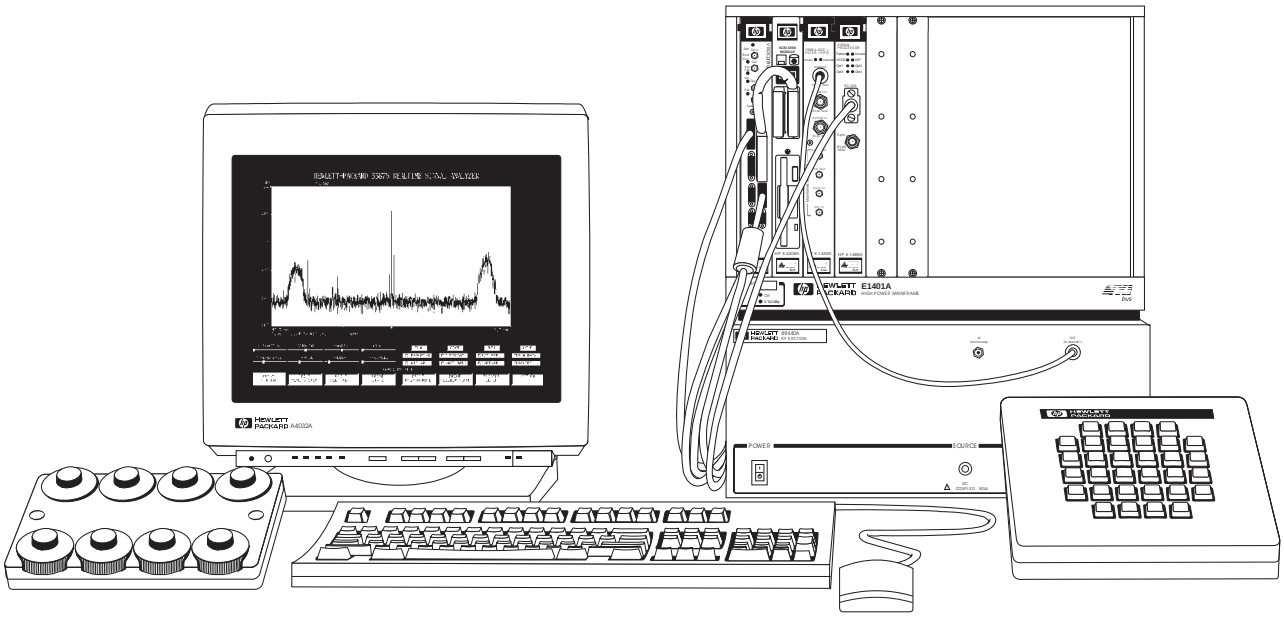
HP 3587
dc to 8 MHz

Technical Specifications

Signal Analysis System



Specifications describe warranted performance over the temperature range of 0° to 50°C (except where noted), after a 30-minute warm-up from ambient conditions, for the system configuration listed. Supplemental characteristics identified as “typical” or “characteristic,” provide useful information by giving non-warranted performance parameters. Typical performance is applicable from 20° to 30°C.

For more detailed specifications refer to the technical data sheets of the individual system components.

Configuration

The performance of a system depends on its hardware and software components. This technical data is based on the following configuration. Any changes in this configuration may effect system performance.

Table 1 Configuration data

Controller	HP E1498A with 64 Mbytes RAM
ADC	HP E1437A with opt ANE, 64 MByte memory
DSP	HP E1485C with four option 104, 96002 DSP
Down Converter	None
System Disk	HP E3249B (4.3 GByte)
Mainframe	HP E1401B (13 slot, C size)
Monitor	HP A4575A (19 inch, color)
Operating Software	HP 35687B Signal analysis software

Record

- Assign file name
- Set throughput file size (sec.,min., A/D samples, largest possible)
- Monitor while recording
- Log (mark) events while recording (<2000 marks)
- Comment logged (marked) events
- Repeat record (circular buffer mode)
- Stop delay
- Event delay
- Record file status
- Write protect on/off
- Comment header included in file

Post Process

- Start at: time, next event, previous event
- Pause/continue
- Display file information (name, date, time, analyzer state, file size, events)
- Display file comment
- Display event log (list)
- Change span
- Change center frequency
- Change resolution

Disk Utilities

- File information
- Initialize disk
- Delete file
- Rename file
- Copy throughput files to/from host system disk
- Write protect on/off

File Utilities

- File name
- Display file information
- Display data comment
- Display event log (list)
- Edit data comment
- Extract data from file (copy begin, copy end, copy to file name, file to copy from)
- Archiving (archive/restore files to/from DDS tape and HP E1562)

Resolution

Windows
Bins

Averaging
RMS
Peak
Nth

Overlap

Measurement Control

Modes
Run
Pause/Continue
Arm

Status Indicators
Overload
Triggered
External reference
Gap

Measurement Results

Types
Frequency
Time
Phase †
Amplitude

Markers

Mode
Off
Single
Relative (same trace, separate trace)

Functions
Marker to Peak
Marker to Next Peak Right/Left
Band Power
Noise

Display

Format
Single
Dual
Triple
Overlay
State

Active Trace
A, B, C, AB, BC, AC, ABC

Standard Display Types
Spectrum
Time
Phase

Advanced Display Types
Spectrogram
Rollogram
Spectral Map/Color Map/ Time Map: azimuth, elevation, threshold, height, scroll direction, hidden line, wireframe
Histogram
PDF
CDF
Strip Chart

Display Title

Trace Coordinates
Y axis: log magnitude, linear magnitude, dB magnitude, dBm magnitude, real, imaginary, phase
X axis: linear frequency, linear time, volts

Trace Label

Units
Peak/RMS
Volts/Volts^2
Volts/Eng Units

Scaling
Y axis: auto scale, Y range, Y reference
X axis: X reference, X magnify, X default

Engineering Units

Threshold

Display Memory
Manipulation: scroll up, scroll down, home, end

Color Configuration
Trace line
Trace grid
Trace background
Display background

User Interface

Input Devices
Keyboard
Mouse
8-knob panel
32-button panel

General

On-line Help

Memory and data storage
Save/Recall
Record/Playback

Optional Features

Option AGG Programming

† Phase display is relative to the beginning of the data block. Data is not corrected for trigger jitter, digital filter phase error, or local oscillator phase error.

Performance

Real-Time Bandwidth (801 lines, 0% overlap, spectrogram display, rms averaging, 16-bit word width, 1024 × 768 pixel display)	1.0 MHz
Signal Capture Buffer (typical)	16,384 spectra, gap free (8 MHz span, 801 lines, 16 bit word width, 64 MByte memory in HP E1437A)
Display Update Rate (typical)	
Spectrogram	60/s
Waterfall	30/s
Color Waterfall	30/s
Frequency Trace	30/s
Time Trace	30/s
Map Rotate †	2 Repaint/s

† 100 Spectra, 1024 x 768 pixel display.

Definitions

Baseband = dc to 8 MHz

dBc = dB relative to input signal level

dBfs = dB relative to full scale amplitude range setting. Full scale on the ADC module is approximately 1 dB below overload.

FS or fs = Full Scale; the same as amplitude range or input range

SNR = Signal to noise ratio

Baseband Specifications

Frequency

Range	dc to 8 MHz
Spans	0.48 Hz to 8.0 MHz, octave steps, includes frequency translation (zoom) capability for spans < 4 MHz
Tuning resolution	20 μHz, span < 8 MHz
Frequency resolution	51 to 12,801 lines
Bin width	37.2 μHz to 78.4 kHz
Window factors	Uniform, Hann, Flattop, Gausstop, Blackman, Gaussian

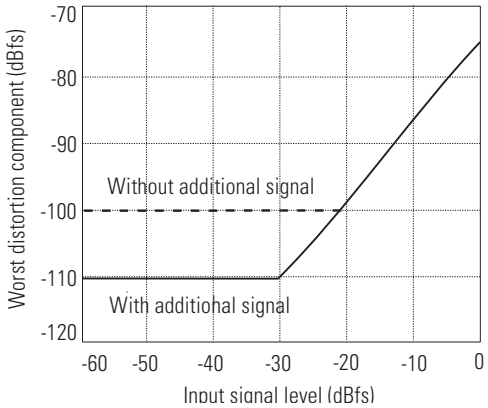
Amplitude

Input impedance	50 Ω
ADC resolution (raw)	23 bits
Input ranges	+ 30 dBm to – 24 dBm, 6 dB steps
Measurement range	+ 28 dBm to – 134 dBm
Sensitivity	– 158 dBm/Hz (– 24 dBm range)
Noise figure	16 dB
Damage level	10 Vrms
Coupling	ac/dc
Autorange	Off/up/single
Autozero	Single by command
ADC sample rate	20.48 MSa/s
ADC clock accuracy	20.48 MHz ± 100 Hz, < 5 ps jitter
Anti-alias filter	8 MHz, low pass
Digital filters	0.48 Hz to 4.0 MHz, octave steps, includes frequency translation (zoom) capability

Dynamic Range

Spurious free dynamic range	< 110 dBfs
Spurious signals (includes alias products)	< – 110 dBfs, using internal clock
Harmonic distortion	< – 110 dBfs or – 75 dBc, whichever is greater

Harmonic distortion versus input level



Input Noise: (For 1 MHz < fo < 8 MHz)

Range	Noise Density
+ 30 dBm to – 6 dBm	– 140 dBfs/Hz
– 12 dBm	– 139 dBfs/Hz
– 18 dBm	– 137 dBfs/Hz
– 24 dBm	– 134 dBfs/Hz

General Specifications

Signal Capture	
Mode	On/Off
Buffer Size	32 MSamples (32 Msamples = 16,384 spectra, 801 line, 8 MHz span, 16 bit word width)
Buffer Length (seconds)	32 Msamples / (span × 2.5)
Averaging	
Mode	Off, rms, Peak, Nth
Number of Averages	1 to 32,767
Overlap Percentage (Overlap processing does not require averaging)	0 to 99% (span < 125 kHz), 0 to 50% (125 kHz > span (< 500 kHz), 0% (span > 500 kHz)
Memory	
Save/Recall	
State	32 registers
Trace	32 registers
Data	32 registers
Record/Playback Mode	Off/Playback/Record
Triggering	
Modes	Freerun, Level, Magnitude, External
Level	± 100% of input
Slope	Positive, Negative
Arm	Auto/Manual
External Clock Input †	
Frequency Range	2 MHz to 20.60 MHz
Input Levels	> –6 dBm sinewave
Printer Output	
Modes	Print Screen/Print Trace

† Performance specifications valid for internal sample clock only. Spurs and noise of greater than –110 dBc on external clock signal will degrade the performance of the ADC.

Specifications Real Time Signal Capture (option ATR)

Option ATR uses HP E1562 VXI disk modules to add deep wideband signal capture and post process signal processing to the HP 3587 feature set.

Capacity: 8 GB per HP E1562E or HP E1562F disk module

Disk modules per system: 1-14

Minimum number of disk modules required for recording (gap free, 16 bit samples):

Bandwidth	Disk modules required
4 MHz	2
2 MHz	1
1 MHz	1
500 kHz to 0.24 Hz	1

Recording time (16 bit samples, one file):

Bandwidth	Disk modules	Time (sec)
4 MHz	2	1,563
2 MHz	1	1,563
1 MHz	1	3,125
500 kHz	1	6,250
250 kHz	1	12,500
125 kHz	1	25,000
62.5 kHz	1	50,000
31.2 kHz	1	100,000
15.6 kHz	1	200,000
7.8 kHz	1	400,000
3.9 kHz	1	800,000
1.9 kHz[1]	1	>800,000

Note 1: Spans provided down to 0.48 Hz.

Incremental recording time per disk module added (16 bit samples, one file):

Bandwidth	Time (sec)
4 MHz	391
2 MHz	781
1 MHz	1,563
500 kHz	3,125
250 kHz	6,250
125 kHz	12,500
62.5 kHz	25,000
31.2 kHz	50,000
15.6 kHz	100,000
7.8 kHz	200,000
3.9 kHz	400,000
1.9 kHz[1]	800,000

Note 1: Spans provided down to 0.48 Hz

Example: Maximum recording time for the 4 MHz span using four additional disk modules:

T = 1,563 sec + 4 x 391 sec = 3,127 sec = 52 min.

General

The HP 3587 frequency range can be extended by using a frequency down converter. Supported down converters include:

Model	Frequency range	Form Factor
HP 89431	2-2650 MHz	19" rack mount
HP E6500	20[1] -1,000 MHz	VXI
HP E6500 opt. 003	201 -3,000 MHz	VXI
WJ 9119-1[3]	0.1-32 MHz	VXI
CS 5040[2] (with HP E6500)	2MHz-18GHz	VXI

Note 1: Tunes down to 2 MHz, performance not specified below 20 MHz

Note 2: Available from Communication Solutions, Inc., 7034 Golden Ring Road, P.O. Box 9694, Baltimore Maryland 21237-0694, (410) 574-4557

Note 3: Also compatible with the WJ 9119

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