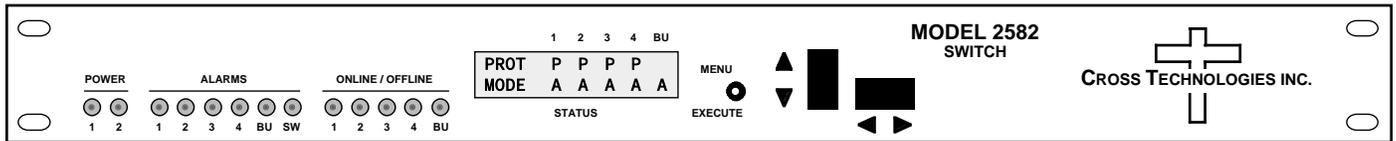


# Instruction Manual

# Model 2582-142 Backup Protection Switch

January 2012 - Rev. B



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# INSTRUCTION MANUAL

## MODEL 2582-142 Backup Protection Switch

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All Cross Technologies, Inc. products are warranted against defective materials and workmanship for a period of one year after shipment to customer. Cross Technologies, Inc.'s obligation under this warranty is limited to repairing or, at Cross Technologies, Inc.'s option, replacing parts, subassemblies, or entire assemblies. Cross Technologies, Inc. shall not be liable for any special, indirect, or consequential damages. This warranty does not cover parts or equipment which have been subject to misuse, negligence, or accident by the customer during use. All shipping costs for warranty repairs will be prepaid by the customer. There are not other warranties, express or implied, except as stated herein.



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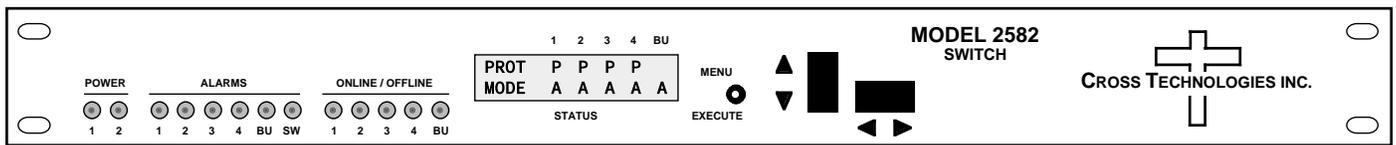
# MODEL 2582-142 Backup Protection Switch, 1 for 4

## 1.0 General

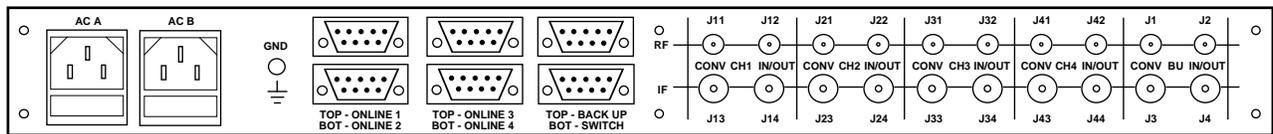
### 1.1 Equipment Description

The 2582-142 provides Auto or Manual backup protection for up to 4 up or downconverters by relay switching of IF and RF from a backup unit to any of 4 on-line units. The controller in the 2582-142 monitors alarms and settings of the on-line units and sets the backup unit to the parameters of the unit being backed up prior to backing it up. The 2582-142 works with standard Cross L-Band up and downconverters by polling their monitor and control ports on a periodic basis. Remote M&C polling of units can be done at anytime. A defective unit's inputs and outputs are switched from the failed unit to the backup when a failure occurs either automatically, manually or remotely. Individual priority levels and "on-line", "off-line" and "not used" modes can be programmed for each on-line converter. Alarms are contact closures to ground. Status of the 2582-142 is via a serial data stream and a contact closure to ground on alarm.

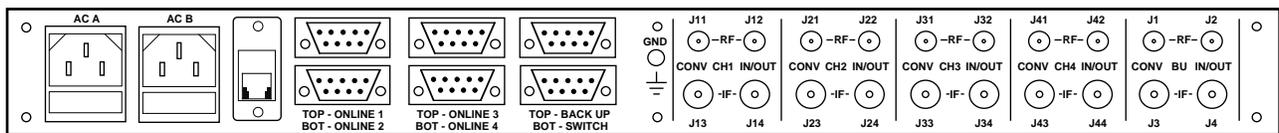
All settings are stored in nonvolatile ROM and on power up the 2582-142 polls all units. Manual Select is controlled by the multi-function switches on the front panel. LEDs indicate alarm and switch conditions. The unit is powered by redundant power supplies, and mounted in a 1RU rack-mount chassis.



Front Panel

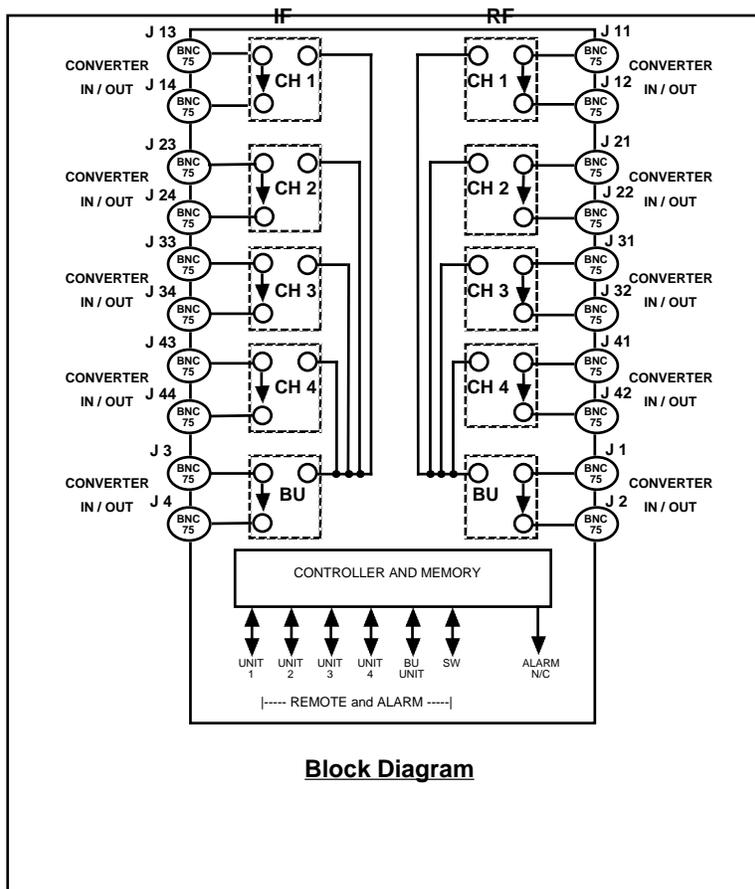


Rear Panel Without Option W28 - Ethernet Connection



Rear Panel With Option W28 - Ethernet Connection

**FIGURE 1.1 Model 2582-142 Front and Rear Panels**



**FIGURE 1.2 Model 2582-142 Switch Block Diagram**

## **EQUIPMENT SPECIFICATIONS\***

### **Model 2582-142 BACK-UP PROTECTION SWITCH, 1 FOR 4**

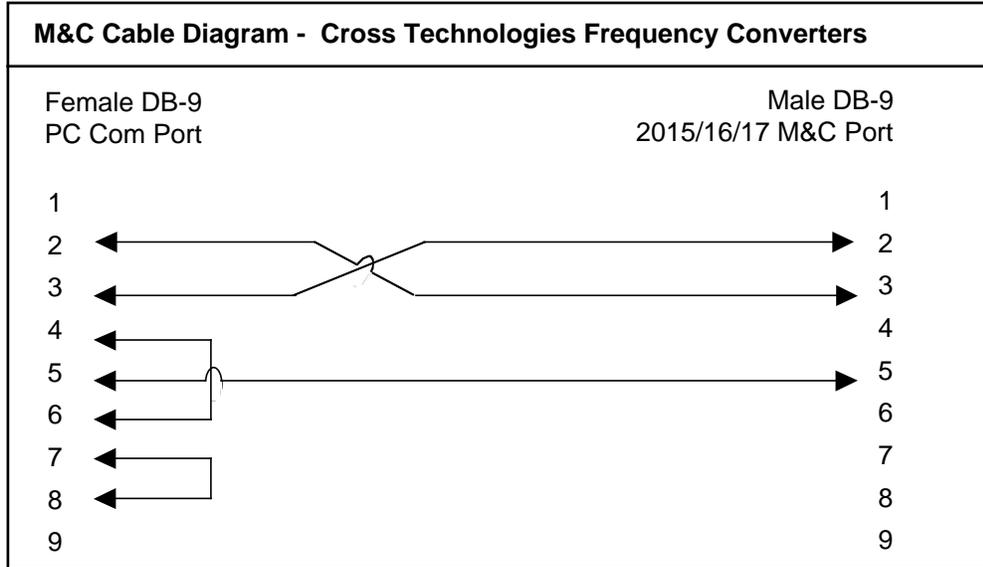
<b>Switch Characteristics</b>	<b>RF (900-2200 MHz)</b>	<b>IF (DC - 200 MHz)</b>
Impedance	75Ω	75Ω
Return Loss	≥12 dB	≥18 dB
Isolation	> <b>45 dB</b>	> 55 dB
Insertion Loss	≤ 2.0 dB	≤1.5 dB
Switch time	≤100 milliseconds	≤100 milliseconds
Type	Relay	Relay
Configuration	1 for 4, no termination (termination optional)	
<b>Controls and Indicators</b>		
Manual Select	Manually select CH1 - CH2 - CH3 - CH4	
ALARM	Red LEDs	
ON-LINE, OFF-LINE	Green, Red LEDs	
<b>Other</b>		
Alm/Remote Connectors	DB9 (female)	
RF Connectors	<b>BNC (female), 75Ω</b>	
IF Connectors	BNC (female), 75Ω	
Mechanical	19 inch standard chassis 1.75" High x 12" Deep	
Power	Redundant power supplies; 100-240 ±10% VAC, 47 -63 Hz, 45 watts	

\*10°C to 40°C; 2000m max. elevation; 80% max. humidity; Specifications subject to change without notice

### 1.3 Monitor and Control Interface

#### A) Remote serial interface

**Protocol:** RS-232C, 9600 baud rate, no parity, 8 data bits, 1 start bit, and 1 stop bit.  
(RS-232C, RS-422, or **RS-485 - option -Q**)



**Connectors:** Rear panel, DB-9 female

SWITCH 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

CH1,CH2,CH3,CH4,BU Pinouts	
Pin	Function
1	Tx-
2	Tx+ (RS-232C)
3	Rx+ (RS-232C)
4	Rx-
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

**B) Status Requests** Table 1.1 lists the status requests for the 2582-142 and briefly describes them.

\* PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.

<b>TABLE 1.1 2582-142 Status Requests</b>		
<b>Command</b>	<b>Syntax *</b>	<b>Description</b>
Command Status	{aaS1}	Returns {aaS1bcdefghijklmno   pq} where:
		• b = BACK-UP Status
		0 = Normal, no channels backed up
		1 = CH1 is currently backed up
		2 = CH2 is currently backed up
		3 = CH3 is currently backed up
		4 = CH4 is currently backed up
		• c = CH1 Status -- 0 = protected, 1 = unprotected
		• d = CH1 Mode -- 0 = AUTO, 1 = MANUAL, 2 = REMOTE
		• e = CH2 Status -- 0 = protected, 1 = unprotected
		• f = CH2 Mode -- 0 = AUTO, 1 = MANUAL, 2 = REMOTE
		• g = CH3 Status -- 0 = protected, 1 = unprotected
		• h = CH3 Mode -- 0 = AUTO, 1 = MANUAL, 2 = REMOTE
		• i = CH4 Status -- 0 = protected, 1 = unprotected
		• j = CH4 Mode -- 0 = AUTO, 1 = MANUAL, 2 = REMOTE
		• k = CH1 Alarm -- 0 = normal, 1 = alarm
		• l = CH2 Alarm -- 0 = normal, 1 = alarm
		• m = CH3 Alarm -- 0 = normal, 1 = alarm
		• n = CH4 Alarm -- 0 = normal, 1 = alarm
		• o = BACK-UP Alarm -- 0 = normal, 1 = alarm
		delimiter (vertical bar character)
		• p = Power Supply A Alarm -- 0 = normal, 1 = alarm
		• q = Power Supply B Alarm -- 0 = normal, 1 = alarm
Min. Auto Switching Status	{aaS5}	Returns {aaS5b} where:
		• b = Minimum Auto Switching mode status
		0 = Normal, Min. Auto Switching OFF

**C) Commands** Table 1.2 lists the commands for the 2582-142 and briefly describes them. After a command is sent the 2582-142 sends a return “>” indicating the command has been received and executed.

**General Command Format** - The general command format is {aaCND...}, where:

- { = start byte
- aa = address of unit (only used if in RS-485 mode)
- C = 1 character, either C (command) or S (status)
- N = 1-digit command or status number, 1 through 9
- D = 1 character or more of data (depends on command)
- } = stop byte

\* PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.

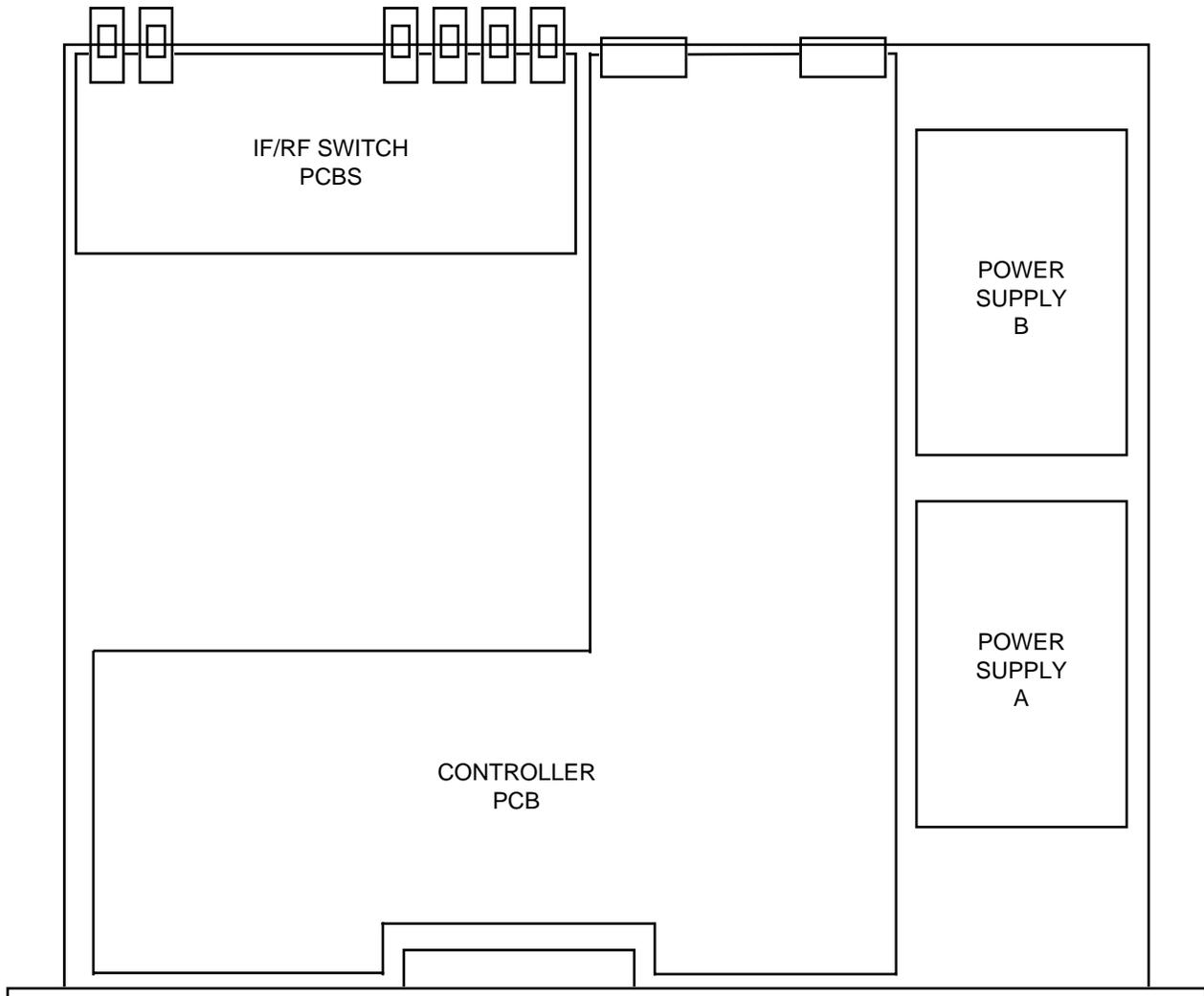
Table 1.2 2582-142 Commands		
Command	Syntax*	Description
Set CH1 Status and Mode	{aaC1xy}	where:
		• x = 0; CH1 Protected
		• x = 1; CH1 Unprotected
		• y = 0; set CH1 to AUTO mode
		• y = 1; switch BACK-UP to CH1
Set CH2 Status and Mode	{aaC2xy}	where:
		• x = 0; CH2 Protected
		• x = 1; CH2 Unprotected
		• y = 0; set CH2 to AUTO mode
		• y = 1; switch BACK-UP to CH2
Set CH3 Status and Mode	{aaC3xy}	where:
		• x = 0; CH3 Protected
		• x = 1; CH3 Unprotected
		• y = 0; set CH3 to AUTO mode
		• y = 1; switch BACK-UP to CH3
Set CH4 Status and Mode	{aaC4xy}	where:
		• x = 0; CH4 Protected
		• x = 1; CH4 Unprotected
		• y = 0; set CH4 to AUTO mode
		• y = 1; switch BACK-UP to CH4
Set Min. Auto Switching Mode	{aaC5x}	where:
		• x = 0; Minimum Auto Switching DISABLED
		• x = 1; Minimum Auto Switching ENABLED
Restore Switch Position	{aaC6x}	where:
		• x = 1; Restore Switch Position after the switch position changed in Minimum Auto Switching mode

All external units (1, 2, and backup) can be controlled remotely via the 2582 switch. Converters to be controlled must be in RS-422 remote mode. Simply enter a prefix of \*1, \*2, or \*5 for units 1, 2, or backup, respectively, before entering the corresponding unit’s status request or command. For example, to send a status command of S1 to converter #1 you would enter {aa\*1S1}, where the address, aa, would only be necessary if the 2582 were in RS-485 mode. Any returned status will also be prefixed with a \*1, \*2, or \*5.

## 2.0 Installation

### 2.1 Mechanical

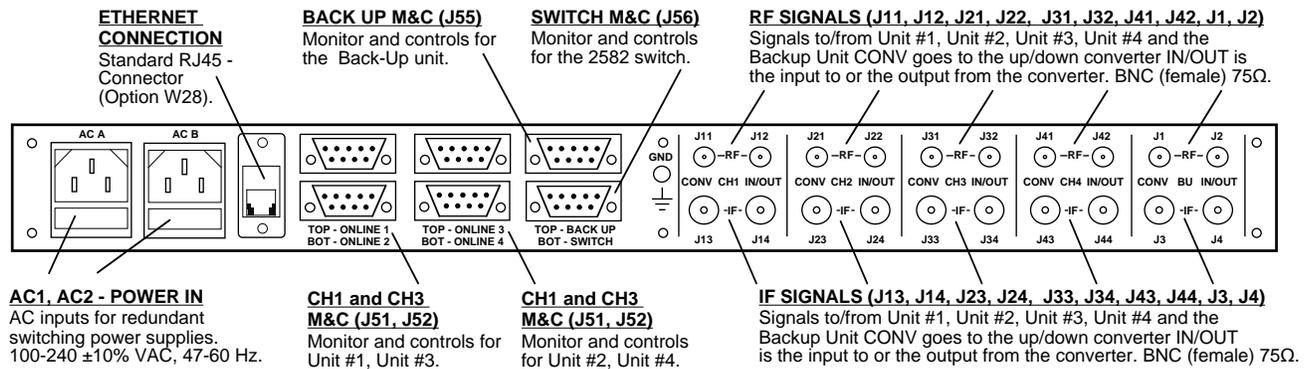
The 2582-142 consists of two IF or L-Band Switching PCBs and one Controller PCB housed in a 1 RU 1 3/4 inch high by 16 inch deep chassis. Two redundant switching,  $\pm 12$ , +24, +5 VDC power supplies provide power for the assembly. The 2582-142 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2582-142 is assembled.



**FIGURE 2.0 2582-142 Mechanical Assembly**

## 2.2 Rear Panel Input/Output Signals

Figure 2.1 shows the input and output connectors on the rear panel.



**FIGURE 2.1 2582-142 Rear Panel I/O's**

TABLE 2.1 SWITCH 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

TABLE 2.2 CH1,CH2,BU Pinouts	
Pin	Function
1	Tx-
2	Tx+ (RS-232C)
3	Rx+ (RS-232C)
4	Rx-
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

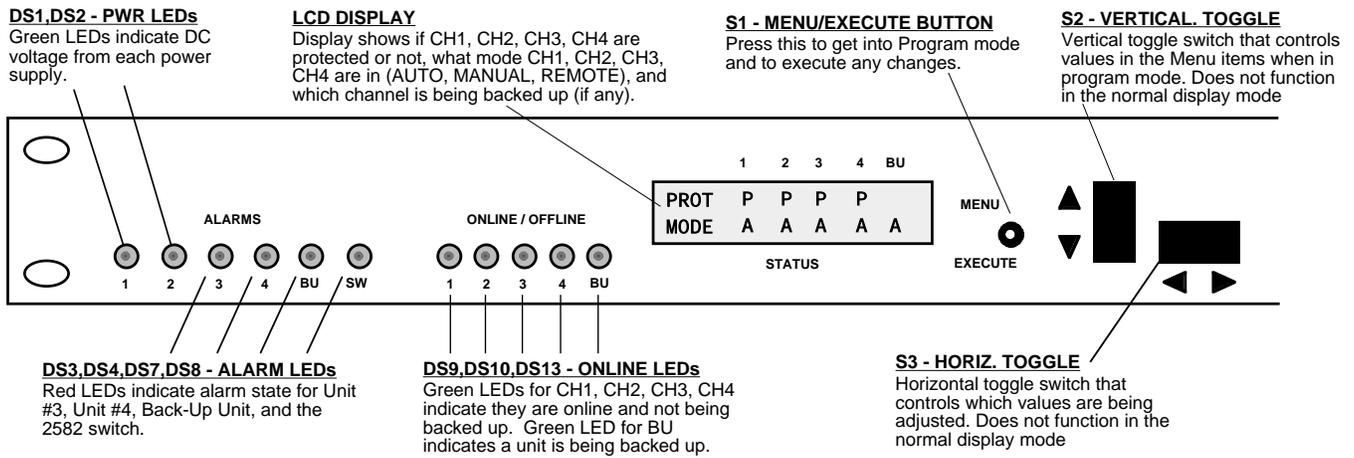
### \*Remote Serial Interface

Interface: DB-9 Male

Protocol: RS-232C/422/485, 9600 baud rate, no parity, 8 data bits, 1 start bit, 1 stop bit.

## 2.3 Front Panel Controls and Indicators

Figure 2.2 shows the front panel controls and indicators.

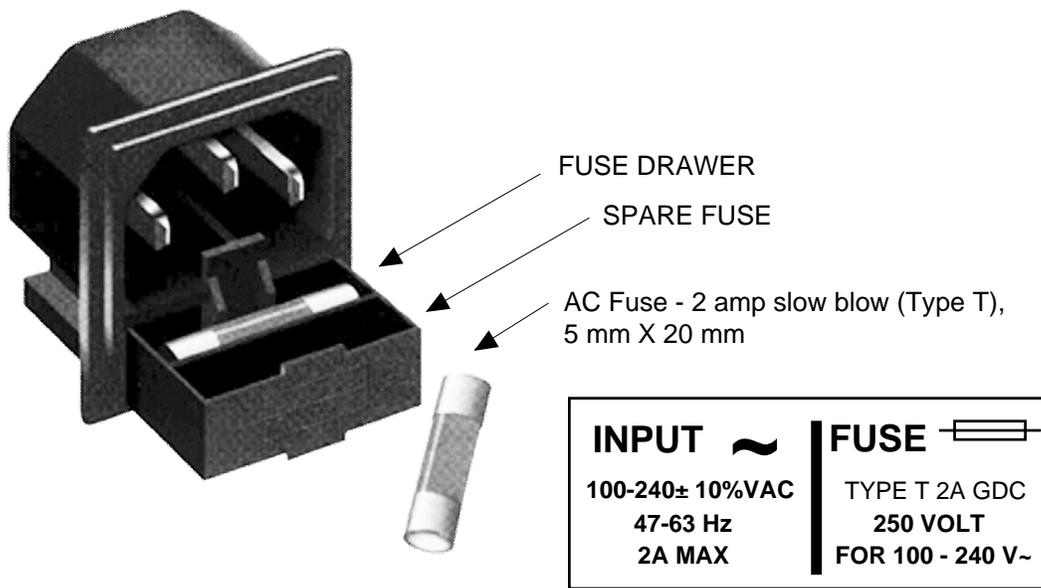


**FIGURE 2.2 2582-142 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2582-142, Switch Section

1. Connect Converters (CH1, CH2, CH3, CH4 BU) to respective channels on the 2582-142 (Figure 2.1).
2. Connect Alarm/Control cables from Converters to respective monitors on the 2582-142 (Figure 2.1).
3. Connect two 100-240  $\pm$  10% VAC, 47 - 63 Hz power cords to AC A and AC B on the back panel (Figure 2.1).
4. Set which unit(s) you wish to protect and the mode for each unit (See Section 2.5 Menu Settings).
5. Be sure DS1 & DS2 (green, DC Power) are on and DS3 to DS8 (red, Alarm) are off (Figure 2.2).
6. AC Fuses - The fuses are 5 mm X 20 mm, 2 amp slow blow (Type T) and are inserted in the far slot in the drawer below the AC inputs as shown in Figure 2.3. There is a spare fuse in the near slot. If a fuse continues to open, the corresponding power supply is most likely defective.



**FIGURE 2.3 Fuse Location and Spare Fuse**

## 2.5 Menu Settings

**2.5.1 Functions** - This section describes operation of the front panel controls. There are three operator switches, the LCD display and alarm indicator LEDs. All functions for the equipment are controlled by these components. The functions are (see Figure 2.4):

### Power Up

### Normal Display

<b>Menu 1</b>	Set CH1 Protected/Unprotected and Auto/Manual modes
<b>Menu 2</b>	Set CH2 Protected/Unprotected and Auto/Manual modes
<b>Menu 3</b>	Set CH3 Protected/Unprotected and Auto/Manual modes
<b>Menu 4</b>	Set CH4 Protected/Unprotected and Auto/Manual modes
<b>Menu 5</b>	Set Switch Priorities
<b>Menu 6</b>	Set Remote Interface
<b>Menu 7</b>	Set RS-485 address
<b>Menu 8</b>	Set Minimum Auto Switching Mode ON and OFF
<b>Menu 9</b>	Restore Switch Position in Minimum Auto Switching mode
<b>Save Menu</b>	Whenever “R” is selected or when you get to the end of the menus

Alarm indications appear on the LEDs (See Figure 2.2).

All program changes must start with the operation of the Menu/Execute switch and must also end with the operation of the Menu/Execute switch verified by the “Save Settings?” Menu. If this sequence is not followed, none of the changes will take effect.

### 2.5.2. Power On Settings

**NOTE:** The last status of a unit is retained even when power is removed. When power is restored, the unit will return to it's previous settings.

When power is first applied, the LCD display goes through three steps.

1. The LCD goes black to show all segments are functioning.
2. The software version will be displayed.

	1	2		BU
REV 1.00				

#### STATUS

3. The present protection state and mode of each channel/unit are shown.

	1	2	3	4	BU
PROT	P	P	P	P	
MODE	A	A	A	A	A

#### STATUS

The unit is now operational and ready for any changes the operator may desire.

### 2.5.3 Control Switches

1. Menu/Execute - Any change to the programming of the unit must be initiated by pressing the Menu/Execute switch and completed by pressing the Menu/Execute switch.
2. Horizontal Switch - This switch is mounted so its movement is horizontal and moves the cursor left or right.
3. Vertical Switch - This switch is mounted so its movement is vertical, and changes settings in each menu.

### 2.5.4 Alarm Indications

An alarm condition will occur if the corresponding unit's local oscillator phase lock loop (PLL) comes out of lock (when connected properly).

	ON POWER UP					
<b>Power Up</b>	REV 1.00					
	NORMAL DISPLAY					
		1	2	3	4	BU
<b>Normal Display</b>	PROT	P	P	P	P	
	MODE	A	A	A	A	PUSH BUTTON
	STATUS					
	PUSHING MENU/EXECUTE SEQUENCE					
<b>Menu 1</b>	Set CH1 Protection/Unprotected and Auto/Manual modes				R	
	===CH 1===					
	Protected Auto					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 2</b>	Set CH2 Protection/Unprotected and Auto/Manual modes				R	
	===CH 2===					
	Protected Auto					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 3</b>	Set CH3 Protection/Unprotected and Auto/Manual modes				R	
	===CH 3===					
	Protected Auto					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 4</b>	Set CH4 Protection/Unprotected and Auto/Manual modes				R	
	===CH 4===					
	Protected Auto					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 5</b>	Set Switch Priorities				R	
	PRIORITIES					
	CH1 CH2 CH3 CH4					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 6</b>	Set Remote Interface				R	
	INTERFACE					
	RS422					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 6</b>	Set RS-485 Address				R	
	ADDRESS = 00					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 7</b>	Set Minimum Auto Switching Mode ON and OFF				R	
	Minimum Auto					
	Switching=OFF					
					SCROLL <>	
					SCROLL ↕	PUSH BUTTON
<b>Menu 8</b>	Restore Switch Position in Minimum Auto Switching mode				R	
	Restore Sw=OFF					
					SCROLL <>	PUSH BUTTON
<b>Save?</b>	When "R" is selected from any above menu or at the end				YN	
	SAVE SETTINGS?					
					SCROLL <>	PUSH BUTTON

**FIGURE 2.4 Menu Display and Sequences**

## 2.5.5 Minimum Auto Switching Mode

### Enabling and Disabling

The Minimum Auto Switching mode is enabled and disabled via a front panel menu. The Minimum Auto Switching mode can also be enabled and disabled via the following M&C command:

{C5x}

Where x=1 to enable and x=0 to disable.

The status of the 2582-142's Minimum Auto Switching mode setting can be queried by sending the following command:

{S5}

Which returns {S5x} where x=1 if enabled and x=0 if disabled.

### Operation

In the Minimum Auto Switching mode the switch will remain in a backup state after an alarm event - even if the alarm event that caused the unit to switch has been cleared. The main display will show an "H" under the BU MODE after an alarm causes the switch to change states while in the Minimum Auto Switching mode. The unit can be restored to the normal state via a front panel restore command or an M&C restore command. The front panel restore switch menu appears after the Minimum Auto Switching mode ON/OFF menu only if the Minimum Auto Switching mode is on. The switch can also be Restored via the following M&C command:

{C6x}

Where x=1 to Restore.

**NOTE:** The switch will automatically restore - as soon as the alarm event that caused the unit to switch has been cleared - *IF* the Minimum Auto Switching mode is disabled either via the front panel setting or by the M&C command.

## 2.5.6 Channel Modes of Operation

### Protect/Unprotect

Each channel may be set to either protected or unprotected. Protected is the normal mode of operation.

Protected mode means the switch will switch in the backup unit when an alarm occurs on the protected channel. Unprotected mode means the switch will take no action when alarms occur on the unprotected channel. The unprotected unit's respective alarm LED on the switch will still illuminate when the unprotected unit goes into Alarm status, but the Switch will ignore the Alarm.

Unprotected mode allows the user to configure a 1 for 4 switch as a 1 for 3, 1 for 2, or 1 for 1.

Unprotected mode also allows the user to only protect only those channels which are higher priority during certain critical periods of use.

### Auto/Manual/Remote

Auto is the normal mode of operation and means the switch will automatically back up the channel in the event that an alarm occurs. An "A" will appear in the LCD display to indicate the unit is 'automatically' protected.

Remote mode means the switch was remotely set (via M&C command) to back up that channel. This gives the user the ability to remotely test the switch's signal path and the backup unit. Remote switch commands override Auto switch positions. For example, if the switch is automatically backing up channel 2 (because channel 2 is alarmed) and the switch receives a remote command to switch to channel 1 it will execute that remote command. An "R" will appear in the LCD display to indicate the unit has been 'backed up' based on a Remote command.

Manual mode means the switch was manually (via front panel menu command) set to back up that channel. This gives the local user the ability to manually test the switch's signal path and the backup unit. Manual switch commands override Remote switch commands which override Auto switch positions. For example, if the switch is automatically backing up channel 2 (because channel 2 is alarmed) and the switch receives a remote command to switch to channel 1 and a manual command to switch to channel 3 it will switch to channel 3. An "M" will appear in the LCD display to indicate the unit has been 'manually' protected.

### 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.
- 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 unit 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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