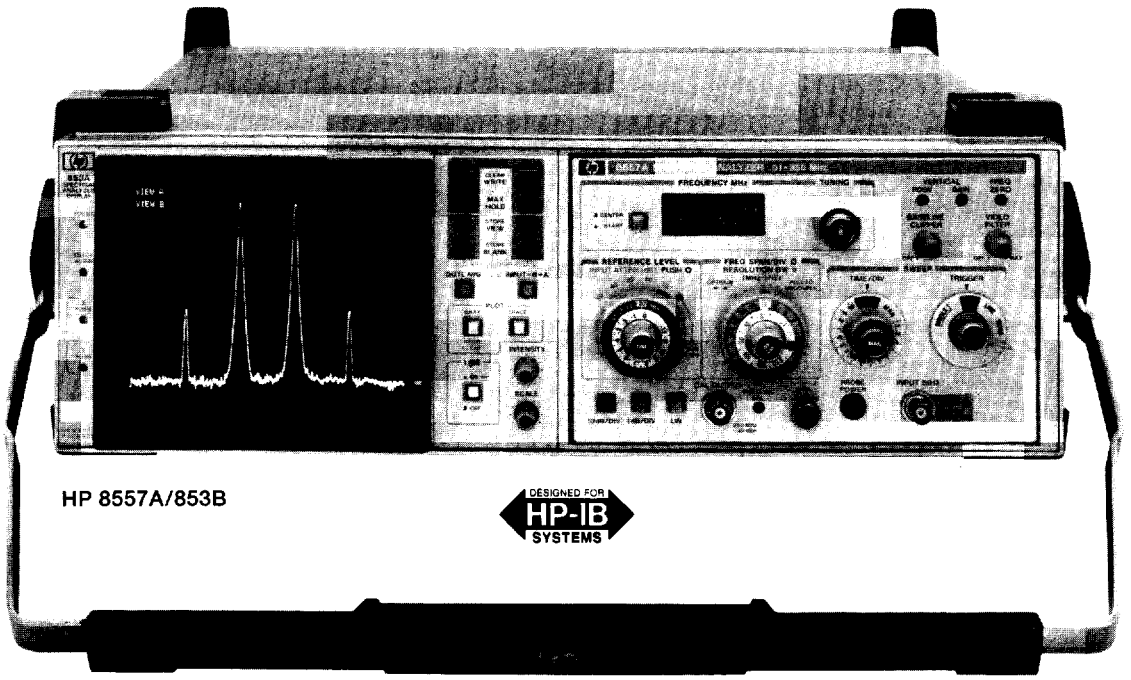
SIGNAL ANALYZERS

Spectrum Analyzer, 0.01 to 350 MHz

Models 8557A/853A

- Rugged portability
- Simple, three knob operation
- Direct plotter control
- Display annotation and storage accessories
- Digital display with trace arithmetic
- Resolution bandwidths from 1 kHz to 3 MHz
- Optional 75 Ω input with dBm or dBmV calibration



HP 8557A/853B

DESIGNED FOR HP-IB SYSTEMS

HP 8557A Spectrum Analyzer Plug-In

Performance Plus Economy

The HP 8557A is a 10 kHz to 350 MHz spectrum anlayzer plug-in for use with the HP 853A or 182T display. The high performance and convenient operation of this economical unit is ideally suited for a variety of applications in production, R & D or field service measurements.

Simple 3-Knob Operation

Preset the HP 8557A to the color-coded, "basic-operation" settings, and use the coupled controls to make most measurements in three easy steps. Tune to the signal; the LED readout displays its frequency. Zoom-in on the signal by reducing the span width; the resolution bandwidth, video filter, and sweeptime automatically change to an optimum value for a calibrated display. Then, change the reference level to bring the peak of the signal to the top of the screen for the most accurate amplitude measurement.

Absolute Amplitude Calibration

Signal levels can be read directly from the CRT in dBm (dBmV for Option 002) without the use of external standards or calculations. The signal level represented by the top CRT graticule line is always indicated by the reference level control, and vertical scale factors of 10 dB/div, 1 dB/div or linear can be selected.

Optional 75 Ω Input

Two options are available which allow measurements in 75 Ω systems. Option 001 has 75 Ω impedance, but retains the dBm power calibration. Option 002 is also 75 Ω, but the amplitude is calibrated in dBmV for measurements on systems such as CATV.

HP 853A Spectrum Analyzer Display

Digital Display

The HP 853A is a digital display mainframe for use with the HP 8557A spectrum analyzer plug-in. Signals are displayed on either of two independently stored digital traces. Display processing capabilities include maximum hold, digital averaging, and trace normalization for extended measurement capability. A built-in microprocessor manages the display operation and provides built-in test routines for display calibration and test (accessible via the front panel).

HP-IB Capability Includes Direct Plotter Control

A hard-copy record of the displayed traces and graticule can be made on a digital plotter via HP-IB by simply using the HP 853A's frontpanel pushbuttons; a controller is not required. Although the analyzer controls are not programmable, some HP-IB capabilities include using a controller for recording trace data or for operator prompts on the HP 853A CRT. The digital display and processing functions can be remotely programmed, and analyzer sweeps can be initiated via HP-IB.

Two Configurations

The display is offered in two styles. The HP 853A (pictured) is a ruggedized, portable mainframe complete with tilt-bail handle and drip proof, protective front cover. The HP 853A is ideally suited for rugged, field service environments and any areas where system mobility is required. The HP 853A Option 001 offers the digital display in a full module bench or rack mount configuration.

Software

The Solid State Camera Software, which runs on the HP 75D Portable Computer, provides a low cost, portable alternative to CRT photos. One program, "Camera," allows the user to permanently store spectrum analyzer display traces along with display annotations. After being stored in the computer's memory or on magnetic card or tape, the display information can later be recalled for viewing on the HP 853A display or for making hard copies with a plotter. Another program, "Limitgen," allows test limit lines to be drawn on the HP 853A display. For more details, see page 684 in the HP 8559A Spectrum Analyzer section.

HP 8557A Specifications

Frequency Specifications

Frequency range: 0.01 to 350 MHz.

Frequency Spans

Full band: displays entire spectrum, 0.01 to 350 MHz.
Per division: 5 kHz to 20 MHz/div in a 1, 2, 5 sequence.
Zero span: analyzer functions as a manually tuned receiver.

Frequency Accuracy

Tuning accuracy: ± (3 MHz + 10% of frequency span per division).
Frequency span accuracy: ±10% of displayed frequency separation.

Spectral Resolution

Resolution bandwidths: eight selectable resolution (3-dB) bandwidths from 1 kHz to 3 MHz in a 1, 3 sequence. Bandwidth and frequency span are independently variable or may be coupled for optimum display when control markers are aligned (▶◀).

Resolution bandwidth accuracy: 3-dB points are ±20% (+10° to +40°C).
Selectivity: (60-dB/3-dB bandwidth ratio) <15:1.
Spectral Stability
Residual FM: <1 kHz p-p in 0.1 second.
Noise sidebands: ≥75 dB down, >50 kHz from center of CW signal with 1 kHz resolution bandwidth and full video filtering.

Amplitude Specifications
Amplitude range: −117 dBm to +20 dBm.
Maximum Input (safe) Levels
Total power: +20 dBm (100 mW, 2.24 Vrms).
Voltage: ±30 Vdc or 30 V RMS (<100 Hz).
Gain compression: typically <1 dB for −10 dBm signal, 0 dB input attenuation.
Average noise level: <−107 dBm with 10 kHz resolution bandwidth, 0 dB input attenuation, and maximum (MAX) video filtering.
Calibrated Display Range
Log: 70 dB with 10 dB/div scale; 8 dB with 1 dB/div scale.
Linear: 8 divisions with linear (LIN) amplitude scale.
Amplitude Accuracy
Calibrator: −30 dBm ±1 dB (into 50 Ω), 250 MHz ±50 kHz.
Reference level: 10 dB steps and a 12 dB vernier for calibrated adjustment from −112 dBm to +40 dBm[1].
Step accuracy (with 0 dB input attenuation): −10 to −80 dBm: ±0.5 dB; −10 to −100 dBm: ±1.0 dB.
Vernier accuracy: ±0.5 dB.
Frequency response: ≤±0.75 dB with 10 dB input attenuation (includes input attenuator and mixer flatness).
Input attenuator: 0 to 50 dB, selectable in 10 dB steps.
Step accuracy: <±0.5 dB per 10 dB step.
Maximum cumulative error: <±1.0 dB.
Bandwidth Switching (amplitude variation)
3 MHz to 300 kHz: <±0.5 dB.
3 MHz to 1 kHz: <±1.0 dB.
Display Fidelity
Log incremental accuracy: ±0.1 dB/dB from Reference Level.
Log maximum cumulative error: ≤±1.5 dB over 70 dB range.
Linear accuracy: ±3% of Reference Level.
Spurious Responses
Second harmonic distortion: >70 dB below a −40 dBm signal (>1 MHz) with 0 dB input attenuation; >60 dB below for signals 20 kHz to 1 MHz.
Third order intermodulation distortion: >70 dB below two −40 dBm input signals (>1 MHz) separated by ≥50 kHz and with 0 dB input attenuation; >60 dB below for signals 10 kHz to 1 MHz.
Image and multiple responses: >70 dB below a −40 dBm input signal (>1 MHz) with 0 dB input attenuation; >60 dB below for signals 20 kHz to 1 MHz.
Residual responses: <−100 dBm with 0 dB input attenuation and no signal present at input.

Sweep Characteristics
Sweep Time
Automatic: sweeptime is automatically adjusted to maintain absolute amplitude calibration for any combination of frequency span, resolution bandwidth, and video filter bandwidth.
Calibrated sweep times: 0.1 msec to 10 sec/div in 1, 2, 5 sequence with ±10% typical accuracy.
Manual sweep: spectrum analyzer may be swept manually in either direction with front panel control.

Signal Input Characteristics
Input Impedance: 50 Ω nominal; type BNC female connector.
Input SWR: typically <1.5 with ≥10 dB input attenuation.

Output Characteristics
Probe power: +15V, −12.6 V, and GND (150 mA max). Use HP 1120A, 1121A, or 1124A high impedance probes.

HP 853A Characteristics

Digital Display
Traces: dual trace, digitally stored display with resolution of 481 horizontal by 801 vertical points for each trace.
Signal processing: maximum hold, digital averaging, and trace normalization.
Internal service routines: front panel pushbuttons access test routines to perform maintenance of digital hardware.

HP-IB
Direct plotter control: all displayed information can be transferred to an HP-IB plotter with front panel pushbuttons.
Controller Interface Functions
Trace data transfer: all trace data values can be transferred to or from the HP 853A with a controller.
Input messages: controller input instructions or annotation can be displayed on either of two 60 character lines.
Display control: all trace processing functions can be remotely controlled.
Sweep control: analyzer sweeps can be initiated and monitored.
HP-IB Interface Functions[3]: SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT1, C0, and E2.

Output Characteristics (Rear Panel)
Vertical output, AUX A: BNC output (50 Ω) provides detected video from 0 to 0.8 V for 8 divisions deflection on CRT display.
Penlift/blanking, AUX B: BNC output provides 0V pen down/unblanking signal at low impedance; 15V penlift/blanking at 10 kΩ impedance.
21.4 MHz IF output, AUX C: BNC output (50 Ω) provides a signal which is proportional to the RF input. Level is about −10 dBm (into 50 Ω) with a signal displayed at the Reference Level. Output is controlled by settings of Resolution BW, Input Atten, and Reference Level.
Horizontal output, AUX D: BNC output (5 kΩ) provides horizontal sweep from −5 V to +5 V for full 10 division CRT horizontal deflection.

HP-IB interface port: 24 pin connector provides digital interface for IEE 488-1978 standard parallel bus.

General

General Specifications
HP 182T compatibility: the HP 8557A Spectrum Analyzer is compatible with the HP 182T and 853A displays. The HP 182T is a normal persistence, cabinet style display which provides non-buffered, rear panel, auxillary outputs (for unattenuated vertical, horizontal, and penlift outputs). However, the HP 182T does not offer the digital display, HP-IB and direct plotter control, or the portability features of the HP 853A.
Temperature range: operating 0° to +55°C; storage −40° to +75°C.
EMI: conducted and radiated interference is within requirements of Methods CE03 and RE02 of MIL-STD 461A, CISPR Publication 11 (1975), and Messempfaenger Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen).
Power: <200 VA with display, 48 to 440 Hz (48 to 66 Hz at 220 or 240 Vac); with HP 853A: 100, 120, 220, or 240 Vac, +5%, −10%; with HP 182T: 115 or 230 Vac, ±10%.
Weight
HP 8557A: net, 5.0 kg (10 lb). Shipping 8.5 kg (18 lb).
HP 853A: net, 15.9 kg (35 lb). Shipping 18.6 kg (41 lb).
HP 853A Opt 001: net, 14.5 kg (32 lb). Shipping, 17.3 kg (38 lb.)
Size
HP 853A/8557A: 158.8 H x 501.7 W x 524.5 mm D (6.25″ x 19.75″ x 20.65″).
HP 853A Opt 001/8557A: 133 H x 425.5 W x 473.3 mm D (5.25″ x 16.75″ x 18.65″).

Ordering Information	Price
HP 8557A Spectrum Analyzer	$6,520
Opt 001: 75 ohm input, dBm calibration	add $100
Opt 002: 75 ohm input, dBmV calibration	add $100
Opt 910: Extra Operation and Service Manual	add $17
HP 853A Portable Spectrum Analyzer Display	$5,550
Opt 001: Full Module Bench/Rack Configuration	less $200
Opt 910: Extra Operation and Service Manual	add $10
Solid State Camera Software: HP part no. 75-00853	$50
HP 182T Cabinet Style, Normal Persistence Display	$4,030

[1] Input not to exceed maximum levels.
[2] A simple modification is required for HP 8557A plug-ins with serial prefix 2106A and lower (modification kit, HP part number 00853-60057).
[3] For more on these codes refer to the HP-IB section of this catalog.