For any assistance, contact your nearest Hewlett-Packard Sales and Service Office.

For Hewlett-Packard Products:

Product maintenance agreements and other customer assistance agreements are available.

EXCLUSIVE REMEDIES

For a particular purpose.

DISCLAIMER OF IMPLICITY

No other warranties are expressed or implied, HP specifically disclaims all other warranties of merchantability and fitness for a particular purpose.

For warranty service or repair, this product must be returned to a service facility.

Warranty

The Hewlett-Packard Company warrants to the original end user customer that this product is warranted against defects in material and workmanship for a period of one year from date of delivery. During the warranty period, the Hewlett-Packard Company will, at its option, either repair, or replace products which have been returned to the Hewlett-Packard Company, after which such products will be returned to the customer in accordance with the terms and conditions stated in this agreement.

CERTIFICATION

Certification
This manual contains information for operating, testing, and servicing the HP 8620A bridge.

The HP 8620A is a high performance 50Ω directional bridge designed for high quality reflection measurements and external source leveling applications over an RF frequency range of 300 kHz to 6 GHz. The bridge achieves a low through loss of 1.5 dB and a high coupling factor of 16 dB. These characteristics make it useful in applications requiring directional couplers, such as power monitoring and closed-loop leveling applications.

Each bridge has a unique serial number. The contents of this manual apply directly to bridges with serial numbers listed in the title page.

Table 5-1 lists accessories available for use with these bridges.

Table 1-1 lists bridge specifications, which are the performance standards or limits against which you can test the device.

Table 2 lists supplemental (typical, non-warranted) bridge characteristics.
### Table 1-2. HP 8620SA Supplementary Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Nominal Throughput Loss</th>
<th>Direction</th>
<th>Extension Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Impedance Voltage</td>
<td>&gt;20 DB</td>
<td>Direct</td>
<td>Female</td>
</tr>
<tr>
<td>Max. Impedance Power</td>
<td>&gt;300 KHz to 2 GHz</td>
<td></td>
<td>50Ω Precision T/F-PN</td>
</tr>
<tr>
<td>Port Match</td>
<td>&gt;300 KHz to 2 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;100 KHz to 2 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;30 KHz to 2 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;10 KHz to 2 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;0.5 KHz to 2 GHz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 1-1. HP 8620SA Specifications

**Connector Kit Number** (HP part number 0860-9006):

<table>
<thead>
<tr>
<th>Connector Kit Number</th>
<th>Connector Kit Number</th>
<th>Connector Kit Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.4 DB from nominal</td>
<td>1-0.8 GHz to 6 GHz</td>
<td>3-6 GHz</td>
</tr>
<tr>
<td>0-0.2 DB from nominal</td>
<td>1-1.5 GHz to 3 GHz</td>
<td>3-6 GHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship</td>
<td>1.80 kg (4.0 lbs)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.27 kg (0.6 lbs)</td>
<td></td>
</tr>
<tr>
<td>Connector Reception</td>
<td>0.204 in to 0.207 in</td>
<td></td>
</tr>
<tr>
<td>Max. Impedance Current</td>
<td>&gt;20 DC</td>
<td>1 amp DC</td>
</tr>
<tr>
<td>Port 1 or Port 2</td>
<td>&gt;20 DC</td>
<td>30 DC</td>
</tr>
<tr>
<td>Max. Impedance Voltage</td>
<td>&gt;25 dB</td>
<td></td>
</tr>
<tr>
<td>Nominal Throughput Loss</td>
<td>&gt;300 KHz to 2 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;100 KHz to 2 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;30 KHz to 2 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;10 KHz to 2 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;0.5 KHz to 2 GHz</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1-2. HP 8620SA Supplementary Characteristics

**Remark:** To a female type-N connector center conductor characteristic relative to 0.207 nominal.
Initial Inspection

1. Check the shipping container and packaging material for damage.
2. Check the shipment for completeness.
3. Check the connectors and bridge body for mechanical damage.
4. Check the bridge electrically.
   - Refer to the "Performance Test" chapter for procedures that.
   - If any of the following conditions exist, notify your nearest Hewlett-Packard office:
     - Failed electrical test
     - Mechanical damage or defect
     - Incomplete shipment

Hewlett-Packard does not wait for a claim settlement before
the customer returns material. Keep them for the carrier's inspection.
If you find damage or signs of stress to the shipping container or
attribute for repair or replacement.
<table>
<thead>
<tr>
<th>Level</th>
<th>Coupled</th>
<th>Number</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td>1</td>
<td>Test Port</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td>2</td>
<td>Input Port</td>
</tr>
<tr>
<td>Coupled</td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.1.**

The table lists the coupling and port information for the bridge operation. Each row corresponds to a different level, with columns for coupled, number, and port settings. The table helps to illustrate the connection and operation for each path and port combination.

---

**Bridge Operation**

- Measurement configurations
- Operating procedures
- Bridge features
- Bridge operation

This chapter includes the following information on the HP 8620A.
Threaded mounting holes (3.5 mm x 0.5 mm) are located under predrilled holes in the model number label. None are located in the bridge. (Do NOT apply bias to the coupled port of the bridge.) DC bias may be applied to a DUT through the main arm of the bridge.

Power variations are then minimized, which is important when measuring impedance devices. Power variations are then minimized, which is important when measuring impedance devices.

Power variations are then minimized, which is important when measuring impedance devices.

Insertion loss of 1.5 DB, which means more power to the device under test, is important in the measurement of high power solid state amplifiers and TWTA. The bridge also features a 0.2 DB insertion loss of 1.5 DB, which means more power to the device under test.

Bridge Features

Figure 2-1. HP 86205A Bridge Ports and Measurement Paths
Figure 2-2. Location of Threaded Mounting Holes.
Read and observe all cautions.

- Tighten the bridge connectors with fingers only.
- If you must use a wrench, use a torque wrench set at 9.2 cm-kg (12 lb-in).

Electrostatic discharge (ESD) can damage the highly sensitive microcircuits in this device. An ESD event as low as 100V can destroy your bridge.

Do not apply more than ±25 dBm CW power, or more than 1 amp DC or 0 VDC to port 3 or 30 VDC to port 1 or 2 of the bridge.

Higher current/power/voltage can electrically damage the bridge.

Before you connect a cable to the bridge, always discharge the cable's center conductor static electricity to instrument-ground.

Do not drop the bridge or subject it to mechanical shock.
Figure 2-3. Remote Directivity Measurement Setup

1. Connect the DUT either directly to the bridge or as close as possible.

2. Place an attenuator between the cable and bridge to improve source match and an attenuator at the bridge end to improve source match. However, you may affect directivity, but may affect source match. The cable length from the analyzer source to the bridge does not affect the measurement.

To set up the measurement equipment as shown in Figure 2-3:

- Connect the equipment that is located on a tower. You can use remote sensing in applications where your DUT is not easily accessible. For example: when measuring the reflection coefficient of an antenna that is located on a tower.

Configuration:
- Remote measurement using a spectrum analyzer and tracking generator
- Remote measurement using two bridges and the HP 8753 network analyzer
- Vector impedance measurement using the HP 8711 network analyzer
- Remote reflection measurement using the HP 8720A directional bridge in the following configurations:

Remote Reflection Measurement Configuration:

Note: This section shows the HP 8720A directional bridge in the following configurations.
Figure 2-4. Vector Impedance Measurement Setup

1. Connect the equipment as shown in Figure 2-4.

To Set Up the Measurement Configuration:

2. Port measurements are not needed.

This configuration provides a low-cost custom test system when full channel output is not needed.

3. With nothing connected to the bridge, make a normalization of the measurement setup by pressing

4. Connect to the bridge and adjust the scale/division under the DISPLAY Key.

CAL Normalize

Note

match.

You may connect the analyzer input shield to either the A or B input port. Use an A/B or B/A ratio measurement to improve the source match.
4. Connect the DUT to the reference plane and adjust the measurement.

Connect an open, short, and load calibration device to the reference plane while pressing the corresponding key for:

- for B/P: ST2-PORT
- for A/P: ST1-PORT

CALibrate menu

or

SHORT (F2) key.

The reference plane and press the corresponding OPEN (F6)

RESPOND connect either an open or short calibration device to

CALibrate menu

CAL key.

Key sequences:

1. Make a measurement calibration by pressing one of the following:
   - STOP
   - START
   - NUMBER OF POINTS
   - MENU
   - MODE
   - MEAS
   - (OR B/P if you connected the analyzer input signal to)
   - PRESET

2. Choose the following parameters on the analyzer:
6. Set up the synthesizer parameters by pressing:

3. Connect the power sensor to the bridge as shown in Figure 2-6.

4. Power meter (can only be done with an HP 438A or 437B).

2. Enter the appropriate power sensor calibration factors into the power meter/sensor.

2. Zero and calibrate the power meter/sensor.

Figure 2-5. External Power Leveling Configuration

1. Connect the equipment as shown in Figure 2-6.

To set up the measurement configuration:

By substituting a frequency counter for the power meter, this automated measurement configuration:

The HP 8753 and HP 8625 sources can alternatively be used in this advice.

The measurement configuration shown in Figure 2-5 provides:

External Power Leveling
The bridge output port level is unity when the reference level (1.0 dB) is applied and the output level is measured. The power level is measured at the point where the power meter is connected.

10. On the HP 8360A, press:

   - When a message is displayed, indicating the operation:
     - Set the power meter under synthesizer control to perform the measurement at each frequency point by pressing:
       - Auto. PLL Start
       - Auto. PLL Stop
       - Auto. PLL Incr.
       - AUTO. PLL INC

7. Set up the reference correction by pressing:
   - AUTO. PRESET

6. When a message is displayed, indicating the operation:
   - Measure Menu Option

5. Set the power meter under synthesizer control to perform the measurement at each frequency point by pressing:
   - Auto. PLL Start
   - AUTO. PLL INC
   - AUTO. PLL Stop

4. When a message is displayed, indicating the operation:
   - Measure Menu Option

3. Set the power meter under synthesizer control to perform the measurement at each frequency point by pressing:
   - Auto. PLL Start
   - AUTO. PLL INC
   - AUTO. PLL Stop

2. When a message is displayed, indicating the operation:
   - Measure Menu Option

1. Set the power meter under synthesizer control to perform the measurement at each frequency point by pressing:
   - AUTO. PLL Start
   - AUTO. PLL INC
   - AUTO. PLL Stop

0. When a message is displayed, indicating the operation:
   - Measure Menu Option

- Level meter above.
- Level meter below.
1. Connect the equipment as shown in Figure 2.6.

To set up the measurement application:
- The configuration is for portable reflection measurement.