

# OPERATING AND SERVICE MANUAL

59307A

## VHF SWITCH

**SERIAL PREFIX: 1332A**

This manual applies directly to the Hewlett-Packard Model 59307A with serial prefix 1332A. For instruments with serial prefixes above 1332A, a manual change sheet is supplied. For instruments with serial prefixes below 1332A, refer to Section VII.

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## SECTION I GENERAL INFORMATION

### 1-1. INTRODUCTION

1-2. This section provides general information on the HP 59307A VHF Switch including an instrument description, equipment supplied, and instrument specifications.

### 1-3. DESCRIPTION

1-4. The HP 59307A provides two dc to 500 MHz, 50-ohm switches (relays) which are optimized for fast rise time (one nanosecond) pulse waveforms. These switches can be controlled either manually from front-panel pushbuttons or remotely from the HP Interface Bus. Under program control, the switches are operated by addressing the 59307A to listen on the bus and then sending either the ASCII character A or B followed by the switch number (1 through 4). This causes the common switch port to be connected to the selected switch position. A LOCAL RESET pushbutton lets the operator assume front-panel control of the instrument if a local lockout command has not been applied to the 59307A.

### 1-5. INSTRUMENT IDENTIFICATION

1-6. Each Hewlett-Packard instrument has a ten-character serial number (e.g. 0000A00000). The four-digit serial prefix identifies a group of identical instruments, and the five digit suffix is a serial number unique to each instrument. If the serial prefix on your instrument is not on the title page of this manual, your instrument is different from this manual and a manual change sheet is included to describe the differences. If the manual change sheet is missing, request one from the nearest Hewlett-Packard Sales and Service office listed at the back of this manual.

### 1-7. EQUIPMENT SUPPLIED

1-8. Table 1-1 lists the equipment supplied with the 59307A.

Table 1-1. Equipment Supplied

Description	HP Part Number
Detachable Power Cord 7-1/2 ft. (231 cm) long	8120-1378
HP Interface Bus Interconnect Cable	10631A

### 1-9. SPECIFICATIONS

1-10. Specifications for the HP 59307A are given in Table 1-2.

Table 1-2. Specifications

<p><b>ELECTRICAL:</b>  <b>Load on bus:</b> 3.3 mA per line  <b>Relay settling time:</b> 20 ms  <b>Relay contacts:</b> 0.5 amp at 25V; &lt; 1 nanosecond rise time  <b>VSWR:</b> &lt; 1.1  <b>Isolation:</b> &gt; 40 dB at 100 MHz  <b>Power requirements:</b> 115V or 230V ±10%, 50 to 400 Hz, 10 VA max.</p>	<p><b>ENVIRONMENTAL:</b> Operating temperature 0 to 50 degrees C.  <b>DIMENSIONS:</b>  <b>Height:</b> 4 inches (101,6 mm) including cabinet feet.  <b>Width:</b> 8.38 inches (212,9 mm)  <b>Depth:</b> 11.6 inches (294,6 mm)  <b>WEIGHT:</b>  <b>Net weight:</b> 5 lb. 13 oz. (2,64 Kg)  <b>Shipping weight:</b> 7 lb. 2 oz. (3,23 Kg)</p>
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1-11. SIGNAL MNEMONICS

1-12. Table 1-3 is a list of signal mnemonics for the 59307A.

Table 1-3. Signal Mnemonics

Mnemonic	Name
ADDR	Address
BIT1	Bit 1
BIT2	Bit 2
CLK	Clock
CLK	"Not" Clock
CLKA	Clock A
CLKB	Clock B
CLR	"Not" Clear
DAC	Data Accepted
DAV	Data Valid
DIO	Data Input/Output
ENABLE	"Not" Enable
BCL	Bus Clear
HSENABLE	Handshake Enable
HSOUT	Handshake Out
LLO	"Not" Local Lockout
MRE	Multiple Response Enable
MRE	"Not" Multiple Response Enable
REMOTE	Remote
REN	Remote Enable
RFD	Ready for Data

## SECTION II INSTALLATION

### 2-1. INTRODUCTION

2-2. This section contains information for unpacking, inspection, repacking, storage, and installation.

### 2-3. UNPACKING AND INSPECTION

2-4. If the shipping carton is damaged, ask that the carrier's agent be present when the instrument is unpacked. Inspect the instrument for damage. If the instrument is damaged or fails to meet electrical specifications, notify the carrier and the nearest Hewlett-Packard Sales and Service office immediately (offices are listed at the back of this manual). Retain the shipping carton and padding material for the carrier's inspection. The Sales and Service office will arrange for the repair or replacement of your instrument without waiting for the claim against the carrier to be settled.

### 2-5. STORAGE AND SHIPMENT

2-6. To protect the 59307A during storage or shipment, use good commercial packing methods. Reliable commercial packing and shipping companies have the facilities and materials to adequately repack an instrument.

#### NOTE

Before returning an instrument to Hewlett-Packard, contact the nearest Hewlett-Packard Sales and Service office for instructions.

2-7. Conditions during storage and shipment should normally be limited as follows:

- a. Maximum altitude: 25,000 feet
- b. Minimum temperature:  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ )
- c. Maximum temperature:  $+167^{\circ}\text{F}$  ( $+75^{\circ}\text{C}$ )

### 2-8. POWER REQUIREMENTS

2-9. The 59307A operates from either 115 or 230 volts, 50 to 400 Hz. Before applying power, the screwdriver-operated switch mounted inside the 59307A must be set to the correct position (115 or 230) and the correct fuse (as labeled on the rear panel) must be installed.



## SECTION III OPERATION AND PROGRAMMING

### 3-1. INTRODUCTION

3-2. This section contains operating information including a description of controls and indicators, programming, and programming examples.

### 3-3. CONTROLS, INDICATORS, AND CONNECTORS

3-4. Figure 3-1 identifies and describes the front-panel controls and indicators. Figure 3-2 shows the rear-panel connectors and controls.

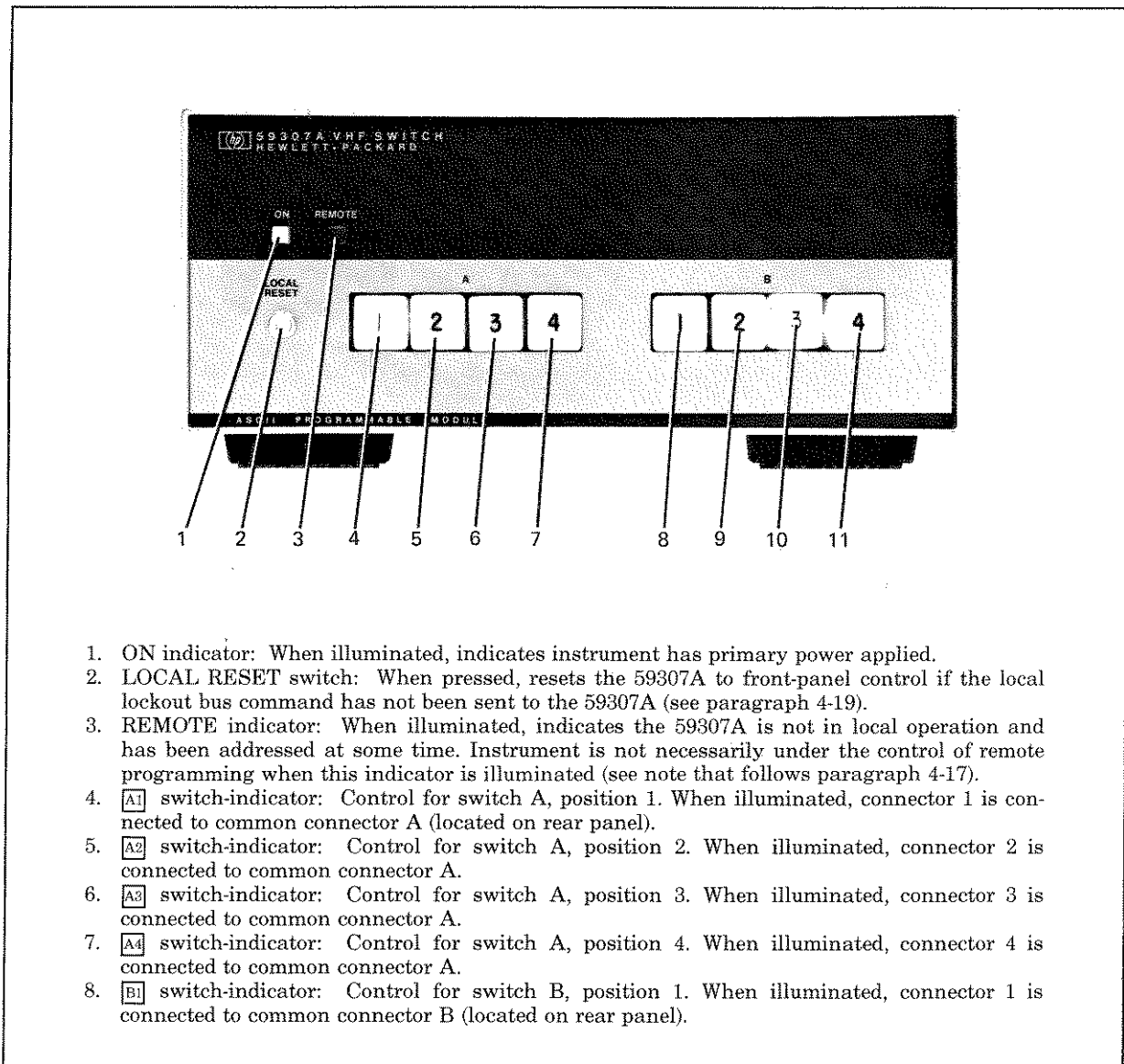
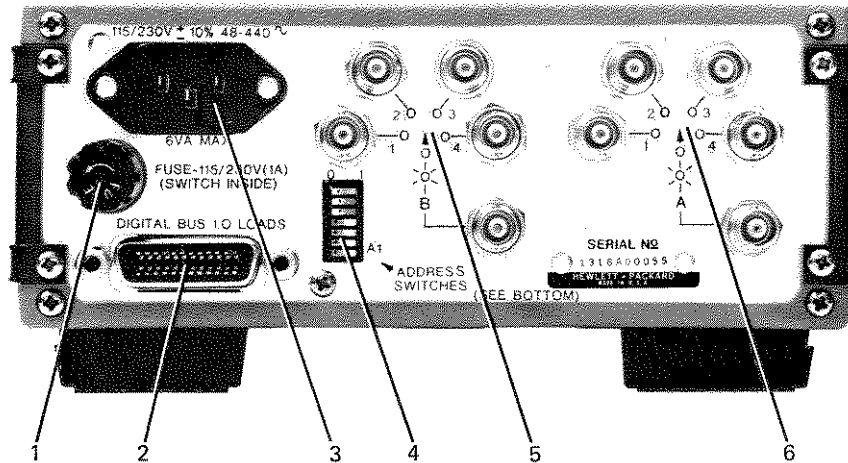


Figure 3-1. VHF Switch Front Panel

9. [B2] switch-indicator: Control for switch B, position 2. When illuminated, connector 2 is connected to common connector B.
10. [B3] switch-indicator: Control for switch B, position 3. When illuminated, connector 3 is connected to common connector B.
11. [B4] switch-indicator: Control for switch B, position 4. When illuminated, connector 4 is connected to common connector B.

Figure 3-1. VHF Switch Front Panel (Continued)



1. FUSE: A 0.5 amp slow-blow fuse is required for either 115-volt operation or 230-volt operation.
2. DIGITAL BUS I/O LOADS connector: A 24-pin connector used to convey data and programming instructions to the 59307A. The "I/O LOADS" label indicates that the instrument represents the normal allowable standard load for one instrument on the Interface Bus (see Table 1-2).
3. AC Input Connector: Ac power receptacle. IEC type with offset pin connected to the chassis. Accepts 115-volts or 230-volts  $\pm 10\%$ , 48 to 440 Hz. Maximum power draw is six volt-amperes.
4. Address Switches: The bottom five switches are used to assign an address code to the 59307A. Switches 6 and 7 are not used. Allowable codes and their ASCII equivalents are identified on the decal on the bottom panel, as follows:

A <sub>5</sub>	A <sub>4</sub>	A <sub>3</sub>	A <sub>2</sub>	A <sub>1</sub>	ASCII ADDRESS	A <sub>5</sub>	A <sub>4</sub>	A <sub>3</sub>	A <sub>2</sub>	A <sub>1</sub>	ASCII ADDRESS
0	0	0	0	0	SP	1	0	0	0	0	0
0	0	0	0	1	!	1	0	0	0	1	1
0	0	0	1	0	"	1	0	0	1	0	2
0	0	0	1	1	#	1	0	0	1	1	3
0	0	1	0	0	\$	1	0	1	0	0	4
0	0	1	0	1	%	1	0	1	0	1	5
0	0	1	1	0	&	1	0	1	1	0	6
0	0	1	1	1	'	1	0	1	1	1	7
0	1	0	0	0	(	1	1	0	0	0	8
0	1	0	0	1	)	1	1	0	0	1	9
0	1	0	1	0	.	1	1	0	1	0	:
0	1	0	1	1	+	1	1	0	1	1	;
0	1	1	0	0	,	1	1	1	0	0	<
0	1	1	0	1	-	1	1	1	0	1	=
0	1	1	1	0	/	1	1	1	1	0	>
0	1	1	1	1	/						

NOTE: DOT IN = 0, DOT OUT = 1

Figure 3-2. VHF Switch Rear Panel



5. Switch B Input/Output Connectors: Front-panel switch positions or remote programming determines the connection of connectors 1, 2, 3, or 4 to common connector B.
6. Switch A Input/Output Connectors: Front-panel switch positions or remote programming determines the connection of connectors 1, 2, 3, or 4 to common connector A.

Figure 3-2. VHF Switch Rear Panel (Continued)

### 3-5. PROGRAMMING

3-6. The 59307A operates in response to a specific set of programming codes. These codes, shown in Table 3-1, determine whether connectors 1, 2, 3, or 4 are connected to the appropriate common connector (A or B). The 59307A also responds to a set of special action codes. These codes, shown in Table 3-2, determine the operating state (i.e., local or remote) of the 59307A. A sample program depicting the use of both sets of codes is shown in Table 3-3.

#### NOTE

The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.

3-7. When the 59307A is switched to remote operation (as listed in Sequence 2, Table 3-3) switches A and B stay in the state they were in under LOCAL. If other states are desired, they must be programmed. When switched to LOCAL from REMOTE (as listed in Sequence 9, Table 3-3) switches A and B assume states indicated by the position of the front panel switches.

Table 3-1. Programming Codes

DIO Lines							ASCII Equiv.	59307A Response
7	6	5	4	3	2	1		
1	0	0	0	0	0	1	A	Programs instrument to connect one of the A group connectors 1, 2, 3, or 4 to common connector A. Specific connection depends on the succeeding code in program sequence.
1	0	0	0	0	1	0	B	Programs instrument to connect one of the B group connectors 1, 2, 3, or 4 to common connector B. Specific connection depends on the succeeding code in the program sequence.
0	1	1	0	0	0	1	1	These codes select which connector (1, 2, 3, or 4) is to be connected to the appropriate common connector A or B. For example, if an ASCII A is succeeded by an ASCII 2, connector 2 and common connector A are connected together.
0	1	1	0	0	1	0	2	
0	1	1	0	0	1	1	3	
0	1	1	0	1	0	0	4	

Table 3-2. Special Action Codes

Name	MRE	REN	DIO Lines							ASCII Equiv.	59307A Response
			7	6	5	4	3	2	1		
*Unlisten	L	H	0	1	1	1	1	1	1	?	Clears instrument as a listener.
Address Code	L	L	0	1	A <sub>5</sub> †	A <sub>4</sub> †	A <sub>3</sub> †	A <sub>2</sub> †	A <sub>1</sub> †		Addresses instrument as a listener which enables it to respond to data on DIO lines.
‡Local Lockout	L	L	0	0	1	0	0	0	1	DC1	Disables LOCAL RESET switch on front-panel. Unit responds to remote programming only.

\*The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.

†A<sub>5</sub> through A<sub>1</sub> must coincide with the code set on the 59307A address switches.

‡Local lockout is one of the Universal Commands used on the interface bus. (Refer to the HP Interface Bus User's Manual for a description of Universal Commands.) The 59307A responds to this command only when in remote operation. The primary use for the local lockout command is as a troubleshooting aid. The command is overridden by setting REN high.

Table 3-3. 59307A Programming Example

Sequence	Control Lines			DIO Lines ASCII Code	Description of Program Sequence
	BCL	REN	MRE		
1	H	H	L	?	Clears all listeners.
2	H	L	L	\$(see note)	59307A addressed to listen. Front-panel REMOTE indicator illuminates.
3	H	L	H	A	Activates switch A.
4	H	L	H	2	Switch A connects connector 2 to common connector A. Pushbutton A2 illuminates.
5	H	L	H	3	Switch A disconnects connector 2 and connects connector 3 to common connector A. Pushbutton A3 illuminates and pushbutton A2 extinguishes.
6	H	L	H	B	Activates switch B.
7	H	L	H	1	Switch B connects connector 1 to common connector B. Pushbutton B1 illuminates.
8	H	L	H	4	Switch B disconnects connector 1 and connects connector 4 to common connector B. Pushbutton B4 illuminates and pushbutton B1 extinguishes.
9	H	H	H		REN = H; 59307A reset to local control (front-panel pushbutton control switch positions). REMOTE light extinguishes.

Note: Bits 1 thru 5 must correspond with switch settings of address switch on rear panel.

# 59307A

## PROGRAMMING SUMMARY SHEET

**Possible Listen Addresses:** Any ASCII code of the form 01A<sub>5</sub>A<sub>4</sub>A<sub>3</sub>A<sub>2</sub>A<sub>1</sub> where A<sub>5</sub> - A<sub>1</sub> can be any combination of 1's & 0's other than 11111. A<sub>5</sub> - A<sub>1</sub> are set by address switches on the back panel of the 59307. 0=DOT IN, 1=DOT OUT on address switches.

**NOTE:** The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code. When the 59307A is switched to remote operation (as listed in Sequence 2 of programming example below) all the relays stay in the state they were in

under LOCAL. If other states are desired, they must be programmed. When switched to LOCAL from REMOTE, (as listed in Sequence 9 of programming example below) all relays assume states indicated by the position of the front panel switches.

**SPECIFICATIONS:**

**Electrical:** 1.0 Bus Loads; Relay settling time, 20 ms; Relay contacts, 0.5 amp at 28V; Power requirements, 115V or 230V ±10%, 50 to 400 Hz, 10 VA max.

### Special Action Codes

Name	MRE	REN	DIO Lines							ASCII Equiv.	59307A Response	
			7	6	5	4	3	2	1			
*Unlisten	L	H	0	1	1	1	1	1	1	1	?	Clears instrument as a listener.
Address Code	L	L	0	1	A <sub>5</sub> †	A <sub>4</sub> †	A <sub>3</sub> †	A <sub>2</sub> †	A <sub>1</sub> †			Addresses instrument as a listener which enables it to respond to data on DIO lines.
‡Local Lockout	L	L	0	0	1	0	0	0	0	1	DC1	Disables LOCAL RESET switch on front-panel. Unit responds to remote programming only.

\*The 59307A automatically unaddresses itself (clears its Listen FF) whenever MRE is low and the code present on the DIO lines is not its own listen address code.

†A<sub>5</sub> through A<sub>1</sub> must coincide with the code set on the 59307A address switches.

‡Local lockout is one of the Universal Commands used on the interface bus. (Refer to the HP Interface Bus User's Manual for a description of Universal Commands.) The 59307A responds to this command only when in remote operation. The primary use for the local lockout command is as a troubleshooting aid. The command is overridden by setting REN high.

### Programming Codes

7	6	DIO Lines					ASCII Equiv.	59307A Response
		5	4	3	2	1		
1	0	0	0	0	0	1	A	Programs instrument to connect one of the A group connectors 1, 2, 3, or 4 to common connector A. Specific connection depends on the succeeding code in program sequence.
1	0	0	0	0	1	0	B	Programs instrument to connect one of the B group connectors 1, 2, 3, or 4 to common connector B. Specific connection depends on the succeeding code in the program sequence.
0	1	1	0	0	0	1	1	These codes select which connector (1, 2, 3, or 4) is to be connected to the appropriate common connector A or B. For example, if an ASCII A is succeeded by an ASCII 2, connector 2 and common connector A are connected together.
0	1	1	0	0	1	0	2	
0	1	1	0	0	1	1	3	
0	1	1	0	1	0	0	4	



59307A Programming Example

Sequence	Control Lines			DIO Lines ASCII Code	Description of Program Sequence
	BCL	REN	MRE		
1	H	H	L	?	<p>Clears all listeners. 59307A addressed to listen. Front-panel REMOTE indicator illuminates.</p> <p>Activates switch A, deactivates switch B. Switch A connects connector 2 to common connector A. Pushbutton A2 illuminates.</p> <p>Switch A disconnects connector 2 and connects connector 3 to common connector A. Pushbutton A3 illuminates and pushbutton A2 extinguishes.</p> <p>Activates switch B, deactivates switch A. Switch B connects connector 1 to common connector B. Pushbutton B1 illuminates.</p> <p>Switch B disconnects connector 1 and connects connector 4 to common connector B. Pushbutton B4 illuminates and pushbutton B1 extinguishes.</p> <p>REN = H; 59307A reset to local control (front-panel pushbutton control switch positions). REMOTE light extinguishes.</p>
2	H	L	L	\$(see note)	
3	H	L	H	A	
4	H	L	H	2	
5	H	L	H	3	
6	H	L	H	B	
7	H	L	H	1	
8	H	L	H	4	
9	H	H	H		

Note: Bits 1 thru 5 must correspond with switch settings of address switch on rear panel.

Digital Bus Pin Summary

Digital Bus Connector Pin Number	Line Name	Use
1-4, 13-15	DIO1-7	Carries characters to 59307A for relay control or for processing as bus commands.
16	DIO8	Not monitored or driven, terminated by resistive network.
6	DAV	These three lines make up the "handshake" system on the HP Interface Bus. DAV is monitored and RFD and DAC are driven by 59307 to control rate of data transferred on DIO lines.
7	RFD	
8	DAC	
9	BCL	Unconditionally clears Listen F/F, halting remote operation. Does not return control to front panel pushbuttons.
11	MRE	Indicates to 59307 whether character on DIO lines is Bus command or for relay control.
17	REN	When low is one of the conditions necessary to put 59307 in REMOTE operation. When high 59307 is in local control.
5	EOI	Not monitored or driven, terminated by resistive network.
10	SRQ	Not monitored or driven, terminated by resistive network.
12	Shield	Not connected.
18-24	Grounds	Connected to chassis ground.

PROGRAMMING SUMMARY SHEET