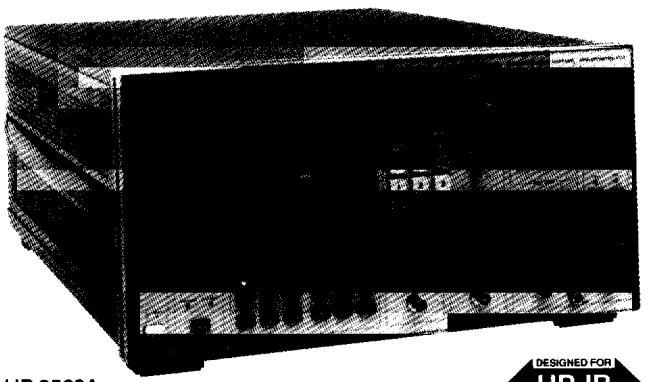
FFT DYNAMIC SIGNAL ANALYZERS

Dual-Channel Dynamic Signal Analyzer with Digital Inputs and Source

HP 3563A, 3562A



HP 3563A

DESIGNED FOR HP-IB SYSTEMS

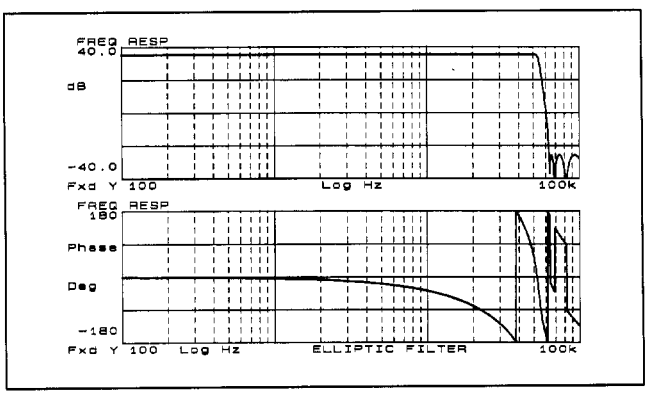
- Measurement of analog and digital signals and devices
- Analog and digital signal sources
- Network, spectrum, waveform, transient analysis
- Extraction of models with s- and z-domain curve fitting
- Modeling of systems using frequency response synthesis
- Linear, logarithmic, swept-sine modes
- 64 μHz to 100 kHz
- 80 dB dynamic range with full alias protection
- High accuracy ($\pm$0.15 dB)
- Acceptance of 16-bit digital input signals (TTL or CMOS)
- 13-bit digital input signal spectrum analysis
- 16-bit, swept-sine, digital network analysis

HP 3563A Control Systems Analyzer

Whether your system is a control loop or other circuitry—electrical, mechanical, or electromechanical—Hewlett-Packard helps you analyze your next-generation system. In addition to measuring traditional analog signals and devices, the HP 3563A provides test and analysis of digital signals, digital devices (such as digital filters), and devices with mixed analog and digital inputs and outputs. A compatible superset of the popular HP 3562A dynamic signal analyzer, this FFT-based instrument offers the versatility required to make the most difficult spectrum, network, and waveform measurements.

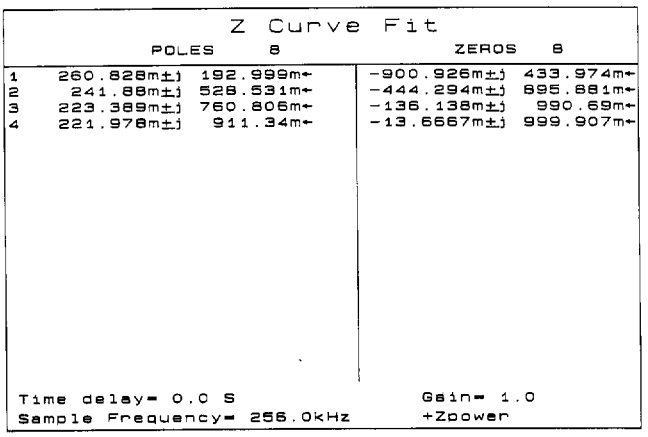
Network Analysis of Digital or Analog Devices

Accurate, high-resolution frequency response measurements of mechanical and analog, digital, or mixed analog/digital electronic systems can be performed with linear resolution FFT, logarithmic resolution FFT, or swept-sine analysis. A built-in signal source provides a variety of random noise, sine wave signals, or arbitrary waveforms in either analog or digital format.



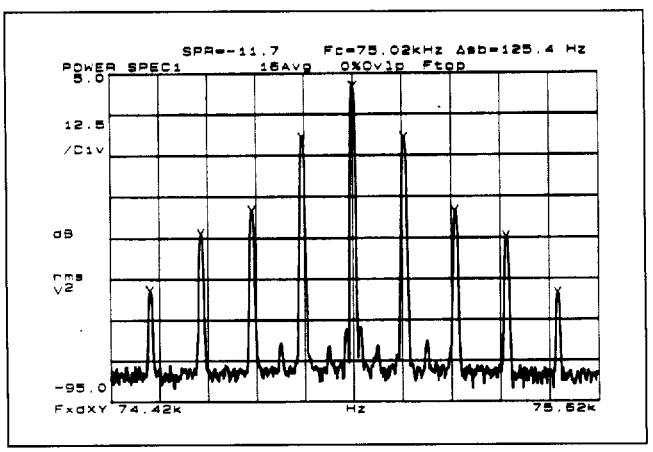
Turning Data into Information

Identify system poles and zeros by applying the HP 3563A curve fitter to a measured frequency response. Separate s- and z-domain curve fitters handle analog or digital systems. The multiple-degree-of-freedom algorithm used in the curve fitter accounts for interaction of adjacent poles more accurately than single-degree-of-freedom methods. Up to 40 poles and 40 zeros can be fit simultaneously. The pole/zero data format can be converted to polynomial or pole/residue format. A choice of impulse invariant, step invariant, and bilinear transformations converts the s-domain model to a z-domain model and vice versa. The ability to convert from one domain to the other greatly simplifies digital filter design.



Spectrum, Waveform, and Transient Analysis

Online analysis of distortion, drift, modulation, and phase noise can benefit from the speed and accuracy of the HP 3563A. Analyze transient events in both the time and frequency domain or capture time records for later recall and analysis.



The HP 3562A dynamic signal analyzer is an analog-only version of the HP 3563A. It is well suited for test and analysis of mechanical systems and predominantly analog electrical and electromechanical systems. The most significant difference between the two instruments is that the HP 3562A cannot be used to measure and analyze digital signals and devices.

HP DYNAMIC SIGNAL ANALYZERS

Dual-Channel Dynamic Signal Analyzer with Digital Inputs and Source

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Specifications (HP 3562A, 3563A)

Contact your local HP sales office for more information, including a data sheet with complete specifications.

Frequency

Measurement range: 64 μHz to 100 kHz, both channels, single- or dual-channel operation

Resolution: Span/800, both channels, single- or dual-channel operation, linear resolution mode

Spans	Baseband	Zoom
Number of spans	66	64
Min. span	10.24 mHz	20.48 mHz
Max. span	100 kHz	100 kHz
Time record (sec)	800/span	800/span

Window functions: Flat top, Hann, uniform, force, exponential, user-defined

Typical real-time bandwidths:

Single-channel, fast averaging 10 kHz

Throughput to CS/80 disk

Single channel	12.5 kHz
Dual channel	6.25 kHz

Amplitude

Absolute accuracy: Single channel (channel 1 or 2)

±0.15 dB ±0.015% of input range (+27 to −40 dBV)

±0.25 dB ±0.025% of input range (−41 to −51 dBV)

Window flatness:

Flat top +0, −0.01 dB

Hann +0, −1.5 dB

Noise floor: With flat top window, 50Ω source impedance and input set to −51 dBV range

20 Hz to 1 kHz (1 kHz span) < −126 dBV (−134 dBV $\sqrt{\text{Hz}}$)

1 to 100 kHz (100 kHz span) < −115 dBV (−144 dBV $\sqrt{\text{Hz}}$)

Frequency response channel match

Analog/analog: For input signals at full scale on any pair of ranges, accuracy is ±0.1 dB, ±0.5 degree (HP 3562A and 3563A).

Digital/digital: For simultaneous sampling on channels 1 and 2, accuracy is ±0.1 dB, ±0.5 degree (HP 3563A only).

Mixed analog/digital: With full-scale inputs on both channels, computational delay between channels corrected for; 1:1 sampling ratio, 16 averages, and 256 kHz sample clock; nominal accuracy is ±0.2 dB, ±1.0 degrees from 64 μHz to 20 kHz and ±0.2 dB, ±4.0 degrees from 20 to 100 kHz (HP 3563A only).

Dynamic range: ≥ 80 dB below full-scale input range.

Analog Input (HP 3563A and 3562A)

Input Impedance: 1 MΩ ±5% shunted by < 100 pF

Input Coupling: Inputs can be ac or dc coupled; ac rolloff is <3 dB at 1 Hz.

Crosstalk: −140 dB (50-Ω source, 50-Ω input termination, input connectors shielded)

Common Mode Rejection:

0 to 66 Hz	80 dB
66 to 500 Hz	65 dB

External Sampling Input: TTL-compatible input for signals ≤ 256 kHz (nominal maximum sampling rate)

Digital Input (HP 3563A)

Measurement data signals can be up to 16 bits wide and must be parallel data in two's complement or offset-binary format. The data qualifier input accepts eight qualifier lines, a trigger, and one clock signal.

Trigger

Trigger Modes: Free run, input channel 1, or 2, source and external trigger.

Trigger Delay: Pre- and post-trigger delay resolution is 1 sample (1/2048 of a time record).

Pre-Trigger: A measurement can be based on data that starts from 1 to 4096 samples (1/2048 to 2 time records) before trigger conditions are met.

Post-Trigger: A measurement is initiated from 1 to 65,536 samples (1/2048 to 32 time records) after the trigger conditions are met.

Analog Source (HP 3563A and 3562A)

Random noise, burst random, sine chirp, burst chirp, fixed sine, and swept sine are available from the front-panel source of the HP 3562A and 3563A. The HP 3563A also provides step, pulse, ramp, and arbitrary signals from the same front-panel source output. Users can select dc offset.

Output Impedance: 50 Ω (nominal)

Output Level: Between +10 and −10 V peak (ac + dc) into a ≥ 10 kΩ, < 1000-pF load. Maximum current is 20 mA.

AC Level: ±5 Vpeak (≥ 10 kΩ, < 1000 pF load)

DC Offset: ±10 Vpeak in 100-mV steps. Residual offset at 0V offset ≤ 10 mV

Distortion: Including subharmonics

25.6 μHz to 10 kHz	−55 dB
10 to 100 kHz	−40 dB

Pulse: Nominally 1 sample wide and bandlimited (HP 3563A)

Digital Source (HP 3563A)

All analog signal types can be output from the digital source connector. Data format is 16-bit parallel in either two's complement or offset binary. Output level is TTL compatible.

Maximum load: 8 LSTTL

Maximum output rate: 256 kHz

General

Specifications apply when AUTO CAL is enabled or within 5° C and 2 hours of last internal calibration.

Power: 86 to 127 Vac, 48 to 66 Hz
196 to 253 Vac, 48 to 66 Hz
450 VA maximum

Weight: Net, 27 kg (58 lb); shipping, 36 kg (79 lb)

Size: 426 mm W × 222 mm H × 578 mm D (16.75 in × 8.75 in × 22.75 in)

Accessories Included

HP 3563A: HP 01650-61607 16-bit Probe Cable: 3 each
HP 03563-61605 16-bit Probe Pod: 3 each
HP 03563-61604 8-bit Probe Cable: 3 each
HP 10347A Pattern Generator Probe Lead Set: 3 each
HP 5959-0288 Grabber (package of 20): 80 each (4 packages)
Pouch for Cables and Probes

HP 3563A/HP 3562A: Getting Started Guide, Operating Manual, Programming Reference

Accessories Available

HP 3563A: HP 10346A 8-Channel TTL Tristate Buffer Pod
HP 10348A 8-Channel CMOS Tristate Buffer Pod
HP 01650-63203 Termination Adapter

HP 3563A/HP 3562A: Transit Case for One HP 3563A: HP p/n 9211-2663

Key Literature

HP 3563A Technical Data Sheet, p/n 5952-7248.
HP 3562A Technical Data Sheet, p/n 5952-2146.
DSA Family Brochure, p/n 5091-5887E.
Standard Data Format Utilities, p/n 5091-2945E.
DSA Accessory Catalog, p/n 5091-9708E.

Ordering Information

	Price
HP 3563A Control Systems Analyzer	$27,450
Opt 907 Front Handle Kit	+$79
Opt 908 Rack Mount Kit	+$42
Opt 909 Rack Mount and Front Handle kit	+$104
Opt 910 Extra Getting Started, Operating, Programming Manuals	+$183
Opt 915 Add Service Manual and Kit	+$102
Opt 921 PC File Utilities	+$153
Opt 922 Delete Cables, Pods, and Pouch	−$1,480
Opt W30 Extended Repair Service (see page 663)	+$625
HP 3562A Dynamic Signal Analyzer	$22,050
Opt 907 Front Handle Kit	+$79
Opt 908 Rack Mount Kit	+$42
Opt 909 Rack Mount add Front Handle Kit	+$104
Opt 910 Extra Operating Manuals	+$230
Opt 914 Delete Service Manuals	−$100
Opt W30 Extended Repair Service (see page 663)	+$495

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 691.