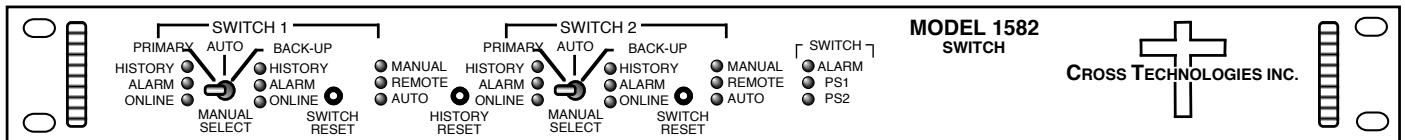


# Instruction Manual

# Model 1582-225L2

## Dual 1:1 Switch

April 2018, Rev. A



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# INSTRUCTION MANUAL

## MODEL 1582-225L2, 1:1 Switch, M&C Monitor & Channel Select

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# 1582-225L2 1:1 Switch, DC-2.5 GHz, 2PDT, M&C Monitor and Channel Select

## 1.0 General

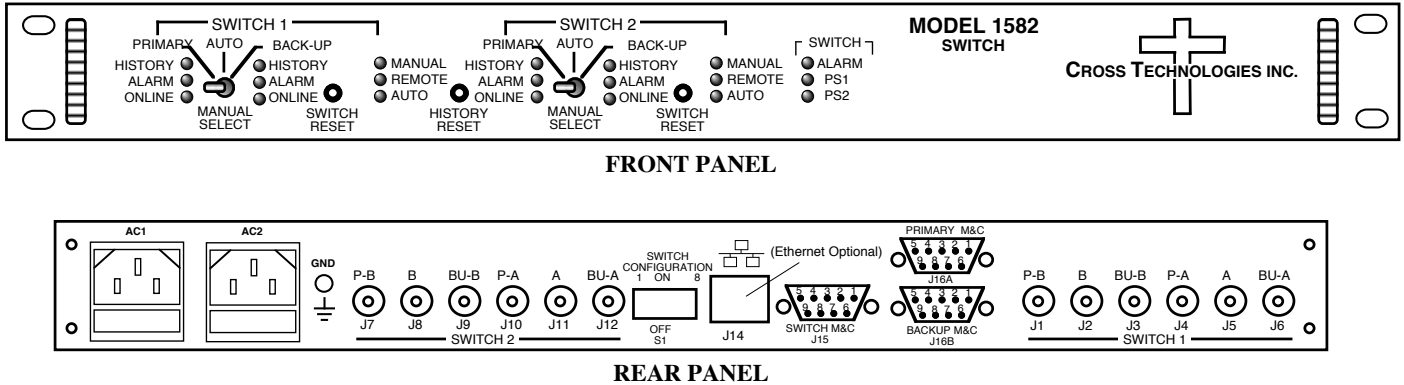
The 1582-225L2 Dual 1:1 Switch provides **two 2PDT switch pairs ( SWITCH 1 and SWITCH 2)**. Each switch independently provides Auto, Manual or Remote (M&C) latched relay switching between PRIMARY and BACK-UP, DC - 2.5 GHz RF signals. The M&C provides monitoring of all parameters, Switch and History Reset, and Channel Selection (when in Auto mode only). Alarm conditions on PRIMARY and BACK-UP are either a contact closure to ground or an open (selectable by a rear panel DIP switch). Auto has three modes:

**Auto - PRIMARY PRIME** : The PRIMARY preferred mode - switches from PRIMARY to BACK-UP only if PRIMARY alarms and BACK-UP is good. The unit switches back to PRIMARY when PRIMARY is no longer in alarm or both PRIMARY and BACK-UP in alarm.

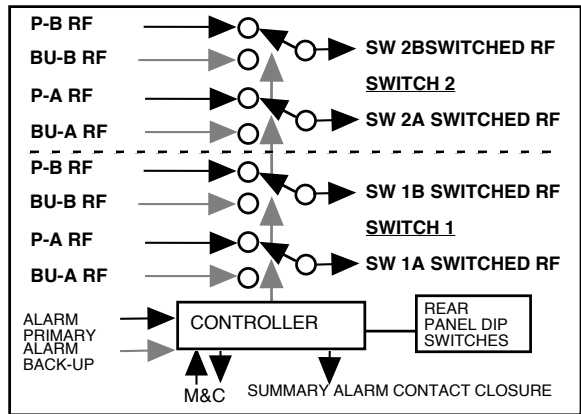
**Auto - LATBACK-UP**; Latch to BACK-UP mode - switches from PRIMARY to BACK-UP if PRIMARY alarms and BACK-UP is good and stays in BACK-UP regardless of PRIMARY or BACK-UP alarm conditions until reset to PRIMARY by the front panel Switch Reset switch or M&C command.

**Auto - MIN SW**; Minimum Auto switching mode - switching occurs if the active channel (set by the front panel Manual Select switch or M&C command) alarms and the other channel is clear. It switches back if this channel then alarms and the other is clear.

When power is lost, the current latched state remains selected. Front panel LEDs indicate PRIMARY and BACK-UP alarms, Remote or Manual mode, and redundant power supplies on. Rear panel DIP switches set alarm polarity (NO or NC for alarm), M&C interface, and Auto modes (PRIMARY PRIME, LATBACK-UP, or MIN SW). The front panel switch selects the signal path in the Manual mode or selects AUTO switching. The RS232 or RS422/485 M&C (Ethernet optional) monitors switch positions, LED and alarm status, and selects the RF switch position (when in Auto mode only). A contact closure to ground indicates an internal fault condition or loss of power. Connectors are BNC for RF signals and DB9 for M&C and alarm input and output contact closures. It is powered by separately fused, 100-240  $\pm$ 10% VAC redundant power supplies.



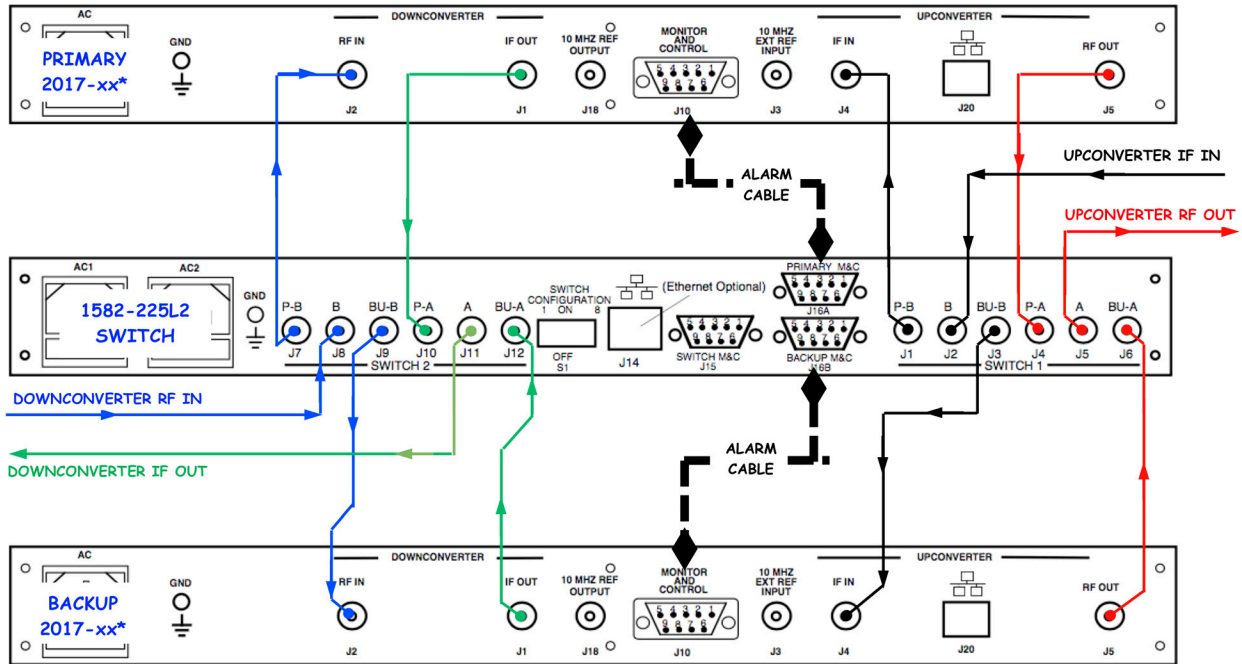
**FIGURE 1.1 Model 1582-225L2 Front and Rear Panels**



**1582-225L2 BLOCK DIAGRAM**

**FIGURE 1.2 Model 1582-225L2 Switch Block Diagram**

**FIGURE 1.3 Model 1582-225L2 Switch Wiring Diagram**



\*BOTH Model 2017-xx Up/Downconverters require NO CHARGE Option W104 to ensure compatibility with 1582-225L2 Switch.

**FIGURE 1.4 Model 1582-225L2 Switch Interconnections Chart**

DESCRIPTION	PRIMARY 2017-xx	1582-225L2 SWITCH	BACK-UP 2017-xx
UPCONVERTER IF INPUT		→ J2	
	J4	←→ J1	
	J5	←→ J4	
UPCONVERTER RF OUTPUT		J5	←
		J3 ←→ J4	
		J6 ←→ J5	
<hr/>			
DESCRIPTION	PRIMARY 2017-xx	1582-225L2 SWITCH	BACK-UP 2017-xx
DOWNCONVERTER RF INPUT		→ J8	
	J1	←→ J10	
	J2	←→ J7	
DOWNCONVERTER IF OUTPUT		J11	←
		J9 ←→ J2	
		J12 ←→ J1	

## 1.2 Technical Characteristics

**TABLE 1.0 1582-225L2 1:1 Switch, Specifications\***

<b>IF/L-Band Switch Characteristics</b>	
Impedance / Connectors	75Ω / BNC
Return Loss	12 dB minimum, ≥ 14 dB typical; DC to 1.5 GHz 10 dB minimum, ≥ 12 dB typical; 1.5 to 2.5 GHz
Frequency Response	≤ ±0.5 dB, 40 MHz BW, ≤ ±1 dB, 1 GHz BW
Isolation	55 dB minimum, ≥ 60 dB typical, DC to 1.5 GHz 45 dB minimum, ≥ 50 dB typical; 1.5 to 2.5 GHz
Insertion Loss	1.5 dB maximum, ≤ 1.0 dB typical; DC to 1.5 GHz 2.5 dB maximum, ≤ 2.0 dB typical; 1.5 to 2.5 GHz
Switch Time	≤ 10 milliseconds
DC Switching	30VDC, maximum; 0.5 Amps, maximum
Type, Configuration	Latching Relay, 2PDT, No Termination
<b>Alarm and Control, M&amp;C</b>	
Alarm Output Signal	Form C relay; 30VDC, 0.5A maximum
M&C Interface / Baud Rate	RS232C or RS422/485, Selectable/9600 (Ethernet Optional)
<b>Connectors, Indicators</b>	
Auto/Manual	Front Panel Switch
Switch Reset, History Reset	Front Panel Switches or M&C
Power, Remote, Manual, Alarm	Green, Yellow, Red, Red LED - Form C contact closure, M&C
<b>Connectors, Other</b>	
RF, Connectors	75Ω BNC (female)
Ext. Alarms In, M&C Connector	DB9 (female)
Size	1 RU, 19 inch Standard Chassis, 1.75" high x 12.0" deep
Power	Redundant 100-240 ±10% VAC, 47-63 Hz., 20 Watts maximum Power Supplies
*10°C to 40°C; Specifications subject to change without notice.	
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(Technical Characteristics continued on page 7...)

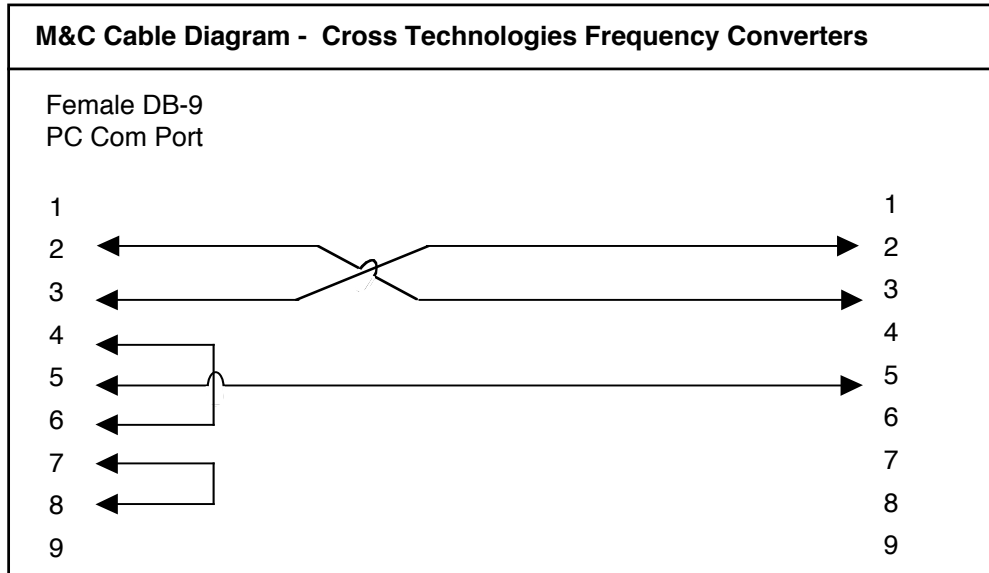
(Technical Characteristics continued from page 6...)

<b>Available Options</b>	
<b>Remote M&amp;C Interface</b>	
W- 8	Ethernet
W-18	Ethernet with SNMP (and MIB) Interface
W-28	Ethernet with Direct TCP/IP Access
W-31	0 to +50 degrees C operation
<b>Connectors/Impedance</b>	
D -	50Ω BNC
SS -	50Ω SMA
* 10°C to 40°C; Specifications subject to change without notice	
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### 1.3 Monitor and Control Interface

#### A) Remote Serial Interface

**Protocol:** RS232C, 9600 baud rate, no parity, 8 data bits, 1 start bit, and 1 stop bit.  
(RS232C, RS-422, or **RS-485**)



**Connector:** Rear panel, DB-9 Female:

J15 Pinouts (RS-232C/422/485)	
Pin	Function
1	Rx-
2	Rx+ (RS-232C)
3	Tx+ (RS-232C)
4	Tx-
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed



## 1.4 M&C Commands

The following tables summarize the commands and status queries applicable to the 1582-225L2 Switch.

\* **PLEASE NOTE:** The two character {aa} prefix, shown in the table below, is present **ONLY** when RS485 is selected.

**Table 2.0 Model 1582-225L2 - M&C Remote Commands**

<b>Table 2.0: Model 1582-225L2 1:1 Switch, M&amp;C Remote Commands</b>		
<b>Command Function</b>	<b>Syntax</b>	<b>Command Description</b>
Set RF Switch Position (SW1)	{aaCRx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		R = Command Code
		x = desired switch position; x=1 to select P; x=2 to select BU. Once the switch position is selected remotely, the switch is in "Remote Mode" and the front panel remote indicator will light. The switch will remain in Remote Mode until one of the following occurs.
		1. A Switch Reset (SW1) command ( {CB} ) is issued.
		2. The front panel Switch Reset button is pressed.
		3. The switch position is manually selected via the front panel Manual Select toggle switch.
		If the switch is already in manual mode (i.e. the front panel toggle switch is in the PRIMARY or BACK-UP position) then the unit will ignore this command.
		example: {CR2}
		Will (remotely) set the switch to BACK-UP. The unit will ignore this command if the switch is in manual mode. The unit will reply with the '>' character if the command is successfully processed.
Set RF Switch Position (SW2)	{aaCSx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		S = Command Code
		x = desired switch position; x=1 to select P; x=2 to select BU. Once the switch position is selected remotely, the switch is in "Remote Mode" and the front panel remote indicator will light. The switch will remain in Remote Mode until one of the following occurs.
		1. A Switch Reset (SW2) command ( {CC} ) is issued.
		2. The front panel Switch Reset button is pressed.
		3. The switch position is manually selected via the front panel Manual Select toggle switch. If the switch is already in manual mode (i.e. the front panel toggle switch is in the PRIMARY or BACK-UP position) then the switch will ignore this command.
		example: {CS2}
		Will (remotely) set Switch 2 to BACK-UP. The unit will ignore this command if the switch is in manual mode. The unit will reply with the '>' character if the command is successfully processed.

**Table 2.0 M&C Remote Commands Continued on page 10...**

## 1.4 M&C Commands (continued from page 9...)

Table 2.1 M&C Remote Commands Continued from page 9...

Table 2.0: Model 1582-225L2, 1:1 Switch, M&C Remote Commands Continued		
Command Function	Syntax	Command Description
Switch Reset (SW1)	{aaCB}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		B = command code
		This command has the same effect as pressing the front panel Switch Reset button.
		example: {CB}
		Will return Switch 1 to Auto mode if it is in Remote mode. Also, this command will reset the switch position if it is currently "latched" to the BACK-UP position (and if PRIMARY is not alarmed). The unit will reply with the '>' character if the command is successfully processed.
Switch Reset (SW2)	{aaCC}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		C = command code
		This command has the same effect as pressing the front panel Switch Reset button.
		example: {CC}
		Will return Switch 2 to Auto mode if it is in Remote mode. Also, this command will reset the switch position if it is currently "latched" to the BACK-UP position (and if PRIMARY is not alarmed).
		The unit will reply with the '>' character if the command is successfully processed.
Alarm History Reset	{aaCH}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		H = command code
		example: {CH}
		Will clear all alarm history status and front panel LEDs. The unit will reply with the '>' character if the command is successfully processed.
Set RS485 Address	{aaCXxx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		X = command code
		xx = unit address, range = 00 to 31
		example: {CX12}
		Will set the unit's RS485 address to 12.
		The unit will reply with the '>' character if the command is successfully processed.

## 1.5 M&C Status Request/Inquiries

**Table 2.2 Model 1582-225L2 - M&C Status Request/Inquiries**

<b>Table 2.2: Model 1582-225L2 1:1 Switch M&amp;C Status Request/Inquires</b>		
<b>Command Function</b>	<b>Syntax</b>	<b>Command Description</b>
Get Switch 1 State	{aaSZ}	Returns: {aaSZbc}
		where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit.
		z = Command Code
		b = Switch Position: 1 or 2
		c = Switch Mode: 'M' if in Manual Mode, 'R' if in Remote Mode, and 'A' if in Auto Mode.
		The unit will append the '>' character if the command is successfully processed.
Get Switch 2 State	{aaSY}	Returns: {aaSYbc}
		where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit.
		Y = Command Code
		b = Switch Position: 1 or 2
		c = Switch Mode: 'M' if in Manual Mode, 'R' if in Remote Mode, and 'A' if in Auto Mode.
		The unit will append the '>' character if the command is successfully processed.
Get Switch 1 Alarm Status	{aaS1}	Returns: {aaS2bcde}
		where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		1 = Command Code
		b = Switch 1 PRIMARY alarm status: 0 if alarm is off, 1 if alarm is on
		c = Switch 1 PRIMARY alarm history status: 0 if no alarm history, 1 if an alarm occurred
		d = Switch 1 BACK-UP alarm status: 0 if alarm is off, 1 if alarm is on
		e = Switch 1 BACK-UP alarm history status: 0 if no alarm history, 1 if an alarm occurred
		The unit will append the '>' character if the command is successfully processed.

(Continued on page 12)

## 1.5 M&C Queries (continued)

**Table 2.2 Model 1582-225L2 - M&C Status Request/Inquiries**

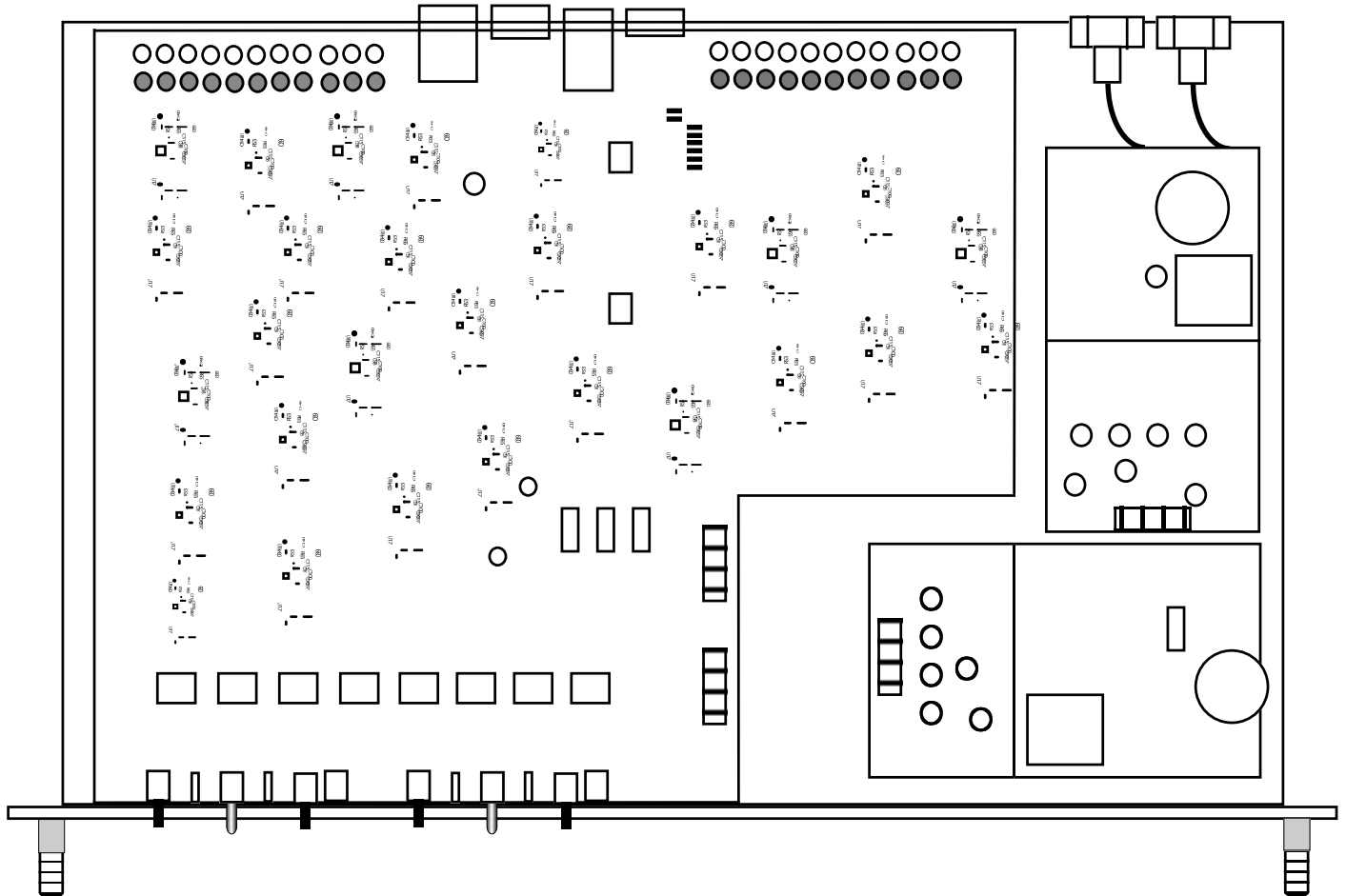
(Continued from page 11)

<b>Table 2.2: Model 1582-225L2 M&amp;C Status Request/Inquires</b>		
<b>Command Function</b>	<b>Syntax</b>	<b>Command Description</b>
Get Switch 2 Alarm Status	{aaSA}	returns: {aaS2bcde}
		where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		2 = command code
		b = Switch 2 PRIMARY alarm status: 0 if alarm is off, 1 if alarm is on
		c = Switch 2 PRIMARY alarm history status: 0 if no alarm history, 1 if an alarm occurred
		d = Switch 2 BACK-UP alarm status: 0 if alarm is off, 1 if alarm is on
		e = Switch 2 BACK-UP alarm history status: 0 if no alarm history, 1 if an alarm occurred
		The unit will append the '>' character if the command is successfully processed.
Get Auto Switching Mode Status	{aaSA}	returns: {aaSAx}
		where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		A = command code
		x = 1 for CH1 Prime Mode, x = 2 for Latch to CH2 Mode, x = 3 for Minimum Auto Switching Mode.
		The unit will append the '>' character if the command is successfully processed.

## 2.0 Installation

### 2.1 Mechanical

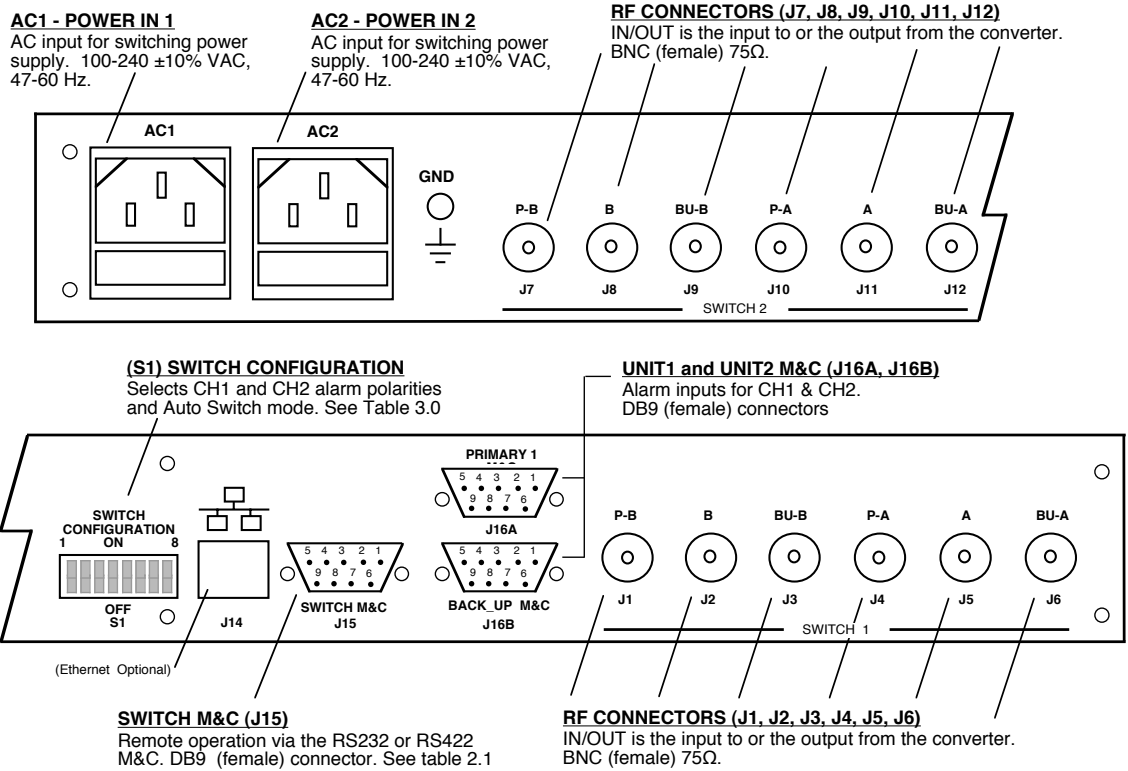
The 1582-225L2 consists of one RF./Controller PCB and one IF piggyback PCB housed in a 1 RU (1 3/4 inch high) by 12 inch deep chassis. Redundant switching power supplies provide power for the assembly. The 1582-225L2 can be secured to a rack using the 4 holes on the front panel.



**FIGURE 2.1 1582-225L2 RF Switch Assembly**

## 2.2 Input and Output Signals

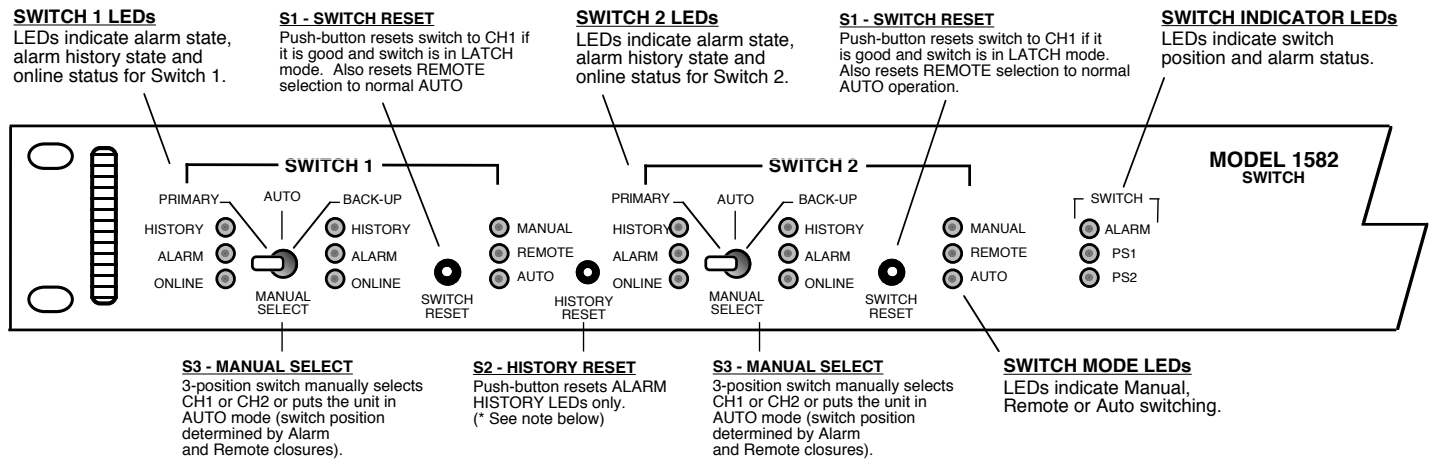
Figure 2.2 shows the input and output connectors on the rear panel.



**FIGURE 2.2 1582-225L2 Switch Rear Panel Inputs/Outputs**  
(Optional Ethernet Shown)

## 2.3 Controls and Indicators

Figure 2.3 shows the front panel controls and indicators.

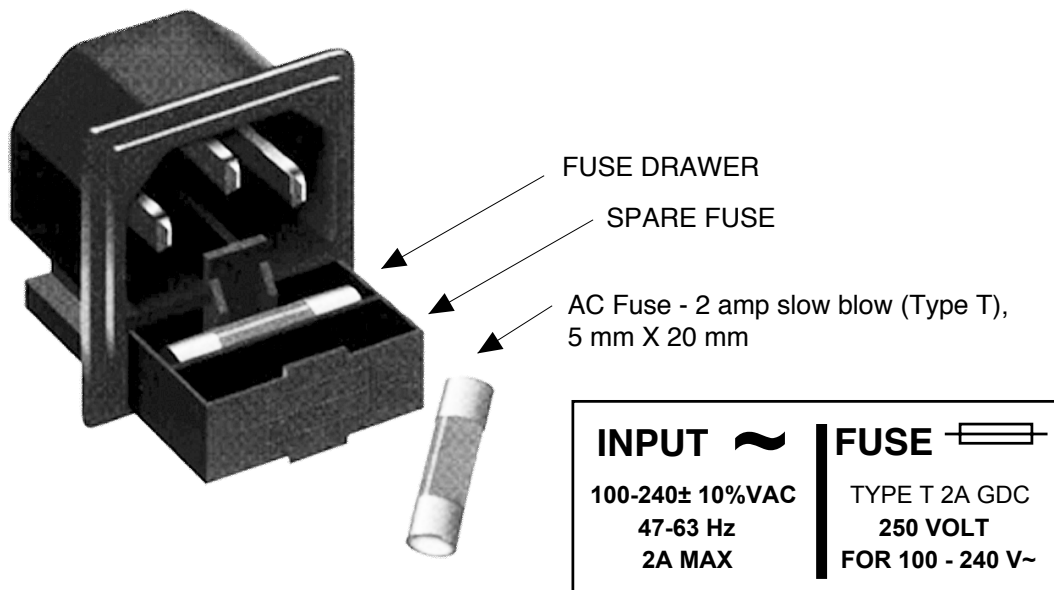


**FIGURE 2.3 1582-225L2 Switch, Front Panel Controls and Indicators**

**\*NOTE:** Restore Ethernet Settings to factory default:  
Press and hold the History Reset switch for 10 seconds to initiate the Ethernet reset process. The SWITCH 2 manual, Remote and Auto LEDs will flash simultaneously during the reset process. Once the LEDs begin flashing the History Reset switch may be released.

## 2.4 Operation

1. Set the on board controls as desired (Tables 2.0, 2.1, Figure 2.3).
2. Install the 1582-225L2 in the equipment rack.
3. Connect RF to the BNC connectors (J1, J2, J3, J4, J5, J6, J7, J8, J9, J10, J11, J12).
4. Connect to signals on the MONITORS AND CONTROLS (DB9 connectors), J16A & J16B, as desired (see Figure 2.2, Table 2.1).
5. Connect power via two power cords to AC1 and AC2.
6. Manually switch between PRIMARY and BACK-UP and be sure switching occurs. Check SW1 and SW2.
7. Switch to AUTO Alarm Switch 1 and note that automatic switching occurs. Remove alarm to CHI and note that the output switches as desired. Push RESET if in LATCH mode. Repeat for CH2.



**FIGURE 2.4** Fuse and Spare Fuse Locations



## 2.5 Auto Switching Description

Automatic control determines switch routing by monitoring alarm inputs on two channels (CH1, CH2) and selecting the initial source. Local and remote control of RF sources is also provided. Latching relays allow the switch to remain in its "current" state independent of power loss. The 1582-225L2 detects an external alarm condition on CH1 and CH2 by either a contact closure to ground or an open (selectable). Switching logic can be selected as follows:

- 1) **CH1 Prime Mode** - Switches from CH1 to CH2 only if CH1 alarms and CH2 is good  
Switches back to CH1 when it is no longer in alarm or when both CH1 and CH2 are in alarm
- 2) **Latch to CH2 Mode** - Switches to CH2 if CH1 alarms and CH2 is good. Latches to CH2.  
Push Manual Reset or ground Remote Reset pin to return to CH1 if it has no alarm or both CH1 and CH2 are in alarm.
- 3) **Minimum AUTO switching, Initial Channel Select (ICS) Mode** - Switch stays on channel last selected by Manual or Remote selection after return to AUTO. AUTO switching occurs only if current channel alarms and the other channel is clear.

Switching is accomplished using latching relays so if power is removed from the 1582-225L2, CH1 and CH2 RF will continue to go to the output selected prior to power loss and will remain there when power is applied assuming no change in alarm status from when power was lost. The channels can be manually switched by the front panel Manual Select switch. If operating in the ICS mode, the last channel manually selected (CH1 or CH2) will be the initial channel when returning the Manual Select switch to AUTO. External REMOTE contact closures can force selection of CH1 or CH2 when the Manual Select switch is in the AUTO position independent of the alarm conditions of CH1 or CH2. Front panel LEDs indicate alarms, alarm history (prior occurrence of alarms which have now cleared), switch conditions for CH1 and CH2, REMOTE or MANUAL operation and presence of power.

RF connectors are 75Ω BNC, female and IF-L connectors are 75Ω BNC, female. Contact closure inputs are via barrier strip. Dual power supplies provide redundant power to the 1582-225L2. The chassis is a 1 3/4" rack mount.

**Table 3.0 Model 1582-225L2 Switch - Configuration DIP Switch**

<b>Table 3.0 Model 1582-225L2 Configuration DIP Switch</b>								
<b>Select Serial M&amp;C Interface (SW1, SW2)</b>	<b>SW1</b>	<b>SW2</b>	<b>SW3</b>	<b>SW4</b>	<b>SW5</b>	<b>SW6</b>	<b>SW7</b>	<b>SW8</b>
RS232	OFF	OFF	X	X	X	X	X	X
RS422	ON	OFF	X	X	X	X	X	X
RS485	OFF	ON	X	X	X	X	X	X
Ethernet (Optional)	ON	ON	X	X	X	X	X	X
<b>Select Auto Switching Mode (Switch A if Dual) (SW3, SW4)</b>	<b>SW1</b>	<b>SW2</b>	<b>SW3</b>	<b>SW4</b>	<b>SW5</b>	<b>SW6</b>	<b>SW7</b>	<b>SW8</b>
CH1 Prime	X	X	ON	OFF	X	X	X	X
Latch to CH2	X	X	OFF	ON	X	X	X	X
Minimum Auto Switching	X	X	OFF	OFF	X	X	X	X
<b>Select Alarm Input Polarity (Switch A if Dual) (SW5)</b>	<b>SW1</b>	<b>SW2</b>	<b>SW3</b>	<b>SW4</b>	<b>SW5</b>	<b>SW6</b>	<b>SW7</b>	<b>SW8</b>
Normally Closed (Open = Alarm) (Logic High = Alarm)	X	X	X	X	OFF	X	X	X
Normally Open (Closed = Alarm) (Logic Low = Alarm)	X	X	X	X	ON	X	X	X

### 3.0 Environmental Use Information

- A. **Rack-Mounting** - To mount this equipment in a rack, please refer to the installation instructions located in the user manual furnished by the manufacturer of your equipment rack.
- B. **Mechanical Loading** - Mounting of equipment in a rack should be such that a hazardous condition does not exist due to uneven weight distribution.
- C. **Elevated Operating Ambient Temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra (Maximum Recommended Ambient Temperature).
- D. **Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Additional space between units may be required.
- E. **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on over current protection and supply wiring. Appropriate consideration of equipment name plate rating should be used, when addressing this concern.
- F. **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connection to the Branch (use of power strips).
- G. **Top Cover** - There are no serviceable parts inside the product so, the Top Cover should not be removed. If the Top Cover is removed the ground strap and associated screw **MUST BE REINSTALLED** prior to Top Cover screw replacement. **FAILURE TO DO** this may cause **INGRESS** and/or **EGRESS** emission problems.



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