



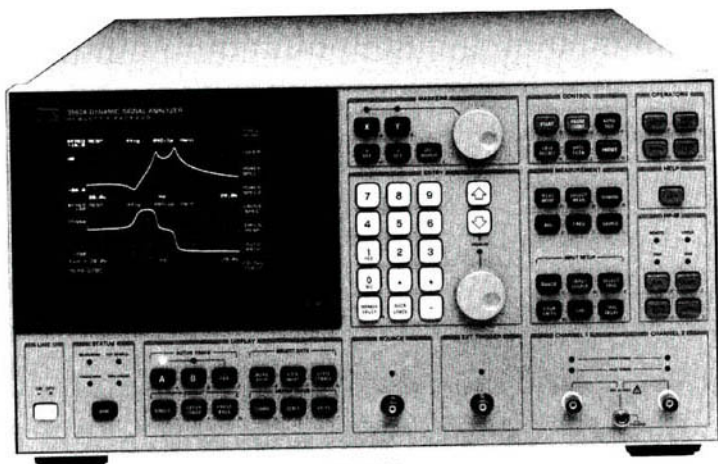
SIGNAL ANALYZERS

Dual-Channel, Dynamic Signal Analyzer 64 μ Hz to 100 kHz

Model 3562A

- Network analysis
- Spectrum analysis
- Transient analysis
- Waveform recording

- Frequency response analyzer
- Modulation analysis
- Direct control of disc drives
- Direct control of HP-GL plotters



HP 3562A

The HP 3562A Dynamic Signal Analyzer is a dual-channel fast-Fourier transform-based network, spectrum and waveform analyzer which provides analysis capabilities in both the time and frequency domains. The dc-to-100 kHz frequency range, 150 dB measurement range and 80 dB dynamic range of the analyzer makes it a powerful solution for testing and analysis in electronics, mechanics and electro-mechanical control systems.

Two high performance input channels and a built-in signal source (noise and sine signals) address network analysis on the bench or in a test system. Zoom analysis with frequency resolution to 25.6 μ Hz plus a powerful AM, FM and PM demodulation function makes the HP 3562A a versatile spectrum analyzer. For transient or waveform analysis, signals can be sampled, digitized then stored in an internal memory, or directed via HP-IB to an external disc drive (without a computer). The stored waveforms can be recalled and analyzed in the time and frequency domains (baseband and zoom analysis).

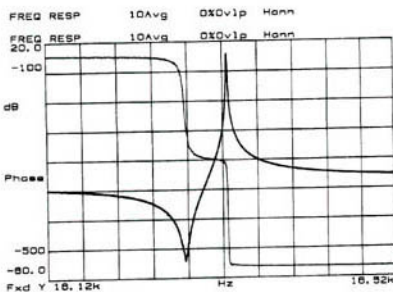
Additional features include a full range of data analysis capabilities such as vector averaging, block-operation Waveform Math, a 40-pole/40-zero Curve Fitter and Frequency Response Synthesis. Front panel operations can be automated without a computer with built-in Auto Sequence programming, or with computers through complete HP-IB programmability. For documentation of results with hardcopy or mass storage, the HP 3562A can control digital plotters and external disc drives directly via HP-IB.

Network Analysis

Accurate, high resolution frequency response measurements of electronic and mechanical systems can be performed with Linear Resolution FFT, Logarithmic Resolution and Swept Sine analysis. A built-in signal source provides a variety of random noise and sinewave signals to meet the requirements of the system under test.

Linear Resolution is the measurement technique common to all Dynamic Signal Analyzers. In the HP 3562A, 2048-point time records are Fourier-transformed into 801-line frequency spectra. For

network analysis, frequency response magnitude and phase, as well as input and output power spectra, can be measured with 801 lines of resolution. Accuracy for the frequency response magnitude and phase is ± 0.1 dB and $\pm 0.5^\circ$.



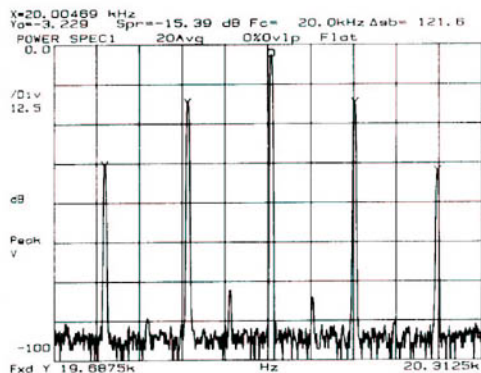
Logarithmic Resolution uses the speed of Linear Resolution FFT measurements to create frequency responses similar to a log-sweep sine test. Linear Resolution points are combined internally (rather than just reformatted), on the fly, to create 80-point-per-decade measurements over 1 to 5 decades. Start and stop frequencies can be selected in a 1-2-5 sequence from 0.1 Hz to 100 kHz (for a 0.1 Hz start frequency the maximum stop frequency is 10 kHz — 5 decades).

The Swept Sine mode reconfigures the HP 3562A as a powerful swept sine frequency response analyzer. The source can generate linear or logarithmic sweeps with increasing or decreasing frequency; user-selectable sweep rate and resolution are also standard source

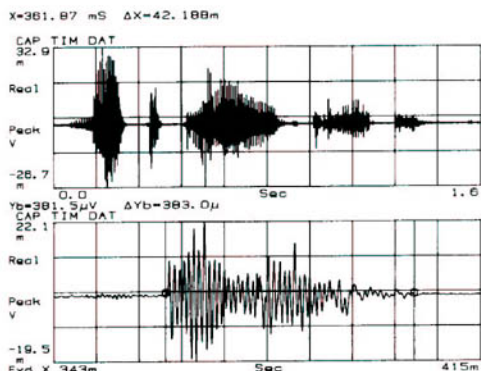
functions. Input channel functions include user-selectable averaging and integration time; automatic input ranging can be activated to provide over 130 dB of dynamic range for measurements of high performance systems.

Spectrum Analysis

On-line analysis of distortion, drift, modulation and phase noise can benefit from the speed and accuracy of the HP 3562A. High resolution measurements are typically 100 times faster than tuned spectrum analyzers — and, since the HP 3562A is an FFT-based analyzer, you can see transient events that a tuned analyzer would probably miss.



The HP 3562A is essentially a dual-channel spectrum analyzer which provides resolution to 25.6 μ Hz anywhere within the dc-to-100 kHz measurement range. Single channel accuracy is ± 0.15 dB with 80 dB of dynamic range. Modulation analysis can be performed on either or both channels with harmonic and sideband markers as well as with the built-in demodulation capability; zoom measurements can be AM, FM or PM demodulated with carrier frequencies up to 99.9 kHz.



Waveform and Transient Analysis

Perform complete analysis of waveforms and transients in the time and frequency domains. Sampled and digitized waveforms can be

stored in internal memory (single-channel Time Capture) or on disc in an external disc drive (single- or dual-channel Time Throughput). Data can be recalled for time domain analysis as single time records or as a compressed display of up to 10 time records (Time Capture mode). Data can also be recalled for baseband and zoom analysis in the frequency domain, with vector averaging if needed.

A complete array of triggering capabilities are included to enhance both waveform recording modes. Pre- and post-trigger delays can be specified to capture the rising edge of a transient or to compensate for delays in the system under test.

Data Throughput to a Disc Drive

When access to prototypes is limited, make your test time more efficient with the Time Throughput capability: through direct control of external disc drives, the HP 3562A can store time data directly to disc without a computer. Set up a measurement and specify the quantity of single- or dual-channel data to be collected. Time data will be sampled, digitized and stored on disc for later analysis as individual time records or as baseband and zoom frequency spectra.

Hardcopy and Mass Storage with Plotters and Disc Drives

To speed and simplify documentation of results, direct control of plotters and disc drives via HP-IB is a standard feature in the HP 3562A. Literally anything displayed on the analyzer screen can be plotted or saved on disc: measurement results, setup state tables, synthesis tables, curve fit tables and Auto Sequence or Auto Math program listings. Plotting is enhanced with user-selectable line types, pens and paging controls. For mass storage operations, files can be given 8-letter user-defined names; and disc catalog can be recalled and displayed to show file name, type (data, setup, etc.) and date and time of storage.

Automation for Improved Productivity

Versatile automation capabilities and a wide range of response-only or stimulus/response measurement functions in the HP 3562A help you create productive solutions for your automated testing needs. As a standalone solution, the analyzer can "learn" a series of keystrokes and then perform them on command (Auto Sequence programming). Up to five Auto Sequence programs can be stored internally, with additional programs stored in an external disc drive.

For networked HP-IB systems, the HP 3562A provides complete HP-IB programmability. Custom display graphics and messages can be created through direct programming of the high resolution vector display — user-defined softkey menus can also be created to simplify interactive testing. Rear-panel outputs for large screen displays are also standard.

HP 3562A Specifications

Frequency

Measurement Range: 64 μ Hz to 100 kHz, both channels, single- or dual-channel operation

Accuracy: $\pm 0.004\%$ of frequency reading

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

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

Window Functions: Hann, Flat Top, Uniform, Force, Exponential, and User Defined

Window Parameters:	Flat Top	Hann	Uniform
3 dB BW (% of span)	0.45	0.185	0.125

Typical Real Time Bandwidth: 10 kHz single-channel, 5 kHz dual-channel, with fast averaging on.

Dual-Channel, Dynamic Signal Analyzer 64kHz to 100 kHz
Model 3562A (cont.)



Model 3562A (cont.)

Amplitude

Accuracy (Linear Resolution)

Defined as Full Scale Accuracy at any of the 800 calculated frequency points. Overall accuracy is the sum of absolute accuracy, window flatness and noise level.

Absolute Accuracy

Single Channel (Channel 1 or Channel 2) ± 0.15 dB $\pm 0.015\%$ of input range (+27 dBV to -40 dBV)

± 0.25 dB $\pm 0.025\%$ of input range (-41 dBV to -51 dBV)

Frequency Response Channel Match:

± 0.1 dB, ± 0.5 degree

Window Flatness

Flat Top: +0, -0.01 dB

Hann: +0, -1.5 dB

Uniform: +0, -4.0

Noise Floor:

(Flat top window, 50 Ω source, 50 Ω input termination)

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

1 kHz to 100 kHz (100 kHz span) < -116 dBV (-144 dBV/ $\sqrt{\text{Hz}}$)

Dynamic Range: All distortion (intermodulation and harmonic), spurious and alias products ≥ 80 dB below full scale input range

Phase

Accuracy: Single channel, referenced to the trigger point.

< 10 kHz $\pm 2.5^\circ$

10 kHz to 100 kHz $\pm 12.0^\circ$

Inputs

Input Impedance: 1 M Ω $\pm 5\%$ shunted by 100 pF maximum

Input Coupling: The inputs may 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 Hz to 66 Hz 80 dB

66 Hz to 500 Hz 65 dB

Common Mode Voltage:

dc to 500 Hz Maximum (ac + dc)

+27 to -12 ± 42.0 Vpeak

-13 to -51 ± 18.0 Vpeak*

*For the -43 to -51 dBV input ranges, common mode signal levels cannot exceed ± 18 Vpeak or (Input Range) + (Common Mode Rejection), whichever is the lesser level.

Common Mode Voltage: 500 Hz to 100kHz. The ac part of the signal is limited to 42 Vpeak or (Input Range) + (10dB), whichever is the lesser level.

Common Mode Distortion: For the levels specified, distortion of common mode signals will be less than the level of the rejected common mode signal.

External Trigger Input Impedance: Typically 50 k Ω $\pm 5\%$

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

External Reference Input

Input Frequencies: 1, 2, 5 or 10 MHz $\pm 0.01\%$

Amplitude Range: 0 dBm to +20 dBm (50 Ω)

Trigger

Trigger Modes: Free Run, Input Channel 1, Input Channel 2, Source and External Trigger. Free Run applies to all Measurement Modes; Input Channel 1, Input Channel 2, Source and External Trigger apply to the Linear Resolution, Time Capture and Time Throughput measurement modes.

Trigger Conditions

Free Run: A new measurement is initiated by the completion of the previous measurement.

Input: A new measurement is initiated when the input signal to either Channel 1 or Channel 2 meets the specified trigger conditions. Trigger Level range is $\pm 110\%$ of Full Scale Input Range; Trigger Level is user-selected in steps proportional to the input range.

Source: Measurements are synchronized with the periodic signal types (burst random, sine chirp and burst chirp).

External: A new measurement is initiated by a signal applied to the front panel External Trigger input. Trigger Level range is ± 10 V peak; Trigger Level is user selected in 80 mV steps.

Trigger Delay

Pre-Trigger: The measurement can be based on data from 1 to 4096 samples (1/2048 to 2 time records) prior to trigger conditions being met. Resolution is 1 sample (1/2048 of a time record).

Post-Trigger: The measurement is initiated from 1 to 65 536 samples (1/2048 to 32 time records) after the trigger conditions are met. Resolution is 1 sample (1/2048 of a time record).

Source

Source Types: Band limited, band translated random noise, burst random, sine chirp, and burst chirp, as well as fixed sine and swept sine signals are available from the front panel Source output. DC Offset is also user-selectable.

Output Impedance: 50 Ω $\pm 5\%$

Input Level: $\leq \pm 10$ V peak (ac + dc) into a ≥ 10 k Ω , < 1000 pF load. Maximum current = 50 mA.

AC Level: ± 5 V peak (≥ 10 k Ω , < 1000 pF load)

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

% In-Band Energy (1 kHz span, 5 kHz center frequency)

Random Noise: 70%

Sine Chirp: 85%

Accuracy and Purity: Fixed or Swept Sine

Flatness: ± 1 dB

Distortion (including subharmonics):

dc to 10 kHz -60 dB

10 kHz to 100 kHz -40 dB

General

Specifications apply within 5°C and 2 hrs of last internal calibration.

Ambient temperature: 0° to 55°C .

Relative Humidity: $\leq 95\%$ at 40°C .

Altitude: $\leq 4,572$ m (15,000 ft.)

Storage

Temperature: -40° to $+75^\circ\text{C}$.

Altitude: $\leq 15,240$ m (50,000 ft)

Power:

115 VAC +10%, -25%, 48 to 440 Hz

230 VAC +10%, -15%, 48 to 66 Hz

450 VA maximum

Weight:

26 kg (56 lb) net

35 kg (77 lb) shipping

Dimensions:

222 mm (8.75 in) high

426 mm (16.75 in) wide

578 mm (22.75 in) deep

HP-IB

Implementation of IEEE Std 488-1978

HP-IB Interface Functions: SH1 AH1 T5 TE0 L4 LE0 SR1 RL1 PPO DC1 DT1 C0. Supports the 91XX and 794X families of HP disc drives, as well as Hewlett-Packard Graphic Language (HP-GL) digital plotters.

Accessories Supplied

Operating, Programming and Service Manuals

Accessories Available

Transit Case for one HP 3562A: HP P/N 9211-2663

Ordering Information

HP 3562A Dynamic Signal Analyzer

Option 907 Front Handle Kit

Option 908 Rack Mount Kit

Option 909 Rack Mount and Front Handle Kit

Option 910 Extra Operating Manuals

Option 914 Delete Service Manuals

*For more on these codes refer to the HP-IB section of this catalog.