Frequency

Range

HP 83751A/B: 2 GHz to 20 GHz
HP 83752A/B: 10 MHz to 20 GHz

Timebase Stability

Standard 10 MHz timebase: ±10 ppm

High stability timebase (Option 1E5): Accuracy = Calibration ±Aging rate &Temperature effects ±Line voltage effects
Aging rate: 5 x 10^{-10}/day, 1 x 10^{-7}/year
With temperature: 1 x 10^{-10}/°C
With line voltage: 5 x 10^{-10} for 10% change

CW Mode

Resolution: 1 Hz
Accuracy: same as timebase
Switching time: 70 ms max

17-4
Specifications and Options

Frequency

---

**Stepped Sweep Mode**

- Resolution: Settable 1 Hz, Display 1 kHz
- Accuracy: See timebase specifications
- Minimum step size: Settable 1 Hz, Display 1 kHz
- Number of points: 2 to 1601

Switching time/point: 7 ms + 8 ms/GHz step (Up to 50 ms switching time can occur when crossing the 2 GHz bandswitch point.)

Dwell time/point: 1 ms to 50 s

---

**Ramp (Analog) Sweep Mode**

- Resolution: 1 kHz
- Accuracy (25 ± 5 °C): for 100 ms sweeps, the greater of:
  
  ±0.01% of span / timebase  
  or  ±75 kHz / timebase

  at other sweep speeds: [±0.001% of span] / [sweep time (s)] / timebase

Sweep time: 10 ms to 100 s; 400 MHz/ms max

---

**Bandswitch Points**

For spans > 100 MHz: Bandswitch points at 2 and 11 GHz.

For ramp sweeps > 0.8 octave: Bandswitch points at 3.35 and 5.9 GHz.
Figure 17-1. Typical Swept Frequency Accuracy (100 ms sweep, ramp mode)
RF Output

With type-N output connector (Option 1E1D), performance is typical above 18 GHz.

Maximum Leveled Power (25 ±5 °C)

- HP 8375141: +10 dBm
- HP 83752A: +10 dBm
- HP 83751B: +17 dBm
- HP 83752B: < 2 GHz, +16 dBm; ≥ 2 GHz, +17 dBm

With Option 1E1 (step attenuator): reduce by 1 dB

Power typically degrades <2.5 dB over 0 to 55 °C

![Graph showing typical maximum available power over frequency](image)

Figure 17-2. Typical Maximum Available Power
Specifications and Options

RF Output

Minimum Settable Power

HP 83751A and HP 83752A: -15 dBm
  With Option 1E1: -85 dBm
HP 83751B and HP 83752B: -10 dBm
  With Option 1E1: -80 dBm

Resolution

Settable: 0.01 dB
Display: 0.1 dB

Accuracy and Flatness

Specifications apply for coupled attenuator mode (Option 1E1) and ALC level > -10 dBm (HP 83751A and HP 83752A); > -5 dBm (HP 83752A and HP 83752B).

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Level</th>
<th>Accuracy†</th>
<th>Flatness†</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 83751A and HP 83752A</td>
<td>&gt; -10 dBm</td>
<td>±1.0 dB</td>
<td>±0.7 dB</td>
</tr>
<tr>
<td>HP 83751A and HP 83752A (with Option 1E1)</td>
<td>&gt; -80 dBm</td>
<td>±1.5 dB</td>
<td>±1.2 dB</td>
</tr>
<tr>
<td>HP 83751B and HP 83752B</td>
<td>&gt; -5 dBm</td>
<td>±1.5 dB</td>
<td>±1.3 dB</td>
</tr>
<tr>
<td>HP 83751B and HP 83752B (with Option 1E1)</td>
<td>&gt; -75 dBm</td>
<td>±1.5 dB</td>
<td>±1.3 dB</td>
</tr>
</tbody>
</table>

* 25 ±5 °C
† Below 50 MHz, flatness is specified over 25 ±5 °C range
Specifications and Options

RF Output

Power Sweep

\[ \pm 25 \text{ dB/sweep, maximum} \]
Usable from minimum to maximum leveled power, within any one attenuator setting.
*Settable to \( \pm 35 \text{ dB/sweep} \).*

Power Slope

0 to \( \pm 2 \text{ dB/GHz} \), up to power sweep limit

External Leveling

External detector:
- range: \(-0.2 \text{ mV} \) to \(-0.5 \text{ V} \)
- bandwidth (sweep speed and modulation mode dependent): 10 or 100 kHz, nominal
*External power meter: 1 Hz bandwidth, nominal*
External mm-wave module: HP 83550 series compatible with Option 1EE

User Flatness (Level) Correction

Number of points: 2 to 801 points/table
Number of tables: up to 9
Entry modes: power meter, HP-IB (Compatible with HP 437B, 438A, 70100, and SCPI compatible power meters)
Specifications and Options
RF output

Source Match

<1.7:1 SWR, (internally Levelled)
Spectral Purity

Harmonics (at max leveled power)

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Harmonic Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 83751A and HP 83752A</td>
<td>10 MHz to 1.5 GHz</td>
<td>−30 dBC</td>
</tr>
<tr>
<td></td>
<td>1.5 GHz to 20 GHz</td>
<td>−45 dBC</td>
</tr>
<tr>
<td>HP 83751B and HP 83752B</td>
<td>All</td>
<td>−20 dBC</td>
</tr>
</tbody>
</table>

Subharmonics

None

Non-harmonic Spurious

This specification applies for coupled attenuator mode (Option 1E1) and ALC level > −10 dBm (HP 83751A and HP 83752A), > −5 dBm (HP 83752A and HP 83752B). This specification also applies for frequencies > 500 kHz from the carrier, and at levels < +5 dBm below 2 GHz.

Non-harmonic spurious: −50 dBC
Specifications and Options
Spectral Purity

Single-Sideband Phase Noise

![Graph showing single-sideband phase noise](image)

Offset From Carrier

Figure 17.3. Typical Phase Noise (10 GHz Carrier)

Residual FM (0.05 to 15 kHz bandwidth)

Residual FM: 1 kHz RMS in CW mode
Residual FM is typically < 10 kHz in unlocked FM mode.
Modulation

Please note that all modulation characteristics are typical or nominal, and are not warranted parameters.

Pulse

On/Off ratio: 60 dB
Rise/Fall times:
  0.5 to 2 GHz: 15 ns
  2 to 20 GHz: 100 ns rise, 50 ns fall
Minimum leveled width: 2 µs (for frequencies > 500 MHz in CW mode, or > 2 GHz in swept mode.)
Internal pulse generator:
  Width range: 1 µs to 65 ms
  Period range: 2 µs to 65 ms
  Resolution: 1 µs
Internal square wave: 1.0 kHz and 27.8 kHz (scalar mode)

AM

Sensitivity: 1 dB/V
Bandwidth (3 dB): > 100 kHz, usable to 1 MHz
Depth for HP 8375XA: 20 dB; (+10 dBm to -10 dBm)
Depth for HP 8375XB: 22 dB; (+17 dBm to -5 dBm)
Input impedance: 3.5 kohms
Specifications and Options

Modulation

FM

AC/Locked mode:
Rates: 50 kHz to 10 MHz
Maximum deviation: same as unlocked mode up to 25 times the rate

DC/Unlocked mode:
Rates: DC to 10 MHz
Maximum deviation:
  DC to 100 Hz rates: ±75 MHz
  100 Hz to 1 MHz rates: ±7 MHz
  1 MHz to 2 MHz rates: ±5 MHz
  2 MHz to 10 MHz rates: ±1 MHz

Sensitivity: -6 or -20 MHz/V (See Chapter 15, “Special Functions,” for FM sensitivity with millimeter head use.)

Input impedance: 1 kohm
General

Compatibility

HP 83751 and HP 83752 sweepers are compatible with HP 8757 scalar analyzers, and HP 8970B noise figure meters.

Programming

HP 83751 and HP 83752 sweepers are fully compatible with the Standard Commands for Programmable Instruments (SCPI) language. SCPI complies with IEEE 488.2-1987. HP 8350 mnemonics have also been implemented to provide compatibility with ATE systems which include an HP 8350B sweeper.

Master/Slave (two-tone) Measurements

Two HP 83750 series sweepers can synchronously track each other over swept or stepped frequencies at any fixed- or swept-frequency offset with limitations. Refer to Chapter 6, “Operating a Master/Slave Setup,” for information on instrument setups and operation.
Specifications and Options
General

Environmental

Operating temperature range: 0 to 55 °C
Type tested to the environmental requirements of: MIL-T-28800E Class 5.
EMC: Conducted and radiated interference comply with:
- EN55011 class A/CISPR-11 Class A
- EN50082-1-1991
  - IEC 801-2/1991 4 kV CD, 8 kV AD
  - IED 801-3/1984 3 V/m (26-500 MHz)
  - IEC 801-4/1988 500 V

Warmup Time

Operation: Requires 30 minutes warm-up time from cold start at 0 to 55 °C. Internal temperature equilibrium reached after 2 hour warm-up at stable ambient temperatures.
Frequency Reference (Option 1E5 only): Reference timebase is kept at operating temperature with the instrument connected to AC power.

Attention!
Instruments disconnected from AC power for more than 24 hours require up to 30 days to achieve timebase aging specification. Instruments disconnected from AC power less than 24 hours require 24 hours to achieve timebase aging specification.
Specifications and Options

General

Power Requirements

90-132 VAC (47-66 Hz), 103.5-126.5 VAC (380-420 Hz), or 198-250 VAC (47-66 Hz); 400 VA maximum (standby 100 VA). Optimum voltage range automatically selected.

If this instrument is to be energized via an external autotransformer for voltage reduction, make sure that its common terminal is connected to a neutral (earthed pole) of the power supply.

Dimensions

133 mm high by 425 mm wide by 498 mm deep (5.25 in. high by 16.75 in. wide by 19.6 in. deep); excluding front and rear panel protrusions.

Figure 17-4. Dimensions
Specifications and Options

General

Weight

Net: 16 kg (35 lb)
Shipping: 23 kg (49 lb)
Options

There are several options available for the sweeper. They are explained in the following sections.

Electrical Options

There are Eve electrical options available for the sweeper. These options are as follows:

- **Option 1E1 Add Output Step Attenuator**
  If Option 1E1 is ordered, an internal step attenuator is included before the RF OUTPUT connector. The step attenuator has a range of 0 to 70 dB in 10 dB steps. The correct amount of attenuation is selected automatically by the sweeper dependent on the output power level selected. If this option is installed, you can select whether or not the step attenuator will automatically switch. (Refer to the “Special Functions” chapter, special function number 6.)

- **Option 1E4 - Rear Panel RF Output**
  If Option 1E4 is ordered, the RF OUTPUT connector will be moved to the rear panel.

- **Option 1E5 - Add High Stability Timebase**
  If Option 1E5 is ordered, the sweeper is shipped with a 10 MHz temperature-controlled crystal reference oscillator for increased frequency accuracy and stability. When Option 1E5 is installed, the sweeper must be connected to ac power to keep the reference oscillator at operating temperature. If the reference oscillator has not been connected to ac power (the oven is cold), the sweeper requires 30 minutes to warm up.

- **Option 1ED - Type-N RF Output Connector**
  If Option 1ED is ordered, the RF OUTPUT connector is a ruggedized type-N female connector instead of the standard 3.5 mm connector. When this option is installed, output power characteristics above 18 GHz are typical and not warranted.
Specifications and Options

Options

Option 1EE - Source Module Connector and Extension Cable
If Option 1EE is ordered, source module interfacing hardware is added. This includes a connector on the rear panel and an extension cable that allows the mm-wave module to be positioned in front of the sweeper. This option provides direct frequency and power level control of HP 83550 series millimeter-wave source modules from the front panel of the sweeper. HP 83751A and HP 83752A sweepers require external amplification to drive source modules. High power sweeper models HP 83751B and HP 83752B can directly drive source modules.

Mechanical Options

There are three mechanical options available for the sweeper. If these options were not ordered with the original shipment, and are now desired, they can be ordered from the nearest Hewlett-Packard office using the part numbers included in each of the following descriptions.

Option 1CM Rack Mount Kit without Handles
Ordering Option 1CM adds a rack mount kit without handles. The HP part number for the rack mount kit without handles is 5062-3977.

Option 1CP - Rack Mount Kit with Handles
Ordering Option 1CP adds a rack mount kit with handles. The HP part number for the rack mount kit with handles is 5062-3983.

Option AX2 - Portable Handle and Front-panel Cover
Ordering Option AX2 adds tilt-bail handle, rubber bumpers, rear feet and a protective front panel cover for field test applications where portability is desired. Complies with MIL-T-28800E Class 5 Style D. The HP part number for the portability kit is 5063-0092.
Warranty Options

There are Eve warranty options available for the sweeper. These options are as follows:

**Option W30 - Two Additional Rears Return to HP Service**

This option extends the benefits of factory warranty to provide a total of three years of customer return repair service.

**Option W50 - Five Year Return to HP Repair Service**

This option extends the benefits of factory warranty to provide a total of five years of customer return repair service.

**Option W52 - Five Year Return to HP Calibration Service**

This option provides five years of HP calibration service at HP customer service centers.

**Option W54 - Five Year MIL-STD Calibration Service**

This option provides five years of MIL-STD calibration at HP customer service centers.