TABLE 1-1. HP MODEL 8569A SPECIFICATIONS (1 OF 4)

SPECIFICATIONS

FREQUENCY SPECIFICATIONS

FREQUENCY RANGE

10 MHz to 21 GHz, covered in six pushbutton-selectable ranges:

Frequency Band GHz	Mixing Mode (n)	Lowest Freq (GHz) [ALT IF]	Highest Freq (GHz)
.01 – 3	1 –	0.010 [0.025]	3.060
6 – 9	1 +	6.035 [6.020]	9.060
3 – 9	2 –	3.033 [3.048]	9.120
9 – 15	2 +	9.058 [9.043]	15.120
6 – 15	3 –	6.055 [6.070]	15.180
12.1 – 21	3 +	12.080 [12.065]	21.000

FREQUENCY SPANS

Full Span (F)
Entire frequency band displayed with frequency of tunable marker indicated by Frequency GHz readout.

Per Division (MHz/Div, kHz/Div)
14 frequency scale calibrations in 1-2-5 sequence from 10 kHz/div to 200 MHz/div. Center frequency is set with the TUNING control and indicated by the FREQUENCY GHz readout.

Zero Span (0)
Analyzer functions as a manually tuned receiver, at the frequency indicated by the FREQUENCY GHz readout, for time-domain display of signal modulation.

FREQUENCY ACCURACY

Tuning Accuracy
Frequency GHz readout (center or marker frequency), after zeroing on the LO feedthrough:
0.01 – 3.0 GHz: ± (1 MHz + 0.3% of center frequency)
3.0 – 21.0 GHz: ± (5 MHz + 0.2% of center frequency)

Frequency Readout Resolution
1 MHz

Frequency Span Accuracy
± 5% of displayed frequency separation

SPECTRAL RESOLUTION AND STABILITY

Resolution Bandwidths
Eight selectable resolution (3-dB) bandwidths in 1-3 sequence from 1 kHz to 3 MHz. Bandwidth may be selected independently or coupled with frequency span. Optimum ratio of frequency span to resolution bandwidth is indicated by alignment of markers (><) on the two controls.

Resolution Bandwidth Accuracy:
Individual resolution bandwidth 3-dB points:
< ±15% (<±30% for 3-MHz bandwidth)

Selectivity:
60-dB/3-dB resolution bandwidth ratio: <15:1

Stability
For fundamental mixing (n = 1 – or 1 +):

Residual FM:
<2 kHz p-p in 0.1 second'

Noise Sidebands:
≥ 70 dB down, >30 kHz from center of CW signal with 1 kHz resolution bandwidth and video filter at MAX (not in detent).

Video Filter
Post-detection low-pass filter averages displayed noise for a smooth trace. The MAX (detent) position selects a video filter bandwidth of approximately 1.5 Hz for noise level measurement.

AMPLITUDE SPECIFICATIONS

AMPLITUDE RANGE

– 111 dBm to + 30 dBm.

'<2 kHz p-p in 0.1 second in a 180-series display mainframe with 220/240 line voltage.

TABLE 1-1. HP MODEL 8559A SPECIFICATIONS (2 OF 4)

Maximum Input (without damage) Levels

Total Power:
+20 dBm (O.lW, 2.2 Vrms) with 0 dB input attenuation
+30 dBm (lW, 7.1 Vrms) with ≥10 dB input attenuation

DC: ±7.1V

AC (<100 Hz): 7.1 Vrms

Peak Pulse Power:
+50 dBm (100W, <10 μsec pulse width, 0.01% duty cycle) with input attenuation ≥30 dB

Gain Compression
<0.5 dB for a −10 dBm input level with 0 dB input attenuation.

Average Noise Level
The displayed average noise level determines sensitivity (minimum discernible signal). Signals at this input level peak approximately 3 dB above the displayed noise.
Maximum average noise level with 1 kHz resolution bandwidth, 0 dB input attenuation, and video filter at MAX (detent):

Frequency Band (GHz)	Harmonic Mode	Average Noise Level (dBm)
01 — 3	1−	−111
6 — 9	1+	−108
3 — 9	2−	−103
9 — 15	2+	−98
6 — 15	3−	−93
121 — 18	3+	−92
18 — 21	3+	−90

Calibrated Display Range

Log (from Reference Level):
70 dB with 10 dB/DIV Amplitude Scale
8 dB with 1 dB/DIV Amplitude Scale

Linear:
8 divisions with LIN Amplitude Scale

AMPLITUDE ACCURACY
With AUTO sweep time selected, amplitude accuracy is determined by one or more of the following factors, depending on the measurement technique.'

2When switching to or from the Alternate **IF,** the **REF LEVEL CAL** and the **FREQ** CAL should **be** readjusted. Without readjustment, an additional reference level error of ±1 dB and an additional frequency readout error of ±1 MHz may result.

Calibrator Output
−10 dBm ± 0.3 dB (into 50Ω)
35 MHz ± 400 kHz

Reference Level
10-dB steps and a 12-dB vernier for calibrated Reference Level adjustment from −112 dBm to +60 dBm.'

Step Accuracy (with 0 dB input attenuation):
−10 dBm to −80 dBm: ±0.5 dB
-10dBmto-100dBm: ±1.0 dB

Vernier Accuracy:
±0.5 dB

Frequency Response
Frequency response, measured with 0 or 10 dB input attenuation, includes input attenuator flatness, mixer flatness, and band-to-band amplitude variation:

Frequency Band GHz	Frequency Response (± dB MAX.)
01 — 3	10
6 — 9	10
3 — 9	15
9 — 15	18
6 — 15	21
121 — 18	23
18 — 21	30

Input Attenuator
0 dB to 70 dB of input attenuation selectable in 10-dB steps

Step Accuracy:
0 dB to 60 dB, 0.01 to 18.0 GHz: <±1.0 dB per 10-dB step

Maximum Cumulative Step Error:
0 dB to 60 dB, 0.01 to 18.0 GHz: <±2.4 dB

Bandwidth Switching (Amplitude Variation)
Bandwidths 3 MHz to 300 kHz: <±0.5 dB
Bandwidths 3 MHz to 1 kHz: <± 1.0 dB

'1nput level not to exceed maximum levels.

TABLE 1-1. HP MODEL 8559A SPECIFICATIONS (3 OF 4)

Display Fidelity

CRT linearity and log or linear fidelity affect amplitude accuracy at levels other than Reference Level.

Log Incremental Accuracy:
±0.1 dB per dB from Reference Level

Log Maximum Cumulative Error:
≤±1.5 dB over entire 70-dB range

Linear Accuracy:
±3% of Reference Level

RESIDUAL RESPONSES

< -90dBm (0.01–3.06 GHz)[4] with 0 dB input attenuation and no signal present at input.

SWEEP SPECIFICATIONS

SWEEP TIME

Automatic (AUTO):

Sweep time adjusted automatically to maintain absolute amplitude calibration for any combination of frequency span, resolution bandwidth, and video filter bandwidth.

Calibrated Sweep Times (sec/Div, mSec/Div, μSec/Div):

20 selectable sweep times in 1-2-5 sequence from 2 μsec/div to 10 sec/div (excluding 2 sec/div), provided primarily for time-domain calibration in zero span (0).

Sweep time accuracy: ±10% (±20% for 5 and 10 sec/div)

GENERAL SPECIFICATIONS

TEMPERATURE RANGE

Operating: 0°C to +55°C
Storage: –40°C to +75°C

HUMIDITY RANGE

Type-tested from 50% to 95% relative humidity (≤+40°C) per requirements of MIL-STD-810C, Method 507.1, Procedure IV.

EMI

Conducted and radiated interference is in compliance with MIL-STD 461A, Methods CEO3 and RE02, CISPR Publication 11 (1975) and Messempfaenger Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen).

POWER REQUIREMENTS

HP Model 853A Display with HP Model 8559A Spectrum Analyzer:

100 or 120 Vac +5% –10%, 48 to 66 Hz, single-phase. Power consumption less than 200 Volt-amperes with plug-in installed.

HP Model 182T/180TR Display with HP Model 8559A Spectrum Analyzer:

115 or 230 Vac ±10%, 48-440 Hz. Power consumption less than 200 Volt-amperes with plug-in installed, convection cooled.

HP Model 181T/181TR Display with HP Model 8559A Spectrum Analyzer:

115 or 230 Vac ±10%, 48-440 Hz. Power consumption less than 225 Volt-amperes with plug-in installed, convection cooled.

WEIGHT

HP Model 8559A Spectrum Analyzer:
Net: 5.5 kg (12.1 lbs)
Shipping: 9.1 kg (20 lbs)

HP Model 853A Display:
Net: 15.9 kg (35 lbs)
Shipping: 18.6 kg (41 lbs)

HP Model 853A Option 001 Display:
Net: 14.5 kg (32 lbs)
Shipping: 17.3 kg (38 lbs)

HP Model 182T Display:
Net: 12.5 kg (27 lbs)
Shipping: 16.5 kg (36 lbs)

HP Model 181T Display:
Net: 11.0 kg (24 lbs)
Shipping: 15.5 kg (34 lbs)

HP Model 181TR Display:
Net: 12.0 kg (26 lbs)
Shipping: 17.5 kg (38 lbs)

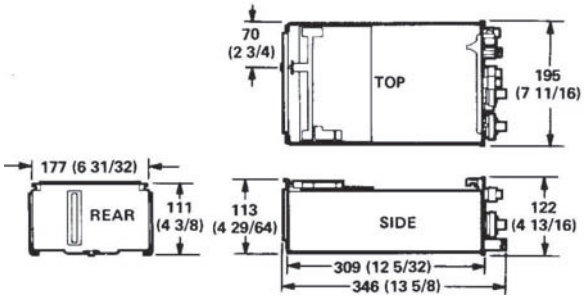
HP Model 180TR Display:
Net: 12.0 kg (26 lbs)
Shipping: 17.5 kg (38 lbs)

[4] 0.025 – 3.06 GHz with ALT IF selected.

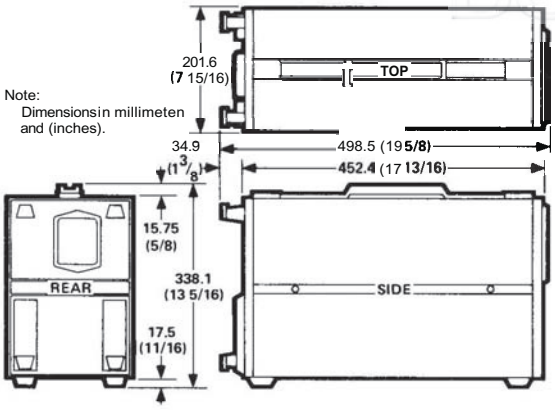
TABLE 1.1. HP MODEL 8559A SPECIFICATIONS (4 OF 4)

DIMENSIONS

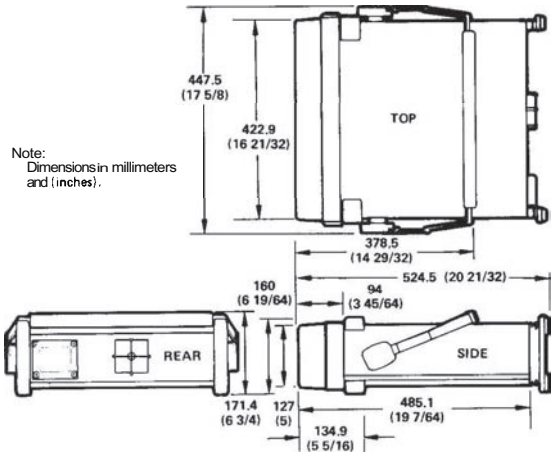
HP Model 8559A Spectrum Analyzer:



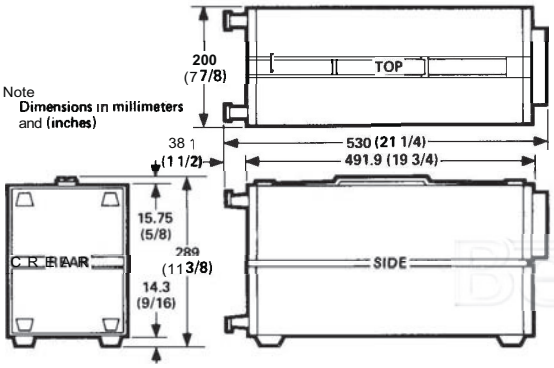
HP Model 182T Display:



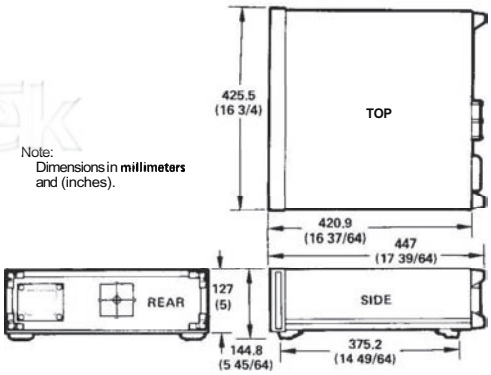
HP Model 853A Display:



HP Model 181T Display:



HP Model 853A Option 001 Display:



HP Model 180TR/181TR Display:

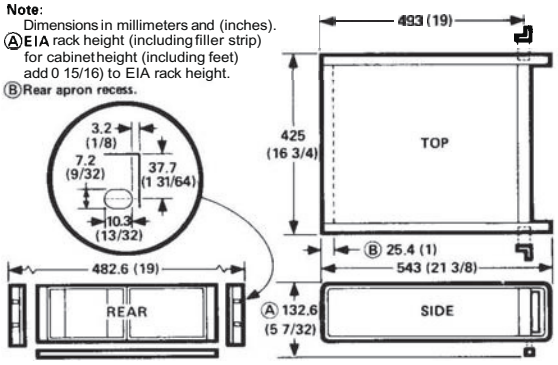


TABLE 1-2. MODEL 8559A/180-SERIES SUPPLEMENTAL CHARACTERISTICS (1 OF 3)

SUPPLEMENTAL CHARACTERISTICS

NOTE: Values in this table are not specifications. They are typical characteristics included for user information.

FREQUENCY CHARACTERISTICS

FREQUENCY ACCURACY

Frequency Cal

Adjusts digital FREQUENCY GHz readout. FREQUENCY CAL control may be used to calibrate the frequency readout on a known signal or on the 35 MHz CAL OUTPUT signal.

FREQUENCY RANGE

Alternate IF

Regular IF approximately 3.0075 GHz. Alternate IF available at approximately 2.9925 GHz for all frequency bands (minimum frequency 25 MHz).

SPECTRAL RESOLUTION AND STABILITY

Frequency Drift
(Fundamental mixing – n = 1 – or 1 +)

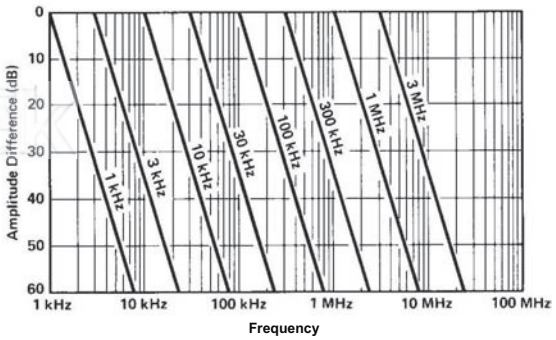
At fixed center frequency after 2-hour warmup:
< ±25 kHz/10 minutes
With temperature changes:
<200 kHz/°C

Resolution Bandwidth Shape

Approximately gaussian (synchronously-tuned, 4-pole filter).

Spectral Resolution

The following graph shows typical spectrum analyzer resolution for different resolution bandwidths.



SIGNAL RESOLUTION VS. FREQUENCY SEPARATION

AMPLITUDE CHARACTERISTICS

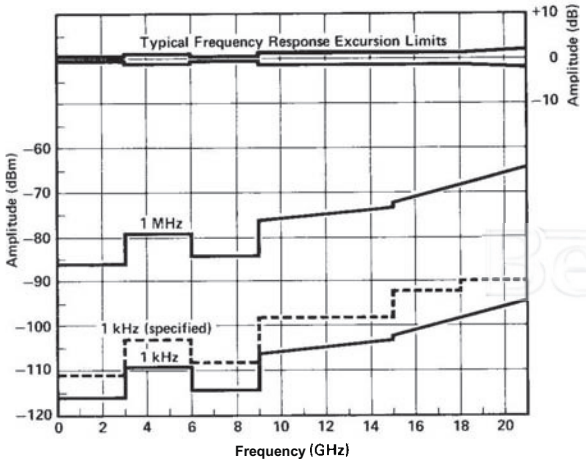
AMPLITUDE RANGE AND ACCURACY

Dynamic Range

Maximum power ratio of two signals simultaneously present at the input that may be measured within the limits of specified accuracy, sensitivity, and distortion (i.e., spurious responses): >70 dB.

Frequency Response and Average Noise Level

The following graph shows typical frequency response and average noise level versus frequency.



AVERAGE NOISE LEVEL AND FREQUENCY RESPONSE

Amplitude Scale Switching

Reference Level variation is typically less than +/–1 dB for any change in Amplitude Scale.

SPURIOUS RESPONSES

(with 0 dB input attenuation)
Second Harmonic Distortion

Input Power	Relative Distortion
–40 dBm	<–70 dB

TABLE 1-2. MODEL 8559A/180-SERIES SUPPLEMENTAL CHARACTERISTICS (2 OF 3)

SUPPLEMENTAL CHARACTERISTICS

NOTE: Values in this table are not specifications. They are typical characteristics included for user information.

Third Order Intermodulation Distortion

For Two Input Signals with		Relative Disortion
Input Power	Signal Sep.	
–30 dBm	50 kHz	<–70 dB

Signal Identifier

Signal identifier provided over entire frequency range and in all Frequency Span/Div settings. Correct signal response is a 1 MHz shift to the left and approximately a 6 dB lower amplitude.

SWEEP CHARACTERISTICS

MANUAL SWEEP

Spectrum analyzer may be swept manually, in either direction, with front panel control.

SWEEP TRIGGER

Free Run

End of each sweep triggers new sweep.

Line

Sweep triggered at ac line frequency.

Video

Sweep triggered on post-detection video waveform. One-half major division of vertical deflection required to trigger sweep.

Single

Single sweep started or reset by turning SWEEP TRIGGER clockwise momentarily.

FRONT PANEL INPUT AND OUTPUT CHARACTERISTICS

SIGNAL INPUT

Input Impedance

50 ohms nominal; Precision Type N female connector.

Input SWR

<2.0 SWR with 0 dB input attenuation
<1.3 SWR with ≥10 dB input attenuation

LO Emission (3.0 – 6.1 GHz)

≤ –8 dBm with 0 dB input attenuation

REAR PANEL OUTPUT CHARACTERISTICS'

VERTICAL, PENLIFTIBLANKING, AND HORIZONTAL OUTPUTS (AUX A, B, D)

These outputs are compatible with and may be used to drive HP X-Y Recorders (using positive pencoils or TTL penlift input) and CRT monitors.

AUX A VERTICAL OUTPUT

BNC output provides detected video signal from a 50-ohm output impedance. Typical 0 – 800 mV range corresponds to full 8-division CRT vertical deflection.

AUX B PENLIFT/BLANKING OUTPUT

BNC output provides a + 15V penlift/blanking signal from a 10K-ohm output impedance when CRT trace is blanked. Otherwise, output is low at OV (low impedance, 150 mA max.) for an unblanked trace.

'Rear panel outputs refer to 180T-series display mainframes and other 180-series mainframes with Option 807 installed. Horizontal, vertical, and blanking outputs, attenuated and shifted in dc level, are available on other 180-series mainframes at the MAIN SWEEP, MAIN GATE, and DELAYED GATE outputs, respectively. DO NOT connect an X-Y recorder to the DELAYED GATE OUTPUT, or damage will result.

TABLE 1-2. MODEL 8559A/180-SERIES SUPPLEMENTAL CHARACTERISTICS (3 OF 3)

SUPPLEMENTAL CHARACTERISTICS

NOTE: Values in this table are not specifications. They are typical characteristics included for user information.

AUX C 21.4 MHz IF OUTPUT

BNC output provides 21.4 MHz IF signal (linearly related to spectrum analyzer RF input) from a 50-ohm output impedance. Output bandwidth controlled by spectrum analyzer RESOLUTION BW setting; output amplitude controlled by INPUT ATTEN, REFERENCE LEVEL FINE, and first six REFERENCE LEVEL positions (i.e., −10 through −60 dBm with 0 dB input attenuation). Output level is approximately −10 dBm into 50 ohms with a signal displayed at Reference Level.

AUX D HORIZONTAL OUTPUT

BNC output provides horizontal sweep voltage from a SK-ohm output impedance. −5V to +5V range corresponds to full 10-division CRT horizontal deflection.