

RCS11

1:1 Redundancy Switch

Installation and Operation Manual

TM061 Rev. 1.3

March, 1998

- NOTICE -

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Radyne (Seller) warrants the items manufactured and sold by Radyne to be free of defects in material and workmanship for a period of two (2) years from date of shipment. Radyne's obligation under its warranty is limited in accordance with the periods of time and all other conditions stated in all provisions of this warranty.

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WARRANTY PERIOD

The applicable warranty period shall commence on the date of shipment from Radyne's facility to the original purchaser and extend for the stated period following the date of shipment. Upon beginning of the applicable Radyne warranty period, all customer's remedies shall be governed by the terms stated or referenced in this warranty. In-warranty repaired or replacement products or parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced products or parts. Repair or replacement of products or parts under warranty does not extend the original warranty period.

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The following are expressly **not covered** under warranty:

1. Any loss, damage and/or malfunction relating in any way to shipping, storage, accident, abuse, alteration, misuse, neglect, failure to use products under normal operating conditions, failure to use products according to any operating instructions provided by Radyne, lack of routine care and maintenance as indicated in any operating maintenance instructions, or failure to use or take any proper precautions under the circumstances.
2. Products, items, parts, accessories, subassemblies, or components which are expendable in normal use or are of limited life, such as but not limited to, bulbs, fuses, lamps, glassware, etc.

Radyne reserves the right to revise the foregoing list of what is covered under this warranty.

WARRANTY REPLACEMENT AND ADJUSTMENT

Radyne will not make warranty adjustments for failures of products or parts which occur after the specified maximum adjustment period. Unless otherwise agreed, failure shall be deemed to have occurred no more than seven (7) working days before the first date on which a notice of failure is received by Radyne. Under no circumstances shall any warranty exceed the period stated above unless expressly agreed to in writing by Radyne.

LIABILITY LIMITATIONS

This warranty is expressly in lieu of and excludes all other express and implied warranties, including but not limited to warranties of merchantability and of fitness for particular purpose, use, or applications, and all other obligations or liabilities on the part of Radyne, unless such other warranties, obligations, or liabilities are expressly agreed to in writing by Radyne.

All obligations of Radyne under this warranty shall cease in the event its products or parts thereof have been subjected to accident, abuse, alteration, misuse or neglect, or which have not been operated and maintained in accordance with proper operating instructions.

In no event shall Radyne be liable for incidental, consequential, special or resulting loss or damage of any kind howsoever caused. Radyne's liability for damages shall not exceed the payment, if any, received by Radyne for the unit or product or service furnished or to be furnished, as the case may be, which is the subject of claim or dispute.

Statements made by any person, including representatives of Radyne, which are inconsistent or in conflict with the terms of this warranty, shall not be binding upon Radyne unless reduced to writing and approved by an officer of Radyne.

WARRANTY REPAIR RETURN PROCEDURE

Before a warranty repair can be accomplished, a Repair Authorization must be received. It is at this time that Radyne will authorize the product or part be returned to the Radyne facility or if field repair will be accomplished. The Repair Authorization may be requested in writing or by calling:

Radyne Corporation

5225 South 37th Street

Phoenix, Arizona 85040 (USA)

ATTN: Customer Support

Phone: (602) 437-9620 Fax: (602) 437-4811

Any product returned to Radyne for examination must be sent prepaid via the means of transportation indicated as acceptable to Radyne. Return Authorization Number must be clearly marked on the shipping label. Returned products or parts should be carefully packaged in the original container, if possible, and unless otherwise indicated, shipped to the above address.

NON-WARRANTY REPAIR

When a product is returned for any reason, Customer and its shipping agency shall be responsible for all damage resulting from improper packing and handling, and for loss in transit, notwithstanding any defect or nonconformity in the product. By returning a product, the owner grants Radyne permission to open and disassemble the product as required for evaluation. In all cases, Radyne has sole responsibility for determining the cause and nature of failure, and Radyne's determination with regard thereto shall be final.

RCS11 1:1 Redundancy Switch

Installation and Operation Manual

TM061 - Record of Revisions

Radyne Corporation is constantly improving its products and therefore the information in this document is subject to change without prior notice. Radyne Corporation makes no warranty of any kind with regard to this material, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. No responsibility for any errors or omissions that may pertain to the material herein is assumed. Radyne Corporation makes no commitment to update nor to keep current the information contained in this document. Radyne Corporation assumes no responsibility for use of any circuitry other than the circuitry employed in Radyne Corporation's systems and equipment.

Revision Level	Date	Reason for Change
1	12-15-96	Initial Release
1.1	2-12-97	Added DVB3000 Connector Pinout Data and Interconnection Data
1.2	3-29-97	Added DMD15 Connector Pinout Data and Interconnection Data
1.3	3-26-98	Added J2 Remote Control Pinout table, Added missing pins to J10 table, added dip switch table as Appendix C, added DM45 and DD45 interconnection and pinout data as Addendum A

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Section 1 - RCS11 1:1 Redundancy Switch Description

1.0 Description

The Radyne RCS11 1:1 Redundancy Switch provides simple backup redundancy protection for all configurations of DMD15 and DMD2400 satellite Modems as well as the DVB3000 series of Digital Video Modulators. The backup functions of the RCS11 may be performed manually or from Terminal Mode.

Operating In the automatic mode, the RCS11 immediately places a backup modem online in the event of a primary online modem failure. In the Manual Mode, the user may designate the selected online primary modem either from the interactive front panel or a remote terminal interface.

1.1 Redundant Power Supplies

The RCS11 is equipped with two fully-redundant internal power supplies that provide +5 Volts to the system. Each power supply is fully independent of the other, including their source of AC power and fusing. The RCS11 remains fully-operational as long as either power supply is providing a source of power. The power supplies are located one on either side of the front of the RCS11 chassis.

1.2 Introduction

Every attempt has been made to include all of the information that is necessary to properly operate the RCS11. However, although information is included on theory of operation and troubleshooting, this is not a service or maintenance manual. Also, the user should be fully familiar with the operation of the individual Satellite Modems, Modulators and/or Demodulators that will be connected to the Switch.

Refer to Figure 1-1 for a pictorial representation of the RCS11 front panel, Figure 1-2 for a Functional Block Diagram of the RCS11 System and Figure 2-3 for an interconnection diagram of the RCS11 with two satellite modems. Figure 2-4 shows the RCS11 interconnection diagram with two DVB3000 Digital Video Modulators.

1.3 Manual Format

This manual is divided into five chapters and one appendix, each of which provides information relating to a different aspect of the RCS11 1:1 Redundancy Switch. The following paragraphs provide a brief overview of the contents of each chapter.

Chapter 1, *Introduction*, describes the basic functionality of the RCS11 and outlines other useful information included in the manual.

Chapter 2, *Installation*, describes the basic methods for setting up and installing a 1:1 Switch into a Satellite Modem or DVB system and provides the connector pinout data for various RCS11 applications.

Chapter 3, *Operation*, provides the user with technical information necessary for operation of the 1:1 Switch.

Chapter 4, *Basic Maintenance and Troubleshooting Procedures*, provides information on the basic troubleshooting checks and basic 1:1 Switch repairs that the user may make on-site.

Chapter 5, *Principles of Operation*, briefly describes the internal operation of the RCS11.

Appendix A, *Specifications*, provides technical reference data on the 1:1 Switch.

Appendix B, *RCS11 Remote Communications Specification*

Appendix C, *RCS11 Dip Switch Setting Tables*

1.4 Cautions and Warnings

CAUTION: A CAUTION identifies and also defines a procedure which must be followed precisely in order to ensure the proper use of the equipment.

WARNING: A WARNING identifies and also defines a procedure which requires mandatory compliance in order to ensure the safety of the operator and the usage of the equipment.

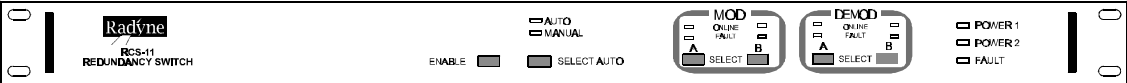


Figure 1-1. RCS11 1:1 Redundancy Switch Front Panel

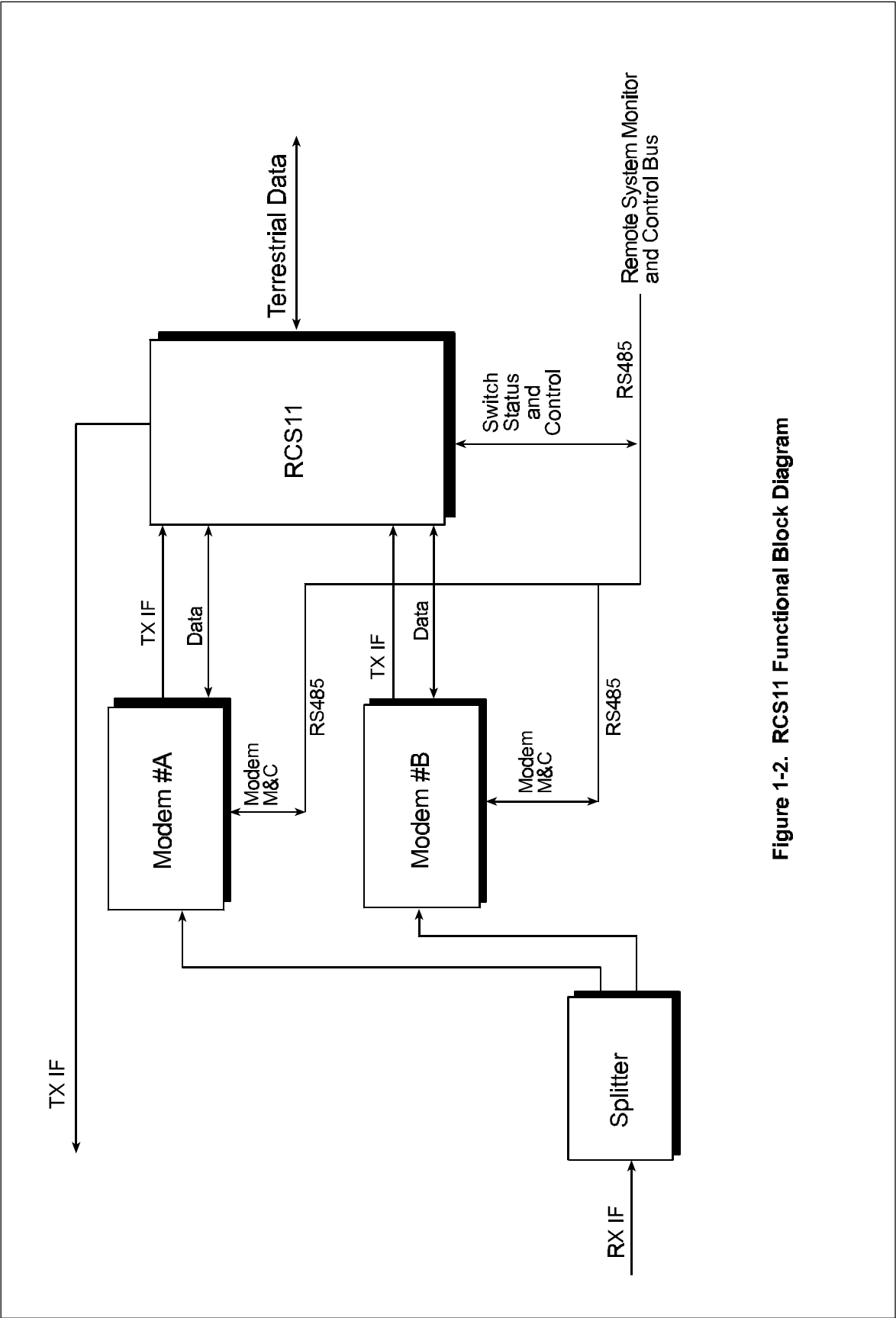


Figure 1-2. RCS11 Functional Block Diagram

Section 2 - Installation

2.0 Installation Requirements

This chapter instructs the user in the methods for setting up and installing an RCS11 1:1 Redundancy Switch into a Satellite Modem system. The cabling configurations for two DMD2400 Satellite Modems, two DVB3000 Digital Video Modulators and two DMD15 Satellite Modems are shown.

2.1 Unpacking the System

Unseal the shipping cartons taking care not to damage the cartons, the packing material or the equipment inside. The cartons and the packing material should be saved in the event that an RCS11 will need to be reshipped. Examine the exterior of the units for any possible shipping damage.

2.1.1 List of Items

Carefully remove the units from the cartons. In addition to this manual, be sure that the following items are present:

- RCS11 1:1 Redundancy Switch
- Two AC Power Cords
- 1:1 Switch System Test Data Sheet
- RCS11 Standard Cable Set
- Optional ES/ES Interconnection Cables
- 75-Ohm Splitter

2.1.2 In Case of Shipping Damage

If any shipping damage is discovered to any of the above listed equipment, promptly contact the transporter and file a damage claim. The transporter is responsible for any damage caused during shipping. Radyne Corporation should also be contacted.

Damage as a result of transport is not covered under the Radyne Corporation Warranty. Refer to the Warranty section in the front of this manual for further information.

The procedure for returning faulty or damaged equipment is contained in the warranty section in the front of this manual.

2.1.3 Test Data Sheet

Each RCS11 1:1 Redundancy Switch system is shipped with a Test Data Sheet. This report contains information on the results of the Switch quality control testing. The report also includes information pertaining to the system settings that were made at the factory. Radyne Corporation recommends that the user save this report for future reference.

2.2 Site Considerations

Adequate site planning and preparation simplifies the installation process and results in a more reliable system.

The user should ensure that the site has adequate electrical power, environmental controls and protection against sources of electrical radiation and interference.

2.2.1 Power Sources

The power sources should be properly grounded and as free as possible from electrical interference. The RCS11 employs a dual redundant power supply configuration. Each power cord on the RCS11 must be plugged into its own separate power circuit. Each circuit must have its own independent circuit breaker.

Grounding is achieved automatically when the three prong power plug is inserted into a power receptacle. This should be checked by testing that there is no voltage present between the chassis of the Switch and the power line ground.

***** WARNING *****

The protective ground must not be bypassed with a three-prong to two-prong adapter or defeated in any way. Defeating the ground may result in operator injury or damage to the system.

2.3 Rack Mounting

The RCS11 is designed so that it can be mounted in a standard 19-inch rack. The RCS11 is 1-3/4 inches (1U) high.

To allow for the easy installation of cables and adequate air circulation through the units, a minimum of six inches of clearance must be provided at the sides and rear of the units. In addition, the RCS11 requires a minimum of 1-3/4 inches (1U) of clearance on top of the unit.

If the Switch is mounted on slide mounts, the cables must be of sufficient length to allow the units to be pulled forward on the mounts.

2.4 Configuring the system

Figure 2-1 shows the rear panel connectors on the RCS11, and Figure 2-2 shows the front panel controls and indicators. Figure 2-3 shows the user the proper interconnection of the cables with two DMD2400 Satellite Modems. Figure 2-4 shows the RCS11 interconnection with the Radyne DVB3000 Digital Video Modulator.

***** WARNING*****

If either AC line cord remains connected to the RCS11, dangerous AC voltages will be present within the Switch. The top cover of the RCS11 should not be removed for any reason other than fuse replacement. Refer to Section 4, Basic Maintenance and Troubleshooting.

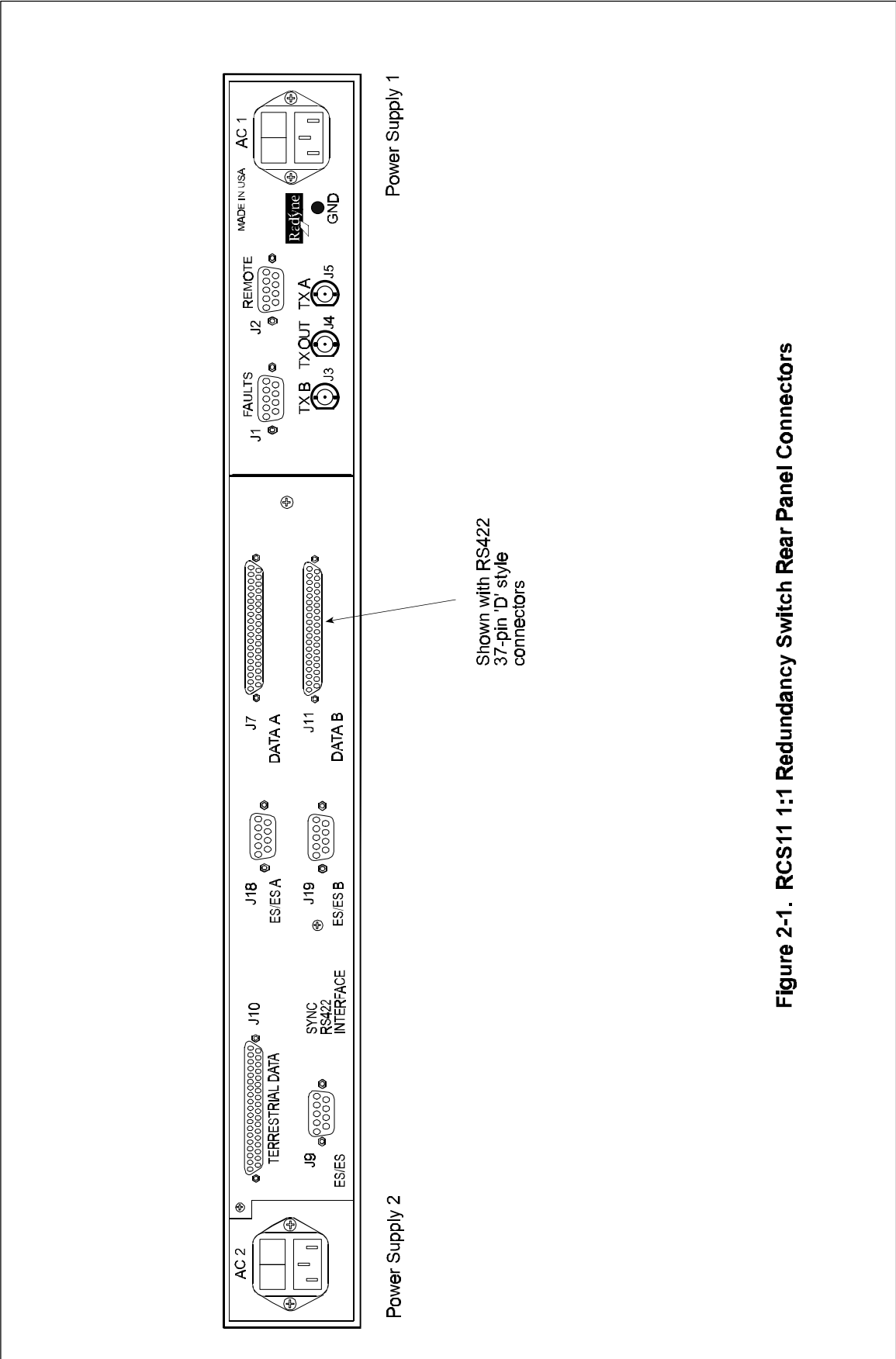


Figure 2-1. RCS11 1:1 Redundancy Switch Rear Panel Connectors



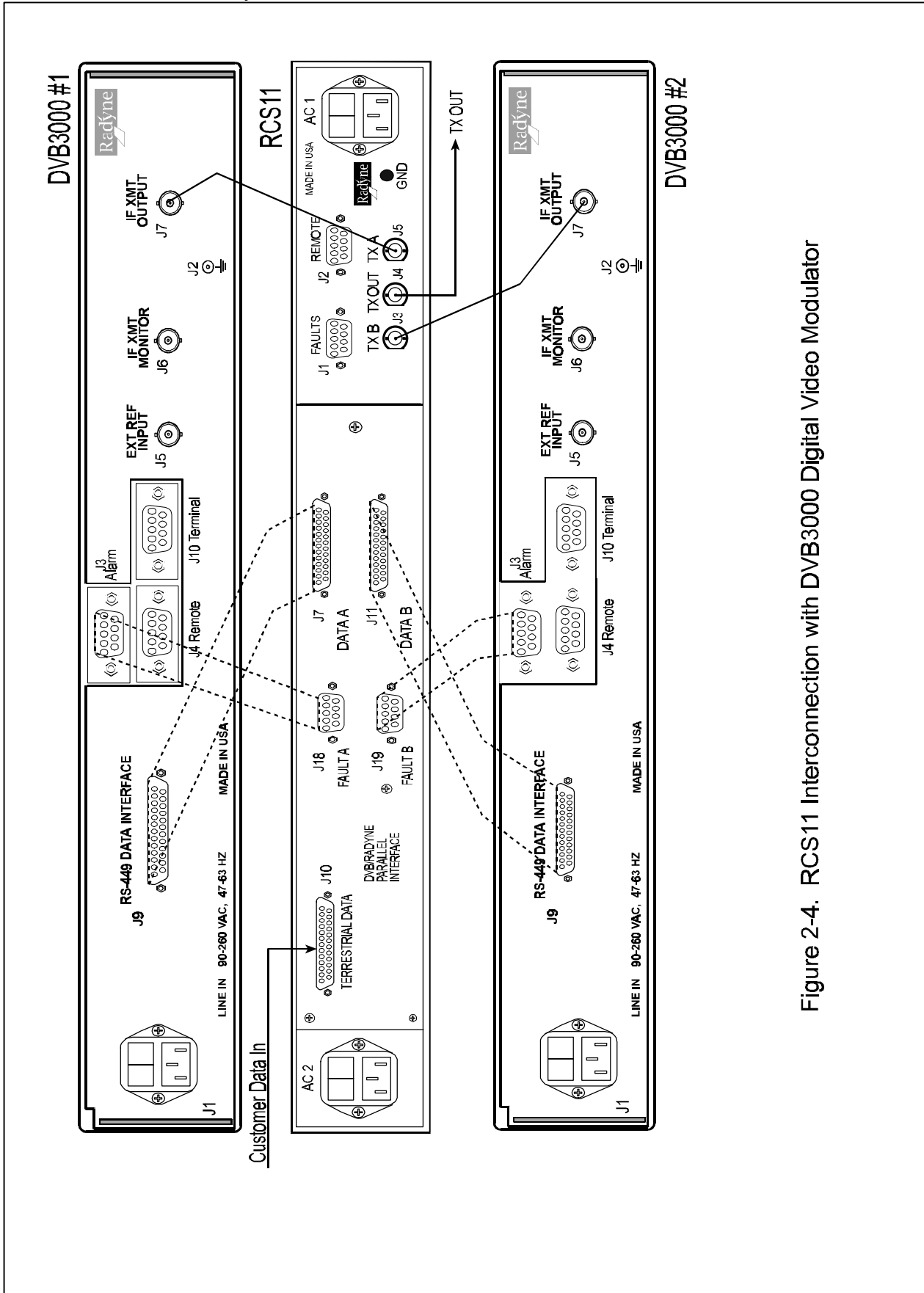


Figure 2-4. RCS11 Interconnection with DVB3000 Digital Video Modulator

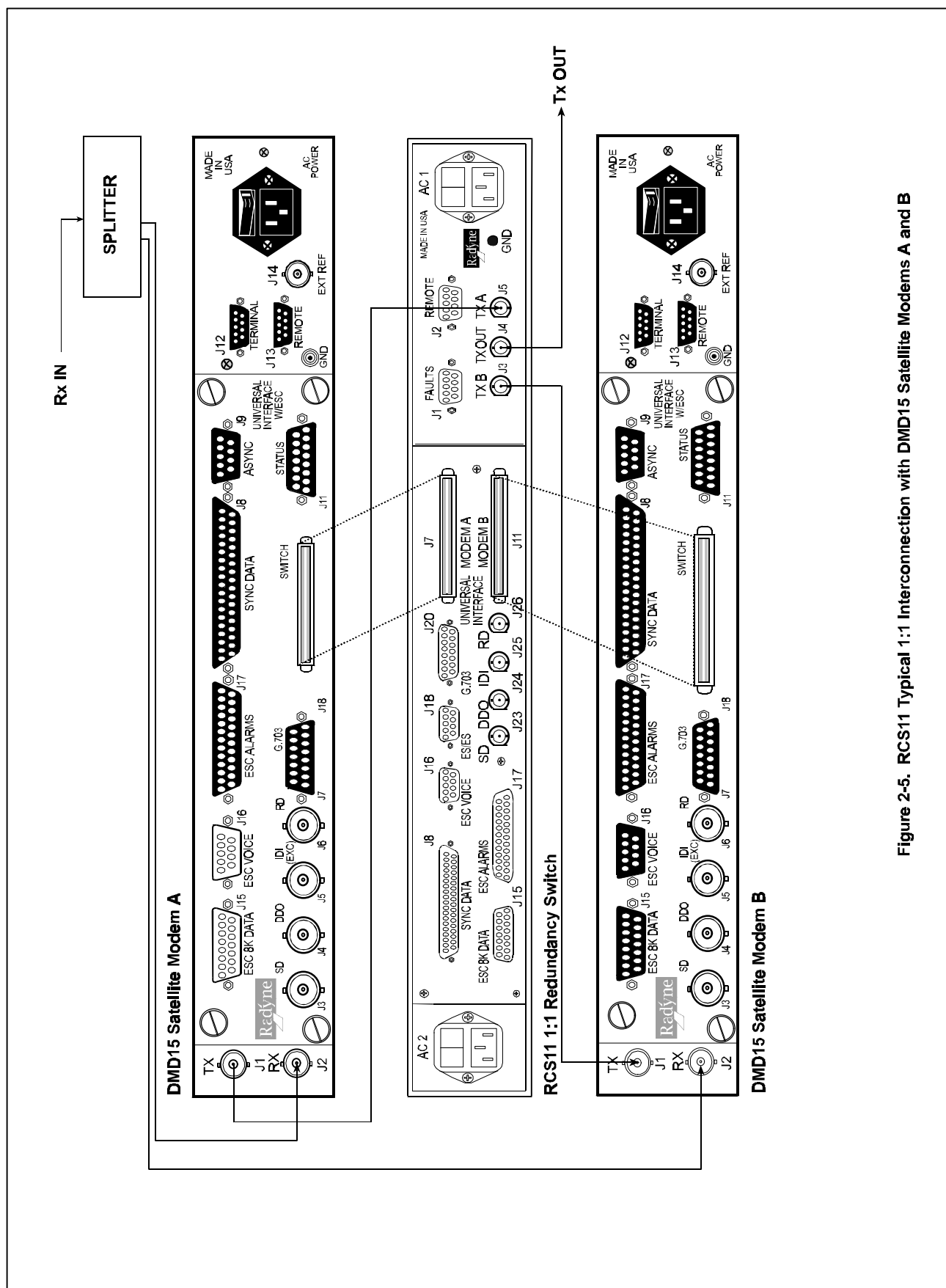


Figure 2-5. RCS11 Typical 1:1 Interconnection with DMD15 Satellite Modems A and B

2.5 RCS11 Rear Panel Connectors and Pinouts

All modem connections are made to the labeled connectors located on the rear of the RCS11. The connector definitions and pinouts below are those on the RCS11 Unit. Any connection interfacing from the modem must be the proper mating connector. Table 2-1 is a listing and brief description of the standard connectors on the RCS11 rear panel. Tables 2-2 through 2-34 list the connector configurations for DMD2400 Modem, DVB3000 and DMD15 applications.

Table 2-1. Standard RCS11 Rear Panel Connectors		
Connector ID	Nomenclature	Description
J1	Faults	9-Pin 'D' Female Subconnector
J2	Remote	9-Pin 'D' Female Subconnector
J3	Tx B	70 MHz IF IN from Modem B
J4	Tx Out	70 MHz IF OUT to Tx RF CFE
J5	Tx A	70 MHz IF IN from Modem A

2.5.1 J1 - Fault Connection

Table 2-2. Fault Connector J1 Pin Assignment	
Pin #	Description
1	Switch Fault Relay - C
2	Switch Fault Relay - NO
3	Mod B Selected Relay - NC
4	Demod B Selected Relay - C
5	Demod B Selected Relay - NO
6	Switch Fault Relay - NC
7	Mod B Selected Relay - C
8	Mod B Selected Relay - NO
9	Demod B Selected Relay - NC

2.5.2 J2 - Remote Control Connection

Table 2-3. J2 RCS11 Remote Control Connector		
Pin Number	Description	Direction
1	485 Select	Must be tied to Pin 5 (GND) to select the RLLP (RS485) Remote mode.
2	RX_232	Input
3	TX_232	Output
4	N.C.	

5	Ground	GND
6	RX_A (-)	Input
7	RX_B (-)	Input
8	TX_A (-)	Output
9	TX_B (-)	Output

2.6 RCS11/DMD2400 SYNC/RS422 Satellite Modem Rear Panel Connectors

Table 2-4. RCS11 Rear Panel Connectors (DMD2400 SYNC RS422 Interface Configuration)		
Connector ID	Nomenclature	Description
J7	Data A	Sync RS422 37-Pin 'D' Data Connector A
J9	Terrestrial ES/ES	ES to ES channel connection at 9-Pin 'D' Female Subconnector
J10	Terrestrial Data	Sync RS422 37-Pin 'D' Terrestrial Data Connector
J11	Data B	Sync RS422 37-Pin 'D' Data Connector B
J18	ES/ES A	ES to ES A channel connection at 9-Pin 'D' Female Subconnector
J19	ES/ES B	ES to ES B channel connection at 9-Pin 'D' Female Subconnector

Table 2-5. J10 - DMD2400 SYNC RS422 Terrestrial Data Interface Connector Pin Assignment		
Pin #	Signal Name	Direction
1	Shield	
3	External FIFO Buffer Output Clock (A) -	Input
4	Transmit Data (A) -	Input
5	Transmit Clock (A) -	Output
6	Receive Data (A) -	Output
7	RTS (A) -	Input
8	Receive Clock (A) -	Output
9	CTS (A) -	Output
11	Data Mode (A) -	Output

12	DTR (A) -	Input
13	Receive Ready (A) -	Output
14	NC	
17	Terminal Timing (A) -	Input
19	Signal GND	GND
20	Common	GND
21	External FIFO Buffer Output Clock (B) +	Input
22	Transmit Data (B) +	Input
23	Transmit Clock (B) +	Output
24	Receive Data (B) +	Output
25	RTS (B) +	Input
26	Receive Clock (B) +	Output
27	CTS (B) +	Output
29	Data Mode (B) +	Output
30	DTR (B) +	Input
31	Receive Ready (B) +	Output
33	NC	
35	Terminal Timing (B) +	Input

Table 2-6. J7 (Modem A) /J11 (Modem B) RS422 Data Interface**Modem A and Modem B Connector Pin Assignment**

Pin #	Signal Name	Direction
1	Shield	
3	External FIFO Buffer Output Clock (A) -	Output
4	Transmit Data (A) -	Output
5	Transmit Clock (A) -	Input
6	Receive Data (A) -	Input
7	RTS (A) -	Output
8	Receive Clock (A) -	Input
9	CTS (A) -	Input
11	Data Mode (A) -	Input
12	DTR (A) -	Output
13	Receive Ready (A) -	Input
14	Mod Fault Alarm	OC TTL Input

17	Terminal Timing (A) -	Output
19	Signal GND	GND
20	Common	GND
21	External FIFO Buffer Output Clock (B) +	Output
22	Transmit Data (B) +	Output
23	Transmit Clock (B) +	Input
24	Receive Data (B) +	Input
25	RTS (B) +	Output
26	Receive Clock (B) +	Input
27	CTS (B) +	Input
29	Data Mode (B) +	Input
30	DTR (B) +	Output
31	Receive Ready (B) +	Input
33	Demod Fault Alarm	OC TTL Input
35	Terminal Timing (B) +	Output

Table 2-7. J9 Terrestrial ES/ES Channel Connection**9-Pin Female 'D'**

Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A
7	RTS	Request to Send (Pin 7 & 8 Tied Together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send
4	TXD-B	Transmit Data B
9	NC	No Connection
5	GROUND	Signal Ground

Table 2-8. J18 ES 'A' and J19 ES 'B' Channel Connection 9-Pin Female 'D' Connector

Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A

7	RTS	Request to Send (Pin 7 & 8 Tied Together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send
4	TXD-B	Transmit Data B
9	NC	No Connection
5	GROUND	Signal Ground

2.7 RCS11/DMD2400 Sync RS232 Interface Rear Panel Connectors

**Table 2-9. RCS11 Rear Panel Connectors
(DMD2400 SYNC RS232 Configuration)**

Connector ID	Nomenclature	Description
J7	Data A	Sync RS232 25-Pin 'D' Data Connector A
J9	Terrestrial ES/ES	ES to ES channel connection at 9-Pin 'D' Female Subconnector
J10	Terrestrial Data	Sync RS232 25-Pin 'D' Terrestrial Data Connector
J11	Data B	Sync RS232 25-Pin 'D' Data Connector B
J18	ES/ES A	ES to ES A channel connection at 9-Pin 'D' Female Subconnector
J19	ES/ES B	ES to ES B channel connection at 9-Pin 'D' Female Subconnector

**Table 2-10. J10 - RS-232 Terrestrial Data Interface
25-Pin 'D-Sub' Female Connector Pin Assignment**

Pin #	Name	Direction
1,7	Shield/Signal Common	Gnd
2	SD A (-)	Output
3	RD A (-)	Input
4	RTS A (-)	Output
5	CTS A (-)	Input
6	DSR A (-)	Input
8	DCD A (-)	Input
15	ST A (-)	Input
17	RT A (-)	Input
19	EXT. FIFO CLK A (-)	Output
20	DTR A (-)	Output

24	TT A (-)	Output
No Connection	NC	9, 10, 11, 12, 13, 14, 16, 18, 21, 22,

**Table 2-11. J7/J11 Modem 'A' / Modem 'B' RS232 Data Interface
25-Pin 'D-Sub' Female Connector Pin Assignment**

Pin #	Name	Direction
1,7	Shield/Signal Common	Gnd
2	SD A (-)	Input
3	RD A (-)	Output
4	RTS A (-)	Input
5	CTS A (-)	Output
6	DSR A (-)	Output
8	DCD A (-)	Output
15	ST A (-)	Output
17	RT A (-)	Output
19	EXT. FIFO CLK A (-)	Input
20	DTR A (-)	Input
23	Demod Fault Alarm	TTL OC Input
24	TT A (-)	Input
25	Mod Fault Alarm	TTL OC Input
No Connection	NC	9, 10, 11, 12, 13, 14, 16, 18, 21, 22,

**Table 2-12. Terrestrial ES/ES Channel Connection
9-Pin Female 'D'**

Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A
7	RTS	Request to Send (Pin 7 & 8 Tied Together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send
4	TXD-B	Transmit Data B

9	NC	No Connection
5	GROUND	Signal Ground

Table 2-13. J18 ES 'A' and J19 ES 'B' Channel Connection 9-Pin Female 'D' Connector		
Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A
7	RTS	Request to Send (Pin 7 & 8 Tied Together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send
4	TXD-B	Transmit Data B
9	NC	No Connection
5	GROUND	Signal Ground

2.8 RCS11/DMD2400 Sync V.35 Interface Rear Panel Connectors

Table 2-14. RCS11 Rear Panel Connectors (DMD2400 SYNC V.35 Configuration)		
Connector ID	Nomenclature	Description
J7	Data A	V.35 25-Pin 'D' Data Connector A
J9	Terrestrial ES/ES	ES to ES channel connection at 9-Pin 'D' Female Subconnector
J10	Terrestrial Data	V.35 25-Pin 'D' Terrestrial Data Connector
J11	Data B	V.35 25-Pin 'D' Data Connector B
J18	ES/ES A	ES to ES A channel connection at 9-Pin 'D' Female Subconnector
J19	ES/ES B	ES to ES B channel connection at 9-Pin 'D' Female Subconnector

Table 2-15. J10 - V.35 Terrestrial Data Interface 25-Pin 'D-Sub' Female Connector Pin Assignment		
Pin #	Assignment	Direction

1	Chassis	GND
7	SIG GND	GND
15	SCT A (ST)	Output
12	SCT B (ST)	Output
2	SD A (SD)	Input
14	SD B (SD)	Input
24	SCTE A (TT)	Input
11	SCTE B (TT)	Input
17	SCR A (RT)	Output
9	SCR B (RT)	Output
3	RD A (RD)	Output
16	RD B (RD)	Output
4	RTS	Input
5	CTS	Output
6	DSR	Output
8	CD	Output
21	Ext FIFO Clock B (+)	Input
19	Ext FIFO Clock A (-)	Input
20	DTR	Input

Table 2-16. J7/J11 - V.35 Data Interface (Modem 'A'/Modem 'B')
25-Pin 'D-Sub' Female Connector Pin Assignment

Pin #	Assignment	Direction
1	Chassis	GND
7	SIG GND	GND
15	SCT A (ST)	Input
12	SCT B (ST)	Input
2	SD A (SD)	Output
14	SD B (SD)	Output
24	SCTE A (TT)	Output
11	SCTE B (TT)	Output
17	SCR A (RT)	Input
9	SCR B (RT)	Input
3	RD A (RD)	Input

16	RD B (RD)	Input
4	RTS	Output
5	CTS	Input
6	DSR	Input
8	CD	Input
25	Mod Fault Alarm	OC TTL Input
23	Demod Fault Alarm	OC TTL Input
21	Ext FIFO Clock B (+)	Output
19	Ext FIFO Clock A (-)	Output
20	DTR	Output

**Table 2-17. Terrestrial ES/ES Channel Connection
9-Pin Female 'D'**

Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A
7	RTS	Request to Send (Pin 7 & 8 tied together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send
4	TXD-B	Transmit Data B
9	NC	No Connection
5	GROUND	Signal Ground

**Table 2-18. J18 ES 'A' and J19 ES 'B' Channel
Connection 9-Pin Female 'D' Connector**

Pin #	Signal Name	Description
1	RXD-B	Receive Data B
6	DSR	Date Set Ready
2	RXD-A	Receive Data A
7	RTS	Request to Send (Pin 7 & 8 tied together)
3	TXD-A	Transmit Data A
8	CTS	Clear to Send

4	TXD-B	Transmit Data B
9	NC	No Connection
5	GROUND	Signal Ground

2.9 RCS11/DVB3000 Radyne Serial Interface Rear Panel Connections

Table 2-19. RCS11 Rear Panel Connectors (DVB3000/RS-449/RS-422 Serial Interface Configuration)		
Connector ID	Nomenclature	Description
J7	Data A	RS-449/RS-422 37-Pin 'D' Data Connector A
J10	Terrestrial Data	RS-449/RS-422 37-Pin 'D' Terrestrial Data Connector
J11	Data B	RS-449/RS-422 37-Pin 'D' Data Connector B

Table 2-20. J10 - Terrestrial Data Interface Connector RS-449/RS-422 Pin Assignment		
Pin #	Signal Name	Direction
1	Shield	GND
4	Send Data (SD) A	Input
5	Serial Clock Transmit (SCT) A	Output
6	Receive Data (RD) A	Output
7	Ready To Send (RTS) A	Output
9	CTS (A)	Output
11	Data Mode (DM) A	Output
15	Ext Ref Int A	Input
17	Serial Clock Transmit External (SCTE) A	Input
19	Signal GND	GND
20	Common	GND
22	Send Data (SD) B	Input
23	Serial Clock Transmit (SCT) B	Output
24	Receive Data (RD) B	Output

25	Ready To Send (RTS) B	Input
26	Receive Timing (RT) B	Output
27	Clear To Send (CTS) B	Output
29	Data Mode (DM) B	Output
33	Ext Ref Int B	Input
35	Serial Clock Transmit External (SCTE) B	Input
37	Common	GND

Table 2–21. J7/J11 - Mod 'A'/Mod 'B' Data Interface Connector RS-449/RS-422 Pin Assignment		
Pin #	Signal Name	Direction
1	Shield	GND
4	Send Data (SD) A	Output
5	Serial Clock Transmit (SCT) A	Input
7	Ready To Send (RTS) A	Input
9	CTS (A)	Input
11	Data Mode (DM) A	Input
14	Mod Fault Alarm OC TTL	Input
15	Ext Ref Int A	Output
17	Serial Clock Transmit External (SCTE) A	Output
19	Signal GND	GND
20	Common	GND
22	Send Data (SD) B	Output
23	Serial Clock Transmit (SCT) B	Input
25	Ready To Send (RTS) B	Output
27	Clear To Send (CTS) B	Input
29	Data Mode (DM) B	Input
33	Ext Ref Int B	Output
35	Serial Clock Transmit External (SCTE) B	Output
37	Common	GND

2.10 RCS11 Radyne Parallel Interface Rear Panel Connections

Table 2-22. RCS11 Rear Panel Connectors (Radyne RS422 Parallel Interface Configuration)		
Connector ID	Nomenclature	Description
J7	Data A	RS422 Parallel 25-Pin 'D' Data Connector A
J10	Terrestrial Data	RS422 Parallel 25-Pin 'D' Terrestrial Data Connector
J11	Data B	RS422 Parallel 25-Pin 'D' Data Connector B
J18	Fault A	TTL OC Fault Input 9-Pin 'D' Female Connector
J19	Fault B	TTL OC Fault Input 9-Pin 'D' Female Connector

Table 2-23. J10 - Radyne RS-422 Terrestrial Parallel - 25-Pin Female (Optional)		
Pin #	Signal Name	Direction
1	OUTCLK	Output
14	OUTCLK	Output
2	CLK+	Input
15	CLK-	Input
3	SYNC+	Input
16	SYNC-	Input
4	VALID+	Input
17	VALID-	Input
5	D0+	Input
18	D0-	Input
6	D1+	Input
19	D1-	Input

7	D2+	Input
20	D2-	Input
8	D3+	Input
21	D3-	Input
9	D4+	Input
22	D4-	Input
10	D5+	Input
23	D5-	Input
11	D6+	Input
24	D6-	Input
12	D7+	Input
25	D7-	Input
13	Not Connected	-----

Table 2-24. J7/J11 - Mod 'A'/Mod 'B' Radyne RS-422 Parallel - 25-Pin Female (Optional)		
Pin #	Signal Name	Direction
1	OUTCLK	Input
14	OUTCLK	Input
2	CLK+	Output
15	CLK-	Output
3	SYNC+	Output
16	SYNC-	Output
4	VALID+	Output
17	VALID-	Output
5	D0+	Output
18	D0-	Output
6	D1+	Output
19	D1-	Output
7	D2+	Output
20	D2-	Output
8	D3+	Output
21	D3-	Output
9	D4+	Output
22	D4-	Output

10	D5+	Output
23	D5-	Output
11	D6+	Output
24	D6-	Output
12	D7+	Output
25	D7-	Output
13	Not Connected	-----

Table 2-25. J18 Fault 'A' and J19 Fault 'B'
Connection 9-Pin Female 'D' Connector

Pin #	Signal Name	Direction
6	MOD FAULT	Input
4	GROUND	Ground

2.11 RCS11/DVB3000 DVB Parallel Interface Rear Panel Connections

Table 2-26. RCS11 Rear Panel Connectors
(DVB3000/DVB Parallel Interface Configuration)

Connector ID	Nomenclature	Description
J7	Data A	RS422 Parallel 25-Pin 'D' Data Connector A
J10	Terrestrial Data	RS422 Parallel 25-Pin 'D' Terrestrial Data Connector
J11	Data B	RS422 Parallel 25-Pin 'D' Data Connector B
J18	Fault A	TTL OC Fault Input 9-Pin 'D' Female Connector
J19	Fault B	TTL OC Fault Input 9-Pin 'D' Female Connector

Table 2-27.
J10 - DVB RS-422 Terrestrial - Parallel - 25-Pin Female

Pin #	Signal Name	Direction
1	Clock +	Input
2	System GND	Ground

3	D7 +	Input
4	D6 +	Input
5	D5 +	Input
6	D4 +	Input
7	D3 +	Input
8	D2 +	Input
9	D1 +	Input
10	D0 +	Input
11	DVALID +	Input
12	PSYNC +	Input
13	Cable Shield	Input
14	Clock -	Input
15	System GND	Ground
16	D7 -	Input
17	D6 -	Input
18	D5 -	Input
19	D4 -	Input
20	D3 -	Input
21	D2 -	Input
22	D1 -	Input
23	D0 -	Input
24	DVALID -	Input
25	SYNC -	Input

Table 2-28.
J7/J11 Mod 'A'/Mod 'B' DVB RS-422 Parallel - 25-Pin Female

Pin #	Signal Name	Direction
1	Clock +	Output
2	System GND	Ground
3	D7 +	Output
4	D6 +	Output
5	D5 +	Output
6	D4 +	Output
7	D3 +	Output
8	D2 +	Output

9	D1 +	Output
10	D0 +	Output
11	DVALID +	Output
12	PSYNC +	Output
13	Cable Shield	Output
14	Clock -	Output
15	System GND	Ground
16	D7 -	Output
17	D6 -	Output
18	D5 -	Output
19	D4 -	Output
20	D3 -	Output
21	D2 -	Output
22	D1 -	Output
23	D0 -	Output
24	DVALID -	Output
25	SYNC -	Output

Table 2-29. J18 Fault 'A' and J19 Fault 'B'**Connection 9-Pin Female 'D' Connector**

Pin #	Signal Name	Direction
6	MOD FAULT	Input
4	GROUND	Ground

Table 2-30.**J12 - RS232 Terminal Port - 9-Pin Female 'D'**

Pin No.	Signal	Description	Direction
3	TxD	Transmit Data	Output
2	RxD	Receive Data	Input
5	Gnd	Ground	-----

2.11 RCS11/DMD15 Universal Interface Module (UIM) Connectors

The following tables contain the pinouts, signals, descriptions and directions for the connectors located on the RCS11 to DMD15 UIM.

J23 - SD - SEND DATA

J23 is the unbalanced Send Data (SD) BNC connector located on the RCS11 Universal Interface Module.

J24 - DDO - DROP DATA OUT

J24 is the unbalanced Drop Data Out (DDO) BNC connector located on the RCS11 Universal Interface Module.

J25 - IDI - INSERT DATA IN

J25 is the unbalanced Insert Data In (IDI) BNC connector located on the RCS11 Universal Interface Module.

J26 - RD - RECEIVE DATA

J26 is the unbalanced Receive Data (RD) BNC connector located on the RCS11 Universal Interface Module.

J8 - SYNC DATA

J8 is the 37-pin Female synchronous data connector.

Table 2-31. J8 - Sync Data RS422/RS485/RS232/V.35 - 37-Pin Female			
Pin Number	Signal	Description	Direction
3	TXO-A	Transmit Octet (-)	Input
21	TXO-B	Transmit Octet (+)	Input
4	SD-A	Send Data A (-)	Input
22	SD-B	Send Data B (+)	Input
5	ST-A	Send Timing A (-)	Output
23	ST-B	Send Timing B (+)	Output
6	RD-A	Receive Data A (-)	Output
24	RD-B	Receive Data B (+)	Output
7	RS-A	Request to Send A (-)	Input
25	RS-B	Request to Send B (+)	Input
8	RT-A	Receive Timing A (-)	Output
26	RT-B	Receive Timing B (+)	Output
9	CS-A	Clear to Send A (-)	Output
10	MF	Mod Fault - Open Collector	Output
28	DF	Demod Fault - Open Collector	Output

27	CS-B	Clear to Send B (+)	Output
11	DM-A	Data Mode A (-)	Output
29	DM-B	Data Mode B (+)	Output
13	RR-A	Receiver Ready A (-)	Output
31	RR-B	Receiver Ready B (+)	Output
15	BAL EXC-A	External Clock A (-)	Input
33	BAL EXC-B	External Clock B (+)	Input
16	RX-0-A	Receive Octet A (-)	Output
34	RX-0 B	Receive Octet B (+)	Output
17	TT-A	Terminal Timing A (-)	Input
35	TT-B	Terminal Timing B (+)	Input
1, 19, 20, 37	GND	Signal Ground	

J7 - G.703 (BALANCED)

Table 2-31 below lists the pinouts and signal definitions for the G.703 (Balanced) 15-pin connector.

Table 2-32. J20 - G.703 (Balanced) 15-Pin Female 'D' Connector			
Pin No.	Signal Name	Signal	Direction
1	Send Data (-)	SD-A	Input
2	Ground	GND	-----
9	Send Data (+)	SD-B	Input
7	External Clock A (-)	BAL EXC-A	Input
8	External Clock B (+)	BAL EXC-B	Input
3	Receive Data A (-)	RD-A	Output
4	Ground	GND	-----
11	Receive Data B (+)	RD-B	Output
12	Drop Data Out (-)	DDO-A	Output
5	Drop Data Out (+)	DDO-B	Output
13	Insert Data In (-) EXC (-)	IDI-A	Input
6	Insert Data In (+) EXC (+)	IDI-B	Input

J7/J11 - SWITCH CONNECTOR

Table 2-33. J7/J11 - Switch Connector - 68-Pin High-Density Female			
Pin No.	Signal	Description	Direction
1	G.703B SD-A	G.703 Send Data Input A	Input
2	SYNC SD-A	Synchronous Data Send Data Input -A	Input
3	ESCBWO 1C	IDR ESC Backward Alarm Out - 1 Common	
4	G.703B IDI-A	G.703 Insert Data Input - A	Input
5	SYNC ST-A	Synchronous Data Send Timing Output - A	Output
6	ESCBWO 1NO	IDR ESC Backward Alarm Out - 1 Normally Open	Input
7	SYNC TT-A	Synchronous Data Terminal Timing Input A	Input
8	ESCBWO 2NC	IDR ESC Backward Alarm Out - 2 Normally Closed	
9	DDO-A RT-A	G.703 Drop Data Out A - Synchronous Data Receive Timing Output - A	Output
10	ESCBWO 3C	IDR ESC Backward Alarm Output - 3 Common	
11	IDO-A RD-A	G.703 Insert Data Out A - Synchronous Data Receive Data A	Output
12	ESCBWO 3NO	IDR ESC Backward Alarm Output - 3 Normally Open	
13	BAL EXC-A	External Clock Input - A	Input
14	GND		
15	ESCAUDTX 1A	IDR ESC Audio Input Channel 1A	Input
16	ESCAUDTX 2A	IDR ESC Audio Input Channel 2A	Input
17	ESCAUD RX 1A	IDR ESC Audio Output Channel 1A	Output
18	ESCAUD RX 2A	IDR ESC Audio Output Channel 2A	Output
19	ESCBWI 3	IDR ESC Backward Alarm Input - 3	Input
20	TXD-A BWI 1	IBS ES Transmit Data A IDR ESC Backward Alarm Input 1	Input
21	MOD FLT	Mod Fault Open Collector Output	Output Open Collector
22	ES RXD-A	IBS ES Receive Data Output - A	Output

23	ES DSR	IBS ES Data Set Ready (RS232 Only)	Output
24	ESCTXC-A	IDR ESC Transmit 8 Kbps Output Clock	Output
25	ESCTXD-A	IDR ESC Transmit 8 Kbps Output Data	Input
26	ESCRXC-A	IDR ESC Receive 8 Kbps Output Clock	Output
27	ESCRXD-A	IDR ESC Receive 8 Kbps Output Data	Output
28	ESCBWO 4NC	IDR ESC Backward Alarm Output - 4 Normally Closed	
29	TXO-A	IBS Transmit Octet Input - A	Input
30	SYNC DM-A	Synchronous Data Data Mode A	Output
31	SYNC CS-A	Synchronous Data Clear to Send - A	Output
32	RXO-A	IBS Receive Octet Output - A	Output
33	SYNC RS-A	Synchronous Data Request to Send A	Input
34	SYNC RR-A	Synchronous Data Receiver Ready - A	Output
35	G703B SD-B	G.703 Send Data Input - B	Input
36	SYNC SD-B	Synchronous Data Send Data Input - B	Input
37	ESCBWO 1 NC	IDR ESC Backward Alarm Out - 1 Normally Closed	
38	G703B IDI-B	G.703 Insert Data Input - B	
39	SYNC ST-B	Synchronous Data Send Timing Output B	
40	ESCBWO 2C	IDR ESC Backward Alarm Out 2 Common	
41	SYNC TT-B	Synchronous Data Terminal Timing - B	
42	ESCBWO 2NO	IDR ESC Backward Alarm Output 2 Normally Open	
43	DDO-B RT-B	G.703 Drop Data Out - B Synchronous Data Receive Timing B	
44	ESCBWO 3NC	IDR ESC Backward Alarm Out - 3 Normally Closed	
45	IDO-B RD-B	G.703 Insert Data Out Synchronous Data	
46	ESCBWO 4C	IDR ESC Backward Alarm Out - 4 Common	
47	BAL EXC-B	External Clock Input B	Input
48	GND	Ground	
49	ESCAUDTX 1B	IDR ESC Audio Input Channel 1B	Input
50	ESCAUDTX 2B	IDR ESC Audio Input Channel 2B	Input
51	ESCAUDRX 1B	IDR ESC Audio Output Channel 1B	Output
52	ESCAUDRX 2B	IDR ESC Audio Output Channel 2B	Output
53	ESCBWI 4	IDR ESC Backward Alarm Input - 4	
54	TX-B BWI 2		Input

55	DMD FLT	Demod Fault Open Collector Output	Output Open Collector
56	ES RXD-B	IBS ES Receive Data Input - B	Output
57	GND	Ground	
58	ESCTXC-B	IDR ESC Transmit 8 Kbps Output Clock B	Output
59	ESCTXD-B	IDR ESC Transmit 8 Kbps Output Data B	Input
60	ESCRXC-B	IDR ESC Receive 8 Kbps Clock Output B	Output
61	ESCRXD-B	IDR ESC Receive 8 Kbps Data Output B	Output
62	ESCBWO 4NO	IDR ESC Backward Alarm Out - 4 Normally Open	
63	TXO-B	IBS Transmit Octet Input B	Input
64	SYNC DM-B	Synchronous Data - Data Mode Out B	Output
65	SYNC CS-B	Synchronous Data - Clear to Send B	Input
66	RXO-B	IBS Receive Octet Output B	Output
67	SYNC RS-B	Synchronous Data Request to Send - B	Input
68	SYNC RR-B	Synchronous Data Receiver Ready - B	Output

J17 - ESC ALARM INTERFACE

Table 2-34. J17 - ESC Alarm Interface - 25-Pin Female 'D'			
Pin No.	Signal	Description	Direction
1	GND		
2	ESCBWO 1NO	Backward Alarm Out-1NO	
3	NC		
4	ESCBWO 2NO	Backward Alarm Out-2 NO	
5	NC		
6	ESCBWO 3NO	Backward Alarm Out-3 NO	
7	GND		
8	ESCBWO 4NO	Backward Alarm Out-4 NO	
9	NC		
10	ESCBWI 2	Backward Alarm In 2	Input
11	ESCBWI 4	Backward Alarm In 4	Input
12	NC		

13	NC		
14	ESCBWO 1C	Backward Alarm Out-1 C	
15	ESCBWO 1NC	Backward Alarm Out-1 NC	
16	ESCBWO 2C	Backward Alarm Out- 2 C	
17	ESCBWO 2NC	Backward Alarm Out- 2 NC	
18	ESCBWO 3C	Backward Alarm Out- 3 C	
19	ESCBWO 3NC	Backward Alarm Out- 3 NC	
20	ESCBWO 4C	Backward Alarm Out- 4 C	
21	ESCBWO 4NC	Backward Alarm Out- 4 NC	
22	ESCBWI 1	Backward Alarm In- 1	Input
23	ESCBWI 3	Backward Alarm In- 3	Input
24	NC		
25	NC		

J15 - ESC 8K DATA INTERFACE

Table 2-35. J15 - ESC 8K Data Interface - 15-Pin Female 'D'			
Pin No.	Signal	Description	Direction
1	ESCRXO-B	Rx Octet-B	Output
2	ESCRXC-B	Rx Clock-B	Output
3	ESCRXD-B	Rx Data-B	Output
4	NC		
5	NC		
6	ESCTXD-A	Tx Data-A	Input
7	ESCTXC-A	Tx Clock-A	Output
8	ESCTXO-A	Tx Octet-A	Output
9	ESCRXO-A	Rx Octet-A	Output
10	ESCRXC-A	Rx Clock-A	Output
11	ESCRXD-A	Rx Data-A	Output
12	GND		
13	ESCTXD-B	Tx Data-B	Input

14	ESCTXC-B	Tx Clock-B	Output
15	ESCTXO-B	Tx Octet-B	Output

J16 - ESC AUDIO

Table 2-36. J16 - ESC Audio - 9-Pin Female 'D'			
Pin No.	Signal	Description	Direction
1	ESCAUDTX 1A	Tx Audio 1A	Input
2	ESCAUDRX 1A	Rx Audio 1A	Output
3	GND		
4	ESCAUDTX 2B	Tx Audio 2B	Input
5	ESCAUDRX 2A	Rx Audio 2A	Output
6	ESCAUDTX 1B	Tx Audio 1B	Input
7	ESCAUDRX 1B	Rx Audio 1B	Output
8	ESCAUDTX 2A	Tx Audio 2A	Input
9	ESCAUDRX 2A	Rx Audio 2A	Output

2.12 RCS11 Initial Installation with DMD2400/DVB3000/DMD15

For initial RCS11 setup and configuration, perform the following procedure:

1. Ensure that the AC line cords to the modems and RCS11 are disconnected before

interconnecting the modems and the RCS11.

2. Interconnect the units as shown in Figure 2-3, 2-4 or 2-5 depending upon the equipment type being configured.
3. Attach the AC line cords to the modems and the RCS11.
4. Using the ON/OFF switches located on either side of the rear panel of the RCS11, power-up both redundant power supplies. Power 1 and Power 2 (Green) LEDs should illuminate. If there is a fault with either one of the power supplies, the appropriate green LED will not illuminate. Refer to Section 4, Basic Troubleshooting and Maintenance for the appropriate action to be taken. If both Power 1 and Power 2 LEDs illuminate green, proceed to the next step.
5. Power up the DMD2400/DVB3000/DMD15s. The green 'Power' LED should illuminate. If not, refer to the appropriate Installation and Operation manual for further action to be taken.
6. Proceed to Section 3 and Refer to Figure 3-1 and Table 3-1 to become familiar with the RCS11 controls and indicators.

Section 3 - Operation

3.1 Operating Procedures

The RCS11 is designed to require minimal operator intervention and control during normal operation. After initial setup, the unit should operate in a relatively 'transparent' manner, providing trouble-free backup of the online modems. The scope of this section, therefore, is limited to instruction on the various modes of control available to the operator. Refer to Figure 3-1 for the RCS11 Front Panel Controls and Indicators and Table 3-1 for a description of the Controls and Indicators.

3.1.1 Configuring the RCS11 (Refer to Figure 3-1)

The purpose of the 'ENABLE' pushbutton on the front panel is to reduce the risk of accidentally changing the operating modes of the RCS11 by accidentally bumping any one of the front panel pushbuttons. For any one of the front panel pushbuttons to function, the 'ENABLE' pushbutton must be depressed simultaneously with the desired function pushbutton.

Depress the 'ENABLE' pushbutton. This pushbutton must be depressed to allow the operator to proceed with any other configurations. The 'MANUAL' LED should illuminate and the FAULT indicator may momentarily flash. Under the MOD region of the front panel, depress 'SELECT A' to bring Modem 'A' modulator online. The green LED should illuminate. Under the DEMOD region of the front panel, depress 'SELECT A' to bring modem 'A' demodulator online. The Green LED should illuminate. The RCS11 should

3.1.1.1 Manual Mode

To manually select which MOD or DEMOD is to be placed online, simultaneously depress the 'ENABLE' pushbutton and the appropriate MOD or DEMOD 'SELECT' pushbutton. When a MOD or DEMOD selection is made, the RCS11 enters Manual Mode to carry out the selection, and will not respond to either modem's MOD or DEMOD Fault signals until placed back into Auto Mode.

3.1.1.2 Auto Mode

To enable automatic backup in the event of a MOD or DEMOD failure, the RCS11 must be placed into the Auto Mode. First, select which MOD and DEMOD are to be active by following the 'Manual Mode' procedure in the previous paragraph. To enter the Auto Mode, simultaneously depress the 'ENABLE' pushbutton and the 'SELECT AUTO' pushbutton. The RCS11 will then enter into Auto Mode with the last selections made in Manual Mode. In the Auto Mode, the decision to switch from one MOD or DEMOD to another is made automatically by monitoring the Fault signals from each modem.

3.1.1.3 Power-Up Defaults

During power-Up, the RCS11 initializes itself to the last mode set by the operator on the front panel pushbuttons. For example, if the operator desires the RCS11 to operate in the Auto Mode, with both Mod and Demod set to Modem B, by placing the RCS11 into this condition using the front panel pushbuttons, the settings are stored into non-volatile memory. If MOD B was to fail, and the RCS11 was to backup with MOD A, the new backup setting would not be saved. If the power was to be removed and restored, the RCS11 would again power-up in AUTO MODE, with both MOD and DEMOD set to Modem B.

Table 3-1. RCS11 Front Panel Controls and Indicators

Nomenclature	Description	Function
Power 1	Indicates PS1 has power applied	LED illuminates Green for Power Available
Power 2	Indicates PS2 has power applied	LED illuminates Green for Power Available
Fault	Indicates a Switch Fault has occurred	LED illuminates Red for Switch Fault
Auto (LED)	Indicates RCS11 is in the Auto Mode	LED illuminates Green for Auto Mode
Manual (LED)	Indicates the RSC11 is in the Manual Mode	LED illuminates Green for Manual Mode
ENABLE (Pushbutton)	-----	Enables Front Panel controls to function
SELECT AUTO (Pushbutton)	-----	Allows the operator to select Automatic Mode of operation
Demodulator Controls and Indicators		
Online LED	Indicates which Demodulator is online: A or B	LED illuminates green for Online
Fault LED	The RCS11 has received a Demodulator fault from Modem A or B	LED illuminates Red for Fault
SELECT Demod A or B (Pushbutton)	-----	Allows the operator to select a Demodulator: A or B
Modulator Controls and Indicators		
Online LED	Indicates which Modulator is online: A or B	LED illuminates green for Online
Fault LED	The RCS11 has received a fault from Modulator A or B	LED illuminates Red for Fault
SELECT Mod A or B (Pushbutton)	-----	Allows the operator to select a Modulator: A or B

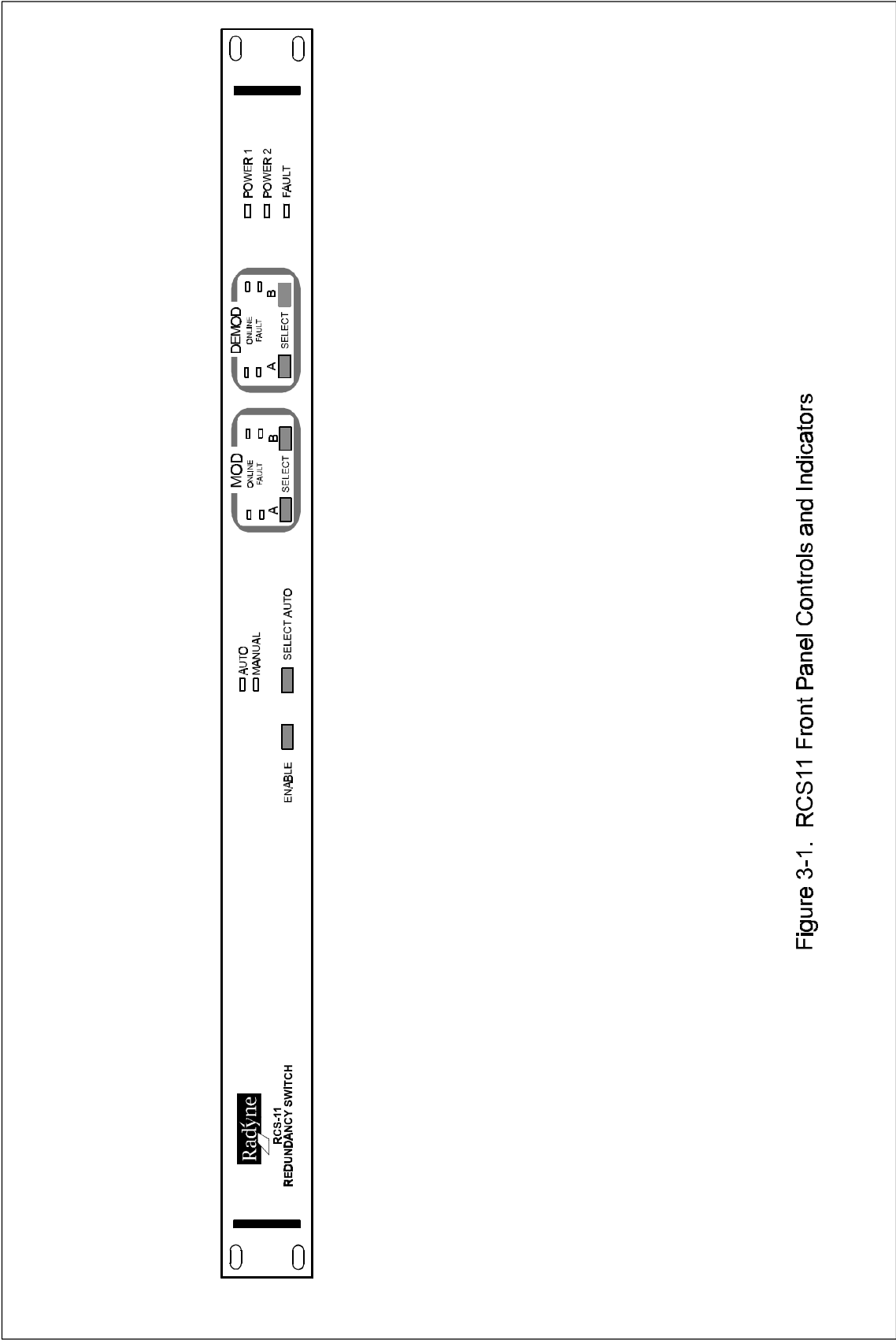


Figure 3-1. RCS11 Front Panel Controls and Indicators

Section 4 - Basic Troubleshooting and Maintenance

4.1 Basic Troubleshooting and Maintenance

This chapter provides information on the basic troubleshooting and repair procedures for the RCS11 1:1 Switch that may be performed on-site by qualified personnel. Only minor repairs will be discussed. For serious failures, the user should not attempt to repair the unit without first contacting Radyne Corporation for further information and instructions.

4.2 Basic User Checks

Upon the detection of an operational failure, the source of the failure must be determined. Basic user checks include checking the power line fuses and the various cables and connectors.

4.2.1 Checking the Cabling and Connectors

Problems that appear difficult to solve can often be traced to a loose or defective cable or connector. As a first check, the user should check all cables within the system for possible broken or loose connections. Cables that are suspect should be replaced. Also, check the jacks on the units for bent or broken pins. Also ensure that both AC power cords are properly plugged into the rear of the RCS11.

4.2.2 Checking the Fuses

***** WARNING *****

High voltage is present on the power supply heat sinks when the power supply is energized. Use extreme caution when removing the RCS11 top cover when the unit is powered up. Do not touch the top cover on any of the internal components during removal or replacement.

*****CAUTION*****

The appropriate AC power cord must be disconnected before the fuse may be removed. To keep the RCS11 operational, be sure to disconnect only one power cord at a time. Also be sure to replace the fuse and the power cord before checking the other fuse.

***** WARNING *****

The AC fuses are located at the front of the RCS11 on the power supply boards inside the unit. Test the fuse with an ohmmeter or similar device. If necessary, replace the fuse with a new one of the same size and rating. Failure to do so may result in damage to the equipment and may result in a fire hazard.

4.3 Major and Minor Faults

Minor faults are failure conditions that do not result in loss of service. Major faults are failure conditions or combinations of conditions that result in loss of service on one or more channels.

The possible minor fault conditions are as follows:

- A failure of one of the Switch's two redundant power supplies;
- A failure of one Demodulator that is being monitored (i.e., a Demodulator that has not been locked out);
- A failure of one Modulator that is being monitored;
- A reference clock slip.

The possible major fault conditions are:

- A Read-Only Memory (ROM) failure in the Switch;
- A Random Access Memory (RAM) failure in the Switch;
- A loss of Carrier Detect on a Demodulator Channel where this attribute is monitored;
- A loss of Terrestrial Input Clock on a Channel where this attribute is monitored;
- A failure of two monitored Modulators;
- A failure of two monitored Demodulators;
- A failure of both RCS11 power supplies.

Section 5 - Principles of Operation

5.0 Principles of Operation

This chapter provides additional basic information on the RCS11.

5.1 RCS11 Major Assemblies

The RCS11 Redundancy Control Unit contains the modules that control and monitor the operation of the 1:1 Switch system. The 1:1 Switch is composed of the following major assemblies and components:

1. Main Switch Board.
2. Front Panel Board.
3. Dual Redundant Power Supplies.

5.1.1 Main Switch Board

The Main Switch Board contains the RCS11 1:1 Switch intelligence and memory circuitry and all switching circuitry. The on-board microprocessor is an MC68HC11, which has a 16-bit address bus and an 8-bit data bus. The microprocessor controls and coordinates all major functions of the Switch and performs all necessary calculations. The non-volatile system memory on the board stores the switching parameter settings for each Modem Channel. Control and data signals are routed to the appropriate devices in the system through various latches and transceivers that are controlled by the microprocessor.

5.1.2 Front Panel Board

The Front Panel Board contains the LED indicators and the pushbutton switches needed to control and operate the RCS11.

5.1.3 Redundant Power Supplies

The 1:1 Switch comes equipped with two fully-redundant internal power supplies (PS1 and PS2) that supply +5 volts to the system. Each supply is fully independent of the other, including their source of AC power and fusing.

The Switch can remain fully operational as long as it is supplied with a source of voltage from either power supply. PS1 and PS2 are located one on either side at the front of RCS11 chassis.

5.2 RCS11 General Operation

5.2.1 Signals

All necessary Modem signals are backed-up through a passive switching system. Signals that are required to maintain the modem in off-line 'hot-standby' are buffered by appropriate circuitry to minimize loading on incoming signals.

5.2.2 Backup

If an online MOD fault is sensed, and the off-line MOD is not also faulted, the RCS11 will switch to the MOD without the fault. The Fault Signal has a small debounce delay to prevent false triggering. If the faulted MOD has its fault cleared, it stays off-line unless the other MOD has subsequently faulted. The DEMOD faults are handled in a similar manner, but the fault signals have longer debounce delays to allow for Demodulator acquisition time.

5.2.2 Fail-safe

If the RCS11 has a non-recoverable internal fault, the MOD and DEMOD both revert back to Modem A, the Switch Fault LED is illuminated, and the Switch Fault Relay switches to a faulted state.

If Power Supply 1 and Power Supply 2 simultaneously fail, the switching circuitry in the RCS11 reverts back to Modem A, and the Switch Fault Relay switches to a faulted state. Modem B does not receive buffered signals in this condition.

5.2.3 Fault Relays

Fault Connector (J1), has Form-C contacts to indicate the state of the MOD and DEMOD selections. An additional Form-C contact is available to indicate an RCS11 Fault.

Appendix A

RCS11 1:1 Redundancy Switch Technical Specifications

A.1 Introduction

This section defines the technical performance parameters for the RCS11 1:1 Redundancy Switch.

RCS11 1:1 Redundancy Switch

Technical Specifications

General Specifications

Online Modulators:	1 unit
Online Demodulators:	1 unit
Backup Modulators:	1 unit
Backup Demodulators:	1 unit
Uplink Transponders:	1 unit
Downlink Transponders:	1 unit
Modes of Operation:	Auto, Manual
Configurations:	Mod/Demod, Mod Only, Demod Only, Modem
Modulator Switch Time:	50 msec max
Demodulator Switch Time:	50 msec max + demod lock time
Modulator Switch Delay Time:	40 ms
Demodulator Switch Delay Time:	1 sec.
IF Switching:	Coaxial, 75 Ohm, (50 Ohm optional), 20 dB return loss

Monitor and Control (RS232/485 Terminal Mode)

Parameters Monitored:	Mode, Mod/Demod/Modem, Power Supply Status, Internal Switch Settings, Software Rev., Auto/Manual, Select A, Select B
Parameters Controlled:	Mode, Mod/Demod/Modem, Auto/Manual, Select A, Select B

Terrestrial Interfaces

DMD2400:	RS422/449, V.35, RS232
DVB3000:	RS422/449, RS422 8-Bit Parallel Radyne, RS422 8-Bit Parallel DVB
DMD15:	Universal

Front Panel Indicators

Unit:	Power 1, Power 2, Switch Fault, Auto, Manual
Modulator:	Online, Fault
Demodulator:	Online, Fault

Front Panel Controls

Enable, Select Auto, Mod Select A, Mod Select B,
Demod Select A, Demod Select B

Options

Cable sets for DMD2400, DMD15, DVB3000, ES/ES

Power and Environmental

Prime Power:	100/240 Vac, 50-60 Hz, 40 Watts (One Bank)
Operating Temp:	0 to 50 degrees C, 95% humidity, non-condensing
Storage Temp:	-20 to 70 degrees C, 99% humidity, non-condensing

Physical

Size:	19 W x 19 D x 1.75 inches H
Weight:	12 pounds

Appendix C – RCS11 DIP Switch Configuration Tables

RCS11 Configuration

How to use this table

All reserved switches should be left in the off position.

Select 'Soft' setting to allow changes in terminal mode.

Select <all others> for any setting that doesn't seem to apply.

Config	S2-2	S2-1	S2-8 .. S2-3 Are reserved for future expansion and should be left in the off position
Mod/Dmd	Off	Off	
Dmd	Off	On	
Mod	On	Off	
Modem	On	On	

Baud Rate	S3-8	S3-7
9600	Off	Off
4800	Off	On
2400	On	Off
1200	On	On
Soft	On	On

Address	S3-6	S3-5	S3-4	S3-3	S3-2	S3-1
32	Off	Off	Off	Off	Off	Off
33	Off	Off	Off	Off	Off	On
34	Off	Off	Off	Off	On	Off
35	Off	Off	Off	Off	On	On
36	Off	Off	Off	On	Off	Off
37	Off	Off	Off	On	Off	On
38	Off	Off	Off	On	On	Off
39	Off	Off	Off	On	On	On
40	Off	Off	On	Off	Off	Off

41	Off	Off	On	Off	Off	On
42	Off	Off	On	Off	On	Off
43	Off	Off	On	Off	On	On
44	Off	Off	On	On	Off	Off
45	Off	Off	On	On	Off	On
46	Off	Off	On	On	On	Off
47	Off	Off	On	On	On	On
48	Off	On	Off	Off	Off	Off
49	Off	On	Off	Off	Off	On
50	Off	On	Off	Off	On	Off
51	Off	On	Off	Off	On	On
52	Off	On	Off	On	Off	Off
53	Off	On	Off	On	Off	On
54	Off	On	Off	On	On	Off
55	Off	On	Off	On	On	On
56	Off	On	On	Off	Off	Off
57	Off	On	On	Off	Off	On
58	Off	On	On	Off	On	Off
59	Off	On	On	Off	On	On
60	Off	On	On	On	Off	Off
61	Off	On	On	On	Off	On
62	Off	On	On	On	On	Off
63	Off	On	On	On	On	On
64	On	Off	Off	Off	Off	Off
65	On	Off	Off	Off	Off	On
66	On	Off	Off	Off	On	Off
67	On	Off	Off	Off	On	On
68	On	Off	Off	On	Off	Off
69	On	Off	Off	On	Off	On
70	On	Off	Off	On	On	Off
71	On	Off	Off	On	On	On
72	On	Off	On	Off	Off	Off
73	On	Off	On	Off	Off	On
74	On	Off	On	Off	On	Off
75	On	Off	On	Off	On	On
76	On	Off	On	On	Off	Off

77	On	Off	On	On	Off	On
78	On	Off	On	On	On	Off
79	On	Off	On	On	On	On
80	On	On	Off	Off	Off	Off
81	On	On	Off	Off	Off	On
82	On	On	Off	Off	On	Off
83	On	On	Off	Off	On	On
84	On	On	Off	On	Off	Off
85	On	On	Off	On	Off	On
86	On	On	Off	On	On	Off
87	On	On	Off	On	On	On
88	On	On	On	Off	Off	Off
89	On	On	On	Off	Off	On
90	On	On	On	Off	On	Off
91	On	On	On	Off	On	On
92	On	On	On	On	Off	Off
93	On	On	On	On	Off	On
94	On	On	On	On	On	Off
Soft	On	On	On	On	On	On

RS232 Driver	S4-8	S4-7	S4-6	S4-5	S4-4	S4-3	S4-2	S4-1
RS232	Off	On	Off	On	Off	On	Off	On
<all others>	On	Off	On	Off	On	Off	On	Off

G703 Driver	S5-4	S5-3	S5-2	S5-1	<i>S5-8 .. S5-5 Are reserved for future expansion and should be left in the off position</i>
G703 Unbalanced	On	On	On	On	
<all others>	Off	Off	Off	Off	

Fault/EXC		
DVB3000 Serial	JP1-5 to JP1-6	JP1-7 to JP1-8
<all others>	JP1-1 to JP1-2	JP1-3 to JP1-4

