

HP 3569A Real-Time Frequency Analyzer

Configuration Guide

The HP 3569A is a two-channel real-time analyzer that offers a wide variety of noise and acoustics measurements in a portable package. To focus the HP 3569A on particular measurement types, you can choose from three application software modules:

- Real-time sound intensity (Option AY1) *
- Narrowband FFT (Option AY2)
- Reverberation Time (Option AY3)

* Note: Prior to February 1, 1994, real-time sound intensity was a standard feature of the HP 3569A. It is now configured as an option, allowing you to select the best combination of price and capability for your application.

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The standard HP 3569A provides one- and two-channel octave measurements (both 1/3 and 1/1 resolutions) with the following center frequency bands:

Resolution	1 Channel	2 Channel
1/3 Octave	1.6 Hz to 20 kHz	1.6 Hz to 10 kHz
1/1 Octave	2 Hz to 16 kHz	2 Hz to 8 kHz

Measurements include:

- One- or two-channel 1/3 or 1/1 octave measurements (including A-weighted and unweighted simultaneously)
- Microphone calibration
- Exponentially averaged measurements
- Integrated sound level measurements
- Impulsive sound measurement (single channel)

- Statistical analysis (single channel)
- Level, event and external octave spectra and slices
- Up to 4096 spectra multispectra display

The standard HP 3569A includes a rechargeable battery pack, ac adapter, carrying case, SDF utilities to share data with a PC, operating manuals and a three-year warranty. The ac adapter recharges the batteries during operation and can recharge a spare external battery pack when used with a battery charge adapter (supplied with the optional extra battery pack).

Measurement Results Summary

Real-Time Octave (Standard)	Real-Time Sound Intensity (Option AY1)	Narrowband FFT (Option AY2)	Reverberation Time (Option AY3)
CH1 Power	Mean Sound	CH1 Power	Power Spectrum
CH2 Power	Pressure	CH2 Power	PSD
CH1 PSD	Intensity	CH1 PSD	T20
CH2 PSD	P-I Index	CH2 PSD	T30
CDF	Field Indicator [†] {F _{pl} }	CH1 Time	RT60 [†]
PDF	Field Indicator [†] {F _{pl} }	CH2 Time	Std Deviation [†]
L ₁		Diff Time	Avg. Count [†]
L ₁₀		Freq. Response	
L ₅₀		Cross Correlation	
L ₉₀		Coherence	
L ₉₉		Intensity	
L _{user}			

[†] Indicates Calculated Functions

Real-time Sound Intensity (Option AY1)

The sound intensity option provides dual-channel real-time sound intensity, measurements for noise source identification, intensity mapping and sound power measurements. These measurements meet IEC 1043 standard class 1 processor requirements for measuring sound power utilizing sound intensity measurements. When used with the HP 3569A's sound power measurement table, the HP 3569A calculates the resultant sound power based on a series of sound intensity measurements. For each surface individual areas are entered into the table and sound power is automatically calculated at the end of the measurement. The analyzer provides the following measurements:

- Mean sound pressure level (average of the SPL of channel 1 and 2)
- Sound intensity
- Pressure - intensity index (ratio of average SPL to intensity)
- Sound power (calculated from intensity multispectrum and user defined areas entered into a table)
- Field indicator functions (F_{pi} and $F_{+/-}$ calculated from the intensity and average SPL multispectrums in accordance with ISO 9614-2 Sound Power Standard).

Narrowband FFT (Option AY2)

This option adds two-channel FFT analysis measurements for acoustics and vibration measurements. In addition to basic two channel FFT measurements, Option AY2 adds some special narrow band intensity displays which are complementary to the real-time intensity option AY1. This option includes baseband and zoom measurements of 100, 200, 400, 800 or 1600 lines of FFT resolution. Hann, uniform and flat top window maximize either amplitude accuracy or frequency resolution and force/exponential windows optimize modal impact tests.

Reverberation Time Measurements (Option AY3)

The reverberation time option provides direct display of sound decay times for 1/3 or 1/1 octave bands. This option extends the real-time octave measurements by adding the automatic source control, input control, and analysis needed to compute RT-60.

The option includes a data smoothing algorithm using reverse-Schroeder integration technique and averaging techniques for handling spatial and multi-decay averaging. A special technique for short reverberation times removes the effects of the real-time octave filters. The

analyzer operates in one-channel mode and provides the following measurements:

- Power spectrum
- Power spectral density (PSD)
- T20 (extrapolated 20 dB decay from -5 to -25dB over a full 60 dB trace)
- T30 (extrapolated 30 dB decay from -5 to -35dB over a full 60 dB trace)
- RT60 (Combined results using high and low level thresholds, cumulative)
- Average count (displays the number of times the decay was valid)
- Standard deviation (displays confidence value for each frequency band)

Enhanced Data Transfer Utilities for PCs (Option 550)

This option simplifies data transfer between the HP 3569A and portable PCs such as the HP 95LX Palmtop computer. These utilities provide the following functions:

- Interactive disk transfer of data from HP 3569A to MS DOS
- Measurement scheduler (allows the HP 95LX to make preprogrammed measurements at scheduled intervals)
- Spreadsheet link to Lotus 1-2-3 Sample spreadsheet for calculating ISO 9614 field indicator functions
- VIEWDATA program for the HP 95LX Palmtop computer