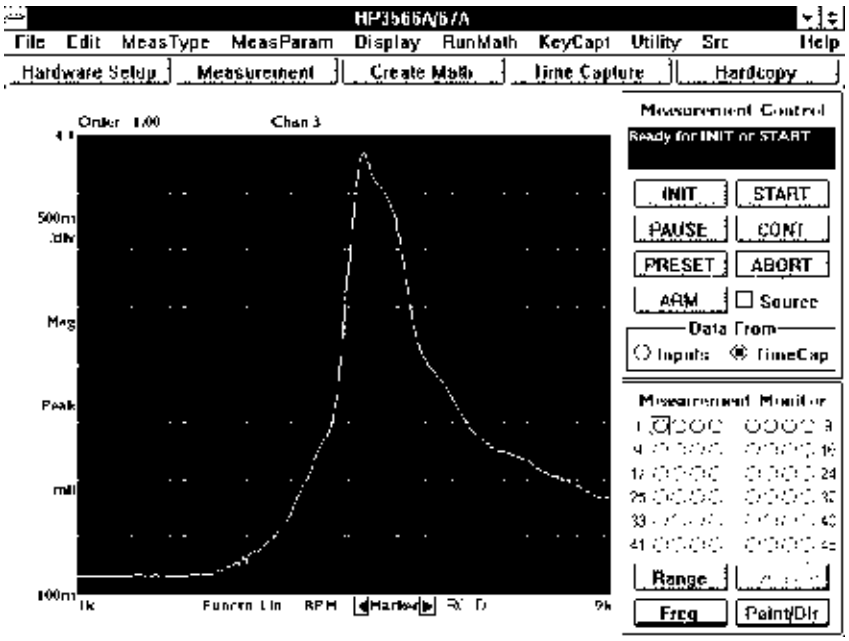
HEWLETT PACKARD

HP 3566A and 3567A PC Spectrum/Network Analyzers

Product Overview

A Complete Noise and Vibration Solution

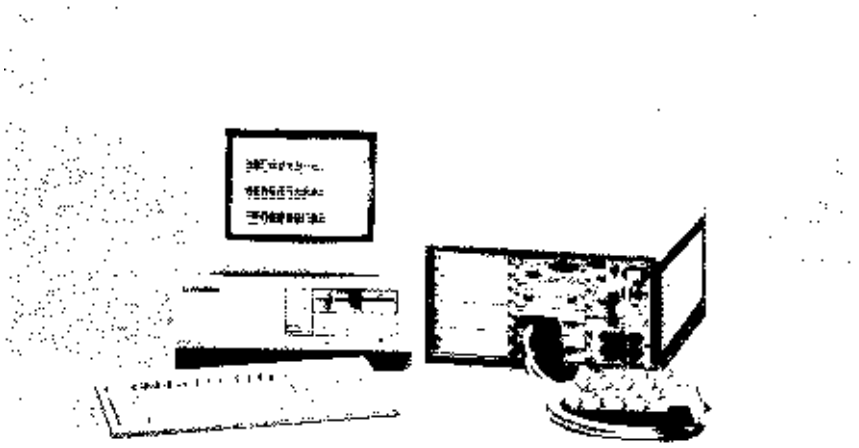


- Expandable and flexible, from 2 to 48 channels
- Complete set of tools for trouble-shooting, analysis, and problem solving
- Focused solutions for noise and acoustics, machine vibration, and modal testing
- Wide range of documentation, presentation, and post-analysis applications in Microsoft Windows

When was the last time you saw a simple noise or vibration problem? Your daily challenges are more likely to include complex and shifting system dynamics, multiple transmission paths, noisy environments, and the need to meet (and document) exacting performance standards.

These multifaceted noise and vibration problems call for a multifaceted measurement solution. The HP 3566A and 3567A PC spectrum/network analyzers give you a complete set of tools for solving even the most challenging problems.

The complete solution, from data collection to documentation



The HP 3566A and 3567A feature identical MS-DOS® operating software, Microsoft® Windows user interface, and signal processing and source hardware modules. The HP 3566A starts with one 8-channel input module and can measure up to 12.8 kHz per channel.

The HP 3567A starts with two single-channel input modules and can measure up to 102.4 kHz per channel. You can expand both analyzers up to 48 channels. Hardware options for both include a tachometer/trigger module, a programmable DAC, and a SCSI throughput disk module.

- For an overview of the analyzers' ability to solve noise and vibration problems, start with page 3
- To see how waveform math makes it easy to create custom measurements, see page 6
- To see how the optional digital-to-analog converter (DAC) module opens up an entirely new realm of test stimulus possibilities, turn to page 7
- To learn why throughput to disk is a better choice than traditional multichannel tape recorders, see page 8
- For a look at how the HP 3566A and 3567A help you document and present your test results, and how the systems can provide automated production testing, turn to page 10
- For a closer look at application-specific software solutions, see page 11 for rotating machinery analysis (including HP's unique order tracking technology), page 14 for swept sine analysis, and page 15 for real-time 1/3 octave measurements

Problems can't hide when you can attack them from every possible angle

You'll find the answer faster with a complete set of measurements. Measurement experts know that the more options they have for approaching a problem, the better their chances of finding an answer quickly.

For instance, transients are usually easier to study in the time domain, whereas the order domain provides unique insights in rotational vibration problems. The amplitude domain creates statistical profiles to identify amplitude level distributions.

In total, the HP 3566A and 3567A offer nearly two dozen different measurements.

Use the full range of frequency domain measurements

The frequency domain is the foundation of most noise and vibration testing, and the HP 3566A and 3567A give you a full set of measurements:

Power spectrum
Frequency response
Coherence
Auto/cross spectrum
Linear spectrum
1/3 and 1/1 octave (synthesized)
RPM spectral map
RPM octave map (synthesized)
Swept sine (optional)

Use time, amplitude, or orders for a different perspective

When you need to attack from a different angle, choose one of the many other measurement types offered by the HP 3566A and 3567A.

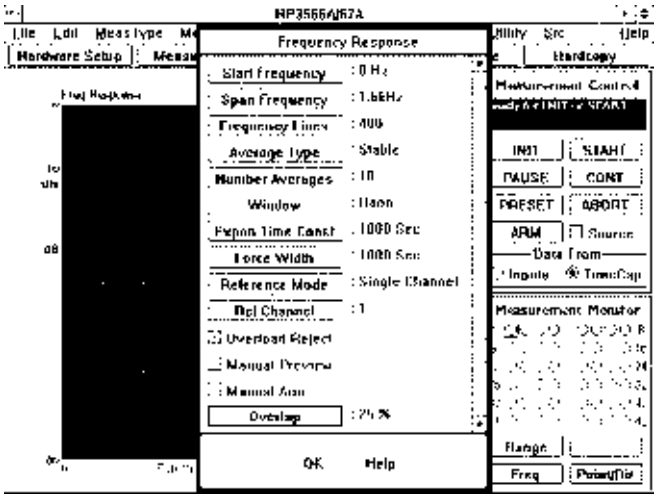
Time domain:
Auto/cross correlation
Instantaneous time
Filtered orbits
Record/playback (optional)

Order domain:
Order track (optional)
RPM track (optional)
Order ratio map (optional)
Order ratio spectrum (optional)

Amplitude domain:
Histogram
Probability density function
Cumulative density function

Zoom in for a closer look

You can configure the FFT processing with as few as 25 lines of resolution or as many as 3200, giving you the optimum balance of speed and resolution. And with frequency resolution down to 64 mHz, you'll measure with much greater accuracy. The zoom is performed in custom digital hardware, so the operation is fast and stable.



Measurement parameters are in one place to simplify setup.

Uncover the details with wide dynamic range

We specify true linearity in our analyzers, not just "bits of resolution," giving you a complete picture of usable dynamic range. The HP 3566A guarantees 72 dB of spur-free and distortion-free dynamic range, and the HP 3567A guarantees 80 dB.

You won't miss a beat with simultaneous sampling. Whether you have two channels or a full compliment of 48, the HP 3566A and 3567A always sample all channels simultaneously. This guarantees accurate phase information.

Use the flexible source for stimulus-response tests

Having a top-quality signal source is key to good frequency response/transfer function measurements. The source module in the HP 3566A and 3567A offers all the important signal types:

Sine
Burst sine
Random noise
Burst random noise
Positive/negative pulse

You also have the option of adding arbitrary waveforms (see page 7) and swept sine (see page 14) to your analyzer's source capabilities.

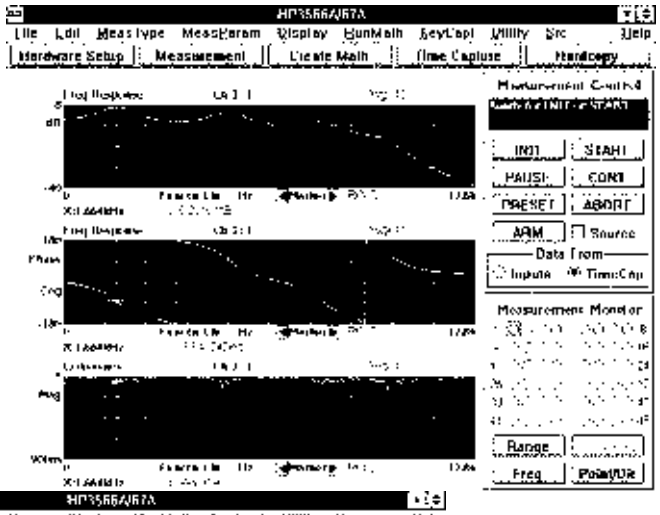
See more and learn more with versatile display formats

Choose the best display for your measurements

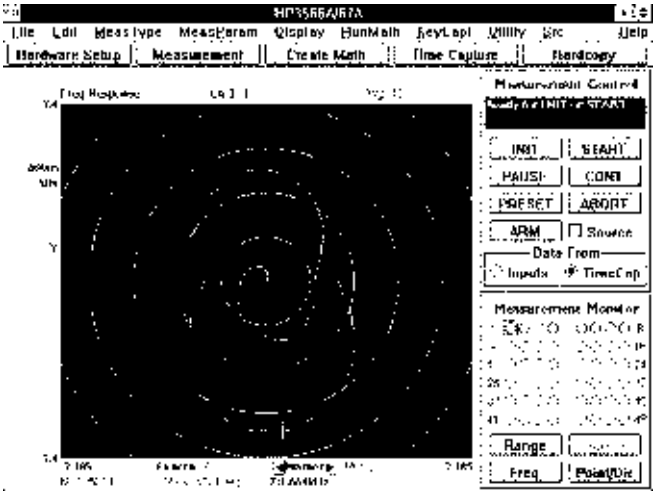
The graphical user interface in HP 3566A and 3567A helps make the most of your measurements by providing a versatile set of display formats. From a single spectrum plot to a triple view of magnitude, phase, and coherence, you can configure the display in whatever way is best for your unique needs.

How would you like to see your data?

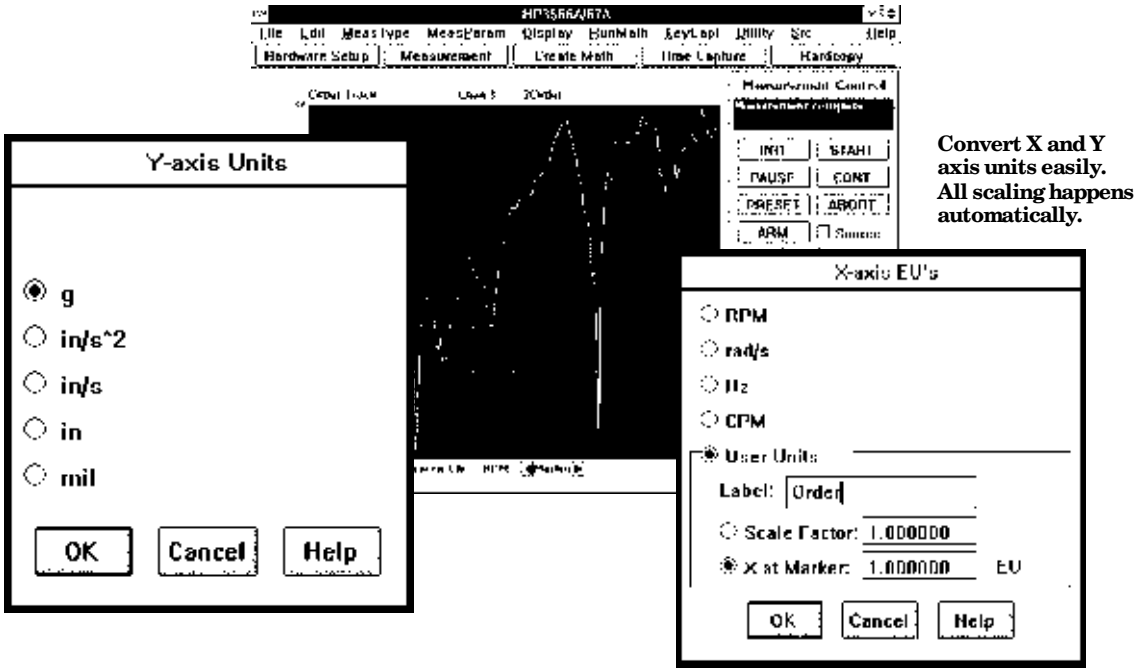
Select the best way to display your results, from standard X-Y plots to Nyquist, Nichols, and polar plots. Set the X-axis to linear or log resolution and choose log, linear, or dB scaling for the Y-axis. Autoscaling saves time by finding the best settings for each display.



Triple displays with coupled markers simplify examining data.



Polar plots display magnitude and phase simultaneously.



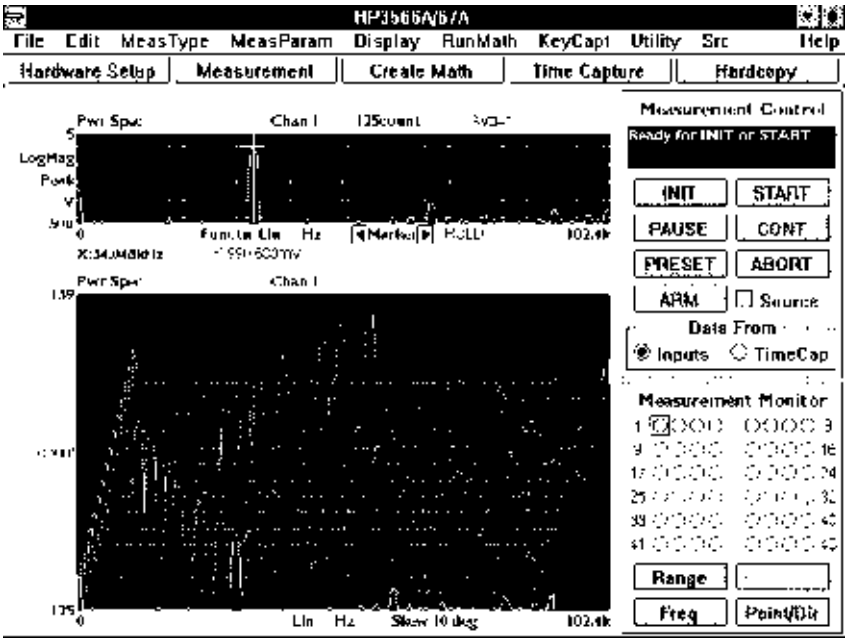
Convert X and Y axis units easily. All scaling happens automatically.

Time capture and triggering give you even more flexibility.

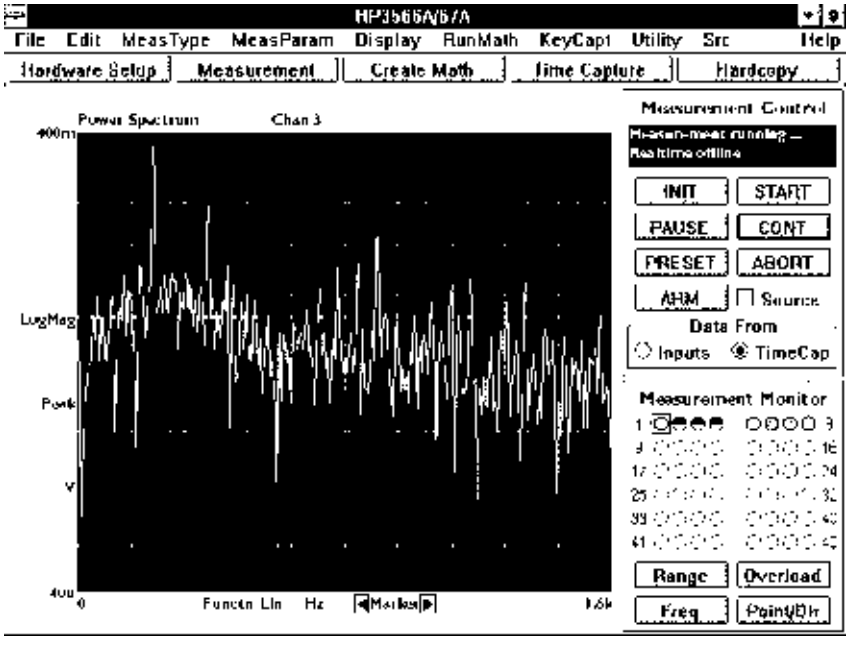
One of the hardest parts of investigating a transient signal is simply catching the signal to get a close look at it. The HP 3566A and 3567A turn this once-difficult task into a simple operation.

The exceptionally high 1.3 Msample per second capture rate provides gap-free data for high channel-count measurements. Capture 40 channels with 12.8 kHz real-time bandwidth, then apply all measurements (except swept sine) to the captured data.

With the 16 MByte RAM option, you can capture as many as 7.5 Msamples. (For signal capture capacity up to 500 Msamples per session, see the throughput to disk option on page 8.)



Map displays show how signals change with time. They can be used with most types of measurements. Map lines can trigger on RPMs, time intervals, or freerun.



The Measurement Control window provides measurement status and control. It shows the overload and underload status of all 48 channels simultaneously. Any overloads are latched so you will not miss them.

Boost test quality and productivity with multichannel measurements

Multiple channels do more than just reduce test time

Whether you're measuring sound with an array of microphones or vibration in a complex structure, a multichannel analyzer provides an obvious productivity advantage.

However, there's more to it than just test time. Multichannel measurements have a quality advantage as well. They elimate errors due to environmental changes between measurements, and they also avoid the problem of unplanned (or even unknown) setup changes in the device or system under test.

Quality measurements are just the beginning

Successful multichannel tests require more than just high-quality measurements. The HP 3566A and 3567A provide the support features and tools you need to measure up to 48 channels simultaneously with efficiency and confidence in the results.

The Windows user interface groups vital setup information in one place, making it easy to select and change key parameters — even with many channels active.

Keep an eye on your signals

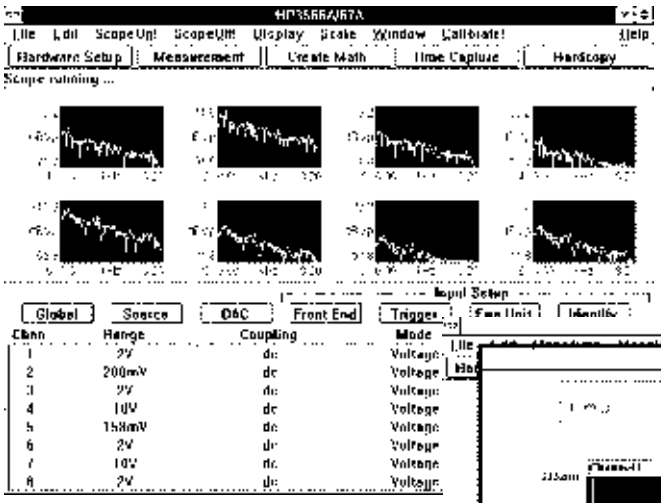
One of the biggest challenges in multichannel measurements is making sure that every input channel is live and connected.

The HP 3566A and 3567A give you an instant look at up to 16 channels simultaneously. You can make sure you're getting the expected signals on all the channels before you actually make your measurement. You can even view these inputs during throughput to disk using time, frequency, waterfall, or spectrogram measurement choices.

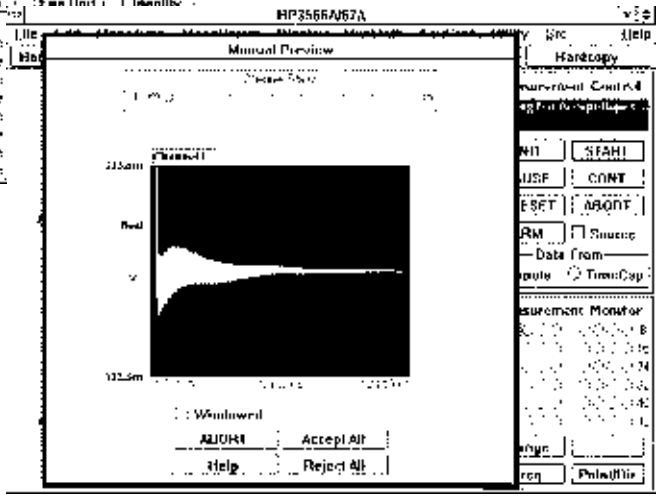
The measurement monitor shows under-range and over-range conditions for up to 48 channels at once. Plus, the monitor latches over-range conditions, so you won't overlook temporary overloads that decrease measurement quality.

Manage impact tests with confidence

For impact tests, the HP 3566A and 3567A provide force/exponential windows, an input time display that lets you view data with pre-trigger delay, and a manual preview mode that lets you accept or reject each measurement — on all 48 channels. The force window amplitude follows the decay set for the exponential window, which makes it easy to remove the effects of windowing.



To preview the complete measurement setup before taking data use the Hardware Setup mode. View 1, 2, 8, or 16 displays simultaneously. Use time, spectrum, waterfall, or spectrogram displays.



Manual preview guarantees good data from hammer tests. Double-hits are easy to see and overloads are identified with red channel status indicators. You can view windowed or unwindowed data.

Waveform math opens the door to unlimited measurement customization

It's like having a product designed just for your tests

When your applications call for measurement results that go a step beyond the ordinary functions, you'll appreciate the power and simplicity of waveform math. It's powerful: you can create an unlimited array of specialized algorithms. And it's simple: all you have to do is click on menu choices in the waveform calculator. There's no programming and no syntax to stumble over.

You can then choose to use your custom functions live, in which case they operate just like the standard measurement choices, or you can run the math routines on previously acquired data.

Built-in functions take the work out of waveform math

The waveform calculator gives you a big head start with more than two dozen ready-to-use functions. You can operate on both time and frequency domain data, using any measurement results.

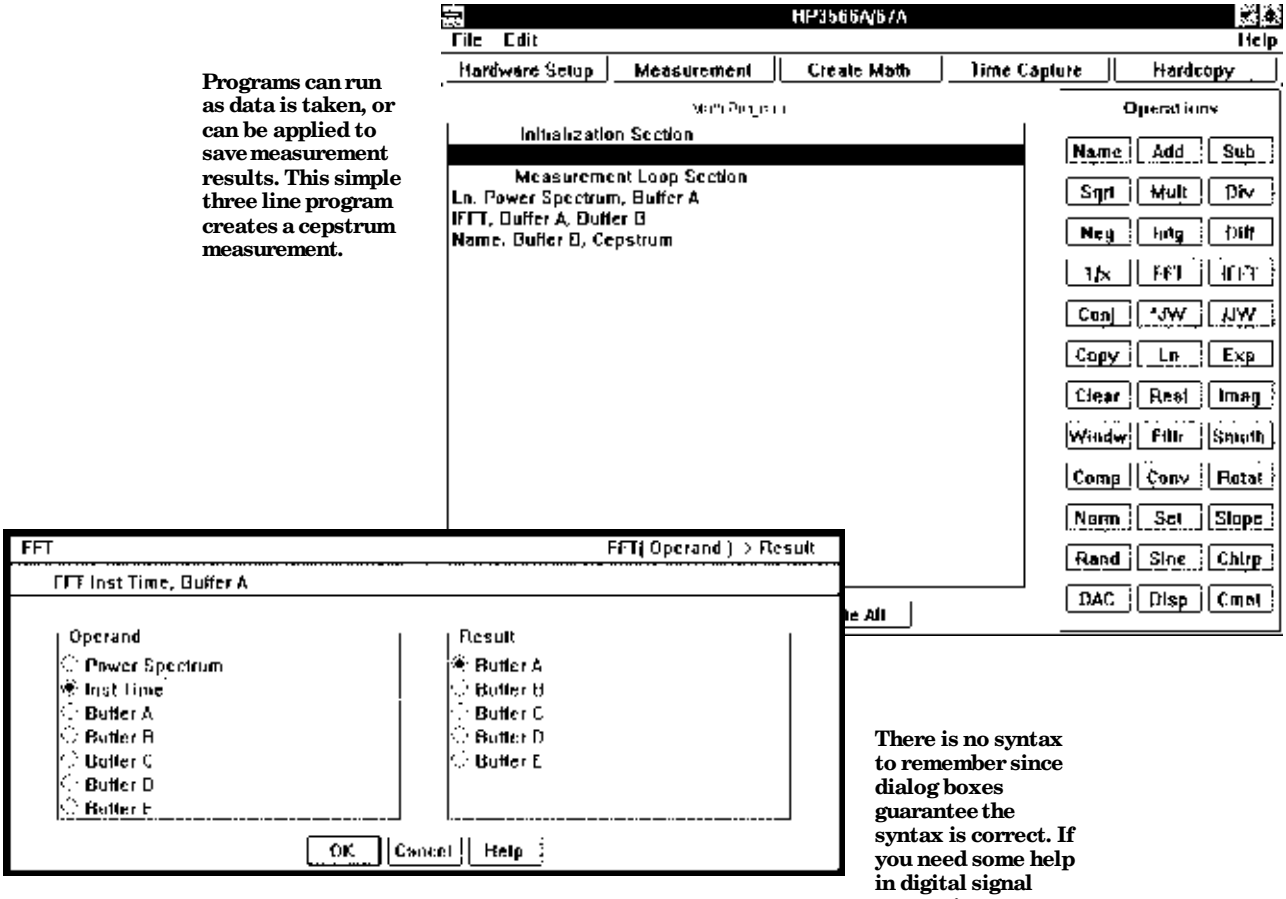
Math adjusts automatically to channel count

When you add or remove input modules or change the number active channels, don't worry about making program changes. When you select it, waveform math automatically operates on all active channels.

Units convert automatically

No matter how complicated your custom math routines are, the HP 3566A and 3567A automatically compute and display correct trace units. You can choose either SI or English units.

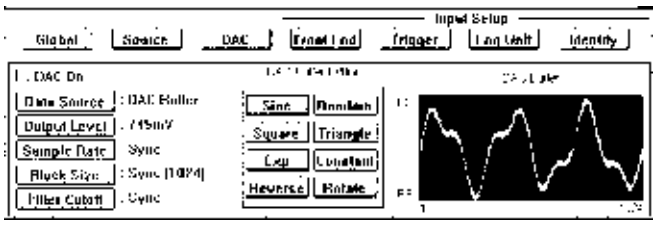
Programs can run as data is taken, or can be applied to save measurement results. This simple three line program creates a cepstrum measurement.



There is no syntax to remember since dialog boxes guarantee the syntax is correct. If you need some help in digital signal processing concepts, use the built-in Help text.

Create unique stimulus signals for your unique measurement needs

If your stimulus/response measurements call for signals that go a step or two beyond the basics, Option 056 is the answer. This digital to analog converter (DAC) module lets you create custom waveforms and playback waveforms you've saved using time capture. In other words, you can get just the signal you need for each test.



Build complex DAC waveforms by adding and multiplying simple building blocks with the DAC Buffer Editor. This waveform is two sinusoids plus noise.

Use chirp waveforms for fast transfer functions

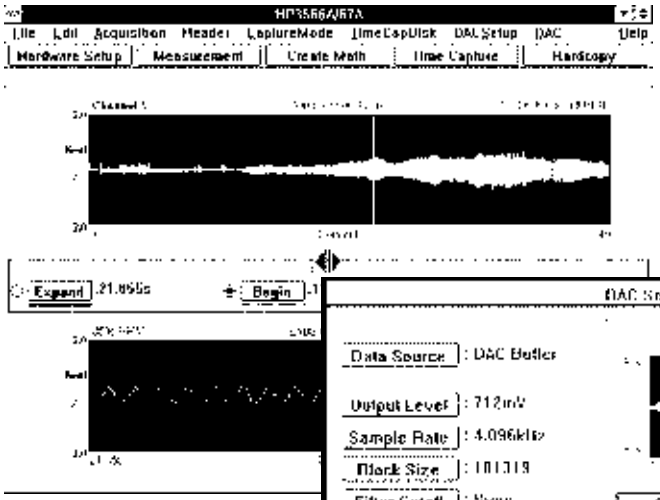
Swept sine offers the widest possible dynamic range (see page 14), but there may be times when you need to maximize test speed while still getting the benefits of sinusoidal stimulus. The sine chirp waveform, available with Option 056, is perfect for these situations.

Generate your own custom waveforms

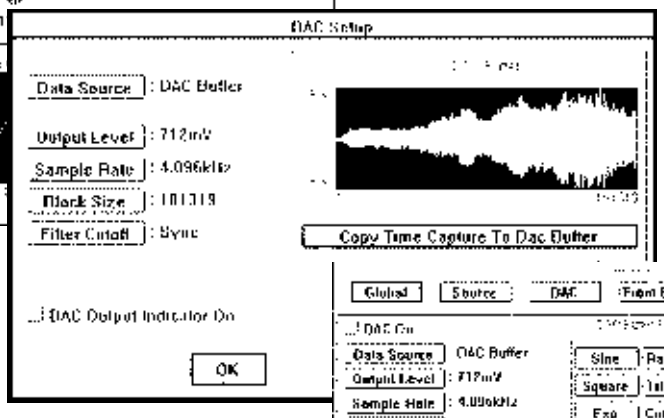
The DAC editor provides the "building blocks" you need to create your own waveforms: sine waves, square waves, triangle waves, exponentials, and constants. You can add and multiply any combination of these waveforms to produce the right stimulus signal.

Record and play back real-world signals

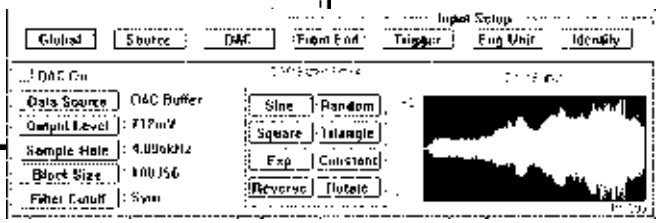
Sometimes there's no substitute for the real thing. The record/playback feature in Option 056 lets you use signals you've collected with time capture as source outputs. You can simulate real-world operating conditions without the time and expense this usually involves.



First select the desired portion of a throughput-to-disk file . . .



then copy it to the DAC buffer for playback.



You can even use it as stimulus for new measurements.

Throughput to disk: the benefits of a tape recorder — without the limitations

When you need to capture large amounts of signal data for later analysis, the traditional answer has been to use a multichannel tape recorder. However, these machines are usually expensive and awkward to use, and they often degrade dynamic range and phase accuracy.

Throughput to disk offers the data collection benefits of a tape recorder without all the limitations. When you activate throughput mode, the analyzers digitize the input signals and save the time samples directly to disk. Not only does this allow you to collect large amounts of data, it boosts the effective real-time bandwidth as well.

Built-in SCSI disk for high-speed data throughput

Option 060 includes a 1 Gbyte Small Computer System Interface (SCSI) drive built right into the module. This direct connect provides aggregate throughout rates greater than 1.3 Msamples per second.

Real-time monitoring means you stay in control

You never have to guess what's going on during throughput with the HP 3566A and 3567A because you can display up to 16 channels of live data simultaneously. (Just click on the scroll bar to see additional channels.) Choose from time, linear spectrum, waterfall, and spectrogram measurements to keep an eye on your data flow.

Make multiple measurements on the same data

With noise and vibration testing, you can't always be sure which measurement type will yield the results you need. Another frequent challenge is limited access to the device or system under test. You don't always have the luxury of trying different setups to see which works best. You may have to collect data in the field in a hurry, then do further analysis back in the lab.

Throughput to disk provides the answer to both scenarios. Because your signal is stored as basic time samples, you can come back and use any measurement you like, as many times as you like (except for swept sine).

For example, acoustic measurements often require 1/3 octave measurements to meet regulatory requirements, but octave doesn't always provide the level of detail you need for in-depth analysis.

Simply store the signals on disk using throughput, measure them once using 1/3 octave, then measure the same data file again using FFT analysis. You can change the center frequency, span, and number of FFT lines as often as you need.

Increase effective real-time bandwidth

Because the throughput process doesn't stop to compute FFTs while storing data to disk, it effectively increases real-time bandwidth.

Let's say you need to analyze 16 channels of data at 12.8 kHz, in real time. Measuring this live would require an analyzer with 512 kHz real-time bandwidth.

Option 060 provides the measurement by throughputting data to disk — with no gaps — then letting you use every measurement and display feature the instrument has to offer.

Use throughput files as stimulus signals

With the optional DAC module (see page 7), you can use throughput files to generate stimulus signals. Any file with a bandwidth of 12.8 kHz or less works with this feature. You can use one throughput file as the stimulus for the next measurement.[1]

SDF makes it easy to transfer data

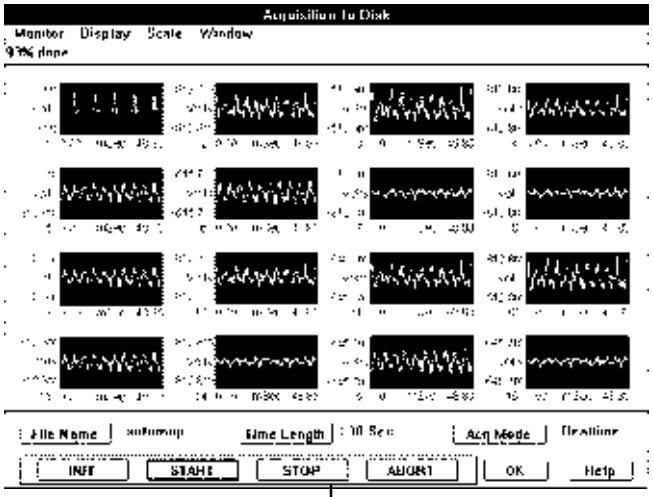
For maximum flexibility when post-processing data, use the Standard Data Format (SDF) utilities included with the HP 3566A and 3567A.

The throughput files are stored in SDF, and you can use the utilities to share data with other analyzers, move data into spreadsheets or other packages (such as PC MATLAB® and the HP 35639A Data Viewer), convert other data file formats to SDF, and access SDF data with a C program. For instance, you could use PC MATLAB's digital filter algorithm on a throughput file, then pass the result back to the HP 3566A or 3567A for analysis..

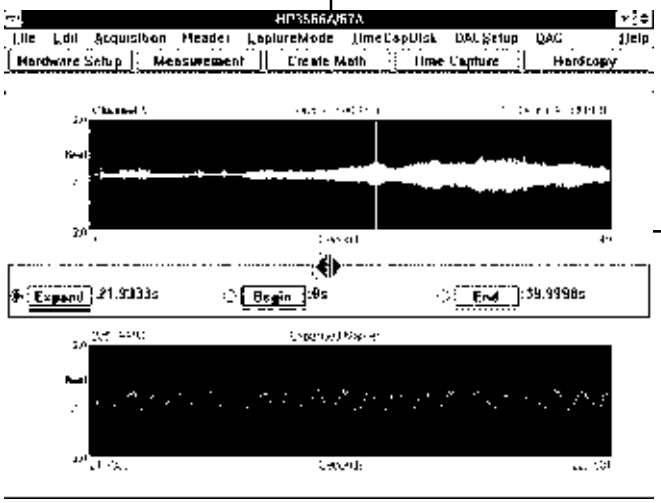
[1] Some limitations on channel bandwidths and channel count apply in this mode.

Making multiple measurements on the same data using throughput to disk or RAM

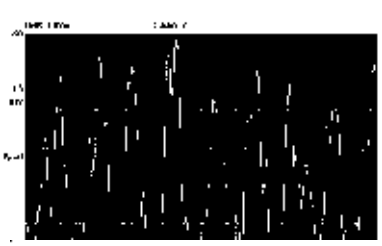
Aquisition Monitor



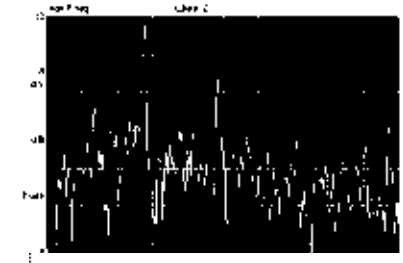
Throughput File



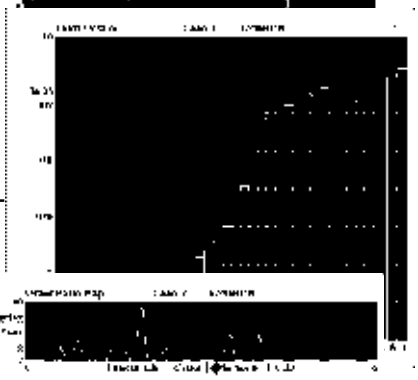
Time Domain



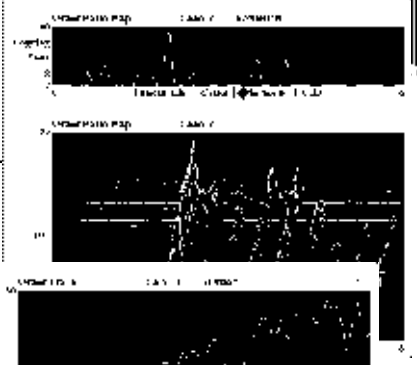
Frequency Domain



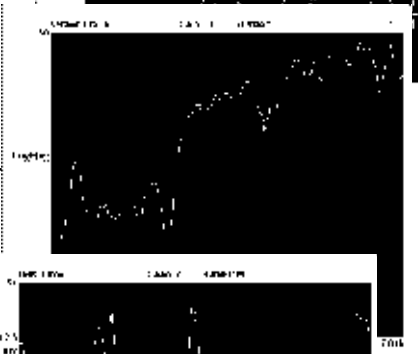
Octave Domain



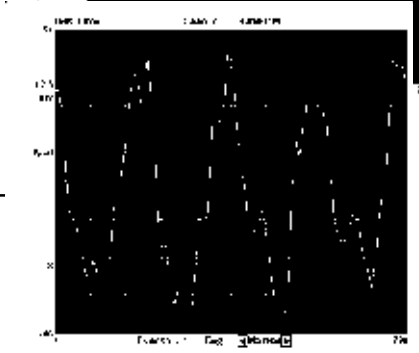
Order Domain

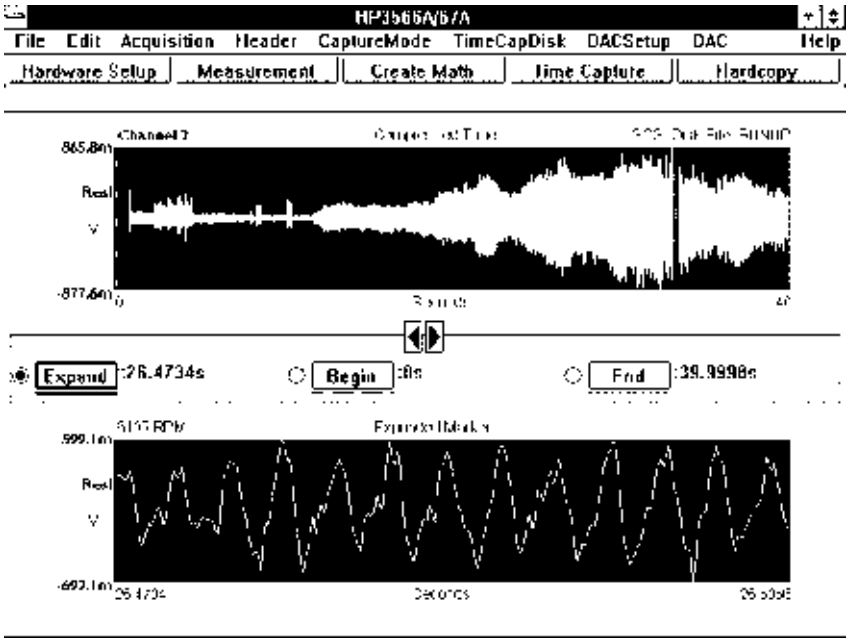


Order Track



Revolution Domain





You can look at the entire time capture file channel by channel. The top display is the envelope of the complete time capture. To zoom in for a closer look use the Expand Marker. The bottom trace shows the area selected with the Expand Marker. To identify corrupt data, overloaded portions of the time capture are shown in red.

Table 1
Throughput Rate Versus File Size for the Internal Disk, option #060.

Throughput File Size [1]	Maximum Aggregate Transfer Rate [2]
0.0 - 500 Msamples (0.0 - 1 Gbyte)	1.31 Msamples/sec

[1] Maximum gap free throughput file size per channel is 128 Msamples (256 Mbytes).

[2] Aggregate transfer rate = (number of active channels) x (individual channel transfer rate).

Table 2
Maximum Frequency Spans for Time Capture to HP 35659A SCSI Module Internal Disk (typical)*

Number of Channels	Maximum Frequency Span (kHz)*	Aggregate Transfer Rate (Msamples/sec)
5	102.4 (80)	1.31
10	51.2 (40)	1.31
20	25.6 (20)	1.31
40	12.8 (10)	1.31
48	6.4 (5)	0.8

* Value in parenthesis is for offline real-time 1/3-octave measurements. Online real-time 1/3-octave measurements require smaller frequency spans. See the Real-time Octave Analysis section for online performance.

Putting your analyzer to work with reporting and automation

Communicate your results quickly and effectively

Your job involves more than just measurements. You need to communicate results, provide documentation and recommend solutions. The HP 3566A and 3567A provide flexible reporting, both directly and through other Windows software packages.

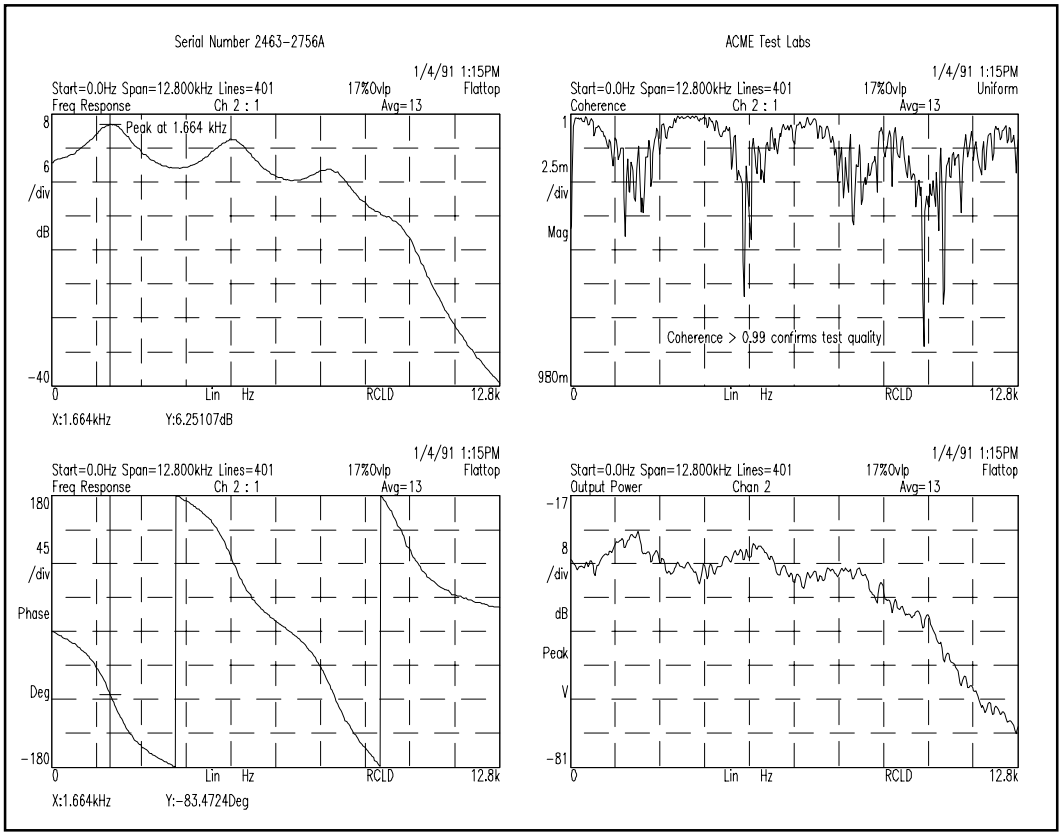
Get versatile Windows hardcopy

Get presentation-quality hardcopy from any printer or plotter supported in Microsoft Windows. With multichannel measurements, color hardcopy is a particularly effective way to communicate.

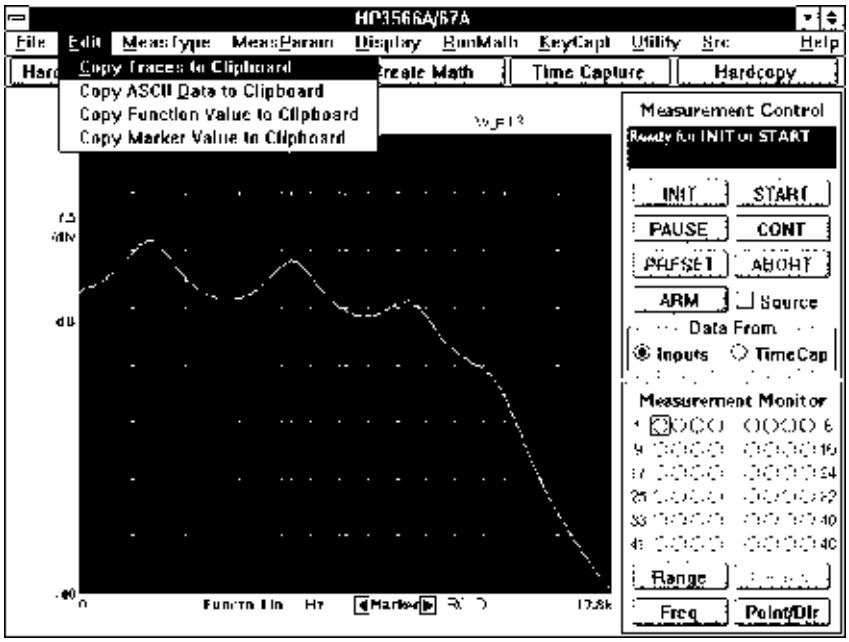
You can select from four plot formats: single portrait, dual portrait, single landscape and dual landscape. As you make your choices, you'll see a condensed preview version of the plot on the screen.

Customize your plots by overlaying multiple traces for easy comparison, or annotating plots with user-defined text.

For maximum reporting flexibility, transfer your results to the HP 35639A Data Viewer, Windows word processors, desktop publishing programs, or graphical presentation packages.



Create multi-display plots and prints, then print them to any one of Windows many supported printers or plotters.



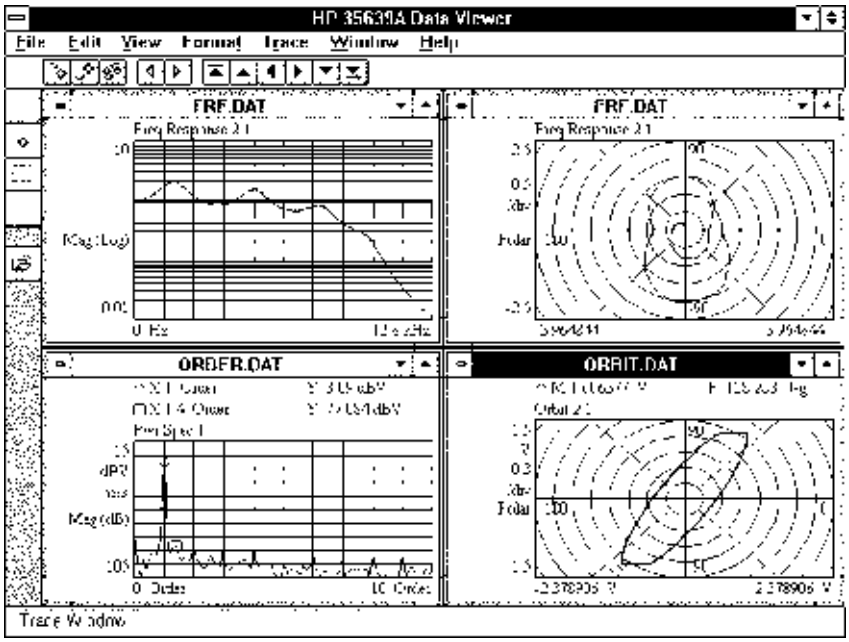
Windows cut-and-paste feature makes report generation easy. Use the clipboard to paste displays or ASCII data into word-processors and spreadsheets.

Use keystroke capture for easy, error-free tests

If you do any kind of repetitive testing, in the lab or on the production floor, the HP 3566A and 3567A can save time and eliminate errors by automating your test procedure. Step through the process once and let keystroke recording memorize everything you do. Then with a single keystroke you (or anybody else) can repeat the tests whenever needed.

Programming for system automation

To integrate your HP 3566A or 3567A into a test system, you can program in one of several Microsoft languages. This programming is done outside of the Windows user interface and is very similar to standard HP-IB instrument programming.



The HP 35639A Data Viewer software is a completely independent Windows application you can use wityout requiring the HP 3566A or 3567A analyzers. You can examine saved measurement data using versatile markers, then paste displays into other Windows applications, or batch print them. It makes a great addition to the HP 3566A and 3567A analyzers.

Rotating machinery analysis: high-quality answers with computed order tracking

Transform your HP 3566A or 3567A into a world-class machinery analysis system with the HP 35636A rotating machinery software. You'll move beyond basic RPM measurements by locking the analyzer's sampling rate to the machine's rotational rate. This synchronizes your measurements to rotational orders and gives you access to an entirely new class of measurement solutions.

Increase measurement quality and decrease measurement headaches

If you've made order tracking measurements with traditional analog techniques, you'll appreciate the simplicity, accuracy, and faster ramp rates of the computed order tracking provided by the HP 35636A. You'll get precise magnitude and phase answers without all the tracking filters, ratio synthesizers and other headaches that order tracking used to require. You'll also avoid the time delays, bandwidth limitations, and phase problems that ratio synthesizers introduce into your measurement.

Machinery Monitoring and Balancing

As rotating machines run up to operating speeds or coast down, the changing order-related forcing functions can excite a variety of structural resonances. A display of the resulting vibration versus RPM provides a valuable signature that you can use to monitor the machine's health over time. Changes in the signature indicate changes in the structure.

Using the Bode plot, problems such as changes in structural stiffness or fault conditions in footings show up immediately. To pinpoint problem areas, you can examine the Bode plot of each order individually.

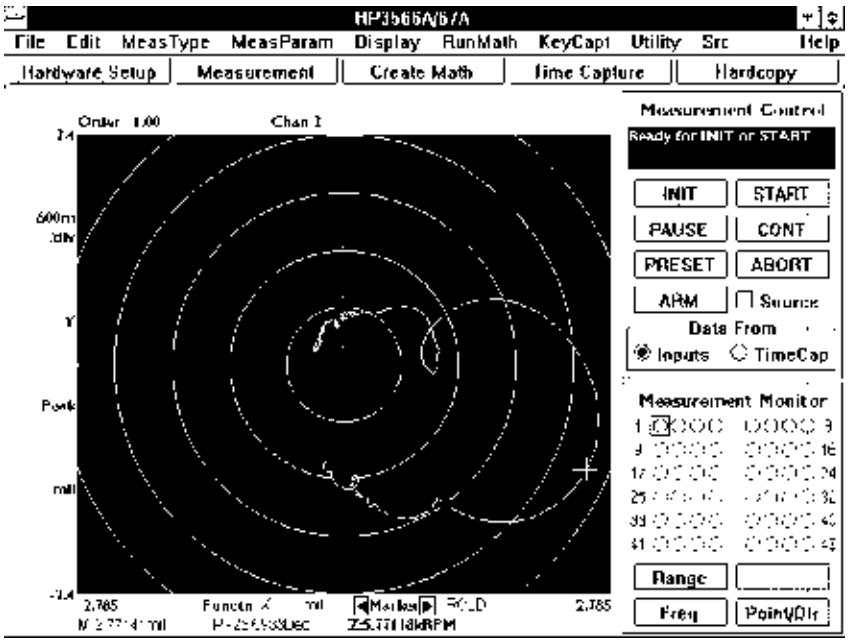
Another important use is comparing the signature of a machine before and after it is repaired or rebuilt. Changes in the signature can indicate bearing damage, defective turbine blades, and shaft misalignment or bending.

Uncover machine faults with runup and rundown analysis

The HP 35636A's order track measurement measures the amplitude and phase of five user-selected orders during runup or rundown. The result is a plot of magnitude and phase as a function of RPM. Phase is measured relative to a once-per-revolution reference point on the shaft, providing the information needed for balancing.

Use the order ratio spectrum for at-speed analysis

If you need to monitor a machine at its operating speed or analyze a machine's transient response to load changes once it has reached operating speed, the order ratio spectrum is the ideal choice. This measurement displays the entire range of orders, up to 200 orders at once. With its selectable

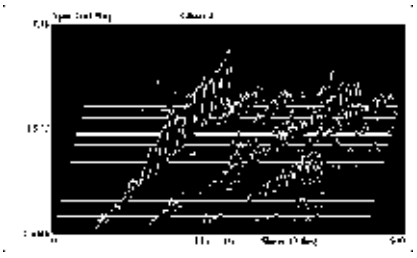


The magnitude and phase of a machine runup are an important signature of its health. Changes can mean trouble. Having signatures of individual orders can help diagnose changes in balance or alignment.

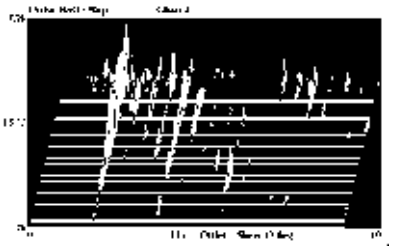
averaging, windowing and frequency resolution up to 800 lines, you'll have a great new tool for analyzing machines that are running near critical frequencies.

Get a new look at shaft movement with filtered orbits

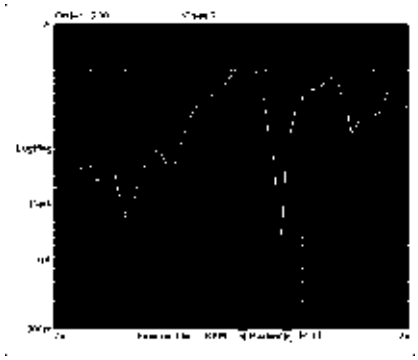
Machinery specialists have used orbit diagrams for years to trace shaft movement with a simple X-Y diagram. The filtered orbit provides a powerful new way to diagnose order-related faults by letting you filter out vibration that is not order-related. Highlighting the contributions of a single order (or any combination of orders) gives you a head start on tracking down problems.



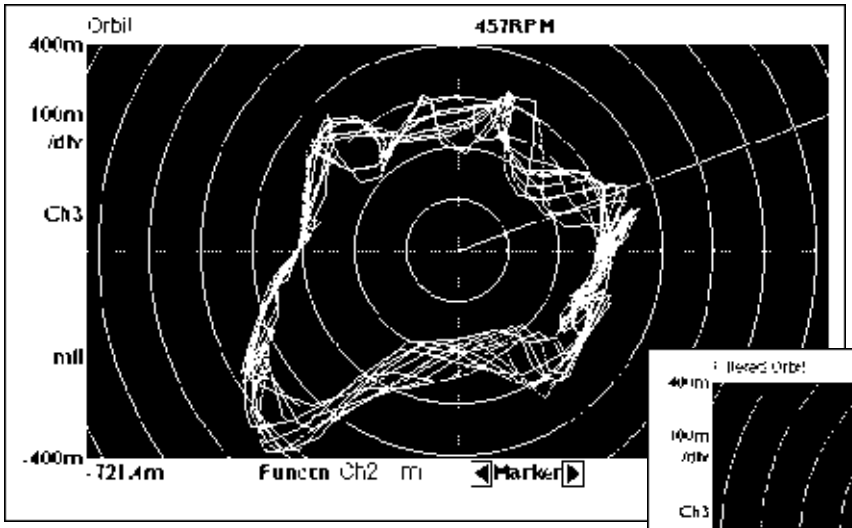
RPM maps show how power spectrums change with RPM. They can be used to identify critical orders. But order-related vibrations fan out with increasing RPM, moving off screen



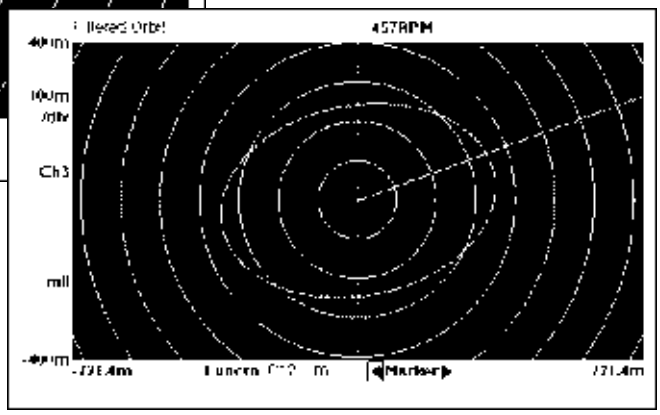
Order ratio maps are a better tool for identifying critical orders. The X-axis is orders, not Hertz, so it's easy to identify critical orders. And you can see more orders since they stay on-screen.



Once critical orders have been identified using an order ratio map, use the order track measurement to examine how a specific order changes with RPM. Orders do not need to be integers, and they can be less than one.



Regular orbit displays are made up of all orders plus noise. Sometimes they look like a ball of string. Filtered orbits remove all vibrations except those from the selected order or orders, providing extra information for troubleshooting.



Noise and Vibration Solutions for Transportation Products

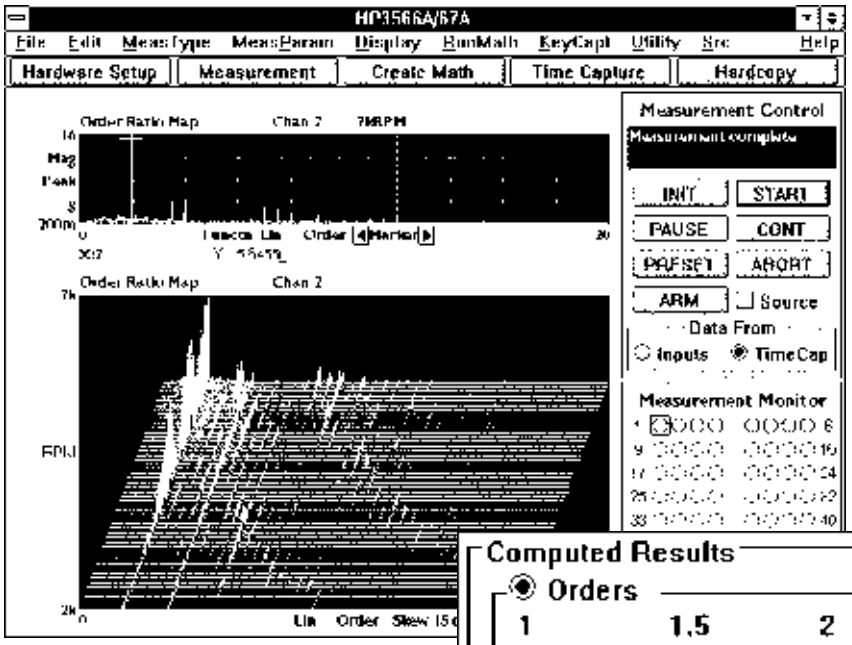
Whether your transportation product is an economy car or a jet fighter, you need to solve noise, vibration and ride harshness problems.

The HP 35636A's RPM tracking measurement helps you understand the relationships between noise, vibration and engine RPM, giving you the insights you need to design and test competitive products. As the engine speeds up, RPM tracking can show you either order-related noise or noise in fixed frequency bands.

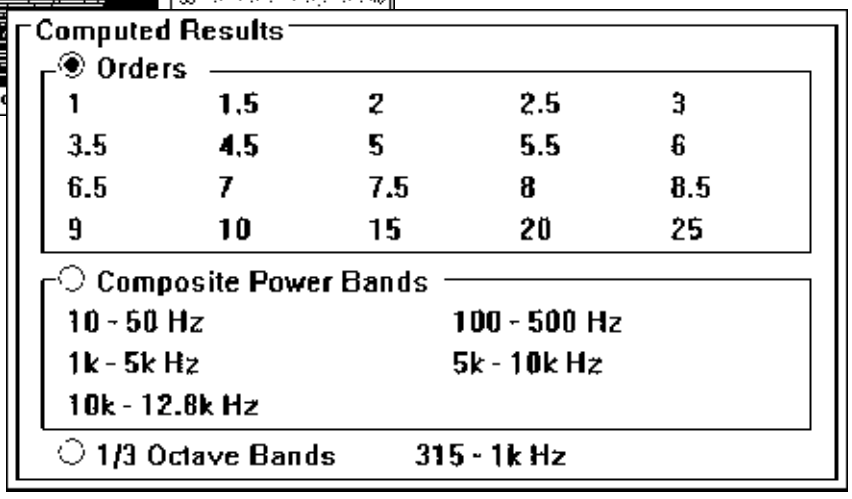
Solve order-related noise and vibration problems

Identifying relative rotational speeds of the various elements in a machine helps you diagnose problems in automobiles, airplanes, and other systems with significant rotational vibration.

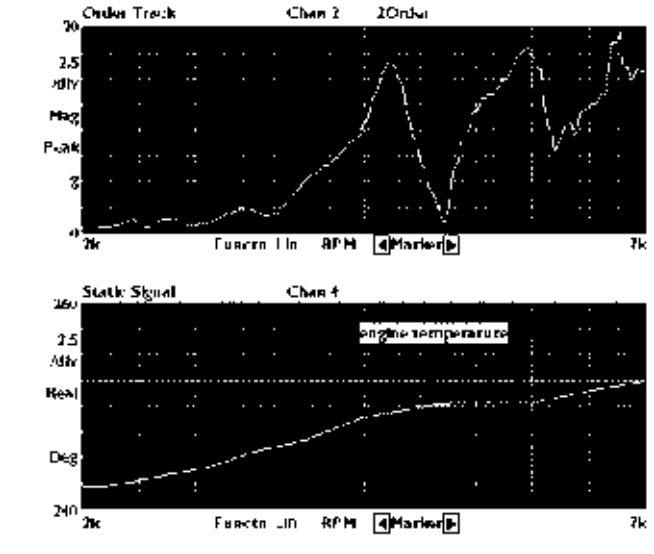
RPM tracking uses 20 tracking digital filters with user-selectable bandwidths you can define in Hertz, orders or percentages. The filters can track any order or suborder of the tach signal, allowing you to focus on specific aspects of the machine's behavior.



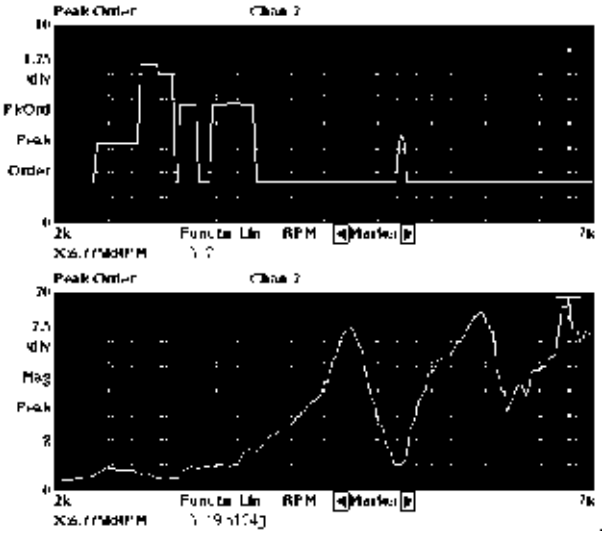
Knowing how an offending vibration relates to engine RPM helps diagnosis its cause. The three dimensional order ratio map lets you see orders plotted as a function of engine RPM. 800 lines of resolution lift signals out of the noise, providing greater resolution than other analyzers.



Select "Orders" to track up to 20 orders simultaneously, using adjustable filter bandwidths. Or look at non-order related vibration or noise in "Composite Power Bands" or "1/3 Octave Bands."



Channels not used for RPM tracking measurements can be used to measure static signals. Here an engine temperature is plotted on the bottom display, with the magnitude of the second order on the top display.



The RPM track measurement has a powerful "peak track" display. The top display shows which order dominates at a given frequency - in this case, mostly second order. The bottom display is a composite amplitude plot created from the order with the largest amplitude at a given frequency.

Solve non-order-related problems, too

Ride quality is a major competitive concern for designers in most transportation-related industries. The ability to separate noise and vibration problems by frequency can give you important insights into both the nature of the problems and the effect they have on perceived ride quality. For instance, the rumble from a transmission may be more irritating to passengers than wind noise.

Using RPM tracking, you can break the spectrum into user-selectable fixed frequency ranges that correlate to different types of noise and vibration. RPM tracking plots the composite power in each of five frequency bands or eleven contiguous 1/3 octave bands as a function of RPM.

Improve diagnosis with constant shaft angle sampling

Constant shaft angle sampling (similar to the order track measurement described on page 11), provides additional insight for noise, vibration and ride harshness measurements. You can track up to 20 orders and average multiple runup or rundown sessions to reduce noise. You'll also have access to relative phase (channel-to-channel) and a powerful track-peak-order display that automatically shows the dominant order at any specific RPM level.

Characterize control systems and other networks with speed and precision

FFT-based measurements offer an attractive combination of speed and accuracy, but when you need maximum dynamic range, swept sine is the answer. The HP 35637A swept sine software adds this powerful measurement capability to the HP 3566A and 3567A. It provides an ideal solution for characterizing control systems and other networks with high dynamic range.

Examine the details with 132 dB dynamic range

By enabling you to set source and input levels for individual frequency bands, swept sine equips your HP 3566A or 3567A with up to 132 dB of dynamic range.

The swept sine option also offers intelligent automation features that ensure the highest possible dynamic range across the measurement span. When auto-level and auto-range are active, the analyzer automatically sets the source level and input ranges, point by point. You'll accurately characterize large positive and negative peaks in the same measurement.

When auto-resolution is active, the analyzer automatically adjusts the sweep frequency resolution as the sweep progresses. The sweep slows down when it encounters rapidly changing parts of the response and speeds up in other areas. This provides the optimum balance of accuracy and efficiency.

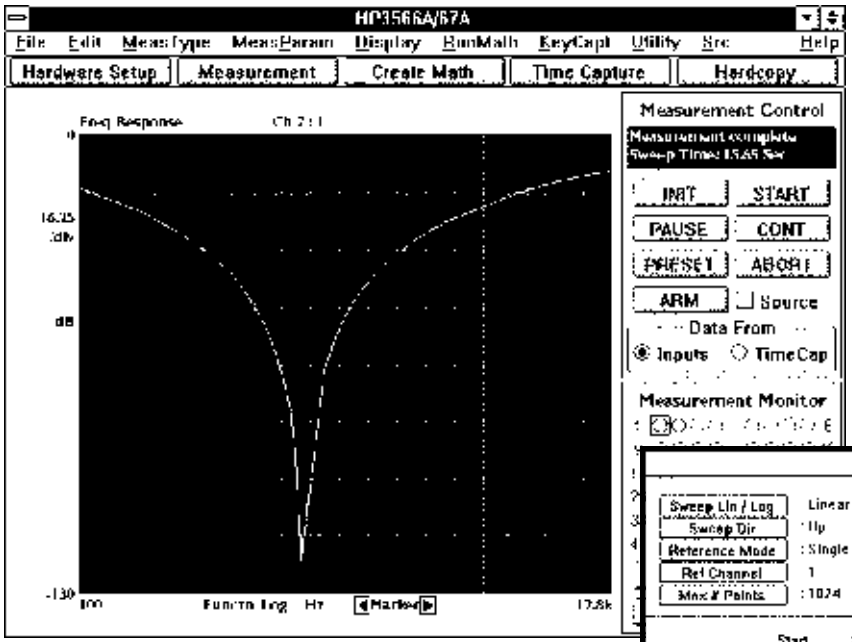
Boost production testing with sweep profiles

On the manufacturing floor, time is money. Reduce your test times with sweep profiles, which let you preset sweep parameters for up to 10 frequency bands in a single measurement. You can place more measurement points where you know you need them, and fewer points where you don't.

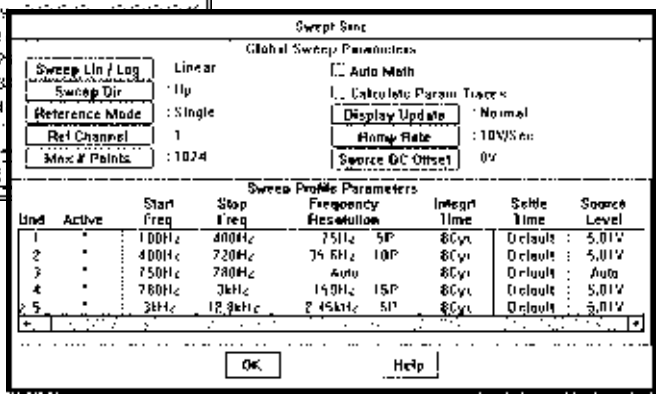
Plus, the multichannel HP 3566A and 3567A can further boost test throughput by testing multiple devices simultaneously.

Find key system parameters in a flash

Chances are your control system or network analysis tests look for basic performance parameters such as gain and phase margin, THD, harmonic power, or band power. The HP 3566A and 3567A provide these readouts with just a single click of the mouse.



Measuring systems like this notch filter require the high dynamic range of swept sine.



Decrease measurements times by spacing points closely where they will do the most good.

Real-time octave analysis with the confidence of digital filtering

Get the benefits of real-time, multichannel octave analysis with the HP 35638A real-time octave software. This option works with the HP 3566A and 3567A hardware to provide gap-free octave measurements for noise and acoustics analysis.

Rely on industry standard digital filtering

The digital filters implemented in the HP 35638A provide stable, real-time octave measurements that avoid the time- and temperature-drift problems of traditional (and expensive) analog filters.

The 1/1, 1/3 and 1/12 octave shapes provided by these digital filters conform to such prominent industry standards as IEC 225-1966, DIN 45651, and ANSI S1.11-1986, order 3 type 1-D. Standard A, B and C weightings are provided.

The HP 3567A provides on-line real-time measurements on two channels at 20 kHz and on four channels at 10 kHz (see table 3).

Both the HP 3566A and 3567A provide real-time octave by way of the throughput to disk. This approach yields 10 kHz real-time bandwidth with the HP 3566A and up to 80 kHz with the HP 3567A.

Save test time with multichannel analysis

When a test requires more than two measurement inputs, a multichannel analyzer is the way to go. Making multiple measurements (or reading taped data in multiple passes) with a two-channel analyzer takes extra time and presents more chances for error. By providing octave measurements on up to 48 channels simultaneously, the HP 3566A and 3567A increase both measurement quality and efficiency.

By taking advantage of throughput to disk (see page 8), you can make real-time 1/3 octave measurements on all the channels in your analyzer. This means you'll acquire all your signals under identical environmental conditions and instrument setup states. Real-time 20 kHz measurements are available on up to 20 channels in the HP 3567A (see table 4). The HP 3566A provides an exceptionally cost-effective solution for real-time measurements up to 10 kHz on 40 channels.

Track band levels over time with octave maps

The ability to observe sound pressure levels over time give you another powerful troubleshooting tool. The HP 35638A option lets you map real-time octave data using three maps triggering choices: time interval, RPM interval, or free run.

In addition, with a simple one-line waveform math program, you can "slice" through the map at any specific frequency. The result will be a clear picture of how a single frequency band changes over time. Reverberation analysis is one of the creative ways to use this feature.

Table 3 - 1/3-Octave Real-Time Rates

Maximum Numbers of Channels	Maximum Frequency Span HP 3566A On-Line	HP 3566A From Throughput Data	Maximum Frequency Span HP 3567A On-Line	HP 3567A From Throughput Data	Aggregate Throughput Rate in Msamples/sec
2	—	10 kHz	20 kHz	80 kHz	0.5
4	—	10 kHz	10 kHz	80 kHz	1.05
5	—	10 kHz	—	80 kHz	1.31
10	—	10 kHz	—	40 kHz	1.31
20	—	10 kHz	—	20 kHz	1.31
40	—	10 kHz	—	10 kHz	1.31
48	—	5 kHz	—	5 kHz	0.79

Table 4 - Real-Time Rates for 1/1 and 1/12-Octave Measurements (one channel)

Type of Measurement	HP 3566A On-Line	HP 3566A From Throughput Data	HP 3567A On-Line	HP 3567A From Throughput Data
1/1 Octave	—	4 kHz	8 kHz	32 k Hz
1/12 Octave	—	12.34 k Hz	12.34 kHz	98.72 kHz

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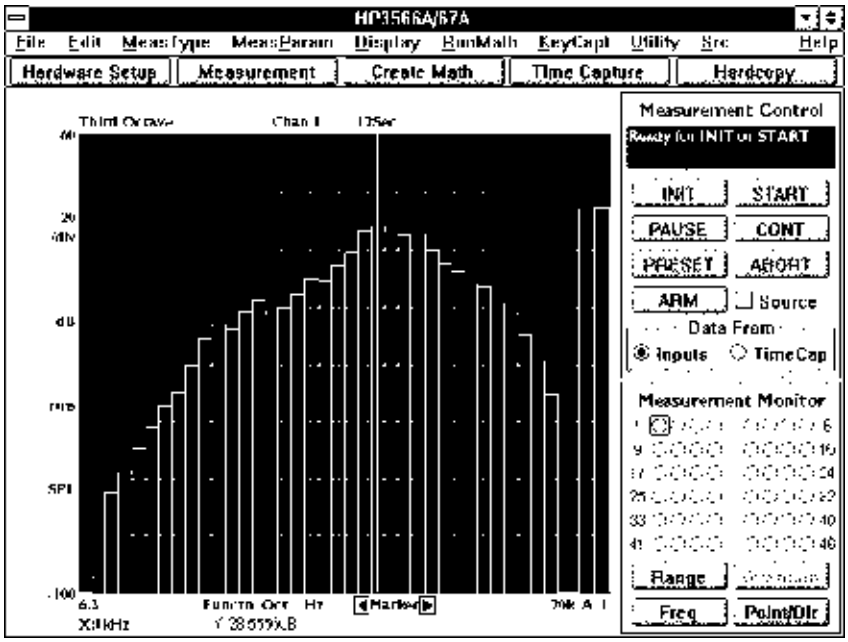
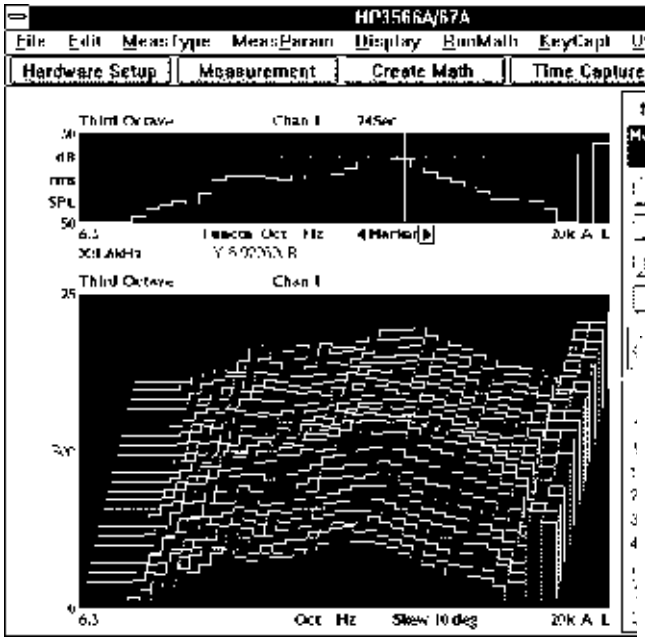
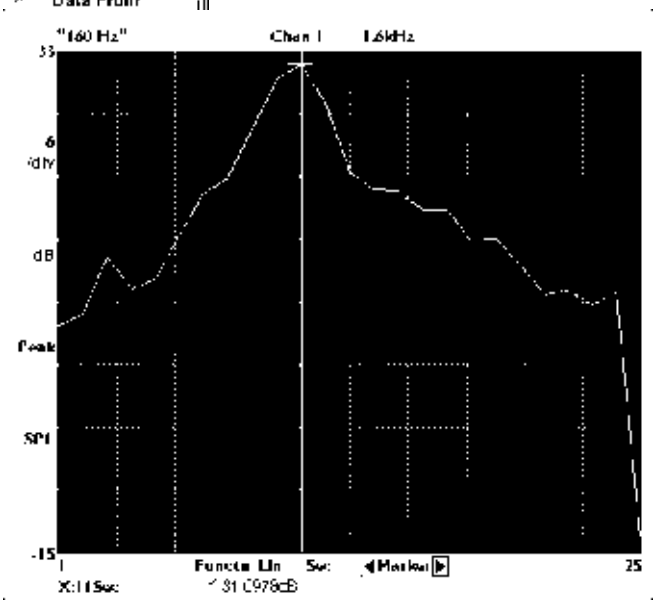


Two bands on the right of the display show overall power and A-weighted power.





Real-time octave maps graph 1/3, 1/12, and 1/1 octave data as a function of time or RPM. Use a simple one-line waveform math program to slice through the map to see how the 160 Hz band changes with time.

Printed 8/94
5963-2340E