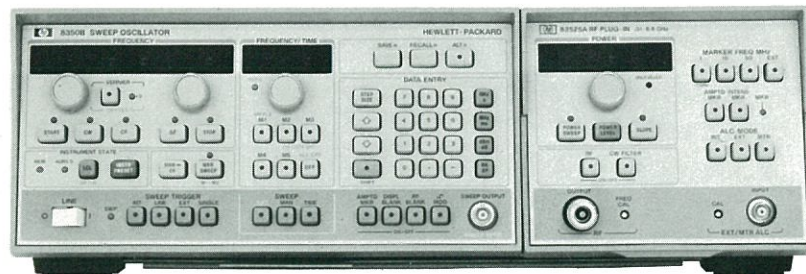


# OPERATING MANUAL

# 8350B SWEEP OSCILLATOR

PROPERTY OF  
ELECTRICAL ENGINEERING DEPARTMENT  
UNIVERSITY OF WATERLOO

INV NUMBER 1247





## SAFETY CONSIDERATIONS

### GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation. This product has been designed and tested in accordance with international standards.

### SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (refer to Table of Contents).



Indicates hazardous voltages.



Indicates earth (ground) terminal.

#### WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

#### CAUTION

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

### SAFETY EARTH GROUND

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

### BEFORE APPLYING POWER

Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

If this product is to be energized via an autotransformer make sure the common terminal is connected to the neutral (grounded side of mains supply).

### SERVICING

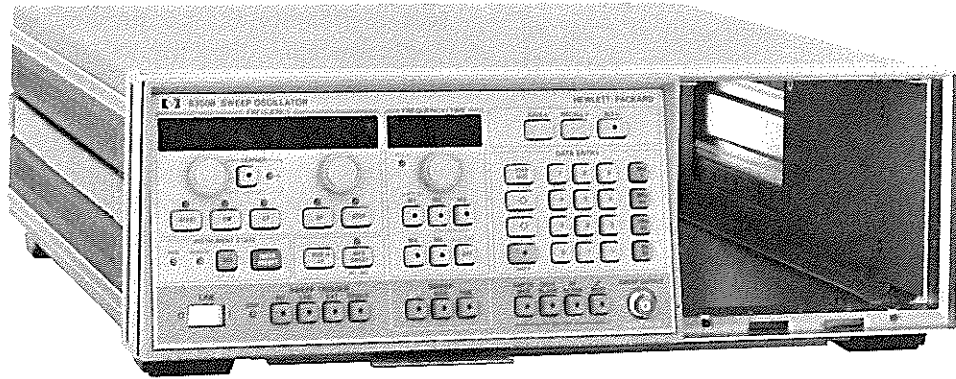
#### WARNING

*Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel.*

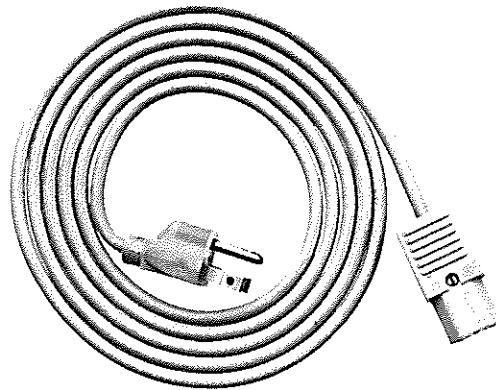
*Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.*

*Capacitors inside this product may still be charged even when disconnected from its power source.*

*To avoid a fire hazard, only fuses with the required current rating and of the specified type (normal blow, time delay, etc.) are to be used for replacement.*



HP 8350B SWEEP OSCILLATOR



POWER CABLE\*

\*POWER CABLE/PLUG SUPPLIED DEPENDS ON COUNTRY OF DESTINATION. REFER TO SECTION II FOR PART NUMBER INFORMATION.

Figure 1-1. Model 8350B Sweep Oscillator

## SECTION I GENERAL INFORMATION

### 1-1. INTRODUCTION

1-2. This Operating and Service Manual contains information required to install, operate, test, adjust, and service the Hewlett-Packard Model 8350B Sweep Oscillator. Figure 1-1 shows the Model 8350B and power cable.

1-3. This manual is divided into eight major sections which provide the following information:

- a. SECTION I, GENERAL INFORMATION, includes a brief description of the instrument, safety considerations, specifications, supplemental characteristics, instrument identification, options available, accessories available, and a list of recommended test equipment.
- b. SECTION II, INSTALLATION, provides information for initial inspection, preparation for use, battery information, rack mounting, storage, and shipment.
- c. SECTION III, OPERATION, consists of three subsections which contain general operating information, local operation information (non-HP-IB), and remote operation information (Programming Notes which provide information on HP-IB use of the Model 8350B).
- d. SECTION IV, PERFORMANCE TESTS, presents procedures required to verify that performance of the instrument is in accordance with published specifications. Performance Tests which are general to most RF plug-in units are given in the section. Performance Test limits and other special tests related to specific RF plug-ins are supplied in each RF plug-in Operating and Service Manual. Included is a Local and Remote Operation Verification procedure.
- e. SECTION V, ADJUSTMENTS, presents procedures required to properly adjust and

align the Model 8350B Sweep Oscillator mainframe after repair. Refer to the Operating and Service Manual of the specific RF plug-in used for adjustments related to the RF plug-in.

- f. SECTION VI, REPLACEABLE PARTS, provides information required to order all parts and assemblies.
- g. SECTION VII, MANUAL BACKDATING CHANGES, provides backdating information required to make this manual compatible with earlier shipment configurations.
- h. SECTION VIII, SERVICE, provides an overall instrument block diagram with troubleshooting and repair procedures. Each assembly within the instrument is covered on a separate Service Sheet which contains a circuit description, schematic diagram, component location diagram, and troubleshooting information to aid the proper maintenance of the instrument.

1-4. Supplied with this manual is an Operating Information Supplement. This is simply a copy of the first three sections of the manual which should be kept with the instrument for use by the instrument operator.

1-5. On the front cover of this manual is a "Microfiche" part number. This number may be used to order 10- by 15-centimeter (4- by 6-inch microfilm transparencies of the Manual. Each microfiche contains up to 60 photo duplicates of the manual pages. The microfiche package also includes the latest Manual Changes sheet as well as all pertinent Service Notes.

1-6. Refer any questions regarding this manual, the Manual Changes sheet, or the instrument to the nearest HP Sales/Service Office. Always identify the instrument by model number, complete name, and complete serial number in all correspondence. Refer to the inside rear cover of this manual for a worldwide listing of HP Sales/Service Offices.

Table 1-1. Model 8350B Specifications (1 of 2)

**SPECIFICATIONS**  
**8350B SWEEP OSCILLATOR**  
 (with RF Plug-in installed)

**FREQUENCY CONTROL FUNCTIONS**

**Range:** Determined by RF plug-in unit used.

**Linearity:** Refer to RF plug-in unit specifications.

**START/STOP Sweeps:** Sweeps up from the START frequency to the STOP frequency.

**Range:** START and STOP parameters are independent, fully calibrated, and continuously adjustable over the entire frequency range. STOP frequency must be greater than or equal to START frequency.

**CF/ $\Delta$ F Sweep:** Sweeps symmetrically upward in frequency, centered on the CF (Center Frequency) setting.

**$\Delta$ F:** Frequency width of sweep. Continuously adjustable from zero to 100% of frequency range. START/STOP and CF/ $\Delta$ F modes can be interchanged without affecting RF output.

**$\Delta$ F Accuracy:** Refer to RF plug-in unit specifications.

**CF Accuracy:** Refer to RF plug-in unit specifications.

**CF Resolution:** 0.00038% of band (262,144 points across band).

**$\Delta$ F Resolution:** 0.1% of freq band (1024 points across band); 0.012% of freq band for  $\frac{1}{8}$  band or less (8192 points across band); 0.0015% of freq band for  $\frac{1}{64}$  band or less (16,384 points across band).

**Display Resolution:** 5 digits maximum.

**CW Operation:** Single frequency RF output. When changing between CF/ $\Delta$ F and CW mode, the CW frequency and the Center Frequency (CF) are equivalent.

**CW Accuracy:** Refer to RF plug-in unit specifications.

**CW Resolution:** 0.00038% of freq band (262,144 points across band).

**Vernier:** Adjusts CW frequency of swept range up to  $\pm 0.05\%$  for continuous adjustment. The  $\neq 0$  LED is on whenever a vernier adjustment value is present.

**Vernier Resolution:** Same as CW resolution.

**Offset:** Allows the CW frequency or center frequency of swept range to be offset by any amount up to the full range of the RF plug-in. After entering an offset and returning the displays to the previous mode, the  $\neq 0$  LED will be on indicating that an offset is present; however, the display will remain unchanged.

**Resolution:** Same as CF.

**Accuracy:** Refer to RF plug-in unit specifications.

**Frequency Markers:** Five frequency markers are independently adjustable and fully calibrated over the entire sweep range. Front panel key provides for the selection of either amplitude or intensity markers. The last marker engaged is the active marker and is the one modifiable by the control knob, step keys, keyboard or remote control.

**Resolution:** 0.4% of selected sweep width (256 points/sweep).

**Accuracy:** Refer to RF plug-in unit specifications.

**Marker Output:** Negative rectangular pulse available from the POS Z BLANK connector on the rear panel. Refer to Table 1-2.

**Marker Sweep:** RF output is swept between Marker 1 and Marker 2 frequency values. The Marker 1 and Marker 2 frequency values can be entered as permanent sweep values with the SHIFT key. Pressing MKR SWEEP again returns the instrument to the last START/STOP values.

Table 1-1. 8350B Specifications (2 of 2)

**Marker→CF:** Marker-to-Center Frequency function causes the CW or Center Frequency (CF) of the sweep output to equal the frequency of the active marker.

### SWEEP AND TRIGGER MODES

**Internal:** Sweep recurs automatically.

**Line:** Sweep triggered by ac power line frequency.

**External Trigger:** Sweep is actuated by an external trigger signal applied to pin 9 of the rear panel Programming Connector on the rear panel. Trigger signal must be  $> +2$  Vdc, wider than 0.5  $\mu$ s, and not greater than 1MHz in frequency.

**Single:** Selects mode and triggers/aborts a single sweep.

**Sweep Time:** Continuously adjustable from 10 ms to 100 seconds. Minimum sweep time may be more than 10 ms depending upon the specific RF plug-in used and the bandwidth swept.

**Manual Sweep:** Front panel controls (knobs, keyboard, and step keys) provide continuous manual adjustment of frequency between end frequencies set in any of the sweep functions. Resolution is 0.1% of selected sweep width (980 points across sweep).

**External Sweep:** Sweep is controlled by a zero to +10 volt sweep ramp external signal applied to the front or rear panel SWEEP OUTPUT/SWEEP INPUT connectors. Resulting RF Output frequency accuracy will be a function of input sweep ramp accuracy and linearity.

**Sweep Output:** Positive-going, direct-coupled sawtooth at front and rear panel SWEEP OUTPUT/SWEEP INPUT connectors, concurrent with swept RF output. In CW mode, dc output is proportional to the RF plug-in unit full-band frequency. Refer to Table 1-2.

### MODULATION CHARACTERISTICS

**External AM:** Refer to RF plug-in unit specifications. Rear panel BNC connector.

**Internal AM:** Square wave modulation available at all sweep speeds through front panel control. Refer to RF plug-in for On/Off ratio specifications. Refer to Table 1-2 for frequency characteristics.

**External FM:** Refer to RF plug-in unit specifications. Rear panel BNC connector.

### GENERAL SPECIFICATIONS

#### Blanking

**RF Blanking:** when enabled, RF automatically is turned off during retrace and remains off until the start of next sweep.

**Display Blanking:** POS Z BLANK; direct-coupled, positive rectangular pulse during retrace and bandswitch points of sweep. Negative intensity marker signals are also output through this connector. NEG Z BLANK; direct-coupled, negative rectangular pulse during retrace and bandswitch points of sweep. Both are rear panel BNC outputs. Refer to Table 1-2.

**Pen Lift:** Output to control the pen lift function of an X-Y recorder. Refer to Table 1-2 for maximum sink current rating.

**Counter Trigger (CNTR TRIG):** Output for controlling the external trigger input of the HP 5343A Microwave Frequency Counter. Rear panel BNC connector.

**Stop Sweep:** Input for stopping the progress of a forward sweep. Rear panel BNC connector.

Table 1-2. Model 8350B Supplemental Characteristics (1 of 2)

**SUPPLEMENTAL CHARACTERISTICS**  
**8350B SWEEP OSCILLATOR**  
 (with RF Plug-in installed)

**INPUT/OUTPUT SIGNAL CHARACTERISTICS**

**Frequency Marker Output:** Intensity markers are available from the POS Z BLANK connector on the rear panel. The markers are -4 volt rectangular pulses with the exception of the active marker, which is a -8 volt pulse. Source impedance is approximately 1000 ohms.

**External Sweep:** Sweep is controlled by an External Sweep Input signal applied to the front or rear panel SWEEP OUTPUT/SWEEP INPUT connectors. The External Sweep Input must be zero volts at start of sweep, increasing linearly to +10 volts at the end of sweep.

**Sweep Output:** Direct-coupled sawtooth, zero to approximately +10 volts, at front and rear panel SWEEP OUTPUT/SWEEP INPUT connectors concurrent with swept RF output. Zero volts at start of sweep, approximately +10 volts at end of sweep, regardless of sweep width. In CW mode, dc output is proportional to the RF plug-in unit full-band frequency. In SHIFT CW mode, a 0 to +10 volt ramp is output, regardless of CW frequency.

**MODULATION CHARACTERISTICS**

**Internal AM:** Square wave modulation available at all sweep speeds. Factory preset to 27.8 kHz although selectable (via internal jumper) to 1000 Hz or 27.8 kHz. Refer to RF plug-in for On/Off ratio specifications.

**INSTRUMENT CONTROL**

**Control Knobs, Step Keys, and Data Entry Keyboard:** All instrument parameters, whether time, frequency, or power, may be set in three ways. The control knobs allow for continuous adjustment of any parameter. An exact function value can be entered through the Data Entry Keyboard. For incrementing or decrementing power or frequency values, the Step Keys (Step Up/Step Down) can be used. The step size can be changed from the pre-programmed default values by pressing [STEP SIZE], enter the desired step size value on the Data Entry

Keyboard, and terminate the command with the GHz, MHz, or dBm key as appropriate. The SHIFT key is used to effect the function written in blue on the front panel.

**INSTRUMENT STATE STORAGE**

**SAVE n/RECALL n:** Up to 9 different front panel settings can be stored in the 8350B via the SAVE n (n=1 through 9) function. Instrument settings are stored in memory locations 1 through 9 and can be recalled randomly or in sequence (1, . . . . 9, 1, . . . .) with Step Up/Step Down keys or by contact closure to ground of the Step Up Advance (pin 22 on the rear panel Programming Connector). All Save registers may be write protected (locked) by pressing [SHIFT] [SAVE<sub>n</sub>]. This command makes it impossible to change the contents of the memory registers until they are unlocked by pressing [SHIFT] [RECALL<sub>n</sub>]. The locked/unlocked register status is retained even with ac power off.

**ALT n:** The ALT n function causes the RF output to alternate on successive sweeps between the current front panel setting and the setting stored in memory location n (n=1 through 9).

**INSTRUMENT STATE**

**Instrument Preset:** The Instrument Preset [INSTR PRESET] key sets the 8350B into the following predetermined state: the RF output is swept over the full frequency range of the RF plug-in at the specified maximum power level (an RF OFF condition can be selected by a pre-settable configuration switch located within the RF plug-in), the internal square wave AM is off, and the frequency markers are off. Instrument Preset also causes an internal analog and digital self-test to occur. If certain internal errors or failures are detected during the self-test or during normal operation of the 8350B, they are indicated via error code messages in the form of "Ennn" (where n=0 through 9) read from the left FREQUENCY display.



Table 1-2. Model 8350B Supplemental Characteristics (2 of 2)

**Local Operation:** The Local (LCL) key is used to return the 8350B to local control from the remotely controlled state. The REM LED indicates when the 8350B is being controlled remotely. The ADRS'D LED indicates when data is being transmitted or received over the HP-IB.

### REMOTE PROGRAMMING (HP-IB)

**Instrument Control:** All front panel controls except the line power switch may be controlled or programmed remotely. The 8350B is fully compatible with the HP-IB. The 8350B has both input and output capability, providing complete control of the instrument state. The HP-IB address can be displayed on the front panel and is selectable by the user from 0 to 30. Refer to Table 2-3 for a listing of HP-IB address codes.

#### HP-IB Functions

**Input Mode Functions:** All front panel controls except the ac power line switch are programmable. Functions that require numerical values typically have greater entry resolution than is displayed. Several special HP-IB functions are provided that are not available from the front panel.

**Frequency Resolution:** Same as  $CF/\Delta F$ .

**Power Resolution:** Refer to RF plug-in unit specifications.

**Output Mode Functions:** The 8350B can output to a controller an instrument state message that completely describes the present instrument status (sweep mode, trigger mode, etc.) and can supply the present numerical value of any function (sweep time, marker frequencies, power levels, start/stop frequencies, etc.).

### GENERAL

#### Nonvolatile Memory

Continuous memory that retains the contents of all instrument state storage registers and the HP-IB address along with the current instrument state when the ac power is turned off for approximately 20 days.

#### Display Blanking Outputs

**POS Z BLANK:** Direct-coupled rectangular pulse approximately +5 volts during retrace and bandswitch points of sweep. Intensity marker signals are also output through this rear panel BNC connector. Marker signals are -4 volt pulses with the exception of the active marker which is -8 volts.

**NEG Z BLANK:** Direct-coupled rectangular pulse approximately -5 volts during retrace and bandswitch points of sweep. No markers are output from this rear panel BNC connector.

**Pen Lift Output:** Output to control the pen lift function of an X-Y recorder. Maximum sink current is approximately 600 ma.

**Rear Panel Programming Connector:** Additional control of and information on the 8350B instrument state is provided via a 25-pin rear panel connector. Output signals such as display and RF blanking, X-Y recorder pen lift, HP 8410B and HP 5343A interface signals. Input signals affect the sweep status, display and RF blanking, pen lift outputs, etc. Refer to Figure 2-7 for a complete listing of signals and voltages on the rear panel Programming Connector.

**8410B Interface Cable:** Permits multi-octave operation of HP 8410B Network Analyzer with the 8350B (order HP Part Number 08410-60146). Connects between 8410B rear panel SOURCE CONTROL and 8350B rear panel PROGRAMMING CONNECTOR.

**Furnished:** 2.29m (7.5 foot) power cable with NEMA plug.

**Operating Temperature Range:** 0°C to +55°C.

**Power:** 100, 120, 220, or 240 volts, +10% -10%, 50 to 60 Hz (Option 400; 60 to 400 Hz). Approximately 270 volt-amps including RF plug-in unit (depends upon specific RF plug-in unit used).

**Weight:** (not including RF plug-in unit): Net 16.5 kg (36.4 lb) Shipping 22.7 kg (50 lb).

**Dimensions:** 425 mm Wide, 133.3 mm High, 422 mm Deep (16.75 x 5.25 x 16.6 in).

## 1-7. SPECIFICATIONS

1-8. Listed in Table 1-1 are the specifications for the Model 8350B Sweep Oscillator. These specifications are the performance standards, or limits, against which the instrument may be tested. Only the specifications for the Model 8350B Sweep Oscillator mainframe are given in this manual. Refer to the Operating and Service Manual for the specific RF plug-in used for complete specifications relating to the RF plug-in. Table 1-2 lists the sweep oscillator supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included as additional information for the user.

## 1-9. SAFETY CONSIDERATIONS

### 1-10. General

1-11. This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation. This product has been manufactured and tested in accordance with international safety standards.

### 1-12. Safety Symbols

1-13. A complete listing of the safety symbols used in this manual is given on the page preceding Figure 1-1. Included are descriptions of symbols which refer the operator to the manual from the instrument, Protective Earth Ground, Frame or Chassis Terminals, Warning, and Caution symbols.

### 1-14. INSTRUMENTS COVERED BY MANUAL

1-15. Attached to the rear panel of the instru-

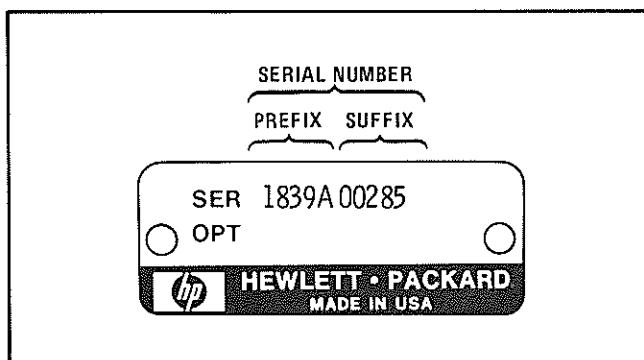


Figure 1-2. Typical Serial Number Plate

ment is a serial number plate. A typical serial number plate is shown in Figure 1-2. The serial number is in two parts. The first four digits followed by a letter comprise the serial number prefix. The last five digits form the sequential suffix that is unique to each instrument. The content of this manual applies directly to instruments having the same serial number prefix as those listed on the title page of this manual under SERIAL NUMBER.

1-16. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. An unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for the instrument is then supplied with a Manual Changes supplement that contains information that documents the differences.

1-17. In addition to change information, the Manual Changes supplement contains information for correcting errors in the manual. To keep this manual as current as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to the manual's print date and part number, both of which appear on the title page. Complimentary copies of the Manual Changes supplement are available on request from Hewlett-Packard.

1-18. For information concerning a serial number prefix that is not listed on the title page or in the Manual Changes Supplement, contact your nearest Hewlett-Packard Sales/Service Office.

### 1-19. DESCRIPTION

1-20. The Hewlett-Packard Model 8350B Sweep Oscillator, together with an RF plug-in unit, forms a complete, solid-state, swept signal source. The Model 8350B can be used with network analyzer systems such as the HP Model 8410B Network Analyzer, the HP Model 8755 Frequency Response Test Set, the 8756A Scalar Network Analyzer, and the HP Microwave Link Analyzers to provide a complete measurement system.

1-21. The front panel of the Model 8350B has been conveniently laid out to optimize the use of instrument operation function blocks. Fre-

quency modes, sweep modes, marker operation, storage register control, and data entry controls are individually grouped for ease of operation and full control versatility on the Model 8350B Sweep Oscillator.

1-22. When the INSTRUMENT PRESET pushbutton is selected, the instrument automatically goes through an internal self check routine to verify proper instrument operation. If certain errors or failures are detected during the self test or in normal operation, they are indicated via error codes displayed on the far left digital display. An INSTRUMENT PRESET condition is then set which automatically presets the sweep oscillator to full RF plug-in band sweep operation.

### 1-23. Accurate High Resolution Data Entry

1-24. Accurate, high resolution digital displays indicate all major function values. Function values may be set by activating the appropriate pushbutton and using the corresponding knob, step keys, or data entry keyboard to enter the desired values.

### 1-25. Sweep and Trigger Modes

1-26. The sweep may be triggered INTERNALLY, through ac power LINE frequency, EXTERNALLY, or in SINGLE sweep operation. SWEEP TIME is continuously variable from 10 ms to 100 seconds. (Minimum sweep time may be greater than 10 ms depending upon the specific RF plug-in used and the bandwidth being swept). A MANUAL SWEEP function allows the data entry controls to provide continuous manual adjustment of frequency between the end frequencies set in any of the sweep functions. A direct coupled sawtooth sweep ramp, zero to approximately 10 volts, is available through both front and rear panel SWEEP OUTPUT/SWEEP INPUT BNC connectors.

### 1-27. START/STOP Mode

1-28. The START/STOP frequency sweep mode, selected upon Instrument Preset, is indicated by yellow LEDs located above the selected operation pushbuttons. In this mode the Model 8350B sweeps up from the START frequency to the STOP frequency. START and STOP frequencies are indicated on the FRE-

QUENCY LED displays. START frequency or STOP frequency may then be changed through the use of the data entry or RPG controls.

### 1-29. CW Mode

1-30. When CW (Continuous Wave) mode is selected, the instrument is tuned to a single frequency RF Output, indicated on the FREQUENCY LED display. CW mode operation is indicated by the yellow LED located above the CW pushbutton. CW frequency, when enabled, may be varied through the use of the data entry or RPG controls. When the SHIFT CW mode is selected, a 0 to 10 volt sweep ramp will be output at the front and rear panel SWEEP OUTPUT/SWEEP INPUT BNC connectors, even though the RF frequency is fixed in the CW mode.

### 1-30A. Fine/Coarse CW Control Knob Resolution

1-30B. The CW control knob resolution may be increased from 0.0015% of band (16,384 points across band) to 0.00038% of band (262,144 points across band) by pressing [SHIFT] [ΔF]. To return to coarse control knob resolution press [SHIFT] [CF]. The resolution of HP-IB entries and entries using the data entry keyboard are both 0.00038% of band (CW hardware resolution). Due to display resolution limitations, small changes to CW frequency may not be shown in the CW Frequency display. The CW Vernier mode will allow small changes in CW Frequency to be displayed.

### 1-31. CF/ΔF Mode

1-32. The CF/ΔF frequency sweep mode allows the instrument to sweep upward in frequency, symmetrically centered about a CF (Center Frequency) setting. CF/ΔF sweep mode operation is indicated by the yellow LEDs centered above the CF and ΔF pushbuttons. CF and ΔF frequencies may be individually varied through use of the data entry or RPG controls. START/STOP and CF/ΔF sweep modes may be interchanged without affecting the RF Output. When changing between CF/ΔF sweep mode and CW mode, the CW frequency and the Center Frequency (CF) are equivalent.

### 1-33. Frequency Marker Operation

1-34. Five independent, continuously variable, amplitude or intensity markers are available to

note significant points on the frequency sweep. Marker selection is indicated by a yellow LED located within each Marker pushbutton. Marker frequency is indicated on the FREQUENCY/TIME LED display. The frequency difference between any two markers can be displayed by the MKRA function. A MKR SWEEP function allows a frequency sweep using Marker 1 and Marker 2 as the START/STOP frequency limits while maintaining the original START/STOP values. For greater accuracy, marker frequencies can also be counted directly using the HP Model 5343A Microwave Frequency Counter. The sweep is momentarily stopped allowing the counter to measure the START, STOP, or activated marker frequency.

### 1-35. Instrument State Storage

1-36. Up to 9 different front panel settings can be stored and recalled in the Model 8350B via the SAVEn (n = through 9) function. The ALTn function causes the RF Output to alternate on successive sweeps between the current front panel setting and the setting stored in the recalled memory location (n = 1 through 9). This allows the Model 8350B to work in conjunction with the HP Model 8755 Frequency Response Test Set or HP Model 8756 Scalar Network Analyzer to perform two simultaneous measurements utilizing different sweep widths and/or power levels.

### 1-37. Modulation Characteristics

1-38. The Model 8350B is capable of internally square wave modulating the RF Output at a 27.8 kHz or 1 kHz (selected by an internal jumper) modulation frequency, as controlled by the front panel  $\square$  MOD key. The RF Output may also be Amplitude or Frequency modulated by an external source via the Model 8350B Sweep Oscillator rear panel inputs.

### 1-39. Remote Programming (HP-IB)

1-40. All front panel controls, except the line power switch, may be controlled or programmed remotely via the rear panel HP-IB interface connector. The Model 8350B can also output to a controller an instrument state message that completely describes the current instrument status (sweep mode, trigger mode, etc.) and can supply the present numerical value of any function (sweep time, marker frequencies, power levels, START/STOP frequencies, etc.)

### 1-41. Other Features

1-42. The Model 8350B also provides RF output blanking during sweep retrace and rear panel positive and negative polarity display blanking outputs for re trace and bandswitching points of sweep. A rear panel PEN LIFT output generates a pulse which is coincident in time with the endpoints of the sweep. A COUNTER TRIGGER output and STOP SWEEP input are also available on the rear panel to interface with the HP Model 5343A Microwave Frequency Counter. A 25-pin rear panel Programming Connector provides additional control of and information on the Model 8350B instrument state. A listing of pin configuration and signals on the Programming Connector is given in Figure 2-7. Output signals on the Programming Connector supplement other rear panel output signals such as display and RF blanking, X-Y recorder penlift, and HP Model 8410B and HP Model 5343A interface signals. Input signals on the Programming Connector affect the sweep status, display and RF blanking, penlift outputs, etc.

#### 1-42A. Displayed Frequency Multiplier

1-42B. The frequency information of the 8350B front panel display may be modified by entering a numeric multiplication factor with the command [n] [SHIFT] [M4]. The displayed frequency information now reflects the actual RF frequencies produced by an external harmonic multiplier.

#### 1-42C. Displayed Frequency Offset

1-42D. The frequency information on the 8350B front panel display may be modified by entering a numeric offset value with the command [n] [SHIFT] [M5]. The displayed frequency information may now reflect the actual RF frequencies produced by an external upconverter.

1-43. To have a complete operating unit, the Model 8350B Sweep Oscillator must be used in conjunction with an RF plug-in unit which operates in the desired frequency range. The HP Model 83500 Series RF Plug-in units have been specifically designed for use with the Model 8350. With the addition of the Model 11869A RF Plug-in Adapter, the HP Model 86200 Series RF Plug-ins may also be used with the Model 8350B.

**1-44. Nonvolatile Memory**

1-45. The Model 8350B has a nonvolatile memory which retains the contents of all instrument state storage registers, the current instrument state, and the HP-IB address. The nonvolatile memory on the A3 microprocessor board is supported by the battery pack BT1 inserted in a battery holder with a battery hold down clamp. When fully charged, the batteries will retain a sufficient charge to hold the memory contents for approximately 20 days. The batteries are charged within the instrument and a full charge is maintained when the instrument LINE switch is ON. When fully discharged, the batteries typically take approximately 30 hours to obtain a full charge.

1-46. The part numbers for battery pack, battery holder, and hold down clamp are listed in the replaceable parts list in Section VI of the manual.

**1-47. OPTIONS****1-48. Option 400, 400 Hz AC Power Operation**

1-49. The standard Model 8350B requires that the ac power line frequency be 50 to 60 Hz. Option 400 allows the instrument to operate with a 400 Hz ac power line frequency.

**1-49A. Option 803, 5343A Interface Cables**

1-49B. Option 803 contains two interface cables (HP Part Numbers 08350-60039 and 08350-60040) used to interface the 8350B with the 5342A Frequency Counter for making frequency measurements while in the swept mode. Refer to Section III Local Operation for a detailed explanation of this feature.

**1-49C. Option 850, 8410B Interface Cable**

1-49D. Option 850 contains the Source Control Cable (HP Part Number 08410-60146) used to synchronize the 8350B and 8410B Network Analyzer when making multi-octave magnitude and phase measurements. Refer to Section III Local Operation for a detailed explanation of this feature.

**1-50. Option 907, Front Handles Kit**

1-51. Option 907, HP Part Number 5061-0089, contains a pair of front handles and the necessary hardware for mounting the handles to the Model 8350B. Refer to Section II of this Operating and Service Manual for a detailed description of this kit and instructions for installation.

**1-52. Option 908, Rack Mount Kit**

1-53. Option 908, HP Part Number 5061-0077, contains a pair of flanges and the necessary hardware to mount the Model 8350B in an equipment rack with 482.6 mm (19 inches) horizontal spacing. Refer to Section II of this Operating and Service Manual for a detailed description of this kit and instructions for installation.

**1-54. Option 909, Rack Mount/Front Handles Kit**

1-55. Option 909, HP Part Number 5061-0083, contains one Option 907 Front Handles Kit and one Option 908 Rack Mount Kit (see descriptions in preceding paragraphs). Refer to Section II of this Operating and Service Manual for a detailed description of this kit and instructions for installation.

**1-56. Option 910, Extra Operating and Service Manual**

1-57. The standard instrument is supplied with one Operating and Service Manual. Each Option 910 provides one additional Operating and Service Manual. To obtain additional Operating and Service Manuals after initial shipment, order by manual part number, listed on the title page and rear cover of this manual.

**1-58. ACCESSORIES SUPPLIED**

1-59. Figure 1-1 shows the Model 8350B and power cable. The power cable supplied depends upon the country of destination. Refer to Section II of this manual for HP Part Number information.

**1-60. EQUIPMENT REQUIRED BUT NOT SUPPLIED**

1-61. To have a complete operating sweep oscillator, the Model 8350B Sweep Oscillator

must have an RF plug-in unit installed. The HP 83500 Series RF Plug-ins have been specifically designed for use with the Model 8350. They provide calibrated output power levels, calibrated power sweeps, internal leveling and slope control, and full HP-IB programmability. Economical use of the HP Model 86200 Series RF Plug-ins may be utilized with the Model 8350B with the addition of the HP Model 11869A RF Plug-in Adapter. The Model 11869A mounts at the rear of the Model 86200 Series RF Plug-in and provides the interface for signals and voltages from the Model 8350B to the RF plug-in. All of the Model 8350B standard operating features including HP-IB remote programming are available, however specific RF plug-in functions (output power level, RF on/off, etc.) cannot be controlled or remotely programmed by the Model 8350B mainframe.

1-62. To use the HP-IB capabilities of the Model 8350B, a computing controller such as the HP 9825 Desktop Computer or the HP 85 Personal Computer is needed.

### 1-63. EQUIPMENT AVAILABLE

#### 1-64. Service Accessories

1-65. Service Accessory Kit (HP Part Number 08350-60020) is available for servicing the 8350B and 83500-series RF plug-ins. The accessory kit includes:

- Two 44-pin printed circuit board extenders. The HP Part Number for each extender is 08350-60031. These boards have keyed slots which allow them to be used in troubleshooting the Model 83500-series RF Plug-ins as well.
- An RF Plug-in extender cable set that provides all electrical connections when the RF Plug-in is removed from the sweep oscillator. The RF Plug-in Interface Connector is extended by one cable (HP Part Number 08350-60034) and the Power Supply Interface connector is extended by the other cable (HP Part Number 08350-60035).
- One hex Balldriver (HP Part Number 8710-0523). Used to remove the hold down plate hex screws from the front panel when repair is necessary.

- One 16-pin I.C. Test Clip (HP Part Number 1400-0734) and one 20-pin I.C. Test Clip (HP Part Number 1400-0979) are provided as an aid for probing Integrated Circuits when troubleshooting.

### 1-66. Model 8410B/8411A Network Analyzer

1-67. The Model 8350B Sweep Oscillator is compatible with the HP Model 8410B Network Analyzer system. The combination of the Model 8410B Network Analyzer, the Model 8411A Frequency Converter, and an appropriate display plug-in forms a phasemeter and ratiometer for direct phase and amplitude ratio measurement on RF voltages. These measurements can be made on single frequencies and on swept frequencies from 110 MHz to 18GHz. Several RF plug-in units for the Model 8350B are capable of multi-octave sweeps in this range. The Model 8410B has an Auto-Frequency range mode which gives it the capability of automatically tracking the Model 8350B Sweep Oscillator over octave and multi-octave frequency bands. Two interconnections to the Model 8350B are necessary to ensure that the Model 8410B will phase lock properly. The Model 8410B Source Control Cable (HP 08410-60146) connects the Model 8410B rear panel SOURCE CONTROL connector to the Model 8350B rear panel PROGRAMMING CONNECTOR. Additionally, the sweep oscillator RF plug-in 1V/GHz output connects to the Model 8410B rear panel FREQ REF INPUT. The model 8410B Source Control Cable connector pins and signals are illustrated in Table 1-3.

### 1-68. Model 8755 Frequency Response Test Set

1-69. The Model 8350B Sweep Oscillator is compatible with the Model 8755 Frequency Response Test Set for broadband swept scalar measurements. The Model 8350B provides internal 27.8kHz square wave modulation of the RF output eliminating unnecessary cable connections to the Model 8755 or the use of an external modulator. The Model 8350B can also produce alternate sweeps through use of the ALT n function which works in conjunction with the channel switching circuits in the Model 8755C (this does not apply to 8755A or 8755B series instruments). This permits Channel 1 on the Model 8755C to respond only to the Model 8350B current state and Channel 2 to the alter-

nate state. A single cable (HP Part Number 8120-3174) connects between the Model 8350B rear panel ALT SWP INTERFACE connector and the Model 8755C front panel ALT SWP INTERFACE connector.

**1-70. Model 8756 Scalar Network Analyzer**

1-71. The Model 8350B Sweep Oscillator is compatible with the HP 8756 Scalar Network Analyzer for broadband swept scalar measurements. The 8756 operates in the RF and microwave frequency ranges depending on the detector used. The 8756 utilizes a versatile digitized CRT and employs built-in storage and normalization features. The 8756 CRT simultaneously displays swept scalar information, a softkey menu, channel number, mode of operation, scale factor, and reference level information of selected channel(s). The 8756 is equipped with advanced HP-IB interfacing capabilities which allows it to display the 8350B START and STOP frequencies as well as the above men-

tioned information. The 8756 HP-IB features also allow the user to control many 8350B functions directly from the 8756 front panel. The Model 8350B provides internal 27.8kHz square wave modulation of the RF output thereby eliminating the use of an external modulator.

**1-72. Power Meters and Crystal Detectors**

1-73. Depending upon the RF plug-in unit used, the RF output can be externally leveled using the HP Model 432 Power meter or negative polarity output crystal detectors. Refer to the Operating and Service Manual of the specific RF plug-in used for detailed information on leveling systems that may be used with the Model 8350B/RF Plug-in combination.

**NOTE**

**The Model 435A and 436A Power Meters should not be used in Model 8350B external leveling systems.**

*Table 1-3. Model 8410B Source Control Cable*

8410B Source Control Cable - HP Part Number 08410-60146				
Mnemonic	Description	8350A Connector Pin (25-pin D Type Male HP Part No. 1251-0063)	8410B Connector Pin (14-pin Micro Ribbon Male HP Part No. 1251-0142)	Wire Color Code
L SSRQ/ L BPRQ	Low=Stop Sweep Request/ Low=Blanking Pulse Request	18/20	7	905
SYNC TRG	High = Synchronizing Trigger	24	1	901
GND DIG	Digital Ground	19	11	90

^

Table 1-4. Recommended Test Equipment<sup>1</sup> (1 of 4)

Instrument	Critical Specifications	Recommended Model	Use <sup>2</sup>
Spectrum Analyzer	Frequency Range: 0.01 to 22 GHz Residual FM: $\leq 100$ Hz Must have auxiliary IF output when used with the HP 8901A Modulation Analyzer.	HP 8565A	P,T
Oscilloscope	Dual channel X vs. Y display mode Sensitivity: $\leq 0.1 \mu\text{S}/\text{DIV}$ Horizontal Sweep Rate: $\leq 0.1 \mu\text{S}/\text{DIV}$	HP 1740A	P
Display Mainframe	Compatible with HP 8755C Swept Amplitude Analyzer and HP 8750A Storage-Normalizer	HP 182T, 180TR	P
Swept Amplitude Analyzer	Capable of transmission measurements Power Resolution: $\leq 0.25 \text{ dB}/\text{DIV}$	HP 8755C	P
Detector	Compatible with Swept Amplitude Analyzer Frequency Range: 0.01 to 12.4 GHz Power Range: $-20$ to $+10$ dBm	HP 11664A	P
Power Splitter	Frequency Range: 0.01 to 12.4 GHz Output Port Tracking: $\leq 0.25$ dB Maximum Input Power: $\geq +20$ dBm	HP 11667A	P
Storage-Normalizer	Compatible with Display Mainframe and Swept Amplitude Analyzer	HP 8750A	P
Digital Voltmeter	Accuracy: $\leq 0.005\%$ Input Impedance: $\geq 10 \text{ M}\Omega$	HP 3456A	A,T
Universal Counter	Frequency Mode Frequency Range: $\geq 30$ kHz Frequency Resolution: $\leq 10$ Hz Time Period Mode Frequency Range: $\geq 20$ kHz Resolution: $\leq 50 \mu\text{S}$	HP 5328A	A
Oscilloscope Probe	1 : 1 General Purpose Probe	HP 10008B	A
Modulation Analyzer	(May be used in addition to Spectrum Analyzer) Frequency Range: Must cover auxiliary IF Output frequency of Spectrum Analyzer used Residual FM: $\leq 10$ Hz	HP 8901A	P
Power Meter	Power Range: $-20$ to $+10$ dBm (No substitution when used for external power meter leveling).	HP 432A	P



Table 1-4. Recommended Test Equipment<sup>1</sup> (2 of 4)

Instrument	Critical Specifications	Recommended Model	Use <sup>2</sup>
Thermistor Sensor	Frequency Range: 0.01 to 12.4 GHz Maximum SWR: $\leq 1.75$	HP 8478B	P
Frequency Counter	Frequency Range: 0.01 to 12.4 GHz Sensitivity: $\leq -20$ dBm Maximum Input Power: $\geq 0$ dBm Frequency Accuracy: $\leq 1$ kHz	HP 5343A	P
Directional Coupler	Frequency Range: 0.1 to 2.0 GHz Nominal Coupling: $\geq 20$ dB Maximum Coupling Variation: $\leq \pm 1$ dB Minimum Directivity: $\geq 32$ dB	HP 778D	P
Directional Coupler	Frequency Range: 2 to 12.4 GHz Mean Output Coupling: $\geq 20$ dB Output Coupling Variation: $\leq \pm 1$ dB Minimum Directivity: $\geq 26$ dB	HP 779D	P
RMS Voltmeter	dB Range: $-20$ to $-70$ dBm (0 dBm = 1 mW into 600 Ohms) Frequency Range: 10 Hz to 10 MHz Accuracy: $\pm 5\%$ of full scale	HP 3400A	P
Function Generator	Frequency Range: 0.1 Hz to 10 MHz Output Level: 10V p-p into 50 Ohms Output Level Flatness: $\leq \pm 3\%$ from 10 Hz to 100 kHz $\leq \pm 10\%$ from 100 kHz to 10 MHz	HP 3312A	P,T
Crystal Detector	Frequency Response: 0.01 to 12.4 GHz Maximum Input Power: $\geq 100$ mW	HP 423B	P
Air Line Extension (2 required)	Impedance: 50 Ohms Frequency Range: dc to 12.4 GHz Reflection Coefficient: 0.018 + 0.001 (times the frequency in GHz)	HP 11567A	P
RF Cable	Impedance: 50 Ohms Length: 61 cm (24 in.)	HP 11170B	P
Step Attenuator	Frequency Range: dc to 12.4 GHz Incremental Attenuation: 0 to 70 dB in 10 dB steps Calibration Accuracy: $\leq \pm 0.1$ dB at all steps	HP 8495A Option 890	P

Table 1-4. Recommended Test Equipment<sup>1</sup> (3 of 4)

Instrument	Critical Specifications	Recommended Model	Use <sup>2</sup>
Attenuator	Attenuation: 3 dB $\pm$ 0.5 dB Frequency Range: 0.01 to 12.4 GHz Maximum Input Power: $\geq$ +20 dBm	HP 8491B Option 003	P
Attenuator	Attenuation: 6 dB $\pm$ 0.5 dB Frequency Range: 0.01 to 12.4 GHz Maximum Input Power: $\geq$ +20 dBm	HP 8491B Option 006	P
Attenuator	Attenuation: 10 $\pm$ 0.5 dB Frequency Range: 0.01 to 12.4 GHz Maximum Input Power: $\geq$ +20 dBm	HP 8491B Option 010	P
Attenuator	Attenuation: 20 $\pm$ 0.5 dB Frequency Range: 0.01 to 12.4 GHz Maximum Input Power: $\geq$ +20 dBm	HP 8491B Option 020	P
Adjustable Short	Frequency Range: 1.8 to 12.4 GHz Impedance: 50 $\pm$ 1.5 Ohms	Maury Microwave <sup>3</sup> 1953-2	P
Adjustable AC Line Transformer	Select to cover line voltage used 100—120 volt	General Radio <sup>4</sup> W5MTB	P
	220—240 volt	General Radio W10HM73	P
Line Voltage Monitor	To be used with above Adjustable AC Line Transformers 120 volt Monitor 240 volt Monitor	RCA <sup>5</sup> 120B	P
		RCA WV 503A	P
Frequency Meters	Frequency Accuracy: $\leq$ 0.17% Calibration Increments: $\leq$ 2 MHz Select to cover Frequency range of RF plug-in 0.96 to 4.2 GHz 3.7 to 12.4 GHz	HP 536A	P
		HP 537A	P
Adapter	APC-7 to Type N(m)	HP 11525A	P
Adapter	APC-3.5(f) to Type N(m)	Amphenol <sup>6</sup> 131-7018	P
Delay Line Discriminator	Refer to Figure 1-3		P

Table 1-4. Recommended Test Equipment<sup>1</sup> (4 of 4)

Instrument	Critical Specifications	Recommended Model	Use <sup>2</sup>
PC Board Extender <sup>7</sup>	44-pin, extends printed circuit boards	HP Part Number 08350-60031 (each)	T
RF Plug-in Extender Cable	Extends RF Plug-in Interface Connector (J2)	HP Part Number 08350-60034	T
RF Plug-in Extender Cable	Extends RF Plug-in Power Supply Interface Connector (J3)	HP Part Number 08350-60035	T

<sup>1</sup>Refer to the Recommended Test Equipment list in the Operating and Service Manual of the RF plug-in used for a listing of equipment specifically relating to the RF plug-in used. Not all equipment included in this list is necessary for all RF plug-ins.

<sup>2</sup>P=Performance Test; A=Adjustments; T=Troubleshooting

<sup>3</sup>Mauray Microwave Corp., 8610 Helms Ave., Cucamonga, CA 91730

<sup>4</sup>General Radio, 300 Baker Avenue., Concord, MA 01742

<sup>5</sup>RCA Distribution & Special Products Div., Dept. EM, New Holland Ave., Lancaster, PA 17604

<sup>6</sup>Amphenol North America, Bunker-Ramo Corp., RF Operations, 33 E. Franklin St., Danbury, CT 06810

<sup>7</sup>Two 44-pin printed circuit board extenders and a fuse kit are included with the Model 8350A Accessory Kit Supplied (HP Part Number 08350-60020). Refer to Figure 1-1 in this manual.

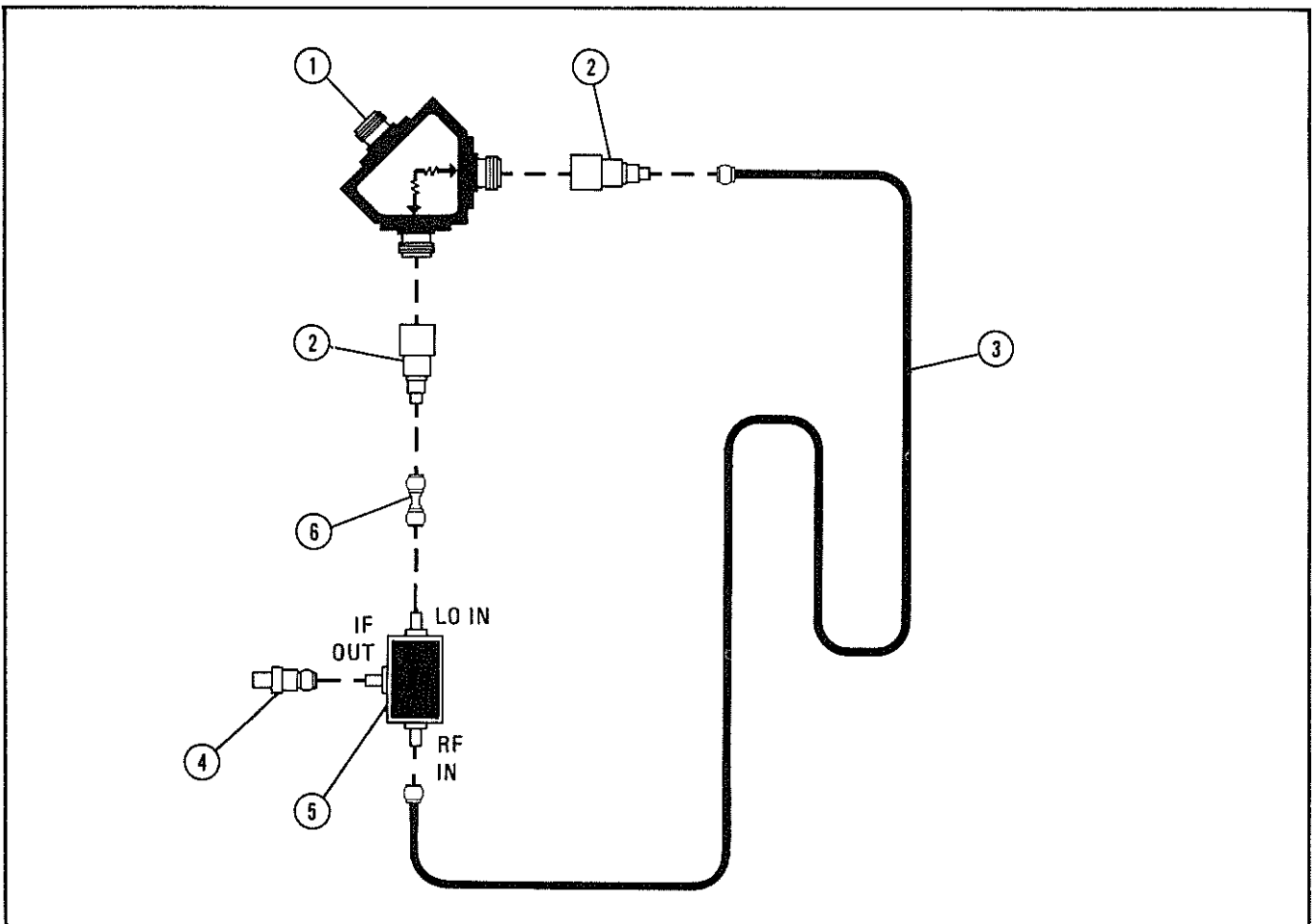
#### 1-74. RECOMMENDED TEST EQUIPMENT

1-75. Equipment required for testing and adjustment of the instrument is listed in Table 1-4. Other equipment may be substituted if it meets or exceeds the critical specifications indicated in the table.

#### 1-76. HEWLETT-PACKARD INTERFACE BUS. (HP-IB)

1-77. The Model 8350B is factory equipped with a remote programming interface using the

Hewlett-Packard Interface Bus (HP-IB). This provides a remote operator with the same control of the instrument available to a manual (local) operator. Remote control is maintained by a system controller (desktop computer, computer, etc.) that sends commands or instructions to and receives data from the Model 8350B using the HP-IB. The HP-IB is Hewlett-Packard's implementation of the IEEE Standard 488-1978. A complete general description of the HP-IB is provided in the manual entitled "Condensed Description of the Hewlett-Packard Interface Bus" (HP Part Number 59701-90030).



Item	Description	HP Part Number
1	Power Splitter	HP 11667A
2	Adapter: Type N Male to SMA Female (2 required)	1250-1250
3	Delay Line: >1 meter (3 feet) in length, SMA male connectors	08503-20038
4	Adapter: BNC Female to Male SMA	1250-1200
5	Mixer: Double Balanced 1 to 12 GHz: RHG Electronics Part No. DM 1-12 1 to 18 GHz: RHG Electronics Part No. DM 1-18  RHG Electronics Laboratories, Inc. Deer Park, NY 11729	0960-0451  None
6	Adapter: SMA Male to SMA Male	1250-1159

Figure 1-3. Delay Line Discriminator

## SECTION II INSTALLATION

### 2-1. INTRODUCTION

2-2. This section provides installation instructions for the Model 8350B Sweep Oscillator and its accessories. This section also includes information about initial inspection and damage claims, preparation for use, and packaging, storage, and shipment.

### 2-3. INITIAL INSPECTION

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1. Procedures for checking electrical performance are given in Section IV, Performance Tests, of this manual. If the instrument combination does not pass the electrical Performance Tests, refer to Section V, Adjustments, of this manual. If, after the adjustments have been made, the instrument combination still fails to meet specifications, refer to Section V, Adjustments, of the Operating and Service Manual for the RF plug-in being used. If a circuit malfunction is suspected, refer to troubleshooting procedures in Section VIII, Service, of this or the RF plug-in manual. If the instrument does not pass the above electrical tests, if the shipment contents are incomplete, or if there is mechanical damage or defect, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or if the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement without waiting for claim settlement.

### 2-5. PREPARATION FOR USE

### 2-6. Power Requirements

2-7. The Model 8350B Sweep Oscillator requires a power source of 100, 120, 220, or 240 Vac, +10% to -10%, 50 to 60 Hz, single-phase (50 to 400 Hz, single phase for Option 400 instruments). Power consumption is approximately 270 volt-amps, depending upon the specific RF plug-in unit used.

### 2-8. Line Voltage and Fuse Selection

2-9. Figure 2-1 illustrates the line voltage selection card and fuse location in the Power Line Module on the rear panel of the Model 8350B. Select the line voltage and fuse as follows:

- a. Measure the ac line voltage.
- b. Refer to Figure 2-1. At the instrument rear panel power line module, select the line voltage (100, 120, 200, or 220 volts) closest to the voltage you measured in step a. Note the available line voltage must be within +10% to -10% of the line voltage selection as shown in Table 2-1. If it is not, you must use an autotransformer between the power source and the Model 8350B.

Table 2-1. Line Voltage/Fuse Selection

Measured ac Line Voltage	PC Selector Board Position	Fuse/ HP Part Number
90 to 110 volts	100	4.0A 2110-0055
108 to 132 volts	120	4.0A 2110-0055
198 to 242 volts	220	2.0A 2110-0002
216 to 264 volts	240	2.0A 2110-0002

- c. Make sure the correct fuse is installed in the fuse holder. The required fuse rating for each line voltage is indicated in Table 2-1 and below the power line module on the rear panel of the Model 8350B.

**CAUTION**

To prevent damage to the instrument, make the correct line voltage and fuse selection before connecting line power to the instrument.

## 2-10. Power Cable

2-11. In accordance with international safety standards, this instrument is equipped with a three-wire power cable. When connected to an appropriate power line outlet, this cable grounds the instrument cabinet. Table 2-2 shows the styles of plugs available on power cables supplied with HP instruments. The HP Part Numbers for the plugs are part numbers for the complete power cables. The type of power cable/plug shipped with the instrument depends upon the country of destination.

2-12. The offset pin of the three-prong connector is the grounding pin. When operating the Model 8350B from a two-contact outlet, the protective grounding feature may be preserved by using a three-prong to two-prong adapter (USA connectors only, HP Part Number 1251-0048) and connecting the green wire of the adapter to ground.

**WARNING**

Before switching on this instrument, be sure that only the specified power cable is used. The instrument is provided with a three-wire power cord which grounds the instrument cabinet. This power cord should only be inserted in a socket outlet provided with a protective earth contact. This protective action should not be negated by the use of an extension cord (power cable) without a protective conductor (ground). Grounding one conductor of a two-conductor outlet is not sufficient protection.

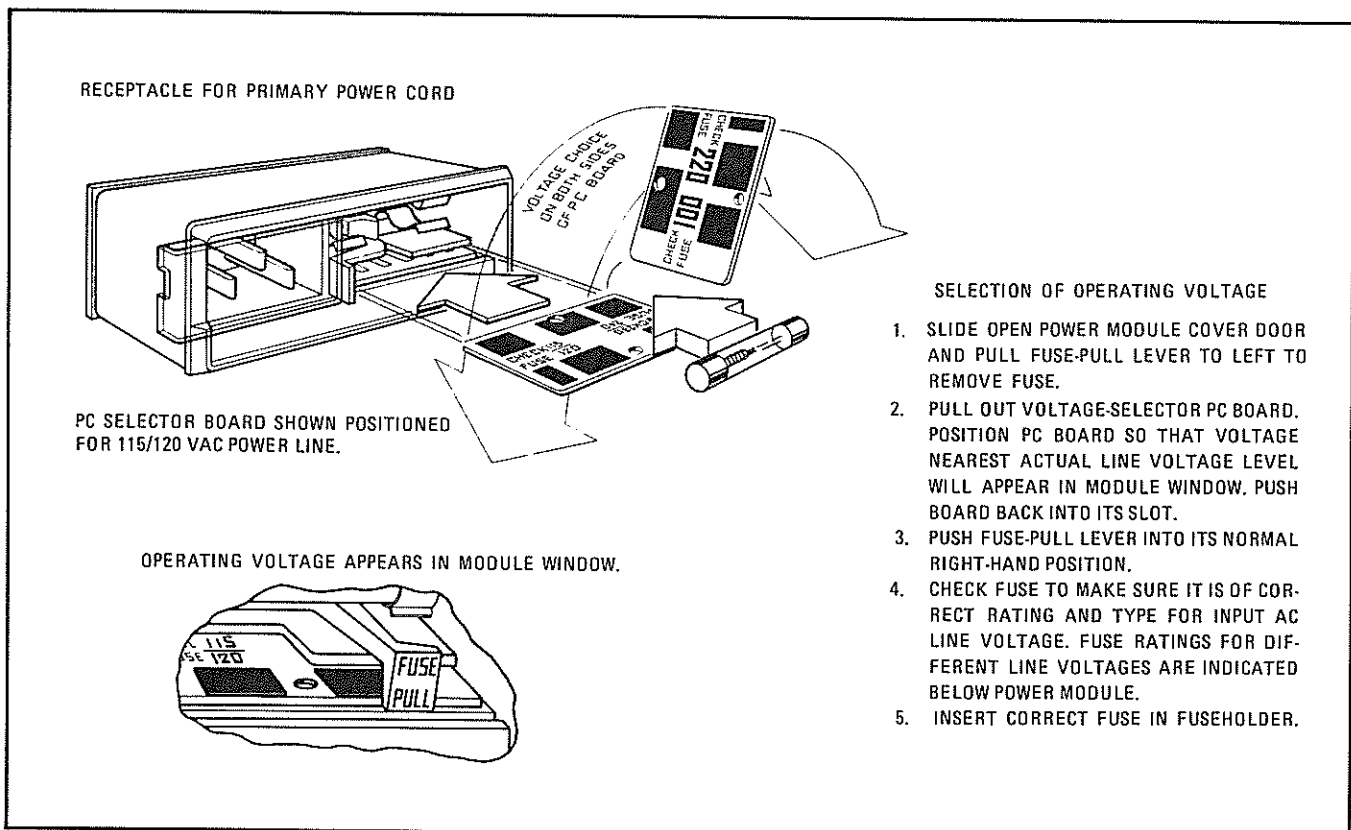
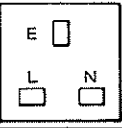

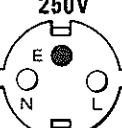
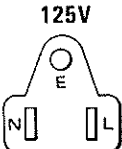
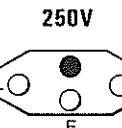
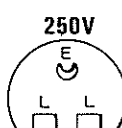
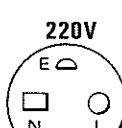
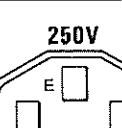


Figure 2-1. Power Line Module

Table 2-2. AC Power Cables Available

Plug Type <sup>1</sup>	Cable HP Part Number <sup>2</sup>	CD <sup>3</sup>	Plug Description <sup>2</sup>	Cable Length (inches)	Cable Color	For Use in Country
<b>250V</b> 	8120-1351 8120-1703	0 6	Straight BS1363A 90°	90 90	Mint Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Zimbabwe, Singapore
<b>250V</b> 	8120-1369 8120-0696	0 4	Straight NZSS198/ASC112 90°	79 87	Gray Gray	Australia, New Zealand
<b>250V</b> 	8120-1689 8120-1692	7 2	Straight CEE7-VII 90°	79 79	Mint Gray Mint Gray	East and West Europe, Saudi Arabia, Egypt, Republic of So. Africa, India (unpolarized in many nations)
<b>125V</b> 	8120-1348 8120-1398 8120-1754 8120-1378 8120-1521 8120-1676	5 5 7 1 6 2	Straight NEMA5-15P 90° Straight NEMA5-15P Straight NEMA5-15P 90° Straight NEMA5-15P	80 80 36 80 80 36	Black Black Black Jade Gray Jade Gray Jade Gray	United States, Canada, Japan (100V or 200V), Mexico, Philippines, Taiwan
<b>250V</b> 	8120-2104	3	Straight SEV1011.1959 24507, Type 12	79	Gray	Switzerland
<b>250V</b> 	8120-0698	6	Straight NEMA6-15P			United States, Canada
<b>220V</b> 	8120-1957 8120-2956	2 3	Straight DHCK 107 90°	79 79	Gray Gray	Denmark
<b>250V</b> 	8120-1860	6	Straight CEE22-VI (System Cabinet Use)			

1. E = Earth Ground; L = Line; N = Neutral
2. Part number shown for plug is industry identifier for plug only. Number shown for cable is HP Part Number for complete cable including plug.
3. The Check Digit (CD) is a coded digit that represents the specific combination of numbers used in the HP Part Number. It should be supplied with the HP Part Number when ordering any of the power assemblies listed above, to expedite speedy delivery.

## 2-13. HP-IB Address Selection

**WARNING**

The HP-IB address switch is set with the top cover removed from the Model 8350B and should be set only by a skilled person who is aware of the hazard involved. Prior to setting the HP-IB address switch, the LINE switch should be set to OFF and the power cord should be disconnected from the ac power source for maximum safety. Capacitors inside the instrument may still be charged even when the instrument is disconnected from its ac power source. Use caution when setting the HP-IB address switch to avoid touching assemblies or components within the instrument other than the HP-IB address switch.

2-14. When the Model 8350B is used under remote control with the HP-IB "address". The Model 8350B is differentiated from any other

instrument on the bus by its own unique address. This HP-IB address is initially preset in the Model 8350B by a 5-segment address switch A8S1, located on the A8 HP-IB Interface assembly, as shown in Figure 2-2. A diagram of A8S1 is given in Figure 2-3. Each of the 5 switches corresponds to one of the digits of the 5-digit binary equivalent of the address, as shown in Table 2-3. A8S1 switch A1 corresponds to the Least Significant Bit (LSB) of the binary address and switch A5 corresponds to the Most Significant Bit. The HP-IB address can be modified by a front panel SHIFT function.

2-15. The 8350B stores HP-IB address information in battery supported non-volatile memory. This allows the instrument to retain the assigned HP-IB address when the instrument is turned off, regardless of A8S1 address switch setting. The address will be retained as long as the battery is charged to a sufficient level. If battery power to the A3 Microprocessor ever fails or is interrupted, the HP-IB address will revert back to the A8S1 address switch setting. An INSTRUMENT PRESET command will not modify the current HP-IB address.

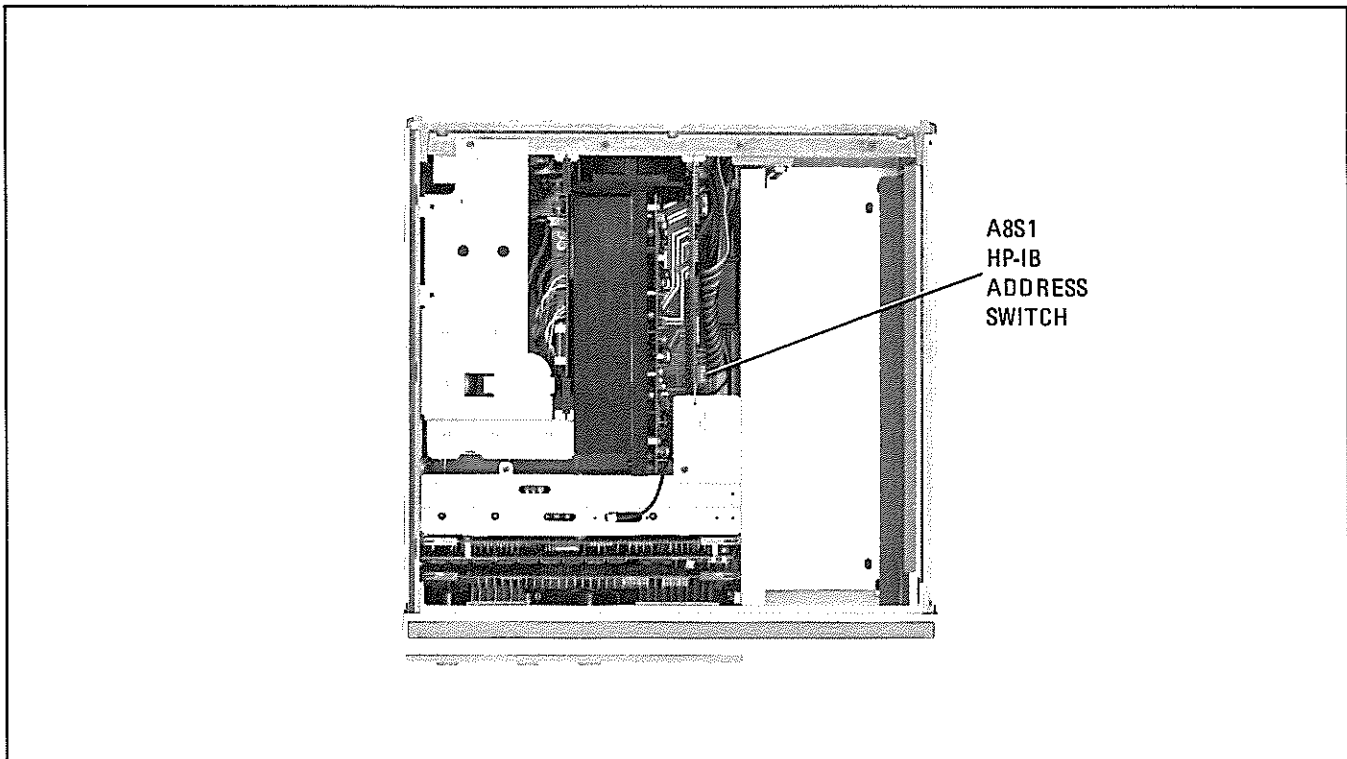


Figure 2-2. Location of A8S1 HP-IB Address Switch



2-16. Thirty-one different address codes are available (decimal 0 to 30). The Model 8350B is shipped from the factory preset to binary address "1011" (decimal 19), as shown in Figure 2-3. The HP-IB address can be read directly from the front panel by pressing [SHIFT] [LCL]. The current HP-IB address is then displayed in decimal form in the FREQUENCY/TIME display. If the HP-IB address must be changed enter the decimal equivalent of the desired HP-IB address and press [GHz] to terminate the entry. The FREQUENCY TIME display should now indicate the new HP-IB address.

2-17. HP-IB address labels are available by ordering HP Part Number 7120-6853 (each). (See Figure 2-4). These labels allow easy reference to the HP-IB address of each system component.

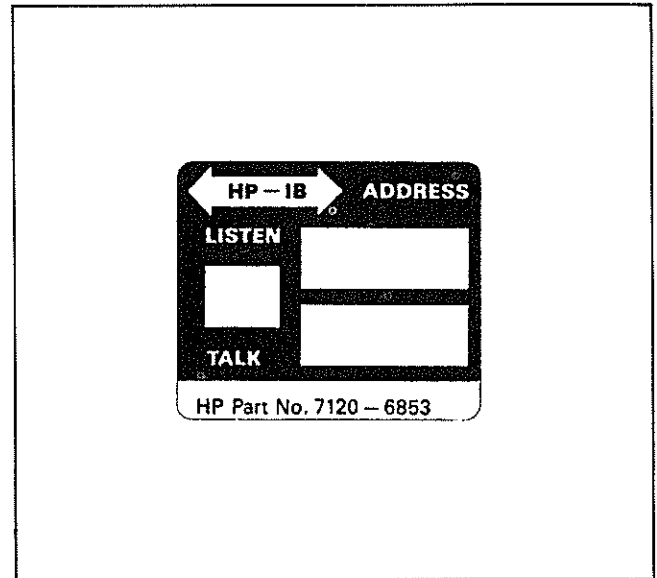


Figure 2-4. HP-IB Address Label

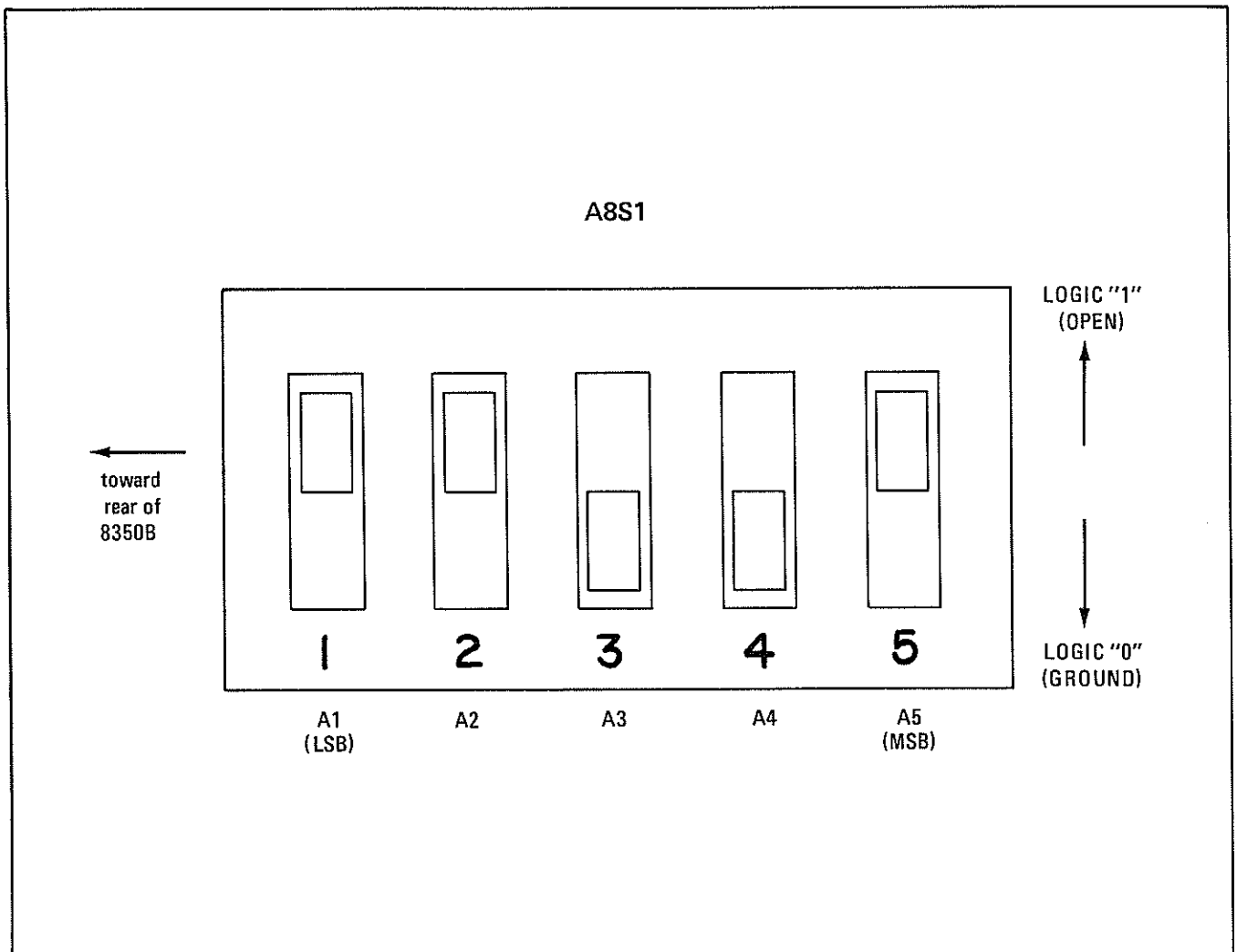


Figure 2-3. A8S1 HP-IB Address Switch

Table 2-3. HP-IB Address Codes

Address Characters		A8S1 Address Switch Settings					Address
Listen	Talk	(MSB)		(LSB)			Decimal Equivalent
		A5	A4	A3	A2	A1	
SP	@	0	0	0	0	0	0
!	A	0	0	0	0	1	1
”	B	0	0	0	1	0	1
#	C	0	0	0	1	1	3
\$	D	0	0	1	0	0	4
%	E	0	0	1	0	1	5
&	F	0	0	1	1	0	6
,	G	0	0	1	1	1	7
(	H	0	1	0	0	0	8
)	I	0	1	0	0	1	9
*	J	0	1	0	1	0	10
+	K	0	1	0	1	1	11
,	L	0	1	1	0	0	12
-	M	0	1	1	0	1	13
.	N	0	1	1	1	0	14
/	O	0	1	1	1	1	15
0	P	1	0	0	0	0	16
1	Q	1	0	0	0	1	17
2	R	1	0	0	1	0	18
3	S	1	0	0	1	1	19
4	T	1	0	1	0	0	20
5	U	1	0	1	0	1	21
6	V	1	0	1	1	0	22
7	W	1	0	1	1	1	23
8	X	1	1	0	0	0	24
9	Y	1	2	0	0	0	25
:	Z	1	1	0	1	0	26
:	[	1	1	0	1	1	27
<	/	1	1	1	0	1	28
=	]	1	1	1	0	1	29
>	^	1	1	1	1	0	30

### 2-18. 11869A Switch Settings for HP 86200 Series RF Plug-ins

2-19. The identification switch on the Model 11869 RF Plug-in Adapter must be preset when using the adapter with HP 86200 Series RF Plug-ins in the Model 8350B. The setting of the identification switch is interrogated at power on, when the 8350B INSTR PRESET button is pressed, or when an HP-IB Instrument Preset (“IP”) command is received. If the identification switch is set incorrectly, the START/STOP frequencies will be in error. Refer to Section II, Installation, of the Model 11869A Operating and Service Manual for instructions to properly set the identification switch.

### 2-20. Internal Square Wave Modulation Frequency Selection

2-21. Internal square wave modulation is available at all sweep speeds on the Model 8350B. Internal square wave modulation is selected by the front panel  MOD pushbutton. Modulation frequency is selectable by an internal jumper to be either 27.8 kHz (preset at the factory for use with Model 8755C Swept Amplitude Analyzer systems) or 1kHz. Refer to Section V Adjustments in this manual for detailed information on how to select and adjust the internal square wave modulation frequency.

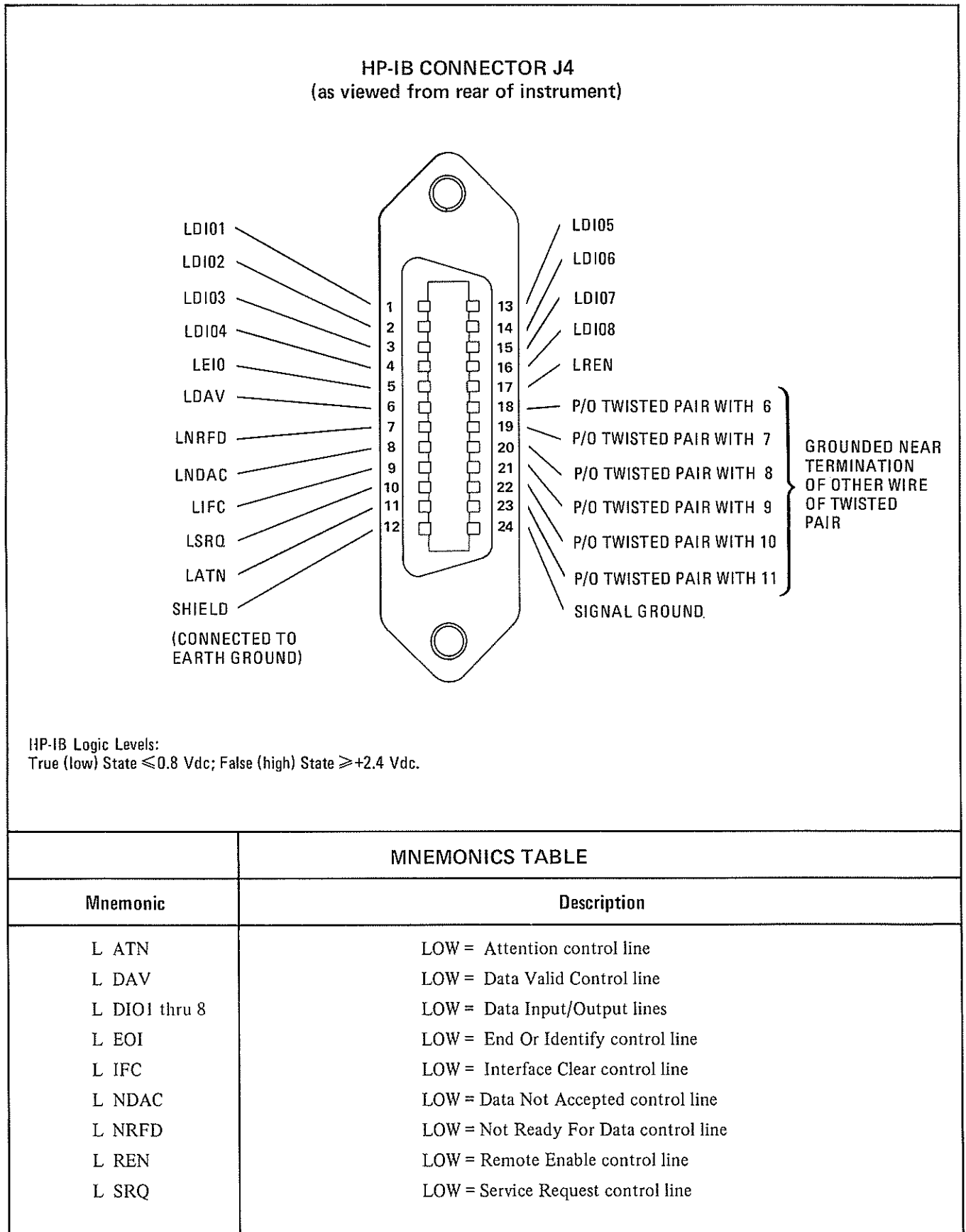


Figure 2-5. HP-IB Connector Signals and Pin Configuration

**2-22. RF Plug-in Configuration Switch**

2-23. Each RF plug-in may have a configuration switch which must be preset prior to operation in the Model 8350B. This is a multiple switch with individual switches that correspond to various RF plug-in functions such as FM sensitivity selection, FM input coupling selection (direct coupled or cross-over), RF power level at instrument power on, and Option 002 Step Attenuator operation. Refer to the Operating and Service Manual of the specific RF plug-in used for detailed information on the configuration switch.

**2-24. Interconnections**

2-25. There are two RF plug-in interconnections on the Model 8350B Sweep Oscillator mainframe. These are the RF Plug-in Interface Connector (J2) and the Power Supply Interface Connector (J3). J2 and J3 are visible at the rear of the RF plug-in channel. A complete listing of pins and the associated signals and voltages for these connectors are listed on the overall instrument Wiring List in Section VIII, Service, of this manual.

**2-26. Mating Connectors**

2-27. All of the externally mounted connectors on the Model 8350B are listed in Table 2-4. Opposite each mainframe connector is an industry identification, the HP part number of a mating connector, and the part number of an alternate source for the mating connector. For HP part numbers of the externally mounted

connectors themselves, refer to Section VI, Replaceable Parts, of this manual.

**2-28. HP-IB Interface Connector and Cables**

2-29. The HP-IB Interface Connector J4, located on the rear panel of the Model 8350B, allows the sweep oscillator to be connected to any other device on the HP-IB Interface Bus. A complete illustration of pin configuration and signals on the HP-IB Interface Connector is given in Figure 2-5.

2-30. All instruments on the HP-IB Interface Bus are interconnected by HP-IB Interface Cables. A list of the available HP-IB Interface Cables and their part numbers is given in Figure 2-6. As many as 15 instruments can be connected in parallel on the HP-IB Interface Bus. To achieve design performance on the bus, proper voltage levels and timing relationships must be maintained. If the system cable is too long or if the accumulated cable length between instruments is too long, the data and control lines cannot be driven properly and the system may fail to perform. Therefore, the following restrictions must be observed:

- a. With two instruments in a system, the cable length must not exceed 4 meters (12 feet).
- b. When more than two instruments are connected on the bus, the cable length to each instrument must not exceed 2 meters (6 feet) per unit.
- c. The total cable length between all units cannot exceed 20 meters (65 feet).

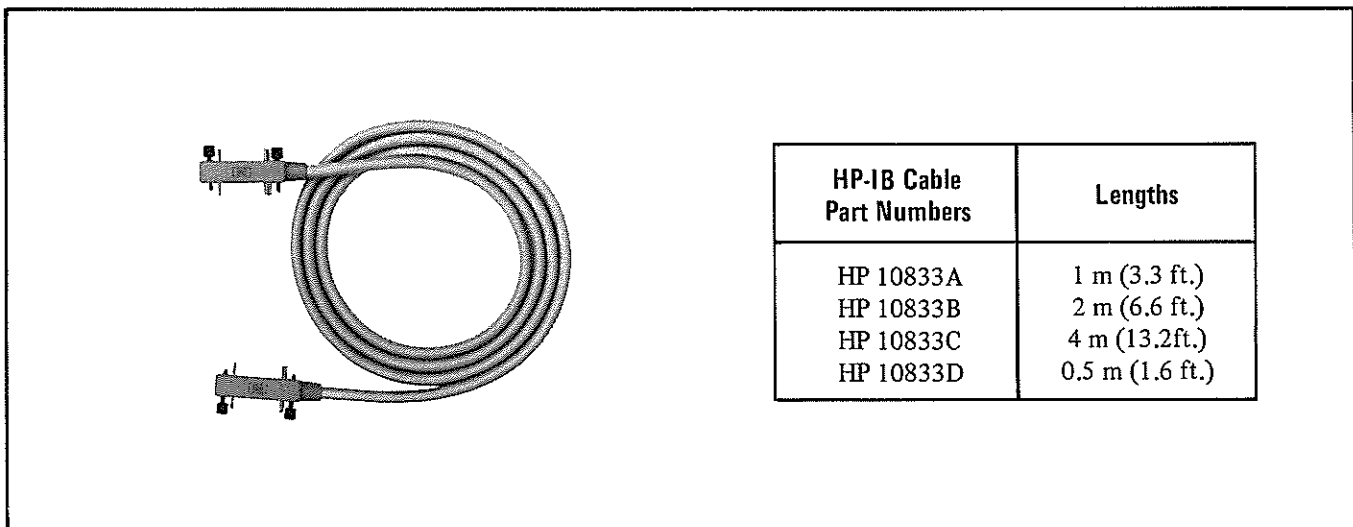


Figure 2-6. HP-IB Interface Cables Available

Table 2-4. Model 8350A Mating Connectors

8350B Connector		Mating Connector	
Connector Name	Industry Identification	HP Part Number	Alternate Source
J1 SWEEP OUTPUT/ SWEEP INPUT (front panel)	BNC	1251-0256	Specialty Connector 25-P118-1
J4 HP-IB INTERFACE BUS*	24-Pin Micro Ribbon	1251-0293	Amphenol 57-30240
J5 POS Z BLANK	BNC	1250-0256	Specialty Connector 25-P118-1
J6 NEG Z BLANK	BNC	1250-0256	Specialty Connector 25-P118-1
J7 PEN LIFT	BNC	1250-0256	Specialty Connector 25-P118-1
J8 SWEEP OUT/IN (rear panel)	BNC	1250-0256	Specialty Connector 25-P118-1
J9 CNTR TRIG	BNC	1250-0256	Specialty Connector 25-P118-1
J10 STOP SWEEP	BNC	1250-0256	Specialty Connector 25-P118-1
J11 FM INPUT	BNC	1250-0256	Specialty Connector 25-P118-1
J12 AM INPUT	BNC	1250-0256	Specialty Connector 25-P118-1
J13 PROGRAMMING CONNECTOR	25-Pin D Series	1251-7902	Berg Eleck. Div 06170-0025
J14 ALT SWP INTERFACE**	Audio 3-Pin Connector	no HP Part Number	Switchcraft TA-3F

\*Refer to Figure 2-6 for HP-IB Interface Cable information. HP-IB Interface connector J4 signals and pin configuration are given in Figure 2-5.

\*\* A 1219 mm (48") cable assembly with a Switchcraft TA-3F Audio 3-Pin connector on each end is supplied with the Model 8755C Swept Amplitude Analyzer as the Alternate Sweep Interface Cable. The complete cable may be ordered separately as HP Part Number 8120-3174.

### 2-31. Programming Connector

2-32. The Programming Connector J13 on the rear panel of the Model 8350B provides digital control of display functions and sweep oscillator Step Up control. Figure 2-7 gives a description of all pins and signals available on the Programming Connector. When the Model 8410B/8411 Network Analyzer is used with the Model 8350B, the Model 8410B Source Control Cable (HP Part Number 08410-60146) connects the Model 8410B rear panel SOURCE CONTROL and the Model 8350B rear panel PROGRAMMING CONNECTOR. Additionally, the sweep oscillator RF plug-in 1V/GHz output connects to the Model 8410B rear panel FREQ REF INPUT to insure that the Model 8410B phase locks with sweep oscillator properly when sweeping octave or multi-octave bands. The Model 8410B Source Control Cable connector pins and signals are illustrated in Table 1-3 of this manual (the 8410A does not have source control cable interfacing capability).

### 2-33. Operating Environment

**2-34. Temperature.** The instrument may be operated in temperatures from 0°C to +55°C.

**2-35. Humidity.** The instrument may be operated in environments with humidity from 5% to 80% relative at +25°C to +40°C. However, the instrument should also be protected from temperature extremes which cause condensation within the instrument.

**2-36. Altitude.** The instrument may be operated at altitudes up to 4572 meters (approximately 15,000 feet).

**2-37. Cooling.** Clearances for ventilation should be at least 10 cm (4 inches) at the rear of the cabinet and 7.6 cm (3 inches) at the sides. The clearances provided by the plastic feet in bench stacking and the filler strips in rack mounting are adequate for the top and bottom cabinet surfaces. A diagram illustrating the path for cooling airflow generated by the rear panel fan is given in Figure 2-8. Insure that the air intake and exhaust venting holes are not obstructed within the limits shown in Figure 2-8.

### 2-38. RF Plug-in Installation

2-39. To operate as a completely functional sweep oscillator, the Model 8350B Sweep

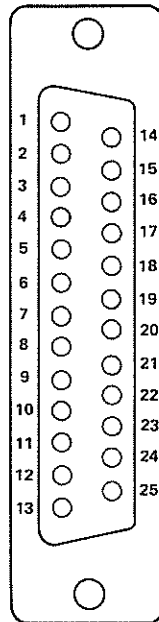
Oscillator must have an RF plug-in unit installed. To install an HP 86200 Series RF plug-in (coupled to a Model 11869A RF Plug-in Adapter) in the Model 8350B, refer to Section II, Installation, in the Model 11869A Operating and Service Manual. To install an HP 83500 Series RF plug-in unit into the Model 8350B mainframe:

- a. Set the Model 8350B mainframe LINE switch to OFF.
- b. Remove all connectors and accessories from the front and rear panel connectors to prevent them from being damaged.
- c. Position the RF plug-in latching handle in the fully raised position. The latching handle should spring easily into the raised position and be held by spring tension.
- d. Insure that the mainframe RF plug-in channel is clear, align the RF unit in the channel and slide it carefully into place towards the rear of the channel. It should slide easily without binding.
- e. The drawer latch handle slot will engage with the locking pin just before the RF plug-in is fully seated.
- f. Press the latch handle downward, while still pushing in on the RF plug-in, until the drawer latch is fully closed and the front panel of the RF plug-in is aligned with the mainframe front panel.

### 2-40. Bench Operation

2-41. The instrument cabinet has plastic feet and a foldaway tilt stand for convenience in bench operation. The tilt stand inclines the instrument for ease of operating the front panel controls and to allow the RF plug-in to be removed more easily. The plastic feet provide clearance for air circulation and make the instrument self-aligning when stacked on other Hewlett-Packard full rack-width modular instruments. The instrument is packaged at the factory with two shipping bars attached to the front sides (refer to Figure 2-12). If the instrument does not include front handle or rack mount options, replace the shipping bars with the self-adhesive trim strips supplied with the instrument.

**PROGRAMMING CONNECTOR J13**  
(as seen from rear panel)



Logic Levels:\*

Low  $\leq 0.8$  Vdc  
High  $\geq 2.4$  Vdc

Control of input lines can be accomplished by contact closure to ground for a logic low level and open circuit for a logic high level.

Pin	Mnemonic	Description	In/Out
1		NO CONNECTION	
2	L MP	LOW = MARKER PULSE	OUTPUT
3	L PLRQ	LOW = PENLIFT REQUEST	INPUT
4	ALT1	ALTERNATE SWEEP 1	OUTPUT
5	L SFSRQ	LOW = STOP FORWARD SWEEP REQUEST	INPUT
6	+5VA	+5 VOLTS (100 ma MAX)	OUTPUT
7	L RFB	LOW = RF BLANK	OUTPUT
8	L RF BRQ	LOW = RF BLANK REQUEST	INPUT
9	EXT TRG	HIGH = EXTERNAL TRIGGER SWEEP	INPUT
10	PL	HIGH = PENLIFT	OUTPUT*
11	L MUTE	LOW = PEN MUTE FOR X-Y RECORDER	OUTPUT
12		NO CONNECTION	
13		NO CONNECTION	
14	L BP1	LOW = BLANKING PULSE 1	OUTPUT
15	L MRKQ	LOW = MARKER REQUEST	INPUT
16	L RTS	LOW = RETRACE STROBE	OUTPUT
17	L ALTE	LOW = ALTERNATE SWEEP ENABLE	OUTPUT
18	L SSRQ	LOW = STOP SWEEP REQUEST	INPUT
19	GND DIG	DIGITAL GROUND	
20	L BPRQ	LOW = BLANKING PULSE REQUEST	INPUT
21	L CNTR	LOW = COUNTER TRIGGER	OUTPUT
22	L STPADV	LOW = STEP ADVANCE	INPUT
23	L PL	LOW = PENLIFT	OUTPUT
24	SYNC TRG	HIGH = SYNCHRONIZING TRIGGER	OUTPUT
25		NO CONNECTION	

\* OPEN COLLECTOR OUTPUT

Figure 2-7. Programming Connector Signals and Pin Configuration

2-42. Front Handles (Option 907)

**CAUTION**

When installing front handles and rack mount kits, insure that the correct screws, specified in the installation figures in this section of the manual, are used. Use of a screw which is longer than the specified length may result in damage to internal components located behind the screw mounting holes in the instrument.

2-43. Instruments with Option 907 contain a Front Handle Kit. This kit supplies the necessary hardware and installation instructions for mounting two front handles on the instrument. Installation instructions are also given in Figure 2-9. Additional Option 907 Kits may be ordered as HP Part Number 5061-0089.

2-44. Rack Mounting (Option 908)

2-45. Instruments with Option 908 contain a Rack Mount Kit. This kit supplies the necessary hardware and installation instructions for preparing the instrument to mount on an equipment rack with 482.6 mm (19 in.) support spacing. Installation instructions are also given in Figure 2-10. Additional Option 908 Kits may be ordered as HP Part Number 5061-0077.

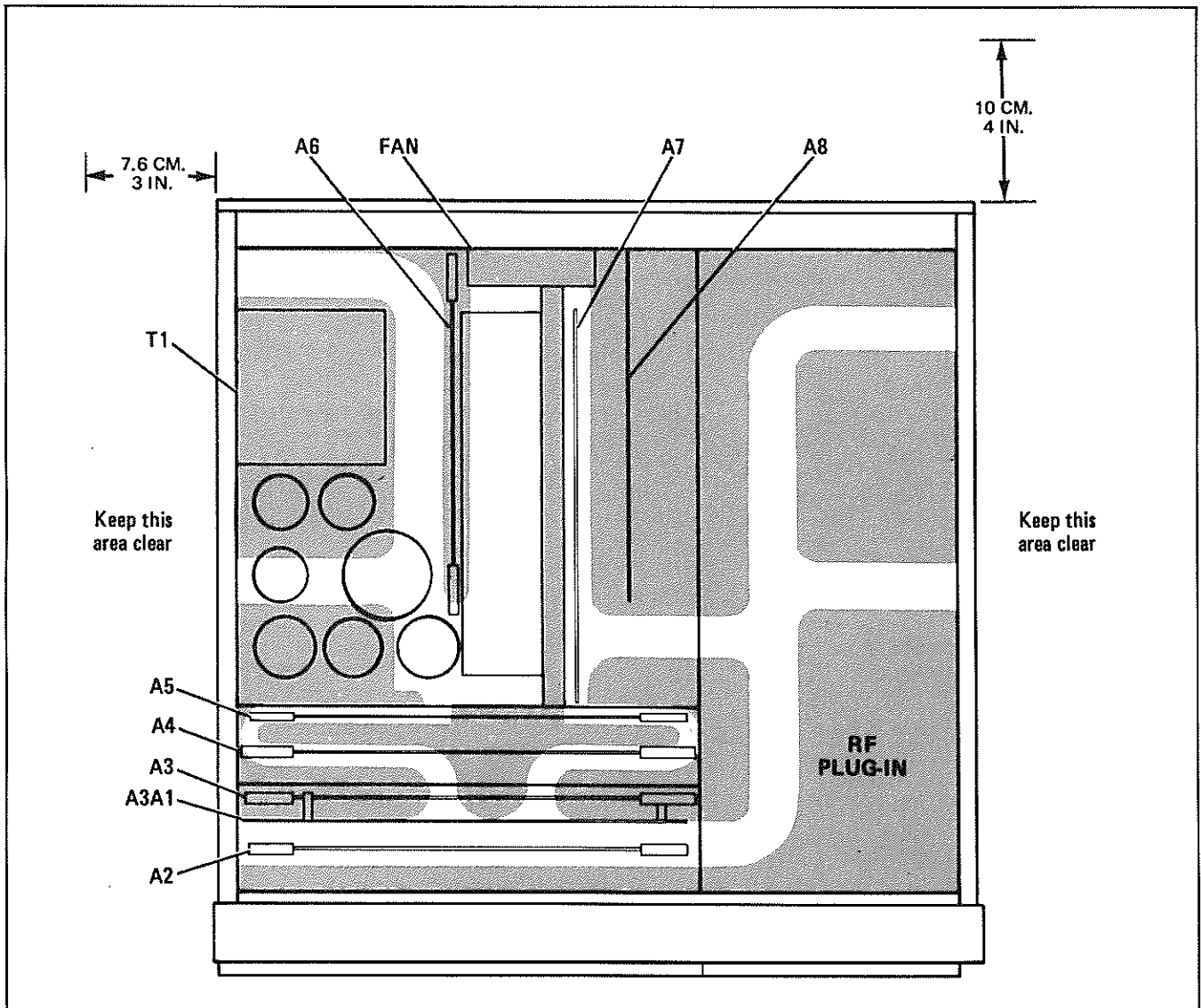
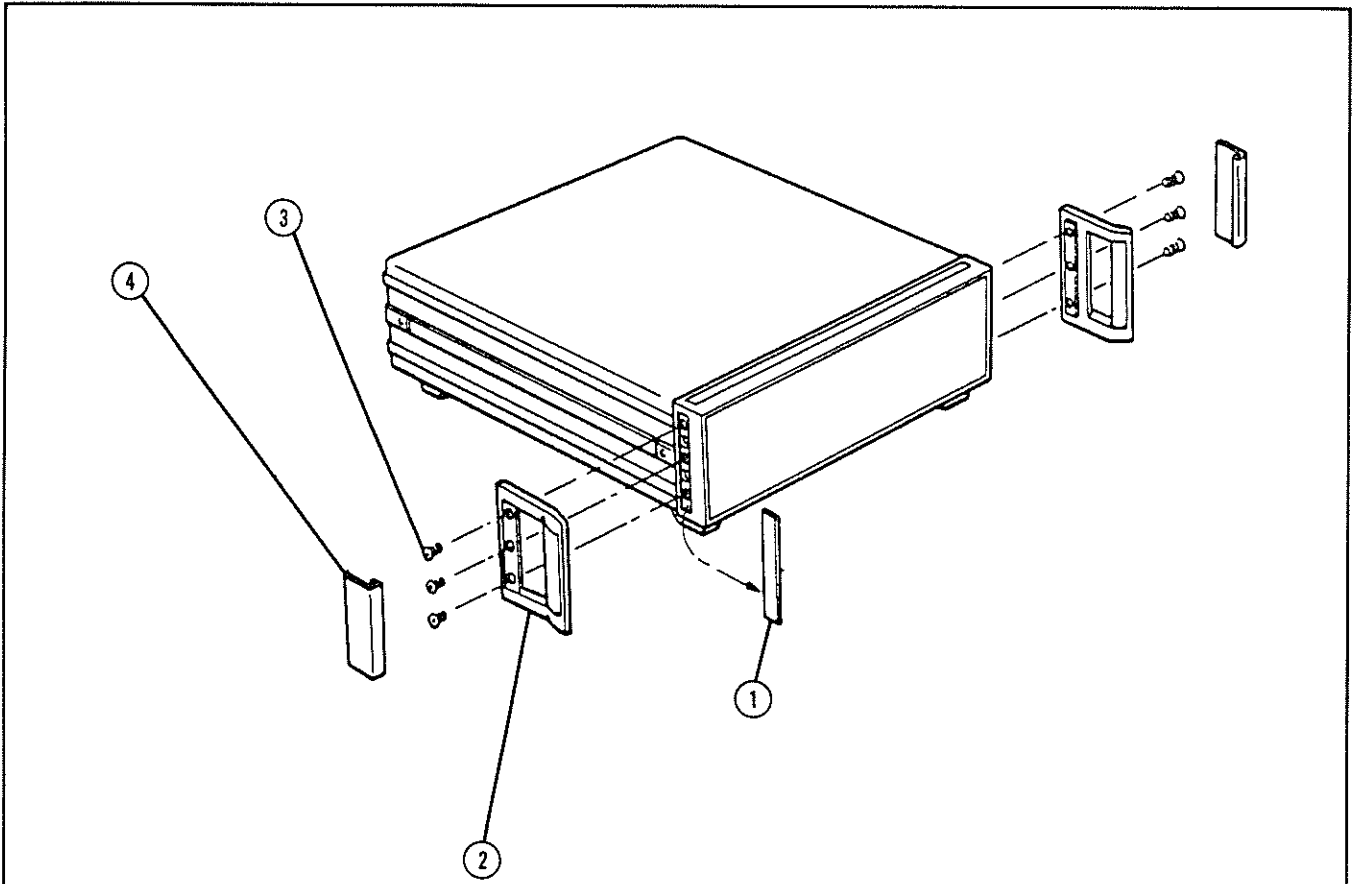


Figure 2-8. Model 8350B Ventilation Clearances and Airflow





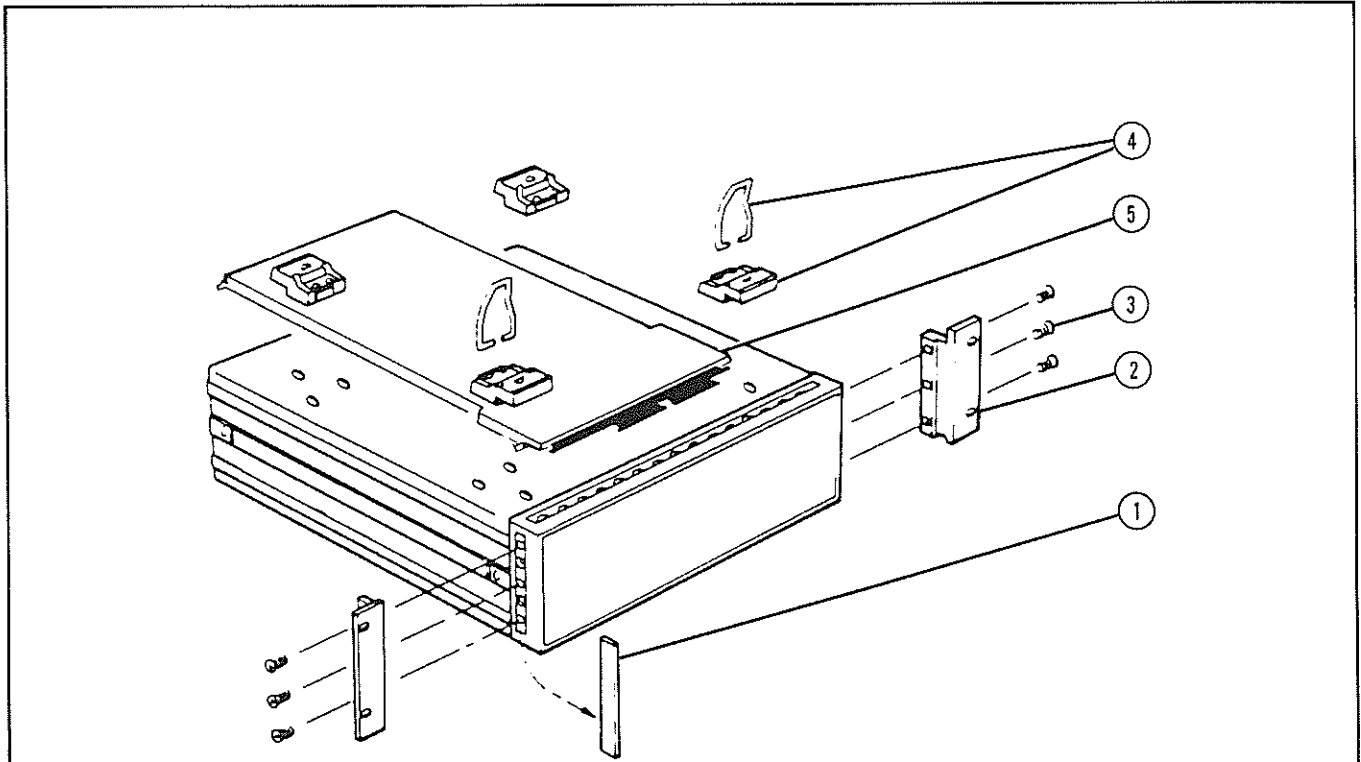
INSTALLATION INSTRUCTIONS:

1. REMOVE SIDE TRIM STRIPS ① .
2. ATTACH FRONT HANDLE ASSEMBLY ② WITH THREE 8-32 x 3/8 SCREWS ③ PER SIDE.
3. PRESS FRONT HANDLE TRIM ④ IN PLACE.

OPTION 907 (HP Part No. 5061-0089) CONTENTS

Item	Qty.	HP Part No.	C D	Description
2	2	5060-9899	6	Front Handle Assembly
3	6	2510-0195	9	#8-32 x 3/8 Screw
4	2	5020-8896	7	Front Handle Trim

Figure 2-9. Option 907 Front Handles Kit



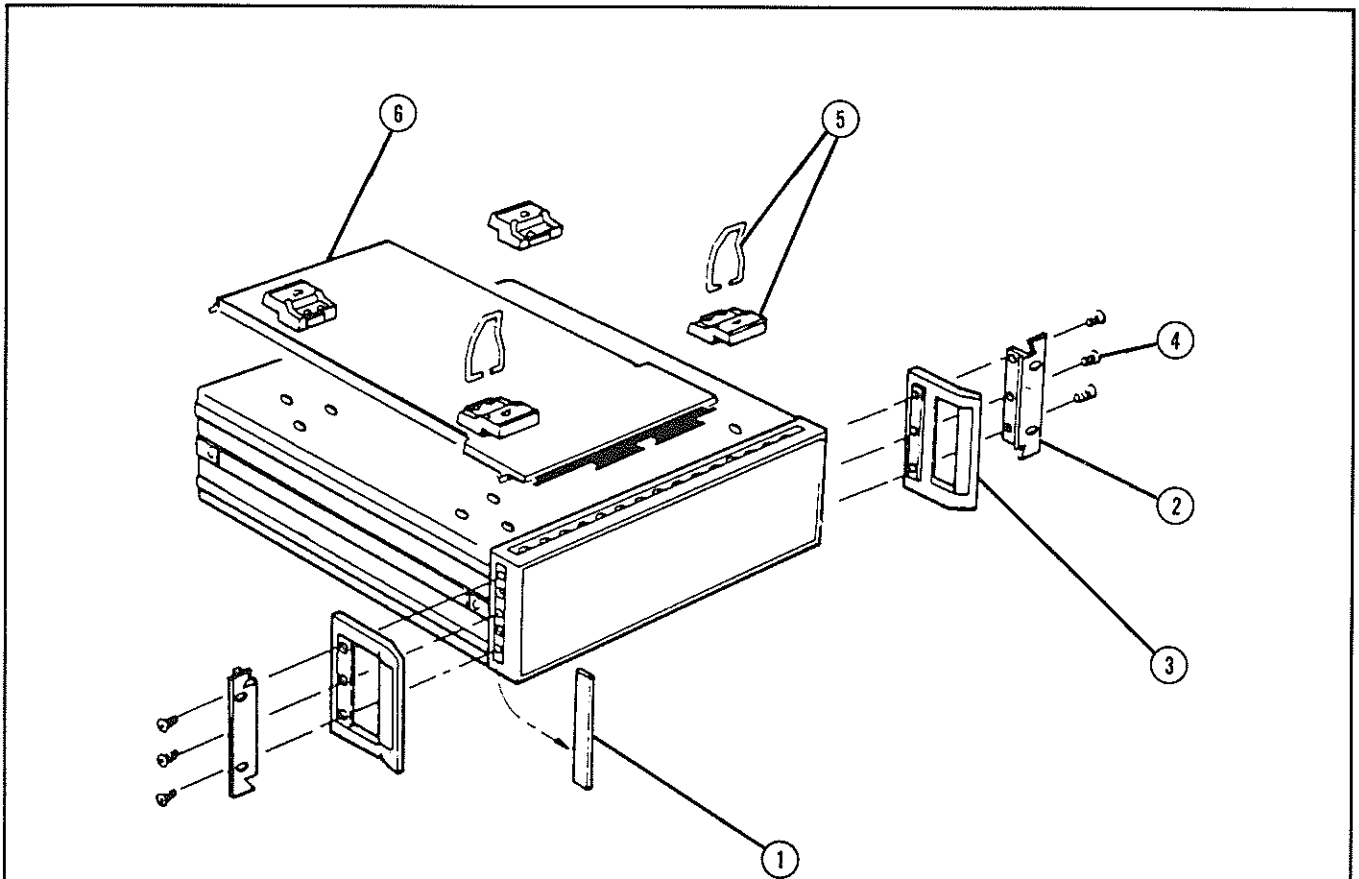
INSTALLATION INSTRUCTIONS:

1. REMOVE SIDE TRIM STRIPS ① .
2. ATTACH RACK MOUNT FLANGE ② WITH 8-32 x 3/8 SCREWS ③ .
3. REMOVE FEET AND TILT STANDS ④ BEFORE RACK MOUNTING. THIS ALSO REMOVES INFORMATION CARD TRAY ⑤ . TO RETAIN USE OF INFORMATION CARDS, DO NOT REMOVE FEET, AND WHEN RACK MOUNTING, ALLOW APPROXIMATELY 2CM (3/4 INCH) BELOW INSTRUMENT TO ACCOMMODATE THE TRAY. (NO FILLER STRIP IS PROVIDED.)

OPTION 908 (HP Part No. 5061-0077) CONTENTS

Item	Qty.	HP Part No.	C D	Description
2	2	5020-8862	7	Rack Mount Flange
3	6	2510-0193	9	#8-32 x 3/8 Screw

Figure 2-10. Option 908 Rack Mount Kit



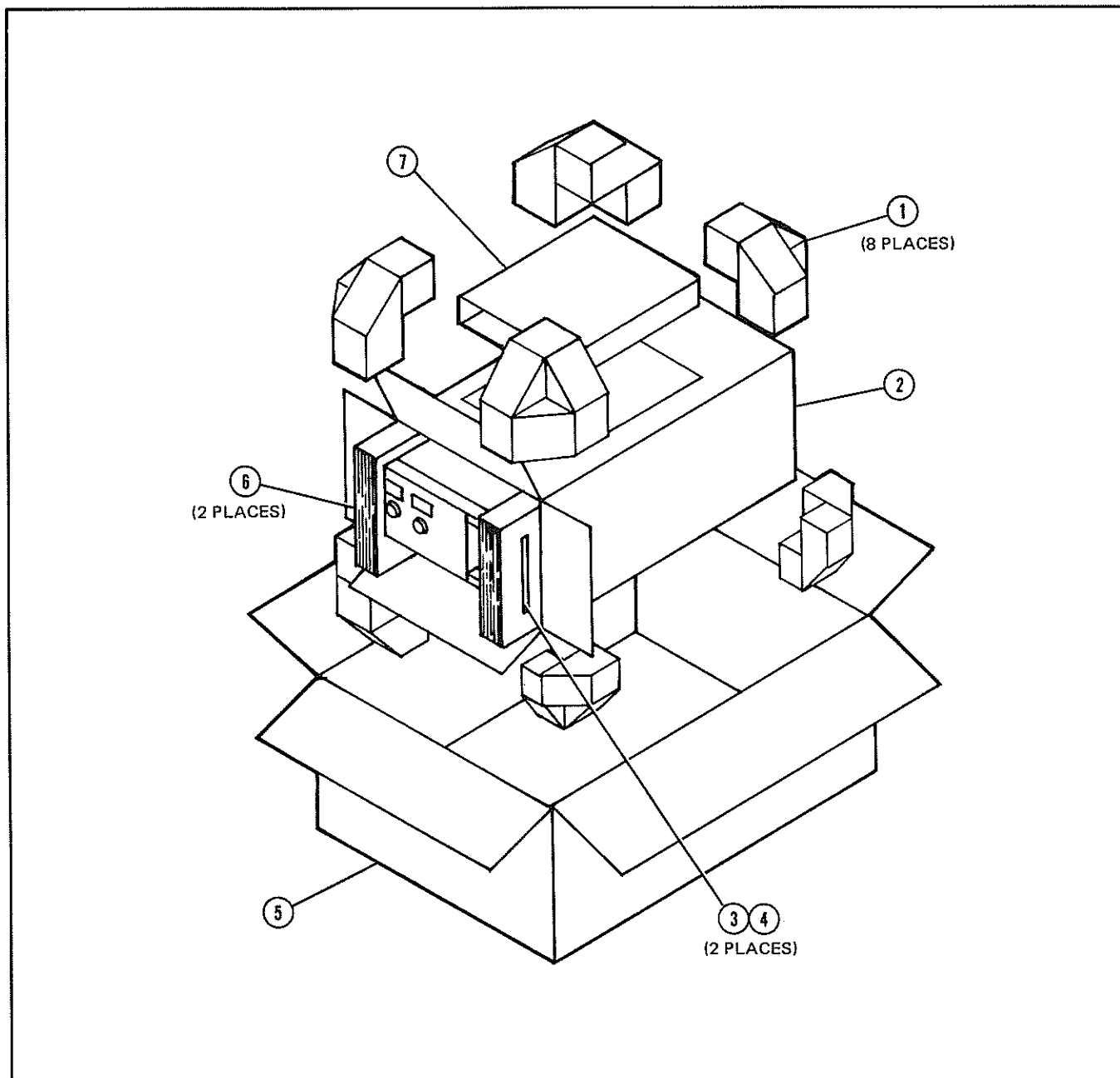
INSTALLATION INSTRUCTIONS:

1. REMOVE SIDE TRIM STRIPS ① .
2. ATTACH RACK MOUNT FLANGE ② AND FRONT HANDLE ASSEMBLY ③ WITH THREE 8-32 x 5/8 SCREWS ④ PER SIDE.
3. REMOVE FEET AND TILT STANDS ⑤ BEFORE RACK MOUNTING. THIS ALSO REMOVES INFORMATION CARD TRAY ⑥ . TO RETAIN USE OF INFORMATION CARDS, DO NOT REMOVE FEET, AND WHEN RACK MOUNTING, ALLOW APPROXIMATELY 2CM (3/4 INCH) BELOW INSTRUMENT TO ACCOMODATE THE TRAY. (NO FILLER STRIP IS PROVIDED.)

OPTION 909 (HP Part No. 5061-0083) CONTENTS

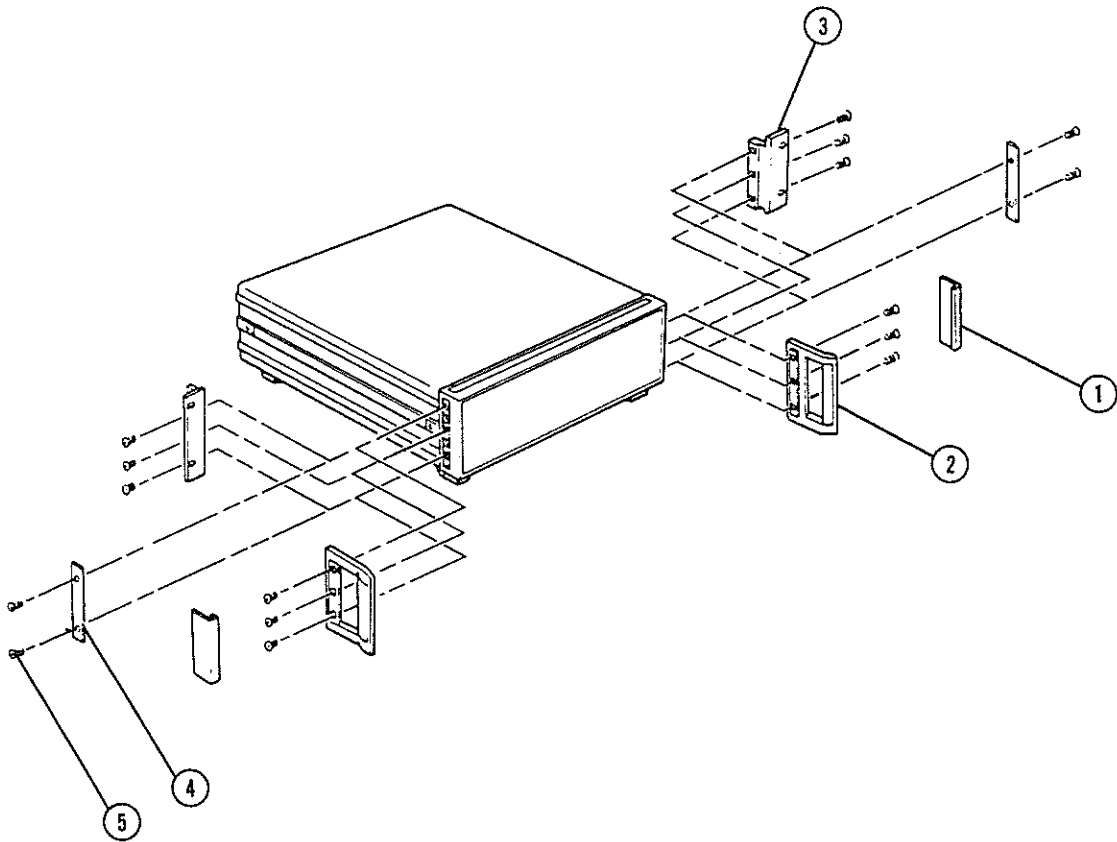
Item	Qty.	HP Part No.	C D	Description
2	2	5020-8874	1	Rack Mount Flange
3	2	5060-9899	6	Front Handle Assembly
4	6	2510-0194	8	#8-32 x 5/8 Screw

Figure 2-11. Option 909 Rack Mount Kit with Handles



Item	Qty	HP Part No.	C D	Description
1	8	9220-2733	7	FOAM PADS - TOP CORNERS; BOTTOM CORNERS
2	1	9211-3462	2	CARTON - INNER
3	2	4040-1738	3	BARS - SHIPPING, NYLON
4	4	2510-0103	9	SCREW - FOR ATTACHING SHIPPING BARS
5	1	9211-3463	3	CARTON - OUTER
6	2	9220-3365	3	SIDE PADS - CORRUGATED CARDBOARD
7	1	9220-2950	0	SLEEVE - FOR MANUAL PROTECTION
8	1	9222-0484	5	POLY BAG - TO COVER INSTRUMENT (NOT SHOWN)

Figure 2-12. Packaging for Shipment using Factory Packaging Materials



1. REMOVE RACK MOUNT FLANGE ③ AND/OR FRONT HANDLE ASSEMBLY. ① ②.
2. ATTACH SHIPPING BARS\* ④ WITH TWO 8-32 x 3/8 SCREWS ⑤.

\*Refer to Figure 2-12 for Part Numbers of Shipping Bars and Screws.

Figure 2-13. Preparation of Instrument for Shipment

## 2-46. Rack Mounting with Front Handles (Option 909)

2-47. Instruments with Option 909 contain a Rack Mount Kit with Front Handles, a combination of the Option 907 Kit and the Option 908 kit. This kit supplies the necessary hardware and installation instructions for preparing the instrument to mount on equipment rack with 482.6 mm (19 in.) support spacing, with the addition of front handles. Installation instructions are also given in Figure 2-11. Additional Option 909 Kits may be ordered as HP Part Number 5061-0083.

## 2-48. Battery Operation

2-49. The 8350B contains a battery pack (inserted in the battery holder with a battery hold down clamp) and has nonvolatile memory which retains the contents of all instrument state storage registers, the current instrument state, and the HP-IB address. When shipped from the factory, the batteries are fully charged. The batteries will retain a sufficient charge to hold the memory contents for approximately 20 days from the date at which they were fully charged. The batteries are charged within the instrument, and a full charge is maintained at all times when the instrument LINE switch remains ON. The batteries do not charge when the instrument LINE switch is OFF. When fully discharged, the batteries will typically take approximately 30 hours to obtain a full charge. Allow the instrument to be on for at least 24 hours when new or when the instrument has been turned off for a long enough period of time that the batteries might have become discharged to a level where memory contents may have been lost. Refer to Section VI Replaceable Parts in this manual for information and part number required to order individual battery packs.

## 2-50. STORAGE AND SHIPMENT

### 2-51. Environment

2-52. The instrument may be stored or shipped in environments within the following limits.

Temperature .....	-40°C to +75°C
Humidity .....	5% to 95% relative at 0° to +40°C
Altitude .....	Up to 15240 meters (approximately 50,000 feet)

2-53. The instrument should also be protected from temperature extremes which may cause condensation in the instrument.

## 2-54. Packaging

**2-55. Original Packaging.** Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. A complete diagram and listing of packaging materials used for the Model 8350B is shown in Figure 2-12. Prior to shipping in the factory packaging materials, the shipping bars should replace the front handles or rack mount flanges, as shown in Figure 2-13, to hold the instrument securely in the packaging material. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number (located on rear panel serial plate). Mark the container FRAGILE to assure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

**2-56. Other Packaging.** The following general instructions should be used for repackaging with commercially available packaging materials:

- Wrap the instrument in heavy paper or plastic. If shipping to a Hewlett-Packard Office or Service Center, attach a tab indicating the type of service required, return address, model number, and full serial number.
- Use a strong shipping container.
- Use enough shock-absorbing material around all sides of the instrument to provide a firm cushion and to prevent movement inside the container. Protect the control panel with cardboard.
- Seal the shipping container securely.
- Mark the shipping container FRAGILE to assure careful handling.
- In any correspondence, refer to the instrument by model number and full serial number.

## SECTION III OPERATION

The Operation section of this manual consists of the following three subsections:

1. **OPERATING INFORMATION:** This subsection contains indexed functional blocks which provide complete (local and remote) information on the use of the 8350B Sweep Oscillator by function. Also contained in this subsection is Operator's Maintenance, Local, and Remote Operator's checks.
2. **LOCAL OPERATION:** This subsection provides Local (non-HP-IB) operating information arranged by function. This subsection also contains information on locally interfacing with the following test equipment:
  - HP 8756A Scalar Network Analyzer
  - HP 8755S Frequency Response Test Set
  - HP 8410B Network Analyzer
  - HP 7010B and other X-Y Recorders
  - HP 5343A Frequency Counter
3. **PROGRAMMING NOTES:** Programming notes are individual publications documenting the HP-IB use of the sweep oscillator. The following programming notes are included in this section:
  - Introductory Operating Guide for use with the HP 9825A/B.
  - Introductory Operating Guide for use with the HP 9835A.
  - Introductory Operating Guide for use with the HP 9845A.
  - Introductory Operating Guide for use with the HP 85A.
  - Quick Reference Guide.

Contact your local sales office for copies of other programming notes as they become available.

This section also includes a blue service tag page. If sweep oscillator service is required, remove one of the tags and fill in as much information as possible. Attach this tag to the sweep oscillator to aid in servicing and reduce turn-around time.

