be used in place of the 75Ω cable (Item 3).
- 3) To provide User access to modem "Fault Summary Relay," Control 'Y' Cable CA/WR13011-4, sold separately, is available for use in place of the CA/WR12135-1 cable.
- 4) 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, sold separately, is available for use in place of the CA/WR12135-1 cable.



KT/12554 70/140 MHz IF 1:1 Redundancy Kit			
Item	CEFD P/N	Qty	Description
1	PL/11560-1	1	Top Assy, CRS-180 70/140 MHz IF 1:1 Redundancy Switch
2	XF/BNC-MF-50-75 ^{Notes 1,2}	4	Transformer, 50-75Ω, 2-200 MHz, BNC, M/F
3	PL/0813-4 ^{Note 2}	2	Cable, Special, IF BNC, 75Ω
4	PL/0946-1 ^{Note 2}	4	Cable, Special, IF BNC, 50Ω
5	CA/WR12135-1 ^{Notes 3, 4}	2	Cable Assy, Control Adapter RoHS-Compliant

Figure 5-39. CDM-700 Switch-to-Modem Control & IF Connections – KT/12554

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

In addition to the basic Modem-to-Switch 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 155MB Copper (CDI-50-1)	None
	None
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)
	GigE (CDI-70)

5.7.2.1 Modem-to-User Non-IP Data Interface Kit and Connection

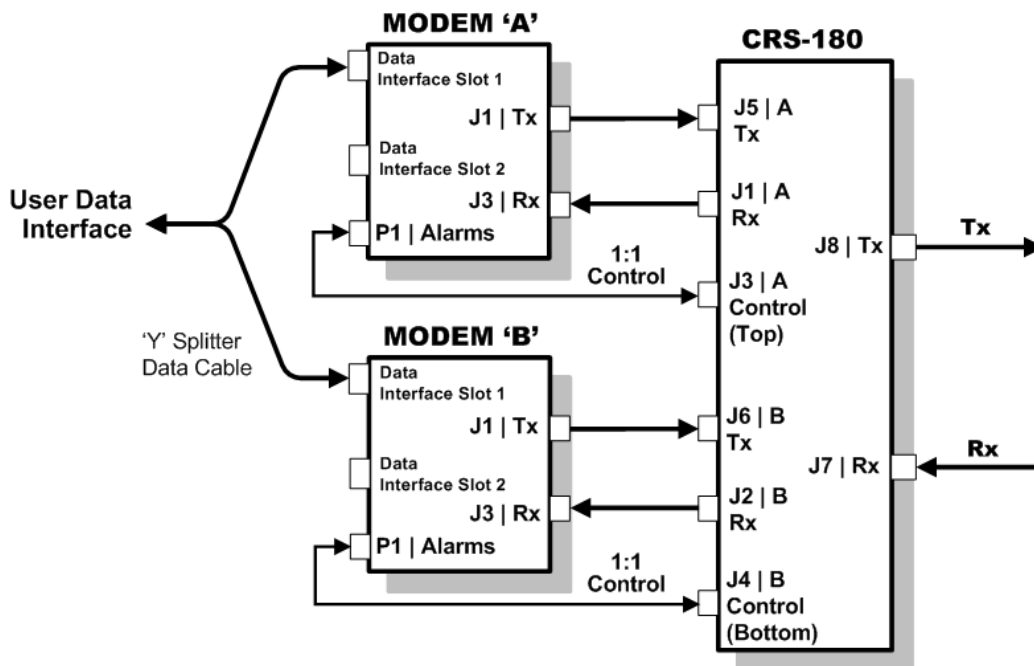


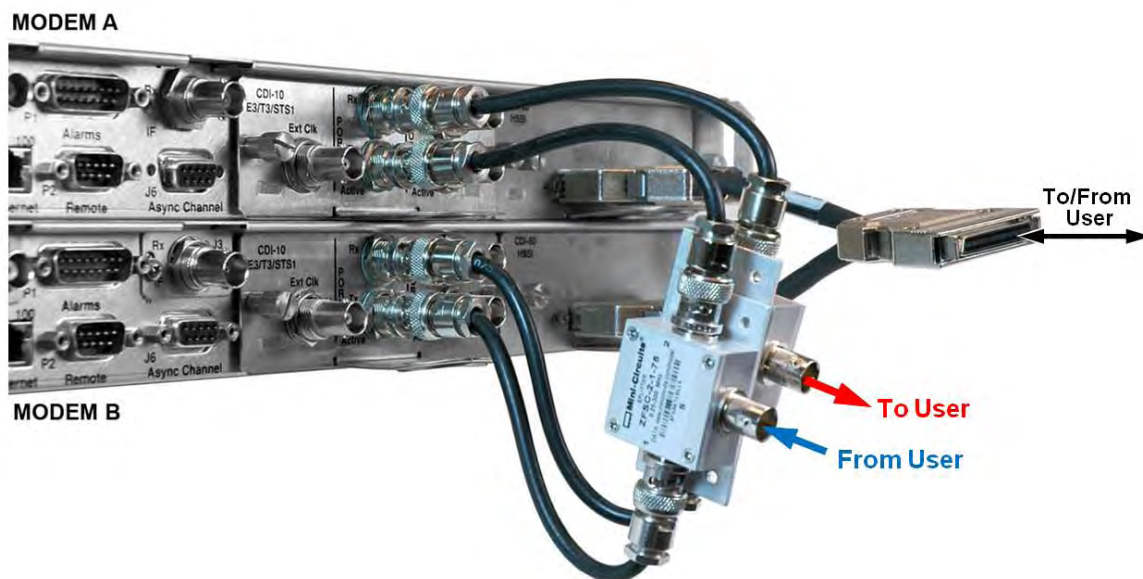
Figure 5-40. CDM-700 Block Diagram – User→Modem→Switch→Traffic

Figure 5-40 shows the block diagram typical for the kits shown in **Sects. 5.7.2.1.1** through **5.7.2.1.3**. **Separate interface cabling kits are needed for these CDM-700 data interfaces**. For example, **Sect. 5.7.2.1.1** identifies the interface kits used with the CDI-10 Dual G.703 E3/T3/STS-1 and the CDI-60 HSSI Data Interfaces.

With the exception of the CDI-70 Gigabit Ethernet Data Interface configuration shown in **Sect. 5.7.2.2**, where user-provided Ethernet cables and Layer 2 Switch are used, one interface kit per 1:1 modem pair is required for each user interface (see examples for specific quantities).

5.7.2.1.1 Dual G.703 E3/T3/STS-1 75Ω Data Interface (CDI-10) Kit KT/12542 and HSSI Data Interface (CDI-60) Kit KT/12578

Figure 5-41 shows an example of a CDM-700 1:1 modem 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/12542 Dual G.703 Interface Kit (each kit can supply one or two CDI-10 interfaces), and one KT/12578 HSSI Interface Kit.



KT/12542 G.703 (CDI-10) 75Ω Interface Kit		
CEFD P/N	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/12578 HSSI (CDI-60) Interface Kit		
CEFD P/N	Qty	Description
PP/SC3523	1	Cable - RoHS-Compliant, HSSI 'Y' Splitter, (2X) HD-50M→HD-50F, 3"

Figure 5-41. CDM-700 CDI-10 G.703 E3/T3/STS-1, CDI-60 HSSI 1:1 Example

5.7.2.1.2 155MB Copper Data Interface (CDI-50) Kit KT/12579

Figure 5-42 shows an example of a CDM-700 1:1 modem configuration with a CDI-50 Data Interface installed in Slot 1 for use with 155MB Copper data, with Slot 2 empty. This figure depicts installation of one KT/12579 155MB Copper Interface Kit – each kit can supply one or two CDI-50 interfaces.



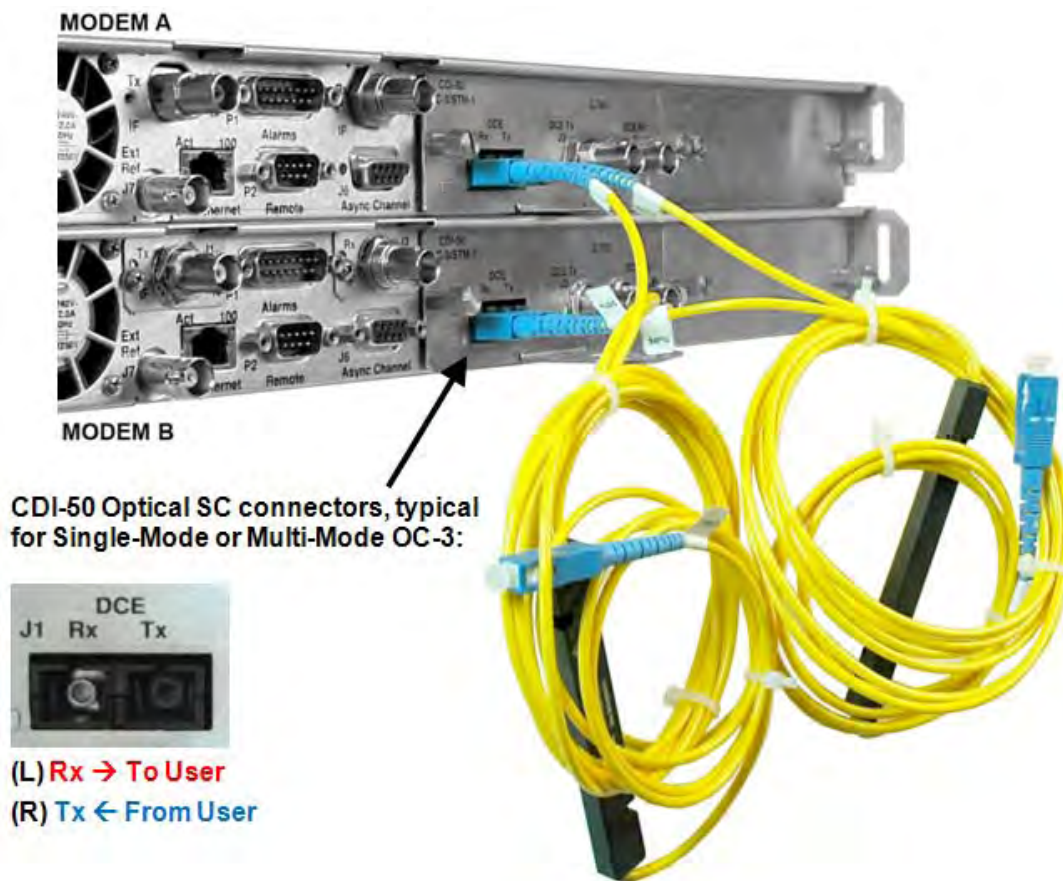
KT/12579 155MB Copper (CDI-50) Interface Kit		
CEFD P/N	Qty	Description
CA/BNC75OHM	4	Cable – IF BNC, 75Ω, 1'
RF/SA32KC-IN/OUT	2	Combiner – 2-way w/Bracket, 0.25-300 MHz, 75Ω BNC

Figure 5-42. CDM-700 CDI-50 155MB Copper 1:1 Example

5.7.2.1.3 OC-3 Data Interface (CDI-50) Kits KT/12580 (Single-Mode) or KT/12581 (Multi-Mode)

Figure 5-43 shows a CDM-700 1:1 modem configuration with installation of one CDI-50 data interface installed in Slot 1 for use with OC-3 data, 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/12580 OC-3 Single-Mode Interface Kit features **yellow** cables.
- The KT/12581 OC-3 Multi-Mode Interface Kit features **orange** cables.



KT/12580 OC-3 Single-Mode (CDI-50) Interface Kit		
CEFD P/N	Qty	Description
PP/CPS2A12501	2	Cable Assy – RoHS-Compliant, Optical Coupler, SC/UPC Connectors
OR		
KT/12581 OC-3 Multi-Mode (CDI-50) Interface Kit		
CEFD P/N	Qty	Description
PP/CPM6A1250	2	Cable Assy – RoHS-Compliant, Optical Coupler, SC/UPC Connectors

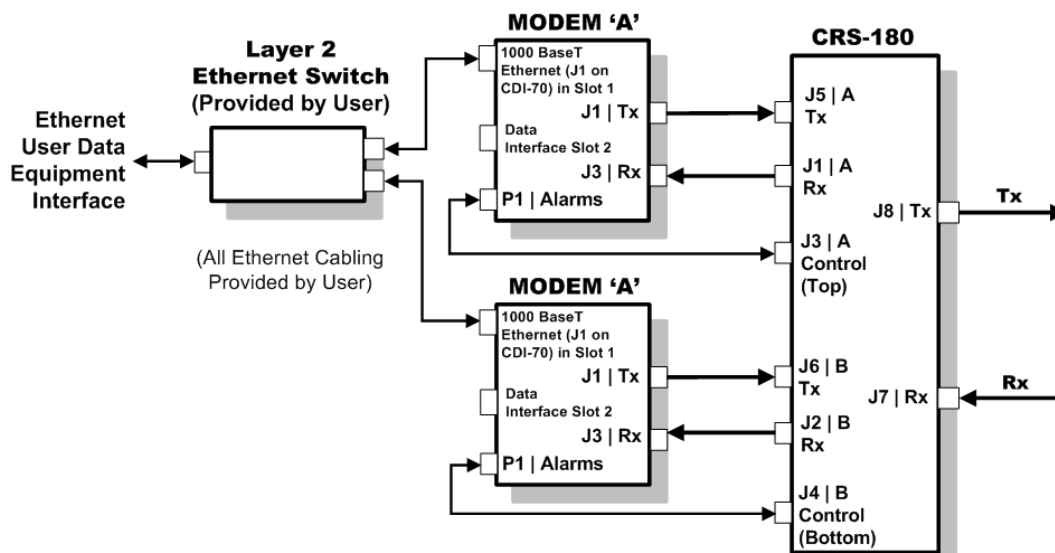
Figure 5-43. CDM-700 CDI-50 OC-3 1:1 Example (Single-Mode shown)

5.7.2.2 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.comtecheftdata.com).

Figure 5-44 shows an example of a CDM-700 1:1 modem configuration with a CDI-70 Gigabit Ethernet Data Interface installed in Slot 1, 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-700 Block Diagram – Gigabit Ethernet (GigE) Interface User→Modem→Switch→Traffic

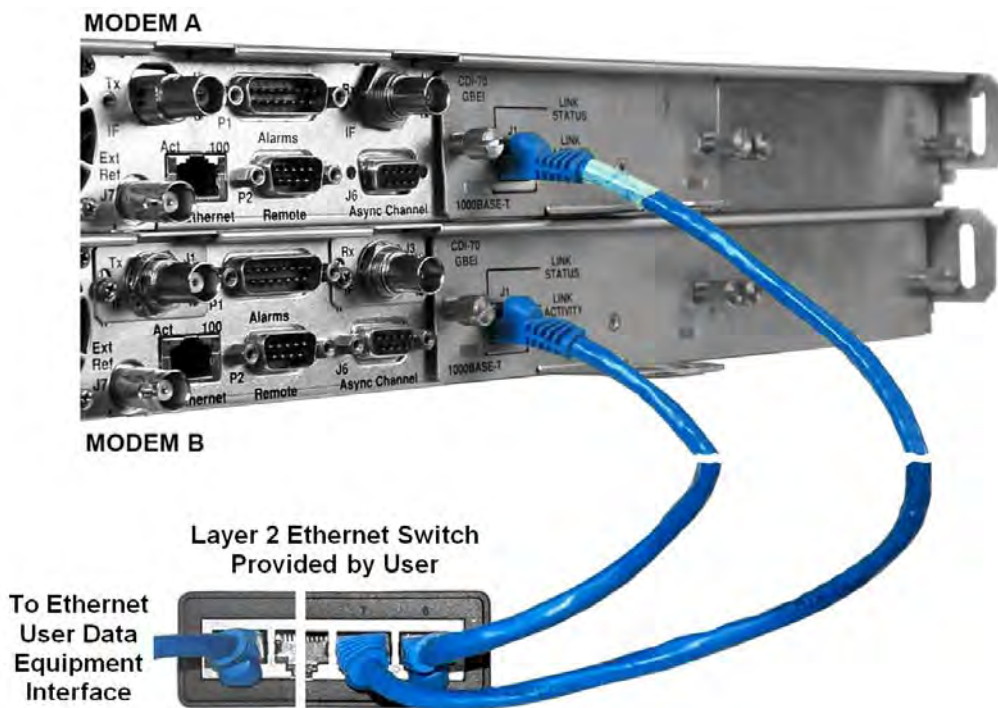


Figure 5-44. CDM-700 CDI-70 Gigabit Ethernet (GigE) 1:1 Example

Appendix A. CABLE DRAWINGS

A.1 Overview

This appendix provides technical specification drawings for the cables used with the CRS-180 70/140 MHz IF 1:1 Redundancy Switch. These cables are divided into two categories – **Control Interface Cables (Section A.2)**, and **IF/Data Interface Cables (Section 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.

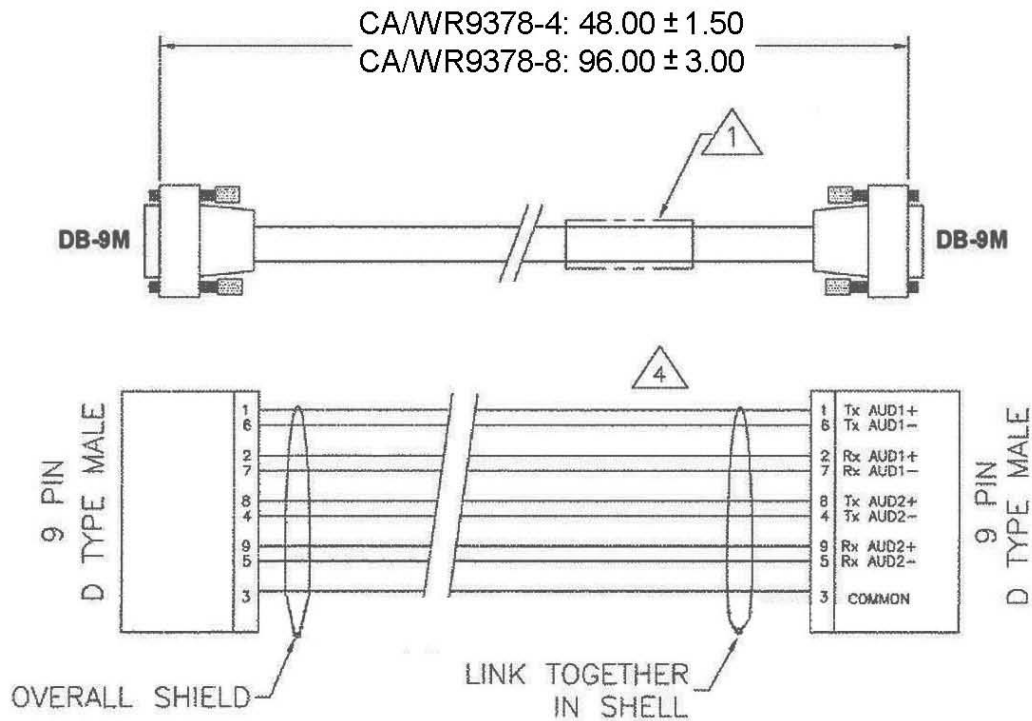
A.2 Control Interface Cables

App. A FIG	CABLE CEFD P/N	DESCRIPTION	USED WITH CRS-180 →	USED FOR (TYPE)	REF Ch. 5 FIG
A-1	CA/WR9378-4	Universal Control Cable, DB-9M→DB-9M, 4' 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	CDM-625/A	1:1 Control	5-1
			CDM-760/-750		5-17
			CDM-570/A		5-22
A-2	CA/WR12135-1	Adapter Control Cable (RoHS), DB-15F→DB-9M, 6'	CDM-710G	1:1 Control	5-29
			CDM-710		5-34
			CDM-700		5-39
A-3	CA/WR13011-4	Optional 'Y' Splitter Adapter Control Cable, DB-15F→DB-9M (4'), DB-9M (6") (Alternate to CA/WR12135-1)	CDM-710G	1:1 Control, Summary Fault Relay	5-29
			CDM-710		5-34
			CDM-700		5-39
A-4	CA-0000187	Optional Non-muting Control Cable, DB-15F→DB-9M, 6' (Alternate to CA/WR12135-1)	CDM-710G	1:1 Control (Non-mute Tx IF)	5-29
			CDM-710		5-34
			CDM-700		5-39

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



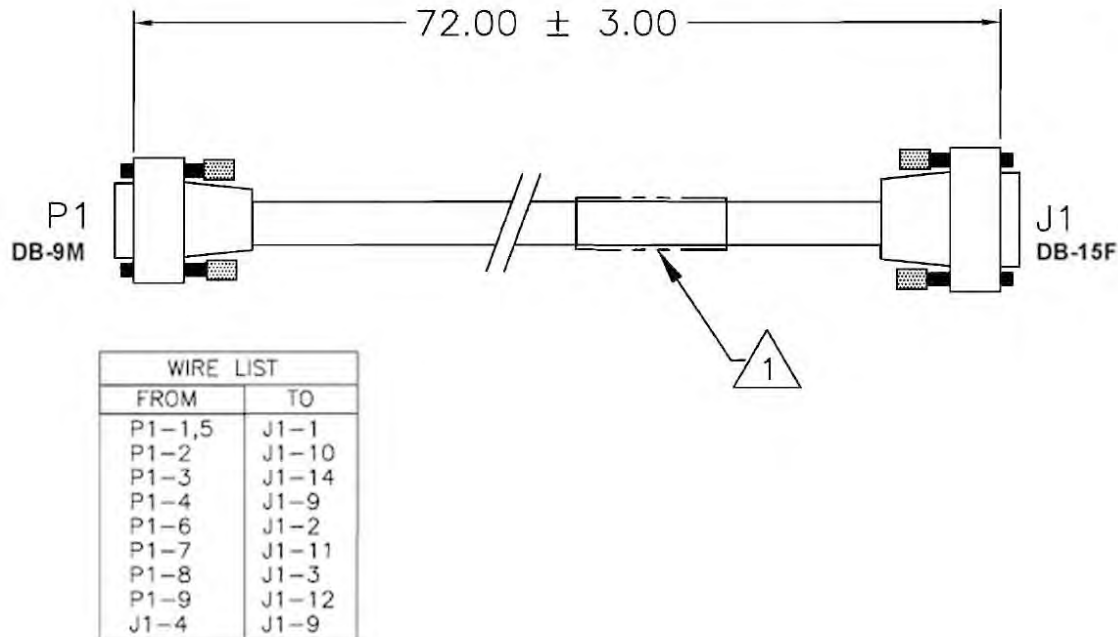
NOTES: UNLESS OTHERWISE SPECIFIED:

1. IDENTIFY CABLE PART NUMBER AND REV LEVEL USING LABEL OR STICKER.
2. REFER TO MN/4905 FOR DETAILED INSTRUCTIONS REGARDING EMI ASSEMBLY PROCESS.
3. ENSURE SHIELDING FOIL AND/OR BRAID IS BONDED TO METAL BACKSHELL FOR EMI SHIELDING.
4. PAIR UP TWISTED PAIRS AS SHOWN ON DRAWING. WIRE REMAINING TWISTED PAIRS STRAIGHT THRU.

INDICATORS		
9M	NOTES	9M
1	TO	1
2	TO	2
3	TO	3
4	TO	4
5	TO	5
6	TO	6
7	TO	7
8	TO	8
9	TO	9

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

A.2.2 Switch-to-Modem, Adapter Control Cable, RoHS, DB-9M→DB-15F



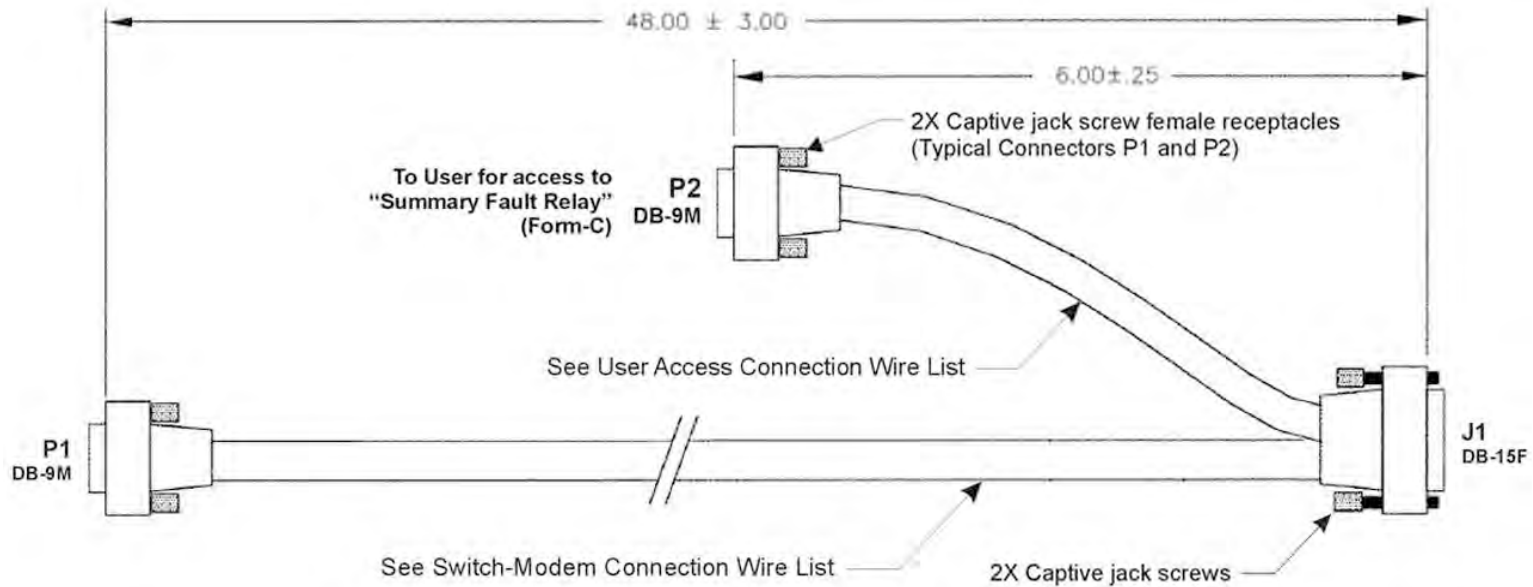
NOTES: UNLESS OTHERWISE SPECIFIED:

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.

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.

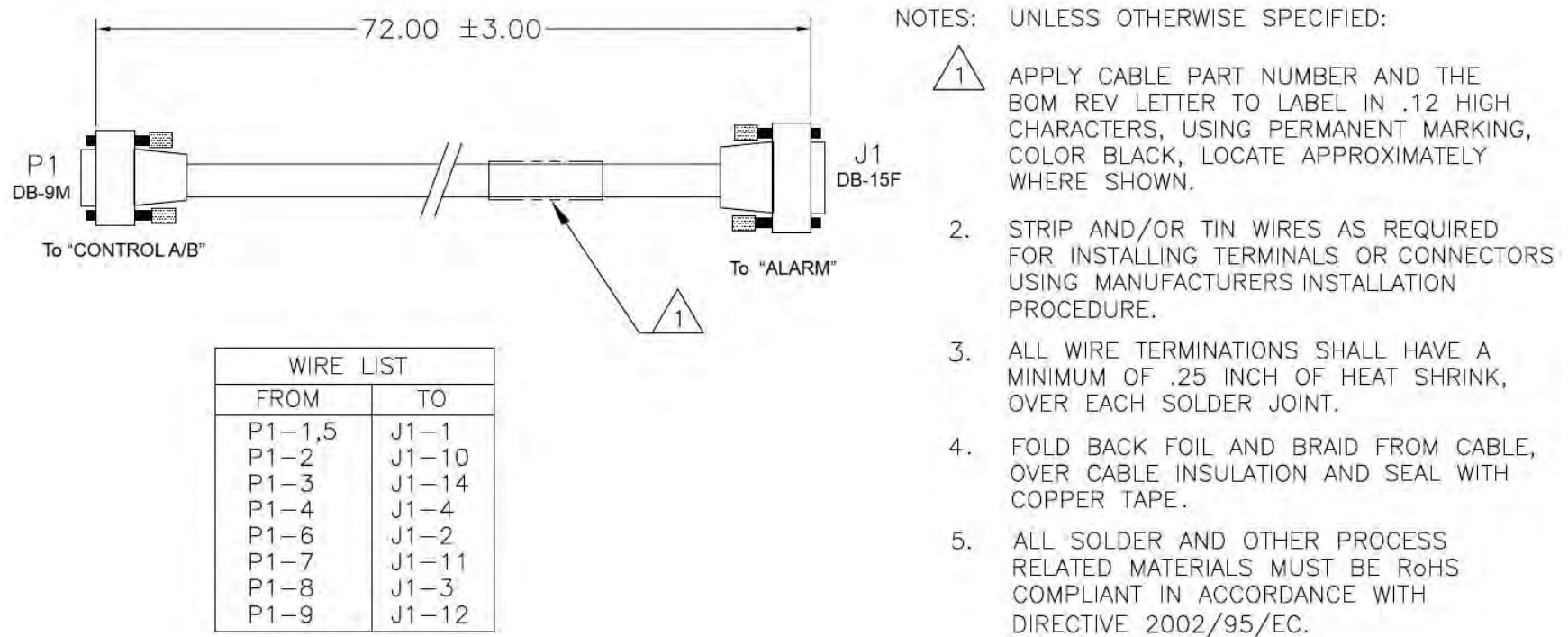


Figure A-4. Optional Control Cable (CA-0000187)

A.3 IF / Data Interface Cables

App. A FIG	CABLE CEFD P/N	DESCRIPTION	USED FOR (TYPE)	USED WITH CRS-180 →	REF Ch. 5 FIG
A-5	PL/0946-1	Cable – RoHS Coaxial, BNC 50Ω, 4'	Modem → Switch IF Interface	CDM-625/A	5-2
				CDM-710G	5-29
				CDM-710	5-34
				CDM-700	5-39
				CDM-570/A	5-23
A-6	CA/BNC75OHM	Cable – RoHS Coaxial, BNC 75Ω, 1'	G.703 Unbalanced Data Interface	CDM-625/A	5-8
			ASI Data Interface	CDM-625/A	5-9
			Single G.703 E3/T3 PIIC Data Interface	CDM-760/-750	5-21
			Single G.703 E3/T3/STS-1 Data Interface	CDM-710G	5-31
			ASI Data Interface	CDM-710	5-36
			Dual G.703 E3/T3/STS-1 Data Interface	CDM-700	5-41
			155MB Copper Data Interface	CDM-700	5-42
			G.703 Unbalanced Data Interface	CDM-570/A	5-27
A-7	CA/RB10461-1	Cable – 1:1 Y-Splitter, DB-25F, 1" →(2X) DB-25M, 4"	RS-422/232 Data Interface	CDM-625/A	5-4
			HSSI Data Interface	CDM-625/A	5-5
			RS-422/232 Data Interface	CDM-570/A	5-25
A-8	CA-0000071	Cable – 1:1 'Y' Splitter, DB-9F →(2X) DB-9M, 8"	Quad E1 Data Interface	CDM-625/A	5-6
			G.703 Balanced Data Interface	CDM-625/A	5-7
			ESC Data Interface	CDM-625/A	5-11
A-9	CA-0000163	Optional Cable – 1:1 'Y' Splitter, DB-9M, 6" → (2X) DB-15F	Quad E1 Data Interface	CDM-625/A	5-6
A-10	CA-0000164	Optional Cable – 1:1 'Y' Splitter, DB-9M, 6" → (2X) RJ-48F		CDM-625/A	5-6
A-11	KT-0000122	Optional Cable Kit – 1:1 'Y' Splitter, DB-9M, 6" →(4X) BNC		CDM-625/A	5-6
A-12	CA-0000070	Cable – 1:1 'Y' Splitter, HD-44F, 8" →(2X) HD-44M	Overhead Data Interface	CDM-625/A	5-10
A-13	CA-0000276	Cable – Shielded, Multi-drop CnC® Plus, 1:1, DB-9M →DB-9M, 1'	PMSI/CnC® Data Interface	CDM-625/A	5-16

App. A FIG	CABLE CEFD P/N	DESCRIPTION	USED FOR (TYPE)	USED WITH CRS-180 →	REF Ch. 5 FIG
A-14	PL/0813-4	Cable – RoHS Coaxial, BNC 75Ω → BNC 75Ω, 4'	Modem → Switch IF Interface	CDM-760/-750	5-17
				CDM-710G	5-29
				CDM-710	5-34
				CDM-700	5-39
A-15	CA-0000560	Cable Assy – RoHS, Optical Coupler, 2m (6.56'), LC Connectors	Optical Gigabit Ethernet Single-Mode Data Interface	CDM-760/-750	5-19
	CA-0000559	Cable Assy – RoHS, Optical Coupler, 2m (6.56'), LC Connectors	Optical Gigabit Ethernet Multi-Mode Data Interface		
A-16	CAWR10522-1	Cable – 1:1 'Y' Splitter, (2X) DB-15M → DB-15F, 5"	G.703 Balanced Data Interface	CDM-570/A	5-26
A-17	PP/SC3523	Cable Assy – RoHS, HSSI 'Y' Splitter, HD-50F(2X) → HD-50M, 3"	HSSI Data Interface	CDM-710G	5-32
				CDM-710	5-37
				CDM-700	5-41
A-18	PP/CPS2A12501	Cable Assy – RoHS, Optical Coupler, 7' Type 'SC/UPC' Connectors	OC-3 Single-Mode Data Interface	CDM-700	5-43
	PP/CPM6A1250	Cable Assy – RoHS, Optical Coupler, 7' Type 'SC/UPC' Connectors	OC-3 Multi-Mode Data Interface	CDM-700	

A.3.1 Switch-to-Modem / Modem-to-User, Coaxial Cable, RoHS, BNC 50Ω

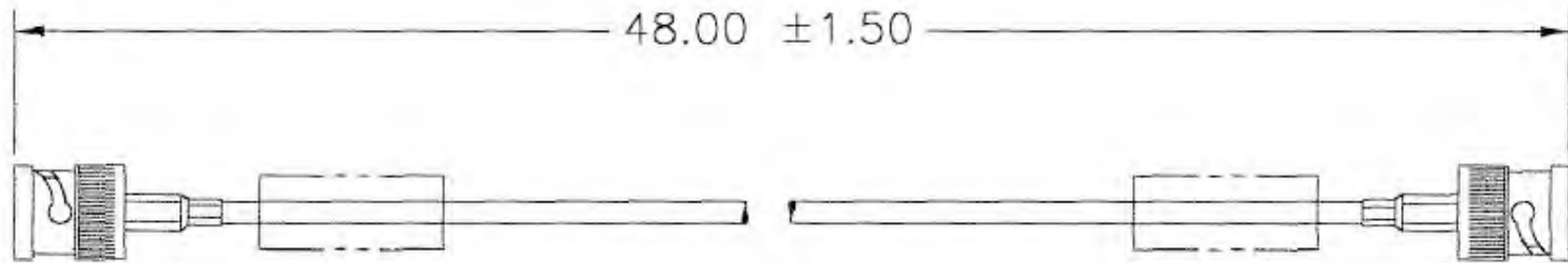


Figure A-5. Tx/Rx BNC 50Ω RoHS Coaxial Cable (PL/0946-1)

A.3.2 Switch-to-Modem / Modem-to-User, Coaxial Cable, RoHS, BNC 75Ω

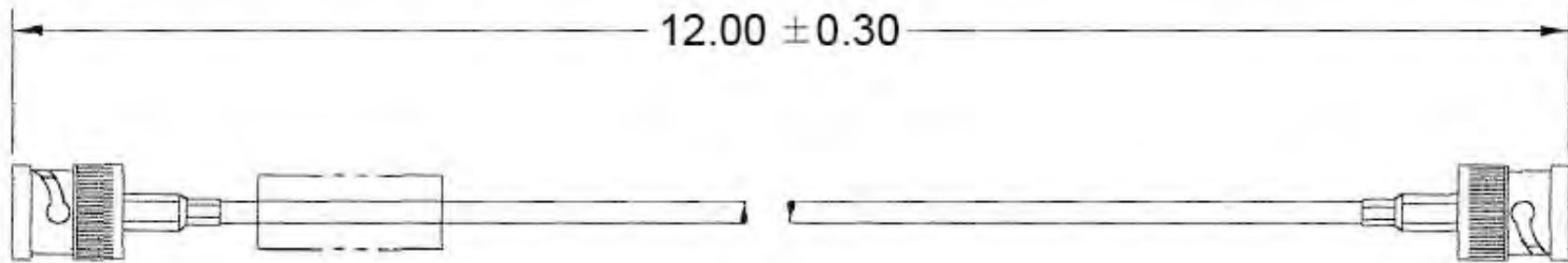
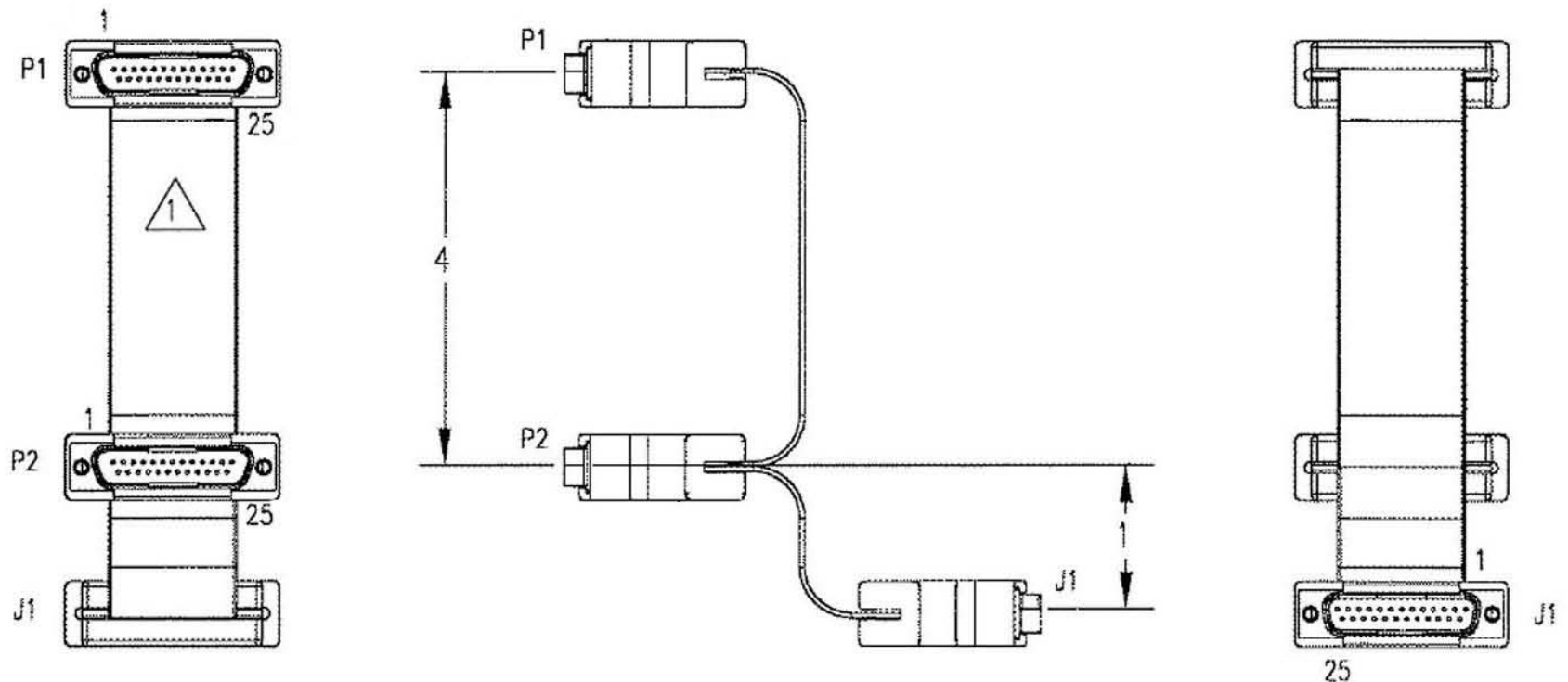


Figure A-6. User Data BNC 75Ω RoHS Coaxial Cable (CA/BNC75OHM)

A.3.3 Modem-to-User, Splitter Cable, DB-25F→(2X) DB-25M



NOTES: UNLESS OTHERWISE SPECIFIED.


-  APPLY CABLE PART NUMBER AND REVISION LEVEL FROM PARTS LIST IN .12 HIGH CHARACTERS USING PERMANENT MARKING. LOCATE APPROX. WHERE SHOWN.
- ALL SOLDER AND OTHER PROCESS RELATED MATERIALS MUST BE RoHS COMPLIANT PER DIRECTIVE 2002/95/EC.

Figure A-7. 1:1 User Data Splitter Cable (CA/RB10461-1)

A.3.4 Modem-to-User, CDM-625/A Data 'Y' Splitter Cable, DB-9F→(2X) DB-9M

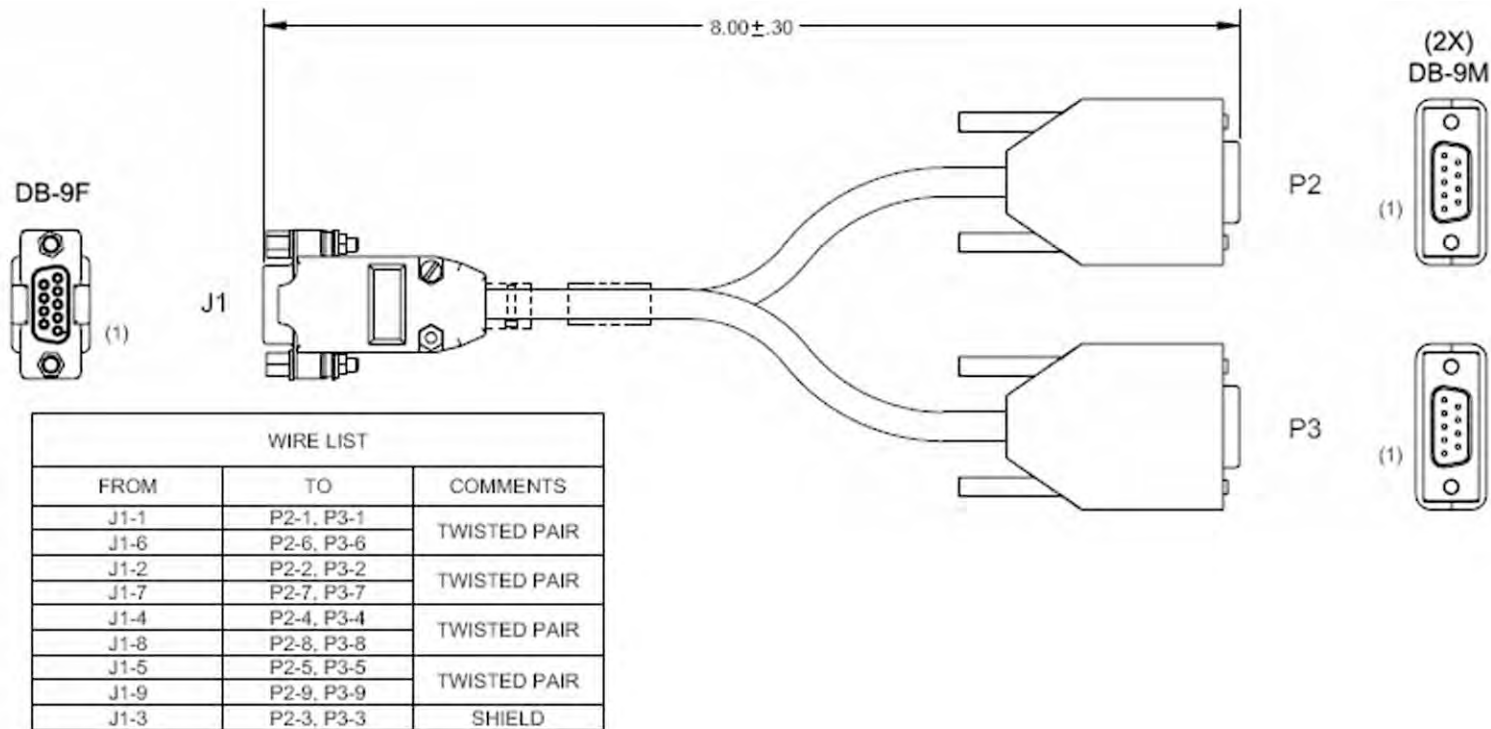


Figure A-8. 1:1 User Data 'Y' Splitter Cable (CA-0000071)

A.3.5 Modem-to-User, Quad E1 ‘Y’ Splitter Adapter Cable, DB-9M→(2X) DB-15F

You may purchase this optional adapter cable 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-000071 ‘Y’ Splitter cable shown in Figure A-8.

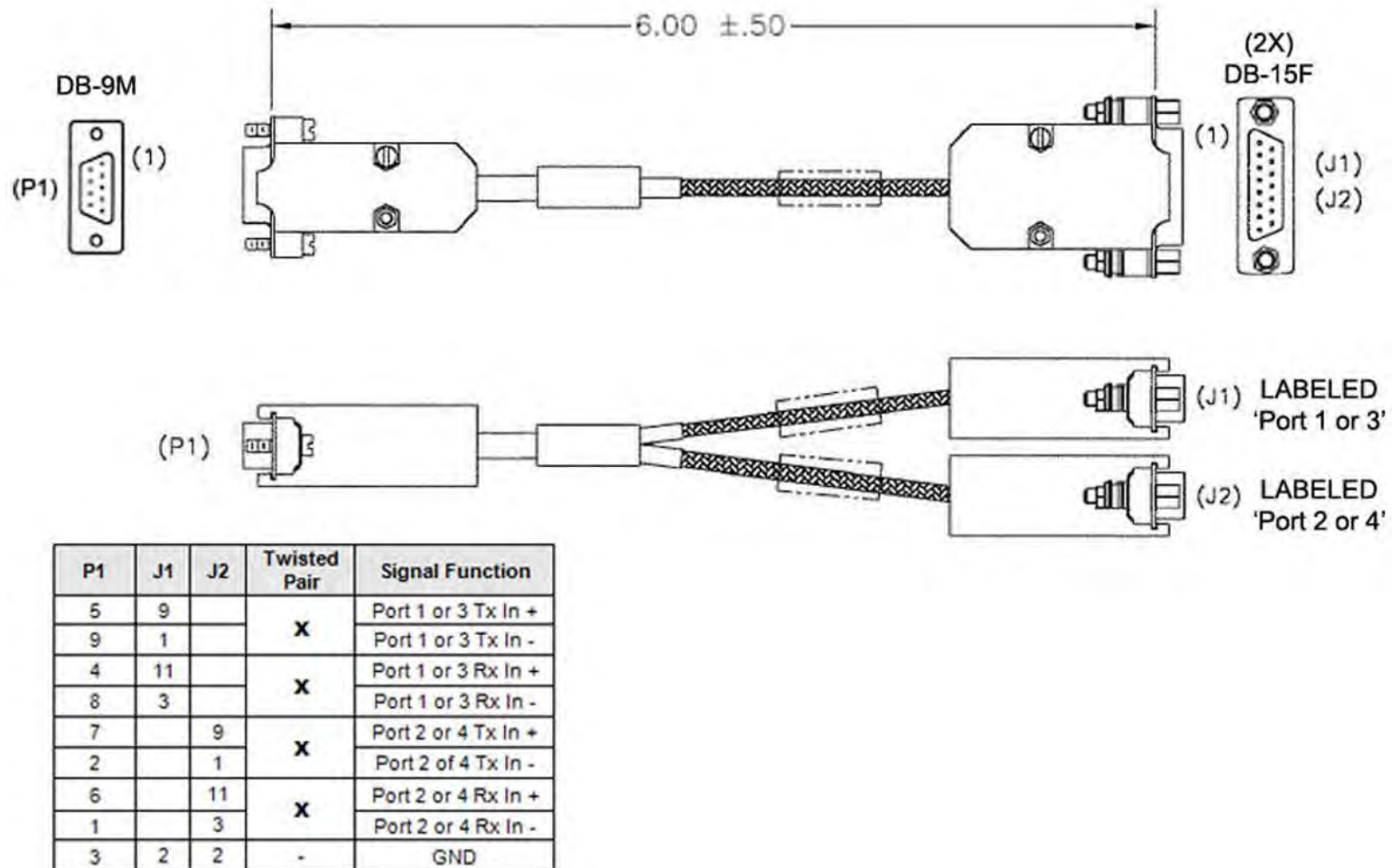


Figure A-9. 1:1 Quad E1 User Data ‘Y’ Splitter Adapter Cable (CA-0000163)

A.3.6 Modem-to-User, Quad E1 ‘Y’ Splitter Adapter Cable, DB-9M→(2X) RJ-48F

You may purchase this optional adapter cable 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**.

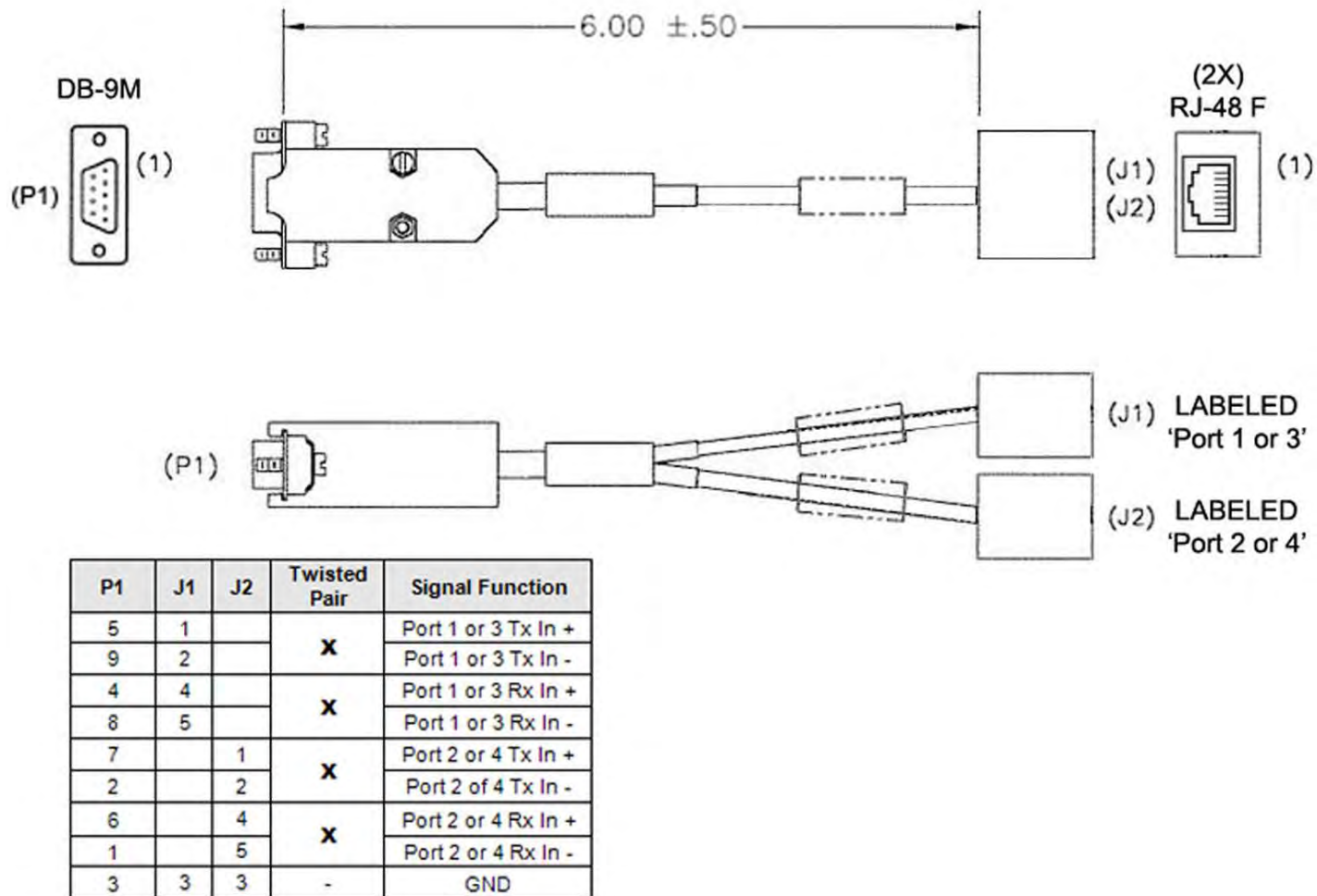
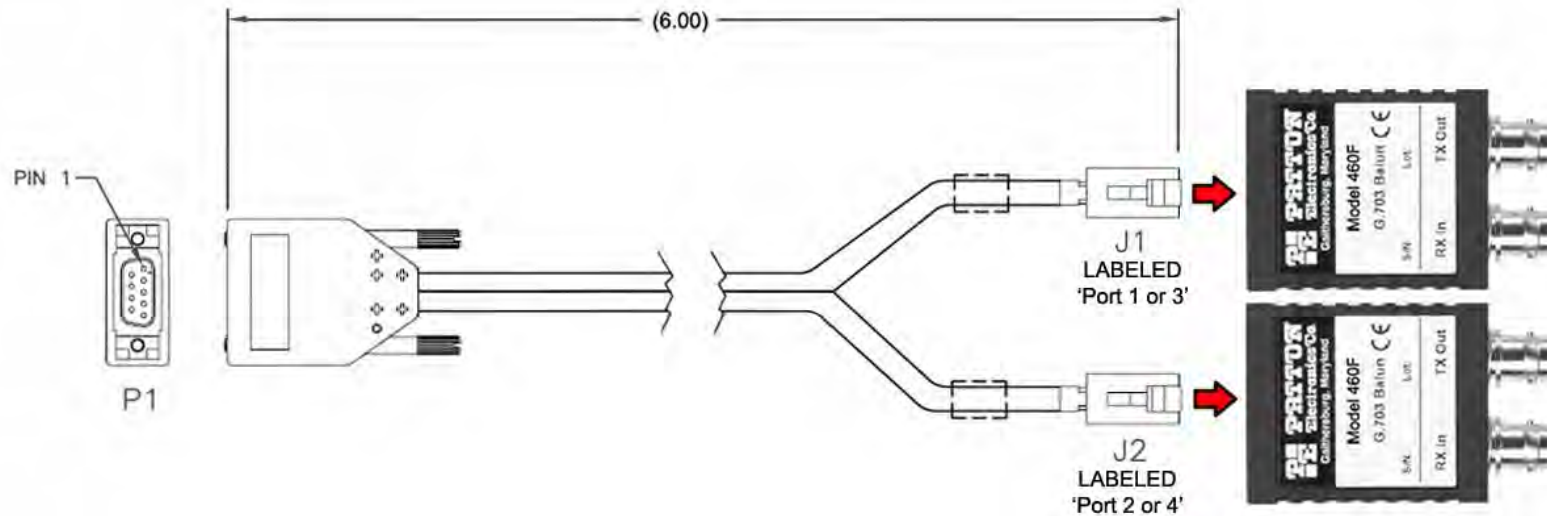


Figure A-10. Quad E1 User Data ‘Y’ Splitter Adapter Cable (CA-0000164)

A.3.7 Modem-to-User, Quad E1 ‘Y’ Splitter Adapter Cable Kit



KT-0000122 Quad E1 Balanced/Unbalanced Adapter Kit		
QTY	CEFD PART NO.	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 or 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-11. Quad E1 User Data ‘Y’ Splitter Adapter Cable Kit (KT-0000122)

A.3.8 Modem-to-User, Overhead User Data ‘Y’ Splitter Cable, HD-44F→(2X) HD-44M

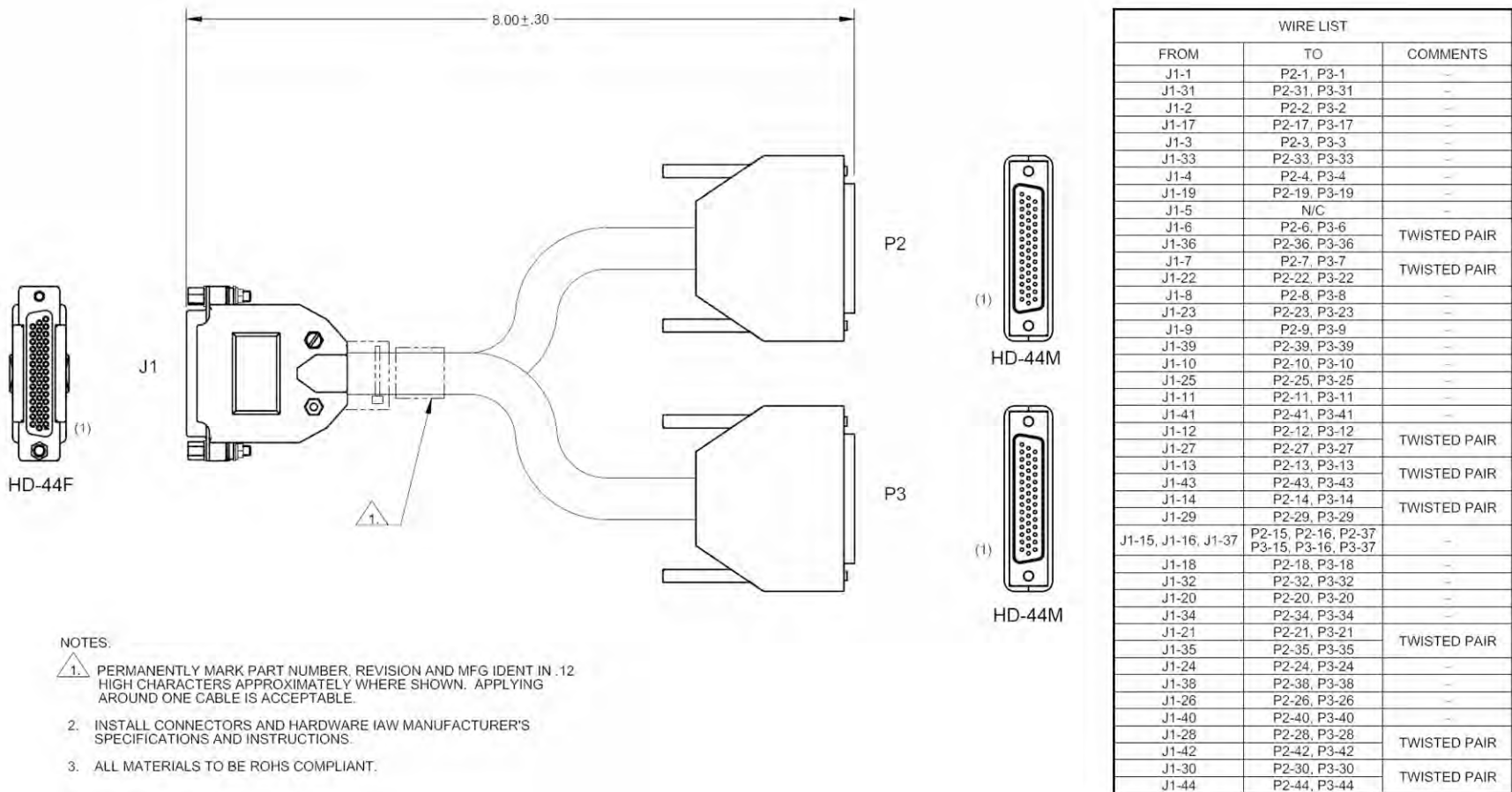


Figure A-12. Overhead User Data ‘Y’ Splitter Cable (CA-000070)

A.3.9 Modem-to-Modem, CDM-625/A Shielded Multi-drop CnC[®] Plus Cable, DB-9M→DB-9M

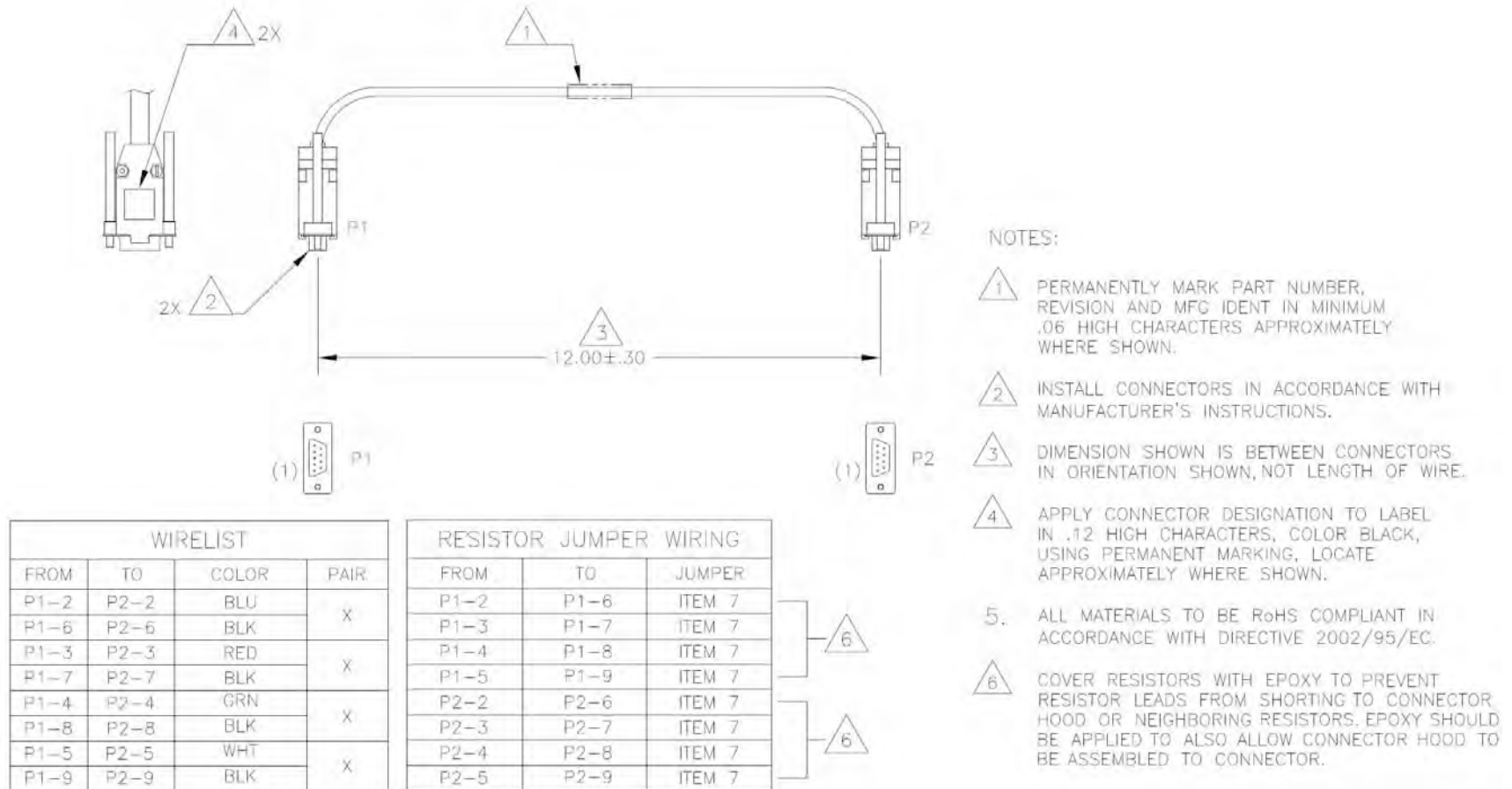


Figure A-13. CDM-625/A Shielded Multi-drop CnC[®] Plus Modem-to-Modem Cable (CA-0000276)

A.3.10 Switch-to-Modem / Modem-to-User, RoHS Coax Cable, BNC 75Ω

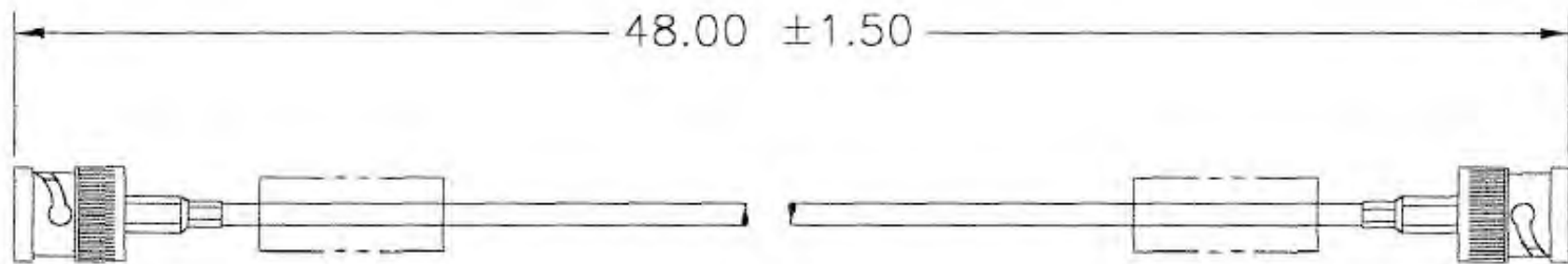


Figure A-14. Tx/Rx BNC 75Ω RoHS Coax Cable (PL/0813-4)

A.3.11 Modem-to-User, Optical Gigabit Ethernet Cable Assemblies, RoHS, Single-Mode OR Multi-Mode, (2X) Type 'LC' → (4X) Type 'LC'

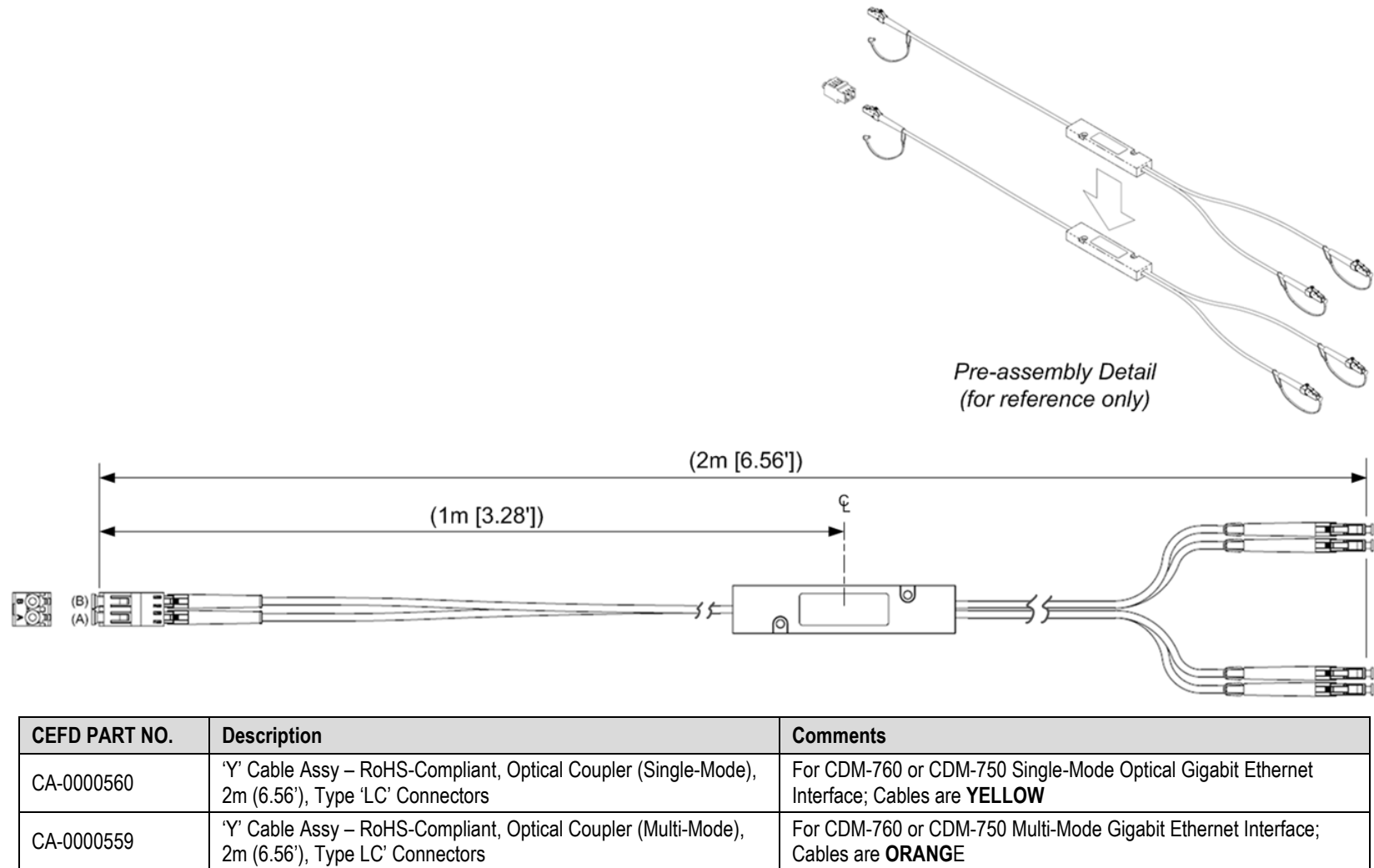
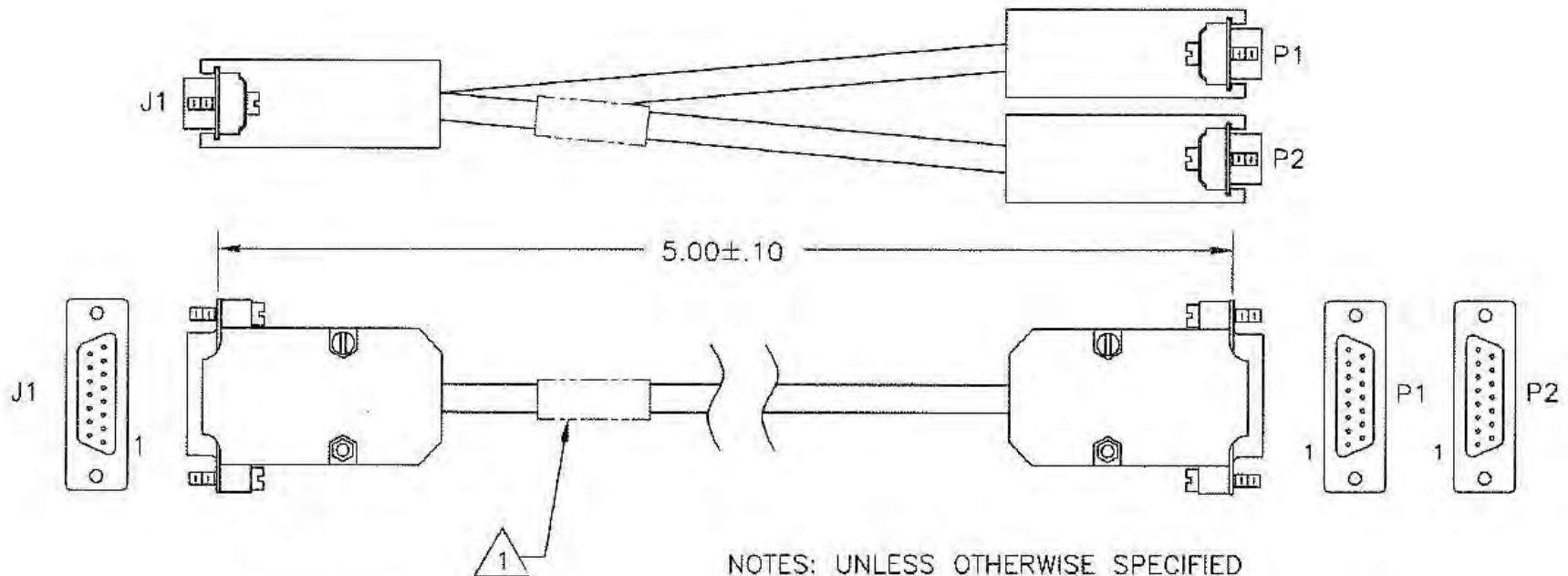


Figure A-15. Optical Gigabit Ethernet User Data Cable Assembly (See Table for CEFD Part No.)

A.3.12 Modem-to-User, G.703 Balanced User Data 'Y' Splitter Cable, DB-15M→(2X) DB-15M



WIRE LIST				
FROM	TO	TO	SIGNAL	PAIR
J1-3	P1-3	P2-3	OUT+	X
J1-11	P1-11	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-16. G.703 Balanced User Data 'Y' Splitter Cable (CA/WR10522-1)

A.3.13 Modem-to-User, HSSI User Data ‘Y’ Splitter Cable, HD-50F→(2X) HD-50M

FROM	TO	SIGNAL	COLOR	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	OPEN	GRN	X
P1-44	P1-44	P2-44	SIG GND	BLU	X
P1-20	P1-20	P2-20		WHT	
P1-45	P1-45	P2-45	OPEN	YEL	X
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	

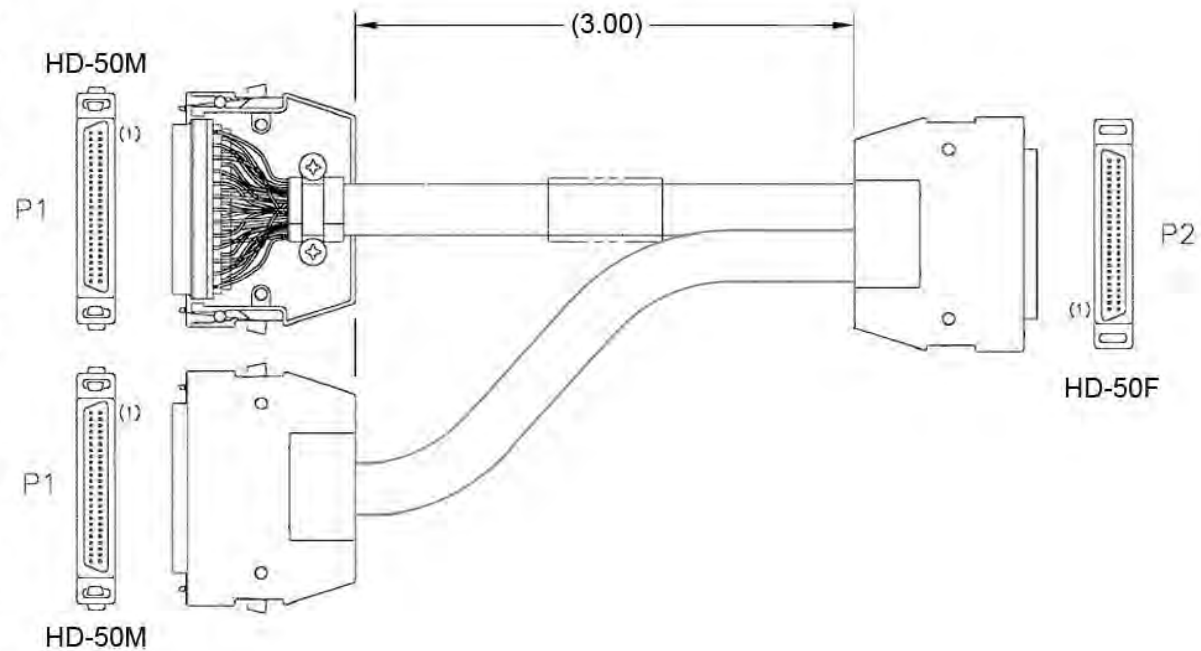
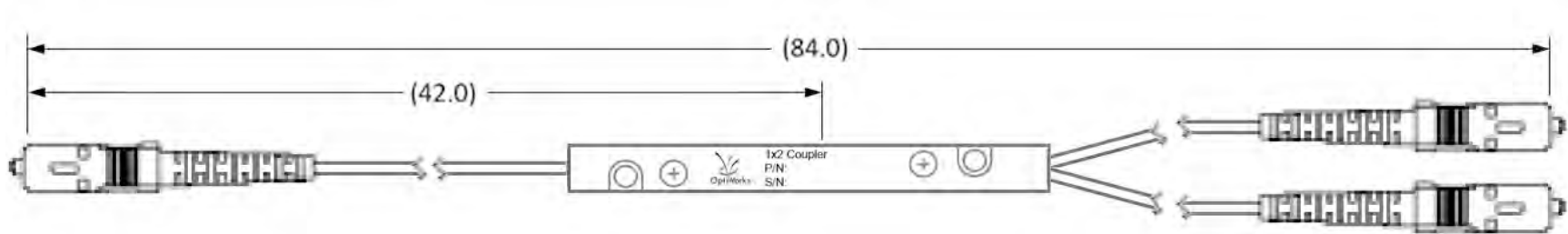


Figure A-17. HSSI User Data ‘Y’ Splitter Cable (PP/SC3523)

A.3.14 Modem-to-User, OC-3 Cable Assemblies, RoHS, Single-Mode OR Multi-Mode, Type ‘SC/UPC’ → (2X) Type ‘SC/UPC’



CEFD PART NO.	Description	Comments
PP/CPS2A12501	'Y' Cable Assy – RoHS-Compliant, Optical Coupler (Single-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 (Multi-Mode), 7', Type 'SC/UPC' Connectors	For CDM-700 Multi-Mode OC-3 Interface; Cables are ORANGE

Figure A-18. OC-3 User Data Cable Assembly (See Table for CEFD Part No.)



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