

# Specifications

Specifications describe the HP 3585B's warranted performance over the temperature range 0°C to 55°C except where noted. Supplemental characteristics are intended to provide information useful in applying the instrument by describing typical, but non-warranted performance. They are described as "typical" or "approximate" and apply over the temperature range  $25 \pm 5^\circ\text{C}$ .

## Frequency

**Measurement range:** Specifications apply 20 Hz–40.1 MHz

**Start/stop, center, manual frequency:** (selectable by keypad or fixed steps; center & manual frequencies also adjustable by knob and user-defined steps)

*Range:* 0 Hz–40.1 MHz

*Resolution:* 0.1 Hz

*Accuracy:* Same as frequency ref. accuracy

**Frequency span:** (selectable by knob, keypad, or 1, 2, 5 step sequence)

*Range:* 0 Hz–40.1 MHz

*Resolution:* 0.1 Hz

**Frequency reference accuracy:**  $\pm 1 \times 10^{-7}$ /mo. of frequency. Warm-up time: 20 min.

**Marker frequency:**

*Readout accuracy:*  $\pm 0.2\%$  of frequency span  $\pm$  resolution bandwidth

*Counter accuracy:*  $\pm 0.3\text{Hz} \pm 1 \times 10^{-7}$ /mo. of counted frequency for a signal 20 dB greater than other signals and noise in the selected resolution bandwidth

*Resolution:* 0.1 Hz

**Resolution bandwidth:**

*Bandwidth:* 3 Hz–30 kHz (3 dB bandwidth) in 1, 3, 10 sequence. Bandwidth may be selected manually or automatically coupled to frequency span.

*Accuracy:*  $\pm 20\%$  at 3 dB points

*Selectivity:* 60 dB/3 dB <11:1

**Video bandwidth:** 1 Hz–30 kHz in 1, 3, 10 sequence

## Amplitude

**Measurement range:**

50/75 $\Omega$  inputs: -137 dBm to +30 dBm or equivalent level in dBV or volts

1 M $\Omega$  input: 31 nVrms to 7.08 Vrms

**Input range settings:** Autoranging, -25 dBm to +30 dBm in 5 dB steps

### AMPLITUDE ACCURACY:

Accuracy note: Measurement accuracy is determined by the sum of *reference level accuracy*, *amplitude linearity* (if the signal is not at the reference level) and *frequency response* across the measurement span (if the signal is not at the center or manual frequency). In measurements where the signal is at the reference level and/or at the center or manual frequency, the amplitude linearity and/or flatness uncertainties will not apply.

**Reference level:**

*Range:* -100 dB to +10 dB

(relative to input range)

*Accuracy, 50/75 $\Omega$  input:* (using 1 or 2 dB/div., measured at manual frequency or with sweep rate reduced by a factor of 4)

+10 dB	-50 dB	-70 dB	-90 dB
$\pm 0.4$ dB	$\pm 0.7$ dB	$\pm 1.5$ dB	

*Typical accuracy, +10 dB to -50 dB:*  $\pm 0.25$  dB

For 5 or 10 dB/div. add 0.1 dB to the figures above

For 1 M $\Omega$  input: Add to above specification  $\pm 0.7$  dB for 20 Hz–10 MHz;  $\pm 1.5$  dB for 10 MHz–40.1 MHz

**Amplitude linearity, 50/75 $\Omega$  input:** (relative to reference level)

0 dB	-20 dB	-50 dB	-80 dB	-95 dB
$\pm 0.3$ dB	$\pm 0.6$ dB	$\pm 1.0$ dB	$\pm 2.0$ dB	

*Typical linearity, 0 dB to -20 dB:*  $\pm 2.0$  dB

**Frequency response, 50/75 $\Omega$  input:**

(relative to center frequency)  $\pm 0.5$  dB

*Typical frequency response:*  $\pm 0.3$  dB

For 1 M $\Omega$  input: Add to above specification  $\pm 0.7$  dB for 20 Hz–10 MHz;  $\pm 1.5$  dB for 10 MHz–40.1 MHz

## Amplitude (continued)

### Marker amplitude:

#### Accuracy:

Center or manual frequency at the reference level:

Use reference level accuracy from +30 dBm to

-115 dBm; add amplitude linearity below -115 dBm.

Anywhere on screen: Add amplitude linearity and frequency response. (Same as display accuracy)

### Resolution:

10 dB/div. scaling: 0.1 dB

5 dB/div. scaling: 0.05 dB

2 dB/div. scaling: 0.02 dB

1 dB/div. scaling: 0.01 dB

## Dynamic range

### Spurious responses:

(image, out-of-band, and harmonic distortion)

50/75Ω input: < -80 dB relative to a single signal at or below the input range setting.

Typical performance: -84 dB - (1 dB/dB below input range setting)

Example: For a -8 dBm signal on the 0 dBm input range, the typical spurious responses would be -92 dB with a noise floor at -115 dBm (3 Hz).

1 MΩ input: < -80 dB except 2nd harmonic distortion < -70 dB

### Intermodulation distortion:

50/75Ω input: < -80 dB relative to the larger of two signals, each ≥ 6 dB below input range setting except 2nd order IM from 10 MHz to 40 MHz < -70 dB

1 MΩ input: < -70 dB for 2nd order, < -80 dB for 3rd order

Residual responses (no signal at input): < -120 dBm using -25 dBm range, or 95 dB below input range setting

Residual phase noise (Typical at 40 MHz, -10 dBm input):

5 kHz offset: -112 dBc/Hz

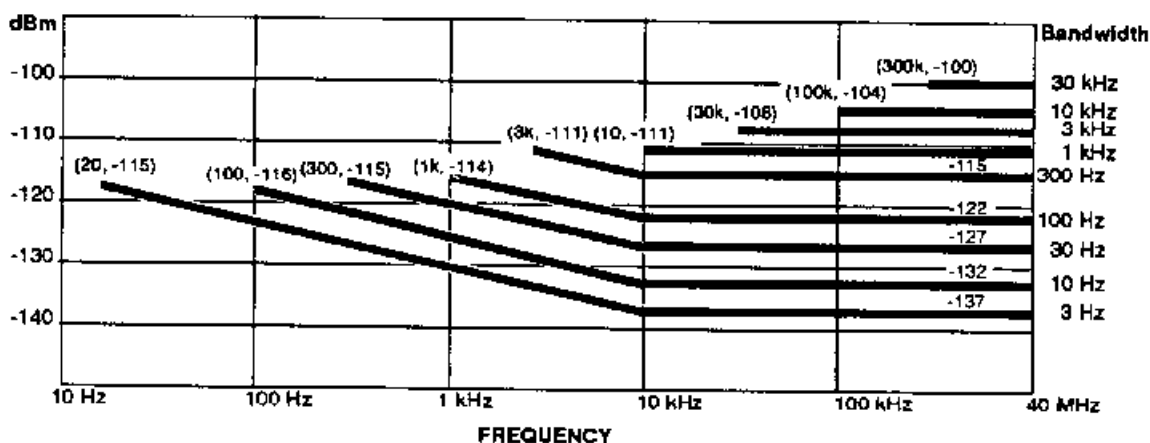
100 kHz offset: -120 dBc/Hz

### Average noise level:

50/75Ω input: (see Below)

1 MΩ input: Below 500 kHz add 12 dB to above

Average Noise Level



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## Display

### Displayed amplitude range:

*Scale:* 10 vertical division graticule with reference level (0 dB) at top graticule line  
*Calibration:* 1, 2, 5, 10 dB/division

**Measurement traces:** Two measurement traces can be displayed. Each trace is 1024 points vertical X 1001 points horizontal.

Trace A is updated by the analyzer sweep, recall from data registers, or by transfer from trace B.

Trace B is updated by transfer from trace A.

**Trace functions:** Transfer trace A to B, transfer trace B to A, max. hold, subtract trace B from A, clear trace A, save/recall trace A

**Trace storage:** 10 complete measurement traces can be stored in nonvolatile registers. These traces can be copied to the displayed traces A and B.

**Limit testing:** The measured trace is checked at the conclusion of each sweep for conformance to user-defined limits at every point. A pass/fail indication is provided in the display and over HP-IB.

Any two of the 10 nonvolatile trace registers can be used as limits. The two memories must be contiguous, with the lower numbered memory as the lower limit. Limits are entered as absolute or relative values. Limit lines can be displayed simultaneously with measurement traces.

**Display hardcopy:** Both display traces, including full annotation and limit lines, are automatically reproduced on HP-GL-compatible HP-IB pen-plotters and on graphics printers such as the HP Thinkjet and HP Laserjet.®

**Trace detection:** Linear envelope detection of video information from the IF signal. Peak signal excursions between sweep data points are measured and displayed to assure that no signal responses are missed.

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## Marker

**Marker accuracy:** See *Frequency and Amplitude* sections of these specifications

### Marker search:

**PEAK SEARCH** -- Sets the marker to the highest signal in the displayed frequency span

**NEXT PEAK** -- Sets the marker to successively lower signal peaks in the displayed frequency span

**NEXT LEFT** -- Sets the marker to the next signal peak to the left of the current marker position in the displayed frequency span

**NEXT RIGHT** -- Sets the marker to the next signal peak to the right of the current marker position in the displayed frequency span

**THRESHOLD**-- When activated, the display line can be adjusted by the user as a search threshold

### Functions:

**FREQUENCY DISPLAY** -- Absolute and relative (offset) modes

**COUNTER** -- Counted frequency of selected signal in absolute and relative (offset) modes

**AMPLITUDE DISPLAY**-- Absolute and relative (offset) modes

**NOISE LEVEL** -- Averaged and corrected noise level, normalized to 1 Hz bandwidth

**SIGNAL TRACK** -- Resets center frequency once per sweep to the peak signal found near the marker position.

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## Sweep

**Modes:** Continuous, single, manual (CW, direct or knob entry)

**Trigger:** Free run, external, line

**Time:** 0.2s to 200s/Hz of frequency span, excluding calibration cycles (autocalibration may be disabled)

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## Tracking generator

**Level:** 0 dBm to -11 dBm, manual control from front panel

**Frequency accuracy:**  $\pm 1$ Hz relative to analyzer tuning

**Frequency response:**  $\pm 0.7$  dB; Typically:  $\pm 0.5$  dB

**Impedance:** 50 $\Omega$ , > 14 dB return loss

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## Signal inputs

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**50/75Ω:** >26 dB return loss, BNC connectors

**1 MΩ:** ±3% shunted by < 30 pF, BNC connector

**Max. input level:**

**50/75Ω:** 13V peak ac plus dc, relay protected for overloads to 42V peak.

**1 MΩ:** 42V peak ac plus dc (derated by factor of two for each octave above 5 MHz)

**External trigger:** Negative-going TTL level or contact closure initiates sweep

**External frequency reference:** 10 MHz or subharmonic to 1 MHz, 0 dBm minimum level

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## Signal outputs

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**Frequency reference:** 10.00 MHz  $\pm 1 \times 10^{-7}$ /mo., +10 dBm into 50Ω

**IF:** 350 kHz, -11 dBV to -15 dBV at the reference level

**Video:** 10 V at the reference level

**External display:** X, Y: 1V full deflection. Z: < 0V to >2.4V

**Probe power:** +15 Vdc, -12.6 Vdc: 150 mA max., suitable for HP active probes

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## HP-IB interface

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Complies with IEEE 488-1978

**Control:** All control settings except tracking generator level, CRT intensity, focus, astigmatism, graticule illumination

**Interface functions:** SH1 AH1 T5 L4 SR1 RL1 FP0 DC1 DT1 C0 E1

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## Instrument state storage

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**Setup state:** 10 nonvolatile registers for storage of complete instrument configuration

**Power-up state:** HP 3585B can be configured to turn on in standard or user-defined state or in power-off state

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## General information

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**Environmental:**

Temperature, operating: 0°C to 55°C

**Humidity:** < 95% RH

**Warm up time:** 20 min. at ambient room temperature

**Power:**

115V (+11% -25%), 48-440 Hz

230V (+11% -18%), 48-66 Hz

180 W, 3A max.

**Weight:** 36.7 kG (81 lb.)

**Dimensions:** 22.9 cm (9 in.)H X 42.6 cm (16.75 in.)W  
X 63.5 cm (25 in.) D

**Ordering information:**

HP 3585B spectrum analyzer

Option W30 2 years extended warranty

Option 907 Front handle kit

Option 908 Rack flange kit

Option 909 Combined rack flange/handle kit

Option 910 Additional set of manuals