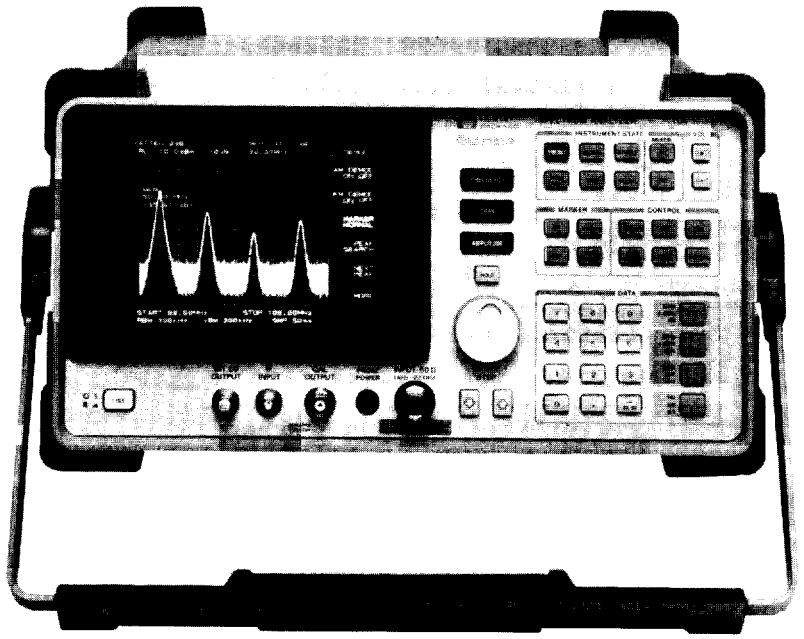
- Synthesized tuning
- Frequency counter
- Factory adjusted preselector
- AM/FM demodulators
- Portable AC Power Source
- Mass Memory Module
- Test and Adjustment Module
- One Year Calibration Cycle
- MIL-T-28800C Rugged
- Lightweight and Portable

DESIGNED FOR HP-IB SYSTEMS



HP 8562A

The HP 8561A and 8562A/B spectrum analyzers put high-performance, synthesized technology into a lightweight, portable package. Ruggedized to military specifications, these analyzers are engineered to survive harsh field conditions. They perform a wide variety of jobs from communication-system and component testing to radar and millimeter measurements. These models are packed with advanced HP technology and HP-IB is standard.

The Choice is Yours

The HP 8562A has a frequency range of 1 kHz to 22 GHz with microwave preselection that can be extended up to 26.5 GHz with option 026. External mixers extend the range to 325 GHz. The HP 8562B covers the same frequency range as the HP 8562A but without preselection. Satisfy your RF measurement needs by using the economical HP 8561A which has a frequency range of 1 kHz to 6.5 GHz with preselection from 2.75 GHz to 6.5 GHz.

Use Them Anywhere

The compact size and shape of the HP 8561A and 8562A/B makes them easy to transport to remote sites. They even slide under an airplane seat. Of course, these portable analyzers also make good sense in the laboratory and on the production line. They fit easily onto crowded work benches or instrument racks. And if there's no room on your bench, they will operate upright on the floor.

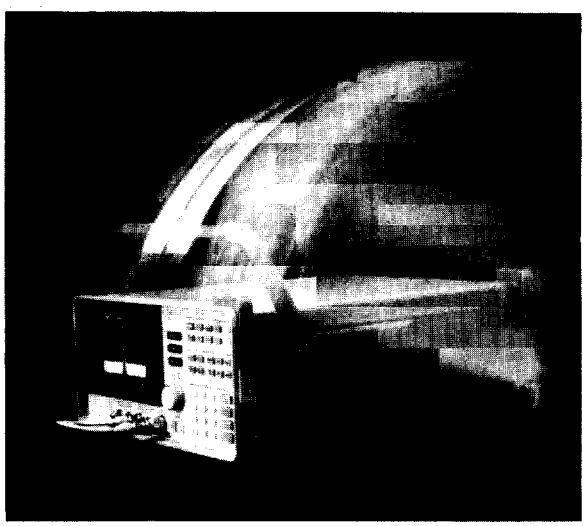
Rugged and Dependable

The HP 8561A and 8562A/B are built to perform in adverse conditions. They have been ruggedized to meet MIL-T-28800C requirements for temperature, pulse shock, and transit drop. These analyzers withstand 30 g's of shock, so there is no need to worry if they are knocked around. Climate isn't a problem either—these models warm up in five minutes in ambient temperatures from -10°C to +55°C.

A removable impact cover fits over the front panel for maximum protection during transit. Inside the cover there are several convenient compartments for small accessories like adapters, BNC cables, and external mixers. You'll find a handy, pocket-size operating guide there too.

Ease of Use

For over 20 years, Hewlett-Packard has been designing spectrum analyzers that are easy for both new and experienced operators to use. The HP 8561A and 8562A/B represent the fifth generation of spectrum analyzers. Their front panels are clean, uncluttered, and inviting to use. Dedicated keys with large, easy-to-read lettering provide the basic tune, zoom, and measure steps. They allow fast access to frequently used functions such as markers, save/recall, and direct printer/plotter output. You may never require more, but if you need it, additional capacity is available using softkeys.



The Portable Spectrum Analyzers meet MIL-T-28800C standards for ruggedness.

SIGNAL ANALYZERS

Spectrum Analyzers, 1 kHz to 325 GHz (cont'd)

Models 8561A, 8562A/B

Communication Measurements

The portable spectrum analyzers are ideal tools for bench measurements and field maintenance of digital radios, CATV/Broadcast measurements, terrestrial point-to-point microwave link maintenance, troubleshooting the interference problems of devices and systems, and measuring low level signals in the presence of high level ambients. Eliminate external mixers to analyze K-band signals by using the HP 8562A/Option 026, preselected to 26.5 GHz. Use the HP 8561A to measure the higher harmonics of mobile/cellular radios and other RF devices without the added expense of buying a microwave spectrum analyzer. The built-in AM/FM demodulator/speaker indicates over-modulation, clipping, synch buzz, and troublesome "birdies." The built-in frequency counter accurately measures the frequency of the carrier. Direct carrier-to-noise measurement can be made with delta markers and noise normalization. Use the MAX HOLD function to capture elusive transient signals.

Component Testing

Fast, accurate, synthesized tuning allows high-speed measurement of mixing-product suppression. Excellent intermodulation distortion and sensitivity improve dynamic range for distortion measurements.

The 8562A/B are ideal choices for stimulus response measurements. They provide up to 118 dB dynamic range and offset tracking capability when synthesized sources are used for stepped distortion and stepped conversion-loss measurements.

The HP 8561A and 8562A/B spectrum analyzers are valuable tools for electromagnetic compatibility (EMC) design and troubleshooting. In conjunction with the HP 11945A Close-Field Probe Set, these analyzers can be used to localize sources of high emissions and to evaluate shielding effectiveness.

Radar Measurements

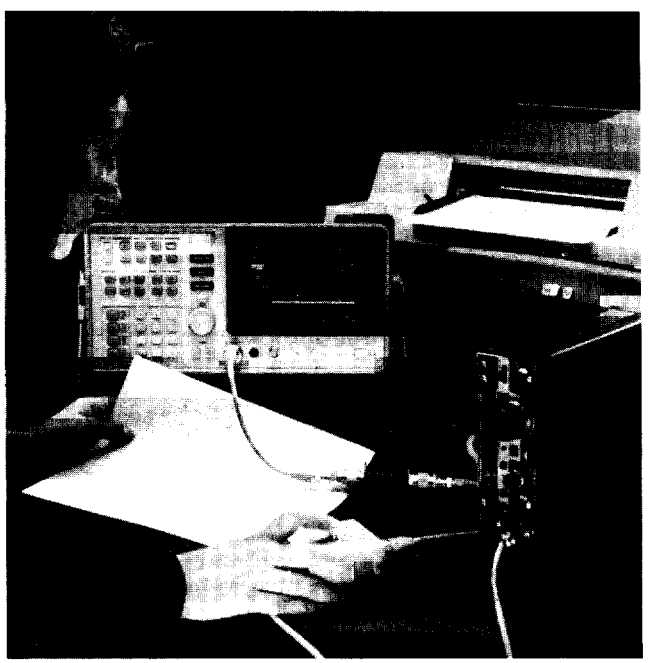
Some analyzers with digital displays have difficulty capturing short-duration radar pulses. With such analyzers it is not certain whether variations from sweep to sweep are due to equipment under test or to the analyzer itself. The HP 8561A and 8562A/B have a digitization uncertainty specification of ±1.25 dB and typical repeatability of 0.2 dB. Users can be sure that observed amplitude variations—those caused by magnetron moding, misfiring, or rotary joint problems—are due to the equipment under test, not the analyzer.

Millimeter Measurements

The HP 8562A/B, used with the HP 11970 series of external mixers (18 to 110 GHz), offer excellent specified performance for sensitivity, flatness, and absolute amplitude accuracy. Each mixer is individually calibrated and provided with conversion loss data, which can be entered into the analyzer directly. No costly LO amplifier is required. These analyzers also supply the bias required for other external mixers operating up to 325 GHz.

Automatic Measurements

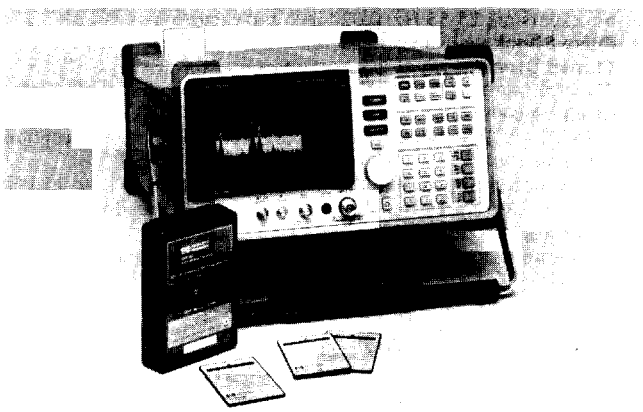
The HP 8561A and 8562A/B reflect HP's commitment to automated testing. Synthesized performance, low temperature rise, and an 8.75-inch rackmount option make the HP portable spectrum analyzers ideal for automatic measurements. Use them in the field and factory as your standard spectrum analyzers to save development time, documentation effort, and internal training. Their one-year calibration interval reduces downtime, and the continuously self-aligning IF ensures measurements you can rely on.



The compact size and direct printer/plotter output of the portable spectrum analyzers are convenient for bench and production applications.

Mass Memory Module

A companion Mass Memory Module, the HP 85620A, plugs onto the rear panel. Use 128K bytes of built-in, battery-backed RAM of the HP 85620A to store at least 10 downloadable programs (DLPs) or more than 100 traces. This module has the capability to generate "smart" limit lines to track the analyzers' settings and automatically adjust to the changes. With the built-in clock, auto-save, and auto-execute capabilities of the Mass Memory Module, the HP 8561A and 8562A/B can automatically make measurements at specified times or when specific frequency/amplitude criteria are met.



The HP 85620A Mass Memory Module provides the analyzers with built-in computer capability.

Test and Adjustment Module

The HP 85629B Test and Adjustment Module or "TAM" is a new approach to servicing spectrum analyzers. It plugs onto the rear panel of the HP 8561A and 8562A/B and performs high level diagnostics, self tests, and much more. The TAM is a must for anyone doing his own repair. And one module can service multiple spectrum analyzers.

Detect Fault

Automatic Fault Isolation makes functionality checks of the CPU, ADC, IF, LO, and RF sections. Just connect the CAL OUTPUT, press a few keys, and many failures can be isolated to a single board within minutes. No external test equipment is required.

Find Fault

Manual probe troubleshooting using the TAM's 8-input voltmeter and the twenty-six 16-pin test connectors spread throughout the analyzer lets you make more than 1000 measurements, isolating the faulty board or component quickly, without racks of equipment.

Readjustment

Once you've repaired the analyzer, readjustment is fast and accurate because the TAM controls both internal analyzer settings and external test equipment. For example, the TAM performs the frequency-response adjustment in 10 minutes. The same adjustment performed manually takes an hour. After readjustment, use the TAM's functional tests for immediate confidence that the repair was completed successfully.

Specifications

Frequency

Frequency Range: 1 kHz to 6.5 GHz (HP 8561A)
1 kHz to 22 GHz (HP 8562A/B)
1 kHz to 26.5 GHz (Opt. 026)
(325 GHz with external mixers)

Harmonic mode (n)	Center frequency
1	1 kHz - 2.9 GHz
1	2.75 GHz - 6.46 GHz
2	5.86 GHz - 13.0 GHz
3	12.4 GHz - 19.7 GHz
4	19.1 GHz - 22.0 GHz
4	19 GHz - 26.5 GHz (Opt. 026)

Frequency Readout Accuracy: Start, Center, Stop, or Marker: ±(freq readout × freq reference accuracy + 5% of span + 15% of res BW + 250 Hz)
Counter Resolution: 10 Hz - 1 MHz (selectable)
Counter Accuracy: ±(marker freq × freq reference accuracy + 50 Hz × n + 2 LSD) for S/N≥25 dB
Delta Counter Accuracy: ±(delta freq × freq reference accuracy + 100 Hz × n + 2 LSD) for S/N≥25 dB
Frequency Reference Accuracy: $<4 \times 10^{-6}$/year (includes aging, temperature drift, settability)
Frequency Stability
Residual FM: <50 Hz × n p-p in 0.1 sec (zero span)
Spectral Purity
Noise Sidebands: <(−100 + 20 Log n) dBc/Hz at 30 kHz offset
Frequency Span
Range: 0 Hz, 2.5 kHz x n to 19.25 GHz
2.5 kHz x n to 23.75 GHz (Opt. 026)
Accuracy: < 5%
Resolution Bandwidth (−3 dB)
Range: 100 Hz - 1 MHz in a 1,3,10 sequence and 2 MHz
Accuracy: ±30% 100 Hz, ±10% 300 Hz to 300 kHz, ±25% 1 MHz and 2 MHz
Selectivity: <15:1 (−60 dB/−3 dB)
Shape: Synchronously-tuned, 4-pole filter
Video Bandwidth
Range: 1 Hz - 3 MHz in a 1,3,10 sequence

Amplitude Range

Amplitude Range: +30 dBm to displayed average noise level
Maximum Safe Input
Average Continuous Power: +30 dBm (1 Watt) with input atten ≥10 dB
Peak Pulse Power: +50 dBm (100 Watt) with input atten ≥30 dB for <10 usec pulse width and <1% duty cycle
DC: 0 Volts
Display Range
Display: 10 × 10 Division Graticule
Calibration: Log 10,5,2 and 1 dB per division, Linear 10% of Reference Level/division
Reference Level Range: Log, −120 to +30 dBm in 0.1 dB steps; linear 2.2 uVolts to 7.07 Volts in 1% steps
Input Attenuation Range: 0 to 70 dB in 10 dB steps

Dynamic Range

Maximum Dynamic Range
Compression to Noise: 118 dB
Signal to Distortion:
Harmonic: ≥2.9 GHz: 100 dB (77.5 dB unpreselected), <2.9 GHz: 77.5 dB
Intermodulation: 86 dB
Displayed Average Noise Level: With 100 Hz res BW, 0 dB Input Attenuator, 1 Hz video filter: −90 dBm, 10 kHz; −100 dBm, 100 kHz; −120 dBm, 1 MHz to 2.9 GHz; −121 dBm, 2.75 GHz to 6.46 GHz; −110 dBm, 5.86 GHz to 13.0 GHz; −105 dBm, 12.4 GHz to 19.7 GHz; −100 dBm, 19.1 GHz to 22.0 GHz; −100 dBm, 19.1 GHz to 26.5 GHz (Option 026)
1 dB Gain Compression: −3 dBm at input mixer above 10 MHz
Spurious Responses: Signals generated by the analyzer due to input signals. For mixer level <−40dBm: all harmonic and intermodulation distortion >60 dB[1] below input signal.
Second Harmonic Distortion: for mixer level =−40 dBm: <−72 dBc, 10 MHz to 2.9 GHz; <−60 dBc (8562B only) above 2.75 GHz. For mixer level =−10 dBm: <−100 dBc (8562B unspecified) above 2.75 GHz.

[1]to 6.46 GHz 8561A/8562A, to 2.9 GHz 8562B

SIGNAL ANALYZERS
Spectrum Analyzers, 1 kHz to 325 GHz (cont'd)
Models 8561A, 8562A/B

Third Order Intermodulation Distortion: for mixer level <−30dBm: <−70 dBc, 10 MHz to 2.9 GHz; <−75 dBc above 2.75 GHz.
Image, Multiple, and Out-of-Band Responses: <−70 dBc, 10 MHz - 22 GHz (8562B unspecified); <−60 dBc, 10 MHz - 22 GHz (8562B unspecified)
Residual Responses: No signal at input, 0 dB input atten. <−90 dBm, 200 kHz to 6.46 GHz.

Amplitude Accuracy
Frequency Response (flatness): 10 dB attenuation.

Frequency Range	8561A/8562A	8562B
1 kHz - 2.9 GHz	±1.0 dB	±1.0 dB
2.75 - 6.46 GHz	±1.5 dB	±1.0 dB
5.86 - 13.0 GHz	±2.0 dB	±1.5 dB
12.4 - 19.7 GHz	±3.0 dB	±1.5 dB
19.1 - 22.0 GHz	±3.0 dB	±2.0 dB
19.1 - 26.5 GHz (Opt. 026)	±3.0 dB	

Calibrator Accuracy: ±0.3 dB
IF Gain Uncertainty: ±1 dB for 0 dBm to −80 dBm reference level
Scale Fidelity: 0.4 dB/4 dB to a maximum of ±1.5 dB over 0 to 90 dB range. Linear: ±3% of Reference Level
Input Attenuator Switching Accuracy: With 20 to 70 dB settings referenced to 10 dB. 1kHz - 2.9 GHz ±0.6 dB/10 dB step, 1.8 dB max
Resolution Bandwidth Switching Uncertainty: ±0.5 dB reference to 300 kHz BW
Pulse Digitization Uncertainty: Pulse response mode, PRF>720/sweeptime. Log (peak to peak): 1.25 (RBW ≤ 1MHz), 3 dB (RBW=2MHz) dB; Linear (peak to peak): 4% of ref level, (RBW ≤ 1 MHz), 12% of ref level, nominal standard deviation: 0.2 dB

Sweep
Sweep Time
Range: 50 usec to 60 sec for zero span, 50 msec to 100 sec for span ≥2.5 kHz
Sweep Trigger: Free Run, Line, Single, Video, External

Demodulation
Modulation Type: AM and FM
Audio Output: Speaker and phone jack with volume control

Inputs & Outputs
Front Panel Connectors
RF Input: Precision type N female, nominal impedance 50 Ω
VSWR: <1.5:1 for <2.9 GHz and ≥10 dB Input Attenuation (nominal); <2.3:1 for >2.9GHz and ≥10 dB Input Attenuation (nominal); <3.0:1 for 0 dB Input Attenuation (nominal)
LO Emission Level (average): With 10 dB input atten. <−80 dBm (8561A/8562A nominal), <−10 dBm (8562B nominal)
Second IF Input: SMA female, nominal frequency: 310.7 MHz; NF: 7 dB (nominal); Gain Compression: −20 dBm (nominal)
First LO Output: SMA female, nominal impedance: 50 ohm; nominal frequency range: 3.0000 - 6.8107 GHz; amplitude +16.5 dBm ±2 dB (20°-30°C)
Calibrator Output: BNC female, nominal impedance: 50 ohm
Rear Panel Connectors
10 MHz Reference (Input/Output): BNC female, nominal impedance: 50 ohm; nominal input range: −2 to +10 dBm
Video Output: BNC female, nominal impedance: 50 ohms (DC coupled)
LO Sweep/0.5 V per GHz Output: Shared BNC female, nominal impedance: 2K ohm (DC coupled); nominal LO sweep output: 0 to +10V (no load)
External Trigger Input: BNC female, nominal impedance: >10K ohm; trigger level: rising edge of TTL level
HP-IB: Interface Functions: SH1, AH1, T6, L4, SR1, RL1, PPO, DC1, DT1, CO, E1. Direct plotter outputs: HP 7225A, 7440A, 7470A, 7475A, 7550A, 9872A/B/C/T. Printer: HP 3630A Paintjet; HP 2225A Thinkjet; other printers with IEEE 488 interface may work.

General Specifications
Environmental
Military Specification: Meets MIL-T-28800C, Type III, Class 3, Style C.
Calibration Interval: 1 year
Warmup: 5 minutes from ambient conditions
Temperature: Operating: −10° to +55°C. Non-operating: −62° to +85°C
Humidity: 95% @ 40°C for 5 days
Altitude: Operating: 15,000 ft. Non-operating: 50,000 ft.
Rain Resistance: Drip-proof at 16 liters/hour/square foot
Vibration: 5-15 Hz: 0.059 inch p-p excursion; 15-25 Hz: 0.039 inch p-p excursion; 25-55 Hz: 0.020 inch p-p excursion
Pulse Shock: half sine: 30 g's for 11 ms duration
Transit Drop: 8-inch drop on 6 faces and 8 corners
Electromagnetic Compatibility: Conducted and radiated interference is in compliance with CISPR publication 11 (1985) and FTZ 526/527/79. Meets MIL-STD-461B, Part 4, with the exceptions shown below.
Conducted Emissions. CE01 (Narrowband): 1 kHz to 15 kHz only. CE03 (Narrowband): Full limits. CE03 (Broadband): 20 dB relaxation from 15 kHz to 100 kHz.
Conducted Susceptibility. CS01: Full limits (limited to 36 Hz for HP 8562B). CS02: Full limits. CS06: Full limits.
Radiated Emissions. RE01: 15 dB relaxation to 28 kHz, and exceptioned from 28 kHz to 50 kHz. RE02: Full limits <1 GHz.
Radiated Susceptibility. RS01: Full limits. RS02: Exceptioned. RS03: Limited to 1 V/meter from 14 kHz to 1 GHz, with 20 dB relaxation at IF frequencies.
Power Requirements
115 VAC operation: Voltage: 90 - 140 V RMS; Current: 3.2 A RMS MAX; Frequency: 47 - 440 Hz
230 VAC operation: Voltage: 180 - 250 V RMS; Current: 1.8 A RMS Max; Frequency: 47 - 66 Hz
Maximum Power Dissipation: 180 Watts
Nominal Audible Noise: 5.0 Bels power at room temperature (ISO DP7779)
Nominal Weight: 8561A/8562A: 20 kg (44 lbs.); 8562B: 19 kg (41.8 lbs.)
Dimensions: 163 mm high × 325 mm wide × 427 mm deep (nominal, without handle, feet, or cover).

Ordering Information	Price
HP 8561A Spectrum Analyzer	$28,000
HP 8562A Spectrum Analyzer	$35,000
HP 8562B Spectrum Analyzer	$31,000
Option 001: Second IF Output	$800
Option 026: Extended Frequency Coverage (HP 8562A only)	$3,000
Option 908: Rackmount Kit with flanges	$250
Option 909: Rackmount Kit with handles and flanges	$300
Option 910: Extra Manual Set	$165
Option 915: Technical Reference Manual	$275
Option 916: Extra Pocket Operating Guide (English)	$15
Option K08: Soft Carrying Case	$245
HP 8561A Option W30: Additional Two Years of HP Service	$560
HP 8562A Option W30: 2 additional years Return-to-HP Service	$700
HP 8562B Option W30: 2 additional years Return-to-HP Service	$620
HP 85620A Mass Memory Module	$2,000
HP 85629B Test and Adjustment Module	$2,000
HP 85700A 32 K Byte RAM Memory Card	$95
HP 85710A Digital Radio Personality	
HP 85901A Portable AC Power Source	$980
Product Support Kit P/N 08562-60021	
HP 8561A and 8562A/B +22C 1 year Return-to-HP CAL	
HP 8561A and 8562A/B +22X 1 year Return-to-HP MIL-STD CAL	