100 MHz SWITCHING MATRIX

MODEL 1258

PUBLICATION NO. 980881

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RETURN of PRODUCT

Authorization is required from Racal Instruments before you send us your product for service or calibration. Call your nearest Racal Instruments support facility. A list is located on the last page of this manual. If you are unsure where to call, contact Racal Instruments, Inc. Customer Support Department in Irvine, California, USA at 1-800-722-3262 or 1-949-859-8999 or via fax at 1-949-859-7139. We can be reached at: helpdesk@racalinstruments.com.

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FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the proper fuse is in place for the power source to operate.

2. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until, performance is checked by qualified personnel.

Racal Instruments

CE Declaration of Conformity

We

Racal Instruments Inc.
4 Goodyear Street
Irvine, CA 92618

declare under sole responsibility that the

1258, P/N 407900-0XX
conforms to the following Product Specifications:

EMC: EN61326:1998 +A1: 1998 +A2: 2001

FCC CFR 47, PART 18 SUBPART B **CLASS A**

ICES-003 ISSUE 4: February 2004 **CLASS A**

Supplementary Information:

The above specifications are met when the product was used as a stand-alone solid-state switching system (mainframe) with backplates installed over all unused slots, as applicable

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (modified by 93/68/EEC).

Irvine, CA, July 11, 2005

VP of Engineering
Karen Evensen

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Chapter 1

SYSTEM SPECIFICATION

General Description

The 1258 is a solid-state switching system capable of routing DC-100MHz signals. A high-speed embedded controller provides fast routing of signals and ease of operation. The solid-state non-blocking switching logic offers maximum signal isolation and low noise. The switching system architecture allows customizable rear panel signal connections.

Figure 1-1, Model 1258 Switching Matrix

Purpose Of Equipment

This instrument provides a high-density capability for signal routing and switching of audio, video, telemetry, ELINT/SIGNT, IF, and other types of signals in the DC-100MHz frequency range.

Features

Key Features

- Solid State Non-Blocking Switch with full fan-out
- 64 Input x 16 Output, expandable to 64 input x 64 output in 16 output increments
- Frequency Response: 100 MHz Bandwidth
- Crosstalk Isolation: -60dB @ 5MHz (200mVp-p)
- Off Isolation: -85dB @ 5MHz (2Vp-p), -110dB @ 5MHz (200mVp-p)
- 19" Rack Mountable, 2 EIA Units High (16.5"W × 19.5"D × 3.5"H)
- Rear Mounted Connectors (variations with SMA and multi-contact DSUBs available)
- GPIB (IEEE-488.2), Ethernet (10BaseT), RS-232, or Manual (front panel) Control
- Field Upgradeable Firmware through Ethernet or RS-232 interface
- Front Panel User Interface w/full color graphical display
- Forced air cooling

Specifications

MAXIMUM RATINGS

Parameter	Condition	Rating	Units
Operating Temperature		0 to +60	°C
Non-Operating Temperature		-40 to +75	°C
Humidity	non-condensing	5 to 95	%
AC Power	47-63Hz operation	250	Vac
Power Consumption		100	Watts
Channel Input Voltage	no damage	±5.0	V

AC CHARACTERISTICS

Parameter	Conditions	Min	Limit Typ.	Max	Units
Dynamic Performance					
Bandwidth -3dB	200 mV p-p, R_L = 50Ω		120		MHz
	1 V p-p, R_L = 50Ω		100		MHz
	2 V p-p, R_L = 50Ω		90		MHz
Slew Rate	2 V Step, R_L = 50Ω		200		V/μs
Settling Time	0.1%, 2V step, R_L = 50Ω		100		ns
Gain Flatness	0.1 dB, 200 mV p-p, R_L = 50Ω		20		MHz
	0.1 dB, 2 V p-p, R_L = 50Ω		10		MHz
	0.5 dB, 200 mV p-p, R_L = 50Ω		60		MHz
	0.5 dB, 2 V p-p, R_L = 50Ω		45		MHz
Crosstalk/Isolation					
Crosstalk (adj. Ch Input)	f = 5MHz, 200 mV p-p, R_L = 50Ω		-60		dB
Crosstalk (adj. Ch Output)	f = 5MHz, 200 mV p-p, R_L = 50Ω		-75		dB
Crosstalk (adj. Ch)	f = 5MHz, 200 mV p-p, R_L = 50Ω		-60		dB
Off Isolation, Input-Output	f = 10 MHz, R_L = 100Ω, one channel		-90		dB
Output Characteristics					
Output Offset Voltage	Worst case all switch configurations			±50	mV
Output Impedance	DC, enabled		50		Ω
	Disabled	1	10		MΩ
Output Capacitance			18		pF
Output Leakage Current	Disabled		1		μA
Output Voltage Range	R_L = 1KΩ	±2.5	±3		V
Output Current		20	40		mA
Short Circuit Current			65		mA
Input Characteristics					
Input Impedance			50		Ω
Input Voltage Range		±2.5	±3		V
Input Bias Current	One switching card (64 in X 16 out)		2	5	μA
	Four switching cards (64 in X 64 out)		8	20	μA
Switching Characteristics					
Switching Transient			15		mV p-p
Switching Time	Command receipt to switch update		6		ms
Break/Make Time			500		μs

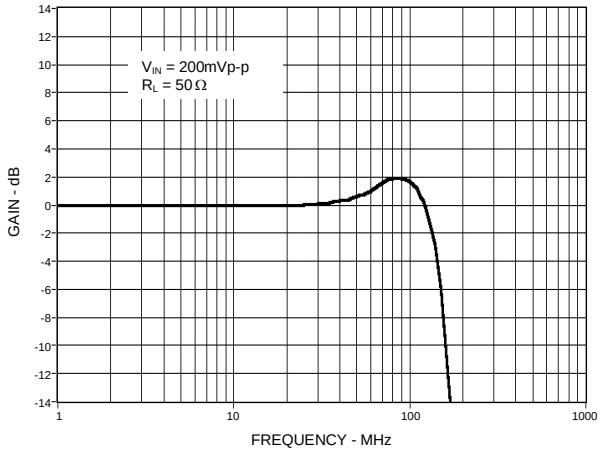

Figure 1-2 Frequency Response

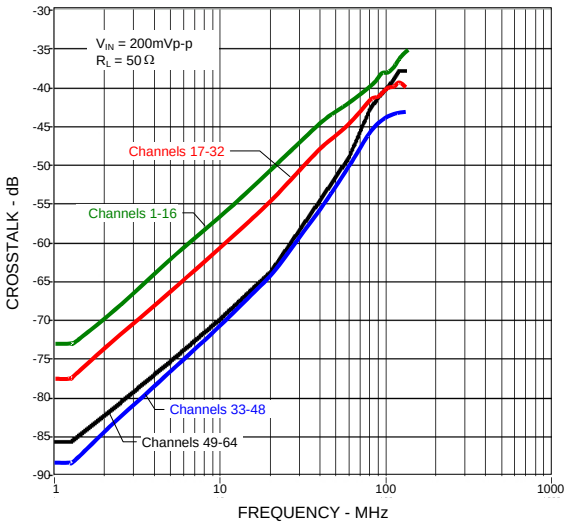

Figure 1-3. Adjacent (Input) Channel Crosstalk vs. Frequency

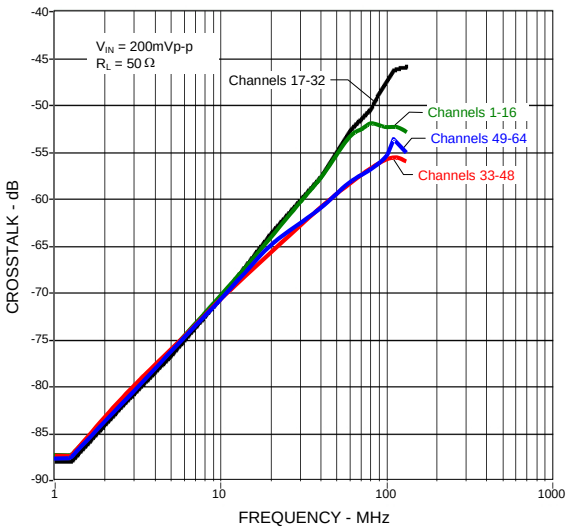

Figure 1-4. Adjacent (Output) Channel Crosstalk vs. Frequency

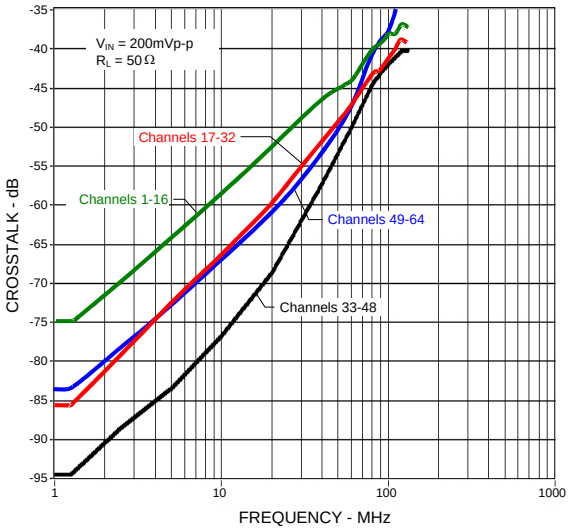

Figure 1-5 Adjacent (Throughput) Channel Crosstalk vs. Frequency

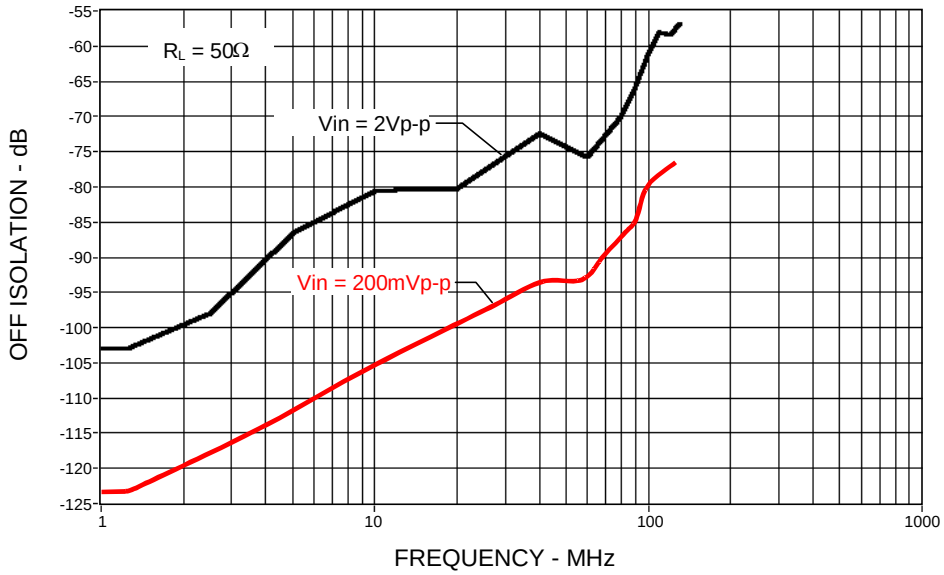

Figure 1-6 Off Isolation, Input-Output

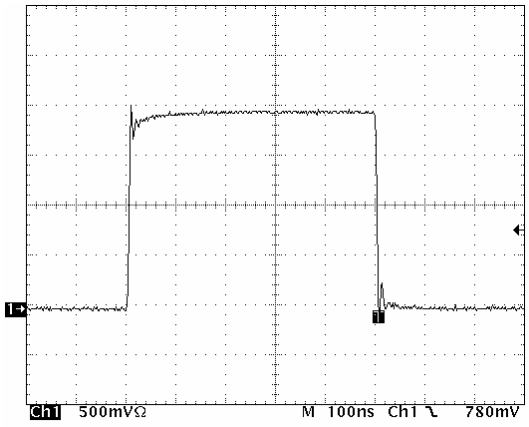

Figure 1-7. 2Vp-p Source

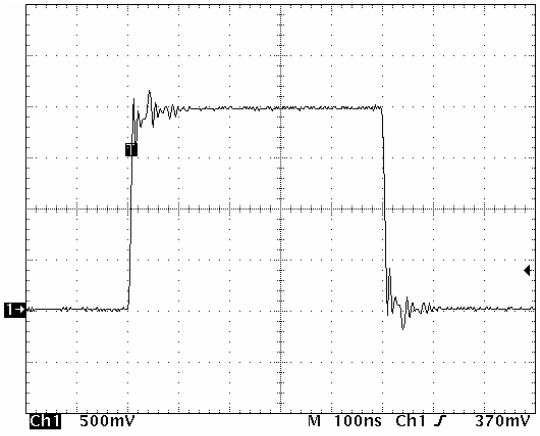

Figure 1-8. Step Response for 2Vp-p

Mechanical

The 1258 is contained in a metal chassis with an outside dimension 16.5 inches wide by 19.5 inches deep by 3.5 inches high. The front panel is 19 inches wide by 3.5 inches high and includes four oval holes for rack mounting and a handle at each end. The unit fits in a standard EIA 2U rack space.

Applicable Documents

- Standard Commands for Programmable Instruments, Volume 1: Syntax and Style
- *ANSI/IEEE Std 488.2-1992,* IEEE Standard Codes, Formats, Protocols, and Common Commands for use with ANSI/IEEE Std 488.1-1987
- *IEEE-802.3 (ANSI 8802.3),* Ethernet Network Standard
- *EIA RS-232-D,* Interface Between Data Terminal Equipment and Data Communication Equipment Employing Serial Binary Data Interchange

Chapter 2

INSTALLATION INSTRUCTIONS

Unpacking, Inspection and Handling

CAUTION

ESD sensitive devices, open the instrument at an ESD safe work station. Read the entire User's Manual before proceeding with the installation and application of power.

1. Remove the instrument from its carton, preserving the factory packaging as much as possible.
2. Inspect the instrument for any defects or damage. Immediately notify the carrier if any damage is apparent.
3. Have a qualified person check the instrument for safety before use.
4. If required for maintenance purposes, the top cover should only be removed after disconnecting the electrical cord to avoid electrical shock
5. Use only fuses rated in accordance with the label on the rear panel of the unit. To avoid electrical shock, be sure to disconnect the electrical cord before replacing the fuse.

Reshipment Instructions

1. Use the original packing material when returning the instrument to Racal Instruments for servicing. The original shipping carton and the instrument's plastic foam will provide the necessary support for safe reshipment.

2. If the original packing material is unavailable, wrap the in an ESD Shielding bag and use plastic spray foam to surround and protect the instrument.

3. Reship in either the original or a new shipping carton.

Mounting

The 1258 is designed to mount in a standard 19" rack. The front panel includes four oval holes at each end for rack mounting. Be sure to leave space for cooling. Air enters the unit through the filters located on the left rear side and exits through vent holes located on the right front side.

Chapter 3
FUNCTIONAL DESCRIPTION

General

The 1258 uses an embedded controller with operational software to control a set of switching cards. The software receives commands through the front panel manual keypad or the remote interfaces. Matrix routing is controlled through a digital link to the switching cards. A simplified functional block diagram of the instrument is shown in Figure 3-1.

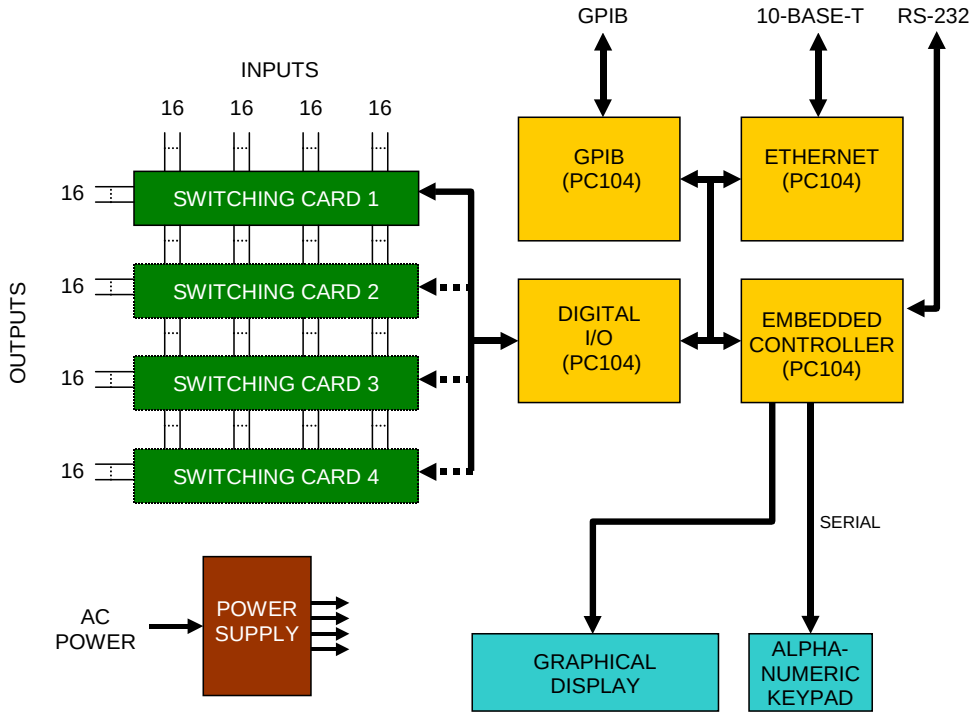

Figure 3-1. Functional Block Diagram

Front Panel User Interface

The front panel includes a 16 key alphanumeric keypad and color display for manual operator control. The internal processor uses the soft smart keys A through D to allow control and status of the instrument. The DEL key is used during manual input to erase, backspace, or delete an input. The ENTER key is used to complete a manual input. The keypad interfaces to the internal processor through a keypad encoder via a serial interface.

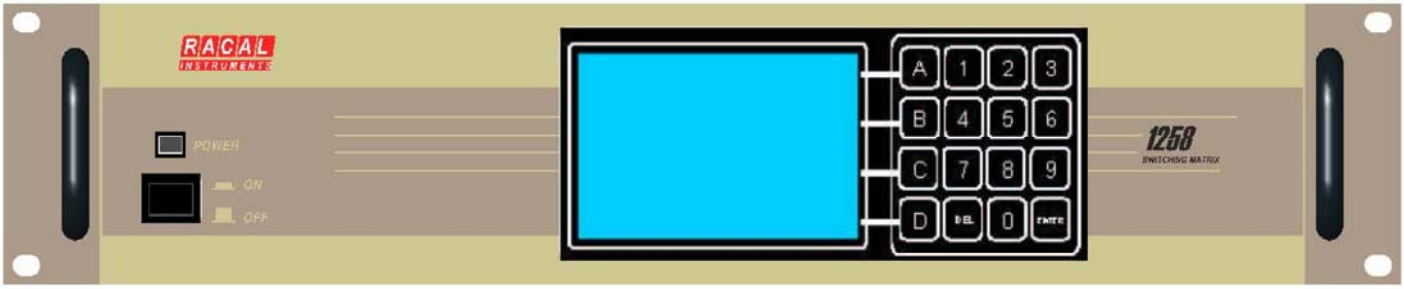

Figure 3-2. Front Panel

Switching System Controller

This switching system controller executes the system software that controls the switching matrix, interfaces with the front panel display and keyboard, and provides communication control and command parsing for the remote control interfaces. On-board non-volatile memory saves configuration information while power is off. The controller interfaces to a display adapter module and to the alphanumeric keypad through an on-board serial interface. The switching cards are controlled internally using a digital I/O.

Communication Interfaces

The GPIB, Ethernet, and RS-232 interfaces allow remote control of the switching matrix. The RS-232 uses a serial interface provided on the PC104 CPU module.

Switching Cards

The 1258 is comprised of one to four modular switching cards. Each card includes a complete 64 input by 16 output switching matrix comprised of four Analog Devices AD8116 16x16 buffered video crosspoint switches and control logic. The switching matrix is field expandable in 16 output increments. The entire 64x64 switching matrix is a non-blocking (full fan-out) design allowing any input to be connected to any output or multiple outputs simultaneously without additional input loading. *Note, however, that the operating system software has an operational mode that can assure that any given switch input is connected to at most one output (MultiConnect disabled). With MultiConnect enabled (default), a single input can be connected to multiple outputs.* The matrix design inherently does not allow multiple inputs to be connected to the same output.

Rear Panel

The rear panel includes an IEC 320 type AC power inlet module for AC power input and fusing. For remote program control an IEEE-488 (GPIB) connector, a Cat. 5 RJ45 Ethernet connector and a 25-pin RS-232 connector are provided. Signal input/output is provided SMA and/or Size 8 contacts. The connectors are mounted in a group of sixteen on rear panel I/O plates. These plates can be arranged in a variety of ways to suit many different requirements. Three types of 50Ω signal connectors are currently available:

- SMA Bulkhead Jack, Johnson Component, P/N 142-0303-411
- Size 8 Plug, ITT Cannon, P/N DM53740 -
- Size 8 Receptacle, ITT Cannon, P/N DM53742

The Size 8 contacts are housed in DSUB combo housings in groups of eight. The Size 8 plugs are housed in ITT Cannon P/N DCM8W8PK87 plug housings and the Size 8 receptacles are housed in ITT Cannon P/N DCM8W8SA197 receptacle housings.

Figures 3-3 and 3-4 shows the I/O configuration for option 407900–001 and 407900-014. Many other variations are possible.

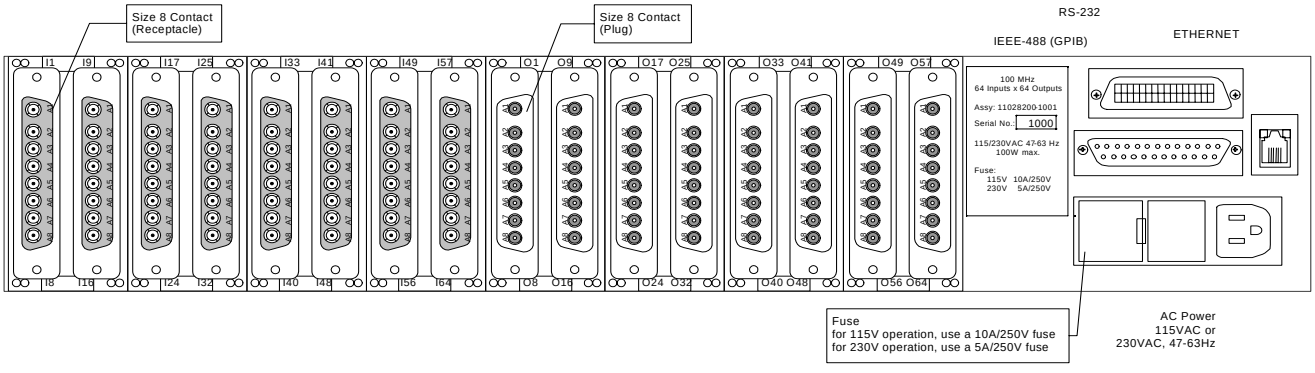

Figure 3-3. Rear Panel (option 407900-001 shown)

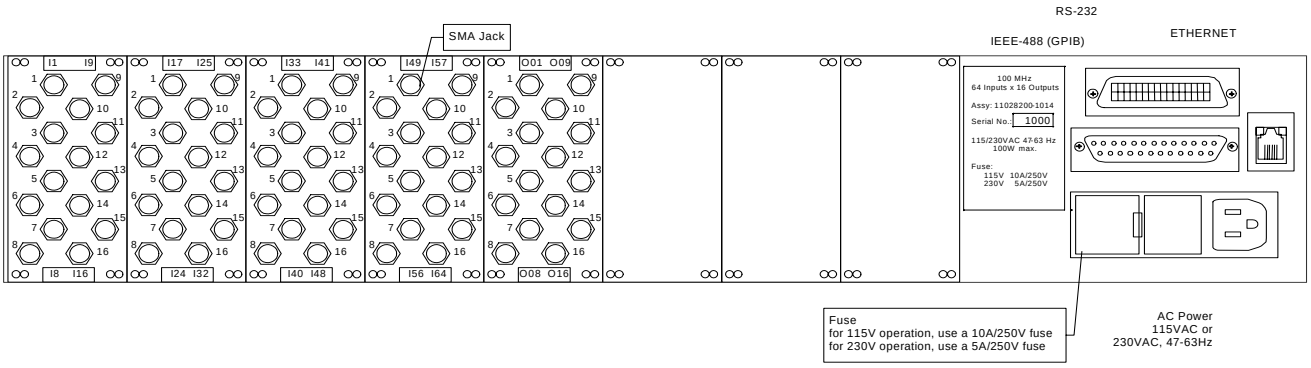

Figure 3-4. Rear Panel (option 407900-014 shown)

Chapter 4
OPERATING INSTRUCTIONS

General

The 1258 can be controlled through the front panel or through one of the rear panel control interfaces, GPIB, Ethernet, or RS-232. Most operations can be performed from a remote computer, however, the front panel interface must be used to configure the remote interfaces, perform display specific operations, and to obtain help on system operation. All remote control interface configuration information is automatically saved if the unit is powered off. To save the matrix configuration and operating modes during power off conditions, use either the 'Current' or 'Last Configuration' PowerUp mode (see PowerUp Configuration for details).

The front panel display has a screen saver feature that protects display from ghost characters being permanently imprinted on the screen due to prolonged inactivity. The display will automatically enter the screen saver mode after 15 minutes of no activity on the front panel. The screen saver does not operate in diagnostic mode. Remote commands are processed as normal during screen saver mode. Software version and matrix configuration information can be found on the About screen as shown in Figure 4-1.

Figure 4-1. About Screen

Manual Front Panel Operation

The front panel interface uses the left-most keys (A, B, C, and D) along with the display to provide dynamic smart key functionality. These keys, along with the DEL and ENTER keys allow the user to display and edit switch routing, configure the system interfaces and modes, run self-test, perform diagnostic functions, and obtain help information. Figure 4-2 shows the general hierarchy of the command structure. Some variations may exist depending on the version of the system firmware.

Smartkey D (bottom left) will always return the display to the previous menu. The ENTER key is used to complete a manual command or setting. The number keys are used for routes and addresses. If a mistake is made, the DEL key can be used to backspace. In any menu where numbers or letters are not being entered, the DEL key can be used to return to the starting menu.

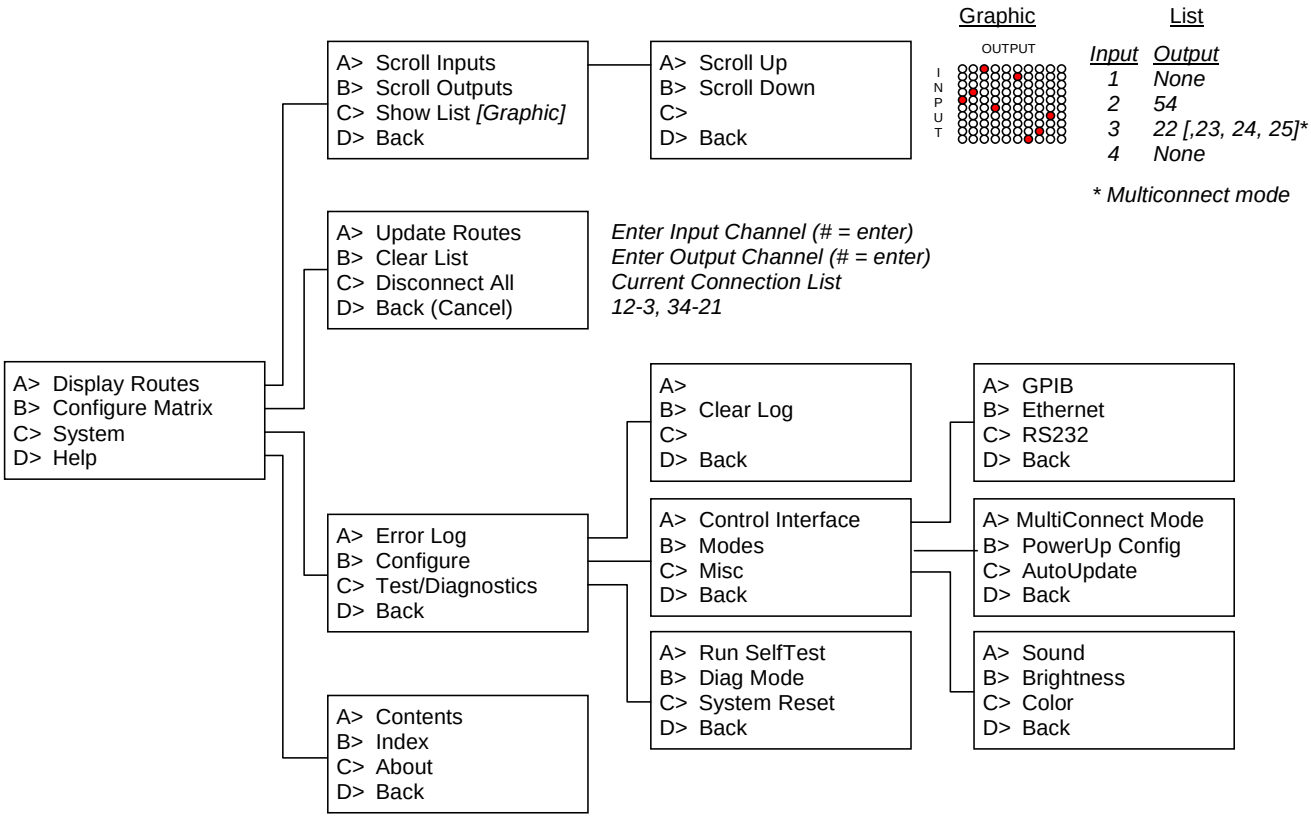

Figure 4-2. Manual Command Structure

Displaying Routes

Signal routing can be displayed graphically (Figure 4-3) or as a list (Figure 4-4). The route connections are updated dynamically in both display modes. The route connections are displayed as a 16 x 16 matrix. The smartkeys allow the display to be scrolled through all available inputs and outputs. The color of the dot indicates the status of the route:

Open .....Open (no connection)

Yellow .....Route on Connect list

Red .....Route on Disconnect list

Green .....Closed(route connected)

The list format allows quick verification of a signal route. The list can be sorted by ascending input order or ascending output order.

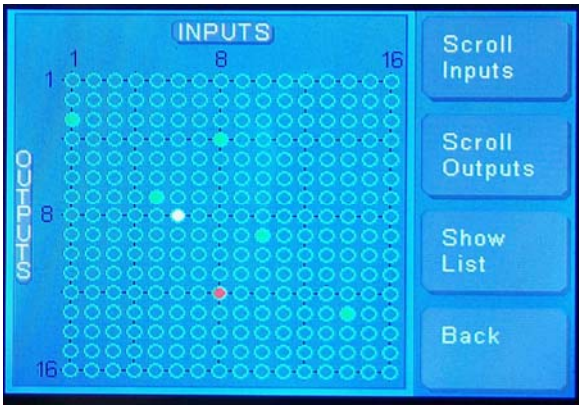

Figure 4-3. Graphical Connection Display

Figure 4-4. List Connection Display (Input Based)

Configuring the Matrix

Signals can be easily routed or un-routed from any input to any output (or multiple outputs in MultiConnect mode) using the front panel. The CONFIGURE MATRIX menu allows input channel followed by an output channel to be entered as shown in Figure 4-5. Press the ENTER key after keying in the input channel and after keying in the output channel. Select either Connect or Disconnect to perform the desired action.

If AutoUpdate is disabled (default), the connection or disconnection is placed on the respective Connect or Disconnect list displayed at the bottom of the screen. Routes on the Disconnect list are shown surrounded by parentheses ( ). The matrix is not physically changed until the UPDATE ROUTES key is pressed. This allows a list of connected or disconnected routes to be entered, then all updated simultaneously. If AutoUpdate is enabled, the connection or disconnection operation is performed immediately.

The menu also has a feature to clear the connect/disconnect list in case a route mistakenly added to the list. In addition, inputs or outputs may also be disconnected without knowing the complete route. By pressing the ENTER key without entering an input channel number, the connection associated with an output channel can be disconnected. Entering an input channel number, but not an output channel, will disconnect all outputs from the input channel.

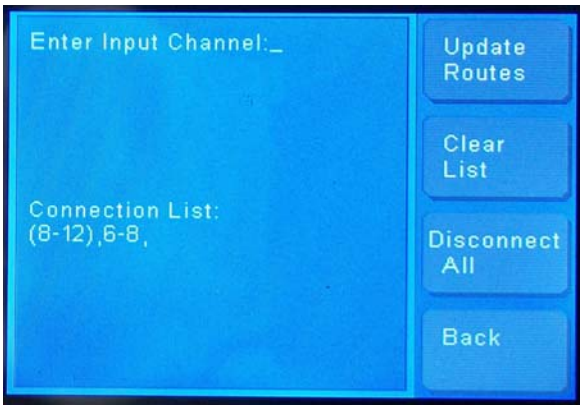

Figure 4-5. Configure Matrix Display

Configuring Remote Control Interfaces

Ethernet Configuration.

When connecting to the 1258 via Ethernet, the only setting that typically must be configured is the IP Address. The default IP Address is a standard internal-use IP Address, however, it may set to any other IP Address to suit your networking requirements. The Port number for the 1258 is 49200. This value cannot be changed. The remaining settings are used only when connecting the 1258 to a more complicated network. In this case it may be necessary to ask a system administrator the proper way to configure the 1258. All settings can be reset back to their default configuration by selecting the Reset Configuration item in the Ethernet Menu. Be sure to verify that the Ethernet cable is firmly plugged into the back of the 1258.

Note: The Ethernet cable must be connected before power is applied to the 1258.

IEEE-488 (GPIB) Configuration.

To communicate with the 1258 using GPIB, it is necessary to configure all settings. The Primary Address can be set to any value from 0 to 30. The Secondary Address can be set to any address from 96 to 126 or set to 0 (disabled). The 1258 GPIB settings can be configured from the front panel only. All settings can be reset back to their default configuration by selecting the Reset Configuration item in the GPIB Menu.

RS-232 Serial Configuration.

When using RS-232 to communicate with the 1258, all protocol settings must be configured the same for the controller as for the 1258. Terminate all commands sent to the 1258 with a linefeed ('\n') or a carriage return ('\r'). The 1258 will time out after 5 seconds if a termination character is not received, and any characters received will be ignored. RS-232 settings can be configured from the front panel only. All settings can be reset back to their factory default configuration using the Reset Configuration option in the RS-232 Menu.

Configuring Operating Modes

MultiConnect Mode

MultiConnect Mode is used to connect an input to more than one output. When switching from MultiConnect to SingleConnect Mode, all connections are disconnected. If MultiConnect is disabled and an attempt is made to connect one input to more than one output, the input will be disconnected from its previous output and then connected to the latest output. See Configuration Commands and Queries for details on executing this command remotely.

PowerUp Configuration

The PowerUp Configuration is used to store settings so the 1258 will startup with the preferred configuration. These settings include all connections, modes and options. There are three modes to choose from: Default, Current, and Last Configuration. The default mode will startup with factory settings. Current configuration mode will startup with all settings as they were when the enter button was pressed while invoking Current Configuration mode. Last Configuration mode will startup with all settings as they were when the power was turned off. See Configuration Commands and Queries for details on executing this command remotely.

AutoUpdate

With AutoUpdate disabled (default), Open and Close routes are placed on Connect and Disconnect lists. The matrix is physically updated simultaneously, with the Update routes command. With AutoUpdate mode enabled, all connections and disconnection's are done immediately after Connect or Disconnect is selected or the Open or Close command is received. In Auto Update mode selecting Update Routes or sending the Update command is not required. AutoUpdate mode can only be saved when the PowerUp mode is 'Current' or 'Last Configuration'. See Configuration Commands and Queries for details on executing this command remotely.

Configuring Miscellaneous Modes

Sound

With Sound enabled (default), the 1258 emits three different beeps: a short 'click' occurs on every key press, a longer higher pitch beep confirms an entry, and a longer lower pitch beep signals an error occurred. Sound can be turned off from SYSTEM⇨CONFIGURE⇨MISC⇨SOUND menu. This feature can only be controlled through the manual front panel keypad.

Display Brightness

The brightness of the display backlight can be controlled from the SYSTEM⇨CONFIGURE⇨ MISC⇨BRIGHTNESS menu. There are six levels to choose from: +0 being the darkest and +5 the brightest (+3 is default). In addition to the six backlight brightness levels, the display may be turned completely off. This feature can only be controlled through the manual front panel keypad.

Color

The color scheme of the display can be controlled from the SYSTEM⇨CONFIGURE⇨ MISC⇨COLOR menu. There are three color schemes available. This feature can only be controlled through the manual front panel keypad.

Using the Test/Diagnostic Mode

Test/Diagnostic Mode

Diagnostic mode (SYSTEM⇨TEST/DIAGNOSTICS⇨DIAG MODE) is helpful for testing and debugging system application software. When enabled, half of the screen is used to display commands performed by the 1258. Each command is proceeded by a designator of its source: E (Ethernet), G (GPIB), M (Manual), or R (RS232). Manual refers to commands performed through the front-panel. All communication commands display the string received on the first line, and the command recognized by the 1258 on the next line. See Configuration Commands and Queries for details on executing this command remotely. The Error Log in the SYSTEM⇨ERROR LOG menu, which provides a list of the last ten errors that have occurred, can also be very useful when debugging application software.

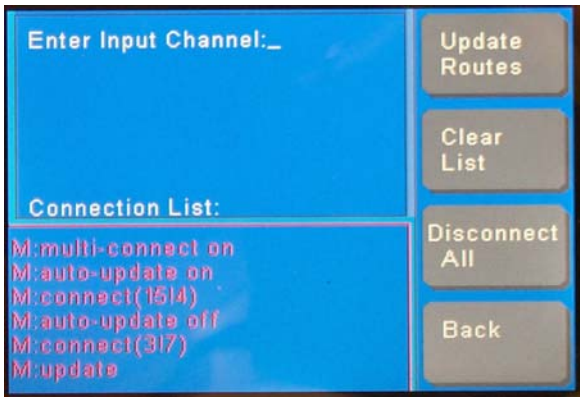

Figure 4-6. Example With Diagnostic Mode Enabled

Remote Operation

Interface Configuration

Before using remote operation, the interface must be configured using the front panel user interface. See Configuring Remote Control Interfaces for instructions on configuring the GPIB, Ethernet, and RS-232 interfaces. Once configured, the 1258 accepts standard ASCII character strings for control and status requests. The 1258 uses a SCPI type command structure and format, though full SCPI compliance is not guaranteed.

Commands and Queries

The <channel_list> parameter is a single input/output route specification or a list of input/output routes separated by commas. Each input/output route is specified by using the syntax: <input_channel>!<output_channel>.

Table I. Remote Command Summary

Command	Function
OPEN(@channel_list) [1, 2,3]	disconnect channel(s)
OPEN:ALL [1, 2,3]	disconnect all
CLOSe(@channel_list) [1, 2,3]	connect channel(s)
CLOSe:STATe? [1, 2,3]	return a list of current connections
CLOSe?(@out)	return input connected to specified output channel
UPDAte [2]	perform all pending connection and disconnection operations
LOCK	lock keypad
UNLOck	unlocks keypad
CONFigure:DIAGnostic	set diagnostic mode
CONFigure:DIAGnostic?	return current diagnostic mode
CONFigure:MULTiconnect	sets multi-connect mode
CONFigure:MULTiconnect?	return current multi-connect mode
CONFigure:AUTOupdate [2]	sets auto-update mode
CONFigure:AUTOupdate?	return current auto-update mode
CONFigure:POWErup [2]	sets power-up mode
CONFigure:POWErup?	return current power-up mode
*IDN?	returns manufacture, model, version, and matrix size information
*RST	reset the system and run self-test
*TST?	return results of self-test
*ESR?	return error code of last error that occurred
*ESR:DESC?	return character description of last error that occurred
*CLS	clear the system status

Notes:

1. The <channel_list> parameter can be a single input/output route connection or a list of input/output routes separated by commas. Each input/output route is specified by using the syntax: <input_channel>!<output_channel). (i.e., OPEN(@27!45) or OPEN(@27!45,36!21)
2. If AUTOupdate is not enabled (default), then connections and disconnections are not performed until the UPDATe command is received.
3. The OPEN and CLOSE commands may optionally be proceeded by ROUTe:.
4. Lowercase letters in the command are optional.
5. On queries returning a binary status, the following applies: 1 = Enabled, On, Pass, 0 = Disabled, Off, Fail (*ESR? returns 0 for no error, and other than zero for errors)

Disconnect commands (OPEN)

The OPEN command specifies routed connections to be disconnected. Connections specified are placed on the disconnection list. If AUTOupdate is enabled, then the disconnect(s) are performed immediately. Otherwise (default) the disconnection(s) are not performed until the UPDATE command is received.

Syntax:

[ROUTe:]OPEN(@channel_list) or [ROUTe:]OPEN:ALL

Examples:

OPEN(@15!47) - place connection input 15 to output 47 on the disconnect list.

ROUTE:OPEN:ALL - place all connections on the disconnect list.

Connect commands (CLOSE)

The CLOSE command specifies routes to be connected. Connections specified are placed on the connection list. If AUTOupdate is enabled, then the connection(s) are performed immediately. Otherwise (default) the connection(s) are not performed until the UPDATE command is received.

Syntax:

[ROUTe:]CLOSe(@channel_list)

Examples:

CLOS(@15!47) - place connection input 15 to output 47 on the connect list.

ROUTE:CLOSE(3!18,7!39), - place connection input 3 to output 18, and input 7 to output 39 on the connect list.

Connection queries (CLOSE?)

The state of the matrix connections can be obtained by using a CLOSE? query command. The obtain a complete list of the current connections, use the CLOSe:STATe? query. To determine the connection of a specific output, use the CLOSe?(output_channel) query.

Syntax:

[ROUTe:]CLOSe[:STATe]? - returns a comma delimited list of the current matrix connections.

[ROUTe:]CLOSe?(@output_channel) - returns input channel number that the specified output channel is connected to. If the specified output channel is not connected to an input, a '0' is returned.

Examples:

ROUTE:CLOSE:STATE? - returns '4!5,7!45' to indicate input 4 is connected to output 5 and input 7 is connected to output 45.

CLOS?(@5) - returns '4' to indicate that the specified output channel is connected to input 4.

Perform connection / disconnection commands (UPDATE)

With the AutoUpdate mode disabled (default), Open and Close commands cause the specified connections to be placed on connect or disconnect lists. The UPDATE command causes all pending connections and disconnections to be performed. This allow simultaneous connections to be performed on multiple routes. To prevent any signal contention, disconnections are performed first, followed by all connections.

Syntax:

UPDAte

Examples:

UPDATE - performs all connects and disconnects present on their respective list.

Keypad Lock and Unlock Commands (LOCK and UNLOck)

The LOCK command is used to prevent inadvertent keypad entry. With the keypad locked, an operator is required to press Smartkey A, then press ENTER within 2 seconds, to unlock the keypad. This lock feature is not designed as a security device, it is only designed to prevent accidental keypad entry. The UNLOck command allows the remote computer to unlock the keypad. The LOCK command is only available through a remote interface.

Syntax:

LOCK
UNLOck

Examples:

LOCK - locks the keypad.
UNLOCK - unlocks the keypad

Configuration Commands and Queries

The CONFigure command and query allows the Diagnostic, MultiConnect, AutoUpdate, and PowerUp modes to be configured or their state determined.

Syntax:

CONFigure:DIAGnostic - set diagnostic mode
CONFigure:DIAGnostic? - return current diagnostic mode
CONFigure:MULTiconnect - sets multi-connect mode
CONFigure:MULTiconnect? - return current multi-connect mode
CONFigure:AUTOupdate - sets auto-update mode
CONFigure:AUTOupdate? - return current auto-update mode
CONFigure:POWErup - sets power-up mode
0 = all switches open and default operational modes
1 = Current configuration
2 = Last configuration at time power was removed
CONFigure:POWErup? - return current power-up mode

Examples:

CONFigure:DIAGnostic(1)- enable diagnostic mode
CONFigure:DIAGnostic? - returns '1' if diagnostic mode is enabled, otherwise it returns '0'
CONFigure:MULTiconnect(0) - disable multi-connect mode (one output per input)
CONFigure:MULTiconnect? - returns '1' if multi-connect mode is enabled, otherwise it returns '0'
CONFigure:AUTOupdate(1) - enable auto-update (automatically performs UPDATE operation on OPEN and CLOSE commands
CONFigure:AUTOupdate? - returns '1' if auto-update mode is enabled, otherwise it returns '0'
CONFigure:POWErup(2)- set power-up mode to configuration at time power removed.
CONFigure:POWErup? - returns value depending on current mode

Identification Query (*IDN?)

The *IDN? query identifies the 1258. The response consists of the following comma delimited information:

- Manufacture Racal Instruments.
- Model Number 1258
- Firmware Revision 1.1 (major.minor version designation)
- Number of Inputs 64 (always 64 on this 1258 version)
- Number of Outputs 64 (varies depending on the number of switching cards installed)

Syntax:

*IDN?

Examples:

*IDN? - returns 'Racal Instruments,1258,1.1,64,64'

System Reset Command (*RST)

The *RST command resets the instrument to the power-on state. All pending operations are aborted, connect and disconnect lists are cleared, self-test is performed, the matrix is reset according to the power-up configuration, and the last error code register is cleared. The command does not affect the configuration or state of the remote interfaces.

Syntax:

*RST

Examples:

*RST - resets the 1258 to its power-on state

Selftest Query (*TST?)

The *TST? query executes a self-test and returns the result. The self-test does not affect the configuration of the matrix routes.

Syntax:

*TST?

Examples:

*TST? - returns '1' if the self-test passed and a '0' if the self-test failed.

Error Query (*ERR? and *ERR:DESC?)

The *ERR? query returns the error code for the error that occurred. The *ERR:DESC? query returns an character description of the last error that occurred. The following errors may occur:

Code (dec.)	Description
0	No error (successful)
81	RS-232 Timeout
82	Invalid argument
83	Unrecognized command

Syntax:

*ERR? - returns error code value of last error (returns '0' if no error exist)

*ERR:DESC? - returns a character description of last error

Examples:

*ERR? - returns '82' to indicate the last error was that an invalid argument was received.

*ERR:DESC? - returns 'INVALID ARGUMENT' as the last error.

System Clear Command (*CLS?)

Syntax:

*CLS

Examples:

*CLS - clears pending query and last error

System Software Update

The system software can be updated through the Ethernet or RS-232 remote interfaces. This operation requires special software and a passcode provided by Racal. A special function screen, accessed during power-up of the unit, allows update and diagnostic functions to be performed. To access this screen, power on the 1258 and wait for the initial power-on confirmation beep. After the first beep, press and hold down the '3' key on the keypad, until an additional beep (or beeps) is heard. Shortly, the special functions menu will appear. The menu allows software updates and system verification operations to be performed. Before updating the system software, Racal will need the current software version and date information from the About screen accessed during normal system operation. Racal will then provide the necessary software, passcode, and instructions to perform the software update.

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Chapter 5
PRODUCT SUPPORT

Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for repair or calibration, call 1-800-722-3262. If parts are required to repair the product at your facility, call 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual.

For worldwide support and the office closes to your facility, refer to the Support Offices section on the following page.

Reshipment Instructions

Use the original packing material when returning the 1258 to Racal Instruments for calibration or servicing. The original shipping crate and associated packaging material will provide the necessary protection for safe reshipment.

If the original packing material is unavailable, contact Racal Instruments Customer Service for information.

Support Offices

RACAL INSTRUMENTS

United States

(Corporate Headquarters and Service Center)
4 Goodyear Street, Irvine, CA 92618
Tel: (800) 722-2528, (949) 859-8999; Fax: (949) 859-7139

5730 Northwest Parkway Suite 700, San Antonio, TX 78249
Tel: (210) 699-6799; Fax: (210) 699-8857

Europe

(European Headquarters and Service Center)
18 Avenue Dutartre, 78150 LeChesnay, France
Tel: +33 (0)1 39 23 22 22; Fax: +33 (0)1 39 23 22 25

29-31 Cobham Road, Wimborne, Dorset BH21 7PF, United Kingdom
Tel: +44 (0) 1202 872800; Fax: +44 (0) 1202 870810

Via Milazzo 25, 20092 Cinisello B, Milan, Italy
Tel: +39 (0)2 6123 901; Fax: +39 (0)2 6129 3606

Racal Instruments Group Limited, Technologie Park,
D-51429 Bergisch Gladbach, Germany
Tel: +49 2204 844205; Fax: +49 2204 844219

Repair and Calibration Request Form

To allow us to better understand your repair requests, we suggest you use the following outline when calling and include a copy with your instrument to be sent to the Racal Instruments Repair Facility.

Model_____ Serial No._____ Date_____

Company Name_____ Purchase Order #_____

Billing Address_____

City

State/Province Zip/Postal Code Country

Shipping Address_____

City

State/Province Zip/Postal Code Country

Technical Contact_____ Phone Number ( )_____
Purchasing Contact_____ Phone Number ( )_____

1. Describe, in detail, the problem and symptoms you are having. Please include all set up details, such as input/output levels, frequencies, waveform details, etc.

2. If problem is occurring when unit is in remote, please list the program strings used and the controller type.

3. Please give any additional information you feel would be beneficial in facilitating a faster repair time (i.e., modifications, etc.)

4. Is calibration data required? Yes No (please circle one)

Call before shipping
Note: We do not accept "collect" shipments.

Ship instruments to nearest support office.

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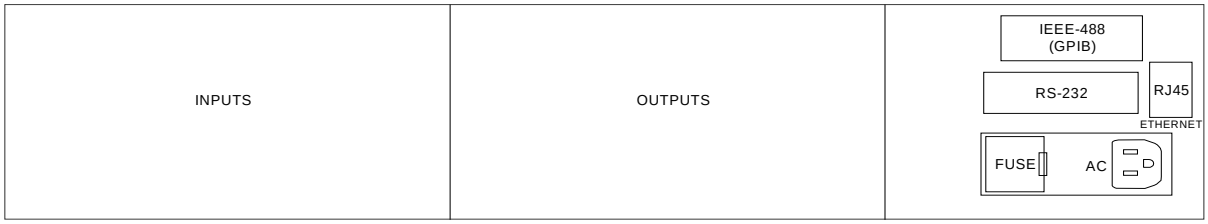
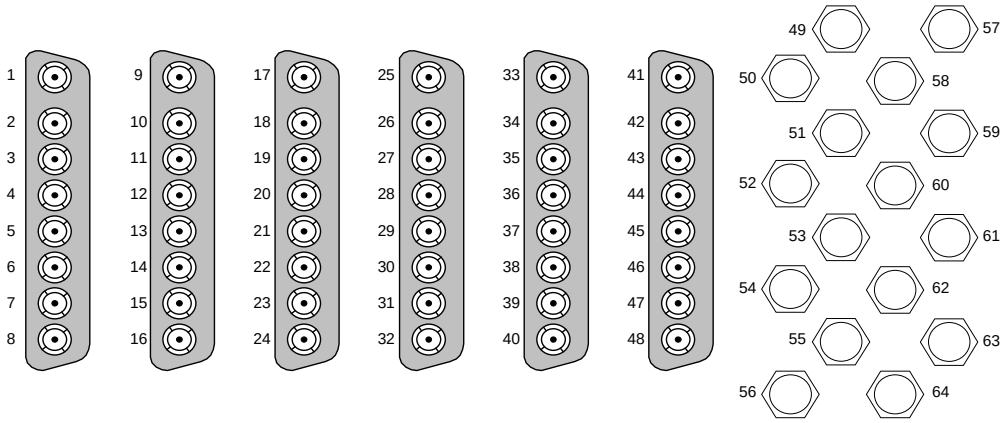
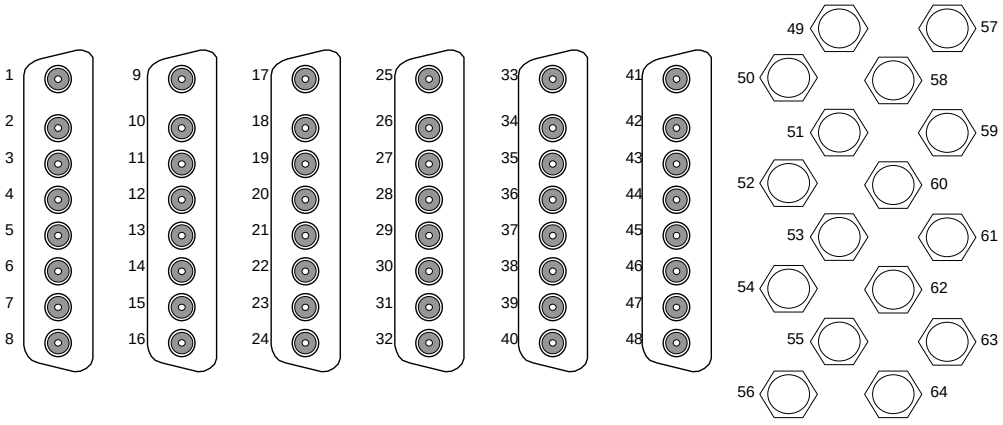
APPENDIX A - CONNECTORS



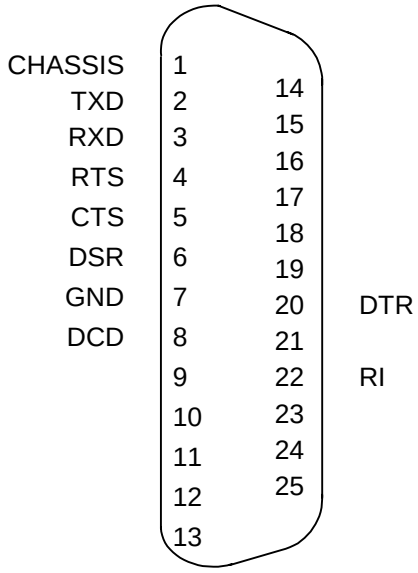
Connector Locations



Rear Panel Input Connectors



Rear Panel Output Connectors



RS-232 Connector

APPENDIX B - DEFINITIONS

Crosspoint Switch - A device that can connect an input signal to one or more output signals.

Crosstalk Isolation - Interference in an output caused by other input or output signals. Measured in decibels (dB) below the nominal signal level. Expressed as dB at a specified load impedance and at a specific frequency or frequency range.

Full Fan-out - The ability to connect an input to any or all outputs without causing additional loading of the input signal source.

Non-Blocking - The connection of an input to an output does not block any other input to output connection.

SMA - A small threaded coaxial connector.