RLC48 1750A
RLC4817501CACAD000
Redundant Active L-Band Combiner

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
ISO 9001:2000

General Description:
Based on Quintech's RPS series redundant power supplies and the LC 2150 series L-Band rack mount combiners, the RLC48 1750A provides an active 48 way redundant combiner operating over the 950-1750 MHz frequency range.

Features:
- Hot-swappable redundant power supply modules
- Hot-swappable redundant combiner modules
- 9 dB of gain in 1dB steps via front panel mounted rotary switches
- Current sensing for combiner failure
- Redundant backup amplifier replaces failed amplifier in less than 1 µsec
- Front panel mounted LED indicators for power supply and combiner status
- Front panel mounted momentary switch for manual switching of redundant combiners
- RS-422 interface for remote switching of combiner modules
- 50 Ω BNC termination boards for unused ports (supplied as required)
- Dual AC power supply modules

Specifications:

Ports	48 input / 1 output
Operating Frequency Range	950 -1750 MHz
Impedance:	50 Ω
P1dB (Input):	-4 dBm (each input), different frequency or carrier per input
Gain (Variable):	0 db to 9 dB in 1dB steps
Frequency Response:	± 2.5 dB over the operating frequency range
	± 0.5 dB over any 40 MHz
	± 0.75 over any 72 MHz
Isolation:	18 dB min.
Return Loss:	15 dB min., 18 dB typical
Noise Figure:	≤ 16 dB
RF Connectors:	BNC, 50 Ω (female)
Power Requirements:	100-240 V~, 50/60 Hz
Power Consumption:	145 W
Redundant Amplifier Switching Speed:	<1 µsec
Phase Differential:	5 degree differential
Nominal Input Level:	-15 dBm
Operating Temperature Range:	0-50° C
Control:	RS-422 via rear panel mounted DB 9 connector. Provides control for remote switching between combiner modules. Also provides alarms for PSU and combiner failures. Software customer supplied.
Mechanical:	6 RU (10.5" H x 19" W x 20" D)
Weight:	41 lbs. gross (boxed), 31 lbs. net

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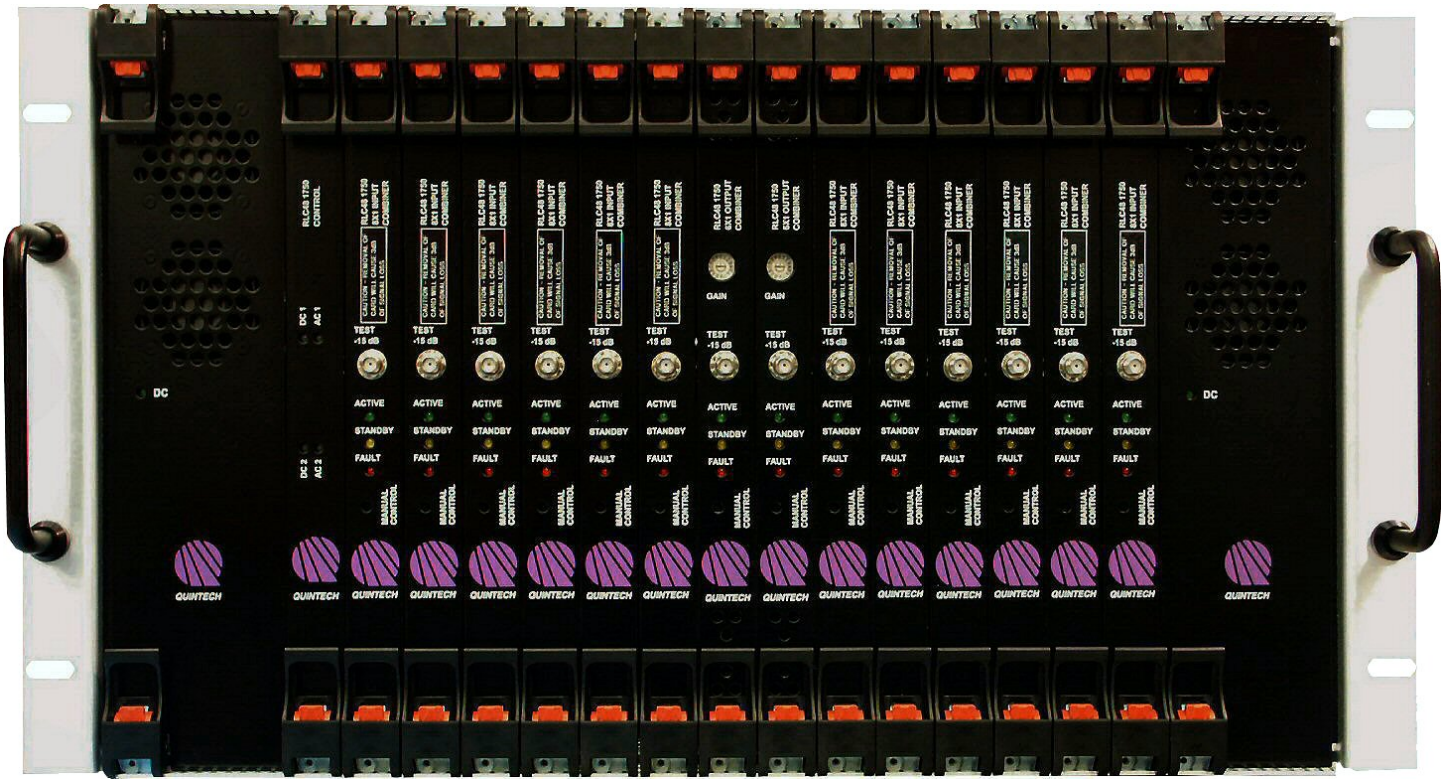

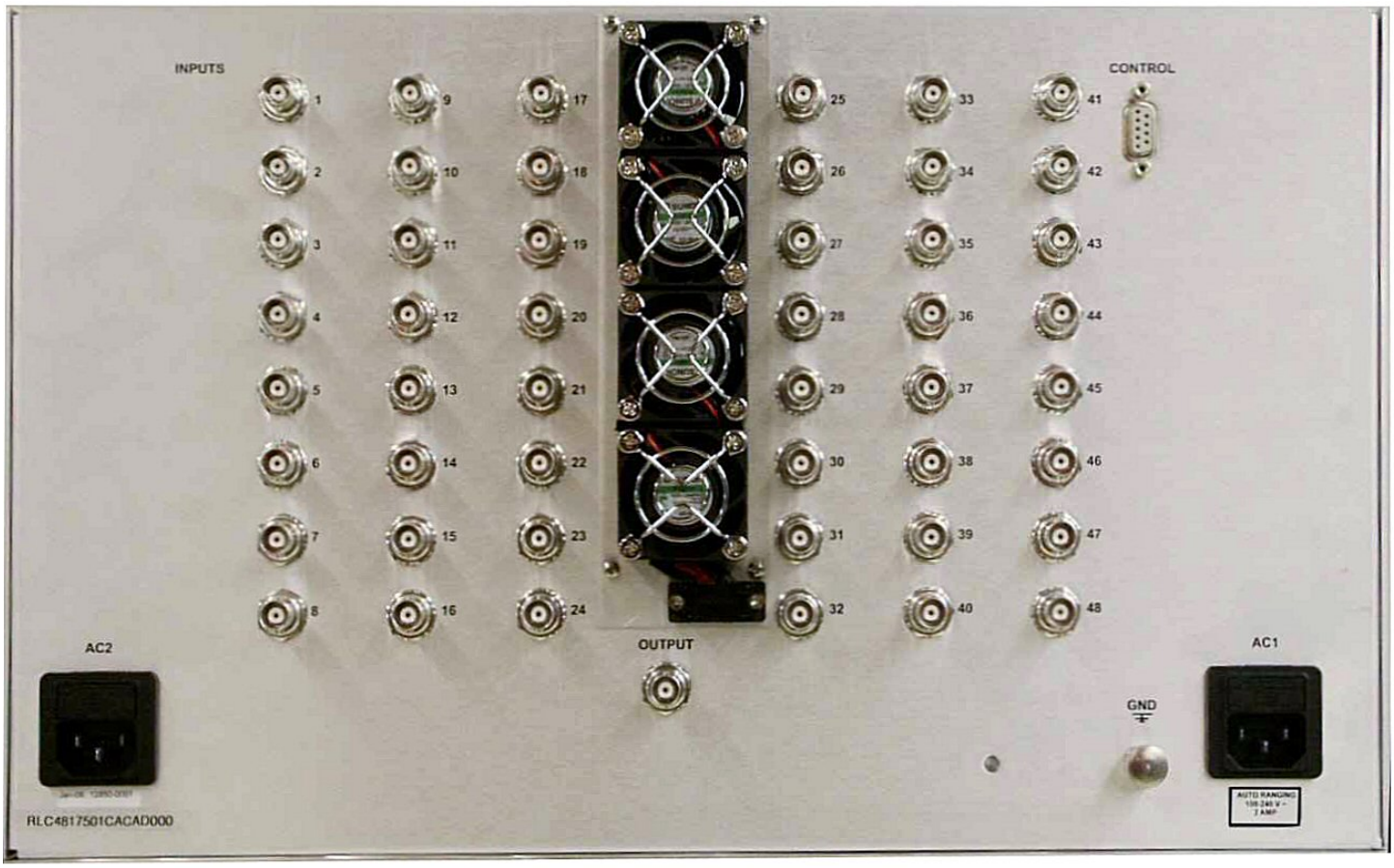

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Usage Information

Front Panel LEDs

Front panel mounted LED indicators have been included to indicate power supply and combiner status. Their meanings are as follows:

DC Power Supply Modules

Green LED on – normal operation
Green LED off – power supply failure

Controller Module

AC1 / AC2

LED green – normal operation
LED off – AC power failure

DC1 / DC2

LED green – DC power supply operating normally
LED red – DC power supply failure

NOTE: In those instances when the green LED goes off on a DC power supply module, its corresponding LED on the controller module will change to red.

Combiner Modules

Green LED on (ACTIVE) – combiner module is currently online and is operating normally
Yellow LED on (STANDBY) – combiner module is operating normally, but is currently offline and in standby mode
Red LED on (FAILURE) – combiner module is offline and is experiencing a failure

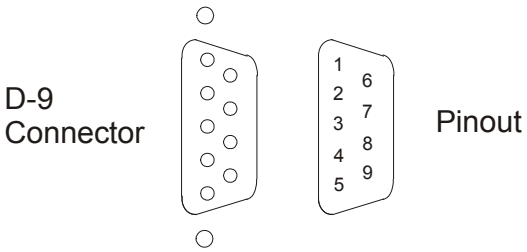
NOTES: For each redundant combiner module pair, only one combiner module can be active at a time; thus, when the ACTIVE (green) LED is lit on one combiner module, the STANDBY (yellow) LED will be lit on its redundant combiner module and vice versa.

Control Port

The RLC48 1750A provides the ability to remotely switch the combiner modules via the RS-422 CONTROL port. In order to communicate with the RLC48 1750A, the following communications parameters must be in effect:

Baudrate - 19200 bps
Data - 8 bits
Parity - none
Stop - 1 bit

Pinouts for the CONTROL port are as follows:



Pin 1 - DC common
Pin 2 - not used
Pin 3 - Noninverting TX
Pin 4 - Noninverting RX
Pin 5 - DC common
Pin 6 - Inverting TX
Pin 7 - not used
Pin 8 - Inverting RX*
Pin 9 - Inverting RX*

*NOTE: Pin 8 and Pin 9 are wired together

Gain Control

The RLC48 1750A provides the ability to adjust the amplifier gain by 10 dB in 1 dB steps via the rotary switches located on the front of the output combiner modules. Each rotary switch is labeled 0 through F with position 0 representing 1 dB of gain and position A representing 10 dB of gain. Positions B through F are not used and will also indicate a gain setting of 10 dB.

Manual Control

The RLC48 1750A provides the ability to manually control the active/standby status of a combiner pair. Pressing the MANUAL CONTROL button on the front of a combiner module will place that module into STANDBY mode and will cause its corresponding redundant combiner module to switch to ACTIVE mode.

Remote Control Interface

The RLC48 1750A can be accessed remotely via the CONTROL port by issuing simple commands from a PC-based command line or terminal interface. Currently, the remote control protocol offers 4 different commands which allow you to perform such actions as:

- inquire about the operational status of the RLC
- retrieve information about the firmware version
- perform remote switching of the redundant combiner pairs

Commands

The specific command types that can be issued to the RLC48 1750A are:

S*x* - Request the current status of a combiner module pair
T*x* - Force a combiner module pair to switch between ACTIVE and STANDBY
F - Retrieve the CPU card firmware version
C*x* - Request cooling fan status

where *x* identifies one of the valid combiner module pairs (1-7) shown in Table 1.

Table 1.

Identifier	Combiner Module Pair	Combiner Ports
1	Input Combiner Module Pair 1	Inputs 1-8
2	Input Combiner Module Pair 2	Inputs 9-16
3	Input Combiner Module Pair 3	Inputs 17-24
4	Input Combiner Module Pair 4	Inputs 25-32
5	Input Combiner Module Pair 5	Inputs 33-40
6	Input Combiner Module Pair 6	Inputs 41-48
7	Output Combiner Module Pair	Output

To issue one of these commands, simply type the one or two character command in the terminal interface or command line interface window and press enter. The RLC48 1750A will respond with a single line response that reflects the desired status or action.

Each response line has the following basic structure:

<unit-model>,<command-echo>,<response>

where:

<unit-model> identifies the product model with which you are communicating
<command-echo> echoes the same command that was entered
<response> is comprised of four numeric characters that reflect the desired action / status

NOTE: When issuing a command, be sure that the combiner module pair identifier (x) is within the acceptable range (1-7). If a value is entered which is out of range, (ex. less than 1 or greater than 7), the RLC48 1750A unit will not respond.

The CONTROL port response time for the RLC48 1750A Sx, Tx, and Cx commands is 50 ms (milliseconds). The CONTROL port response time for the F (firmware) command is 100 µs (microseconds). Removal of one or more redundant combiner modules will increase response time to 900 ms (milliseconds). The response time for the remaining redundant combiner module pairs will remain at 50 ms(milliseconds).

Response Codes

Each response code component is comprised of 4 numeric characters (ex. ABCD), where each character position reflects a particular piece of status information. Table 2 identifies the possible numeric values that may appear in each character position and their respective meanings.

Table 2.

Command	Character Position	Value	Meaning
Sx/Tx	A	0	Combiner Mod. 1 Offline, Combiner Mod. 2 Offline
		1	Combiner Mod. 1 Online, Combiner Mod. 2 Offline
		2	Combiner Mod. 1 Offline, Combiner Mod. 2 Online
		3	Combiner Mod. 1 Online, Combiner Mod. 2 Online
Sx/Tx	B	0	Combiner Mod. 1 in Fault Mode, Combiner Mod. 2 in Fault Mode
		1	Combiner Mod. 1 Current Normal, Combiner Mod. 2 in Fault Mode
		2	Combiner Mod. 1 in Fault Mode, Combiner Mod. 2 Current Normal
		3	Combiner Mod. 1 Current Normal, Combiner Mod. 2 Current Normal
Sx/Tx	C	1	Combiner Mod. 1 in Primary Mode, Combiner Mod. 2 in Standby Mode
		2	Combiner Mod. 1 in Standby Mode, Combiner Mod. 2 in Primary Mode
Sx/Tx	D	1	Power Supply Mod. 1 good, Power Supply Mod. 2 failure
		2	Power Supply Mod. 1 failure, Power Supply Mod. 2 good
		3	Power Supply Mod. 1 good, Power Supply Mod. 2 good
Cx	A	0	Cooling Fan Mod. 1 failure, Cooling Fan Mod. 2 failure
		1	Cooling Fan Mod. 1 normal, Cooling Fan Mod. 2 failure
		2	Cooling Fan Mod. 1 failure, Cooling Fan Mod. 2 normal
		3	Cooling Fan Mod. 1 normal, Cooling Fan Mod. 2 normal
Cx	B, C, D		Reserved for Future Use

Examples

Command	Response
S1	RLC1750,S1,3323
T1	RLC1750,T1,3313
F	MODEL RLC1750 FIRMWARE 070814_RLC_CPU_002
C7	RLC1750,C7,0000

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