

# SIGNAL ANALYZERS

Spectrum Analyzers, Bench, 100 Hz to 325 GHz

HP 8566B, 8567A, 8568B

- 100 Hz to 325 GHz coverage with synthesizer accuracy
- 10 kHz to 1.5 GHz coverage at a lower price
- 100 Hz to 1.5 GHz coverage with counter accuracy
- 2 to 22 GHz preselected range
- Trace markers with amplitude and frequency readout
- 16 Kbytes of user RAM for trace data or custom routines



HP 8566B

SUPPORTED BY  
**HP ITG**  
SOFTWARE

DESIGNED FOR  
**HP-IB**  
SYSTEMS



with Turbo Option

## HP 8566B, 8567A, 8568B Spectrum Analyzers

The HP 8566B, 8567A, and 8568B are high-performance spectrum analyzers for bench and ATE system use. The HP 8566B has the highest performance of the three, with a frequency range from 100 Hz to 22 GHz that can be extended to 325 GHz using external mixers. (HP 8566B Option 1BH is available for general export.) The HP 8567A and 8568B are RF spectrum analyzers with frequency coverage to 1500 MHz. See pages 251 and 252 for specification summaries on all analyzers.

Each analyzer is designed around its own internal bus and controlled by its own microcomputer to yield significant improvements in operational and data processing features as well as flexibility under computer control. Each analyzer has 16 Kbytes of user RAM for storing trace data, instrument states, or custom downloadable programs (DLPs).

### New HP 8566B Turbo Option

Increase the measurement speed of your HP 8566B spectrum analyzer. A new turbo option (Option 002) nearly doubles the analyzer's processing rate, so your measurements can be made up to 50% faster, with 25% improvement typical. If you already own an HP 8566B, a turbo retrofit kit is available as Option R02.

### Performance

The exceptional frequency stability of both the HP 8566B and the HP 8568B makes it possible to measure with 10 Hz resolution bandwidths. This narrow resolution bandwidth yields sensitivities to  $-135$  dBm in both instruments. Excellent frequency stability, sensitivity, and frequency-reference accuracy combine to allow very accurate measurement of small signals in the presence of large ones.

For applications that don't require the high performance of the HP 8568B, the HP 8567A offers the same speed, versatility, and automatic operation capability at a lower price. Resolution bandwidths as narrow as 1 kHz yield sensitivities as low as  $-115$  dBm.

### Flexibility

These spectrum analyzers fit into many applications, such as EMC testing (see page 256), broadband signal surveillance, and component stimulus-response testing. The HP 8444A Option 059 tracking generator adds stimulus-response capabilities to the RF models for a minimal cost. The HP 85644A and 85645A tracking sources add 6.5 GHz and 22 GHz high-performance scalar capability to the HP 8566B.

### Usability

The instrument control settings are conveniently shown on the CRT for easy reference. Functions are activated by pressing a front-panel key, then selecting the function value using the knob, step keys, or numeric keyboard. To maintain a calibrated display, certain functions are automatically coupled in the analyzer. For example, resolution bandwidth, video bandwidth, and sweep time are automatically adjusted by the instrument when the frequency span is reduced.

Up to four tunable display markers are available to aid in measuring and analyzing signals. Two markers can be used to make relative measurements by displaying their amplitude and frequency differences. Marker information allows you to step between evenly spaced portions of a spectral display (such as signal harmonics) or "zoom in" on a selected portion of the spectrum. Analyzer control settings can be saved in the non-volatile memory of the analyzer.

### Versatile CRT Display and Plotting Capabilities

All displayed information resides in the analyzer's digital memory, which refreshes the CRT at a flicker-free rate. Multiple traces can be displayed to measure residual FM or drift, or to conduct real-time surveillance over a wide frequency range.

By adding an HP-IB plotter, hard copy of all information on the display of the analyzer can be made for analysis, documentation, or presentation. Plots can be produced directly or with the aid of a controller.

### Custom Softkey Programming

Custom measurement routines can be created to meet your specific requirements. These programs can be created on an external controller or from the front-panel controls of the instrument, then stored in the non-volatile memory of the analyzer. Custom programming allows you to create complex measurement routines that can be stored and later executed using a single softkey.

### System Software

BASIC system software for the HP 8566B, 8567A, and 8568B spectrum analyzers provides high-level routines to aid in developing custom programs for specific measurement applications. Capabilities include automatic computation and setting of analyzer functions to ensure optimum measurement performance.

# SIGNAL ANALYZERS

## Spectrum Analyzers, Bench, 100 Hz to 1500 MHz

### HP 8568B, 8567A

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#### Specification Summary

FREQUENCY	HP 8568B	HP 8567A
Frequency Range	100 Hz to 1500 MHz (dc-coupled) 100 kHz to 1500 MHz (ac-coupled)	10 kHz to 1500 MHz
Frequency Span	100 Hz to 1500 MHz + zero span	100 Hz to 1500 MHz + zero span
Frequency Reference Accuracy		
Aging Rate	< 2.5 × 10 <sup>-7</sup> /year	< 5 × 10 <sup>-8</sup> /year
Temperature Stability	< 7 × 10 <sup>-9</sup> (0° to 55° C)	< 1 × 10 <sup>-8</sup> (5° to 55° C)
Resolution Bandwidth (-3 dB)	10 Hz to 3 MHz in 1,3,10 sequence	1 kHz to 3 MHz in 1,3,10 sequence
Video Bandwidth	1 Hz to 3 MHz in 1,3,10 sequence	1 Hz to 3 MHz in 1,3,10 sequence
Residual FM (peak-to-peak, <100 kHz span)	< 3 Hz (res BW ≤ 30 Hz)	< 100 Hz (res BW 1 kHz)
Drift (per minute of sweep time, after 1-hour warmup)	< 10 Hz (freq span ≤ 100 kHz)	< 100 Hz (freq span ≤ 100 kHz)
Phase Noise (30 kHz offset, 1 Hz res BW)	-107 dBc	-105 dBc
<b>AMPLITUDE</b>		
Amplitude Range	-135 to +30 dBm	-115 to +30 dBm
Log Display Range	1, 2, 5, or 10 dB/div for 10, 20, 50, or 90 dB display	1, 2, 5, or 10 dB/div for 10, 20, 50, or 90 dB display
Scale Fidelity—incremental	± 0.1 dB/dB; 0 to 90 dB	± 0.1 dB/dB; 0 to 80 dB
cumulative (20° to 30° C)	≤ ± 1.0 dB; 0 to 80 dB ≤ ± 1.5 dB; 0 to 90 dB	≤ ± 1.0 dB; 0 to 80 dB ≤ ± 1.5 dB; 0 to 90 dB
Calibrator Uncertainty	± 0.3 dB	± 0.3 dB
Frequency Response (input atten ≥ 10 dB)	± 1.5 dB, 100 Hz to 1500 MHz/± 1 dB, 100 kHz to 1500 MHz	± 1 dB, 10 kHz to 1500 MHz
Spurious Responses (< -40 dBm at mixer)	< -70 dBc (< 10 MHz input sig) < -75 dBc (> 10 MHz input sig)	< -70 dBc
Second Harmonic Distortion (-30 dBm at mixer)	< -70 dBc (sig ≥ 10 MHz) < -60 dBc (sig < 10 MHz)	< -70 dBc (sig ≥ 10 MHz) < -60 dBc (sig < 10 MHz)
Third Order Intercept (TOI)	+10 dBm (sig > 10 MHz)	+10 dBm (sig > 10 MHz)
Residual Responses (at 1 MHz) (0 dB attn, no input signal)	< -105 dBm	< -100 dBm
Gain Compression (≤ 10 dBm at mixer)	< 0.5 dB	< 1.0 dB
Displayed Average Noise Level (0 dB attn, 1 Hz Video BW)	< -112 dBm, 500 Hz to 1 MHz (10 Hz res BW) < -135 dBm, > 1 MHz (10 Hz res BW)	< -92 dBm, 50 kHz to 1 MHz (1 kHz res BW) < -115 dBm, > 1 MHz (1 kHz res BW)
Sweep Time: Zero Span	1 μs to 1500 s	1 μs to 1500 s
Swept	20 ms to 1500 s	20 ms to 1500 s

#### General Specifications (apply to both HP 8568B and 8567A unless noted)

##### Environmental

**Temperature:** Operation: 8568B, 0° to 55° C; 8567A, 5° to 55° C  
Storage: -40° to +75° C

**EMI:** Conducted and radiated interference is within the requirements of MIL-STD461B, CE03/part 2 and RE02/part 7, and the requirements of CISPR Pub. 11 and FTZ 526/1979

**Power requirements:** 100, 120, 220, or 240 Vac (+5%, -10%), 50 to 60 Hz or 400 Hz with Op 400

##### Warmup Time

**Operation:** 30 min from cold start

##### Frequency reference

**8568B:** Frequency within 1 × 10<sup>-8</sup> of final stable freq within 30 min

**8567A:** Frequency within 5 × 10<sup>-8</sup> of final stable freq within 30 min

**Size** (w/out handles): 279.4 mm H × 425.5 mm W × 558.8 mm D (11 in × 16.75 in × 22 in)

**Weight:** Net, 45 kg (100 lb)

##### Inputs

RF in (Type N), RF in (BNC, 8568B only), ext freq ref in, ext sweep trig in

**Quasi-peak:** Video in, IF in

##### Outputs

Cal out, display X, Y, and Z out, horiz sweep out, video out, penlift out, 21.4 MHz IF, 1st LO, freq ref, probe power out (8568B only)

**Quasi-peak:** Video out, IF out

#### Ordering Information

	Price
<b>HP 8568B</b> Spectrum Analyzer	\$38,765
<b>HP 8567A</b> Spectrum Analyzer	\$29,680
<b>Opt 001</b> 75 ohm (BNC) RF input	+\$204
<b>Opt 016</b> Installed EMI Receiver Functions	+\$255
<b>Opt 044</b> Add HP 8444A Opt 059 Tracking Generator (8567A only)	+\$7,600
<b>Opt W30</b> Extended Repair Service (see page 671)	
8568B	+\$1,060
8567A	+\$670
<b>Opt W32</b> Calibration Service (see page 671)	
8568B	+\$3,610
8567A	+\$2,860
<b>Opt 400</b> 400 Hz Power Line Frequency Operation	
8568B	+\$410
8567A	+\$715
<b>Opt 010</b> Rackmount Slide Kit	+\$460
<b>Opt 908</b> Rack Flange Kit (instrument w/out handles)	
8568B	+\$66
8567A	+\$153
<b>Opt 913</b> Rack Flange Kit (instrument w/handles)	
8568B	+\$71
8567A	+\$153
<b>Opt 910</b> Add Extra Set of User's Manuals	+\$355
<b>Opt 915</b> Add Service Manuals	
8568B	+\$825
8567A	+\$825
<b>Opt 462</b> Impulse Bandwidths for EMI Measurements (8568B only)	+\$2,040
<b>Opt 080</b> 8568B Information Card in Japanese	\$0
<b>Opt 081</b> 8568B Information Card in French	\$0

# SIGNAL ANALYZERS

## Spectrum Analyzer, Bench, 100 Hz to 325 GHz HP 8566B

### HP 8566B Specification Summary

#### Frequency

**Frequency range:** 100 Hz to 22 GHz with internal mixer; extendable to 110 GHz with HP 11970 external mixers, to 75 GHz with HP 11974 series preselected mixers, and to 325 GHz with mixers from other suppliers

**Frequency span:** 0 Hz, 100 Hz to 22 GHz, variable in approximately 1% increments

**Frequency reference accuracy:** Aging rate,  $<1 \times 10^{-9}/\text{day}$ ,  $<2.5 \times 10^{-7}/\text{year}$

**Temperature stability:**  $<7 \times 10^{-9}$ ,  $0^\circ$  to  $55^\circ \text{C}$

**Resolution bandwidth:** 3 dB bandwidths of 10 Hz to 3 MHz in a 1, 3, 10 sequence

**Bandwidth selectivity, 60 dB/3 dB ratio:**  $<11:1$ , 30 Hz to 3 kHz;  $<13:1$ , 10 kHz and 30 kHz;  $<15:1$ , 100 kHz to 3 MHz

**Bandwidth shape:** synchronously tuned, 4- or 5-pole filters, approximately Gaussian shape

**Video bandwidth:** 1 Hz to 3 MHz in a 1, 3, 10 sequence

**Residual FM** (typical peak-to-peak, fundamental mixing mode):  $<0.2 \text{ Hz}$ , frequency span  $<5 \text{ kHz}$ ;  $<5 \text{ Hz}$ , frequency span  $<100 \text{ kHz}$ ;  $<200 \text{ Hz}$ , frequency span  $<5 \text{ MHz}$

**Drift** (typical, after 1-hour warmup at stabilized temperature):  $<10 \text{ Hz/min}$  of sweep time, frequency span  $\leq 100 \text{ kHz}$ ;  $<500 \text{ Hz/min}$  of sweep time, frequency span 100 kHz to 5 MHz;  $<5 \text{ kHz/min}$  of sweep time, frequency span  $\geq 5 \text{ MHz}$

#### Spectral Purity

**Noise sidebands** (center frequency 100 Hz to 5.8 GHz): 320 Hz offset,  $<-80 \text{ dBc/Hz}$ ; 1 kHz offset,  $<-85 \text{ dBc/Hz}$ ; 10 kHz offset,  $<-90 \text{ dBc/Hz}$ ; 100 kHz offset,  $<-105 \text{ dBc/Hz}$

#### Amplitude

**Amplitude range** (dBm):  $-134$  to  $+30$ , 1 MHz to 2.5 GHz;  $-132$  to  $+30$ , 2 to 5.8 GHz;  $-125$  to  $+30$ , 5.8 to 12.5 GHz;  $-119$  to  $+30$ , 12.5 to 18.6 GHz;  $-114$  to  $+30$ , 18.6 to 22 GHz

**Log display range:** 1, 2, 5, or 10 dB/division for 10, 20, 50, or 90 dB displays, respectively

**Scale fidelity:**  $\pm 0.1 \text{ dB/dB}$  over 0 to 80 dB display ( $20^\circ$  to  $30^\circ \text{C}$ );  $<\pm 1.0 \text{ dB}$  max over 0 to 80 dB display;  $<\pm 1.5 \text{ dB}$  max over 0 to 90 dB display

**Calibrator uncertainty:**  $\pm 0.3 \text{ dB}$

**Frequency response** (10 dB input atten): 100 Hz to 2.5 GHz,  $\pm 0.6 \text{ dB}$ ; 2 to 12.5 GHz,  $\pm 1.7 \text{ dB}$ ; 12.5 to 20 GHz,  $\pm 2.2 \text{ dB}$ ; 20 to 22 GHz,  $\pm 3.0 \text{ dB}$

#### Dynamic range

**Spurious responses:**  $<-70 \text{ dBc}$  for mixer levels  $\leq -40 \text{ dBm}$

#### Second harmonic distortion

**Unpreselected, mixer levels  $\leq -40 \text{ dBm}$ :**  $<-70 \text{ dBc}$ , 100 Hz to 2.5 GHz;  $<-80 \text{ dBc}$ , 50 to 700 MHz

**Preselected, mixer levels  $\leq -10 \text{ dBm}$ :**  $<-100 \text{ dBc}$ , 2 to 22 GHz

**Third order intercept (TOI):**  $> +5 \text{ dBm}$ , 100 Hz to 5 MHz;  $> +7 \text{ dBm}$ , 5 MHz to 5.8 GHz;  $> +5 \text{ dBm}$ , 5.8 to 18.6 GHz

**Image responses:**  $<-70 \text{ dBc}$ , 100 Hz to 18.6 GHz;  $<-60 \text{ dBc}$ , 18.6 to 22 GHz

**Multiple responses:**  $<-70 \text{ dBc}$ , 100 Hz to 22 GHz

**Out-of-band responses:**  $<-60 \text{ dBc}$ , 2 to 22 GHz

**Residual responses** (0 dB input atten, no input signal):  $<-100 \text{ dBm}$ , 100 Hz to 5.8 GHz;  $<-95 \text{ dBm}$ , 5.8 to 12.5 GHz;  $<-85 \text{ dBm}$ , 12.5 to 18.6 GHz;  $<-80 \text{ dBm}$ , 18.6 to 22 GHz

**Gain compression** ( $\leq -5 \text{ dBm}$  at mixer):  $<1.0 \text{ dB}$ , 100 Hz to 22 GHz

**Displayed average noise level** (0 dB input atten, 10 Hz res BW)

**Unpreselected:**  $<-95 \text{ dBm}$ , 100 Hz to 50 kHz;  $<-112 \text{ dBm}$ , 50 kHz to 1 MHz;  $<-134 \text{ dBm}$ , 1 MHz to 2.5 GHz

**Preselected:**  $<-132 \text{ dBm}$ , 2 to 5.8 GHz;  $<-125$ , 5.8 to 12.5 GHz;  $<-119 \text{ dBm}$ , 12.5 to 18.6 GHz;  $<-114 \text{ dBm}$ , 18.6 to 22 GHz

#### Sweep Time

**Zero span:** 1  $\mu\text{s}$  to 1500 s

**Swept:** 20 ms to 1500 s

**Accuracy:**  $\pm 10\% \leq 200 \text{ s}$  sweep times;  $\pm 30\% > 200 \text{ s}$  sweep times

**Trigger:** Free run, line, video, external, continuous, and single

#### General Specifications

##### Environmental

**Temperature:** Operation,  $0^\circ$  to  $55^\circ \text{C}$ ; storage,  $-40$  to  $+75^\circ \text{C}$

**Humidity:** Operating  $<95\% \text{ RH}$ ,  $0^\circ$  to  $40^\circ \text{C}$ .

**EMI:** Conducted and radiated interference is within the requirements of MIL-STD-461C, Part 7, REO2 and CEO3 (Air Force), and the requirements of CISPR Pub. 11 and Messemphaenger-post-feruegun 526/527/79

**Power requirements:** 100, 120, 220, or 240 Vac ( $+5\%$ ,  $-10\%$ ), 50 to 60 Hz or 400 Hz with Opt 400

**Warmup time operation:** 30 min from cold start ( $0^\circ$  to  $55^\circ \text{C}$ )

**Frequency reference:** frequency within  $1 \times 10^{-8}$  of final stable frequency within 30 min

**Size (w/out handles):** 279.4 mm H  $\times$  425.5 mm W  $\times$  598.5 mm D (11 in  $\times$  16.75 in  $\times$  23.56 in)

**Weight:** net, 50 kg (112 lb)

#### Inputs

RF in (Type N), ext freq ref in, ext sweep trig in

**Quasi-peak:** Video in, IF in

#### Outputs

Cal out, 1st LO out, IF out, sweep + tune out, display X, Y, Z out, horiz sweep out, video out, penlift out, 21.4 MHz IF out, freq ref, 10 MHz

**Quasi-peak:** Video out, IF out

#### Ordering Information

HP 8566B Spectrum Analyzer	Price
<b>Opt 002</b> Turbo Option	\$64,500
<b>Opt R02</b> Turbo Retrofit Kit	\$2,500
<b>Opt 016</b> Installed EMI Receiver Functions	\$3,000
<b>Opt 400</b> 400 Hz Power-Line Frequency Operation	+\$255
<b>Opt W30</b> Extended Repair Service (see page 671)	+\$410
<b>Opt W32</b> Calibration Service (see page 671)	+\$1,150
<b>Opt 462</b> Impulse Bandwidths for EMI Measurements	+\$3,900
<b>Opt 010</b> Rackmount Slide Kit	+\$2,040
<b>Opt 908</b> Rack Flange Kit (instrument w/out handles)	+\$460
<b>Opt 913</b> Rack Flange Kit (instrument w/handles)	+\$66
<b>Opt 910</b> Add Extra Set of User's Manuals	+\$71
<b>Opt 915</b> Add Service Manuals	+\$355
<b>Opt 031</b> German Operating Manual	+\$825
<b>Opt 080</b> Information Card in Japanese	\$0
<b>Opt 081</b> Information Card in French	\$0
<b>Opt E69</b> Internal MATE Test Module Adapter	\$0
	+\$4,500