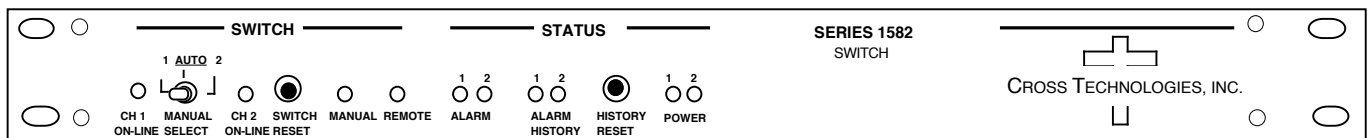


# Instruction Manual

# Model 1582-70L Switch

April 2009 Rev A



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**INSTRUCTION MANUAL**  
**MODEL 1582-70L SWITCH**

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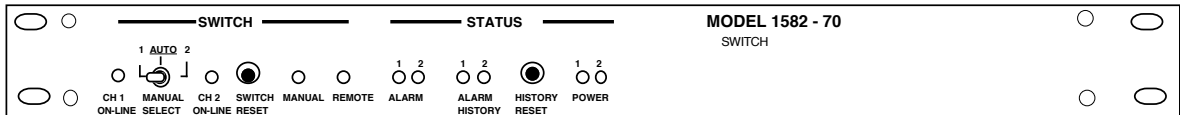
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## INSTRUCTION MANUAL 1582-70L SWITCH

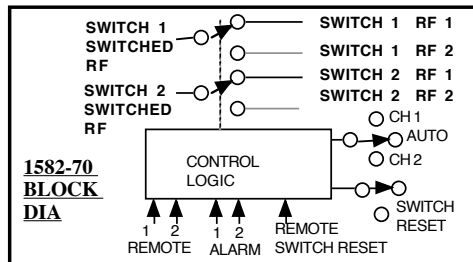
**1.1 Equipment Description** - The 1582-70L Switch provides AUTO or Manual latched relay switching between CH1 and CH2 RF signals.(DC - 1.5 GHz). Automatic control determines switch routing by monitoring alarm inputs on two channels (CH1, CH2) and selecting the initial source. Local and remote control of RF sources is also provided. Latching relays allow the switch to remain in its "current" state independent of power loss. The 1582-70L 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 1582-70L, 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 BNC, female. Contact closure inputs are via barrier strip. Dual power supplies provide redundant power to the 1582-70L. The chassis is a 1 3/4" rack mount.



**FIGURE 1.0 1582-70L SWITCH**



**FIGURE 1.1 1582-70L BLOCK DIAGRAM**

## 1.2 Technical Specifications

### 1582-70L Technical Specifications

#### Switch Characteristics

Impedance	75 ohms
Type	Latching Relay
Isolation	>65 dB DC to 10MHz >50 dB to 1.0 MHz, >40 dB to 1.5 GHz
Switch time	≤10 milliseconds
Insertion Loss	≤1 dB to 1.0 GHz ≤1.5 dB to 2.0 GHz
Configuration	DPDT
Connectors, RF	75Ω BNC, Female
Conn, Alarm/Controls	Barrier Strip

#### Controls

MANUAL SELECT channel	Manually select CH1, CH2, or AUTO operation. If operating in the ICS mode, the last manually selected (CH1 or CH2) will be the initial channel.
SWITCH RESET	Resets switch to CH1 if it is good and switch is in the latch mode. Also Resets REMOTE
HISTORY RESET	Resets alarm history (prior occurrence of alarms which have now cleared) LEDs only

#### Indicators, LEDs

CH1 ON-LINE	Turns green when Channel 1 is selected
CH2 ON-LINE	Turns green when Channel 2 is selected
MANUAL	Turns red when the Manual Select switch manually selects channel 1 or 2.
ALARM CH1	Turns red when Channel 1 alarm input is a closure or open (selectable)
ALARM CH2	Turns red when Channel 2 alarm input is a closure or open (selectable)
ALARM HISTORY 1	Turns red on Channel 1 alarm and stays red until HISTORY RESET is pushed
ALARM HISTORY 2	Turns red on Channel 2 alarm and stays red until HISTORY RESET is pushed
POWER CH1	Turns green when power is applied to AC1 input on the rear panel
POWER CH2	Turns green when power is applied to AC2 input on the rear panel
REMOTE	Turns amber when REMOTE control is active

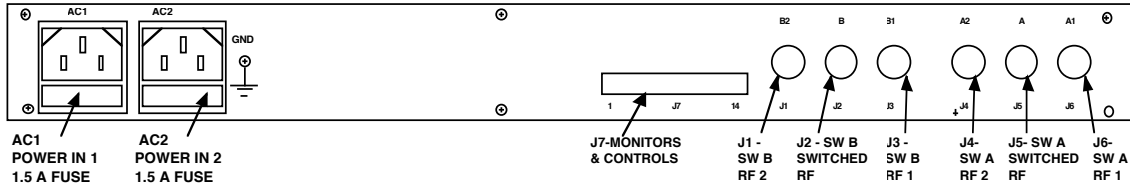
#### Other

Mechanical	19 inch standard chassis 1.75"high X 12" deep
Power	Redundant power supplies; 100-240 ±10% VAC, 47 - 60Hz, 30 watts

\*Specifications subject to change without notice

## 2.0 Installation

**2.1 Input/Output Connectors** - The following are the input and output connectors.



**FIGURE 2.0 1582-70L REAR PANEL**

**TABLE 2.0 INPUT / OUTPUT CONNECTORS (FIGURE 2.0)**

**J1, J2, J3, J4, J5, J6 - RF CONNECTORS (FIGURE 2.0)**

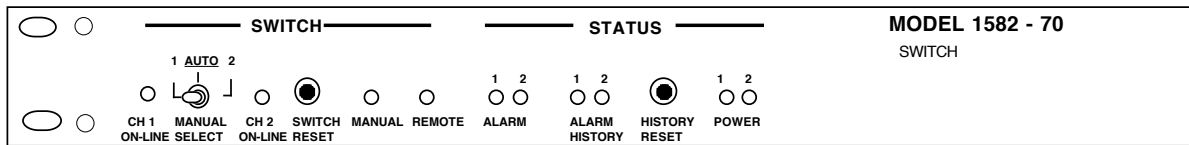
**J7 - MONITORS AND CONTROLS CONNECTOR (FIGURE 2.0)**

<b>Function</b>	<b>Pin #</b>	<b>Description</b>
ALARM 1 IN	13	Ground or Open (selectable by JP2) is Ch 1 alarm
ALARM 2 IN	14	Ground or Open (selectable by JP2) is Ch 2 alarm
REMOTE 1 IN	1	When in AUTO, momentary ground on this pin selects Ch 1
REMOTE 2 IN	2	When in AUTO, momentary ground on this pin selects Ch 2
REMOTE RESET IN	4	When in LATCH mode, ground resets switch to Ch 1
MANUAL INDICATION	8	*Open collector output (< 5Ω) to gnd when in Manual mode.
SWITCH 1 MON	11	**Relay closure to J7 pin 6 (<5Ω) when selected RF is channel 1 RF..
SWITCH 2 MON	12	**Relay closure to J7 pin 6 (<5Ω) when selected RF is channel 2 RF.
SWITCH MON COMMON	6	Common pin for SWITCH 1, 2 MONITOR
REMOTE MON	9	*Open collector (< 5Ω) to gnd when in REMOTE mode
GROUND	3,7,10	Ground
NO CONNECTION	5	Not connected

\*Max voltage able to be connected to this is +20 VDC @ 30ma  
 \*\*Max voltage to be connected to this is +30 VDC@ 100 ma

**AC1, AC2 - POWER IN** - Provides AC inputs for dual power supplies.

## 2.2 Controls and Indicators -The following are the controls and indicators.



**FIGURE 2.2 1582-70L CONTROLS AND INDICATORS**

**TABLE 2.1 FRONT PANEL CONTROLS AND INDICATORS**

<u>Item</u>	<u>Description</u>
CH1 ON-LINE LED	Turns green when Channel 1 is selected
CH2 ON-LINE LED	Turns green when the Channel 2 is selected
MANUAL LED	Turns red when the Manual Select switch manually selects channel 1 or 2.
ALARM CH1 LED	Turns red when Channel 1 alarm input is a closure or open (selectable)
ALARM CH2 LED	Turns red when Channel 2 alarm input is a closure or open (selectable)
ALARM HISTORY 1	Turns red on Channel 1 alarm and stays red until HISTORY RESET is pushed
ALARM HISTORY 2	Turns red on Channel 2 alarm and stays red until HISTORY RESET is pushed
POWER CH1 LED	Turns green when power is applied to AC1 input on the rear panel
POWER CH2 LED	Turns green when power is applied to AC2 input on the rear panel
REMOTE LED	Turns amber when REMOTE control is active
MANUAL SELECT	3-position switch as follows: 1 - manually select Channel 1 center - auto - switch position determined by alarm and Remote closures 2 - manually select Channel 2 If operating in the ICS mode, the last channel manually selected (CH1 or CH2) will be the initial channel.
SWITCH RESET	Resets switch to CH1 if it is good and switch is in the latch mode, Also Resets REMOTE selection to normal AUTO operation
HISTORY RESET	Resets history alarm LEDs only

## **TABLE 2.2 PC BOARD SETTINGS**

NOTE: Dot position means jumper goes from pins 1-2; non-dot means jumper goes from pins 2-3

### **JP1 - 3-pin jumper - 3-pin jumper that works with JP3**

In the dotted position when channel 1 alarms the 1582-70 will switch to channel 2 until channel 2 alarms.

At this point, if channel 1 is still in alarm, the switch will stay on channel 2.

When the channel 1 alarm clears if channel 2 is still in alarm, the switch will switch to channel 1.

JP1 normal position - **non-dotted** and operates in conjunction with JP3 as noted below.

### **JP2 - Input alarm condition** 3-pin jumper

In the dotted position open is normal, ground is alarm

In the non-dot position ground is normal, open is an alarm.

JP2 normal position - **dot**

### **JP3 - LATCH to CH2 mode on / off** - 3-pin jumper effective when JP1 is in the non-dot position.

With JP3 in the dot and JP1 in the non-dot, when channel 1 alarms, the 1582-70 switch switches to channel 2 and stays there until the reset button is pushed on the front panel or by an external closure to ground on the remote RESET pin on J7, and then it switches to channel 1. (If channel 1 alarms are cleared). If in the ICS mode and originally set to CH2 the 1582-70 will not switch if CH2 alarms. Only the RESET functions (front panel pushbutton or J7 closure to ground) will return the switch to CH1.

With JP3 in the non-dot and JP1 in the non-dot, when channel 1 alarms the 1582-70 switches to channel 2 until the alarm on channel 1 clears and then the 1582-70 switches back to channel 1 automatically.

JP3 normally position - **dot**.

### **JP4 - CH2 alarm enable / ignore** - 3-pin jumper

Dotted position - Failure in CH1 will cause the 1582-70 to switch to CH2 even if CH2 is in alarm. LEDs will correctly show CH2 alarm status

Non-dotted position - Failure in CH1 will cause the 1582-70 to switch to CH2 only if CH2 is not in alarm.

JP4 Normal position - **non-dot**

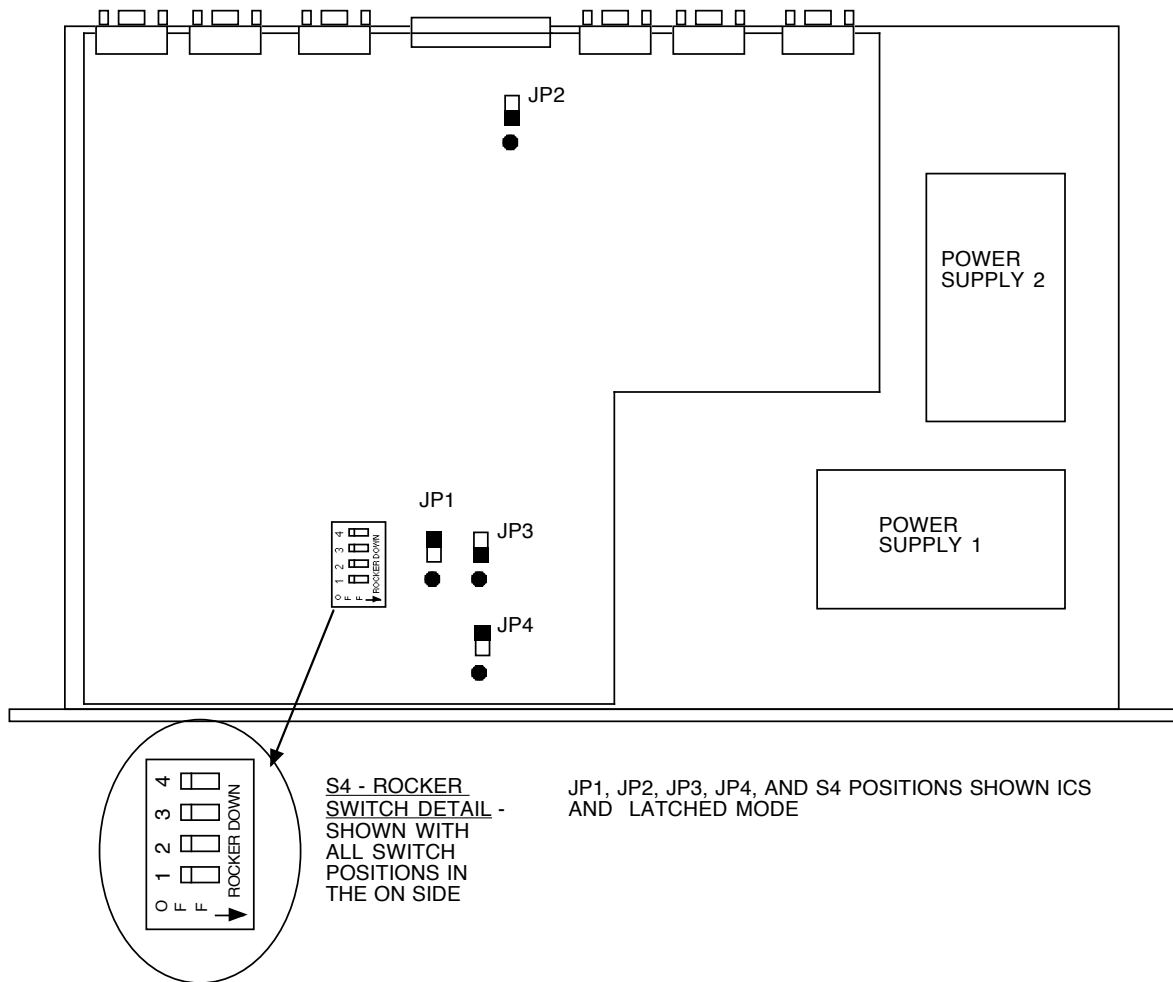
**SW4 - Initial Channel Select (ICS) Mode**- 4-position DIP switch Selects the Initial Channel Select mode when JP1,2,3 in Dot and JP4 in Non-dot.

**S4 positions 1,2,3,4 to ON - ICS is enabled.** In the ICS mode, the initial channel can be either CH1 or CH2 by switching the front panel Manual Select switch to either CH1 or CH2 and then back to the Auto position. or by grounding either Remote 1 or Remote 2 pins on J8 and then grounding the Remote reset pin on J8 causing the 1582-70 to go back to Auto in the channel last selected remotely if both channel alarms are clear or both channels are in alarm. The initial channel can also be selected if both channel alarms are clear or both channels are in alarm..

**S4 positions 1,2,3,4 to OFF - ICS is disabled (Minimum Auto switching, Return to Last State Mode)**

The 1582-70 goes to the last state (CH1 or CH2) it was in when in Auto after Manually or Remotely switching and returning to Auto. Auto switching occurs only if current channel alarms and the other channel is clear.

**S4 normal position - 1,2,3,4 to ON**



**FIGURE 2.3 PCB SETTINGS PARTS LOCATIONS**

**2.3 Mechanical** - The 1582-70L is rack mounted by attaching the front panel to a rack through the four holes at the edges of the panel.

**2.4 Installation**

- Set the on board controls as desired (Tables 2.2, 2.3, Figure 2.3).
- Install the 1582-70 in the equipment rack.
- Connect RF to the BNC connectors (J1 - J3, J4 - J6)).
- Connect to signals on the MONITORS AND CONTROLS connector, J7, as desired (see Figure 2.0, Table 2.0)
- Connect power via two power cords
- Manually switch between channels 1 and 2 and be sure switching occurs
- Switch to AUTO. Alarm channel 1 and note that automatic switching occurs. Remove alarm to channel 1 and note that the output switches as desired. Push RESET if in LATCH mode. Repeat for Channel 2.
- Check that Ch 1 and Ch 2 are selected when in AUTO and momentary ground is applied to J7 pins (1) and (2) Momentarily ground remote Reset pin 4 on J7 if in LATCH mode to return to AUTO operation.



TABLE 2.3 Cross Technologies 1582-70 Switch Matrix														
Function	JP1	JP2	JP3	JP4	S4-1	S4-2	S4-3	S4-4	RMT-1	RMT-2	RST-S1	R-RST	MAN -S3	HIST -S2
1-2 = DOT 2-3 = NON-DOT														
Auto	1-2	X	X	2-3	X	X	X	X	OPEN	OPEN	OPEN	OPEN	AUTO	X
Alarm Input Normally High	X	1-2	X	X	X	X	X	X	X	X	X	X	X	X
Alarm Input Normally Low	X	2-3	X	X	X	X	X	X	X	X	X	X	X	X
"CH1" Equal Primary Source	2-3	X	2-3	2-3	X	X	X	X	OPEN	OPEN	OPEN	OPEN	AUTO	X
Restore "CH1" on Reset "	2-3	X	1-2	2-3	X	X	X	X	OPEN	OPEN	OPEN	OPEN	AUTO	X
Ignore Alarm "2" (Switching Only)	X	X	X	1-2	X	X	X	X	X	X	X	X	X	X
Disable Latch Power On Reset	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ICS Reset "Auto" Latch Manual "1"	1-2	X	X	X	ON	X	X	X	X	X	X	X	X	X
ICS Reset "Auto" Latch Manual "2"	1-2	X	X	X	ON	X	X	X	X	X	X	X	X	X
ICS Reset "Auto" Latch Remote "1"	1-2	X	X	X	X	X	ON	X	X	X	X	X	X	X
ICS Reset "Auto" Latch Remote "2"	1-2	X	X	X	X	X	ON	X	X	X	X	X	X	X
Remote Select "1"	X	X	X	X	X	X	X	ON	CLOSED	OPEN	OPEN	OPEN	AUTO	X
Remote Select "2"	X	X	X	X	X	X	X	X	OPEN	CLOSED	OPEN	OPEN	AUTO	X
Manual Select "1"	X	X	X	X	X	X	X	X	X	X	X	X	""A""	X
Manual Select "2"	X	X	X	X	X	X	X	X	X	X	X	X	""B""	X
Remote Reset	X	X	X	X	X	X	X	X	OPEN	OPEN	OPEN	CLOSED	X	X
Local Reset	X	X	X	X	X	X	X	X	OPEN	OPEN	CLOSED	OPEN	X	X
Alarm History Reset	X	X	X	X	X	X	X	X	X	X	X	X	X	CLOSED
AUTO, LATCH, & ICS Setting	2-3	X	1-2	2-3	ON	ON	ON	ON	OPEN	OPEN	OPEN	OPEN	AUTO	OPEN

**2.5 Switch Mode Setup** - The following gives the switch mode settings of the on board controls that can be changed in the field with JP1, JP2, JP3, JP4; S4. ( Figure 2.3). All shown with external **alarm = ground**.

**1) CH1 Prime Mode** - Switches from CH1 to the 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

**Non-dot** JP1, JP3, JP4;

**Dot** - JP2;

**S4** - ALL TO OFF.

**2) Latch to CH2 Mode** - Switches from CH1 to the CH2 if CH1 alarms and CH2 is good. Latches to CH2. Push Reset or ground Remote Reset pin to return to CH1 if it has no alarm or both CH1 and CH2 are in alarm.

**Non-dot** - JP1, JP4;

**Dot** - JP2, JP3;

**S4** - ALL TO OFF.

**3) Minimum Auto switching, Initial Channel Select (ICS) Mode**- Switch stays on channel last selected by Manual or Remote selection after return to Auto if both channel alarms are clear or both channels are in alarm. Auto switching occurs only if current channel alarms and the other channel is clear.

**Non-dot** - JP4;

**Dot** - JP1, JP2, JP3;

**S4** - ALL TO ON.

Factory set mode is generally **(3) Minimum Auto switching, Initial Channel Select (ICS) Mode**.

## 3.0 Theory of Operation Cross Technologies 1582-70L Switch

**3.1 Introduction** - The 1582-70L Switch provides automatic and manual control of RF sources or loads depending on the user's application. Automatic control is facilitated by monitoring of alarm inputs and selecting the initial RF source. Local and remote control of RF sources is also provided. LED indicators are provided for Alarm and Alarm History ("CH1" and "CH2"), Power ("CH1" and "CH2"), Remote, Manual as well as "CH1" and "CH2" Select. Latching relays are an option that allows the switch to remain in its "current" state independent of power loss.

### 3.2 Circuit Description (Refer to Switch Matrix)

#### 3.2.1 Auto Operation

Assume that the jumper and switch settings are configured for "Normal Auto Switch Setting" as shown at the bottom of the matrix unless otherwise specified..

Alarm inputs "1" and "2" are monitored by the "Auto Latch" (U4). This latch will only change states when the selected source is in an alarm state and the unselected source is in a not alarmed state. The alarm inputs first pass through U1A and U1B where they are either inverted (Low = Alarm - JP1 1-2) or not inverted (High = Alarm - JP1 2-3). The output of U1A (pin 3) is the Alarm 1 status where High = Alarm. The output of U1B (pin 6) is the Alarm 2 status where High = Alarm. These outputs then go to inputs on U6 and U4. A logic Low on the output of U4A (pin 3) = "1" is alarmed AND "2" is not alarmed. In this case the Auto Latch (U4) will be set to select "CH2". A logic Low on the output of U4B (pin 6) = "1" is not alarmed AND "2" is alarmed. In this case the Auto Latch (U4) will be set to select "A". If both alarm inputs are alarmed or both alarm inputs are not alarmed, the Auto Latch will not be affected. The output of the Auto Latch (U4 - pin 6) determines which RF source will be selected (in auto mode only) where a logic High = Select "CH2".

The Auto Latch logic then passes through the remote control circuitry, which without remote control asserted, will not affect the logic levels. After the remote circuitry the logic signal passes through the manual control circuitry, which without manual control asserted, will not affect the logic levels. After the manual control circuitry, the logic is either applied directly to the relay drivers (High = Select "CH2") for non-latching relays or is routed through U9A and U10 for latching relay versions.

For models with latching relays the logic signal first passes through U9A that provides a relay pulse to ensure that the relays will all be set to the same state on power-up. R28 and C7 provide a pulse to the dual "one-shot" (U10) The outputs of U10 provide the relay set (U10 pin 6) and reset (U10 pin 10) pulses for the latching relays. A "Set" pulse selects "CH1" and a reset pulse selects "CH2". U12A and U12B provide a "lock out" that eliminates the possibility of a set and reset pulse occurring simultaneously by "resetting" each other's "one-shot" during a set or reset pulse.



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