The HP 35670A is a portable two- or four-channel dynamic signal analyzer with the versatility to be several instruments at once. Rugged and portable, it’s ideal for field work. Yet it has the performance and functionality required for demanding R&D applications. Optional features optimize the instrument for troubleshooting mechanical vibration and noise problems, characterizing control systems, or general spectrum and network analysis.

**Take the HP 35670A where it’s needed!**
Whether you’re moving an instrument around the world or around the lab, portability is a real benefit. Small enough to fit under an airplane seat, the HP 35670A goes where it’s needed. But there’s more to portability than size. Like a nominal 12- to 28-volt dc power input and self-contained features that do not require external hardware, such as built-in piezoelectric integrated circuit power supply, analog trigger and tachometer inputs, and optional computed order tracking.

**Versatile enough to be your only instrument for low frequency analysis**
With the HP 35670A, you carry several instruments into the field in one package. Frequency, time, and amplitude domain analysis are all available in the standard instrument. Build on that capability with options that either add new measurement capability or enhance all measurement modes.

**Frequency Range**
- 102.4 kHz 1 channel
- 51.2 kHz 2 channel
- 25.6 kHz 4 channel

**Dynamic Range**
90 dB typical

**Accuracy**
±0.15 dB

**Channel Match**
±0.04 dB and ±0.5 degrees

**Real-time Bandwidth**
25.6 kHz/1 channel

**Resolution**
25.6 kHz/1 channel

**Time Capture**
0.8 to 5 M samples (option UFC)

**Source Types**
Random, Burst random, Periodic chirp, Burst chirp, Pink noise, Sine, Swept-Sine (option 1D2), Arbitrary (option 1D4)

**Laboratory-quality measurements in the field**
Obtain all of the performance of your bench-top analyzer in a portable instrument.

**Ease-of-use**
Portability, versatility, and performance are valued attributes, but to be really valuable an instrument must also be easy to use. The HP 35670A has a friendly front panel, plus online help that’s always available to answer your questions. An interactive measurement state lets you configure the instrument setup from a single display.
HP 35670A Dynamic Signal Analyzer

Shown with option AY6 - Add Two Channels

Versatile Measurement Modes
Standard and optional measurement modes include:
• FFT Analysis
• Real-Time Octave Analysis (option 1D1)
• Order Analysis (option 1D0)
• Swept-Sine (option 1D2)
• Correlation Analysis
• Histogram Analysis
• Time Capture
All measurement options may be retrofitted.

Powerful Markers
Extract information from measurement data with trace and special markers:
• Individual Trace
• Coupled Trace
• Absolute or Relative Peak Search
• Harmonic
• Band
• Sideband Power
• Waterfall
• Time Parameter
• Frequency and Damping

Built-In 3.5 inch Flexible Disk Drive
Store instrument states, programs, time captured data, waterfall data, trace data, limits, math functions, data tables, and curve fit/synthesis tables.
Supported disk formats are HP-LIF and MS-DOS. Internal RAM may also be formatted as storage disk.

RPM Display
Read RPM in any measurement mode

HP Instrument BASIC (Option 1C2)
Develop a custom user-interface, integrate several instruments and peripherals into a system using the HP 35670A as the system controller, or simply automate measurements.

Online Help
Applications oriented help is just a few keystrokes away.

Large 6.9 inch (17.5 cm) display
Display area is not compromised by portability

Input Channels
• Analog A-weighted filters (switchable)
• Transducer sensitivity input
• Engineering units: g, m/s², m/s, m, in/s², in/s, in, mil, kg, dyn, lb, N, and pascals
• Built-in 4 mA constant current power supply

Precision Measurements
• 16-bit ADC
• ±0.15 dB spectrum amplitude accuracy
• ±0.04 dB, ±0.5 degrees channel match (full scale)
• 90 dB dynamic range (typical)
• 130 dB dynamic range with swept-sine (option 1D2)
• Up/Down autorange
• Up only autorange

Math Functions
Powerful math and data editing functions to quickly modify measurement results. (Curve fit and frequency response synthesis available with option 1D3.)
Source Types
- Random Noise
- Burst Random Noise
- Periodic Chirp
- Burst Chirp
- Pink Noise
- Fixed Sine
- Arbitrary Waveform Source (Option 1D4)
- Swept-Sine Source (Option 1D2)

Note: The source is located on the front panel of a standard two-channel HP 35670A.

HP-IB Connector
Integrate the HP 35670A with other instruments and peripherals for system operation or printing/plotting. System controller for HP-IB (IEEE-488.1 and 488.2) compatible instrumentation via HP Instrument BASIC (option 1C2). Provides direct control of HP-IB printers, plotters, and HP 5580 disk drives.

Serial Port
Plot to HP-GL plotters or print to HP-GL and raster printers.

Parallel Port
Plot to HP-GL plotters or print to HP-GL and raster printers.

External Monitor
Drive a multisync monitor for remote viewing by large groups.

External Trigger (42 Volt Peak Max)
No external signal conditioning hardware required. Triggers on selected level between ±10 volts.

Tachometer (42 Volt Peak Max)
No external signal conditioning hardware required. Reads frequency (RPM) on selected levels between ±20 volts.

Low Noise Fan
Fan may be turned off for acoustic applications. Running speed depends on ambient temperature.

DC Power
Accepts 12 to 28 volts dc (nominal). Use the HP 35250A power cable for DC power source connection, or the HP 35251A power cable with cigarette-lighter adapter.

AC Power
Universal power supply will operate with any combination of voltage between 100 and 240 VAC and line frequency between 47 and 440 Hz. The maximum power requirement is 350 VA.

Power Select
Switch between ac and dc power sources without interrupting instrument operation.

Keyboard
Use a standard PC keyboard to title data, edit HP Instrument BASIC programs, or to operate the instrument.

WARNING
- Always turn power down to zero before inserting or removing any board.
- Never connect between signal ground and chassis ground.
- Never turn power on when the HP 35670A is connected to HP-IB devices.
- Never turn power on when any HP 35670A board is not completely seated in its printed circuit backplane slot.

CAUTION
- Do not place larger objects where they may obstruct air intake or exhaust vents.
- Do not obstruct air intake or exhaust vents.
- Do not place power source cables on the front panel of the HP 35670A.

CAUTION
- Do not put objects on the HP 35670A.
- Do not place objects on the HP 35670A.
Spectrum Analysis

FFT-based spectrum analyzers, such as the HP 35670A, are ideal for measuring the spectra of low-frequency signals like speech or mechanical vibration. Transient components, usually missed with swept-frequency analyzers, are easily measured and displayed at speeds fast enough to follow trends. The HP 35670A has both the performance and features required to take full advantage of this technology.

**Averaging**

Various averaging modes let you further refine spectrum analysis measurements. Time averaging extracts repetitive signals out of the noise while rms averaging reduces the noise to its mean value. Exponential averaging, available for both time and rms averaging, is useful for reducing the noise while following changing signals—tracking the resonance shifts in a fatiguing structure for example.

**16-Bits for High Performance**

With a 16-bit ADC (90 dB typical dynamic range) and a real-time bandwidth of 25.6 kHz, you can be sure nothing will be missed. Resolve signals using 100 to 1600 lines resolution, or for really close-in analysis, use frequency zoom to resolve signals with up to 61 µHz resolution. Use time or RPM arming to develop waterfalls of sequential vibration spectra for trend analysis or for an overview of device vibration.

**Power and Linear Spectrums**

Match your spectrum measurement mode to the signal being tested. Use linear spectrum analysis to measure both the amplitude and phase of periodic signals such as the spectra of rotating machinery. Power spectrum analysis is provided for averaging nonrepetitive signals.

Two spectrums of road induced vibration measured at different speeds are compared using the front/back mode of the HP 35670A.
**Time Domain**

Use your spectrum analyzer as a low-frequency oscilloscope or view signals in the time and frequency domains simultaneously. (Note: anti-alias filters can be switched off.) Special markers for time-domain data facilitate extraction of key control system performance parameters: overshoot, rise time, setting time, and delay time.

**Data Table**

Use a tabular format to keep track of key frequencies in the spectra of rotating machinery. The amplitude and frequency of the signal and a 16-character entry label field are listed for each selected point.

**Automatic Units Conversion**

Display vibration data in the units of your choice. Select g, m/sec², in/sec², m/s, in/s, m, mil, inch, Kg, lb, N, dyn, or pascals as appropriate for your application. The instrument automatically converts frequency-domain data from specified input transducer units to the units you select for display. For example, accelerometer data is automatically converted and displayed as mils when mils are selected. Of course, dB, dBV, dBm and volts are available for electrical applications.

**Markers**

Markers streamline analysis by helping you select and display specific data. Marker functions include marker to peak, next right peak, and coupled markers for selecting points in multiple data displays. Markers readouts are absolute or relative to your selected reference.

**Special Markers**

Three special marker functions facilitate analysis of your spectral data. Sideband markers aid analysis of modulation signals. Use this function to quickly locate sidebands in the complicated spectra of rotating machines. A band-power marker reads the total power in a selected band of frequencies and a total harmonic distortion marker lets you calculate total harmonic distortion without including the effects of noise.
The HP 35670A has the flexibility to make measurements of both electrical networks and mechanical devices. FFT-based network analysis is fast enough to allow real-time adjustments of circuit parameters while the swept-sine option provides exacting measurements over more than six frequency decades, and a 130 dB dynamic range.

Source
Select the optimum stimulus for each application—random noise, periodic chirp, pink noise, fixed sine, burst random, and burst chirp. For zoomed network analysis measurements, the source is band-translated to match the zoom span at frequencies up to 51.2 kHz. An optional arbitrary source lets you test your product using real-world signals. A ±10 volt dc source offset facilitates tests of control systems.

Impact Testing
Force and exponential windows allow impact testing for modal and structural analysis. Quality measurements are ensured using preview and accept/reject during averaging. A 4 mA constant current transducer power supply is built-in for true portability.

Limits are used for go/no go testing in production. The response of an accelerometer is being checked in this example.

Limits
Test network measurements against preset limits. Up to 800 separate line segments are available for setting upper and lower limits. Limits are also used for testing spectrum measurements.

Four Channels (option AY6)
Test up to three devices simultaneously with a four-channel HP 35670A. Channel one is the common reference channel and two, three, and four are the response channels. Alternatively, select channels one and three as reference channels for two totally independent network measurements. See option AY6 description for more information.
Markers
A frequency and damping marker provides the resonant frequency and the damping ratio of single-degree-of-freedom frequency response measurements.

Gain and phase margin markers extract key frequency-domain stability data from frequency-response measurements of control systems.

Signal Injection for Control Loops
Use one of three HP signal injection devices for testing control loops. The HP 35280A summing junction provides convenient dc to 1 MHz signal injection for most control loops. Use the HP 35281A clip-on transformer when it is not possible to temporarily open the loop, or use the HP 35282A signal injection transformer when secondary voltages are up to 600 Vpk.

Capture transient events or time histories for complete analysis in any measurement mode (except swept-sine). Use either the entire time-capture record or a selected region of interest for repetitive analysis in the FFT, octave, order track, correlation or histogram instrument modes.

Add an additional 4 Mbytes (option AN2) or 8 Mbytes (option UFC) of memory for really deep time-capture capability.

An interval of time-capture data has been selected for analysis in the octave mode.

STARModal and STARAcoustics are products of Structural Measurement Systems.
CADA-PC is a product of LMS International.
Microsoft® is a U.S. registered trademark of Microsoft Corp.
AMI PRO is a product of Lotus Development Corp.
Using Measurement Results

Taking the measurement is only half the job. Raw measurement data must be stored, recalled, printed, plotted, integrated with other data for analysis, and reported. The HP 35670A has a variety of tools to help you finish the job.

Enhanced Data Transfer Utilities for PCs
Standard Data Format (SDF) Utilities, provided with the HP 35670A, allow you to easily move data from the instrument to wherever it's needed:

• For general digital signal processing and filtering, translate data files to formats compatible with MATLAB and MATRIX, Data Set 58, or ASCII for use in popular spreadsheets.
• For specific applications, use application software that reads SDF files directly, such as STARModal and STARAcoustics from SMS and CADA-PC from LMS.
• Transfer data to and from the HP 35665A, 3566A, 3567A, 3562A, 3563A.
• Use the viewdata feature to display data on your PC or to convert to the HP-GL format for transfer to Microsoft's Word for Windows or Lotus' AMI PRO word processing software.
• Convert between HP-LIF and MS-DOS formats.
• Read data files into a program.

Documented Results
The HP 35670A supports a variety of HP-IB, serial and parallel printers and plotters for direct hardcopy output. The internal 3.5 inch flexible disk drive stores data, instrument states, HP-GL plots and HP Instrument BASIC programs in HP-LIF or MS-DOS formats for future recall or use on HP workstations or a personal computer.

Entire display screens can be imported directly into your word processing program by plotting HP-GL files to your named DOS file. HP-GL files are interpreted and displayed directly by Microsoft's Word for Windows and AMI PRO from Lotus Development Corp.

Computed Order Tracking
(Option 1D0)

Self-contained—no ratio synthesizer or tracking filter required
Order Maps
Order Tracking
RPM or Time Trigger
Display RPM Profile
Track Up to Five Orders/Channel
Up to 200 Orders
Composite Power
RPM Measurements

Order tracking facilitates evaluation of spectra from rotating machines by displaying vibration data as a function of orders (or harmonics) rather than frequency. All measurement spectra is normalized to the shaft RPM.

Now you can have order tracking without compromising portability. Traditional analog order tracking techniques require external tracking filters and ratio synthesizers. With HP’s computed order tracking algorithm, external hardware is gone.

Because order tracking is implemented in the software, data is more precise and your job is easier. Compared to traditional analog order tracking techniques, computed order tracking offers:

• Improved dynamic range at high orders
• More accurate tracking of rapidly changing shaft speeds
• Accurate RPM labeled spectra with exact RPM trigger arm
• Wide 64:1 ratio of start to stop RPMs

Order Map
Use order maps for an overview of vibration data versus RPM or time. Display the amplitude profile of individual orders and suborders using the slice marker function. Alternatively, use trace markers to select individual traces for display.

The slice marker feature is used to select and display an order or suborder from an order map.
**Order Tracking**

Measure only the data you need. Order tracking lets you measure the amplitude profile of up to five orders plus composite power simultaneously on each channel. Up to four orders or three orders and composite power can be displayed simultaneously.

**RPM Profile**

Use RPM profile to monitor the variation of RPM with time during order tracking measurements.

**Composite Power**

Composite power provides the total signal power in a selected channel as a function of RPM.

**Run-Up and Run-Down Measurements**

Run-up and run-down measurements of any order are made using external trigger as the phase reference. Display the results as bode or polar plots; both are available. Markers allow convenient notation of important shaft speeds.

**Orbits**

Obtain oscilloscope-quality orbit measurements with your HP 35670A. Unlike traditional FFT analyzers, the HP 35670A equipped with computed order tracking displays a selected number of loops (usually one) as the shaft RPM is varied.

Markers are used to annotate shaft speeds at selected points in a run-up measurement.
Real-Time Octave Measurements
(Option 1D1)
Microphone Adapter and Power Supply
(Option UK4)

Real-Time Third Octave to 40 kHz
ANSI S1.11-1986 Filter Shapes
Microphone Inputs and Power
A-Weighted Overall SPL
RPM or Time-Triggered Waterfalls

Eliminate the expense and inconvenience of multiple instruments in the field. With optional real-time octave analysis, and the optional microphone adapter and power supply, you have a complete real-time octave analyzer added to your HP35670A at a fraction of the cost of a second instrument. Now you can carry both your FFT and real-time octave analyzers to the job site in the same hand.

Real-Time 1/3-Octave to 40 kHz on One Channel
With two input channels of 1/3-octave real-time measurements at frequencies up to 20 kHz, you get all of the information you'll ever need to understand the noise performance of your product. No misinterpreted measurements because transient components were missed. When the frequency range requirement is 10 kHz or less, use four channels to characterize spatial variations. For those exceptional circumstances, use 1/3-octave resolution at frequencies up to 40 kHz on a single channel. Resolutions of 1/1- and 1/12-octave are also available.

Overall sound pressure level and A-weighted sound pressure level can be displayed with the octave bands individually, together, or not at all.

A fan-off mode lets you use the instrument in the sound field being measured.

ANSI S1.11-1986
All octave filters comply with filter shape standards ANSI S1.11-1986 (Order 3, type 1-D), DIN 45651, and IEC 225-1966. An 80-dB dynamic range for the audio spectrum provides the performance required by acousticians. Switchable analog A-weighting filters in the input channels comply fully with both ANSI S1.4-1983 and IEC 651-1979 Type 0.

Advanced Analysis
Use waterfall displays of octave data for an overview of device noise versus time or RPM. Display individual frequency bands as a function of RPM or time using the slice marker function. Alternatively, use trace markers to select individual traces for display.

A pink noise source is available for testing electro-acoustic devices.

Sound Level Meter Measurements
Peak hold, impulse, fast, slow, and $L_{eq}$ are all provided with optional Real-time Octave Measurements. All measurements conform to IEC 651-1979 Type 0 - Impulse.
Swept-Sine Measurements
(Option 1D2)

130-dB Dynamic Range
Logarithmic or Linear Sweeps
“Auto” Frequency Resolution

While FFT-based network analysis is fast and accurate, swept-sine measurements are a better choice when the device under test has a wide dynamic range or covers several decades of frequency range. Use swept-sine measurements to extend the network measurement capabilities of the HP 35670A.

Network Analysis Over a 130-dB Range

With traditional swept-sine, the HP 35670A is optimally configured to measure each individual point in the frequency response. The result is a 130 dB dynamic range. With FFT-based network analysis, all frequency points are stimulated simultaneously and the instrument configures itself to measure the highest amplitude response—thereby limiting the dynamic range.

Characterize Nonlinear Networks

Use the auto-level feature to hold the input or output amplitude constant during a sweep. This provides the device response for a specific signal amplitude. With FFT-based network analysis using random noise, the random amplitudes of the stimulus tend to “average out” the nonlinearities and therefore does not capture the dependency of the response on the stimulus amplitude.

Logarithmic Sweep

Test devices over more than six decades of frequency range using logarithmic sweep. In this mode, the frequency is automatically adjusted to provide the same resolution over each decade of frequency range. With FFT-network analysis, resolution is constant—not a problem when measuring over narrow frequency ranges.

Flexible

Make the measurement your way. Independently select logarithmic or linear sweep, sweep up or down, automatic or manual sweep, and autoresolution.

Automatic Frequency Resolution

Use autoresolution to obtain the fastest sweep possible without sacrificing accuracy. With autoresolution, the HP 35670A automatically adjusts the frequency step according to the device response. High rates of amplitude and phase change are matched with small frequency steps. Low rate-of-change regions are quickly measured with larger frequency steps.

Test Multiple Devices Simultaneously

Increase throughput in production. Swept-sine measurements up to 25.6 kHz can be made on three devices simultaneously using swept-sine on a four-channel HP 35670A. Channel one is the common reference channel for these measurements. Alternatively, channels one and three can be designated as independent reference channels for two totally independent swept-sine measurements.

The stability of a control loop is quickly characterized using the gain and phase margin marker function.
Realize the advantages of using your instrument with a computer without sacrificing portability. HP Instrument BASIC provides the power of a computer inside your HP 35670A.

- Create custom interfaces for simplified operation.
- Use the HP 35670A as a system controller to integrate it with other instruments and peripherals.
- Enhance functionality by creating custom measurements.
- Increase productivity with automated operation.

HP Instrument BASIC is a compatible subset of the HP BASIC used in HP 9000 series 200, 300, 400 and 700 computers.

**Easy Programming**
The HP Instrument BASIC program editor supports:
- Line-by-line syntax checking
- Pre-run program verification
- Single step and debug
- Automatic line numbering

An optional PC-style 101-key keyboard facilitates program development and editing. Simple programs can be entered or edited using the front-panel keys. Large programs can be developed or edited in HP 9000 Series 200, 300, and 400 computers, or on a HP Vectra with Instrument BASIC for Windows, HP E2200A, and then transferred to the HP 35670A.

### Over 200 HP Instrument BASIC Commands

<table>
<thead>
<tr>
<th>Program entry and editing</th>
<th>Binary functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program debugging</td>
<td>Trigonometric operations</td>
</tr>
<tr>
<td>Memory allocation</td>
<td>String operations</td>
</tr>
<tr>
<td>Relation operators</td>
<td>Logical operators</td>
</tr>
<tr>
<td>General math</td>
<td>HP-IB control</td>
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<tr>
<td>Graphics control</td>
<td>Mass storage</td>
</tr>
<tr>
<td>Graphics plotting</td>
<td>Event initiated branching</td>
</tr>
<tr>
<td>Graphics axes and labeling</td>
<td>Clock and calendar</td>
</tr>
<tr>
<td>Program control</td>
<td>General device I/O</td>
</tr>
<tr>
<td></td>
<td>Array operations</td>
</tr>
</tbody>
</table>

### Keystroke Recording
Most program development begins with keystroke recording. Each keystroke is automatically saved as a program instruction as you set up your measurement using the front panel. The recorded sequence can be used as the core of a sophisticated program or run as an automatic sequence.

**Keystroke Recording**
Keystroke recording quickly creates the core of your HP Instrument BASIC program.
**Add Two Channels**  
(Optional AY6)

**Curve Fit and Synthesis**  
(Optional 1D3)

**51.2-kHz Frequency Range On One and Two Channels**  
**25.6-kHz Frequency Range On Four Channels**  
**One or Two Reference Channels**

Enhance your productivity by adding two additional input channels to your portable analyzer. Having four channels often means the difference between solving a problem in the field and having to schedule time in a test bay.

Monitor four signals simultaneously or use channel one as the reference channel for up to three simultaneous cross-channel measurements. Two totally independent cross-channel measurements are made by selecting channels one and three as independent reference channels. All channels are sampled simultaneously.

Use triaxial measurements to simultaneously characterize the motion of mechanical devices in three axes.

For control systems, simultaneously measure several points in a single loop.

**20 Poles/20 Zeros Curve Fitter**  
**Frequency Response Synthesis**  
**Pole/Zero, Pole/Residue and Polynomial Format**

Use curve fit and synthesis in the HP 35670A to take the guesswork out of your design process. The 20-pole and 20-zero multiple-degree-of-freedom curve fitter calculates a mathematical model of your system or circuit from measured frequency response data. The model can be expressed in pole/zero, pole/residue, or polynomial format.

Transfer the circuit model to the synthesis function to experiment with design modifications. Add and delete poles and zeros, change gain factors, time delays, or frequency scaling, then synthesize the frequency response from the modified model. Design modifications are tested without ever touching a soldering iron.
Arbitrary Waveform Source  
(Option 1D4)

Frequency or Time Domain Entry  
Data Edit  
Store Up to Eight Arbitrary Waveforms

Test your products using real-world signals. Measure a signal in either the time or frequency domain, then output it via the arbitrary waveform source. Use math functions and data edit to obtain precisely the output waveform you need. An arbitrary waveform may be output once or repeatedly.

Standard source types can be optimized for specific applications. For example, random noise can be shaped to improve the effective dynamic range of your measurement. Alternatively, you can use data edit and math functions to create an arbitrary waveform.

Use time capture as a digital tape recorder, then playback captured signals through the arbitrary waveform source.

Add 8-Mbytes RAM  
(Option UFC)
Add 4-Mbytes RAM  
(Option AN2)

Expand the data storage and time-capture capacity of your HP 35670A.

<table>
<thead>
<tr>
<th>Number of Spectra Stored Per Channel</th>
<th>Standard</th>
<th>Add 4 Mbyte</th>
<th>Add 8 Mbyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFT - 1 Channel 1</td>
<td>130</td>
<td>600</td>
<td>1000</td>
</tr>
<tr>
<td>FFT - 2 Channels 2</td>
<td>50</td>
<td>250</td>
<td>400</td>
</tr>
<tr>
<td>FFT - 4 Channels 3</td>
<td>20</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>1/3-Octave Spectra 4</td>
<td>4000</td>
<td>18800</td>
<td>32000</td>
</tr>
<tr>
<td>Time Capture 1</td>
<td>550 KSamples</td>
<td>2.6 M Samples</td>
<td>4.7 M Samples</td>
</tr>
</tbody>
</table>

1 Conditions: Preset with instrument mode switched to 1 channel.  
2 Conditions: Preset  
3 Conditions: Preset with instrument mode switched to 4 channels.  
4 Conditions: Preset with instrument mode switched to octave.

Add 1-Mbyte Nonvolatile RAM  
(Option UFF)

Use the 1-Mbyte nonvolatile RAM in environments too harsh for the 3.5 inch flexible disk drive. The memory functions as a high-speed disk for storage of the following information.

- Instrument Setup States  
- Trace Data  
- User Math Definitions  
- Limit Data  
- Time Capture Buffers  
- HP Instrument BASIC Programs  
- Waterfall Display Data  
- Curve Fit/Synthesis Tables  
- Data Tables

Information stored in nonvolatile RAM is retained when the power is off.
**HP 35670A Ordering Information**

**HP 35670A**  
Dynamic Signal Analyzer  
Standard Configuration:

- 1.4 Mbyte, 3.5-in. flexible disk drive
- 1.5 Mbytes user RAM
- Impact Cover
- Standard Data Format Utilities
- AC Power Cord
- Operating manual set including:
  - Operator’s Guide
  - Quick Start Guide
  - Installation and Verification Guide
  - HP-IB Programming with the HP35670A
  - HP-IB Commands: Quick Reference
  - HP-IB Programmer’s Guide
- Standard one-year warranty

**Options for the HP 35670A**

<table>
<thead>
<tr>
<th>Opt. Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AY6</td>
<td>Add Two Channels (four total)</td>
</tr>
<tr>
<td>1D0</td>
<td>Computed Order Tracking</td>
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<tr>
<td>1D1</td>
<td>Real-Time Octave Measurements</td>
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<tr>
<td>1D2</td>
<td>Swept-Sine Measurements</td>
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<tr>
<td>1D3</td>
<td>Curve Fit and Synthesis</td>
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<tr>
<td>1D4</td>
<td>Arbitrary Waveform Source</td>
</tr>
<tr>
<td>1C2</td>
<td>HP Instrument BASIC</td>
</tr>
<tr>
<td>AN2</td>
<td>Add 4-Mbytes Memory</td>
</tr>
<tr>
<td>UFC</td>
<td>Add 8-Mbytes Memory</td>
</tr>
<tr>
<td>UFF</td>
<td>Add 1-Mbyte Nonvolatile RAM</td>
</tr>
<tr>
<td>1F0</td>
<td>PC-style Keyboard</td>
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<tr>
<td>1F1</td>
<td>German Keyboard</td>
</tr>
<tr>
<td>1F2</td>
<td>Spanish Keyboard</td>
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<tr>
<td>1F3</td>
<td>French Keyboard</td>
</tr>
<tr>
<td>1F4</td>
<td>UK Keyboards</td>
</tr>
<tr>
<td>1F5</td>
<td>Italian Keyboard</td>
</tr>
<tr>
<td>1F6</td>
<td>Swedish Keyboard</td>
</tr>
<tr>
<td>AX4</td>
<td>Rack Mount Without Handles</td>
</tr>
<tr>
<td>1O0</td>
<td>Software Bundle 1D0-1D4, UFC</td>
</tr>
<tr>
<td>UK5</td>
<td>Carrying Case (for shipping)</td>
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<tr>
<td>OB1</td>
<td>Additional Manual Set</td>
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<tr>
<td>OB3</td>
<td>Additional HP Instrument BASIC Manual Set</td>
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<tr>
<td>1BP</td>
<td>Military Calibration (meets MIL 45662A)</td>
</tr>
<tr>
<td>W30</td>
<td>Two Year Extended Service Contract</td>
</tr>
</tbody>
</table>

**To Upgrade Your HP 35670A**

To add an option to your HP 35670A, order HP 35670U followed by the option number. Options AY6, AN2, UFC and UFF must be installed by Hewlett Packard. Option UE2 is available to upgrade instrument firmware to latest version, as appropriate.

**Accessories**

**DC Power Cables**

The HP 35250A is a three meter cable terminated with lugs for connecting to most dc power sources. The HP 35251A is a three meter cable terminated with an adaptor that plugs into a cigarette lighter.

**For Testing Control Systems**

The HP 35280A summing junction provides convenient dc to 1 MHz signal injection for most control loops. Use the HP 35281A clip-on transformer when it is not possible to temporarily open the loop, or use the HP 35282A signal injection transformer when secondary voltages are up to 600 Vpk.

**Physical Sensors**

For a complete list of accessories for this and other HP Dynamic Signal Analyzers, please refer to the HP DSA Accessory Catalog (publication number 5091-9708E).
The following features are standard with the HP 35670A:

**Instrument Modes**
- FFT Analysis
- Correlation Analysis

**Measurement**
- Frequency Domain
- Linear Spectrum
- Cross Spectrum
- Time Domain (oscilloscope mode)
- Time Waveform
- Cross-Correlation
- Amplitude Domain

**Trace Coordinates**
- Linear Magnitude
- Log Magnitude
- dB Magnitude
- Group Delay
- Phase

**Trace Units**
- y-axis amplitude: combinations of units, unit value, calculated value, and unit format describe y-axis amplitude
- Units: volts, g, meters/sec², inches/sec², meters/sec, inches/sec, meters, mils, inches, pascals, Kg, N, dyn, lb, user-defined EUs
- Unit Value: rms, peak, peak-to-peak
- Calculated Value: V, V²s/Hz
- Frequency: Hz, cpm, order, seconds, user-defined

**Display Formats**
- Single
- Quad
- Dual Upper/Lower Traces
- Small Upper and Large Lower Traces
- Front/Back Overlay Traces
- Measurement State
- Bode Diagram
- Waterfall Display with Skew
- Trace Grids On/Off
- Display Blanking
- Screen Saver

**Display Scaling**
- Auto Scale
- Selectable Reference
- Manual Scale
- Linear or Log X-Axis
- Input Range Tracking
- Y-Axis Log X & Y Scale Markers with Expand and Scroll

**Marker Functions**
- Individual Trace Markers
- Coupled Multi-Trace Markers
- Absolute or Relative Marker
- Peak Search
- Harmonic Markers
- Band Marker
- Sideband Power Markers
- Waterfall Markers
- Time Parameter Markers
- Frequency Response Markers

**Signal Averaging (FFT Mode)**
- Average Types (1 to 9,999,999 averages)
- RMS
- RMS Exponential
- Time Exponential
- Time
- Averaging Controls
- Overload Reject
- Fast Averaging On/Off
- Update Rate Select
- Select Overlap Process Percentage
- Preview Time Record
- Measurement Control
- Start Measurement
- Pause/Continue Measurement
- Triggering
- Continuous (Freerun)
- External (Analog or TTL Level)
- Internal Trigger from any Channel
- Source Synchronized Trigger
- HP-IB Trigger
- Armed Triggers
- Automatic/Manual
- RPM Step
- Time Step
- Pre- and Post-Trigger Measurement Delay

**Tachometer Input:**
- ±4 V or ±20 V range
- 40 mv or 200 mV resolution
- Up to 2048 pulses/rev
- Tach hold-off control

**Source Outputs**
- Random
- Burst Random
- Periodic Chirp
- Burst Chirp
- Fixed Sine
- Note: Some source types are not available for use in optional modes. See option description for details.

**Input Channels**
- Manual Range
- Up/Only Auto Range
- Anti-alias Filters On/Off
- AC or DC Coupling
- Up/Down Auto Range
- LED Half Range and Overload Indicators
- Floating or Grounded
- A-Weight Filters On/Off
- Transducer Power Supplies
- (4 ma constant current)

**Frequency**
- 20 Spans from 195 mHz to 102.4 kHz (1 channel mode)
- 20 Spans from 98 mHz to 51.2 kHz (2 channel mode)
- Digital zoom with 244 mHz resolution throughout the 102.4 kHz frequency bands.

**Resolution**
- 100, 200, 400, 800 and 1600 lines

**Windows**
- Hann
- Flat Top
- Uniform
- Force/Exponential
- Conjugate
- Real and Imaginary
- FFT, FFT⁻¹
- EXP
- PSD
- A, B, and C weighting
- Constants K1 thru K5
- Functions F1 thru F5

**Analysis**
- Limit Test with Pass/Fail
- Data Table with Tabular Readout
- Data Editing

**Time Capture Functions**
- Capture transient events for repeated analysis in FFT, octave, order, histogram, or correlation modes (except swept-sine).
- Time-captured data may be saved to internal or external disk, or transferred over HP-IB. Zoom on captured data for detailed narrowband analysis. Up to 750K samples of data can be saved in the standard unit.

**Data Storage Functions**
- Built-in 3.5 in. 1.44-Mbyte flexible disk also supports 720-Kbyte disks, and 128-Kbyte NVRAM disk. Both MS-DOS® and HP-LIF formats are available. Data can be formatted as either ASCII or Binary (SDF). The HP 35670A provides storage and recall from the internal disk, internal RAM disk, internal NVRAM disk, or external HP-IB disk for any of the following information:
  - Instrument Setup States
  - User-Math
  - Time Capture Buffers
  - Waterfall Display Data
  - Data Tables

**Interfaces**
- HP-IB. (IEEE-488.1 and 488.2)
- Parallel RS-232C Serial

**Hard-Copy Output**
- To Serial or Parallel HP-GL Plotters
- To Raster Printers
- To Serial or Parallel HP-GL Printers
- To Disk File (Supports Raster Printer, HP-GL Printer, and HP-GL Printer)
- Time Stamp

**HP-IB Capabilities**
- Listener/Talker (Direct control of plotters, printers, disk drives)
- Conforms to IEEE 488.1/488.2
- Conforms to SCI 1992
- Controller with HP Instrument Basic option

**Standard Data Format (SDF) Utilities**
- Exchange data between virtually all HP Dynamic Signal Analyzers
- Easy data transfer to spreadsheets
- Data transfer to MATRX, and Matlab

**SDF utilities run in an external PC**
- Calibration & Memory
- Single or Automatic Calibration
- Built-In Diagnostics & Service Tests
- Nonvolatile Clock with Time/Date
- Data Storage Functions

**Online Help**
- Access to Topics via Keyboard or Index
- Fan On/Off

Data subject to change.
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Printed in U.S.A. 12/97
5966-3063E