



RCU108

1:8 Converter Protection Switch Installation and Operation Manual

Part Number TM066

Revision 1

April, 1997

IMPORTANT NOTE: The information contained in this document supersedes all previously published information regarding this product. This manual is subject to change without prior notice.

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In no event shall Radyne be liable for incidental, consequential, special or resulting loss or damage of any kind howsoever caused. Radyne's liability for damages shall not exceed the payment, if any, received by

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RADYNE CORPORATION

5225 South 37th Street

Phoenix, Arizona 85040 (USA)

ATTN: Customer Support

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

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

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

RCU108 1:8 Protection Switch
Installation and Operation Manual
TM066 - Record of Revisions

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Revision Level	Date	Reason for Change
1	5-10-97	Initial Release

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Section One - RCU108 1:8 Protection Switch Description

1.0 Introduction

The Radyne RCU108 1:N Redundancy Control Unit provides backup protection for any number of online converters ranging from 2 through 8. The switch will operate with any Radyne Frequency Up or Downconverter product without distinction. The RCU108 Switch features plug-and-play simplicity of operation. Simply install the cables, tell the Backup to 'Learn,' and the protection switching is activated without complicated programming. Monitoring of all the online converters and the operation of the switch becomes the duty of the backup converter. Identical firmware in all Radyne converter products enables any converter plugged into the backup slot of the switch to assume the role of protection system controller.

As the system controller, the designated backup converter communicates with the online converters via the equipment RS485 interface. As a result, the switch contains a minimal amount of circuitry and is therefore very reliable. Control and monitoring of all the online converters and the switch itself can be performed through the operator RS232/422/485 serial interface. Once the backup converter is told to learn the primary converters, the backup will monitor the frequency, gain and channel settings of the online converter by polling the primary converters on a periodic basis. If any changes are made to the online settings, the backup converters will notify the user via the front panel or through the RS232/485 port. In the event of a failure of any online converter, the restored circuit will have the same online settings that were identified through the last learning process.

Menu programmable features in the backup converter allow various levels of backup priority to be set. A priority of 1 would be the highest level of protection, where a priority of zero or none means the converter would be logically removed from backup protection by the switch.

Manual backup from the front panel push-buttons on the switch allow the operator to fully test the circuitry and operation of the protection switch system exactly as if a fault had been issued by the converter being manually backed-up. Manual mode allows a converter to be removed or reinstalled into the system without the fear of interrupting the circuit that has been routed through the backup converter.

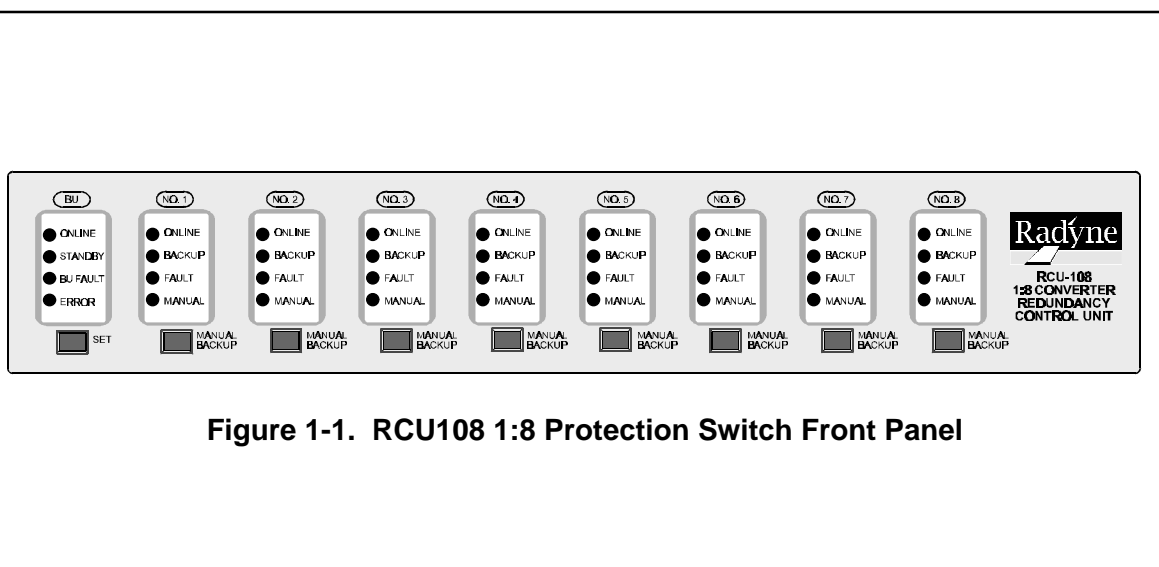


Figure 1-1. RCU108 1:8 Protection Switch Front Panel

Section 2 - Installation

2.0 Installation Requirements

The RCU108 is designed to be installed within any standard 19-inch equipment cabinet or rack, and requires 2 rack units of mounting space (3.5 inches) vertically, and 17-inches of depth. Including cabling, a minimum of 20-inches of rack depth is required. The unit can be placed on a table or suitable surface if required.

⚠ WARNING: *There are no user-serviceable parts or configuration settings located inside the RCU108 chassis. There is a potential shock hazard internally at the power supply module. DO NOT open the RCU108 chassis under any circumstances.*

⚠ CAUTION: *Before initially applying power to the unit, it is a good idea to disconnect the transmit output from the operating satellite ground station equipment. This is especially true if the current RCU108 configuration settings are unknown, where incorrect setting could disrupt existing communications traffic.*

2.1 Unpacking

The RCU108 was carefully packaged to avoid damage and should arrive complete with the following items for proper installation:

1. RCU108 Unit.
2. One cable set per paragraph 2.3.
3. Installation and Operation Manual.

2.1.1 Removal and Assembly

If using a knife or cutting blade to open the carton, exercise caution to ensure that the blade does not extend into the carton, but only cuts the tape holding the carton closed. Carefully unpack the unit and ensure that all of the above items are in the carton.

The RCU108 is shipped fully-assembled and does not require removal of the covers for any purpose in installation.

2.2 Mounting Considerations

When mounted in an equipment rack, adequate ventilation must be provided. The ambient temperature in the rack should be between 10° and 35° C, and held constant for best equipment operation. The air available to the rack should be clean and relatively dry.

2.3 Cabling

The RCU108 comes complete with all the cabling required to interface with the Upconverters or Downconverters. Refer to Figure 2-1 to become familiar with the rear panel connectors on the RCU108. Figure 2-2 shows a typical interconnection between four Upconverters and the RCU108. The list of supplied cables is as follows:

<u>P/N</u>	<u>Description</u>	<u>QTY</u>
CA/3563	RS485 Equipment Interface Cable	1 for N (8 max.)
CA/4013-2	B/U Switch Interface Cabne	1 for N (8 max.)

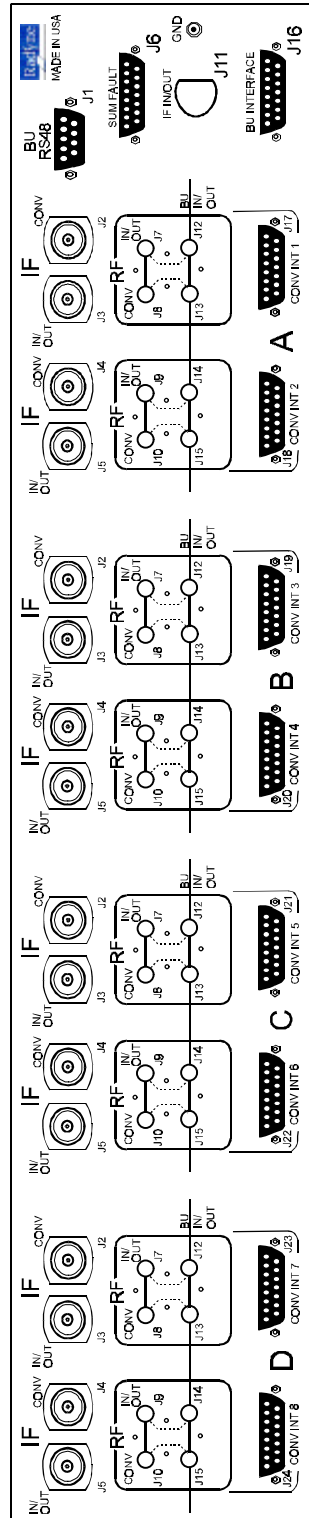
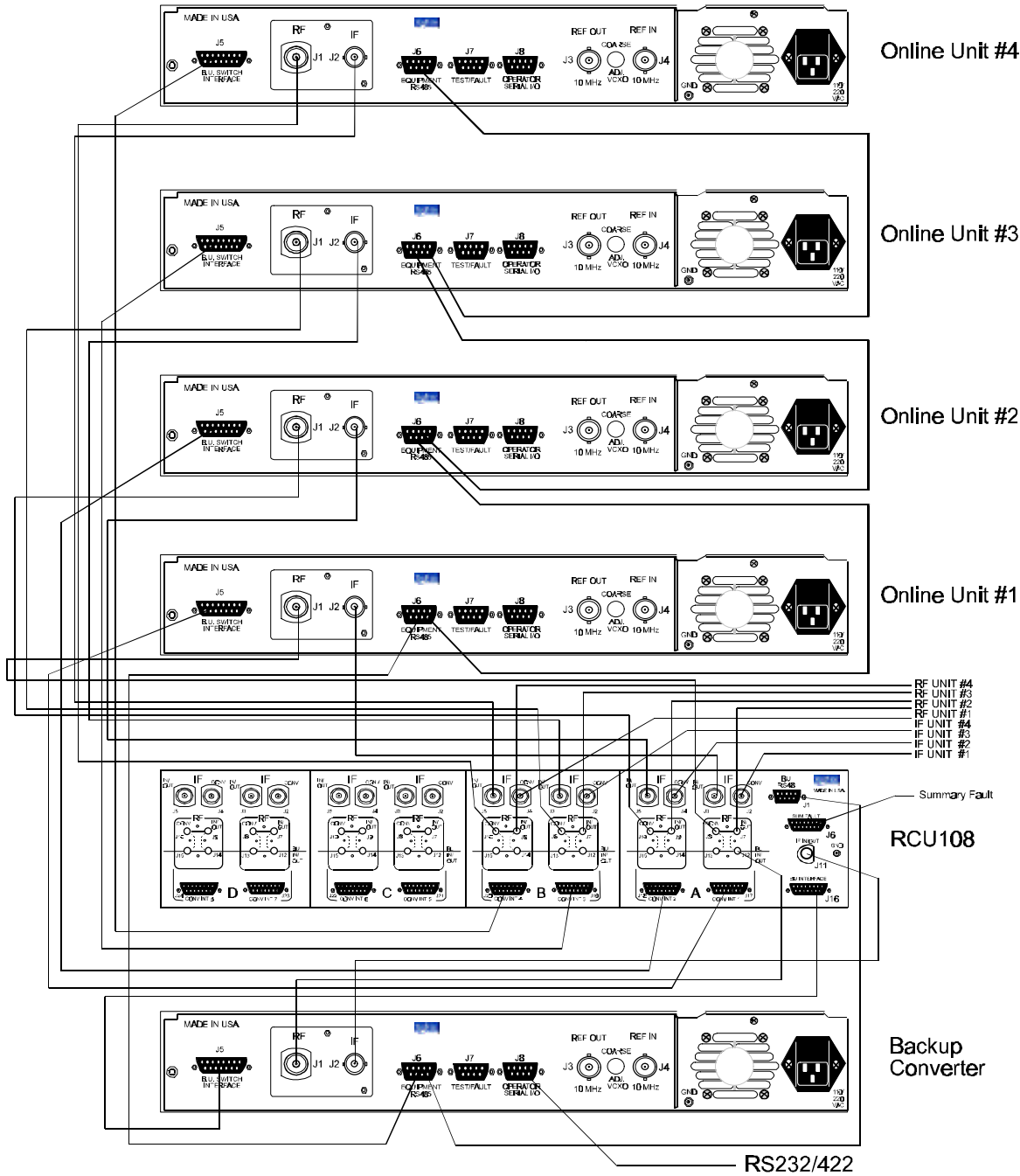


Figure 2-1. RCU108 Rear Panel

Radyne 1:4 Frequency Converter System Interconnection Diagram



CA/3602-1	RF Cable Converter #1	1 Ea.
CA/3602-2	RF Cable Converter #2	1 Ea.
CA/3602-3	RF Cable Converter #3	1 Ea.
CA/3602-4	RF Cable Converter #4	1 Ea.
CA/3602-5	RF Cable Converter #5	1 Ea.
CA/3602-6	RF Cable Converter #6	1 Ea.
CA/3602-7	RF Cable Converter #7	1 Ea.
CA/3602-8	RF Cable Converter #8	1 Ea.
CA/3602-U	RF Cable Backup Converter	1 Ea.

Routing of the cables between the converters and the switch is depicted in Figure 2-2. Note that the RF/IF cabling included with the switch does not include cables to other panels in the rack.

2.4 Hardware Interfaces

Hardware interfaces between the online and backup converters and the switch equipment include the RF interface, IF interface, Switch Interface, and Equipment RS-485 interface. In addition to the above, the operator has access to all converter equipment in the system including the switch via the operator RS-232 interface on the converter.

2.4.1 Backup Switch Interface (Converter Interface) Connector (J16 - J24)

The protection switch interface connector is a DB 15-pin connector that connects each converter with the redundancy control unit. This cable serves as a direct link for each converter in the configuration whether they are the primary converter or the backup unit. The pinout of the switch is as follows:

Note: The DB 15-pin connector is identified as J5 on the converters and connects to the Redundancy Control Unit J16 through J24. J16 connects to the backup converter, J17 connects to converter #1, J18 connects to converter #2, J19 connects to converter #3, etc.

J16 - J24 B/U Switch Interface

<u>Pin# DB 15</u>	<u>Nomenclature</u>	<u>Description</u>
1	N.O	Form-C contact summary fault normally open contact
5	N.C.	Form-C contact summary fault normally closed contact
9	COM	Form-C contact summary fault common contact
13	GND	
2	+15V Or'd	Diode Or'd +15 Vdc from converter
6	FCB1	Fault Code bit 1
10	FCB2	Fault Code bit 2
14	FCB3	Fault Code bit 3
3	FCB4	Fault Code bit 4
7	IDB1	ID Bit 1
11	IDB2	ID Bit 2
15	IDB3	ID Bit 3

4	IDB4	ID Bit 4
8	INT O	Interrupt
12	RMT	

The ID Bits provide information to the converter that tells the converter which slot (either primary or backup) the converter is plugged into. The addresses are as follows:

<u>IDB4</u>	<u>IDB3</u>	<u>IDB2</u>	<u>IDB1</u>	<u>Position</u>	
1	0	0	1	Backup	
X	X	X	X	Primary	Where: XXXX = 1 through 8 and identifies the slot to which the primary is connected.
		also			

2.4.2 Switch Fault/Status Connector (J6)

The RCU108 Redundancy Control Unit contains a summary Fault/Status connector that is available to the equipment operator for the purpose of monitoring the summary fault status of all converters. The pinouts of this 15-pin D Sub connector are as follows:

<u>J2 D sub 15</u>	<u>J6 D sub 15</u>	<u>Description</u>
1	1	Converter Summary Status N.O.
2	9	Converter Summary Status Common
3	2	Primary/Backup Summary Fault Relay Common
4	10	Backup Summary Fault Relay N.O.
5	3	Primary #2 Summary Fault Relay N.O.
6	11	Primary #4 Summary Fault Relay N.O.
7	4	Primary #6 Summary Fault Relay N.O.
8	12	Primary #8 Summary Fault Relay N.O.
9	5	Converter Summary Status N.C.
10	13	Ground
11	6	ACC (Do not apply Voltage)
12	14	Primary #1 Summary Fault Relay N.O.
13	7	Primary #3 Summary Fault Relay N.O.
14	15	Primary #5 Summary Fault Relay N.O.
15	8	Primary #7 Summary Fault Relay N.O.
16		N/C

2.4.3 Up/Downconverter Equipment RS485 Port (J1)

An equipment multi-drop, full-duplex, bi-directional RS485 Interface allows communication between converters. Because the RS485 interface uses a master/slave (talker/listener) configuration, the converter that is designated the backup converter will automatically be established as the master. Under normal RS485 protocol, the master will poll a specific slave by address and only then will the slave unit respond. The swapping of Transmit Data and Receive Data is accomplished in the inter-converter cable (CA/3563) as the hardware interface is identical for all converters.

<u>J6 DB 9-Pin</u>	<u>Description</u>
1	GND
2	SRCLK
3	No Connect
4	TX Not
5	TX
6	SRDAT
7	No Connect
8	RX Not
9	RX

The signals on pins 2 and 6 of the DB9 connector are the clock and data of the I-squared bus which is an interface employed in the 1:8 (RCU108) protection systems only.

2.4.4 RCU108 RF and IF Interfaces

The RF and IF connectors located on the rear of the RCU108 has four sections designated 'A' through 'D'. Each section allows for two converter assignments. The RF and IF connector designations are identical from section to section. The various sections are only differentiated by the letter designations. Refer to Figure 2-1 to locate the IF and RF connectors outlined in the following paragraphs.

2.4.4.1 Rear Panel Section A, Converter Number 1

J2 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 1. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J3 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J7 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J8 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 1 (J1). This connection is made through supplied RF cable assembly CA/3602-1.

J12 - RF Backup IN/OUT

This SMA/Female connector goes to the RF connector of the RCU108 to the Backup Converter (J1). This connection is made through the supplied RF cable assembly CA/3602-B.

J13 - Converter Interconnect

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J14) of the RCU108. The connection is made with CA/3602-U, a supplied item.

2.4.4.2 Rear Panel Section A, Converter Number 2

J4 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 2. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J5 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J9 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J10 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 2 (J1). This connection is made through supplied RF cable assembly CA/3602-2.

J15 - Converter Interconnect

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J12) section B of the RCU108. The connection is made with RF cable assembly CA/3602-U, a supplied item.

2.4.4.3 Rear Panel Section B, Converter Number 3

J2 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 3. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J3 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J7 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J8 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 3 (J1). This connection is made through supplied RF cable assembly CA/3602-3.

J13 - RF Backup Interface

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J14) of the RCU108. This connection is made through the supplied RF cable assembly CA/3602-U.

2.4.4.4 Rear Panel Section B, Converter Number 4

J4 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 4. The connection is made through the IF cable assembly, CA/3598, which is a supplied item.

J5 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J9 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J10 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 4 (J1). This connection is made through supplied RF cable assembly CA/3602-4.

J15 - RF Backup Interface

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J12) section C of the RCU108. The connection is made with RF cable assembly CA/3602-U, a supplied item.

2.4.4.5 Rear Panel Section C, Converter Number 5

J2 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 5. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J3 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J7 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J8 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 5 (J1). This connection is made through supplied RF cable assembly CA/3602-5.

J13 - RF Backup Interface

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J12) section C of the RCU108. The connection is made with RF cable assembly CA/3602-U, a supplied item.

2.4.4.6 Rear Panel Section C, Converter Number 6

J4 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 6. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J5 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J9 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J10 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 6 (J1). This connection is made through supplied RF cable assembly CA/3602-6.

J15 - RF Backup Interface

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J14) section D of the RCU108. The connection is made with RF cable assembly CA/3602-U, a supplied item.

2.4.4.7 Rear Panel Section D, Converter Number 7

J2 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 7. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J3 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J7 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J8 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 7 (J1). This connection is made through supplied RF cable assembly CA/3602-7.

J13 - RF Backup Interface

This SMA/Female connector goes to the RF connector of the RCU108 to the RF connector (J14) Section C of the RCU108. The connection is made with RF cable assembly CA/3602-U, a supplied item.

2.4.4.8 Rear Panel Section D, Converter Number 8

J4 - IF Converter

This BNC/Female connector is routed from the IF connector (J2) of the RCU108 to J2 of primary converter number 8. The connection is made through the IF cable assembly CA/3598 which is a supplied item.

J5 - IF In/Out

This BNC/Female connector is routed from the User IF connector of the RCU108 to the User Interface.

J9 - RF In/Out

This SMA/Female connector is routed from the User RF connector of the RCU108 to the User Interface.

J10 - RF Converter

This SMA/Female connector goes to the RF connector of the RCU108 to the Primary Converter number 8 (J1). This connection is made through supplied RF cable assembly CA/3602-8.

J15 - 50 Ohm Termination**2.4.5 Interfaces Common to the Converters**

The RS485 equipment interface and the operator serial I/O interface found on the converter hardware both play a role in the operation of the switch and are included here for continuity. For further information, please refer to the converter manual for more information on these two interfaces.

2.4.6 Operator Serial I/O (J8 on Converter Rear Panel)

Through the Operator Serial Port, the operator can gain access to all of the control features of the converter. This enables the remote operator to configure the switch, set the gain and frequency of the converter and interrogate status of the converter.

The Operator Serial Port is a DB 9-pin female connector at the rear of the converter. This port provides serial interface that can be configured as either a RS232, RS422 or RS485 interface. This port allows the user to remotely control all of the features outlined in the Serial Protocol (Appendix B). The serial port comes configured as an RS-232 Serial port for DCE unless indicated otherwise. The pinout of the D sub 9-pin socket connector configured for RS232 or RS422/485 is as follows:

Operator Serial I/O Connector (Rear Panel)

<u>J8 DB 9 Pin#</u>	<u>RS232</u>	<u>RS422/485</u>	<u>AS/3048 J10</u>
1	N/C	RXData\	1
2	TXData	TXData	3
3	RXData	RXData	5
4	DTR----to pin 6	DTR---to pin 6	7
5	GND	Gnd	9

6	DSR----to pin 4	DSR ---to pin 4	2
7	RTS----to Pin 8	RTS----to Pin 8	4
8	CTS----to pin 7	CTS----to pin 7	6
9	N/C	TXData\	8

NOTE: In order to obtain these signals at the output connector, the jumper configuration on the AS/3048 Controller PWB must have been performed as outlined in Appendix B. A summary of jumper selections is as follows:

Configuration	JP4-1	JP4-2	JP4-3	JP4-4	JP4-5	JP4-6	JP3	JP5	JP6	JP7	JP8
RS232	OUT	OUT	OUT	OUT	IN	IN	OUT	OUT	IN	OUT	OUT
RS422	IN	IN	IN	IN	OUT	OUT	OUT*	OUT	OUT	OUT	IN
RS485	IN	IN	IN	IN	OUT	OUT	OUT*	OUT	OUT	OUT	IN
485 1/2 DPLX	IN	OUT	OUT	IN	OUT	OUT	OUT*	IN	OUT	IN	IN

* Receiver terminations for twisted pair RS422/485 can be optionally terminated at 120 ohms by installing JP3. Factory-supplied cables for multiple converter "daisy chain" operation are terminated at the cable ends.

Section 3 - Operation

3.0 Definitions

The nomenclature used throughout this manual is meant to imply various roles that each (up or down) converter assumes depending upon the state of the converters and the settings of the protected converter system. These descriptions are as follows:

A **Protected Converter System** consists of the primary converter, backup converter, and the RCU108 switch and required interface cables.

The **Primary Converter** is the converter that is connected to any Primary Port on the Switch.

The **Backup Converter** is the converter that is connected to the Backup Port on the Switch

3.1 Controls and Indicators

Operator Controls and Indicators consist of the front panel LED indicators, Manual and Set buttons. Refer to Figure 3-1 for an illustration of the RCU108 front Panel.

RCU108 front panel LED indicators include the following:

POWER - Identified as BU, NO. 1 through NO. 8. When illuminated, these LEDs indicate that the converter has been connected to the switch in the corresponding location and that the converter is turned on.

ONLINE - This LED, when illuminated, indicates that the corresponding converter has been placed online.

STANDBY - The Standby LED indicates that the Backup Converter is in Standby Mode and waiting to back up any Primary Converter.

BU FAULT - Indicates the Backup Converter has a faulted condition and cannot back up a Primary Converter.

ERROR - When illuminated, indicates that data has changed between the backup and the Primary Converters or an IF/RF Switch has failed to respond.

BACKUP - When illuminated, indicates that the corresponding converter is offline and that the Backup is currently passing data.

FAULT - When illuminated, indicates that the corresponding converter has a faulted condition.

MANUAL - When illuminated, indicates that the operator has forced the switch to deselect the specified converter and put the backup converter online and keep it there. To actuate the Manual Backup, push the MANUAL BACKUP button, and while keeping it depressed, push the SET button. All other converters will operate normally, but will not back up another converter in the event of a failure. To remove a manually simulated fault, push the SET button once to remove it from manual mode, and push it again to allow the primary converter to take control.

3.2 Operation

The 1:8 protection switch unit provides automatic restoration for one online converter. An RS485 equipment interface allows the backup converter to 'learn' the Frequency, Gain and Channel settings of the primary converters. The learning process is initiated by the user, via the backup converter, Front Panel Display or User Serial Port RS232/RS485. By entering the Switch menu from the front panel of the backup converter, it will allow the user to set the priorities of each primary converter. Entering the 'Learn' mode menu from the front panel allows the user to initiate the learning process. The backup converter will indicate whether the learning process was successful. If the process was not successful, the converter will indicate the learning process failed. Refer to the converter manual for more details.

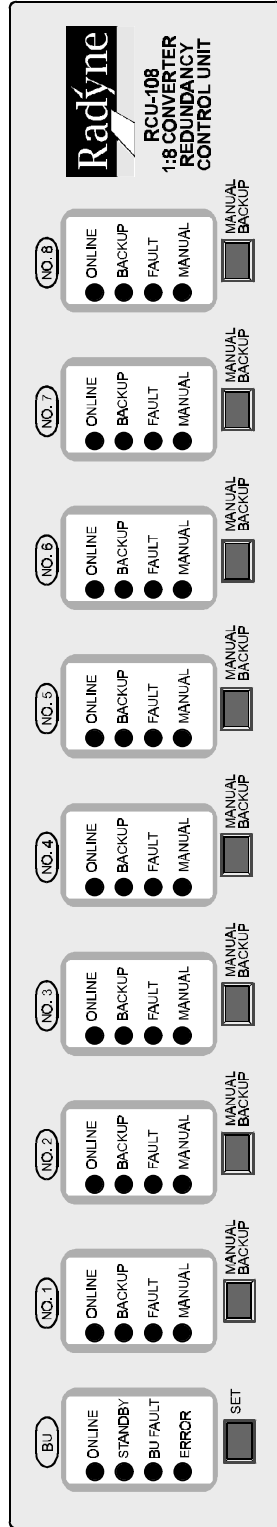


Figure 3-1. RCU108 Front Panel

3.3 Switch Menu

For a 1:8 Backup Converter, the Menu will appear as follows:

{MENU} for Main Menu {ENTER} for Switch Menu

3.4 Switch Configuration Menu

CONV	1 2 3 4 5 6 7 8
PRI	0 0 0 0 0 0 0 0

This Menu is applicable for a 1:8 Backup Converter. It allows the operator to specify the priority of the various converters.

0 = No Priority - The Backup will ignore the Prime.

1 = Highest Priority, 8 = Lowest Priority.

The Arrow keys are used to move left and right and increase/decrease a converter's priority. When all of the priorities have been set, pressing the Enter key causes the Backup to accept the entries and store them in non-volatile RAM. Pressing the Menu key will scroll to the next menu.

3.5 Learn Menu (Backup Converter Only)

{MENU} for next menu {ENTER} for Learn Mode
--

Depressing <MENU> will scroll to the Utilities Menu. Depressing <ENTER> will cause the Backup Converter to 'Learn' about the Primary Converter. The screen automatically scrolls to the 'Learn Status' menu.

3.6 Learn Status Menus (Backup Converter Only)

Automatic Learning In Progress

The 'Automatic Learning in Progress' window indicates that the Backup Converter is polling the Prime Converters in order to learn about them.

Automatic Learning
Successfully Completed

This window indicates that the Backup Converter was successfully able to 'Learn' about the Primary Converters.

Automatic Learning
Failed

This window indicates that the Backup Converter was not able to learn about the Prime Converter. When the <Menu> key is pressed, the Backup Converter will provide more information about the failure. This information includes the following:

No Response - The Prime Converter did not respond.

Invalid Response - The Prime Converter responded, but the Backup Converter did not receive the message clearly.

Incompatible Converter - The Backup Converter is not capable of backing up the Prime Converter.

RF is Turned Off - The Backup Converter will not 'Learn' and back up an upconverter that has its RF turned off. Turn the RF 'ON' on the Prime Converter and repeat the 'Learn' process.

3.7 Switch Logic

The RCU108 uses the output of the Form-C relay in the converter to determine what action to take. In the following descriptions, it is assumed that the switch is in Auto mode and that the other converters are not faulted. (If the switch were in Manual mode, no switching would take place).

The Fault N.O logic level is derived from the normally open contact of the summary fault Form-C relay in the converter. The converter, when clear of any and all faults, asserts the summary fault relay to the not faulted state and the contact is open. A fault in the converter, turning the converter off, failure of the converter power supply, or disconnecting the switch interface cable will cause the relay to close. Upon detection of this event, the switch will toggle control and data to the backup converter.

Once the fault in the faulted converter is cleared, the converter will reset the summary fault relay and the contact will again be open. Upon detection of this event, the switch will place the converter in standby, so that it can be placed online in the event that another converter fails. The switch will not automatically switch back to the original online converter.

3.8 Troubleshooting and/or Replacing a Faulted Converter

Prior to testing or replacing a faulted converter it is strongly recommended that the mode selection switch be set to manually backup the faulted converter. Once the faults on the faulted converter have been cleared (or the converter has been replaced), the switch can be placed in the Auto Mode by pressing the SET button once. (The backup will remain online and the prime will be in standby. There will be no interruption in traffic).

To put the Prime online and the Backup in Standby, press the SET button twice and the Switch will

toggle back to its original configuration. NOTE: There will be a minor interruption in traffic when the Switch toggles.

Section 4 - Maintenance

4.0 Periodic Maintenance

The RCU108 requires no periodic field maintenance procedures. The unit contains no adjustments. Should a unit be suspected of a defect in field operations after all interface signals are verified, the proper procedure is to replace the unit with another known working unit. If this does not cure the problem, faulty cabling or power should be suspected.

A fault in the operation of the RCU108 should become evident through an illogical LED indication on the front panel. For example, failure of the RF transfer switch will become obvious when the ERROR LED becomes illuminated. This can be confirmed via the Front Panel of the Backup Converter using the Switch Fault Menu. In this case, the RCU108 logic has commanded the transfer switch to a certain position, but the relay remains stuck in the old position.

Verification of the operation of the IF and RF transfer switches can be verified through a DC continuity check at the BNC and RF connectors at the rear of the RCU108. The RF and IF cables will need to be removed to perform this test. Failure of either the IF or RF transfer switch can be verified by checking the voltage to the coils on either relay assembly. The IF transfer switch coil should have 4.5 Vdc and the RF transfer switch Coil should have 14.0 Vdc across the coil (not to ground). If a fault in either the RF or IF transfer switch module is suspected, these assemblies can be changed in the field.

Appendix A

Technical Specifications

Front Panel Display

Indications: Online, Backup, Fault, Manual (Primary Converters)
Online, Standby, Fault, Error (Backup Converter)

Controls: Manual + Set/Reset Pushbuttons

Backup Configuration

Menu: (via backup converter):

Converter ID#: 1 through N (RS485 Equipment Address)

Priority: 1 (highest) through N and 0 (none)

Converter Priority: (Via Backup Converter front panel or serial port):
Frequency, Gain, Status, Fault Isolation

Rear Panel:

BU INTFC 1-8 & BU D Sub, 15-Pin Socket (J17- J24)

RF In/Out SMA-F

IF In/Out BNC-F

Summary/Fault Status D Sub, 15-Pin socket (J6)

RS485 D Sub, 9-Pin (J1)

Switch Transfer Specifications:

Bandwidth DC-18 GHz

Insertion Loss (Online) 0.4 dB C-band, 0.5 dB, Ku-band

Insertion Loss (Backup) 0.8 dB x N

Impedance 50 Ohms

VSWR 1.5:1 Maximum

Isolation 70 dB min.

Switch IF Ports:

Bandwidth 50-180 MHz

Insertion Loss 0.2 dB

Impedance 75 ohms

VSWR 1.3:1

Isolation 80 dB

Mechanical:

Size: 19" x 3.5" x 19" deep

Weight 8 Lbs. (1:8)

**- Appendix B -
RCU108 Block Diagram,
Configuration Drawings
and Schematics**

