HEWLETT PACKARD

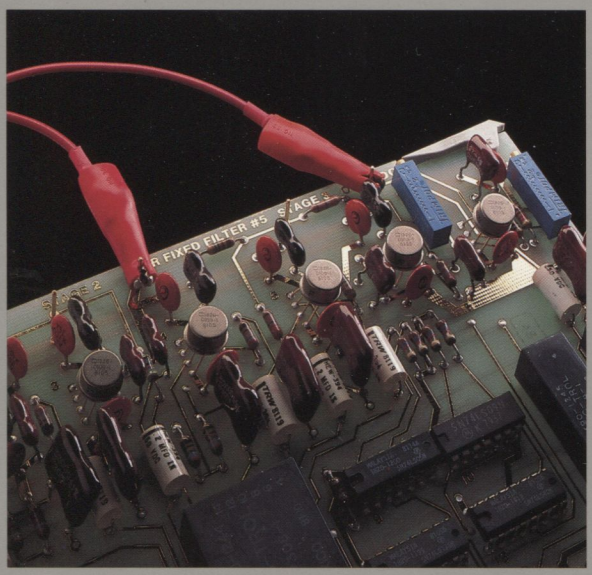
3562A DYNAMIC SIGNAL ANALYZER

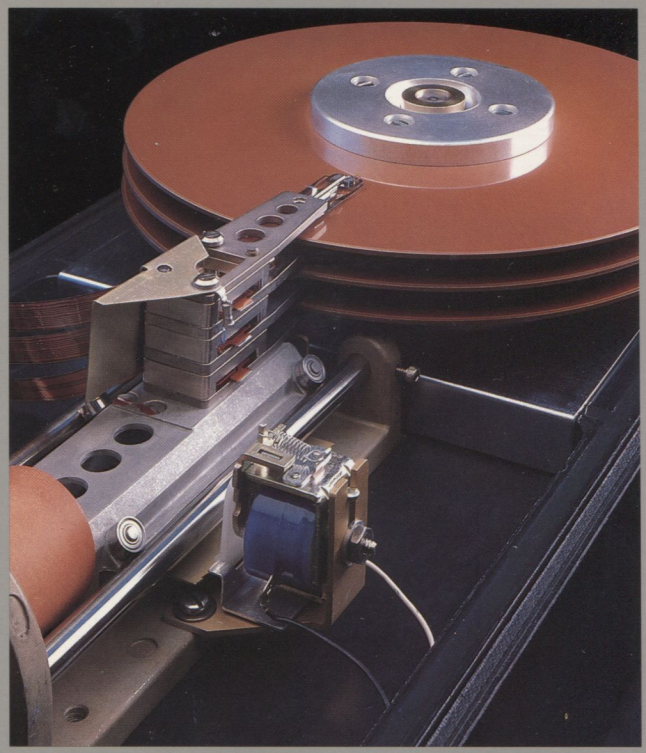
64μHz TO 100kHz

DESIGNED FOR HP-IB SYSTEMS

A Complete Solution for Network, Spectrum and Waveform Analysis.

The Hewlett-Packard 3562A Dual-Channel Dynamic Signal Analyzer Delivers . . .





Outstanding Performance in Electronic Applications:

Network Analysis
- 80 dB dynamic range
- ±0.1 dB and ±0.5 degree frequency response accuracy for precise results
- Built-in noise and sine wave sources meet your testing needs

Spectrum Analysis
- ±0.15 dB amplitude accuracy
- 25.6 μHz resolution over the entire dc-to-100 kHz frequency range
- AM, FM and PM demodulation capability

Waveform Analysis
- Storage of sampled data internally, or externally using HP-IB disc drives
- Recall data as many times as needed for baseband and zoom analysis

Complete Characterization of Control Systems:

Testing
- 801-line linear-resolution FFT analysis
- Phase-continuous swept sine frequency response measurements
- True differential inputs for in-circuit testing without instrumentation amplifiers

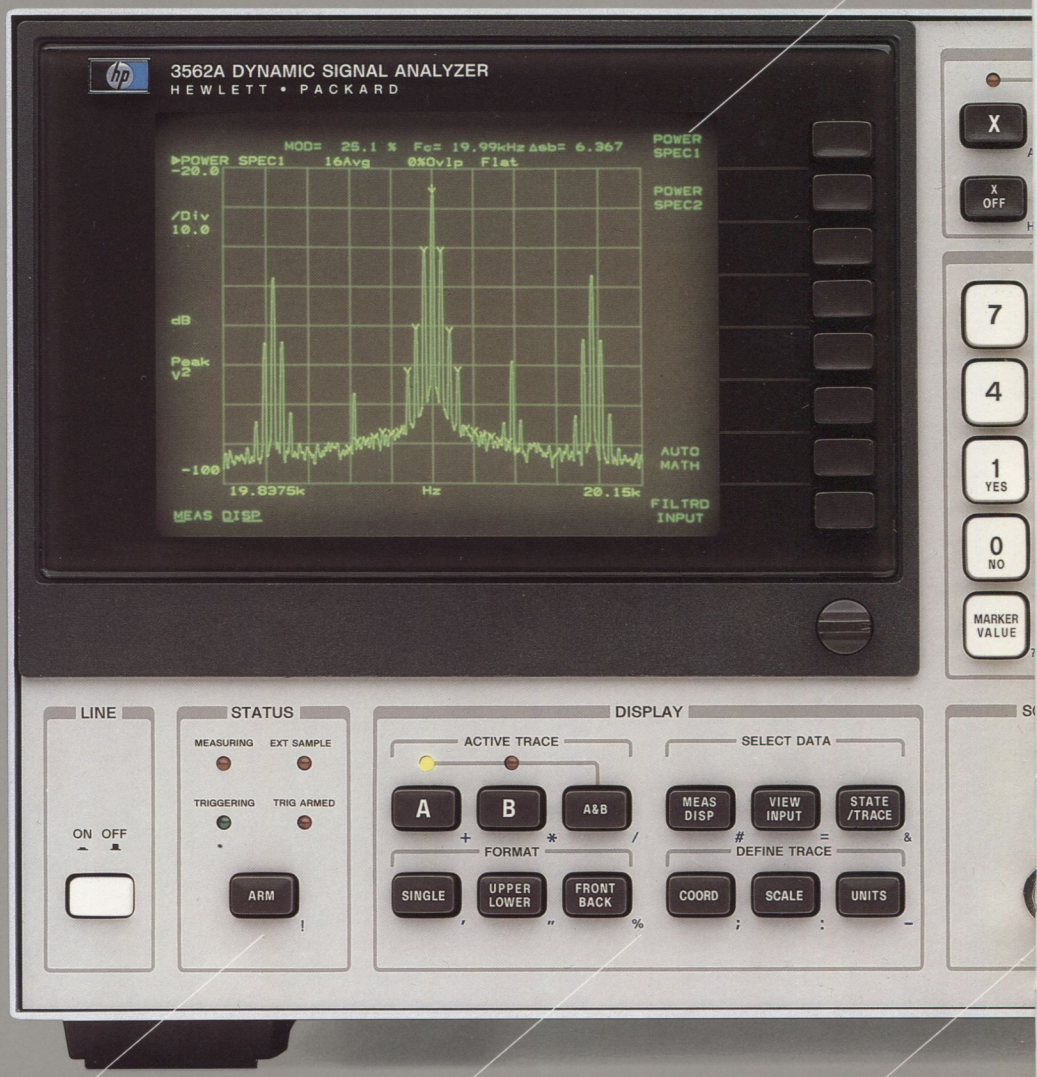
Analysis and Design
- Simple math operations let you compute open loop response from closed loop measurements
- An advanced curve fitting algorithm can extract up to 40 poles and 40 zeroes from a measured system
- Frequency Response Synthesis can be used to model network magnitude and phase

Versatile Analysis of Mechanical Systems:

Structural Dynamics
- Logarithmic-resolution analysis matches the true response of proportional-bandwidth systems
- Burst-random noise and burst-sine chirp signals reduce leakage and save measurement time
- Direct-to-disc storage of sampled data allows detailed analysis with a wide range of measurements

Machinery Vibration
- Engineering units for user-defined display annotation: "g's", "ips", etc.
- External sampling allows normalization of the frequency axis for order analysis
- Orbit diagrams (time 1 versus time 2) simplify visual analysis of rotational dynamics

The Hewlett-Packard 3562A Dual-Channel Dynamic Signal Analyzer



Observe the measurement status at a glance.

Display measured data or a detailed setup state summary.

Built-in signal source produces random noise and sine wave signals.

Auto Calibration maintains the specified amplitude and phase accuracies.

Annotated vector display with softkey menus and operational messages.

Independent X and Y axis markers plus harmonic, sideband and slope functions.

Six special preset states and the capability to automate measurements.

Six measurement modes operate within the 100 kHz measurement range.

Powerful data manipulation and response modeling functions are built-in.

On-line Help for instant access to operating information.

Direct digital plot and direct control of HP-IB* disc drives.

Dual input channels feature true differential operation and Auto Ranging.

DESIGNED FOR HP-IB SYSTEMS

*HP-IB: not just IEEE-488, but the hardware, documentation and support that delivers the shortest path to a measurement system.

Accuracy and Versatility for Complete Testing and Analysis

The HP 3562A Dynamic Signal Analyzer is more than a piece of test equipment: it is the embodiment of a well designed solution to an engineering problem. In the development and manufacture of electronic and mechanical systems, the HP 3562A has the performance, versatility and intelligence to work with you every step of the way: testing, analysis, documentation and automation.

Testing: Versatility is the Key

Accurate measurements are a basic requirement of every testing process. From dc to 100 kHz, the HP 3562A performs fast, accurate network, spectrum and waveform measurements. A wide range of measurements such as power spectrum, histogram, frequency response, cross correlation and orbits can be performed on analog signals or sampled data stored on an external disc—stored by the HP 3562A without an external computer. Additionally, data from either channel can be stored in an internal buffer for waveform and spectrum analysis.

Analysis: Built-In Computing Power

Once data is gathered, interpretation and analysis are enhanced by the computing power built into the HP 3562A. Subtract a stored calibration trace, display impulse response, or convert acceleration to velocity or displacement —manually or automatically.

For detailed analytical modeling of systems, the HP 3562A's advanced Curve Fitter can extract system poles and zeroes from a measured frequency response. Conversely, the Frequency Response Synthesis capability can convert a user-entered math model of a system into the predicted magnitude and phase responses.

Documentation: Control Discs and Plotters

In today's world of productivity and quality assurance, efficiency is measured with documented test results. Through direct control of digital plotters and external disc drives, the HP 3562A helps you solve documentation problems efficiently. Store measurements and setup states on disc, or plot fully annotated results for hardcopy documentation.

Automation: With or Without Computers

The HP 3562A is programmable via HP-IB, or with a built-in key sequence learning function called Auto Sequence programming. Measurements, analysis operations and documentation functions can be automated by entering the necessary keystrokes into an Auto Sequence program. Develop powerful multi-function tests in the HP 3562A: an Auto Sequence program can loop with timed pauses between each iteration, start at a programmed time, or even start another Auto Sequence program.

Ease of Use: On-Line Help

To be effective, a new tool must be easy to learn and easy to use. "Ease of use" is a promise that the HP 3562A makes and keeps. Logically arranged groups of keys perform direct actions or activate softkey menus. For instant assistance, the front panel "Help" key provides on-line display of detailed key descriptions.

Accuracy and Versatility For Electronic Testing and Analysis

On the bench or in a measurement system, confidence in results is based on performance and versatility, qualities built into the HP 3562A. In electronic applications, the HP 3562A is a very flexible and cost-effective solution for network, spectrum and waveform analysis.

Network Analysis

For fast adjustment of filters or for high volume testing of networks, the HP 3562A is a real-time solution: high-Q devices can be measured with 1 Hz resolution in 1 second. Two input channels and a built-in source fulfill the basic requirements for frequency response measurements. The HP 3562A goes beyond the basics with 801 lines of frequency resolution, 80 dB of dynamic range and channel match of ±0.1 dB and ±0.5 degree.

FFT or Swept Sine Testing

If you need fast network characterizations or detailed swept sine measurements, the HP 3562A provides a flexible solution. Test network response with Linear Resolution FFT analysis, up to 5 decades of Logarithmic Resolution analysis, or true swept measurements with the Swept Sine mode. Within Swept Sine an input-autoranging function makes it possible to test active devices with more than 130 dB of gain or attenuation.

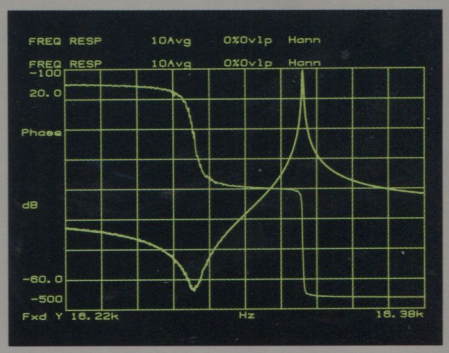
Built-In Noise and Sine Sources

The linearity of a device-under-test determines which type of stimulus will yield optimum test results: random noise for non-linear devices and sine for linear devices. The random noise and fast sine chirp signals produced by the built-in source are band-limited and band-translated to reduce out-of-band effects. And, unlike most Dynamic Signal Analyzers, the source is fully HP-IB programmable.

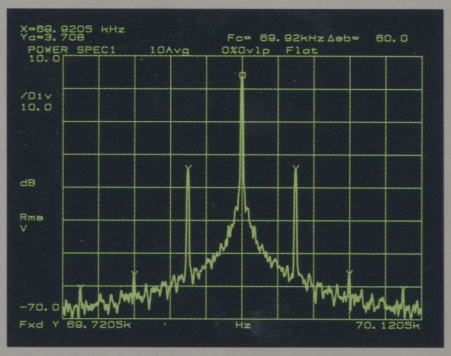
In Swept Sine mode, the source produces phase-continuous linear or log sweeps with user-defined start and stop frequencies. Significant parameters such as sweep rate and direction can also be selected, giving you complete testing flexibility.

Trace Markers and Waveform Math

Thorough analysis of test results is fast and easy with the computing power of the HP 3562A. Measure and store a calibration trace, then use block-operation Waveform Math and the stored trace to normalize a network measurement. Characterize device parameters such as 3 dB bandwidth quickly and accurately with independent X and Y markers.



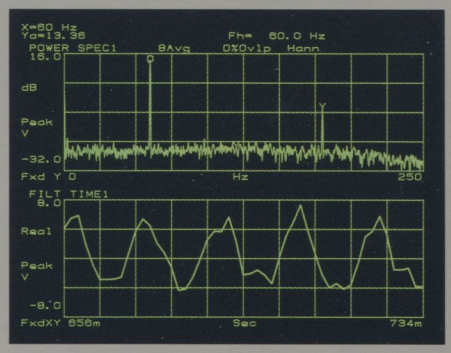
Display frequency response magnitude and phase, as well as input or output power, with single, upper/lower or front/back (shown) formats.



High resolution zoom measurements and special function markers simplify analysis of distortion and sidebands.

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 swept spectrum analyzers—and, since it is a Fourier transform-based analyzer, the HP 3562A will let you see transient events that a swept analyzer would probably miss. Detailed spectral analysis is simplified by the fast-setup zoom capability and by the flexibility of the HP 3562A display and markers. Observe time and frequency traces simultaneously. Display a full 100 kHz spectrum on one trace and a zoom spectrum on the other for fast on-line analysis. Read signal levels with 0.01 dB resolution using single-point, harmonic and sideband markers.



Demodulation can compute and display the modulating signal as a frequency spectrum and as a time waveform.

. . . With Demodulation

Complex modulated signals can be separated and analyzed in the time or frequency domains with the HP 3562A Demodulation capability. Signals on either input channel can be analyzed independently with AM, FM or PM demodulation. Specify a carrier frequency up to 99.9 kHz, or let the auto-carrier algorithm find it for you. This measurement capability can be a powerful addition to audio and speech spectral analysis.

Waveform Analysis

Perform complete analysis of time waveforms and transients with the HP 3562A Time Capture and Time Throughput data recording modes. Sample, digitize and record waveforms containing frequencies up to 100 kHz with complete alias protection. Analyze the recorded waveform with 801 lines of frequency resolution over the original measurement span, or with post-capture zoom analysis.

Internal Storage Buffer

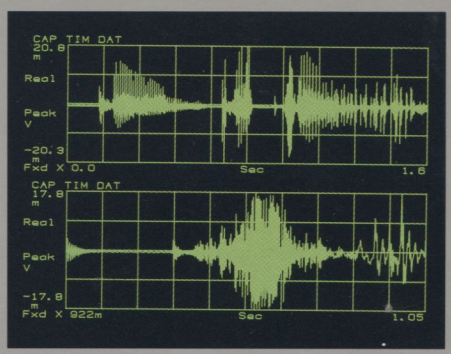
Time Capture features a 20K-sample buffer which can store up to 10 time records of gap-free time data. Scroll through the 20K-sample buffer and display time records and linear spectra. Measure power spectra and histograms: the HP 3562A computes a measurement from captured data just as it would with an analog input signal. Frequency resolution can be increased with zoom factors up to 10 times the original resolution.

External Disc Storage

Lengthy or one-time events can be sampled and stored in an external HP-IB disc drive with the Time Throughput mode. Store up to 32,000 time records (134 Megabytes) per throughput session for later analysis as individual 2048-point records. Frequency domain analysis can benefit from the 12.5 kHz real-time bandwidth and zoom factors greater than 32,000 times the original resolution. Throughput data can also be analyzed using the HP 3562A Demodulation capability.

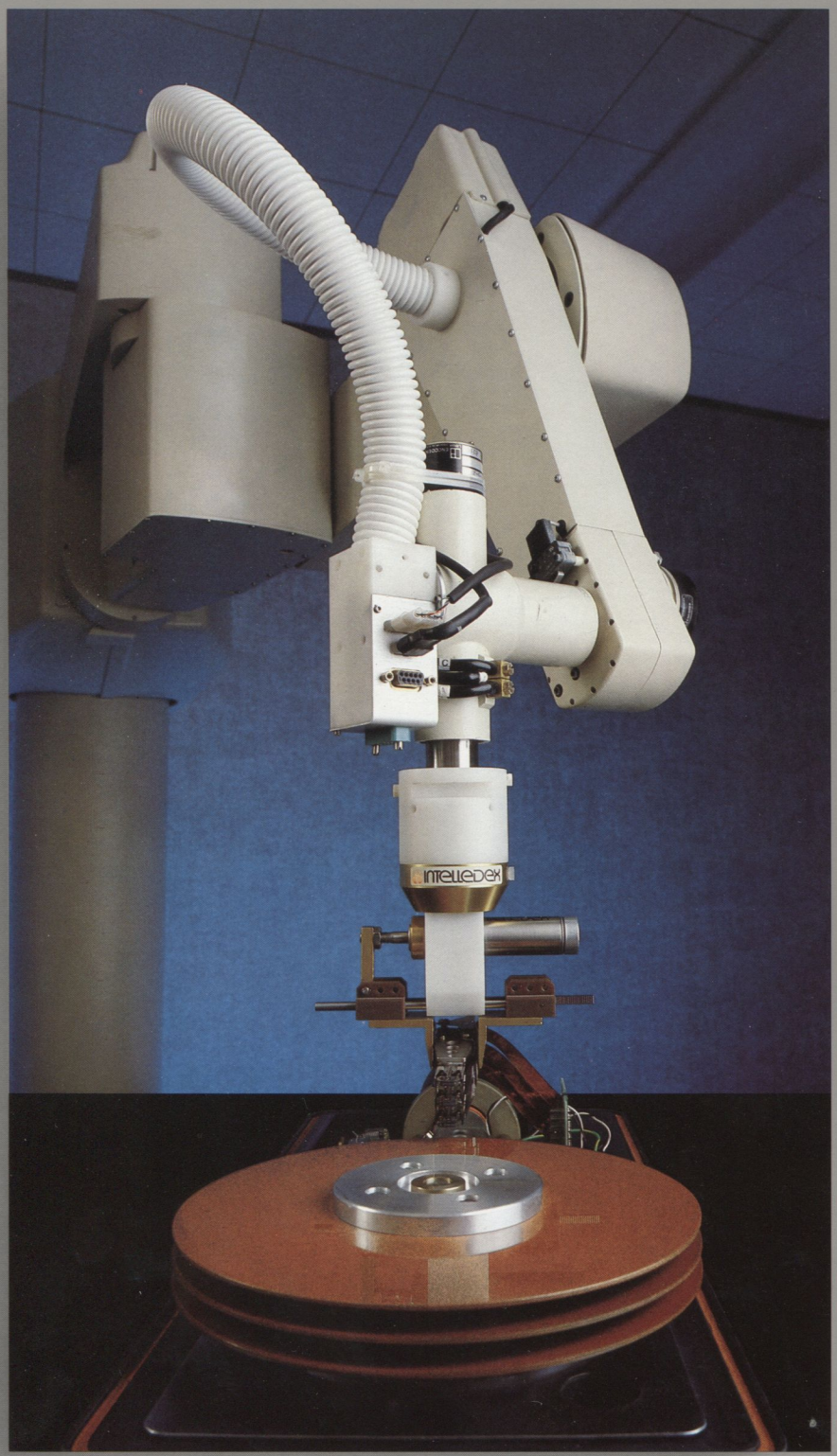
Trigger Flexibility

A complete array of triggering capabilities are available in both waveform recording modes, including pre- and post-trigger delay. Catch the rising edge of a transient. Compensate for network delays. Trigger a measurement manually, automatically or via HP-IB.



Capture and display time data as a compressed block, an expanded block, or as a linear or power spectrum.

The Servo Solution Set: FFT, Swept Sine Testing, and More.



The design, test and analysis of closed loop control systems often requires a variety of tools: desktop computers, dual-channel FFT analyzers and swept sine frequency response analyzers. Increase your efficiency with the HP 3562A, a single-instrument solution for servo system design and test engineers. From the front panel of the HP 3562A you can:

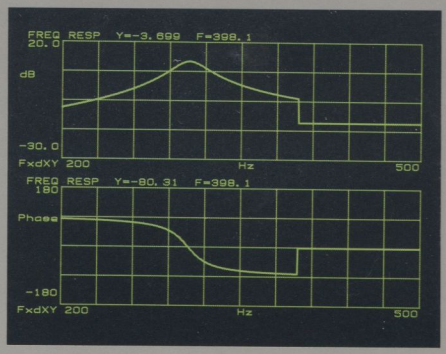
- Create a table of poles and zeroes and transform it into a frequency response
- Measure frequency or impulse response with FFT or Swept Sine testing
- Compute open loop response from a closed loop measurement
- Extract and tabulate poles and zeroes from a measured response

System Modeling Aids Designers

Model the response of a system, before you build it, in the same device that will be used to test it. Describe your system or compensation network in a pole/zero, pole/residue or ratio-of-polynomials format. The HP 3562A Frequency Response Synthesis capability will transform a table of pole/zero, pole/residue or polynomial values into a display of magnitude and phase over a specified frequency span. As an enhancement to analysis, a table in one format can be converted to either of the other two with a single command. For complete documentation, synthesis tables and synthesized responses can be plotted or stored in an external disc drive.

Address All of Your Testing Needs

Characterization of system stability begins with a measurement of the control loop frequency response To meet the demanding needs of control loop testing, the HP 3562A contains three types of frequency response measurement: Linear Resolution FFT, Log Resolution and true Swept Sine. A pair of differential input channels let you make measurements in the loop without instrumentation amplifiers. The built-in signal source lets you choose the right stimulus for your system: random noise, fast sine chirps or sine sweeps.



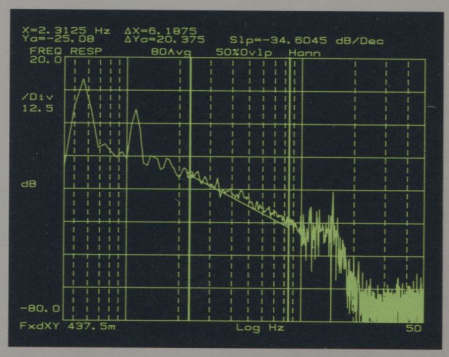
Swept Sine measurements can display the instantaneous magnitude, phase and frequency. Intermediate results can be plotted while the measurement continues.

Swept Sine

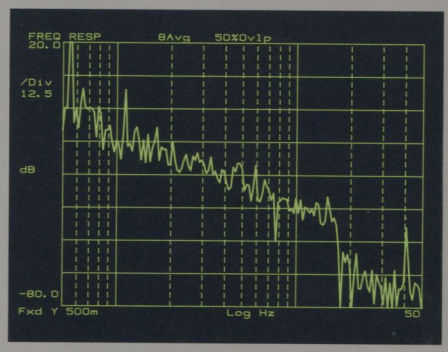
The HP 3562A Swept Sine capability features the phase-continuous linear and log sweep frequency response measurements typically found in frequency response analyzers. Swept Sine is enhanced with several powerful features: the source offers dc-offset, bi-directional sweep, manual sweep, and automatic level control; the input section provides either manual or automatic selection of integration time and effective sweep rate. For high performance systems, an input-autoranging sweep function can measure frequency responses with more than 130 dB of dynamic range.

Linear Resolution FFT

Linear Resolution is the constant-resolution measurement technique common to all Dynamic Signal Analyzers. Perform accurate, informative frequency response measurements with 801 lines of frequency resolution. Display magnitude, phase, input and output power for fast, complete characterization of a system. Testing flexibility is enhanced by the built-in signal source: test non-linear systems with random noise and averaging; use fast sine chirps to characterize non-linearities or to perform fast measurements of linear systems.



Linear Resolution measurement of a control system displayed on log frequency scale with slope marker.



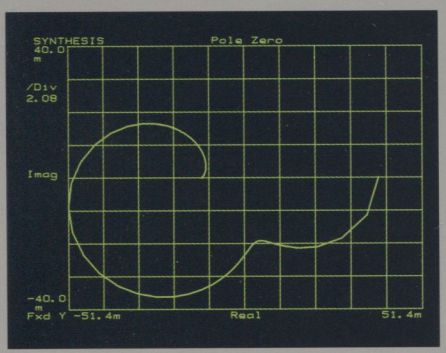
Log Resolution measurement of the same control system. Proportional resolution provides improved resolution at lower frequencies and reduced variance at upper frequencies.

Logarithmic Resolution

This measurement technique uses Linear Resolution FFT data to create a measurement similar to, but faster than, an equivalent log-sweep swept sine test: logarithmically-spaced "filters" are formed by combining, rather than just reformatting, Linear Resolution points. This technique addresses the natural response of systems by concentrating resolution in the lower half of a measured decade while maintaining good resolution in the upper half. Frequency response and power spectrum measurements can be performed across 1 to 5 decades with 80-point-per-decade resolution.

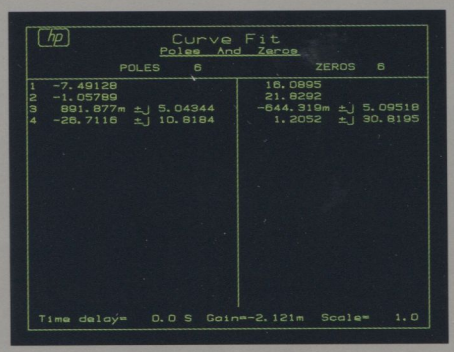
Advanced Functions for System Analysis

To complete the cycle of design, test and analysis, powerful computing and analysis capabilities have been built into the HP 3562A. A measured response can be analyzed graphically in the time and frequency domains, or numerically as a table of analytical values. Use Waveform Math to compute functions that may have to be derived indirectly such as open loop response. For numerical analysis, the HP 3562A Curve Fitter can display results as a table of poles and zeroes for Laplace domain analysis.



Frequency response measurements can be displayed in Nyquist (real vs. imaginary) and Nichols (log magnitude vs. phase) formats.

Curve Fit pole/zero table for the Log Resolution measurement on page 9.



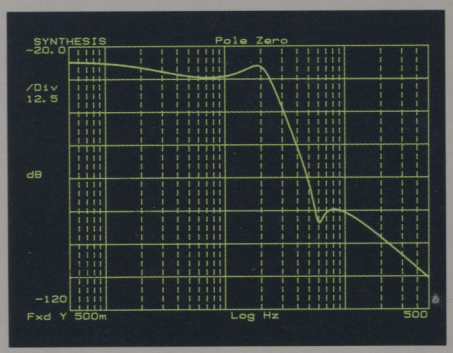
Detailed Pole/Zero Analysis

Verify a design analytically with the HP 3562A Curve Fitter. Once a frequency response has been measured, the Curve Fitter will estimate the Laplace domain transfer function of the device using up to 40 poles and zeros. A single command will transfer the pole/zero values into the frequency Response Synthesis table where conversion into pole/residue or polynomial formats can take place.

Conceptually, the Curve Fitter is a mathematical process which creates a "best fit" model of the measured response "curve". A typical system with 10 poles and 10 zeroes can be fit and tabulated in less than 60 seconds.

The Curve Fitter was designed for use in the feedback control system environment. Its multiple degree of freedom (MDOF) algorithm can fit an entire response simultaneously—a typical single degree of freedom (SDOF) curve fitter will only fit one resonance at a time. Further, good noise immunity in the algorithm means that accurate results can be obtained in a typical noisy measurement environment.

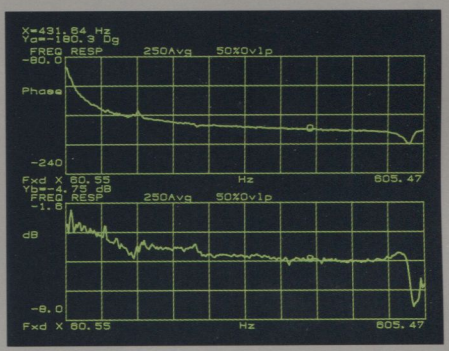
The synthesis capability can compute and display the predicted frequency response of a system. Data can come from the curve fitter or from a table of user-entered values.



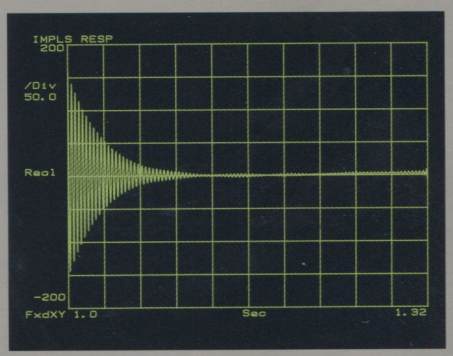
Data-Block Math Computations

Built-in Waveform Math capabilities make manipulation of entire data blocks as easy as pressing the keys on a hand-held calculator. Subtract a real or complex constant to normalize a result. Convert a closed loop measurement into an open loop response for stability analysis. Use the inverse FFT capability to derive the impulse response of a system. All without an external computer, and all from the front panel of the analyzer.

Computation on data, as it is taken, can be performed using the Auto Math feature. Enter a sequence of math operations into the Auto Math program: results such as coherent output power can be computed and displayed on-line for fast analysis.



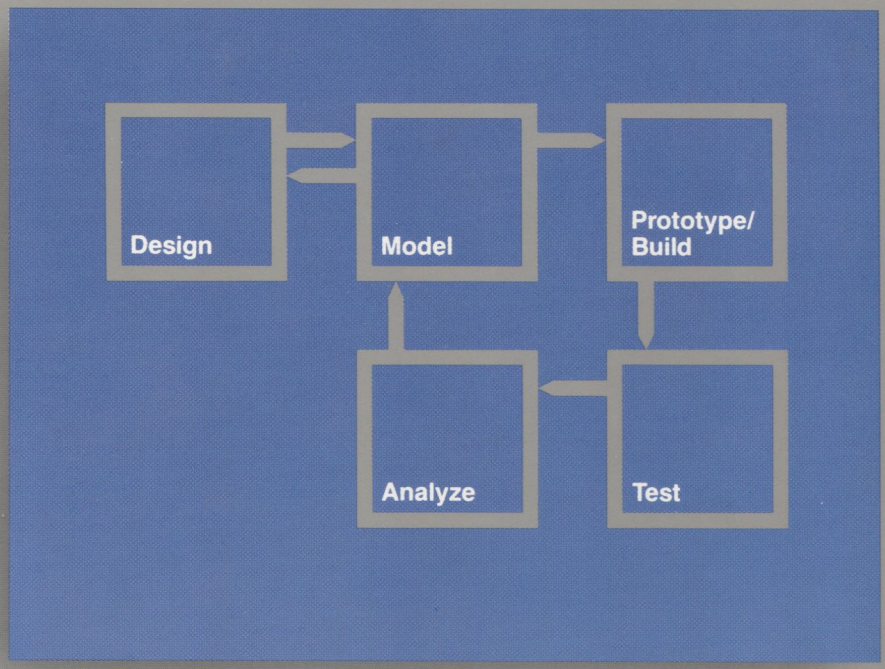
Expanded portion of a computed open-loop response of a control system. Markers indicate the gain margin (−4.75 dB) at the −180° phase crossing.



For time domain analysis, the impulse response can be displayed as a measurement or a computed result.

The Development and Manufacturing Cycle

The HP 3562A is a valuable asset in the development and manufacture of electronic and mechanical products. Within the product development cycle shown here, the HP 3562A can contribute directly to three areas: Model, Test and Analyze. The diagram can also represent the development of the manufacturing process for the new product. Within this process, the HP 3562A can increase testing productivity and make analysis more efficient in statistical quality control.



Product Development

Model

Systems and compensation networks can be modeled and refined in the same device which will be used to test the actual system. A designer can enter a pole/zero, pole/residue or polynomial representation of the system, then synthesize frequency response magnitude and phase over a selected frequency span.

Test

FFT and Swept Sine testing capabilities are standard features in the HP 3562A. Select measurements such as frequency response, impulse response and histogram. The built-in source generates random noise and sine signals for testing linear and nonlinear systems. A pair of true differential inputs let you measure in-circuit without external instrumentation amplifiers.

Analyze

Test results can be displayed and analyzed as frequency response magnitude and phase, a table of poles and zeroes, and more. Characterize loop stability using built-in Waveform Math and the versatile trace markers. Document results with hardcopy, or save results in mass storage through direct control of digital plotters and HP-IB disc drives.

Manufacturing

Test

The HP 3562A offers several capabilities which improve testing productivity. On a bench or in a test system, this instrument can operate as a network, spectrum or waveform analyzer—the signal generator for network analysis is built-in. Instrument configuration can be changed quickly with internal or external storage of setup states: five internally and more externally on magnetic disc. Measurements can also be stored on disc. When stored, each disc file is labelled with the time and date.

Automation without computers can be accomplished through a built-in function called Auto Sequence programming. For computer-based automated testing, the HP 3562A is also fully HP-IB programmable. Enhance interactive testing with the ability to create custom softkey menus, graphics and messages—outputs to drive external large-screen analog displays are standard.

Analyze

Through the HP-IB, the HP 3562A can become an integral part of a networked system. Additionally, direct control of disc drives enhances efficiency in statistical analysis: data is stored on a disc in the same format used by HP desktop computers—transferring data to the quality assurance computer is as easy as picking up a disc from the test station. For graphical analysis, the HP 3562A can also control digital plotters to create hardcopy of measurements.

Structures and Machines: A Multi-Purpose Analysis Tool

In the world of mechanical analysis, the HP 3562A is equipped to handle your most demanding problems in structural analysis, vibration and noise control. As a dual-channel Dynamic Signal Analyzer, the HP 3562A can perform single-channel analysis of vibration spectra as well as cross-channel orbit and frequency response function measurements. Add the HP META Structural Analysis software and an HP Series 300 computer for a powerful structural analysis system.

Structural Dynamics

Structures respond to forces by vibrating and deforming. Whether the vibrations are caused by operating forces or a test hammer or shaker, the HP 3562A makes it easy to measure and identify resonances.

Shaker Testing with Linear or Log Resolution

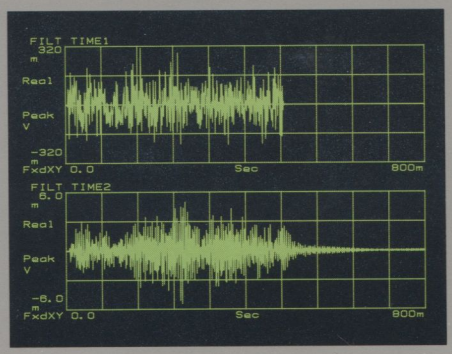
The HP 3562A provides several features designed to save you time during shaker tests. Autoranging input channels and built-in signal source save setup time. Actual testing time can be reduced with:

- Burst Random and burst sine chirp signals when testing lightly damped structures, and . . .
- Logarithmic Resolution measurements, with random noise, for broadband tests.

The HP 3562A Log Resolution capability is optimized for broadband testing of mechanical resonances. Resolution is concentrated in the lower half of a decade while good resolution is maintained in the upper half.

For high resolution characterization of closely spaced resonances, zoom measurements with 801-point Linear Resolution are still the best solution. A wide range of zoom spans let you select the resolution you need anywhere in the measurement range of the HP 3562A.

Burst random noise stimulus (upper trace) lets the response (lower trace) decay before the end of the time record. The result is shorter measurement times due to reduced leakage and fewer averages.



Enhanced Impact Testing

For impact testing of structures, the HP 3562A can speed and simplify your toughest mechanical frequency response function measurements. Perform impact tests faster and with better results using selectable pre- and post-trigger delays and force/response windows. Save time when averaging with Automatic Overload Rejection—rather than starting a new group of averages, a measurement that overloads an input channel will be rejected from the average.

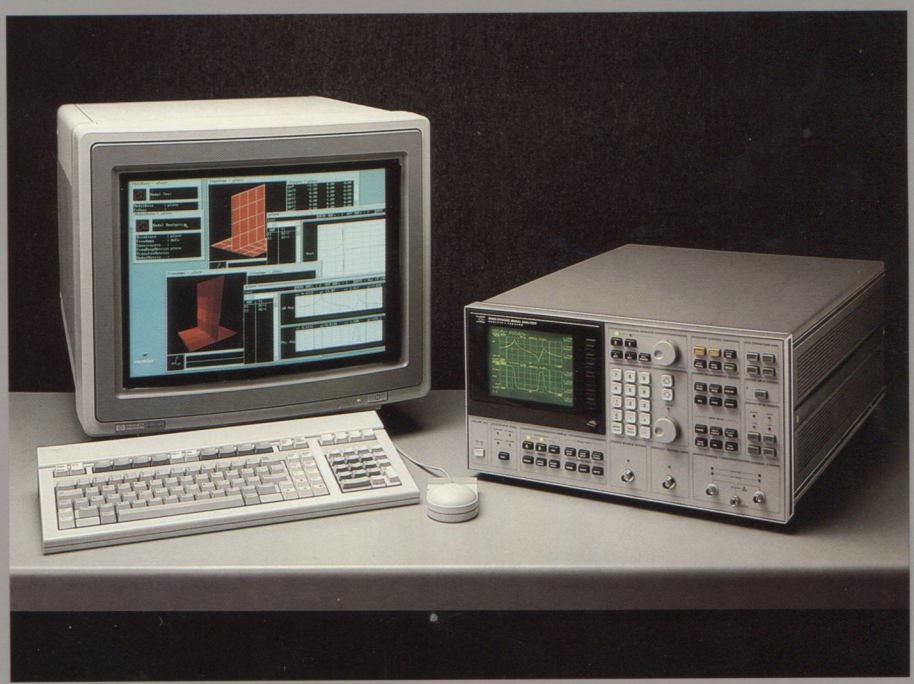
Throughput Data to a Disc Drive

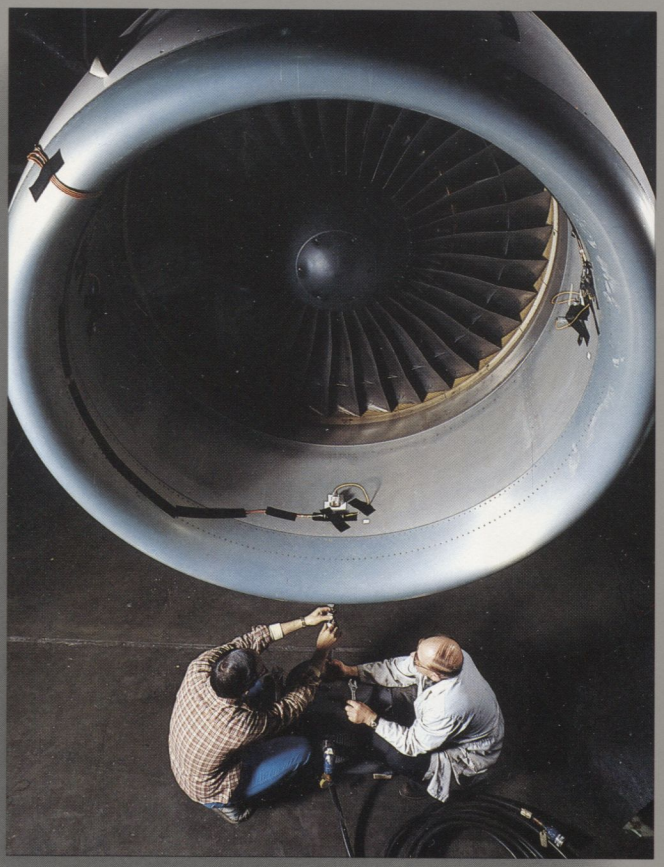
When access to prototypes are limited, make your test time more efficient with the Time Throughput capability: the HP 3562A can store data in an external HP-IB disc drive without the aid of a computer. Set up a measurement and specify how much data is to be collected. Time data will be sampled, digitized and stored directly on the disc for later analysis. During analysis, setup a measurement as you normally would and the HP 3562A will recall and process the data—as many times as necessary with baseband or zoom analysis.

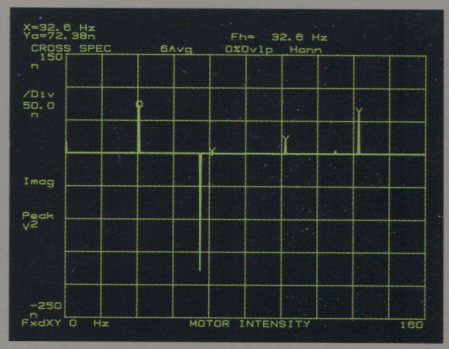
Modal Analysis Software

All of the previously mentioned measurement capabilities make the HP 3562A a powerful structural dynamics analyzer. Add to those capabilities the HP META Structural Analysis software and an HP Series 300 computer. The result is a multi-purpose structural analysis system with powerful computation and analysis capabilities. Perform Modal Analysis with the HP META-MODAL software, Structural Modification Simulation with the HP META-MODS software and Forced Response Simulation with the HP META-FORCE software. Contact your local HP Sales Representative for details.

HP META Structural Analysis software provides complete structural test and analysis capabilities.







For acoustic intensity analysis, the imaginary part of the cross power spectrum can be displayed. Harmonic markers highlight multiples of the fundamental.

Machinery Vibration

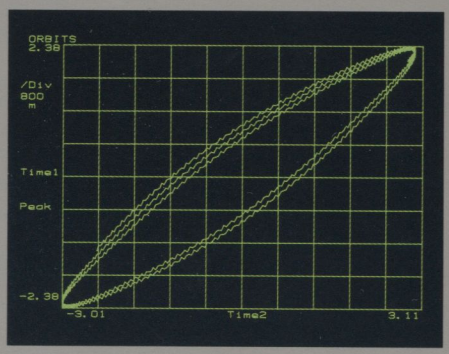
The HP 3562A is a multi-purpose solution for machinery monitoring, balancing and analysis. As a Dynamic Signal Analyzer, the HP 3562A provides fast, detailed displays of machine vibration spectra. Two input channels let you monitor two points on a machine for fast balancing, or for cause and effect analysis in gear trains.

Predictive Maintenance

Signature analysis is the process of measuring baseline vibrations and documenting the results for future comparison. This entire process is easy to implement with the HP 3562A. Display the results in orders of rotation using external sampling. Save measurements in an external disc drive for manufacturing or field service reference—get hardcopy of signatures quickly with an HP-GL digital plotter.

Machinery Balancing

Balancing of rotating machinery is often performed to ensure long, reliable operation. The HP 3562A delivers a powerful multi-plane balancing solution with dual-channel measurements. Use the orbit diagram capability to detect shaft centerline motion. Frequency response can be used to measure relative phase between any two signals; compute the balancing solution from the measured data using Auto Sequence programming and Waveform Math.



Built-in Orbit diagram capability reduces equipment requirements for rotating machinery analysis.

A New Vibration Analysis Technique

Within a rotating machine, blade pass and gear mesh vibrations combine with running speed resonances to form complex vibrations. Analysis of complex vibrations is simplified by the HP 3562A with a technique known as Demodulation. Demodulation lets you separate the blade pass or gear mesh components from the running speed—even if the running speed is unknown—for direct analysis of the frequency and amplitude of the individual components.

For Further Information . . . regarding rotating machinery analysis with Dynamic Signal Analyzers, please refer to Hewlett-Packard Application Note 243-1, "Effective Machinery Maintenance Using Vibration Analysis", available from your Hewlett-Packard Sales Representative.

Acoustic Intensity

Acoustic intensity measurements are becoming increasingly popular in noise control applications: measurements can be made in almost any acoustic environment and tests are much faster than traditional lead-wrapping techniques. By adding a pair of high quality microphones to an HP 3562A, Cross Power Spectrum measurements can be made which will indicate sound intensity and direction at the test point.

Versatile automation capabilities 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 perform them on command. In "system controller" mode, the HP 3562A can command HP-IB disc drives and HP-GL plotters for mass storage and hardcopy documentation. And, for HP-IB systems, the dual- and single-channel measurement capabilities address a wide range of testing needs.

Control Disc Drives and Plotters

Mass storage of measurements and hardcopy plots are a vital part of any well-documented engineering process. With the HP 3562A, documentation is as easy as pressing the PLOT or DISC hardkeys: software drivers for HP-IB disc drives and HP-GL plotters are programmed into the analyzer. Copy setup states, measurements, Synthesis or Curve Fit tables and Auto Sequence programs directly from the display to disc or hardcopy.

Programmable from the Front Panel

Stated simply, Auto Sequence programming is computer aided engineering without a computer. Teach the HP 3562A a series of keystrokes to perform measurements, Waveform Math computations, disc and plotter operations, and more. The HP 3562A can hold as many as five independent or interrelated Auto Sequence programs—additional programs can be stored on an external disc. For unattended testing, an Auto Sequence program can be set to start automatically at a specified time and repeat at regular intervals. By adding an external disc and an HP-GL plotter, the HP 3562A can become the center of a powerful standalone test station.

Catalog

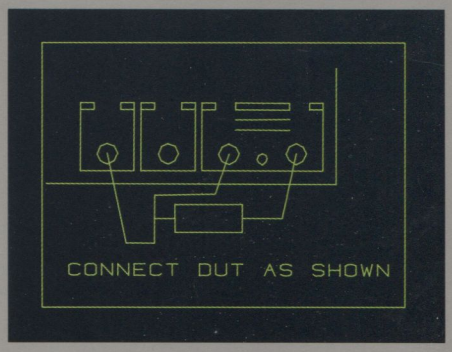
Page 1

Disc ARCHIV Entries: 12 Used, 524 Free
Sectors: 0 Deleted 889 Free

Filename	Type	Size	Date	Time
TEST1	Setup	3	08/31/84	09:24:32
TEST2	Setup	3	08/31/84	09:24:38
TEST3	Setup	3	08/31/84	09:24:53
MEASPLOT	Aseq1	2	08/31/84	10:41:56
MEASSAVE	Aseq2	2	08/31/84	10:42:43
LOPASS1	Data	28	07/10/84	14:12:02
AMP1	Data	28	07/10/84	14:12:51
LOPAS2	Data	28	07/10/84	14:13:28
AMP2	Data	28	07/10/84	14:13:43
FILTER	Synth	4	07/11/84	08:57:53
LOPAS3	Data	28	07/11/84	08:58:29
COMP	Cv Fit	4	07/11/84	09:00:48

A complete catalog of disc files, all with alphanumeric labels, is maintained by the HP 3562A. Date and time of storage aids in identification.

For interactive testing, create custom graphics and on-screen messages via HP-IB programming of the vector display.



Programmable for HP-IB Systems

Automated test systems can benefit from the versatility and programmability of the HP 3562A. Perform dc-to-100 kHz spectrum and network measurements with this single instrument. Single-channel spectrum analysis can be performed with 10 kHz real-time bandwidth. Network analysis is easy to implement with the programmable source and two autoranging input channels. For analysis, data blocks can be transferred rapidly to the test system computer with simple HP-IB commands.

Advanced Signal Processing

Explore advanced levels of signal processing via the HP-IB. For specialized analysis, generate custom window shapes in a computer and transfer them to the analyzer. Access the internal signal processing commands directly for powerful 32-bit computing: perform floating point block math, on real or complex values, with specifiable block sizes up to 32K-points. Perform 50 ms Fast Fourier Transforms on 2048-point data blocks. Analyze results visually: the processed block can be transferred to the HP 3562A display for quick interpretation.

Advanced Technology

The HP 3562A Dynamic Signal Analyzer really is more than a piece of test equipment. High performance analog and digital technologies have been combined to create a versatile testing and analysis solution which will meet your bench and system needs now and in the future.

On the analog side, begin with a pair of differential inputs with fully specified performance. Add two 13-bit analog-to-digital converters that provide a full 80 dB of dynamic range.

Once the data is digitized, two HP proprietary multiple-path digital filters provide over 60 baseband and zoom spans with full alias protection. Data manipulation and internal control are performed by three processors working in parallel: an instrument control processor, a dedicated FFT processor and a 32-bit floating-point processor. Finally, a fourth processor shows you the results on the HP vector display.

Specifications describe the instrument's warranted performance. Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance specifications. Supplemental characteristics are denoted as 'typical,' 'nominal,' or 'approximately.'

Measurement Functions

The following table lists the functions the analyzer can measure directly based on the selected measurement mode. The measurement modes are abbreviated as: LN (linear resolution), LG (log resolution), SS (swept sine) and TC (time capture).

Time Domain Measurements	
Filtered Time Record	LN*,TC
Compressed Time Buffer (up to 10 records; chnl 1 or chnl 2)	TC
Orbits (chnl 1 versus chnl 2)	LN*
Input Time Record (full span; chans 1 & 2)	LN*,LG,SS,TC
Auto Correlation (chnl 1 & 2)	LN*
Cross Correlation	LN*
Impulse Response	LN*
Frequency Domain Measurements	
Input Linear Spectrum (full span; chans 1 & 2)	LN*,LG,SS,TC
Filtered Linear Spectrum (chnl 1 & 2)	LN*,TC
Power Spectrum (chnl 1 & 2)	LN*,LG,SS,TC
Power Spectral Density (PSD; chnl 1 & 2)	LN*,LG,TC
Square Root of PSD (chnl 1 & 2)	LN*,LG,TC
Energy Spectral Density (ESD; chnl 1 & 2)	LN*,TC
Cross Power Spectrum	LN*,LG,SS
Frequency Response, lin frequency spacing	LN,SS
Frequency Response, log frequency spacing	LG,SS
Coherence Function (with averaging)	LN*,LG,SS
Amplitude Domain Measurements	
Histogram (chnl 1 & 2)	LN*,TC
Probability Density Function (PDF; chnl 1 & 2)	LN*,TC
Cumulative Density Function (CDF; chnl 1 & 2)	LN*,TC

Demodulation is a valid pre-processing function for all starred Linear Resolution measurements (LN*) when zooming. All Linear and Log Resolution measurements can be performed on Time Throughout data with the exception of full span Linear Spectrum and Input Time Record.

Frequency

Measurement Range: 64 μHz 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, Linear Resolution mode

Spans:	Baseband	Zoom
# 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 and User-Defined

Window Parameters:	Flat Top	Hann	Uniform
Noise Equiv BW (% of span)	0.478	0.188	0.125
3 dB BW (% of span)	0.45	0.185	0.125
Shape factor (60 dB BW/3 dB BW)	2.6	9.1	716

Typical Real Time Bandwidths:

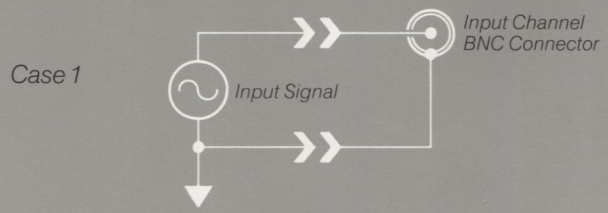
Single-channel, single display	2.5 kHz
Single-channel, Fast Averaging	10 kHz
Dual-channel, single display	2 kHz
Dual-channel, Fast Averaging	5 kHz
Throughput to CS/80 disc	
Single-channel	12.5 kHz
Dual-channel	6.25 kHz

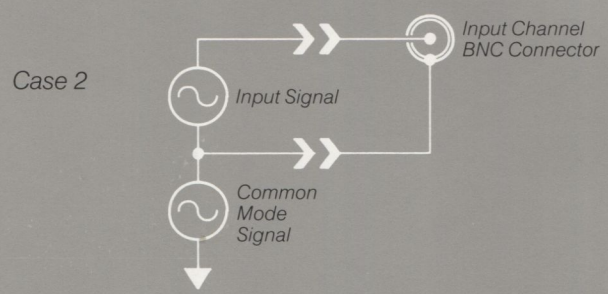
Amplitude

Accuracy: Defined as Full Scale Accuracy at any of the calculated frequency points. Overall accuracy for Linear or Logarithmic Resolution Mode is the sum of the absolute accuracy, window flatness and noise level. Overall accuracy for Swept Sine is the sum of absolute accuracy and noise level.

Input Connections:

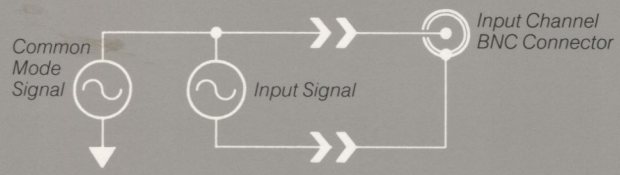
Cases 1 and 2 are the recommended input connections. For these cases, the amplitude accuracy specified below is applicable.



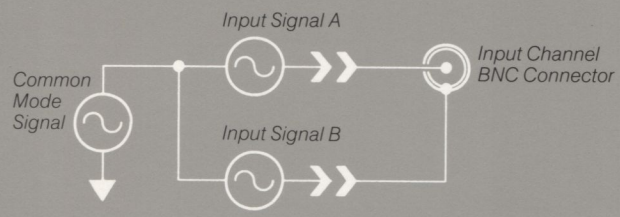


Cases 3 and 4 are input connections which degrade amplitude accuracy. For these cases, the amplitude accuracy specified below must be modified with the accuracy adders.

Case 3



Case 4



Absolute Accuracy:
Single Channel (Channel 1 or Channel 2)
± 0.15 dB ± 0.015% of input range (+ 27 dBV to − 40 dBV, input connections as specified in Cases 1 and 2 above)
± 0.25 dB ± 0.025% of input range (− 41 dBV to − 51 dBV, input connections as specified in Cases 1 and 2 above)

DC Response:

Input Range (dBV rms)	dc Level
+ 27 to − 35	> 30 dB below full scale
− 36 to − 51	> 20 dB below ful scale

Frequency Response Channel Match:
± 0.1 dB, ± 0.5 degree (input connections as specified in Cases 1 and 2)

Accuracy Adder: Single-channel, inputs connected as shown in Cases 3 and 4 above.
Add ± 0.35 dB and ± 4.0 degrees to the absolute accuracy.

Accuracy Adder: Dual-channel measurements
Add ± 0.35 dB and ± 4.0 degrees once for each input connected as shown in Cases 3 and 4 above.

Window Flatness:

Flat Top:	+ 0, − 0.01 dB
Hann:	+ 0, − 1.5 dB
Uniform:	+ 0, − 4.0

Effective Log. Resolution Window Flatness:
+ 1.72, − 5.56 dB

Noise Floor: Flat top window, 50 Ω source impedance, − 51 dBV range
20 Hz to 1 kHz (1 kHz span) < − 126 dBV (− 134 dBV/√Hz)
1 kHz to 100 kHz (100 kHz span) < − 116 dBV (− 144 dBV/√Hz)

Dynamic Range: All distortion (intermodulation and harmonic), spurious and alias products ≥ 80 dB below full scale input range (16 averages)

Phase

Accuracy: Single channel, input connections as specified above in Cases 1 and 2; referenced to the trigger point

< 10 kHz	± 2.5 degrees
10 kHz to 100 kHz	± 12.0 degrees

Inputs

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

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

Input Range (dBV rms)	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 100 kHz. The ac part of the signal is limited to 42 Vpeak or (Input Range) + (10 dB), 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 kΩ ± 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 ± 0.01%
Amplitude Range: 0 dBm to + 20 dBm (50 Ω)

HP 3562A Specifications

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 ±110% of Full Scale Input Range; Trigger Level is user-selected in steps of (Input Range in volts)/128.

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 Vpeak; 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

Band limited, band translated random noise, burst random, sine chirp, 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 ±5 Ω

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

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

DC Offset: ±10 Vpeak 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 when AUTO CAL is enabled, or within 5°C and 2 hrs of last internal calibration.

Ambient temperature: 0° to 55° C.
Relative Humidity: ≤95% at 40°C.
Altitude: ≤ 4,572 m (15,000 ft.)

Storage:
Temperature: −40° to +75°C.
Altitude: ≤ 15240 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 lbs) net
35 kg (77 lbs) 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
SH1 AH1 T5 TE0 L4 LE0 SR1 RL1 PP0 DC1 DT1 C0
Supports the 91XX and 794X families of HP disc drives as well as Hewlett-Packard Graphics Language (HP-GL) digital plotters.

Accessories Included:
Operating, Programming and Service Manuals

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

Ordering Information: U.S. list prices only
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 Manual

For more information, call your local HP sales office listed in the telephone directory white pages. Ask for the Electronic Instruments Department. Or write to Hewlett-Packard: **U.S.A.:** P.O. Box 10301, Palo Alto, CA 94303-0890. **Europe:** P.O. Box 999, 1180 AZ Amstelveen, The Netherlands. **Canada:** 6877 Goreway Drive, Mississauga, L4V 1M8, Ontario. **Japan:** Yokogawa-Hewlett-Packard Ltd., 3-29-21, Takaido-Higashi, Suginami-ku, Tokyo 168. Elsewhere in the world, write Hewlett-Packard Intercontinental, 3495 Deer Creek Road, Palo Alto, CA 94304 USA.
Printed in U.S.A. **Data and Prices are subject to change** **5954-7958**