



RC-1170/1270

Redundancy Switch Controllers Installation and Operation Manual

Part Number MN-RC-1170/1270
Revision 1

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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Acronym List

Acronym	Description / Definition	First Use Page
CEFD	Comtech EF Data	1-1
CID	Circuit Identification	5-23
EIA	Electronic Industries Association	Preface-ii
EMC	Electromagnetic Compatibility	Preface-v
ESD	Electrostatic Discharge	1-2
FCC	Federal Communications Commission	Preface-v
IP	Internet Protocol	4-1
IPA	IP Address	5-9
LCD	Liquid Crystal Diode	3-3
LED	Light Emitting Diode	1-5
LNA	Low Noise Amplifier	1-2
LNB	Low-noise Block Down Converter	1-2
LRS	Local Remote Status	5-8
LVD	Low Voltage Directive	Preface-vi
M&C	Monitor and Control	5-1
MIB	Management Information Base	5-2
NIC	Network Interface Card	4-1
NMS	Network Management System	5-2
OID	Object Identifier	5-2
PC	Personal Computer	2-8
PCB	Printed Circuit Board	1-2
R&TTE	Radio Equipment and Telecommunications Terminal Equipment	Preface-v
RS	Recommended Standards	Preface-ii
SNMP	Simple Network Management Protocol	5-1
SNTP	Simple Network Timing Protocol	5-17
VFD	Vacuum Fluorescent Display	3-2

Units of Measurement

Unit / Symbol	Definition
Ω	Ohm
A	Ampere
AC	Alternating Current
bps	bits per second
°C	Celsius (degrees)
DC	Direct Current
Hz	Hertz
kHz	kiloHertz
dB	decibel
dBc	Decibels relative t the carrier
dBm	Decibel-milliwatts
°F	Fahrenheit (degrees)
Kbps	Kilobit per second
kg	kilogram
ksps	Kilosymbols per second
lbs.	pounds
mA	Milli-amp
Mbps	Megabit per second
MHz	Megahertz
mm	millimeter
ms	millisecond
Msps	Megasymbols per second
mW	milliwatt
in.	inch
Pps	Packets per second
μF	100 micro-farads
W	Watt
V	Volt

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PREFACE

About this Manual

This manual provides installation and operation information for Comtech EF Data (CEFD) RC-1170/1270 Redundancy Switch Controllers.

Conventions and References

Patents and Trademarks

See all of Comtech EF Data's Patents and Patents Pending at <http://patents.comtechedata.com>.
Comtech EF Data acknowledges that all trademarks are the property of the trademark owners.

Warnings, Cautions, Notes, and References



A **WARNING** indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.



A **CAUTION** indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. **CAUTION** may also be used to indicate other unsafe practices or risks of property damage.

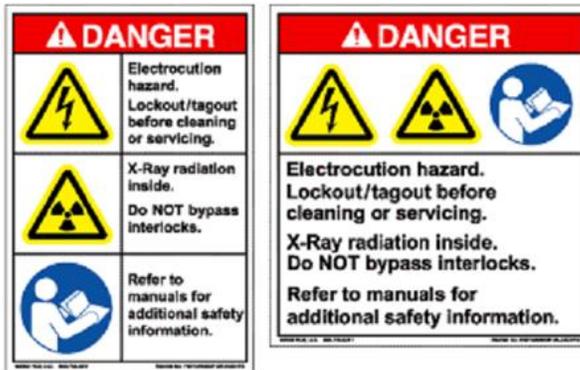


A **NOTE**: gives you important information about a task or the equipment.



A **REFERENCE** directs you to important operational information or details furnished elsewhere, either in the manual or in adjunct Comtech EF Data publications.

Examples of Multi-Hazard Notices



Recommended Standard Designations

Electronic Industries Association (EIA) designations supersede Recommended Standard (RS) designations. Reference to the old RS designations may appear where it might concern actual text (e.g., RS-232) displayed on the product rear panels and on screens or pages in the Serial Remote or HTTP (Web Server) Interfaces. All other references in the manual refer to EIA designations.



CAUTION

It is important that you review and understand the Safety and Compliance information that follows.

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.

Class I Pluggable Equipment Type A-Protective Earthing

The cable distribution system/telecommunication network of this product relies on protective earthing and the integrity of the protective earthing must be insured.

In Finland:

"Laitte on liitettävä suojakoskettimilla varustettuun pistorasiaan."

In Norway:

"Apparatet må tilkoples jordet stikkontakt."

In Sweden:

"Apparaten skall anslutas till jordat uttag."

In Denmark:

"Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord."

Galvanic Isolator Use

In Norway:

"Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet."

Restricted Access Location

In Nordic Countries, equipotential bonding should be applied, using the permanently connected ground stud, by a qualified service person.

Electrical Installation



CAUTION

Connect the unit to a power system that has separate ground, line and neutral conductors. Do not connect the unit without a direct connection to ground.

Operating Environment



CAUTION

Do not operate the unit in any of these extreme operating conditions:

- Ambient temperatures less than 0°C (32°F) or more than 50°C (122°F)
- Precipitation, condensation, or humid atmospheres of more than 95% relative humidity
- Unpressurized altitudes of more than 2000 meters (6561.7 feet).
- Excessive dust
- Flammable gases
- Corrosive or explosive atmospheres

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 55032** – 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 (FCC) Federal Code of Regulation FCC Part 15, Subpart B.**

**CAUTION**

Obey these instructions to make sure that the unit complies with the standards:

- Use coaxial cable that is of good quality for connections to the L-Band Type 'N' Tx (transmit) and Type "F" 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 products with their covers on at all times.

European Union Low Voltage Directive (LVD) (2014/35/EC)

<HAR> Type of power cord required for use in the European Community.



CAUTION: Double-pole/Neutral Fusing

ACHTUNG: Zweipolige bzw. Neutralleiter-Sicherung

International Symbols:



Alternating Current



Protective Earth



Fuse



Ground

European Union RoHS Directive (2011/65/EU)

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 2011/65/EU).

European Union Radio Equipment Directive (2014/53/EC)

In accordance with the European Union Radio Equipment Directive 2014/53/EC, 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

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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

This chapter provides an overview and specifications for the Comtech EF Data (CEFD) redundancy switch controllers:

- RC-1170 (1:1)
- RC-1270 (1:2)



Figure 1-1. RC-1170 (1:1)



Figure 1-2. RC-1270 (1:2)

1.1 Overview



This equipment contains parts and assemblies sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when touching, removing, or inserting Printed Circuit Boards (PCBs).

A complete redundant system consists of:

- RC-1170 or RC-1270 Redundancy Switch Controllers
- Redundant amplifier plate with two or three Low Noise Amplifier (LNA)/Low Noise Block-down Converter (LNB)s
- Interconnect cable up to 400 feet in length

The redundancy switch controller performs the following functions:

- Supplies selectable 13/18 V power to the LNA/LNBs.
- Measures LNA/LNB current.
- Performs calibration on LNA/LNB current.
- Signals a fault with abnormal current deviation.
- Switches LNA/LNB on a priority basis in auto mode.
- Controls waveguide and coaxial switch position.
- Provides a 9-pin EIA-485/-232 serial interface.
- Normal/maintenance switch online during servicing.

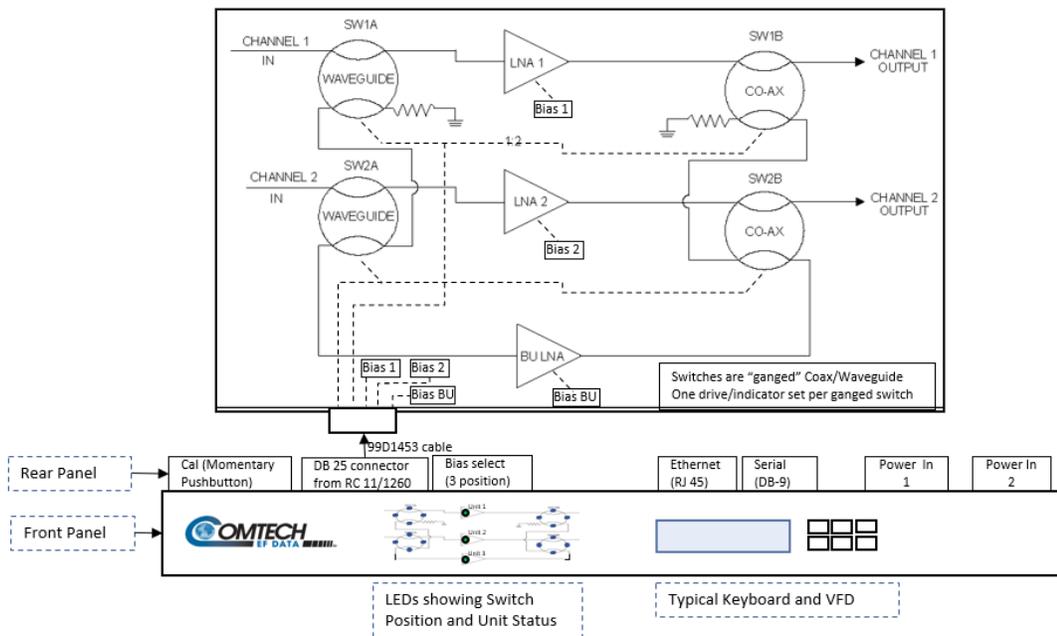


Figure 1-3. Indoor Controller/Outdoor 1:2 LNA Switch System

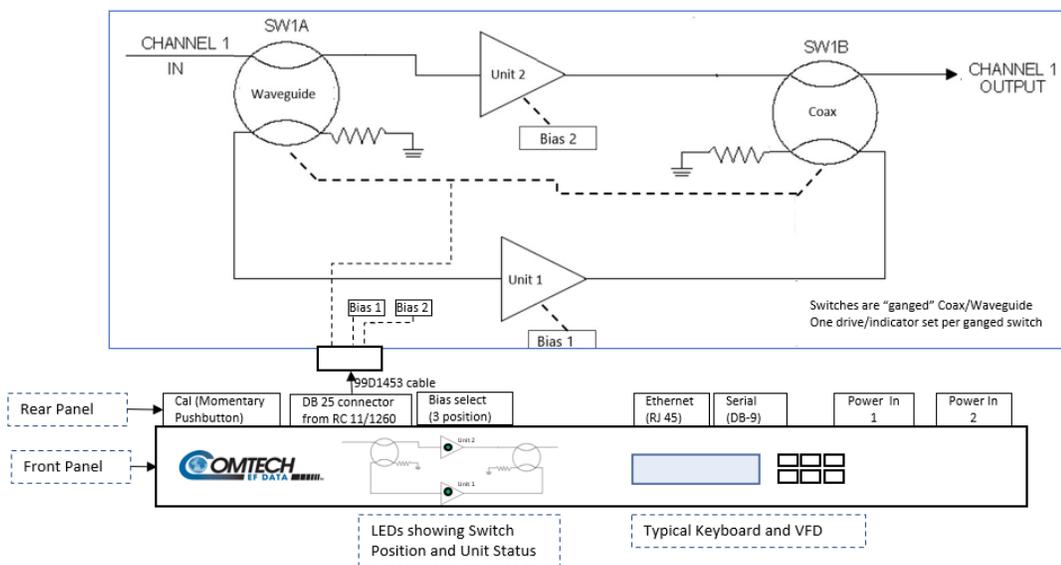


Figure 1-4. Indoor Controller/Outdoor 1:1 LNA Switch System

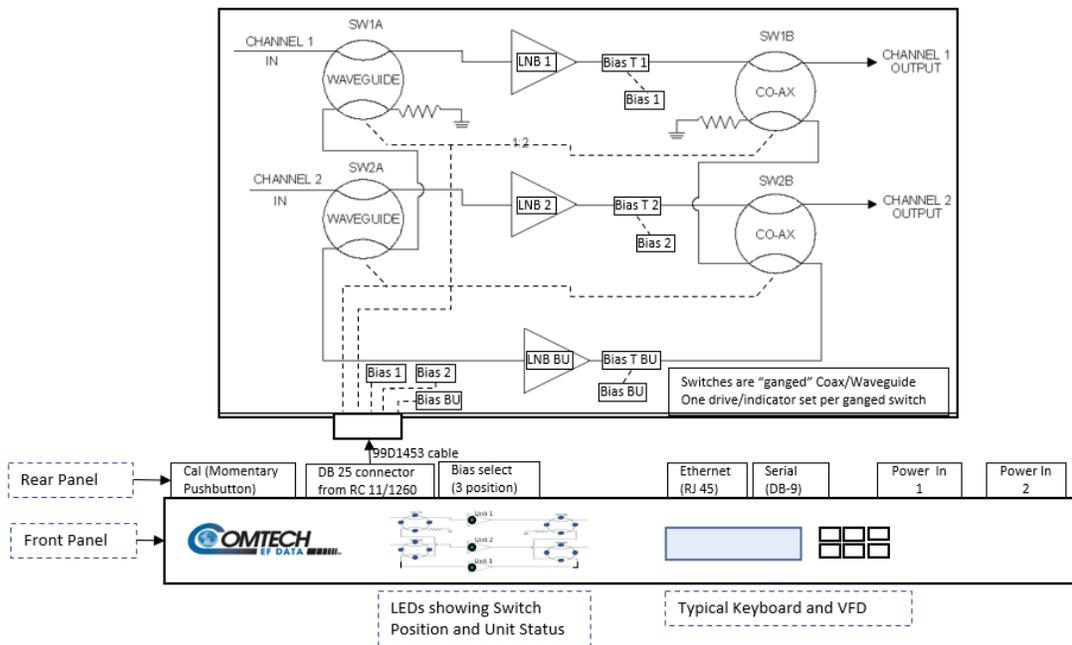


Figure 1-5. Indoor Controller/Outdoor 1:2 LNB Switch System

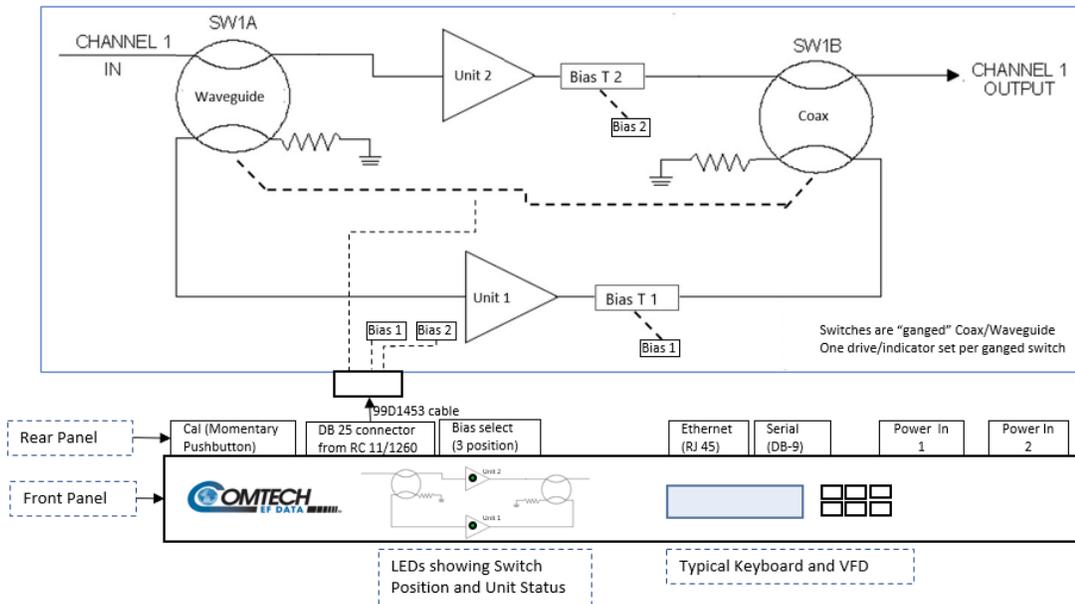


Figure 1-6. Indoor Controller/Outdoor 1:1 LNB Switch System

1.2 Specifications

Item	Description
Power Input	90 to 240 VAC, 47 to 63 Hz, less than 40 W Input Nominal current 0.65 A (standard)
Power Output	13/18 VDC, 0.5 A per LNA/LNB (standard) 14 VDC, 600 mA per LNA/LNB (optional), 150 mA total minimum load, each outlet protected by a current-limiting regulator.
Physical Dimensions: Depth Height Width (Front Panel) Width (Chassis)	16" (40.64 cm) 1 3/4" (4.44 cm) 19" (48.26 cm) 16.5" (41.91 cm)
Weight	5 lb. (2.27 Kg)
Environmental: Operating Temperature Storage Temperature Humidity	0 to 50°C (32 to 122°F) -40 to +100°C (-40 to 212°F) 5 to 85%, non-condensing, optional 0 to 50°C (32 to 122°F)

1.2.1 Front Panel Controls

Item	Description
Vacuum fluorescent display and associated keypad	Used to configure the unit.
Light Emitting Diode (LED) Unit Status	<ul style="list-style-type: none"> GREEN: Unit is active and has no detected faults YELLOW: Unit is in a muted condition. Only applicable to some system configurations RED: Unit has a detected fault Note: A flashing LED indicates unit is bypassed by the switch system.

1.2.2 Rear Panel Controls

Item	Description
Bias Voltage Select	Selects 13 V, 18 V, or "As set by front panel" for units.
Calibration SW	Performs calibration of the LNA/LNB currents. Calibrates all outputs at the same time.

1.2.3 Indicators

Note: Applies to RC-1170 only (1:2 systems).

Item	Parameters	Description
Tri-color LED	Unit 1, 2, & 3 Status	<ul style="list-style-type: none">• GREEN: Un-muted and no-fault present• YELLOW: Muted• RED: Fault Detected <p>Note: A flashing LED indicates unit is bypassed by the switch system.</p>

Chapter 2. INSTALLATION AND CONNECTORS

This chapter provides the following information for the Redundancy Switch Controller:

- Unpacking
- Installation
- Power connection
- External connections

2.1 Unpack and Inspect the Shipment



This equipment contains parts and assemblies sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling the equipment.



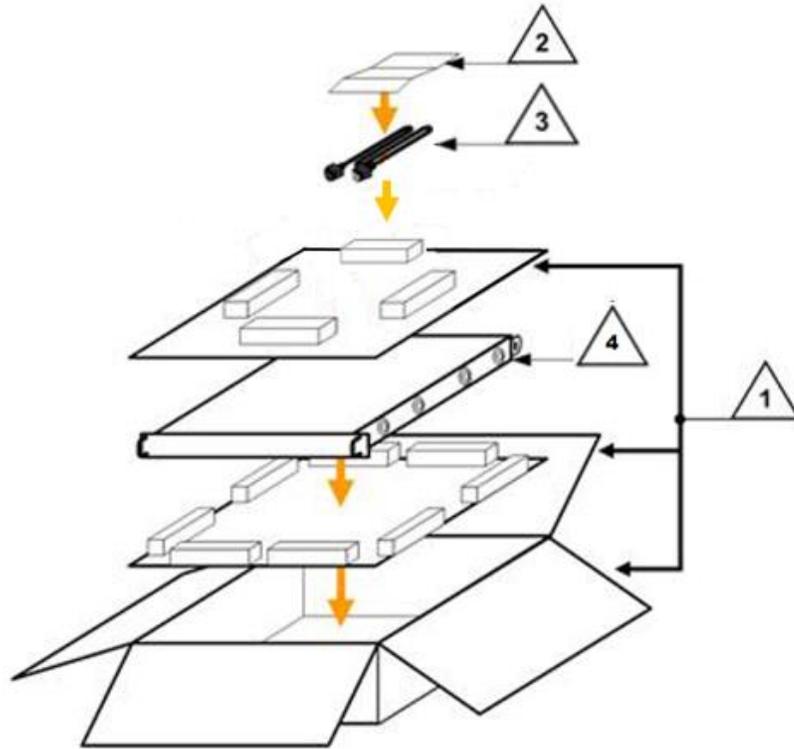
Inspect the shipment. Do these steps:

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 CEFD to submit a damage report.*
4. *Read the online manual.*

The RC-1170/1270 Redundancy Switch Controller and its power cord are packaged and shipped in a reusable cardboard carton containing protective foam spacing (Figure 2-1). The Installation and Operation Manual can be found on the CEFD website, www.comtechedata.com under the Download Manuals tab.



Do not use any cutting tool that will extend more than 1 inch (2.54 cm) into the container and cause damage to the unit.



Item	Description
1	Reusable cardboard carton and protective foam spacing
2	Packing Slip
3	Power Cord
4	Redundancy Switch Controller

Figure 2-1. Redundancy Switch Controller Package Content

2.2 Rack-Mount Installation

The unit is designed to mount in a standard 19" (48.26 cm) rack cabinet or enclosure. A rack-mount installation requires 1.75" (4.44 cm) of panel height. The rack-mount will extend approximately 16" (40.64 cm) into the cabinet.

The environment around the rack mount should be moisture-free with a moderate indoor temperature. There should also be adequate air ventilation on the sides of the rack mount equipment.

Attach the supplied slide rails to the front and rear of the cabinet and proceed with the power connections.

2.3 Connectors



Figure 2-2. RC-1170/1270 Rear Panel Connectors

2.3.1 Power Connection

The detachable power cords are intended to mate with the AC receptacle/filter at the rear of the unit. The power cords are designed to be connected to two independent power sources, each providing an AC voltage between 90 and 240 V. (Although this is not a requirement, the cords enhance the integrity of the redundancy.)



Power can be applied to the unit without the output cables connected.

2.3.1.1 DC Filter Input Module

Note the following:

- The DC Filter Input Module input voltage is -48 VDC nominal, -36 VDC minimum, -72 VDC maximum.
- Power Module Manufacturer: TE Connectivity P/N 6DAF1 (CEFD P/N 506-0015-002).
- Mating Connector (by User): Molex 03-12-1036.

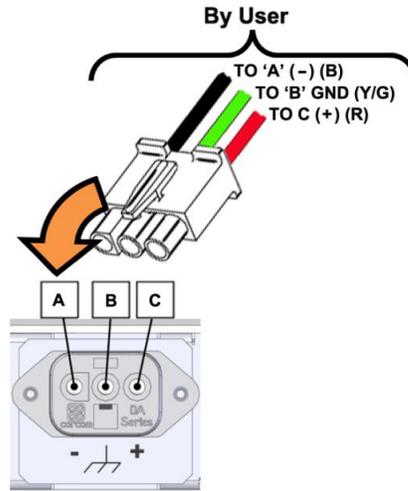


Figure 2-3. DC Input Filter Module with User Supplied Power Harness

Table 2-1. DC Input Filter Module Pinouts

Pin #	Signal Name	Wire Colors	Wiring Options	
A	Negative	Black	-48 VDC	0 VDC
B	Ground	Green/Yellow	Earth Ground	Earth Ground
C	Positive	Red	0 VDC	+48 VDC

2.3.2 J1, Control and Bias



The LNA/LNB J1 connector is a 25-pin D socket and can mate with any 25-pin miniature D connector plug. See Table 2-2 for connector pinouts.

Table 2-2. 'J1' Controller LNA/LNB Output Connector

Pin #	Name	Description	Notes
12	LNA 1 +14 VDC	Output power for LNA/LNB 1	selectable 12/18 V
25	LNA 1 RETURN	Ground	Same
10	LNA 2 +14 VDC	Output power for LNA/LNB 2	selectable 12/18 V
23	LNA 2 RETURN	Ground	Same
8	BACK UP +14 VDC	Output power for backup LNA/LNB.	selectable 12/18 V
21	BACK UP RETURN	Ground.	
5	1 ONLINE CMD	Places LNA/LNB 1 online, 48 VDC pulse for 400 ms	
4	2 ONLINE CMD	Places LNA/LNB 2 online, 48 VDC pulse for 400 ms	
3	BACKUP 1 CMD	Places BU on 1, 48 VDC pulse for 400 ms.	
2	BACKUP 2 CMD	Places BU on 2, 48 VDC pulse for 400 ms.	
1	WG SW COM	Ties to common of all coils. When coil is pulsed, it becomes the return.	
6	WG SW IND 1 OL	Indicator contact from associated waveguide switch	
19	WG SW IND 2 OL	Indicator contact from associated WG switch	
7	WG SW IND BU OL	Indicator contact from associated WG switch	
17	WG SW IND COM	Logic ground	
9	EXT BACKUP FLT	Induces BU FLT if tied to GND	
11	EXT FAULT 2	Induces Unit 2 FLT if tied to GND	
13	EXT FAULT 1	Induces Unit 1 FLT if tied to GND	
20	BU STATUS	BU Status, Totem pole TTL driven with series 330 ohm resistor between device driver and pin appropriate to directly drive typical LED, High when FAULTED, low when OK	
22	UNIT 2 STATUS	Unit 2 Status, Totem pole TTL driven with series 330 ohm resistor between device driver and pin appropriate to directly drive typical LED, High when FAULTED, low when OK	
24	UNIT 1 STATUS	Unit 1 Status, Totem pole TTL driven with series 330 ohm resistor between device driver and pin appropriate to directly drive typical LED, High when FAULTED, low when OK	
14	SHIELD GND	Connects shield on cable to chassis ground.	
15	Unit Fault NC	Open when Main Unit faulted, tied to GND if OK	
16	Unit Fault NO	Open when Main unit OK, tied to GND if faulted	
18	Logic GND	Logic Ground	

Figure 2-4 and Figure 2-5 shows the waveguide switch and indicator wiring.

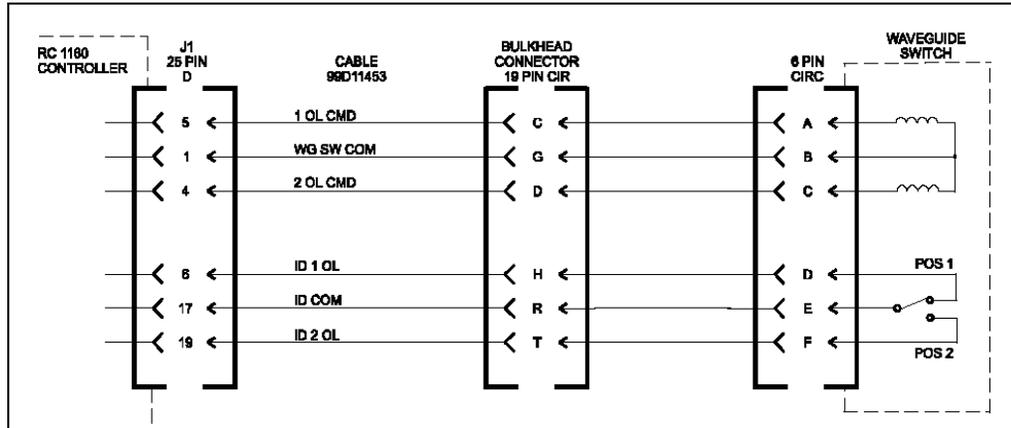


Figure 2-4. Waveguide Switch Wiring 1:1 Configuration

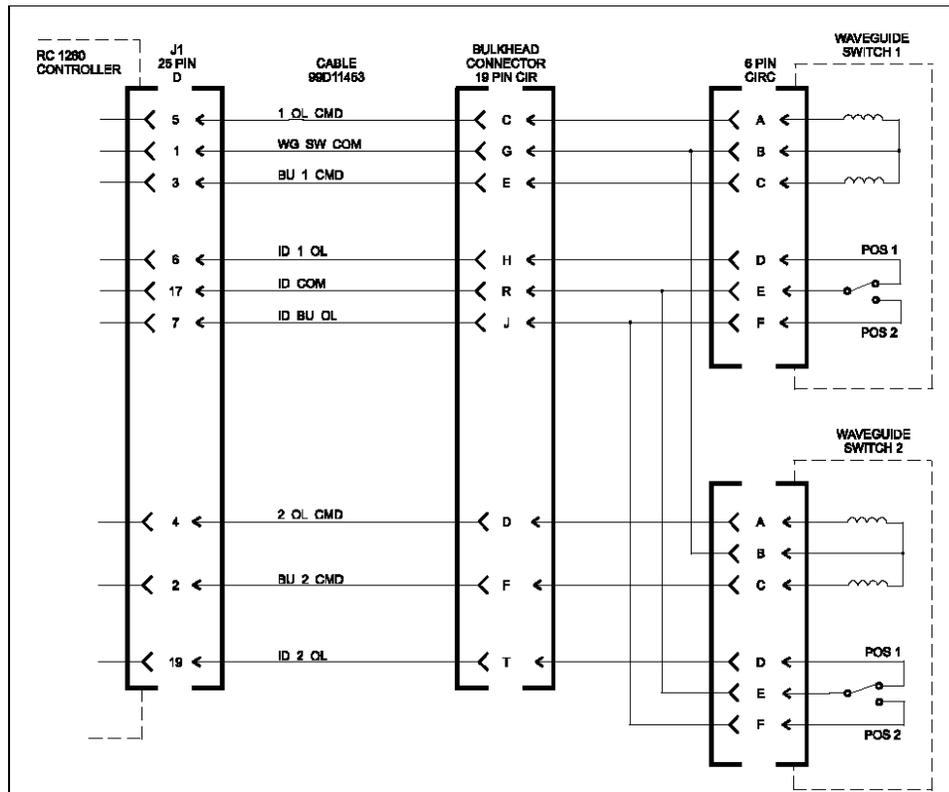


Figure 2-5. Waveguide Switch Wiring 1:2 Configuration, RC-1270 Only

2.3.3 J3, EIA 232/485



Table 2-3. 'J3' 2-Wire EIA-485 Interface Connector Pinout

Pin #	Description	Function
5		
9	+RX/TX	Signal
4		
8	-RX/TX	Signal Complement
3		
7	+RX/TX	Signal
2		
6	-RX/TX	Signal Complement
1	GND	Ground

Table 2-4. 'J3' 4-Wire EIA-485 Interface Connector Pinout

Pin #	Description	Function
5		
9	+TX	Signal
4		
8	-TX	Signal Complement
3		
7	+RX	Signal
2		
6	-RX	Signal Complement
1	GND	Ground

Table 2-5. 'J3' EIA-232 Interface Connector Pinout

Pin #	Description	Function
5		
9		
4		
8		
3	RD	Receive Data
7		

Pin #	Description	Function
2	TD	Transmit Data
6		
1		

2.3.4 J4, '10/100 ETHERNET' Management Utility Port



The 'J4 Unit Comm' 100BaseTX Ethernet RJ-45 port is used to operate the Ethernet remote control interfaces. It is also used for updating the modem firmware. This receptacle uses a CAT5 Ethernet cable for connection to an Ethernet hub, router, switch, Personal Computer (PC), etc.

The plug for the RJ-45 cable features a flexible tab. The RJ-45 receptacle features a mating slot. This design configuration ensures a secure installation.

Connection Instructions

As shown in Figure 2-6, press down the tab on the cable plug and then insert the plug into the receptacle. The connection is complete when the tab 'clicks' into position inside the receptacle.

Note the unit control Ethernet connector is "typical" but the "Controller to Unit" ethernet connections are proprietary and not for general use.

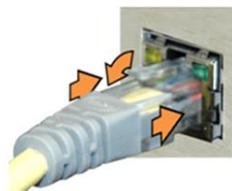


Figure 2-6. RJ-45 Connector Example

Table 2-6. 'J4 Unit Comm' 10/100 Ethernet M&C Interface Connector Pinout

Pin #	Description	Direction
1	Tx+	Out
2	Tx-	Out
3	Rx+	In
4	N/A	--
5	N/A	--
6	Rx-	In

Table 2-7. Controller to Unit Ethernet Connection (optional)

Pin #	Description
1	Ethernet
2	Ethernet
3	Ethernet
4	Aux Mute driven to the remote Unit
5	+24 V from the remote Unit
6	Ethernet
7	Summary Fault from remote unit
8	Remote GND

Note: The Controller/Unit interconnection uses some of the typically unused 10/100 Base-T conductors for fault status, AUX Mute, 24 V parasitic power, and controller to unit GND. Use of these pins means the base unit connectors are not compatible with a 1000Base-T (Gigabit ethernet) connection and the cable coming from the “device being controlled (LPOD/LGAN)” likely cannot be directly plugged into a standard Ethernet port without a custom adapter cable.

2.3.5 Bias Select Switch



The Bias Select Switch has three positions: HI / SW / LO. When in center position, voltage supplied to units is “As per front panel setting/software selection”. Either of the other positions overrides the front panel/software selection and forces all bias voltages to the selected.

2.3.6 Current Cal Switch



The Current Cal Switch is a momentary push button switch that records the nominal current present for each unit supplied. Note there are separated “calibration” values for the low and high bias voltage options.

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Chapter 3. FRONT PANEL OPERATION

Before operating the unit from the front panel, check to ensure that the installation is complete. Check the connections from the waveguide switch indicators (shown in Chapter 1).



The unit will not be damaged if the waveguide switch indicator connections are not made. However, the online indicators will be erroneous.

3.1 Overview



Figure 3-1. RC-1170 Front Panel

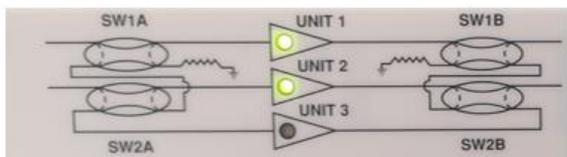


Figure 3-2. RC-1270 Front Panel

Table 3-1. Front Panel Features

Feature	Description	Function
1	LED Indicators	The LEDs indicate, in a summary fashion, the status of the modem.
2	Keypad	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 Vacuum Fluorescent Display (VFD).
3	Vacuum Fluorescent Display (VFD)	The VFD is an active display showing two lines of 40 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.

3.1.1 LEDs

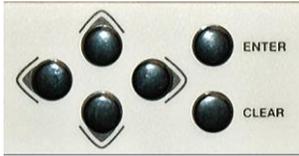


Note: RC-1270 is shown above. RC-1170 is similar.

The LEDs reflect the unit status and offline/online switch position.

- Green: Unit is ACTIVE and has no detected faults.
 - Online: Shown by a solid LED.
 - Offline: Shown by a flashing LED.
- Yellow: Unit is in a muted condition or bias voltage is set to "Off". This is only applicable to some system configurations.
- Red: Unit has a detected fault.
- All LEDs blinking RED means no switch(es) detected

3.1.2 Keypad



The keypad has an auto-repeat feature. When you hold down a key for more than one second, the key action repeats, automatically, at the rate of 15 keystrokes per second. This is particularly useful when editing numeric field with many digits, such as frequency or data rate.

The keypad functions as follows:

Key	Description
ENTER	Use this key to display the nested menu for a selected function, or to execute (save) a configuration change.
CLEAR	Use this key to back out of a selection or to cancel a configuration change that has not been executed using ENTER. Press CLEAR to return to the previous menu screen.
◀▶ (Left, Right)	Use these keys to navigate between available selections, or to move the cursor position, on any menu screen.
▲▼ (Up, Down)	Use these keys primarily to change the alphanumeric selection (i.e., numbers for configuration data, letters for text strings) at the current cursor position, or to scroll through pre-defined parameter settings that may be provided at the current cursor position.

3.1.3 Vacuum Fluorescent Display (VFD)



The Redundancy Switch Controllers feature a VFD. The VFD is an active display showing two lines of 40 characters each. It produces a blue light with adjustable brightness. Compared to a Liquid Crystal Display (LCD), the VCD provides superior viewing characteristics and does not suffer problems of viewing angle or contrast.

On most menu screens, you will observe a flashing solid block cursor, which blinks at a once-per-second rate. This indicates the currently selected menu item, digit, or field. Where this solid block cursor would obscure the item being edited (e.g., a numeric field) the cursor automatically changes to an underline cursor.

3.1.3.1 Screen Saver



If the operating unit is left displaying the same screen for weeks at a time, the VFD could become burnt with this image. To prevent such burn-in, a screen saver feature activates after eight minutes of idle time. The screen saver messages loop from right to left across the screen. Press any key to restore the previous screen.

3.2 Front Panel Menus

Opening Screen



The opening screen displays the software version and the unit serial number.

- Press Enter to move to the next screen.
- Press Clear to move to the previous menu screen.

3.2.1 Select: Menu



Press **ENTER** or **CLEAR** to immediately access the **SELECT:** menu screen from the opening screen. From any nested menu, press **CLEAR** repeatedly until this screen reappears.

Use the **<▶** arrow keys to select Config, Monitor, Status, or Utility. Press **ENTER** to continue.

Table 3-2. Select Menu Description

Item	Description
Configuration	Use to make changes to the unit.
Monitor	Use to monitor the current status of the unit, such as reported voltages, currents, etc.
Status	Use to see the Current Fault / Alarm status.
Utility	Use to configure various operational functions, such as setting the local clock, display LED brightness, etc.

3.2.1.1 Select: Config Menu



Use the ◀▶ arrow keys to select a submenu. Press ENTER.

Table 3-3. Select: Config Menu Description

Item	Description
Remote	Use to make changes to the communications port.
Unit	Use to make changes to the unit.
Redundancy	Use to make changes to the Redundant configuration.
Mask	Use to define Mask / Alarm / Fault behavior to reported operating parameters.

Use the ◀▶ arrow keys to select Remote, Unit, Redundancy, or Mask from this screen. Press ENTER to continue.

3.2.1.1.1 Select: Config: Remote Control Menu



Table 3-4. Select: Config: Remote Menu Description

Item	Description
Local	Use for only front panel control.
Ethernet	Use for both front panel and ethernet port control.

Use the ◀▶ arrow keys to select Local or Ethernet from this screen. Press ENTER to continue.

3.2.1.1.2 Select: Config: Unit Menu



Table 3-5. Select: Config: Unit Menu Description

Item	Description
Common	Use for global configuration controls.
Unit 1/2/3	Use to control the settings associated with the selected unit.

Use the ◀▶ arrow keys to select Common or Unit 1/2/3 from this screen. Press ENTER to continue.

Select: Config: Unit: Common: Current Window Menu



Table 3-6. Select: Config: Unit: Common: Current Window Menu Description

Item	Description
Enable	Use to turn off/on Enable feature.
Range	Use to select the Range percent.

If measured current varies by more than $\pm x\%$, as shown in the Range percent setting, an issue will be identified with the unit.

Use the ◀ ▶ arrow keys to select Enable or Range. Press ENTER to continue.

Select: Config: Unit: Unit 1/2/3 Menu



Table 3-7. Select: Config: Unit: Unit 1/2/3 Window Screen

Menu Branch	Function
Current Source	Select Off, 13 V, 18 V. via up/down key press This can only be changed if the rear panel Bias Control Switch is in the center position.
Ref	This shows the nominal current as recorded by Calibrate in this screen or as recorded by the rear panel Calibrate push button.
Calibrate	There is a calibrated reference point for both 13 V and 18 V. Select this and press "Enter" to set calibration point.

3.2.1.1.3 Select: Config: Redundancy Menu



Table 3-8. Select: Config: Redundancy Menu

Menu Branch	Function
Redundancy Mode	Select Auto or Manual. If a unit fault is detected, an appropriate switchover will occur, and the system will fall into manual mode. If Manual mode is selected, the unit will not throw a switch in the event of a detected fault.

3.2.1.1.4 Select: Config Mask Menu



Use the ◀▶ arrow keys to select Unit 1/2/3 from this menu. Press ENTER to continue.

Select: Config: Mask: Unit

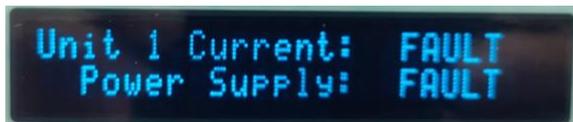


Table 3-9. Select: Config: Mask: Unit Menu

Menu Branch	Function
Current	Set to Alarm: If the unit current goes outside of the allowable window (window size and window center calibrated point set by the user), an event is reported but does not cause a switchover. Set to Fault: An event is recorded, and the unit will switchover if in <i>Auto Redundancy</i> mode.
Power Supply	Set to Alarm: If the unit bias voltage goes outside the allowable window (window size and window center calibrated hard coded), an event is reported but does not cause a switchover. Set to Fault: An event is recorded, and the unit will switchover if in <i>Auto Redundancy</i> mode.

3.2.1.2 Select: Monitor Menu



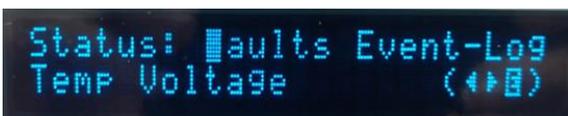
Select Unit 1/2/3, which allows access to a unit's individual operating conditions.
Use the ◀▶ arrow keys to select a unit from this menu. Press ENTER to continue.

3.2.1.2.1 Select: Monitor: Unit 1/2/3



The Unit screen displays the unit's bias voltage and current.

3.2.1.3 Select: Status Menu



Use the ◀▶ arrow keys to select Faults (current), Event Logs, Temp (controller temperature), and Voltage (internal controller) from the screen menu. Press ENTER to continue.

3.2.1.3.1 Select: Status: Faults Menu

Select: Status: Faults: Live Faults



This menu screen allows access to Live Faults.

Use the ◀▶ arrow keys to select Controller or Unit 1/2/3 from the screen menu. Press ENTER to continue.

Select: Status: Faults: Controller Fault



This screen shows the status of the Controller Fault.

Select: Status: Faults: Unit 1/2/3 Fault



This screen shows the status of Unit 1/2/3 Faults.

3.2.1.3.2 Select: Status: Event Log Menu

Select: Status: Event Log: Stored Event Menu



Use the ◀▶ arrow keys to select View or Clear-all from the screen menu. Press ENTER to continue.

Select: Status: Event Log: Stored Events: View



This screen shows a typical date-stamped event log.

3.2.1.3.3 Select: Status: Temperature



This screen shows the controller temperature.

3.2.1.3.4 Select: Status: Voltage



This screen shows the controller internal voltages. These will be shown as “N/A” if not monitored.

3.2.1.4 Select: Utility Menu



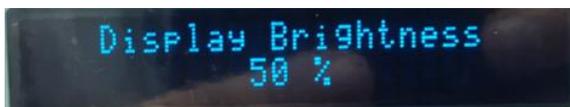
Use the ◀▶ arrow keys to select Date/Time, or Display Firmware from this screen. Press ENTER to continue.

3.2.1.4.1 Select: Utility: Date/Time



Use this screen to set the real time clock used to time stamp events.

3.2.1.4.2 Select: Utility: Display



Use this screen to set the display brightness.

3.2.1.4.3 Select: Utility: Firmware (Images)



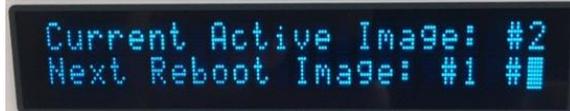
Use the ◀▶ arrow keys to select Info or Select from this screen. Press ENTER to continue.

Select: Utility: Firmware: Firmware Info



This screen provides the released version of the two stored firmware images.

Use the ◀▶ arrow keys to select Bootrom, Image #1, or Image #2 from this screen. Press ENTER to continue.

Select: Utility: Firmware: Current Active Image

This screen displays the current active firmware.

Use the ◀▶ arrow keys to select Image #1 or Image #2 from this screen. Press ENTER to continue.

3.3 Modes of Operation

3.3.1 RC-1170

The RC-1170 can operate in three different modes:

- Single LNA/LNB
- Dual singles
- 1:1 Redundancy

3.3.2 RC-1270

The RC-1270 can operate in four different modes:

- Single
- Dual single
- Triple single
- 1:2 switch controller

The single and dual modes are covered in Section 3.3.2.1.

3.3.2.1 Single and Dual Mode (Future)

The unit remains in the Manual mode at all times for the single or dual modes.

If there is a failure of an LNA/LNB, the respective fault light will illuminate, but no switch over will occur. The RC-1270 performs equally in this mode.

Because there are no indicator contacts from the waveguide switch, the online indicators will not illuminate. For appearance purposes only, the indicator connections could be made in the J1 mating connector to simulate the waveguide switch. Refer to Chapter 1 for more information.

3.3.2.2 1:1 Configuration Mode

In this mode, two LNAs are connected to the same antenna feed through a waveguide switch. Only one of the two LNAs can be connected online. The other LNA/LNB remains on stand-by, although powered at all times.

Either one of the LNA/LNB can be online when the unit is switched from manual to auto mode.

In case of failure of the online LNA/LNB, the switch controller will change the waveguide switch to the opposite position. The controller will then go to manual mode to prevent any future switch backs to the failed unit.

If the stand-by LNA/LNB fails, the switch controller will switch from auto to manual mode.

3.3.2.3 Triple Single Mode (Future)

In the triple single mode, the auto/manual switch stays in manual position at all times. This allows the unit to power three independent LNAs.

The redundancy feature of two separate AC power sources combined with two internal power supplies is also an option in this mode.

3.3.2.4 1:2 Redundant Mode

In this mode, three LNAs are configured with two LNAs/LNBs online and one powered LNA/LNB as a dedicated backup.

If an online LNA/LNB fails, the backup LNA/LNB will switch online to replace the faulted unit. The controller will then change the system to the manual mode.

If the system is then set to "Auto Redundancy" mode and the remaining Dedicated online" unit fails, the system will again switch with the "most recently faulted" LNA/LNB replaced with the backup LNA/LNB. Again, the system will change to the Manual redundancy mode.

3.4 Calibration

After the unit is installed and properly cabled, a calibration check must be performed. The calibration push-button is located on the left side of the rear panel.

3.4.1 Calibration Requirement

The calibration of the unit becomes necessary because the controller can operate with LNA/LNB currents from 65 to 600 mA.

During the calibration process, an electronic potentiometer will scale the current reading to the center of the error window. The potentiometer setting is stored in EEPROM and is recalled upon power-up.

Three requirements are necessary to initiate a calibration:

- LNAs intended for service are connected correctly.
- Controller is in local mode.
- Unit is in manual mode.
- There is a separate calibration point for each unit and each bias voltage (i.e. each unit will have a calibration point for 13 V operation and one for 18 V). The quickest way to set all calibration points is with the rear panel switches.
- Connect the system and confirm the LNA/Bs are operating correctly.
- Set the rear panel bias voltage switch to “High” and press the momentary “Cal” button.
- Repeat the calibration process with the bias switch on the Low setting.
- Set the bias switch to the center “SW” setting.

If the LNA/LNB current deviates from the initial value by approximately $\pm 30\%$ (as set by user), a fault will occur.



It is important to calibrate the system only upon initial installation. If the calibration is performed as part of routine maintenance, the upward or downward drift of the current will be constantly adjusted.

3.4.2 Calibration Failure

Upon pressing the calibration push-button, the electronic potentiometer will move up or down to center itself in the error window. Should the LNA/LNB current be ≤ 65 mA or \geq than 600 mA, the circuit will be unable to center itself. The fault LED will be on for the respective LNA/LNB.

3.5 Internal Adjustments and Switches

3.5.1 Power Supply Voltage

This parameter is set at the factory.

Chapter 4. FIRMWARE UPDATES

4.1 Overview



Make sure to operate the RC-1170/1270 Redundancy Switch Controller with its latest available firmware.

The RC-1170/1270 Redundancy Switch Controller is factory-shipped with its latest version of CEFD's firmware. If you need to update the firmware, you can apply the update without having to remove it from operation. You may directly acquire the download from CEFD's web site (www.comtechedata.com), or receive the archive file by e-mail from CEFD Product Support.

4.1.1 Important Considerations

Before you proceed with the firmware update, make sure that:

- The '**J4 | Unit Com**' ethernet interface is connected to the user PC
- The PC is running a terminal emulation program for operation of the Serial or Ethernet interfaces.
- The Management Internet Protocol (IP) Address has been noted.
- The PC is running a compatible web browser for operation of the HTTP Interface.
- The CEFD's latest firmware files have been downloaded or are available on the User PC in an accessible temporary folder.

4.1.2 Firmware Update Procedure Summary

1. Download the firmware update archive file to a user-supplied PC.
2. Directly connect the '**J4 | Unit Com**' ethernet interface to a Network Interface Card (NIC) or network switch on the same subnet as the user PC.

3. Extract the firmware update files from the archive download file. The file to be uploaded is similar to FW-0021329-_v1.1.1.zip.



Using the wrong firmware could cause your unit to fault.

4. Navigate to the **Admin > Upgrade** web page.
5. Follow the **Firmware Upgrade** procedure.

Redundant Controller :: Upgrade

Home	Admin	Configuration	Status
Access	Time	SNMP	Upgrade

Firmware Upgrade Procedure

1. The procedure below was written for the Chrome Browser. If a different browser is used, some buttons may be renamed.
2. Extract the contents of a WebPost Zip file, similar to FW-0021329-_WebPost_v1.1.1.ZIP
3. Press the **Choose File** button in the frame below and browse to the directory containing the firmware extracted in Step 2.
4. Select the firmware Zip Archive, filename will be similar to FW-0021329-_v1.1.1.ZIP
5. Press the **Upload File** button in the same frame. Wait while the file is uploaded to the amplifier. **Warning: Do not browse to another page during the file upload as it will abort the upload prematurely! Should this happen, reboot the amplifier before retrying.**
6. Wait for the "Upload Complete (XXXXXXXX)" message to appear in the **ReFLASH Status** indicator shown below. Check the 8 digit hexadecimal file checksum shown "(XXXXXXXX)" with the checksum shown in the firmware release notes. If the checksums match, proceed to Step 7 below, otherwise repeat from Step 3.
7. Press the **Extract Files** button below. Wait for the "ReFLASH Done" message to appear in the **ReFLASH Status** indicator.
8. Select the appropriate image in the **Next Reboot Image** field.
9. Once the **Next Reboot Image** displays the proper value, click the **Reboot** button.

Firmware File Upload

No file chosen

ReFLASH Status: **None**

Firmware Image

Active Image: **2** Next Reboot Image: **2**

Firmware Information

Boot:

FW-0021340- 1.1.1 17/08/21

Bulk1:

FW-0021329- 1.1.1h 13/09/21
 FW-0021330- 1.1.1h 13/09/21
 FW-0021328- 1.1.1 23/08/21
 FW-0021327- 1.1.1 19/08/21

Bulk2:

FW-0021329- 1.1.1h 13/09/21
 FW-0021330- 1.1.1h 13/09/21
 FW-0021328- 1.1.1 24/08/21
 FW-0021327- 1.1.1 19/08/21

Figure 4-1. Upgrade Webpage Example

4.1.3 About Firmware Numbers, File Versions, and Formats

The CEFD website catalogues its firmware update files by product type (e.g., router, modem, etc.), the specific model, and optional hardware configurations. The Software Updates tab is displayed on the Home page. The Software Downloads page opens where there is another tab for Download Flash & Software Update Files. The RC-1170/1270 Redundancy Switch Controller is listed under Amplifiers. Once the page is opened, the firmware download hyperlink appears as **FW-0021329X_V###**, where 'X' is the revision letter, and '###' represents the firmware version number (e.g., V156 = Version 1.5.6).

4.2 Download and Extract the Firmware Update Files

Do these steps:

1. Go to the CEFD website at www.comtechedata.com.
2. On the Home page, click the **Software Updates** tab to open the Software Downloads page.
3. On the **Software Downloads** page, click **Download Flash and Software Update Files**.
4. Select the **Amplifiers** hyperlink.
5. Select the product hyperlink.
6. Select the appropriate firmware archive ZIP file download hyperlink.



Using the wrong firmware could cause your unit to fault.

7. Once you select the ZIP hyperlink, the **File Download** dialogue opens on your browser and prompts an action. You may otherwise click **[Cancel]** to quit the file download process. Note the following:
 - For ZIP files:



- Click **[Open]** to open the archive file. Use a file archive utility, such as 7-zip, to select the files for extraction to your destination folder.
 - Click **[Save]** to download the ZIP file to your Windows Downloads folder. Once the download is complete the dialogue prompts you to either **[Open]** the archive file, or to open or view the Windows Downloads folder for further action.
8. If not already done with **File Download > Open**, you must extract, at a minimum, these files (filenames are subject to change):
 - **FW-0021329X_v111.zip – The Firmware Bulk Image file**
 - **FW-0021329X_v111_Release Notes.pdf – The Firmware Release Notes PDF file**
 - The webpost also contains *.mib files, used for SNMP.



WHERE: 'X' is the firmware revision letter, and '111' is the firmware version (e.g., FW Ver. 156 = "1.5.6")

- Confirm availability of the firmware files in a temporary folder. There are several ways you can view the contents of the temporary folder on a Windows-based PC.

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Chapter 5. ETHERNET INTERFACE OPERATION

5.1 Overview

Operation of the RC-1170/1270 Redundancy Switch Controller Ethernet Interface is available when you connect a user-supplied, windows-based PC to the '**J4 | Unit Com**' communications port on the RC-1170/1270 Redundancy Switch Controller using the appropriate adapter cable.

Two protocols are available to use for the Ethernet remote Monitor and Control (M&C). Operate these protocols separately.



CEFD recommends use of the Ethernet-based Simple Network Management Protocol (SNMP) interface for advanced users only. All other users are strongly encouraged to use the RC-1170/1270 Redundancy Switch Controller HTTP Interface for remote M&C of the RC-1170/1270 Redundancy Switch Controller.

- Telnet Interface. You may use the serial remote control protocol via this interface. This requires use of Windows Command-line, or a user-supplied terminal emulation program such as Tera Term.
- HTTP (Web Server) Interface. This requires a compatible user-supplied web browser such as Google Chrome.

5.1.1 Prerequisites

Before you proceed with Ethernet remote product management, make sure the following is true:

- The RC-1170/1270 Redundancy Switch Controller is operating with the latest version firmware files.
- The User PC is running a terminal emulation program for operation of the RC-1170/1270 Redundancy Switch Controller Telnet Interface.
- The User PC is running a compatible web browser for operation of the RC-1170/1270 Redundancy Switch Controller HTTP Interface.
- The User PC is connected to the RC-1170/1270 Redundancy Switch Controller '**J4 | Unit Com**' port.
- You have recorded the RC-1170/1270 Redundancy Switch Controller's Management IP Address.

5.2 SNMP Interface

SNMP is an Internet-standard protocol for managing devices over IP networks. An SNMP-managed network has three key components:

- The managed device. This includes the RC-1170/1270 Redundancy Switch Controller.
- The SNMP Agent. This software runs on the RC-1170/1270 Redundancy Switch Controller. The RC-1170/1270 Redundancy Switch Controller SNMP Agent supports both SNMPv1 and SNMPv2c.
- The user-supplied Network Management System (NMS). This software runs on the User PC.

5.2.1 Management Information Base (MIB) Files

An MIB file is used for SNMP remote management of a unique device, and consist of a tree of nodes called Object Identifiers (OIDs). Each OID provides remote management of a particular function. These MIB files should be compiled in a user-supplied MIB Browser or SNMP NMS server.

In the RC-1170/1270 Redundancy Switch Controller MIB file names, the letter x represents the revision of the file.

5.2.1.1 CEFD Root MIB File

- FW10874-2-.mib
- CEFD MIB file gives the root tree for all CEFD RC-1170/1270 Redundancy Switch Controller products (PSx) and consists of only the following OID:
 - Name: comtechEFData
 - Type: MODULE-IDENTITY
 - OID: 1.3.6.1.4.1.6247
 - Full path:
iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).comtechEFData(6247)
Module: ComtechEFData

5.2.1.2 RC-1170/1270 Redundancy Switch Controller MIB File

- FW-0021149X_rev111.mib
- MIB file consists of all of the OID's for management of the RC-1170/1270 Redundancy Switch Controller functions.

5.2.1.3 RC-1170/1270 Redundancy Switch Controller Traps MIB File

- FW-0021148X_rev111.mib
- Trap MIB file provides SNMPv1 traps common for RC-1170/1270 Redundancy Switch Controller

5.2.2 SNMP Community Strings



In SNMP v1/v2c, the SNMP Community String is sent unencrypted in the SNMP packets. Caution must be taken by the network administrator to ensure that SNMP packets travel only over a secure and private network if security is a concern.

The RC-1170/1270 Redundancy Switch Controller uses Community Strings as a password scheme that provides authentication before gaining access to the router agent's MIBs. They are used to authenticate users and determine access privileges to the SNMP agent. The RC-1170/1270 Redundancy Switch Controller defines three Community Strings for SNMP access:

- Read Community default = public
- Write Community default = private
- Trap Community default = comtech

Type the SNMP Community String into the user-supplied MIB Browser or Network Node Management software.



For correct SNMP operation, the RC-1170/1270 Redundancy Switch Controller MIB files must be used with the associated version of the RC-1170/1270 Redundancy Switch Controller M&C. See the RC-1170/1270 Redundancy Switch Controller Firmware Release Notes for information on the required Firmware/Software (FW/SW) compatibility.

5.2.3 SNMP Traps



The RC-1170/1270 Redundancy Switch Controller SNMP agent supports both SNMPv1 and v2c. The RC-1170/1270 Redundancy Switch Controller Traps file needs to be compiled only if SNMPv1 traps are to be used.

The RC-1170/1270 Redundancy Switch Controller has the ability to send out SNMP traps both when a fault occurs and when a fault clears in the unit. Configure which style of traps the RC-1170/1270 Redundancy Switch Controller sends by using the RC-1170/1270 Redundancy Switch Controller SNMP Trap Version OID.

The RC-1170/1270 Redundancy Switch Controller supports the following MIB2 SNMPv1 traps and v2 notifications:

MIB2 SNMPv1 trap: Authentication Failure	5
MIB2 SNMPv2 notifications: Authentication Failure	1.3.6.1.6.3.1.1.5. 5

The RC-1170/1270 Redundancy Switch Controller supports the following Faults SNMPv1 traps and v2 notifications:

Faults SNMPv1 traps:	
redSystemSummaryFaultEventV1	624712901
redUnit1CurrentEventV1	624712902
redUnit1VoltageEventV1	624712903
redUnit2CurrentEventV1	624712904
redUnit2VoltageEventV1	624712905
redUnit3CurrentEventV1	624712906
redUnit3VoltageEventV1	624712907
redPS56VEventV1	624712908
redPS24EventV1	624712909
redPS15VEventV1	624712910
redPS5V8EventV1	624712911
redPS5VEventV1	624712912
redPS3V3EventV1	624712913
redSwitch1EventV1	624712914
redSwitch2EventV1	624712915
redSwitch3EventV1	624712916
redSwitch4EventV1	624712917
redRefLockDetectEventV1	624712918
redLocalSwitchVoltageDetectEventV1	624712919
redRemoteSwitchVoltageDetectEventV1	624712920
Faults SNMPv2 notifications:	
redSystemSummaryFaultEvent	1.3.6.1.4.1.6247.129.2.1.1
redUnit1CurrentEvent	1.3.6.1.4.1.6247.129.2.1.2
redUnit1VoltageEvent	1.3.6.1.4.1.6247.129.2.1.3
redUnit2CurrentEvent	1.3.6.1.4.1.6247.129.2.1.4
redUnit2VoltageEvent	1.3.6.1.4.1.6247.129.2.1.5
redUnit3CurrentEvent	1.3.6.1.4.1.6247.129.2.1.6
redUnit3VoltageEvent	1.3.6.1.4.1.6247.129.2.1.7
redPS56VEvent	1.3.6.1.4.1.6247.129.2.1.8
redPS24VEvent	1.3.6.1.4.1.6247.129.2.1.9
redPS15VEvent	1.3.6.1.4.1.6247.129.2.1.10
redPS5V8Event	1.3.6.1.4.1.6247.129.2.1.11
redPS5VEvent	1.3.6.1.4.1.6247.129.2.1.12
redPS3V3Event	1.3.6.1.4.1.6247.129.2.1.13
redSwitch1Event	1.3.6.1.4.1.6247.129.2.1.14

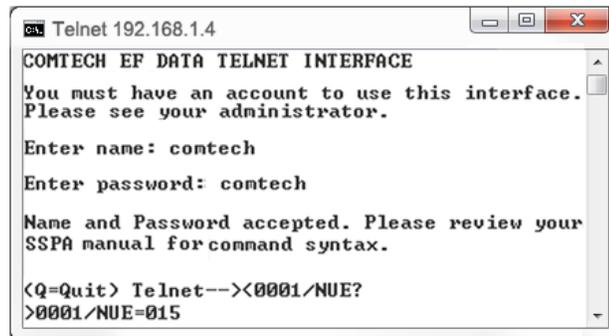
redSwitch2Event	1.3.6.1.4.1.6247.129.2.1.15
redSwitch3Event	1.3.6.1.4.1.6247.129.2.1.16
redSwitch4Event	1.3.6.1.4.1.6247.129.2.1.17
redRefLockDetectEvent	1.3.6.1.4.1.6247.129.2.1.18
redLocalSWVoltEvent	1.3.6.1.4.1.6247.129.2.1.19
redRemoteSWVoltEvent	1.3.6.1.4.1.6247.129.2.1.20

5.3 Telnet Interface



Chapter 5. SERIAL INTERFACE OPERATION

The RC-1170/1270 Redundancy Switch Controller has a Telnet interface for the purpose of equipment M&C via the optional Serial Remote Control protocol. The Telnet interface requires user login at the **Administrator** level and **Read/Write** level. Once logged into the Telnet interface as the Administrator, you have access to the optional serial-based Remote Control Interface. An example of the login process and remote control operation is shown here:



```
Telnet 192.168.1.4
COMTECH EF DATA TELNET INTERFACE
You must have an account to use this interface.
Please see your administrator.
Enter name: comtech
Enter password: comtech
Name and Password accepted. Please review your
SSPA manual for command syntax.
<Q=Quit> Telnet--><0001/NUE?
>0001/NUE=015
```

Figure 5-1. Telnet Interface Example – Windows Command-line

5.3.1 Telnet Remote Control Operation via Tera Term

There is a disadvantage when using the Windows Command line as a Telnet client with the optional Remote Control protocol. For the messages coming from the Telnet Server, Command line cannot translate a carriage return command (**\r**) to a carriage return + line feed command (**\r\n**). Therefore, any multi-line Target-to-Controller response (e.g., the response to the FRW? query) shows as one line, with the latter lines overwriting the previous lines.

To see the full response messages, you can use the Tera Term terminal emulation program configured as a Telnet client. An example of the login process and remote control operation, when using Tera Term as the interface, is shown in Figure 5-2.

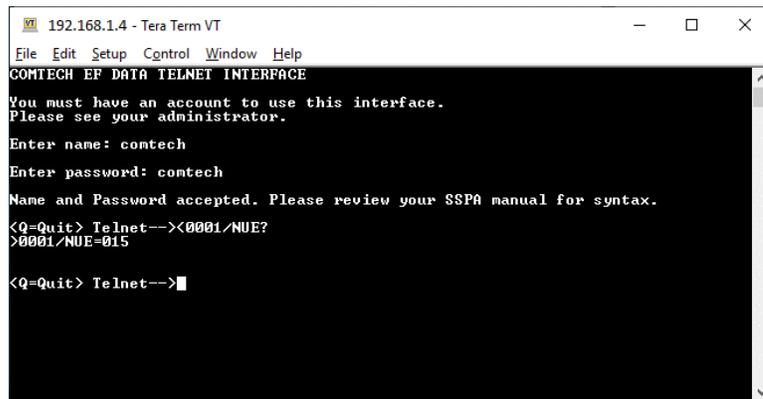


Figure 5-2. Telnet Interface Example – Tera Term

5.3.1.1 Configure Tera Term for Telnet Remote Control Operation

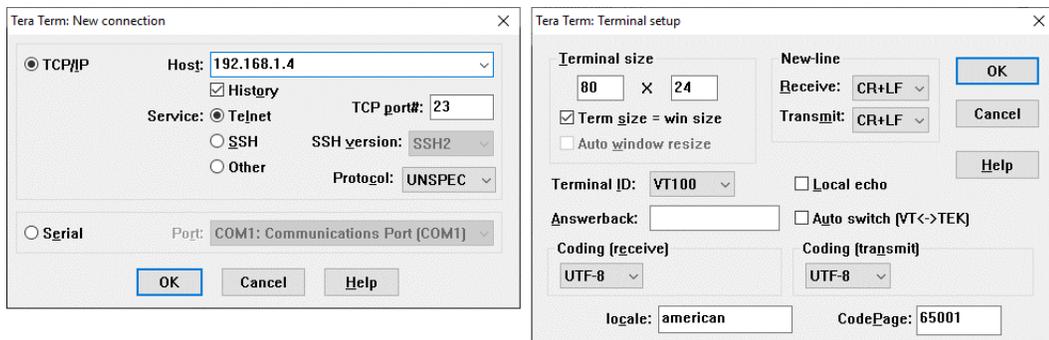


Figure 5-3. Configure Tera Term

See Figure 5-3. Do these steps:

1. Make sure to define the Connect To Telnet connection properties correctly (new connection prompt is displayed when Tera Term is started) (Figure 5-3):
 - a. Enter the RC-1170/1270 Redundancy Switch Controller’s Traffic/Management IP Address as the “Host address” (e.g., 192.168.1.4).
 - b. Enter 23 as the “TCP port#”.
 - c. Select TCP/IP instead of Serial.
 - d. Click **[OK]** to save your settings.
2. For Terminal Setup (Setup → Terminal) (Figure 5-3, right):
 - a. Select the “CR+LF” option in the Receive dropdown box in the New-line section.
 - b. Select the “CR+LF” option in the Transmit dropdown box in the New-line section.
 - c. Click **[OK]** to save your settings.

5.4 HTTP (Web Server) Interface

A user-supplied web browser allows the full M&C of the RC-1170/1270 Redundancy Switch Controller through its HTTP Interface. This embedded web application is designed for use with Microsoft's Internet Explorer Version 5.5 or higher. It is a non-secure web application.

5.4.1 Enable the HTTP Interface

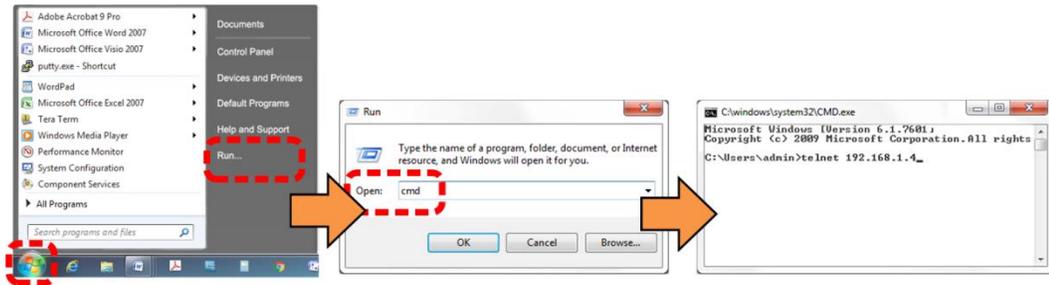


Figure 5-4. Open Windows Command-line

Follow these steps to enable the HTTP Interface in the RC-1170/1270 Redundancy Switch Controller using only a 100BaseTx remote interface (this assumes that you are running a Microsoft Windows operating system):

See Figure 5-4 and do these steps:

1. Select **Start**, then **Run**, then type "**cmd**" to open the Windows Command-line window.
2. Type "**Telnet 192.168.1.4**" to start a Telnet session with the unit using the default Management IP address.

See Figure 5-5 and do these steps:

3. Enter the Telnet username and password (the default for both parameters is **comtech**):
4. The Local Remote Status (LRS) remote command sets or returns Local or Remote state in the form x, where x=1, 2, or 3:
 - LRS=1 (Serial)
 - LRS=2 (Ethernet)
 - LRS=3 (Serial+Ethernet) (default value)

Use the **LRS=2** remote command to set the remote access parameter for Ethernet remote control.

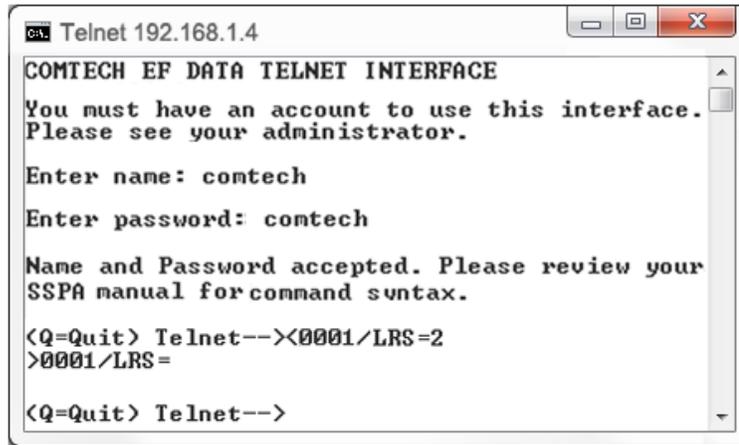


Figure 5-5. Telnet Login and Remote Command Execution



You must assign a unique IP Address (IPA) for each unit on the network before connecting to an existing network. As the IP address may need to be changed to something other than the factory default setting, use the remote command $IPA=xxx.xxx.xxx.xxx.yy$, where: $xxx.xxx.xxx.xxx$ is a valid IP address on the network where the unit is to be installed, and yy is the range (typically, $yy = 24$).

Changing the IPA value requires that you cycle power on the unit, and then start a new Telnet session using the new IP address.

5.4.2 HTTP Interface User Login

Do these steps:

1. From the PC, enter the default Management IP Address for the RC-1170/1270 Redundancy Switch Controller (i.e., <http://192.168.1.4>) into the **Address** area of the browser.



2. In the Login window, type the **User name** and **Password**, and then click **OK**. The default User Name and Password are both **comtech**.



Once the valid User Name and Password is accepted, the RC-1170/1270 Redundancy Switch Controller HTTP Interface splash page opens. The unit and firmware version in this example will differ from your setup.

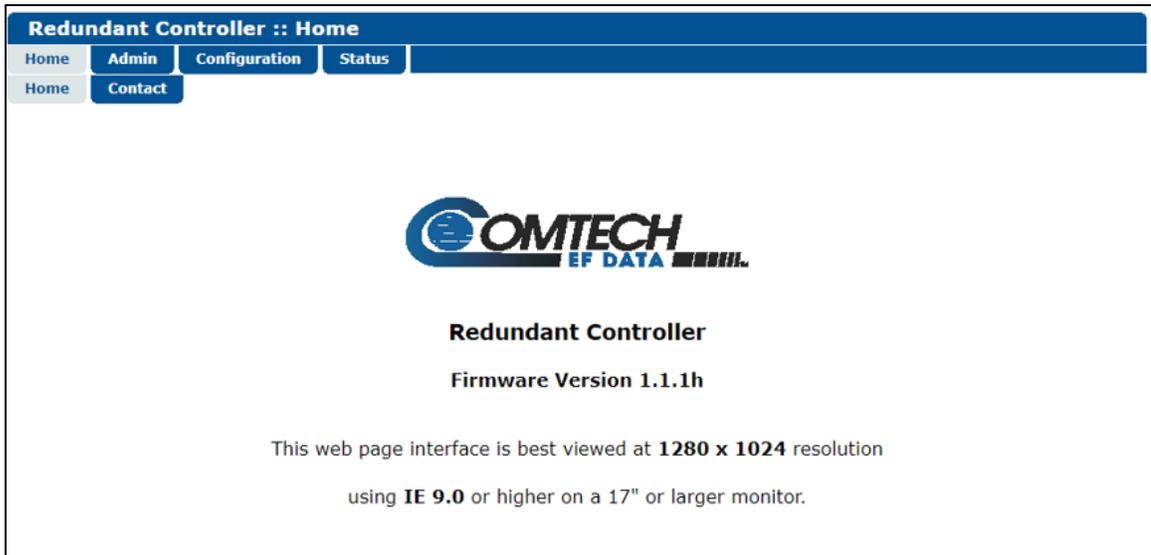


Figure 5-6. RC-1170/1270 Redundancy Switch Controller HTTP Interface 'Splash' Page Example

5.4.3 HTTP Interface Features

5.4.3.1 Menu Tree

Home	Admin	Config	Status
Home	Access	Unit	Summary
Contact	Time	Redundancy	Status
	SNMP	Mask	Events
	Upgrade	Utility	

Figure 5-7. RC-1170/1270 Redundancy Switch Controller HTTP Interface Menu Tree

Figure 5-7 shows the menus and pages in the RC-1170/1270 Redundancy Switch Controller HTTP Interface. This interface has four top level navigation tabs, shown in blue. Each top level tab has page hyperlinks (grey). These hyperlinks open individual nested Web pages.

5.4.4 HTTPS Web Navigation

5.4.4.1 Page Navigation

The HTTP Interface has four navigation tabs at the top of each page. Click a navigation tab to see its page hyperlinks. Click a page hyperlink to open a page.



This manual uses a convention for all web pages to show you how to navigate to the featured page: Navigation Tab | Page Hyperlink. For example, “Home | Home” instructs you to click the ‘Home’ navigation tab, and then click the ‘Home’ page hyperlink.

5.4.4.2 Page Sections

This manual explains the purpose and operation for each Web page and its sections.

Each page has one or more sections. The title at the upper-left corner of each page or section describes its operational features. Each section can have editable fields, action buttons and read-only displays for a specific function.



5.4.4.3 Action Buttons

Action buttons are important in the RC-1170/1270 Redundancy Switch Controller HTTP Interface. Click an action button to do one of these tasks:



- Click **[Refresh]** to see the latest page data.
- Reset changed parameters to remove **unsaved** changes.
- **Submit** (save) changes.



If you change any parameters, make sure to click the related action button before you leave the page. If you go to another page without first clicking the action button, your changes are not saved.

5.4.4.4 Drop-down Lists

A drop-down list lets you choose from a list of selections. Left-click the drop-down button to open the list. Then, left-click on an item to select that choice.



5.4.4.5 Text or Data Entry

Text boxes let you type data into a field. An action button can be associated with a single text box, or a group of text boxes. For any text box, left-click anywhere inside the box and type the desired data into that field. Make sure to press **ENTER** when done typing.



Click the related action button to save the data.

5.5 HTTP Interface Pages

This section provides page examples and descriptions for the HTTP Interface.



The page figures provided in this section are intended for reference purposes only. Your setup may differ from what is shown in this section.

5.5.1 Home Pages

Click **Home** or **Contact** to continue.

5.5.1.1 Home | Home

Use this page to identify the product. Click the **Home** navigation tab or the page hyperlink to return to this page from anywhere in the HTTP Interface.

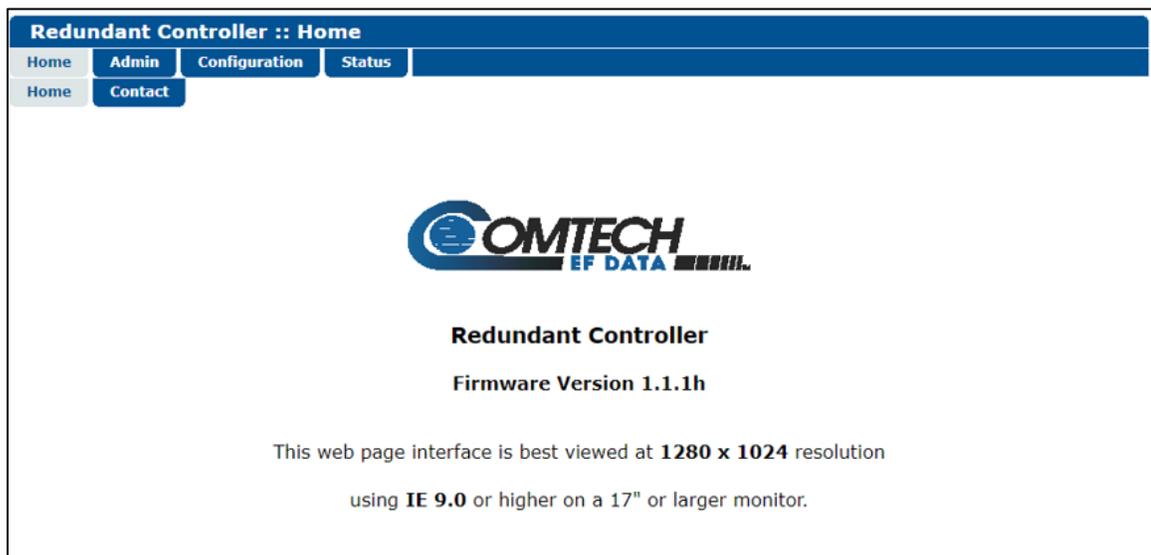


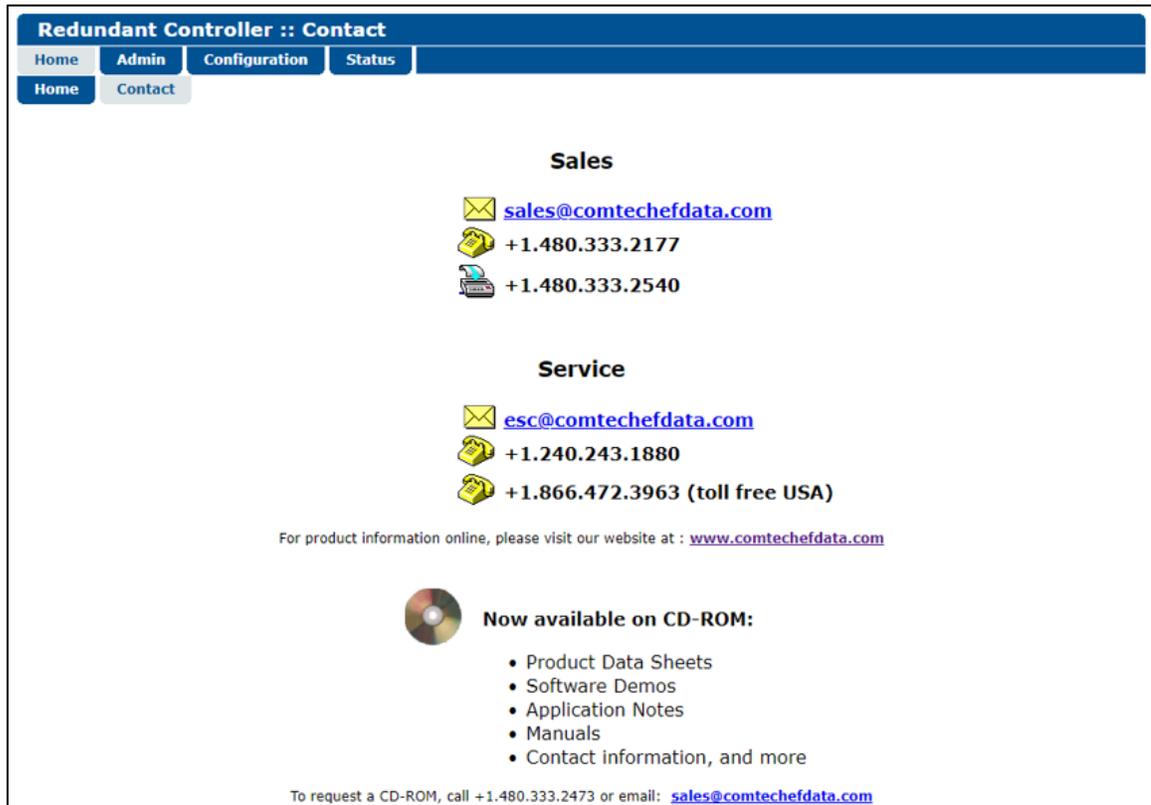
Figure 5-8. RC-1170/1270 Redundancy Switch Controller 'Home | Home' Page (50 W Unit Example Shown)

5.5.1.2 Home | Contact

For all product support, please call:

+1.240.243.1880

+1.866.472.3963 (toll free USA)



Redundant Controller :: Contact

Home Admin Configuration Status Home Contact

Sales

 sales@comtechefdata.com

 +1.480.333.2177

 +1.480.333.2540

Service

 esc@comtechefdata.com

 +1.240.243.1880

 +1.866.472.3963 (toll free USA)

For product information online, please visit our website at : www.comtechefdata.com

 **Now available on CD-ROM:**

- Product Data Sheets
- Software Demos
- Application Notes
- Manuals
- Contact information, and more

To request a CD-ROM, call +1.480.333.2473 or email: sales@comtechefdata.com

Figure 5-9. 'Home | Contact' Page

5.5.2 Admin (Administration) Pages



These pages are available only to users who have logged in using the Administrator Name and Password.

Use these administrator pages to set up user access. Click **Access**, **Time**, **SNMP**, or **Upgrade** to continue.

5.5.2.1 Admin | Access

Click **[Refresh]** to see the latest page data.

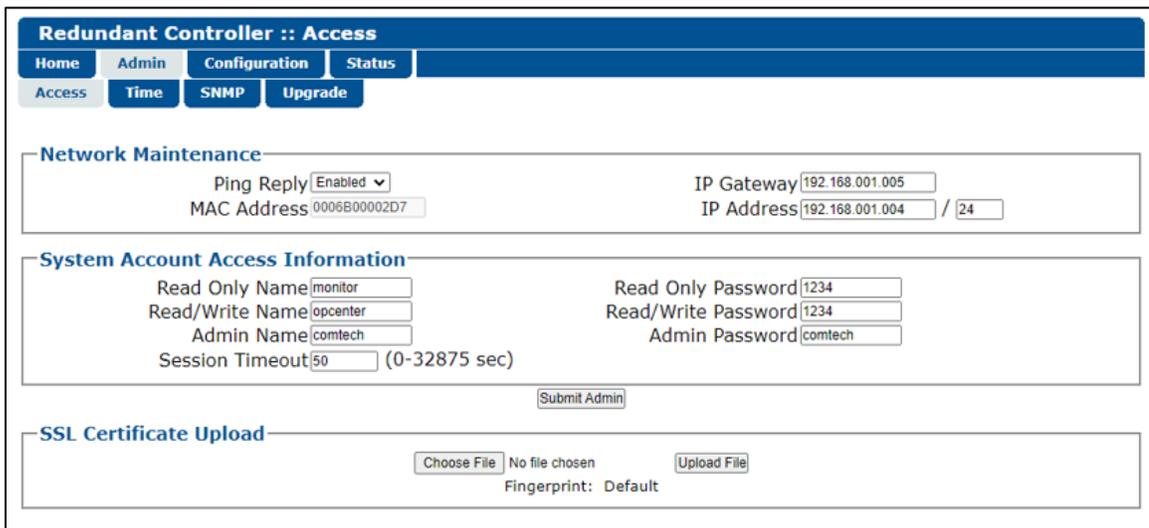


Figure 5-10. 'Admin | Access' Page

Name	Description
Network Maintenance	<p>Ping Reply: Select Enabled or Disabled.</p> <p>IP Gateway: Enter the desired IP Gateway Address in the text box.</p> <p>IP Address: Enter the desired IP Address/Range in the text box.</p> <p>MAC Address (read only): The MAC is set at the factory to a guaranteed unique address that you cannot modify.</p>
System Account Access Information	<p>Name fields can be any alphanumeric combination with a maximum length of 10 characters.</p> <p>Password fields can be any alphanumeric combination with a maximum length of 10 characters.</p> <p>Read Only Name: The factory default is: monitor</p> <p>Read Only Password: The factory default is: 1234</p> <p>Read/Write Name: The factory default is: opcenter</p> <p>Read/Write Password: The factory default is: 1234</p> <p>Admin Name: The factory default is: comtech</p> <p>Admin Password: The factory default is: comtech</p>

Name	Description
	Session Timeout: Number of seconds to Session Timeout Click [Submit Admin] to save any changes.
SSL Certificate Upload	Select [Choose File], and then [Upload File]

5.5.2.2 Admin | Time

Figure 5-11. 'Admin | Time' Page

Name	Description
Time	Simple Network Timing Protocol (SNTP) Server Address: Enter the desired IP of the SNTP Server Address. (0.0.0.0 = SNTP is disabled) Local Time Offset: Enter the GMT offset for the Switch Controller location (-12 to +12). Time: Enter the time. Date: Enter the date. Click [Submit] to save any changes.

5.5.2.3 Admin | SNMP

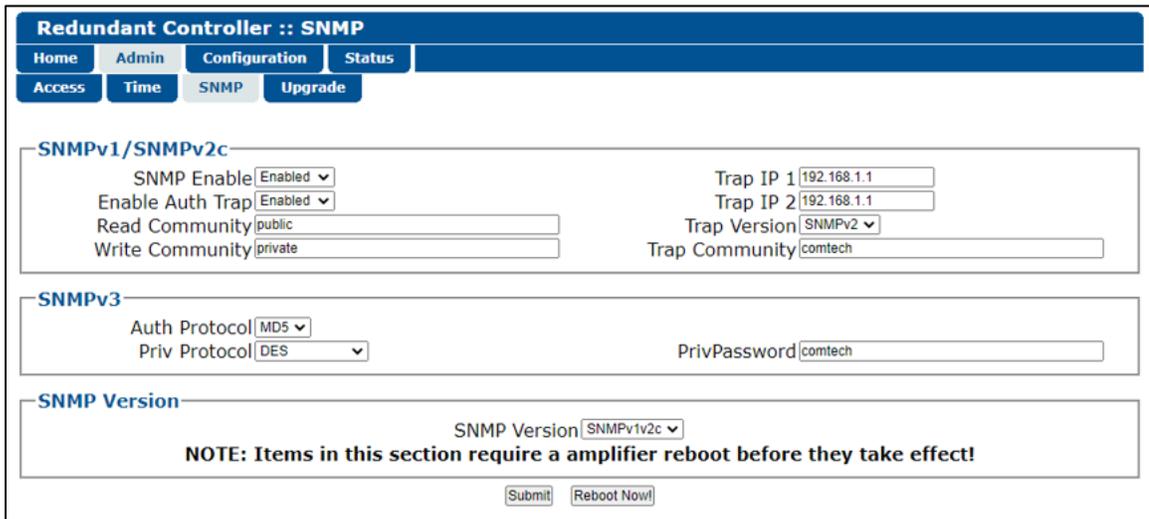


Figure 5-12. 'Admin | SNMP' Page

Name	Description
SNMPv1/SNMPv2c	SNMP Enable: Use the drop-down list to select Enabled or Disabled. Enable Authentication Trap: Use the drop-down list to select Enabled or Disabled. Read Community String: Automatically populates as public. Write Community String: Automatically populates as private. Trap IP 1: The Administrator can assign up to two SNMP Trap IP Addresses. Trap IP 2: The Administrator can assign up to two SNMP Trap IP Addresses. Trap Version: Use the drop-down list to select the version. Trap Community String: This can be any combination of characters and a length of 0 to 20 characters. The factory default for the SNMP Trap Community String is "comtech".
SNMPv3	Auth Protocol: Select a value from the drop down menu. Priv Protocol: Select a value from the drop down menu. PrivPassword: Create a private password. The default is comtech.
SNMP Version	SNMP Version: Use the drop down list to select SNMPv1v2c. A reboot is required for the selection to take affect.

Click **[Submit]** to save any changes or **[Reboot Now]**.

5.5.2.4 Admin | Upgrade

Redundant Controller :: Upgrade

Home
Admin
Configuration
Status

Access
Time
SNMP
Upgrade

Firmware Upgrade Procedure

1. The procedure below was written for the Chrome Browser. If a different browser is used, some buttons may be renamed.
2. Extract the contents of a WebPost Zip file, similar to FW-0021329- _WebPost_v1.1.1.ZIP
3. Press the **Choose File** button in the frame below and browse to the directory containing the firmware extracted in Step 2.
4. Select the firmware Zip Archive, filename will be similar to FW-0021329- _v1.1.1.ZIP
5. Press the **Upload File** button in the same frame. Wait while the file is uploaded to the amplifier. **Warning: Do not browse to another page during the file upload as it will abort the upload prematurely! Should this happen, reboot the amplifier before retrying.**
6. Wait for the "Upload Complete (XXXXXXXX)" message to appear in the **ReFLASH Status** indicator shown below. Check the 8 digit hexadecimal file checksum shown "(XXXXXXXX)" with the checksum shown in the firmware release notes. If the checksums match, proceed to Step 7 below, otherwise repeat from Step 3.
7. Press the **Extract Files** button below. Wait for the "ReFLASH Done" message to appear in the **ReFLASH Status** indicator.
8. Select the appropriate image in the **Next Reboot Image** field.
9. Once the **Next Reboot Image** displays the proper value, click the **Reboot** button.

Firmware File Upload

Choose File No file chosen
Upload File
Extract Files

ReFLASH Status: **None**

Firmware Image

Active Image: **2**
Next Reboot Image: **2**
Set Image1
Set Image2
Reboot

Firmware Information

Boot:
FW-0021340- 1.1.1 17/08/21

Bulk1:
FW-0021329- 1.1.1h 13/09/21
FW-0021330- 1.1.1h 13/09/21
FW-0021328- 1.1.1 23/08/21
FW-0021327- 1.1.1 19/08/21

Bulk2:
FW-0021329- 1.1.1h 13/09/21
FW-0021330- 1.1.1h 13/09/21
FW-0021328- 1.1.1 24/08/21
FW-0021327- 1.1.1 19/08/21

Figure 5-13. 'Admin | Upgrade' Page

Name	Description
Firmware Upgrade Procedure	Follow the nine steps to upgrade the firmware.
Firmware File Upload	Choose File Button: Used to navigate to the Firmware Zip File. Upload File Button: Used to upload the Firmware Zip File. Extract Files Button: Used to extract the Firmware File from the Zip File.
Firmware Image	Shows the current Active Image and the Next Reboot Image. Select [Set Image 1], [Set Image 2], or [Reboot]
Firmware Information	Shows the firmware for Boot, Bulk1, or Bulk2.

5.5.3 Config Pages

Use the **Configuration** pages to configure all operating parameters for the RC-1170/1270 Redundancy Switch Controller. Click **Unit**, **Redundancy**, **Mask**, or **Utility** to continue.

5.5.3.1 Config | Unit

Figure 5-14. 'Config | Unit' Page

Name	Description
Unit Common Configuration	Current Window: Select Enable or Disable. Current Window: Set percentage required.
Unit 1/2/3 Configuration	Current Source: Select 13 V or 18 V Click [Submit Unit 1/2/3]
Calibrate Unit 1/2/3 Current	Reference Point: Set required point, mA. Click [Calibrate Unit 1/2/3]
Serial Communication Settings	Remote Address: Set Remote Address, 0001 to 9999. Data Bits – Parity – Stop bits: Automatically populates. Baud Rate: Set rate using the dropdown list.

5.5.3.2 Configuration | Redundancy



Appendix A. REDUNDANCY DRAWINGS

Redundant Controller :: Redundancy

Home Admin Configuration Status

Unit Redundancy Mask Utility

Status

Unit 1 Online Status:	Online	Force Unit 1 Offline
Unit 2 Online Status:	Online	Force Unit 2 Offline
Unit 3 Online Status:	Offline	Force Unit 3 Offline

Configuration

Redundancy Switch Mode: Manual

Offline Mute

Unit 1 Offline Mute Disabled <input type="button" value="Submit"/>	Unit 2 Offline Mute Disabled	Unit 3 Offline Mute Disabled
---	---	---

Figure 5-15. 'Config | Redundancy' Page

Name	Description
Status	Shows the status for each unit, either Online or Offline. Click [Force Unit 1/2/3 Offline]
Configuration	Redundancy Switch Mode: Select Auto or Manual. Click [Submit] to save the change.
Offline Mute	Unit 1/2/3 Offline Mute: Select Disabled or Enable. Click [Submit] to save the changes.

5.5.3.3 Configuration | Mask

Some of the RC-1170/1270 Redundancy Switch Controller events can be user configured.

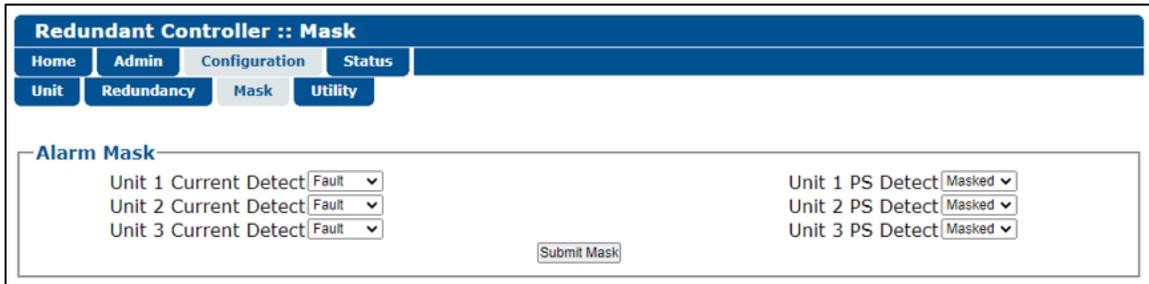


Figure 5-16. 'Configuration | Mask' Page

Name	Description
Alarm Mask	Unit 1/2/3 Current Detect: Select an item from the drop down list. Unit 1/2/3 PS Detect: Select Masked or Unmasked.

Click **[Submit Mask]** to save the changes.

5.5.3.4 Config | Utility

Figure 5-17. 'Configuration | Utility' Page

Name	Description
Circuit ID	Enter a Circuit Identification (CID) (unit identification label) string of up to 48 characters. This is the identification label for the unit. Click [Submit CID] to save the change.
Equipment Identification	Serial Number: This is read only. Model Number: This is read only. Part Number: This is read only.

5.5.4 Status Pages

Select the **Summary**, **Status**, and **Events** tabs on the Status pages.

5.5.4.1 Status | Summary

Click **[Refresh]** to see the latest page data.

Redundant Controller :: Summary	
Home	Admin
Configuration	Status
Summary	Status
Events	
Summary Info	
Circuit Identification: LNA Redundant Controller 1	Summary Fault: OK
Serial Number: 000000000	Unit 1 Status: Online
Model Number: Redundant Controller	Unit 2 Status: Online
FW Version: Boot:1.1.1 Bulk1:1.1.1h Bulk2:1.1.1h	Unit 3 Status: Offline
Active Software Image: Image 2	Unit 1 Current Source: 322.5 mA
Next Reboot Image: Image 2	Unit 2 Current Source: 313.7 mA
Hardware Revision: 0	Unit 3 Current Source: 319.1 mA
Ref Tuning Voltage: N/A	Temperature: 46.5 °C
Date (MM/DD/YY): 09/14/21	Number Unread Events: 61
Time (HH:MM:SS): 14:48:41	

Figure 5-18. 'Status | Summary' Page

Name	Description
Summary Info	This page details the status of the unit. The Summary Fault line indicates that no faults are present with "OK" on green background. If a fault exists, the Summary Fault message changes to "FAULT" on a red background. Should this occur, review the logged faults and alarms on the Status Events page (see Sect. 5.5.4.4).

5.5.4.2 Status | Status

Use this read-only page see general status data for the RC-1170/1270 Redundancy Switch Controller.



The Status | Status page updates automatically once every 5 seconds. Some fields will display, only if equipped (e.g. If the system doesn't have an Internal Reference and LNB attached to the Amplifier, then the LNB Current & LNB PS information is not displayed.)

Redundant Controller :: Status			
Home	Admin	Configuration	Status
Summary	Status	Events	
Status			
PARAMETER	MONITOR	STATUS	
56V Power Supply	55.3 V	OK	
24V Power Supply	23.9 V	OK	
15V Power Supply	15.0 V	OK	
5.8V Power Supply	NA	NA	
5V Power Supply	NA	NA	
3.3V Power Supply	NA	NA	
PS1 56V Power Supply	NA	NA	
PS2 56V Power Supply	NA	NA	
Unit 1 Power Supply	18.5 V	OK	
Unit 2 Power Supply	18.5 V	OK	
Unit 3 Power Supply	13.5 V	OK	
Unit 1 Current Source	322.7 mA	OK	
Unit 2 Current Source	319.3 mA	OK	
Unit 3 Current Source	318.2 mA	OK	
Local Switch	0.0	NA	
Remote Switch	55.8	OK	

Figure 5-19. 'Status | Status' Page

5.5.4.4 Status | Events

Use this page to see stored events data. The whole Event log is displayed.

Click **[Refresh]** to see the latest page data.

Redundant Controller :: Events

Home Admin Configuration Status

Summary Status Events

Events Log

Refresh Clear Log

	Date	Time	Type
1	09-14-21	14:51:39	Info - LOG Faults Cleared
2	09-14-21	14:51:43	Info - LOG Main Power Off
3	09-14-21	14:52:02	Info - LOG Main Power On

Figure 5-20. 'Status | Events' Page

Appendix A. REDUNDANCY DRAWINGS

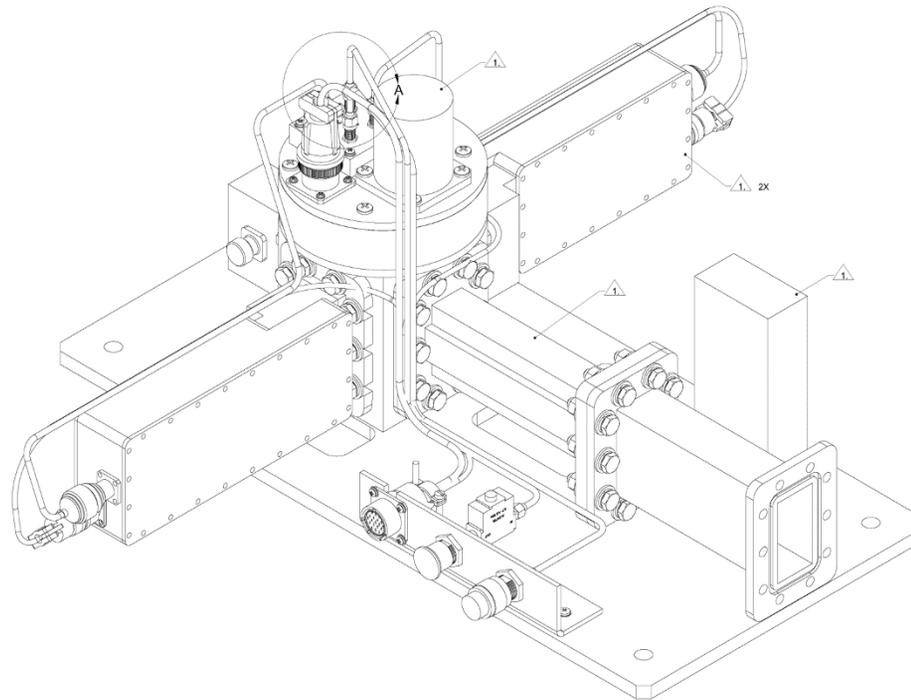


Figure A-1. C-Band LNA 1:1 Redundant System Assembly

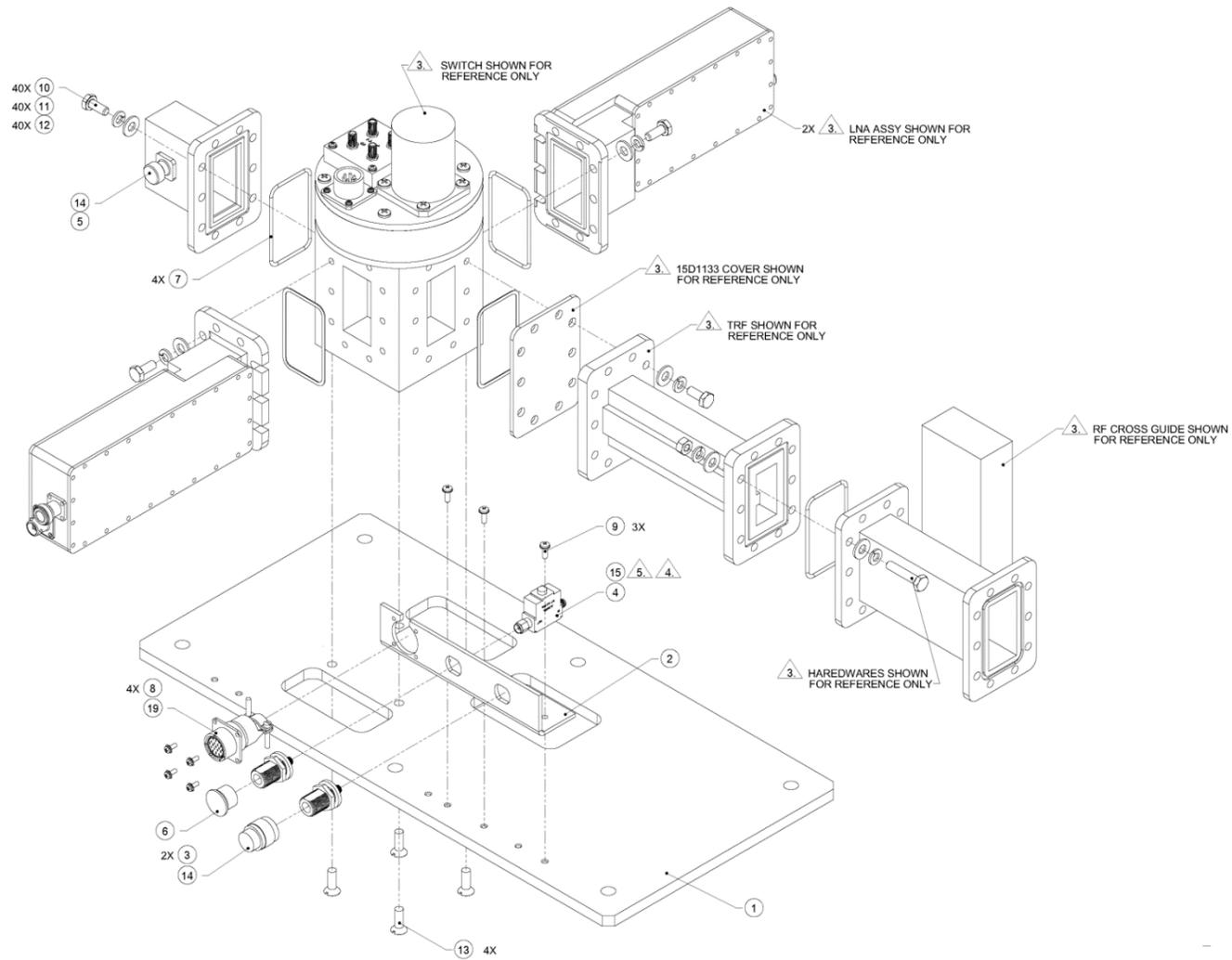


Figure A-2. C-Band LNA 1:1 Redundant System (Exploded View)

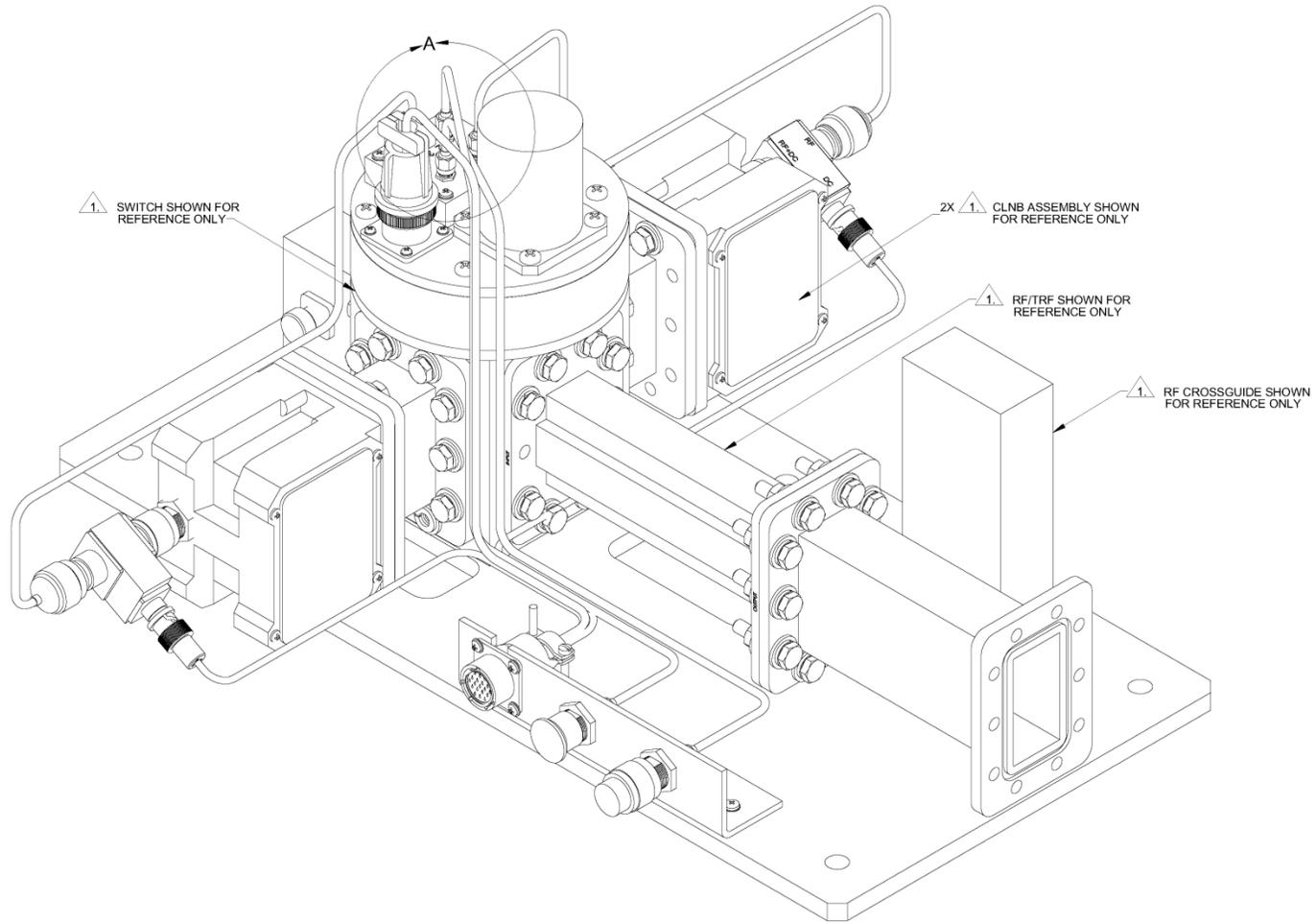


Figure A-3. C-Band LNB 1:1 Redundant System Assembly

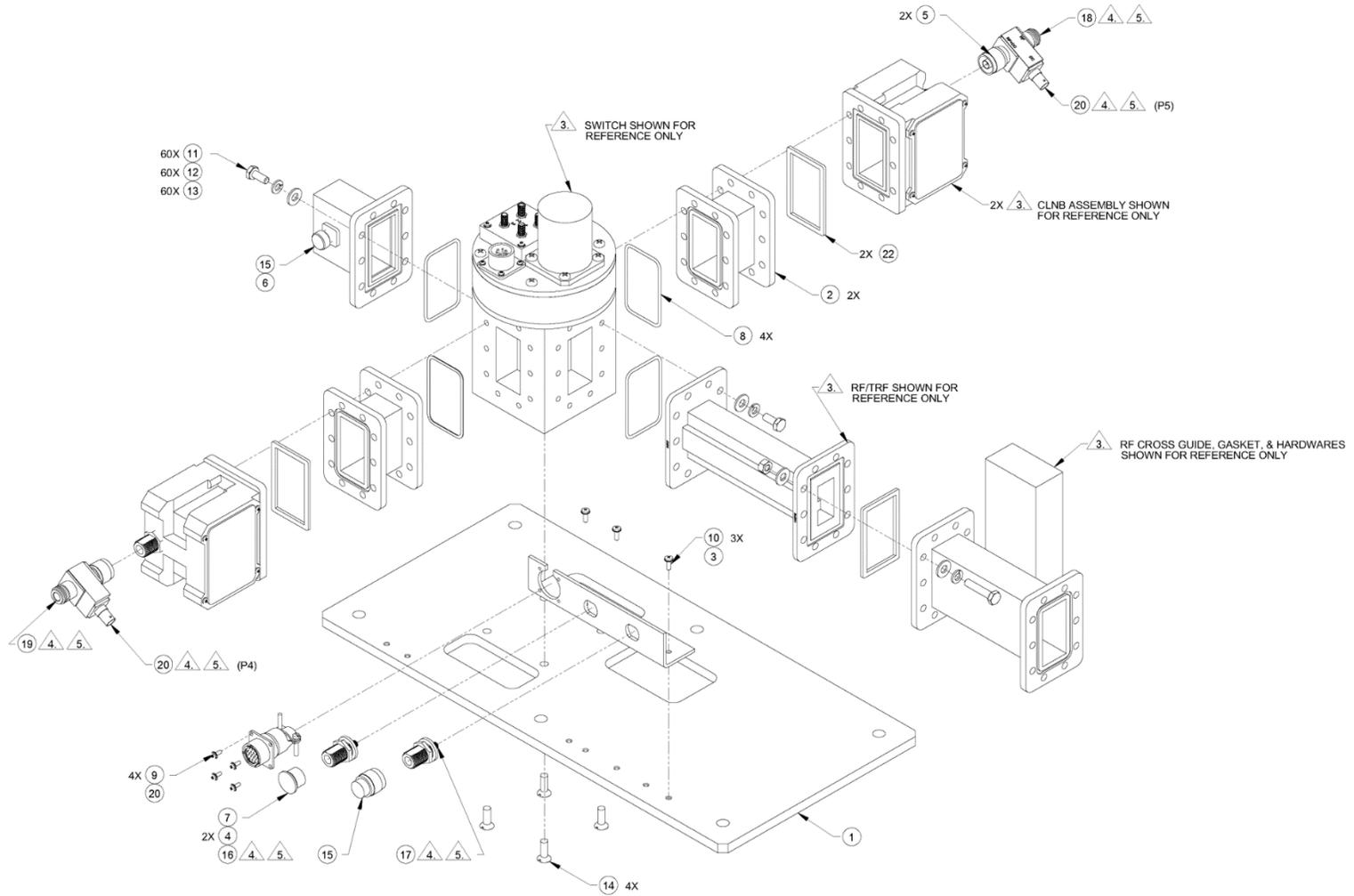


Figure A-4. C-Band LNB 1:1 Redundant System (Exploded View)

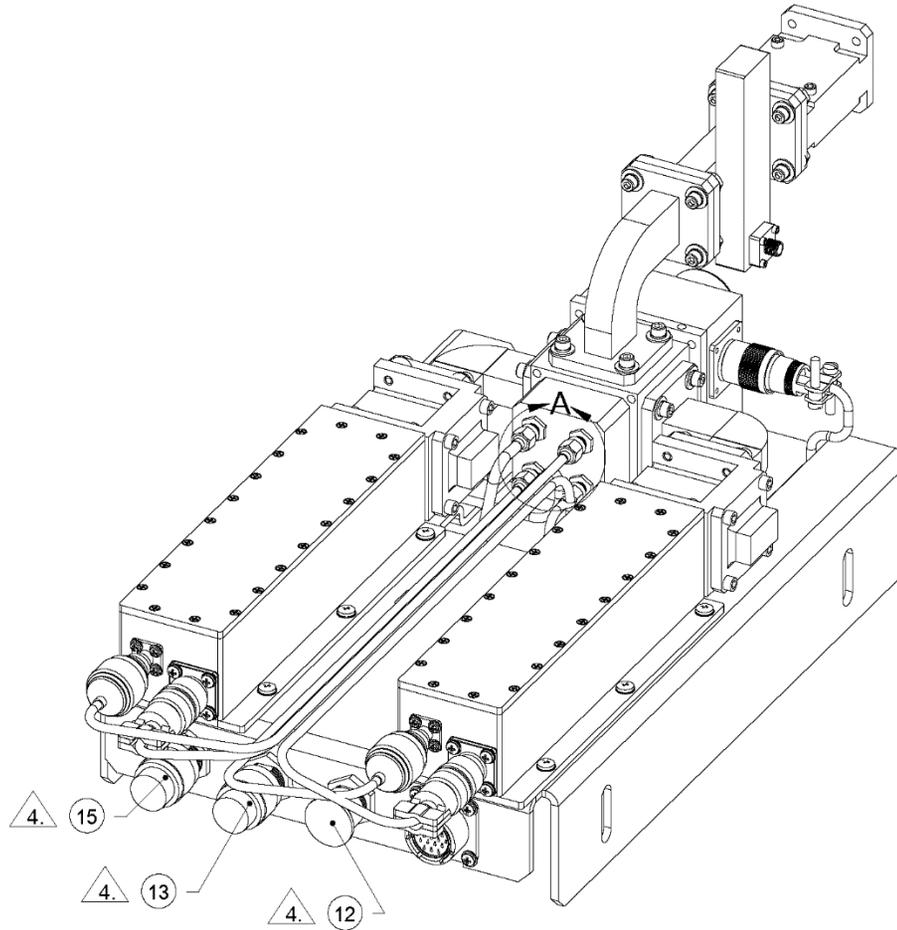


Figure A-5. Ku-Band LNA 1:1 Redundant System Assembly

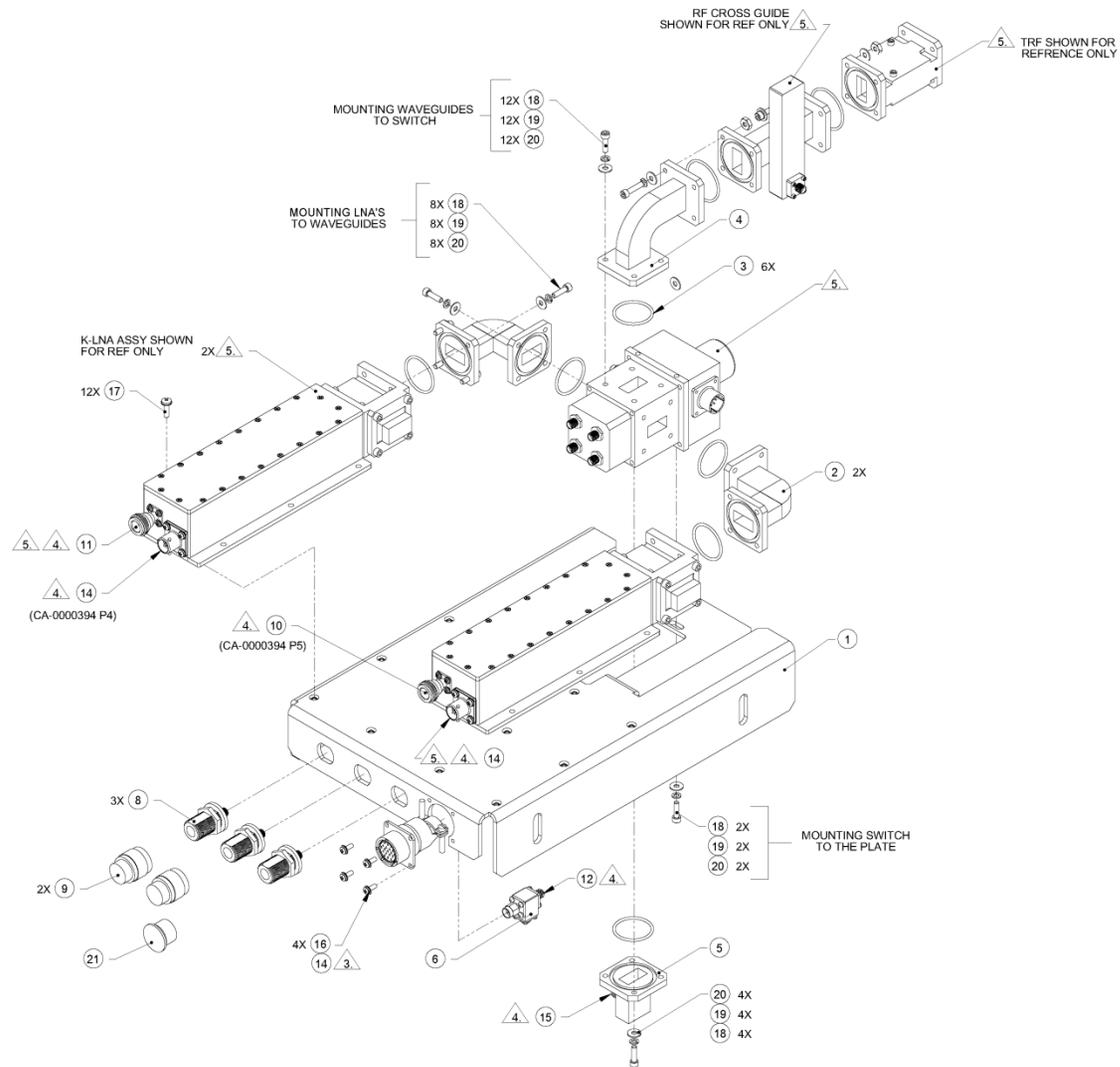


Figure A-6. Ku-Band LNA 1:1 Redundant System (Exploded View)

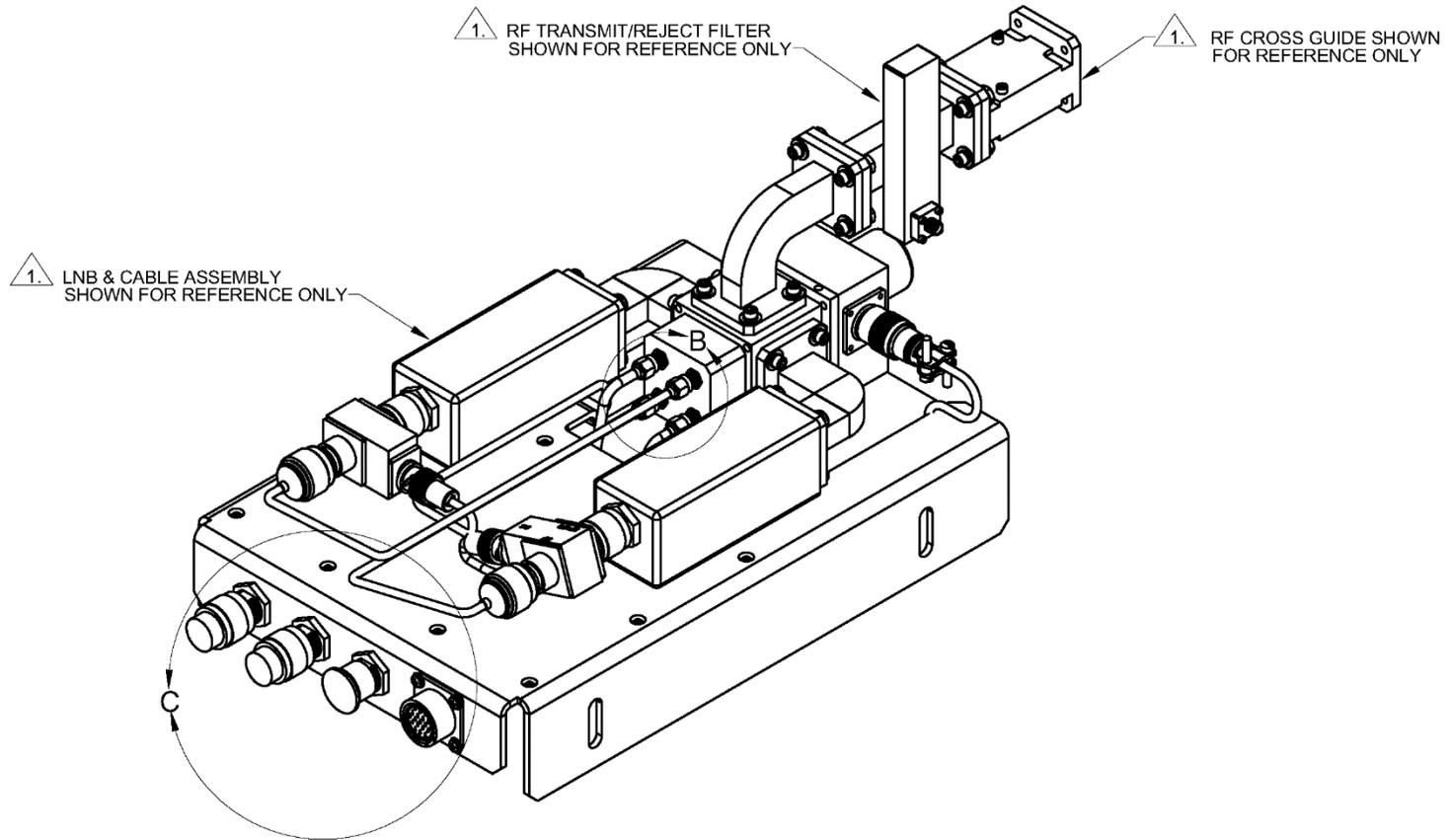


Figure A-7. Ku-Band LNB 1:1 Redundant System Assembly

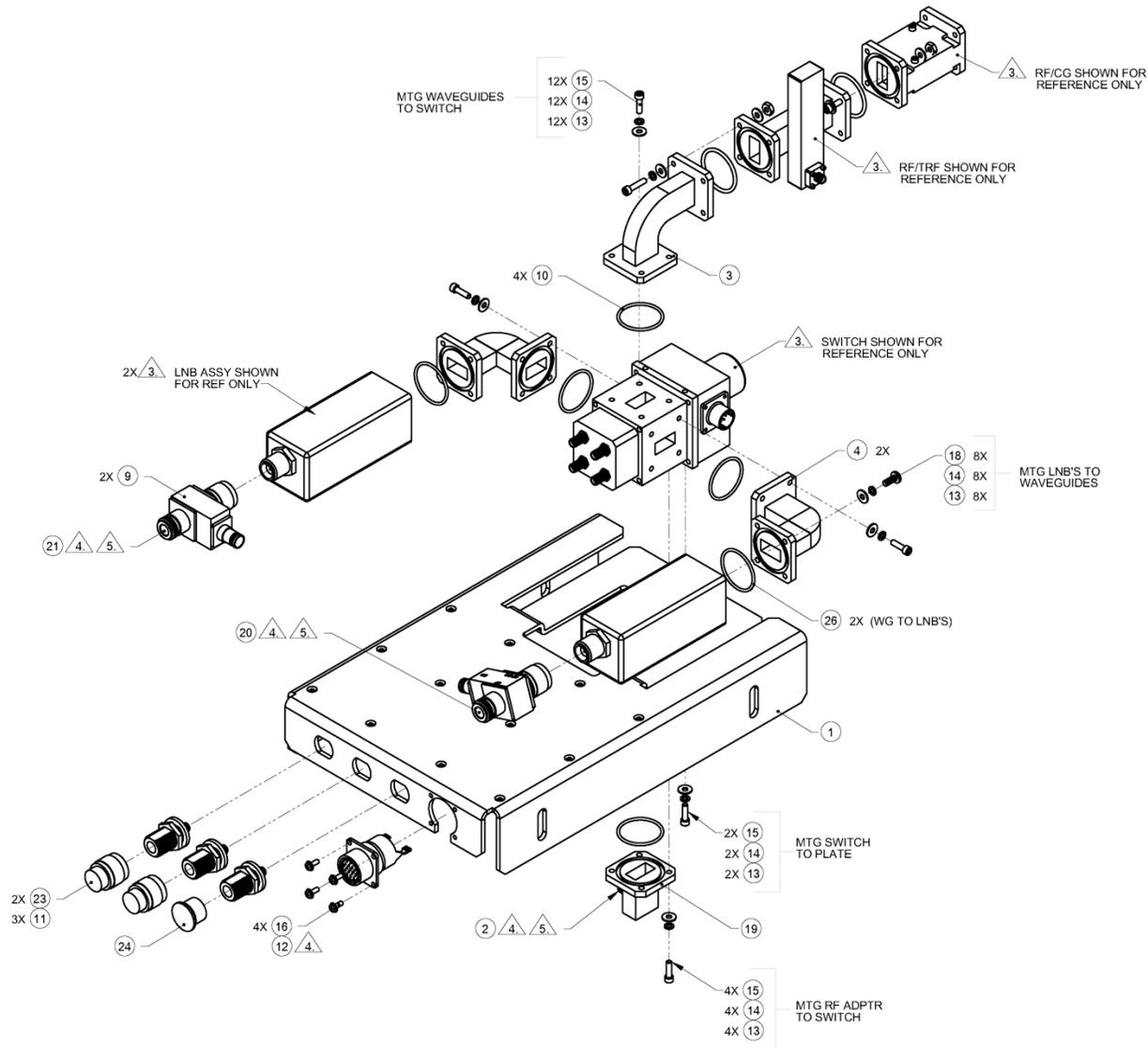


Figure A-8. Ku-Band LNB 1:1 Redundant System (Exploded View)

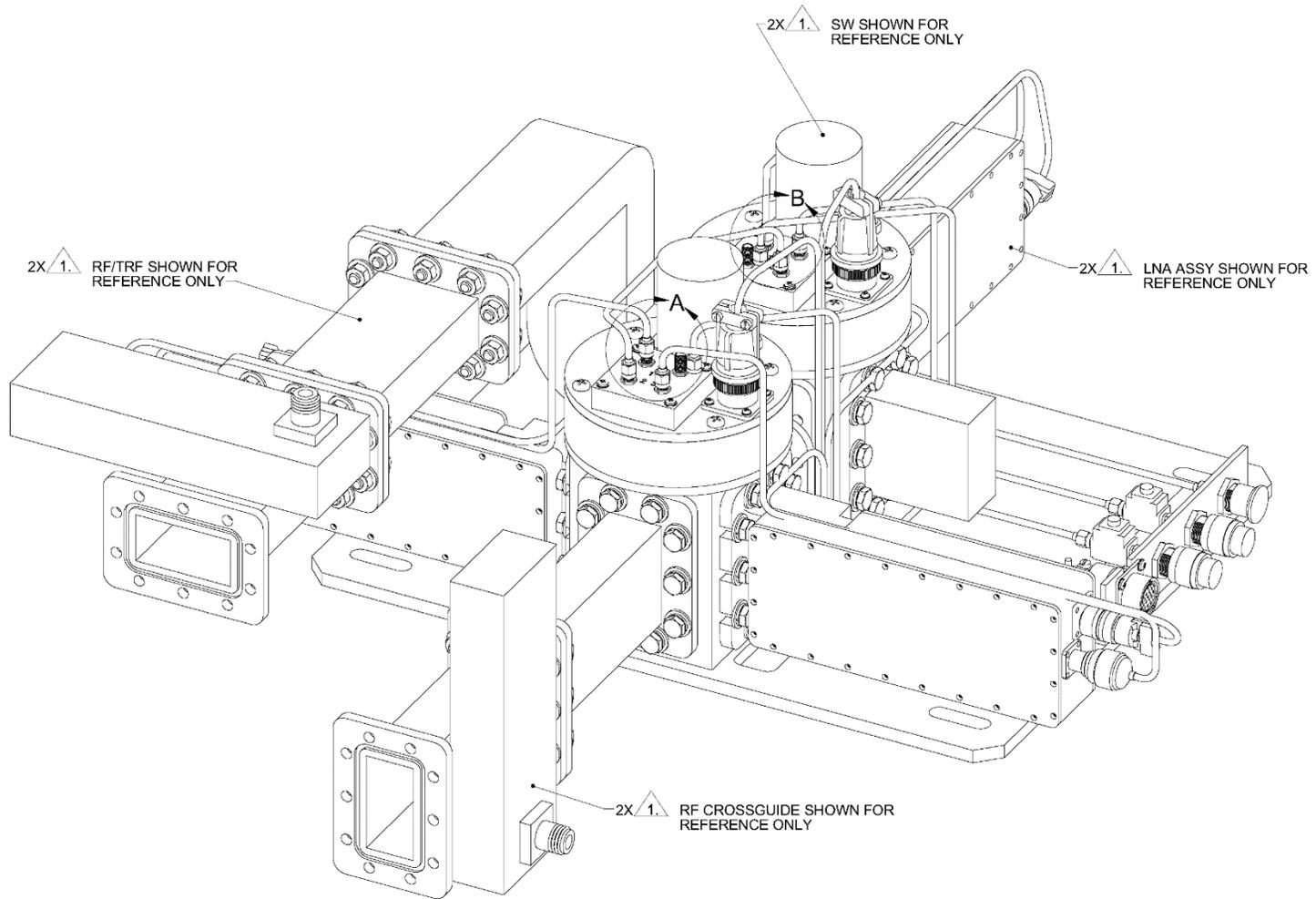


Figure A-9. C-Band LNA 1:2 Redundant System Assembly

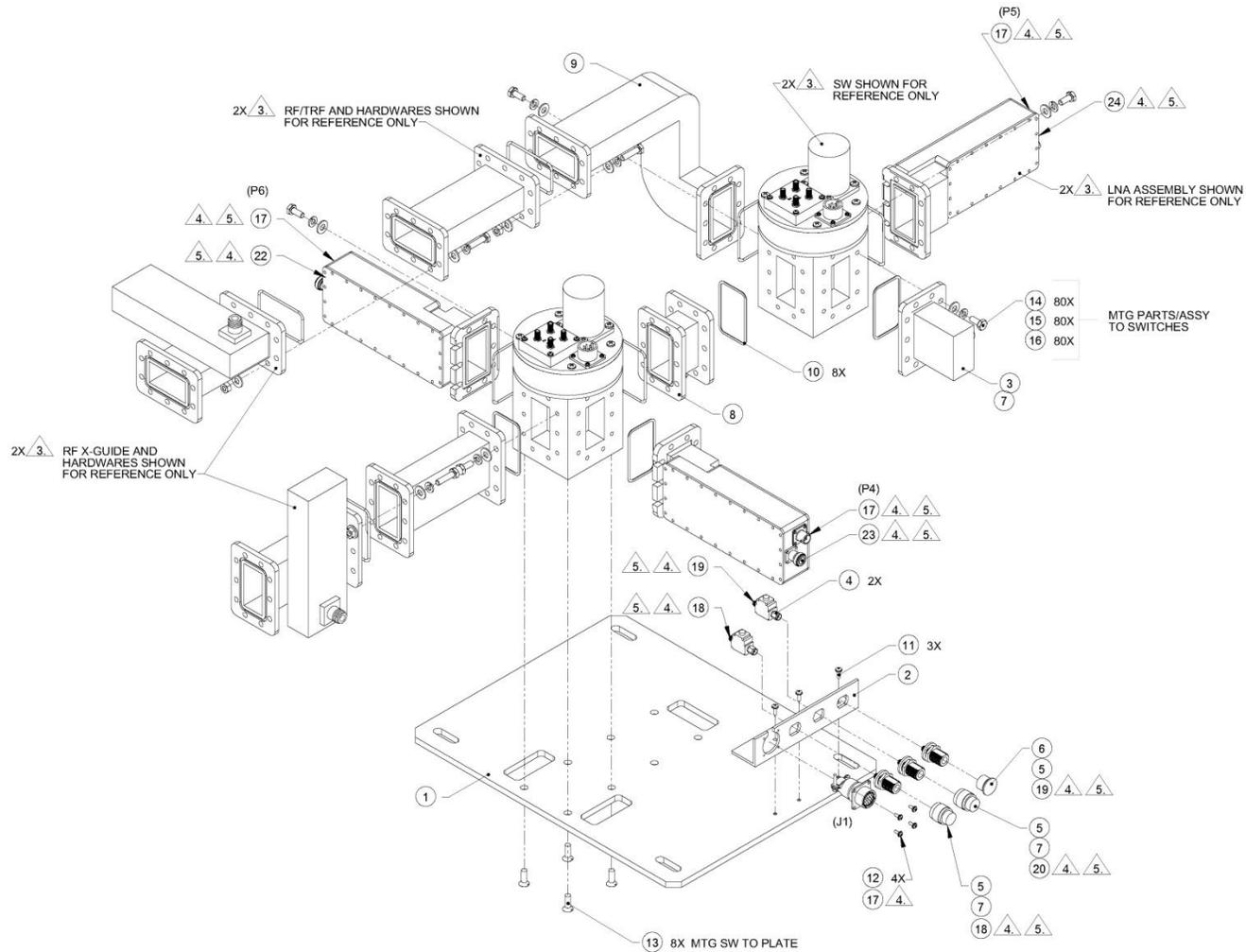


Figure A-10. C-Band LNA 1:2 Redundant System (Exploded View)

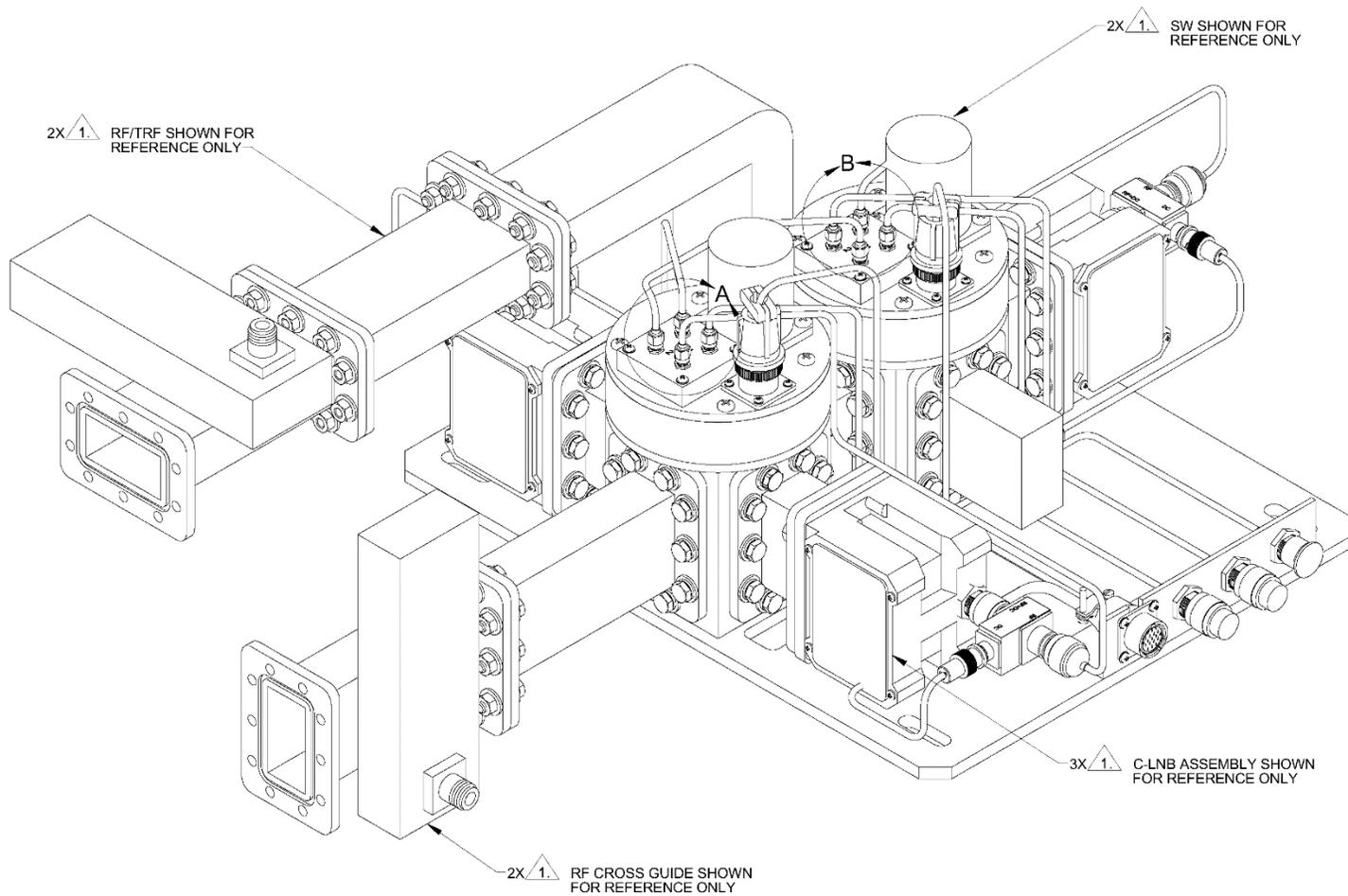


Figure A-11. C-Band LNB 1:2 Redundant System Assembly

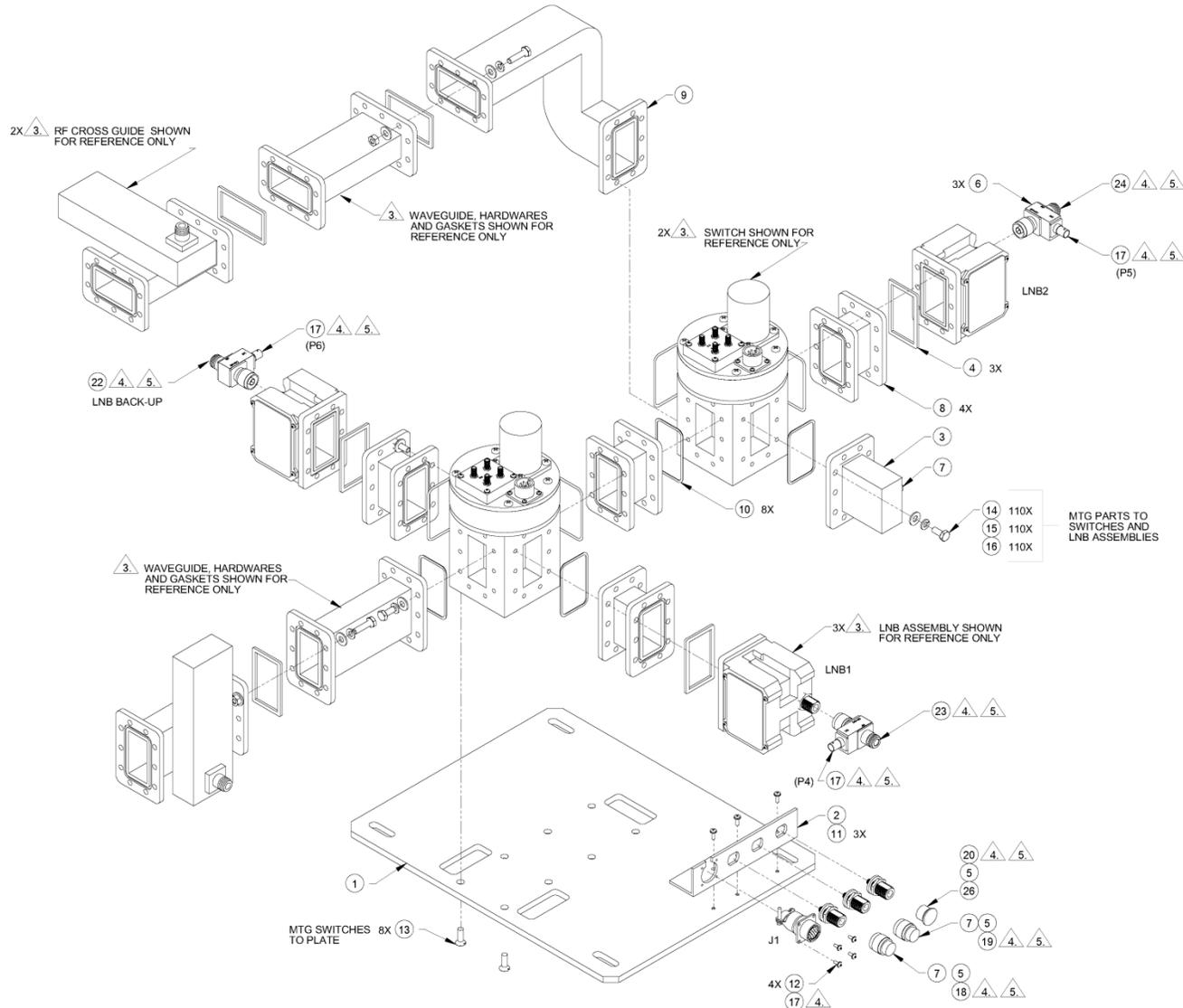


Figure A-12. C-Band LNB 1:2 Redundant System (Exploded View)

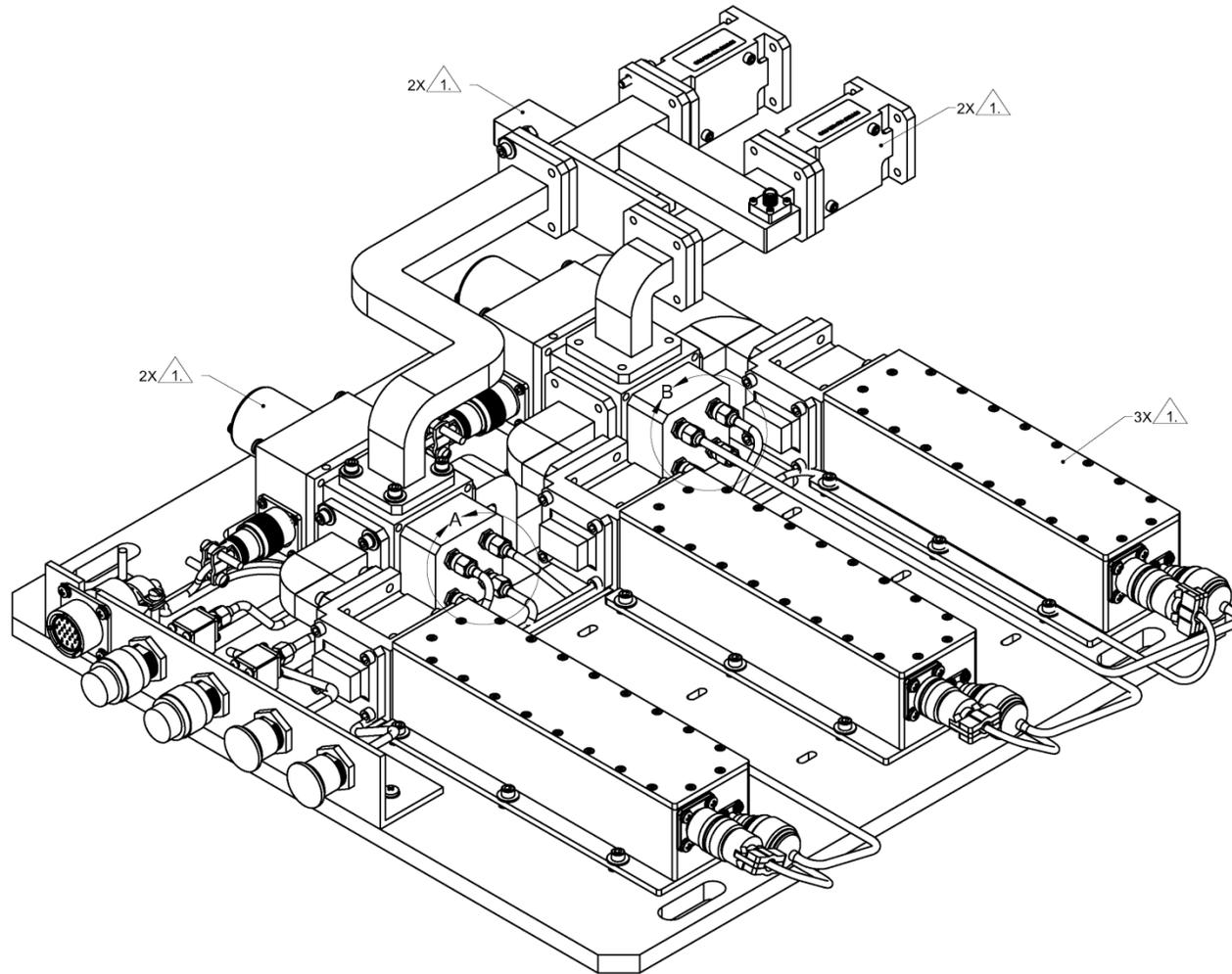


Figure A-13. Ku-Band LNA 1:2 Redundant System Assembly

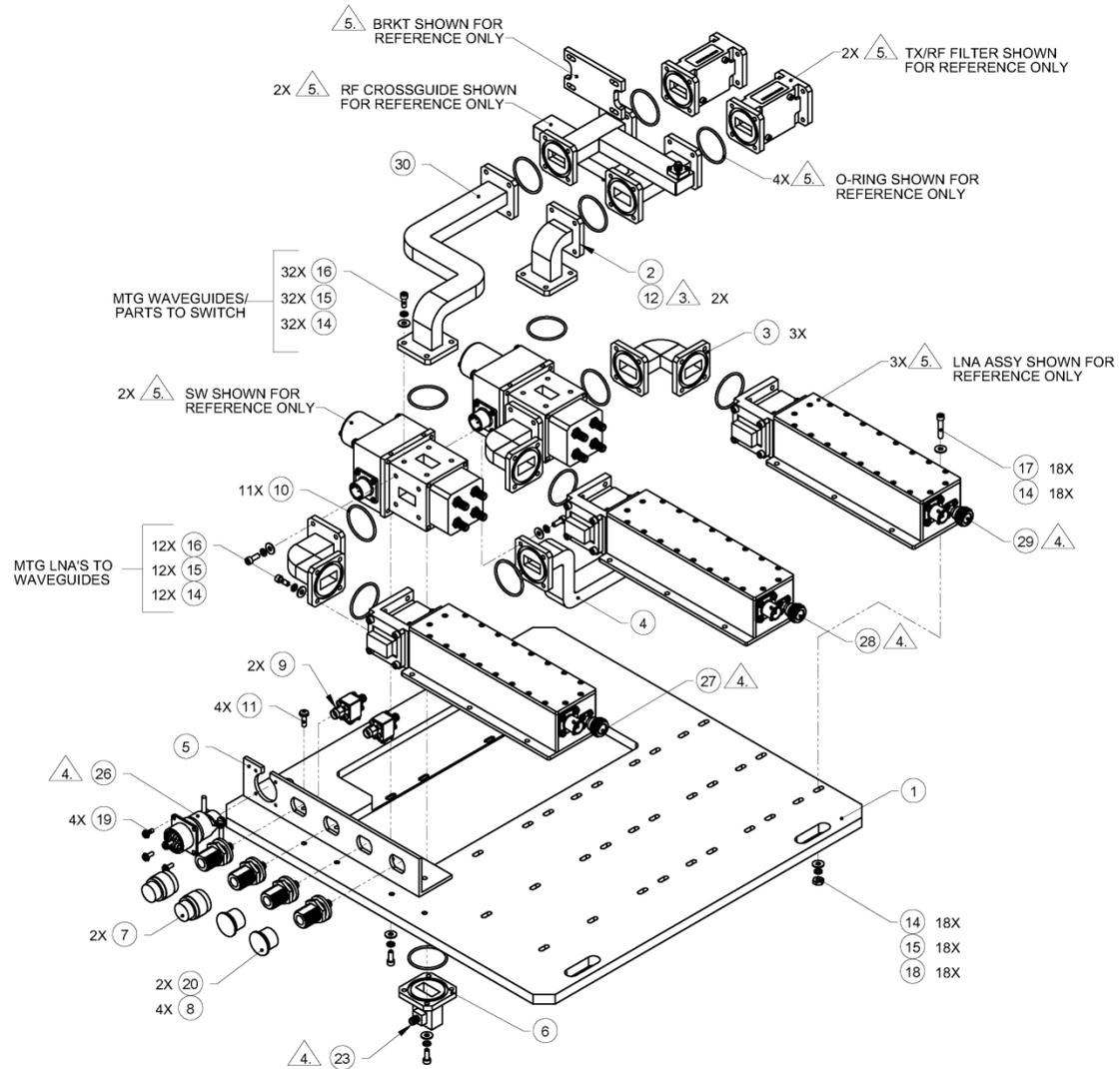


Figure A-14. Ku-Band LNA 1:2 Redundant System (Exploded View)

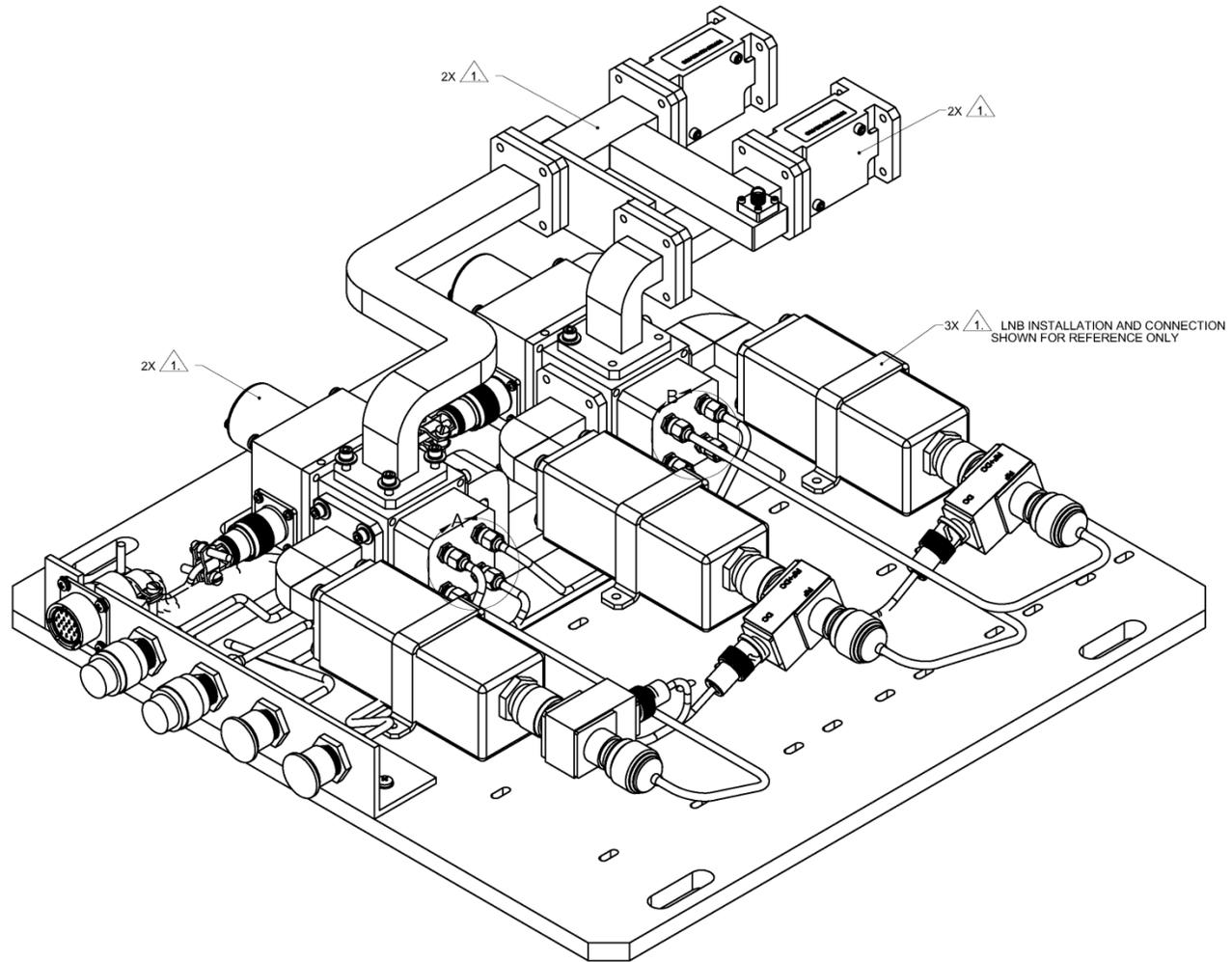


Figure A-15. Ku-Band LNB 1:2 Redundant System Assembly

Appendix B. Remote Commands

B.1 Some Common Commands

A few of the most common commands and queries are listed below. Full details for each of these are listed at the end of this section.

- RMS = Retrieve Maintenance Status. Displays voltages, Heatsink temperature, output power monitor reading, etc
- RCS = Retrieve Configuration Status
- RAS = Retrieve Alarm Status. Displays current alarm or fault status

B.2 Remote Control Protocol and Structure

This section describes the protocol and message command set for remote monitor and control of the Redundant Controller product.

For legacy serial communication the electrical interface is either a full duplex EIA-485/EIA-422 multi-drop bus (for the control of many devices) or an EIA-232 connection (for the control of a single device), and data is transmitted in asynchronous serial form, using ASCII characters. Control and status information is transmitted in packets of variable length in accordance with the structure and protocol defined in later sections.

Additionally, the Redundant Controller product also supports the serial command protocol over a Telnet session through the use of a 10/100Base-T ethernet connection to the product. The ethernet communications interface also supports SNMP protocol, and provides a graphical user interface (GUI) through web pages that can be accessed using a web browser.

B.3 EIA-485

For applications where multiple devices are to be monitored and controlled, a full-duplex (4-wire) EIA-485 is preferred. Half-duplex (2-wire) EIA-485 is possible, but is not preferred.

In full-duplex EIA-485 communication there are two separate, isolated, independent, differential-mode twisted pairs, each handling serial data in different directions. It is assumed that there is a 'controller' device (a PC or dumb terminal), which transmits data, in a broadcast mode, via one of the pairs. Many 'target' devices are connected to this pair, which all simultaneously receive data from the controller. The controller is the only device with a line-driver connected to this pair; the target devices only have line-receivers connected.

In the other direction, on the other pair, each target has a tri-stateable line driver connected, and the controller has a line-receiver connected. All the line drivers are held in high-impedance mode until one (and only one) target transmits back to the controller.

Each target has a unique address, and each time the controller transmits, in a framed 'packet' of data, the address of the intended recipient target is included. All of the targets receive the packet, but only one (the intended) will reply. The target enables its output line driver, and transmits its return data packet back to the controller in the other direction on the physically separate pair.

B.3.1 EIA-485 (Full Duplex) Summary

Two differential pairs - one pair for controller to target, one pair for target to controller.

- Controller-to-target pair - has one line driver (controller), and all targets have line-receivers.
- Target-to-controller pair - has one line receiver (controller), and all targets have tri-state drivers.

B.3.2 EIA-232

This is a much simpler configuration in which the controller device is connected directly to the target via a two-wire-plus-ground connection. Controller-to-target data is carried, via EIA-232 electrical levels on one conductor, and target-to-controller data is carried in the other direction on the other conductor.

B.4 Basic Protocol

Whether in EIA-232 or EIA-485 mode, all data is transmitted as asynchronous serial characters, suitable for transmission and reception by a UART. The asynchronous character format is fixed at 8N1 (8 data bits, No parity, and 1 stop bit). Baud rates 2400, 4800, 9600, 19200, and 38400 are supported.

All data is transmitted in framed packets. The host controller is assumed to be a PC or ASCII dumb terminal, which is in charge of the process of monitor and control. The controller is the only device that is permitted to initiate, at will, the transmission of data. Targets are only permitted to transmit when they have been specifically instructed to do so by the controller.

All bytes within a packet are printable ASCII characters, less than ASCII code 127. In this context, the Carriage Return and Line Feed characters are considered printable.

All messages from controller to target require a response (with one exception). This will be either to return data that has been requested by the controller, or to acknowledge reception of an instruction to change the configuration of the target. The exception to this is when the controller broadcasts a message (such as Set Time/Date) using Address 0, when the target is set to EIA-485 mode.

B.5 Packet Structure

The exchange of information is transmitted, Controller-to-Target and Target-to-Controller, in '**packets**'. Each packet contains a finite number of bytes consisting of printable ASCII characters, excluding ASCII code 127.

In this context, the Carriage Return and Line Feed characters are considered printable. With one exception, all messages from Controller-to-Target require a response – this will be either to return data that has been requested by the Controller, or to acknowledge reception of an instruction to change the configuration of the Target.

Controller-to-Target						
Start of Packet	Target Address	Address Delimiter	Instruction Code	Code Qualifier	Optional Arguments	End of Packet
< ASCII code 60 (1 character)	(4 characters)	/ ASCII code 47 (1 character)	(3 characters)	= or ? ASCII codes 61 or 63 (1 character)	(n characters)	Carriage Return ASCII code 13 (1 character)

EXAMPLE: <0412/MUT=1{CR}

Target-to-Controller						
Start of Packet	Target Address	Address Delimiter	Instruction Code	Code Qualifier	Optional Arguments	End of Packet
> ASCII code 62 (1 character)	(4 characters)	/ ASCII code 47 (1 character)	(3 characters)	=, ?, !, or * ASCII codes 61, 63, 33, or 42 (1 character)	(From 0 thru n characters)	Carriage Return, Line Feed ASCII codes 13,10 (2 characters)

EXAMPLE: >0412/MUT=1{CR}{LF}

B.5.1 Start Of Packet

The '<' and '>' characters indicate the start of packet. They may not appear anywhere else within the body of the message.

- Controller to Target: This is the character '<' (ASCII code 60)
- Target to Controller: This is the character '>' (ASCII code 62)

B.5.2 Address

Up to 9,999 devices can be uniquely addressed. In both EIA-232 and EIA-485 applications, the permissible range of values is 1 to 9999. It is programmed into a target unit using the remote control port.



The controller sends a packet with the address of a target - the destination of the packet. When the target responds, the address used is the same address, to indicate to the controller the source of the packet. The controller does not have its own address.

B.5.3 Address Delimiter

This is the “forward slash” character '/' (ASCII code 47)

B.5.4 Instruction Code

This is a three-character alphabetic sequence that identifies the subject of the message. Wherever possible, the instruction codes have been chosen to have some significance – e.g., **AMP** for RF Power Amplifier State, **ATT** for attenuation, etc. This aids in the readability of the message, should it be displayed in its raw ASCII form. Upper case and lower case alphabetic characters may be used (A-Z, and a-z).

B.5.5 Instruction Code Qualifier

This is a single character that further qualifies the preceding instruction code. Code Qualifiers obey the following rules:

1. From Controller to Target, the only permitted values are:

Symbol	Definition
= (ASCII code 61)	The '=' code is used as the Assignment Operator (AO) and is used to indicate that the parameter defined by the preceding byte should be set to the value of the argument (s) which follow it. EXAMPLE: In a message from Controller-to-Target, CWE=1 would mean 'enable the current window alarm'.
? (ASCII code 63)	The '?' code is used as the Query Operator (QO) and is used to indicate that the Target should return the current value of the parameters defined by the preceding byte. EXAMPLE: In a message from Controller-to-Target, CWE? denotes 'Is the current window alarm enabled or disabled'.

2. From Target to Controller, the only permitted values are:

Symbol	Definition
= (ASCII code 61)	The '=' code is used in two ways: <ol style="list-style-type: none"> a. If the controller sends a query code to a target, (EXAMPLE: CWE?, meaning 'is the current window alarm enabled or disabled?'), the target responds with CWE=x, where x represents the value in question, "1" being 'enabled' and "0" being 'disabled'. b. If the controller sends an instruction to set a parameter to a particular value, and, providing the value sent is valid, the target will acknowledge the message by replying with CWE=(with no message arguments).
? (ASCII code 63)	If the controller sends an instruction to set a parameter to a particular value, and, if the value sent is not valid, the target will acknowledge the message by replying (for example) with CWE? (with no message arguments). This indicates that there was an error in the message sent by the controller.
! (ASCII code 33)	If the controller sends an instruction code that the target does not recognize, the target will acknowledge the message by echoing the invalid instruction, followed by the ! character. (EXAMPLE: XYZ!)
* (ASCII code 42)	If the controller sends an instruction to set a parameter to a particular value, and, if the value sent in the argument is valid, however, if the target is in the wrong mode, the target will not permit that particular parameter to be changed at this time, the target will acknowledge the message by replying, (for example), with CWE* (with no message arguments).

Symbol	Definition
Symbol	Definition
# (ASCII code 35)	If the Controller sends a correctly formatted command, but the target is not in serial remote mode, it will not allow reconfiguration and will respond with CWE#. If the controller sends an instruction code that the target cannot currently perform because the hardware is unavailable, the target will acknowledge the message by echoing the valid instruction followed by the # character.

B.5.6 Message Arguments

Arguments are not required for all messages. Arguments are ASCII codes for the characters 0 to 9 (ASCII codes 48 to 57), period (ASCII code 46) and comma (ASCII code 44).

B.5.7 End Of Packet

Both of the following examples indicate the valid termination of a packet.

- Controller to Target: This is the 'Carriage Return' character (ASCII code 13)
- Target to Controller: This is the two-character sequence 'Carriage Return', 'Line Feed'. (ASCII code 13, and code 10.)

B.5.8 End-Of-Life Commands

Certain commands (denoted by an * in the Parameter Type field) are being marked as EOL. While these commands are fully supported in this product, it is highly recommended that the equivalent new commands be used for new implementations. The new commands will generally follow the outdated commands.

B.6.2 Future Commands

CODE	C	Q
REF	X	X

CODE	C	Q

CODE	C	Q

CODE	C	Q

B.7 Customer Commands

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Clear All Stored Events	CAE=	None	Command only. Clear all Stored Events. This command takes no arguments. Example: <1/CAE='cr' >0001/CAE='cr'lf'	CAE= CAE*	N/A	N/A
Circuit Identification	CID=	24 bytes	Command or Query. CID is a user-defined string of data that may be used to identify or name the unit or station, which is a fixed length of 24 characters. Valid characters include: Space () * + - , . / 0-9 and A-Z Examples: <1/CID=Redundant Controller #01'cr' >0001/CID= <1/CID?'cr' >0001/CID=Redundant Controller #01'cr'lf' Default Value: -----	CID= CID? CID*	CID?	CID=x...x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Calibrate Unit 1 Current	CL1=	N/A	<p>Command or Query.</p> <p>The CL1 command stores the value of Unit 1 Current Supply (in mA) as a reference point. The Unit 1 current alarm point is then determined by the calibrated Unit 1 reference point, and the common current window setting (see LCW command).</p> <p>Note: This command will return a mode error if the Unit 1 current source output has not been enabled first (see CS1 command).</p> <p>Example: <1/CL1='cr' >0001/CL1='cr''lf'</p> <p>The CL1 query will return the value that was stored during Unit 1 current calibration.</p> <p>Example: <1/CL1?'cr' >0001/CL1=xxx.x</p> <p>Where: xxx.x is the calibrated Unit 1 current value in mA.</p> <p>Default Value: 000.0</p>	CL1= CL1? CL1*	CL1?	CL1=xxx.x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Calibrate Unit 2 Current	CL2=	N/A	<p>Command or Query.</p> <p>The CL2 command stores the value of Unit 2 Current Supply (in mA) as a reference point. The Unit 2 current alarm point is then determined by the calibrated Unit 2 reference point, and the common current window setting (see LCW command).</p> <p>Note: This command will return a mode error if the Unit 2 current source output has not been enabled first (see CS2 command).</p> <p>Example: <1/CL2='cr' >0001/CL2='cr''lf'</p> <p>The CL2 query will return the value that was stored during Unit 2 current calibration.</p> <p>Example: <1/CL2?'cr' >0001/CL2=xxx.x</p> <p>Where: xxx.x is the calibrated Unit 1 current value in mA.</p> <p>Default Value: 000.0</p>	CL2= CL2? CL2*	CL2?	CL2=xxx.x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Calibrate Unit 3 Current	CL3=	N/A	<p>Command or Query. Only available for 1:2 Redundant Controller.</p> <p>The CL3 command stores the value of Unit 3 Current Supply (in mA) as a reference point. The Unit 3 current alarm point is then determined by the calibrated Unit 3 reference point, and the common current window setting (see LCW command).</p> <p>Note: This command will return a mode error if the Unit 3 current source output has not been enabled first (see CS3 command).</p> <p>Example: <1/CL3='cr' >0001/CL3='cr''lf'</p> <p>The CL3 query will return the value that was stored during Unit 3 current calibration.</p> <p>Example: <1/CL3?'cr' >0001/CL3=xxx.x</p> <p>Where: xxx.x is the calibrated Unit 3 current value in mA.</p> <p>Default Value: 000.0</p>	CL3= CL3? CL3*	CL3?	CL3=xxx.x (See description for details of arguments)
Unit 1 Current Source	CS1=	1 byte	<p>Command or Query.</p> <p>This command enables or disables Unit 1 current source.</p> <p>Note: CS1 must be enabled before Unit 1 current can be calibrated.</p> <p>0 = Disable 1 = Enable</p> <p>Example: <1/CS1=1'cr' >0001/CS1='cr''lf'</p> <p>Default Value: 0</p>	CS1= CS1? CS1*	CS1?	CS1=x (Same format as command arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Unit 2 Current Source	CS2=	1 byte	Command or Query. This command enables or disables Unit 2 current source. Note: CS2 must be enabled before Unit 2 current can be calibrated. 0 = Disable 1 = Enable Example: <1/CS2=1'cr' >0001/CS2='cr''lf' Default Value: 0	CS2= CS2? CS2*	CS2?	CS2=x (Same format as command arguments)
Unit 3 Current Source	CS3=	1 byte	Command or Query. Only available for 1:2 Redundant Controller. This command enables or disables Unit 3 current source. Note: CS1 must be enabled before Unit 3 current can be calibrated. 0 = Disable 1 = Enable Example: <1/CS3=1'cr' >0001/CS3='cr''lf' Default Value: 0	CS3= CS3? CS3*	CS3?	CS3=x (Same format as command arguments)
Current Window Enable	CWE=	1 byte	Command or Query. This command allows the user to enable the current window alarm. If disabled, the LCW value will be retained, but unused. 0 = Disabled 1 = Enabled Example: <1/CWE=0'cr' >0001/CWE='cr''lf' Default Value: 0 (Current Window Disabled)	CWE= CWE? CWE*	CWE?	CWE=x (Same format as command arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
RTC Date	DAT=	6 bytes	Command or Query. A date in the form mmddyy, where: dd = day of the month (01 to 31), mm = month (01 to 12) yy = year (00 to 99)tim Example: DAT=042457 (April 24, 2057)	DAT= DAT? DAT*	DAT?	DAT=mmddyy (see Description of Arguments)
RTC Date	DAY=	6 bytes	Command or Query. A date in the form ddmmyy, where: dd = day of the month (01 to 31), mm = month (01 to 12) yy = year (00 to 99)tim Example: DAY=240457 (April 24, 2057)	DAY= DAY? DAY* DAY#	DAY?	DAY=ddmmyy (see Description of Arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Retrieve Firmware Number	N/A		Query only. Returns the firmware type(s) loaded into the unit. The firmware information is returned in the following format: FW-AAAAAAA B.B.B DD/MM/YY Where: FW-AAAAAAA = the firmware part number B.B.BB = the version number DD/MM/YY = Day/Month/Year firmware released Example: <1/FRW?'cr' >0001/FRW= Boot: FW-0021340 1.1.1 04/09/21 Bulk1: FW-0021329 1.1.1 04/09/21 FW-0021330 1.1.1 04/09/21 FW-0021328 1.1.1 04/09/21 FW-0021327 1.1.1 04/09/21 Bulk2: FW-0021329 1.1.1 04/09/21 FW-0021330 1.1.1 04/09/21 FW-0021328 1.1.1 04/09/21 FW-0021327 1.1.1 04/09/21	FRW=	FRW?	FRW={CR}Bo ot:{CR}abc{C R}Bulk1:{CR}a bc{CR}abc (See description for details of arguments)
Force Unit Offline	FOF=x	1 byte	Command only. Force Unit offline in Manual redundancy switch mode, where: 1 = Force Unit 1 offline 2 = Force Unit 2 offline 3 = Force Unit 3 offline Only online unit in Manual redundancy switch mode can be forced offline. Example: <1/FOF=1'cr' (Force Unit 1 offline) >0001/FOF='cr''lf'	FOF= FOF? FOF*	N/A	N/A

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Hardware ID	N/A	1 byte	Query only: Returns the value of the Hardware ID byte. Example: <0001/HID?'cr' >0001/HID=0'cr'lf'	HID=	HID?	HID=x
Initialize Events Pointer	IEP=	None	Command only. Resets internal pointer to allow RNE? Queries to start at the beginning of the stored events log. Example: <1/IEP='cr' >0001/IEP='cr'lf'	IEP= IEP? IEP*	N/A	N/A
Software Image	IMG=	1 byte	Command or Query. Current Active software image, Where: 1=Bulk Image # 1 currently active 2=Bulk Image # 2 currently active Examples: <1/IMG=1'cr' (instructs the unit to load firmware from image #1 at the next reset / power up). <1/IMG?'cr' (queries the image number that the firmware loaded during bootup) Note: If the user sends the IMG command, and then queries the IMG value, the numbers may not be equal because the command tells the firmware which image to boot from at the next bootup, and the query reports the image that the firmware booted from on the last bootup value. The numbers may not be equal because the command tells the firmware which image to boot from at the next bootup, and the query reports the image that the firmware booted from on the last bootup.	IMG= IMG? IMG* IMG#	IMG?	IMG=x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
IP Address	IPA=	18 bytes	Command or Query. Used to set the IP address and network prefix for the 10/100 BaseT Ethernet management port, in the format: xxx.xxx.xxx.xxx.yy, Where: xxx.xxx.xxx.xxx is the IP address, and yy is the network prefix (8-30) Example: <1/IPA=192.168.001.004.24'cr' >0001/IPA='cr''lf' Note: Changing the IP address through the Telnet interface requires the user to power cycle the unit, and then restart a new Telnet session with the new IP address. The IP address typed into the Telnet client software does not include the range parameter, so it would be: 192.168.1.4. Default Value: 192.168.001.004.24	IPA= IPA? IPA* IPA#	IPA?	IPA= xx.xxx.xxx.xxx .yy (See description of arguments)
Gateway Address	IPG=	15 bytes	Command or Query. Used to set the Gateway IP address for the 10/100 Base Tx Ethernet management port, in the format: xxx.xxx.xxx.xxx, Where: xxx.xxx.xxx.xxx is the IP address Example: <1/IPG=192.168.001.005'cr' >0001/IPG='cr''lf' Default Value: 192.168.001.005	IPG= IPG? IPG*	IPG?	IPG = xxx.xxx.xxx.xx x

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
LNA/LNB Current Window	LCW=	2 bytes	<p>Command or Query.</p> <p>This command allows the user to set the alarm window in \pm % of the calibrated LNA/LNB Current. Valid inputs are 20 to 50 in increments of 1%. In addition, setting the value to 99¹ disables the alarm function.</p> <p>Note: A return value of 99 indicates that the current window is disabled. This may be because a value of 99 was set for LCW, or it may be because the CWE has been disabled. Since the method of setting 99 to this command is being obsoleted, it is recommended the user utilize CWE instead of 99.</p> <p>The following example will set the alarm window to \pm30%.</p> <p>Example: <1/LCW=30'cr' >0001/LCW='cr''lf'</p> <p>Default Value: 30</p>	LCW= LCW? LCW*	LCW?	LCW=xx (Same format as command arguments)
Retrieve next 5 unread Stored Alarms	N/A	145 bytes	<p>Query only.</p> <p>See RNE query.</p>	LNA=	LNA?	See RNE query
Local Remote State	LRS=	1 byte	<p>Command or Query.</p> <p>Local/Remote status, where:</p> <p>0 = Local 1 = Serial Remote Control 2 = Ethernet Remote Control 3 = Serial + Ethernet Remote Control</p> <p>Example: LRS=1 (selects Serial Remote)</p> <p>Note: The user will always have query access in any mode. Also, the LRS command is available in all modes as a means of acquiring control. The intent of this command is to limit changes from being made on multiple interfaces at the same time. The web page GUI will refuse connections unless LRS is set to enable Ethernet remote control.</p> <p>Default Value: 3 (Serial+Ethernet)</p>	LRS= LRS?	LRS?	LRS=x (Same format as command arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Unit MAC Address	N/A	17 bytes	Query only. MAC address of the unit, reported in hexadecimal. Example: <0001/MAC?'cr' >0001/MAC=00-06-B0-00-D2-A7'cr''lf'	MAC=	MAC?	MAC=xx-xx-xx-xx-xx-xx-xx-xx (See description for details of arguments)
System Alarm Mask	MSK=	10 bytes	Command or Query. Alarm mask conditions. If the mask value for a certain parameter is set to fault, then a fault condition will be registered if specified hardware conditions are not met. If the mask value is set to alarm, then a fault condition will only appear to be an alarm that will not set the summary fault relay. If the mask value is set to masked, then the fault will never be reported to the user. NOTE: setting a, e, or f, will be ignore if those options are not installed Form of: abcdef Where: 0 = Fault 1 = Alarm 2 = Masked 4 = Not Installed a = Ext reference Detect b = Unit 1 Current c = Unit 1 Power Supply d = Unit 2 Current e = Unit 2 Power Supply f = Unit 3 Current (for 1:2 Redundant Controller) g = Unit 3 Power Supply (for 1:2 Redundant Controller) Example: <0001/MSK=2222222'cr' >0001/MSK='cr''lf' Default Value: 2222222	MSK= MSK? MSK*	MSK?	MSK=abcdefg (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Number of Unread stored Events	N/A	3 bytes	Query only. Unit returns the Number of stored Events, which remain Unread in the form of xxx. Example: <1/NUE?'cr' >0001/NUE=126'cr''lf'	NUE=	NUE?	NUE=xxx
Unit Online Status	N/A	3 bytes	Query only. Online/offline status of Unit 1, Unit 2 and Unit 3. ONL=abc, where: a=Unit 1 b=Unit 2 c=Unit 3 (for 1:2 Redundant Controller only) 0 = Offline 1 = Online Example: <1/ONL?'cr' >0001/ONL=110'cr''lf' (Unit 1 and Unit 2 online, Unit 3 offline)	N/A	ONL?	ONL=abc (See description for details of arguments)
Part Number	PNM=	Various 1-96 bytes, alpha-numeric	Command or Query. The PNM command sets the unit's part number (DOTCODE). The DOTCODE string may be up to 96 printable ASCII characters in length. The PNM query will return the DOTCODE string that was loaded into the unit. Example: <1/PNM=HPODC0.350WRSW00'cr' >0001/PNM='cr''lf'	PNM = PNM? PNM *	PNM?	PNM=x....x (see description for details of return string)
Retrieve Alarm Status	N/A	Variable # bytes	Query only. The unit returns the alarm state for the following sections: RAS? The Alarm status of the unit, Where: OK = no fault condition FT = faulted AL = alarm	RAS=	RAS?	RAS=x....x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
			MS = masked			
Retrieve Alarm Status (Continued)			<p>System Alarm Status where: SYS-ATEMP = Internal Temperature SYS-XRFLD = External Reference Lock Detect SYS-UNT1I = Unit 1 Current Source SYS-UNT1V = Unit 1 Voltage SYS-UNT2I = Unit 2 Current Source SYS-UNT2V = Unit 2 Voltage SYS-UNT3I = Unit 3 Current Source SYS-UNT3V = Unit 3 Voltage SYS-WGSW1 = Remote Waveguide Switch 1 SYS-WGSW2 = Remote Waveguide Switch 2 SYS-WGSW3 = Local Waveguide Switch 1 SYS-WGSW4 = Local Waveguide Switch 2</p> <p>Power Supply Alarm Status where: PS-PS56V = 56V Power Supply PS-PS24V = 24V Power Supply PS-PS15V = 15V Power Supply PS-P5V8T = 5.8V Power Supply PS-P5V0T = 5.0V Power Supply PS-P3V3T = 3.3V Power Supply PS-P56V1 = Chassis 56V Power Supply 1 PS-P56V2 = Chassis 56V Power Supply 2</p> <p>Note: XRFLD, WGSW1, WGSW2, WGSW3, and WGSW4 will report NA if the appropriate model / options have not been selected / installed.</p>			

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Retrieve Alarm Status (Continued)			Example: <1/RAS?'cr' >0001/RAS= SYS-ATEMP=OK SYS-XRFLD=NA SYS-UNT1I=OK SYS-UNT1V=OK SYS-UNT2I=OK SYS-UNT2V=OK SYS-UNT3I=OK SYS-UNT3V=OK SYS-WGSW1=NA SYS-WGSW2=NA SYS-WGSW3=NA SYS-WGSW4=NA PS-PS56V=OK PS-PS24V=OK PS-PS15V=OK PS-P5V8T=OK PS-P5V0T=OK PS-P3V3T=OK PS-P56V1=OK PS-P56V2=OK			
Reboot	RBT=	1 byte	Command only. Soft Reboot 1 = Reboot System Example: <1/RBT=1	RBT = RBT? RBT*	N/A	RBT=x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Retrieve Configuration Status	N/A		<p>Query only. Used to query the configuration status of the unit.</p> <p>Where: CWE = Current Window Enable LCW = Current Window ONL1 = Online Status for Unit 1 ONL2 = Online Status for Unit 2 ONL3 = Online Status for Unit 3 (1:2 redundancy) RED = Redundancy Switch Mode XRF = External Reference Status (if installed) LRS = 0-Local, 1-Serial, 3-Serial and Ethernet</p> <p>Example: CWE=1'cr' LCW=49'cr' ONL1=1'cr' ONL2=1'cr' ONL3=Not Installed'cr' RED=0'cr'</p> <p>XRF=N/A'cr' LRS = 1'lf'</p>	RCS=	RCS?	RCS=x....x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Redundancy Switch Mode	RED=	1 byte	Command or Query. Redundancy Switch Mode, where: 0 = Manual 1 = Automatic Example: <1/RED=1'cr' (Automatic Mode) >0001/RED='cr''lf'	RED= RED? RED*	RED?	RED=x
Retrieve Equipment Type	N/A	22 bytes	Query only. The unit returns a string indicating the Model Number and the version of the M&C firmware installed in the unit. Example: <1/RET?'cr' >0001/RET=Redundant Controller VER: 1.1.1'cr''lf'	RET=	RET?	RET=x....x (See description for details of arguments)
Restore Factory Defaults	RFD=	None	Command only. Restores factory defaults in the NVRAM Example: RFD='cr'	RFD= RFD? RFD*	N/A	N/A
Retrieve Maintenance Status	N/A	Varies depending on hardware	Query only. The unit returns the maintenance status as follows: RMS?X Where: X= 'cr' ATEMP = Internal Temperature in deg C REFVT = Reference Voltage UNT1V = Unit 1 Voltage UNT1I = Unit 1 Current UNT2V = Unit 2 Voltage UNT2I = Unit 2 Current UNT3V = Unit 3 Voltage UNT3I = Unit 3 Current P5V8T = 5.8V Voltage P5V0T = 5.0V Voltage P3V3T = 3.3V Voltage	RMS= RMS*	RMS?	RMS=x....x (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Retrieve Maintenance Status (cont.)			PS15V = 15V Voltage PS24V = 24V Voltage PS56V = 56V Voltage SL24V = Local Switch Voltage SR56V = Remote Switch Voltage P56V1 = Chassis 56V Power Supply 1 Voltage P56V2 = Chassis 56V Power Supply 2 Voltage SSTAT = Switch State Indicator Note: REFVT, SL24V, SR56V will report 000.0 if the appropriate model / options have not been selected / installed. Example: <1/rms? ATEMP=035.0 REFVT=000.0 UNT1V=018.5 UNT1I=002.3 UNT2V=018.5 UNT2I=002.6 UNT33V=013.5 UNT33I=002.6 P5V8T=006.0 P5V0T=005.2 P3V3T=003.3 PS15V=015.0 PS24V=023.9 PS56V=053.8 SL24V=000.0 SR24V=054.2 P56V1=053.9 P56V2=053.7 SSTAT=S2R21:11,S1R21:11,S2L21:10,S1L21:10			
Retrieve Next 5 unread stored	N/A	xx bytes	Query only. Unit returns the oldest 5 Stored Events which have not yet been read over the remote control.	RNE=	RNE?	RNE={CR}AB CCddmmyyhh mmss{CR}AB CCddmmyyhh

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Summary Alarm Status	N/A	1 byte	Query only. Indicates if there are any active alarm conditions. SAS=x, Where: 0 = no active alarms 1 = at least one active alarm Example: <1/SAS? >0001/SAS=0'cr'lf'	SAS=	SAS?	SAS=x (See description for details of arguments)
Remote Baud Rate	SBR=	5 bytes	Command or Query. Set remote baud rate as follows: 02400 = 2400 baud 04800 = 4800 baud 09600 = 9600 baud 19200 = 19200 baud 38400 = 38400 baud Examples: <0001/SBR=9600'cr' >0001/SBR='cr'lf' <0001/SBR?'cr' >0001/SBR=09600'cr'lf' Note: When changing baud rates remotely the response to the command will be returned using the same baud rate as that used to send the command. Default Value: 09600	SBR= SBR? SBR*	SBR?	SBR=xxxxx (Same format as command arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Summary Fault Status	N/A	1 byte	Query only. Indicates the condition of the summary fault relay. Where: 0 = Not Faulted (SumFLT_COM J6 pin K is not connected to SumFLT_NC J6 pin M) 1 = Faulted (SumFLT_COM J6 pin K is connected to SumFLT_NC J6 pin M) Example: <1/SFS? >0001/SFS=0'cr'lf'	SFS=	SFS?	SFS=x (See description for details of arguments)
SNMP Authentication Trap Enable	SNA=	1 byte	Command or Query. SNMP Authentication Trap Enable 0 = Disabled 1 = Enabled Example: <1/SNA=0	SNA= SNA?	SNA?	SNA=x (See description for details of arguments)
SNMP Enable	SNM=	1 byte	Command or Query. SNMP Enable. 0 = Disabled 1 = Enabled Example: <1/SNM=0	SNM= SNM?	SNM?	SNM=x (See description for details of arguments)
Serial Number	N/A	9 bytes	Query only. Used to Query the unit's nine-digit serial number in the form of SNO=xxxxxxxx, Where: xxxxxxxx is the unit's nine-digit serial number. Note: This command is functionally identical to RSN. Example: <1/SNO?'cr' >0001/SNO=072282040'cr'lf'	SNO=	SNO?	SNO=xxxxxxxx xx (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Remote Address	SPA=	4 bytes	Command or Query. Set Physical Address-between 0001 to 9999. Resolution 0001 Example: <1/SPA=0412'cr' >0001/SPA='cr"lf' Default Value: 0001	SPA=	SPA?	SPA=xxxx (Same format as command arguments)
SNMP Read Community	SRC=	16 bytes, characters, no spaces	Command or Query. SNMP read community string. Empty string is not allowed Example: <1/SRC=public	SRC = SRC!	SRC?	SRC =x (See description of arguments)
SNMP Trap Destination IP Address 1	STA=	15 bytes, Numerical	Command or Query. Used to set the IP address of the first SNMP Trap destination IP Address 1 Where traps will be sent in the form: xxx.xxx.xxx.xxx is the IP address Example: <1/STA=010.006.030.001 When not configured, returns >0001/STA=0.0.0.0	STA = STA!	STA?	STA=xxx.xxx.xxx.xxx (See description of arguments)
SNMP Trap Destination IP Address 2	STB=	15 bytes, Numerical	Command or Query. Used to set the IP address of the first SNMP Trap destination IP Address 2 Where traps will be sent, in the form: xxx.xxx.xxx.xxx is the IP address Example: <1/STB=010.006.030.001 When not configured, returns >0001/STB=0.0.0.0	STB = STB!	STB?	STB=xxx.xxx.xxx.xxx (See description of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
SNMP Trap Version	STV=	1 byte	Command or Query. SNMP Trap Version that will be used to send traps. 1 = SNMP Trap Version 1 2 = SNMP Trap Version 2 3 = SNMP Trap Version 3 (Read-only) Example: <1/STV=0	STV = STV!	STV?	STV =x (See description of arguments)
SNMP Write Community	SWC=	16bytes, characters, no spaces	Command or Query. SNMP write community string. Empty string is not allowed Example: <1/SWC=private	SWC = SWC!	SWC?	SWC =x (See description of arguments)
Set RTC Time	TIM=	6 bytes	Command or Query. A command in the form hhmmss , indicating the time from midnight, where hh = hours, between 00 and 23; mm = minutes, between 00 and 59, and ss = seconds, between 00 and 59 Example: (time = 23 hours, 12 minutes and 59 seconds since midnight): <1/TIM=231259'cr' >0001/TIM='cr''lf'	TIM = TIM? TIM *	TIM?	TIM=xxxxxx (Same format as command arguments)
Temperature	N/A	7 bytes	Query only. Unit returns the value of the internal temperature, in the form of sxx.x (degrees C). Example: <1/TMP?'cr' >0001/TMP=+38.2'cr''lf'	TMP=	TMP?	TMP=sxx.x (See description for details of arguments)
Retrieve Number of Unread Stored Alarms	N/A	2 bytes	Query only. Returns the number of stored events, which remain unread in the alarm log. Example: <1/TNA? 'cr' >0001/TNA=14'cr''lf'	TNA=	TNA?	TNA=xx (See description for details of arguments)

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Total Number of Events	N/A	2 bytes	Query only. Returns the number of unread entries in the stored events log. Example: <1/TNE? 'cr' >0001/TNE=14'cr''lf'	TNE=	TNE?	TNE=xx (See description for details of arguments)
SNTP Local Time Offset	TPL=	1 to 3 bytes	Command or Query. SNTP Local Time Offset, in the format of sXX, where s = + or - sign XX = range from 0 to 12 Example: TPL=-7 (Local Time Offset is GMT-7) TPL=+0 (Local Time Offset is GMT)	TPL= TPL? TPL*	TPL?	TPL=sXX (See description for details of arguments)
SNTP Server IP Address	TPS=	15 bytes	Command or Query. SNTP Server IP Address, in the format: xxx.xxx.xxx.xxx, Where: xxx.xxx.xxx.xxx is the IP address To disable SNTP, set the IP address to 000.000.000.000 Example: <1/TPS=192.168.001.005'cr' >0001/TPS='cr''lf' Default Value: 000.000.000.000 (SNTP is disabled)	TPS= TPS? TPS*	TPS?	TPS=xxx.xxx.xxx.xxx

B.7.1 Future Commands

Parameter Type	Command (Instruction Code and Qualifier)	Arguments for Command or Response to Query	Description of Arguments (Note that all arguments are ASCII numeric codes between 48 and 57)	Response to Command (Target to Controller)	Query (Instruction Code and Qualifier)	Response to Query (Target to Controller)
Reference Tune Voltage	REF=	4 bytes, numerical	Command or Query Sets or reports the Reference Tune Voltage. Example: <1/REF=87'cr' Default Value: 87.	REF= REF? REF*	REF?	REF=x....x (See description for details of arguments)

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