Agilent Technologies 35670A
Dynamic Signal Analyzer

Technical Specifications

Versatile two- or four-channel high-performance FFT-based spectrum/network analyzer

122 µHz to 102.4 hHz 16-bit ADC

<table>
<thead>
<tr>
<th>Key Specifications</th>
<th>102.4 kHz 1 channel</th>
<th>51.2 kHz 2 channel</th>
<th>25.6 kHz 4 channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>90 dB typical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.15 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel Match</td>
<td>±0.04 dB and ±0.5 degrees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time Bandwidth</td>
<td>25.6 kHz/1 channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>100, 200, 400, 800 &amp; 1600 lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Capture</td>
<td>&gt; 6 Msamples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source Types</td>
<td>Random, Burst random, Periodic chirp, Burst chirp, Pink noise, Sine, Swept-Sine (option1D2), Arbitrary (option 1D4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary of Features on Standard Instrument

The following features are standard with the Agilent 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/sec^2, inches/sec^2, 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, V^2, V^3/Hz, Hz, V^2/Hz (ESD)
- Unit Format: linear, dB's with user selectable dB
- Value: Unwrapped Phase
- Magnitude: Real Part
- dbMagnitude: Imaginary Part
- Group Delay: Nyquist Diagram
- Phase: Polar

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

**Display Scaling**
- Autoscale
- 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 Time Exponential
- RMS Exponential Peak Hold
- 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 (Free-run)
- External (Analog or TTL Level)
- Internal Trigger from any Channel
- Source Synchronized Trigger
- GPIOB Trigger
- Armed Triggers
- Automatic/Manual
- RPM Step
- Time Step
- Pre- and Post-Trigger Measurement Delay

**Tachometer Input**
- ±4V or ±20V 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
- Pink Noise
- Fixed Sine

**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 µHz resolution throughout the 102.4 kHz frequency bands.

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

**Windows**
- Hann
- Flat Top
- Force/Exponential

**Math**
- ‘,’ ‘/’, ‘*’
- Magnitude
- Square Root
- LN
- EXP
- ‘j’ or ‘/j’
- 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 GPIB. Zoom on captured data for detailed narrowband analysis. Up to 6 Msamples 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 2 Mbyte NVRAM disk. Both MS-DOS® and HP-LIF formats are available. Data can be formatted as either ASCII or Binary (SDF). The 35670A provides storage and recall from the internal disk, internal RAM disk, internal NVRAM disk, or external GPIB disk for any of the following information:

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

**Interfaces**
- GPIB (IEEE-488.1 and 488.2)
- Parallel R-232C Serial

**Hard-Copy Output**
- To Serial or Parallel HP-GL Plotters (PCL5e)
- To Raster Printers
- To Serial or Parallel HP-GL Printers
- To Disk File
- To HP-GL Printer
- To HP-GL Plotter

**GPIB Capabilities**
- Listener/Talker (Direct control of plotters, printers, disk drives)
- Conforms to IEEE 488.1/488.2
- Conforms to SCIPI 1982
- Controller with Agilent Instrument Basic option

**Standard Data Format (SDF) Utilities**
- Exchange data between virtually all Agilent Dynamic Signal Analyzers
- Easy data transfer to spreadsheets
- Data transfer to MATRIX_x 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
- Time/Date Stamp on Plots and Saved Data Files

**Online Help**
- Access to Topics via Keyboard or Index

**Fan**
- On/Off

MS-DOS® is a U.S. registered trademark of Microsoft Corporation.
**Agilent 35670A Specifications**

Instrument specifications apply after 15 minutes warm-up and within 2 hours of the last self-calibration. When the internal cooling fan has been turned OFF, specifications apply within 5 minutes of the last self-calibration. All specifications are with 400 line frequency resolution and with anti-alias filters enabled unless stated otherwise.

### Frequency

<table>
<thead>
<tr>
<th>Mode</th>
<th>Maximum Range**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel Mode</td>
<td>102.4 kHz</td>
</tr>
<tr>
<td>2 Channel Mode</td>
<td>51.2 kHz (option AY6*)</td>
</tr>
<tr>
<td>4 Channel Mode (option AY6 only)</td>
<td>25.6 kHz</td>
</tr>
</tbody>
</table>

** Show All Lines mode allows display of up to 131.1, 65.5 and 32.7 kHz respectively. Amplitudes accuracy is unspecified and not alias protected.

### Spans

<table>
<thead>
<tr>
<th>Mode</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel Mode</td>
<td>195.3 mHz to 102.4 kHz</td>
</tr>
<tr>
<td>2 Channel Mode</td>
<td>97.7 mHz to 51.2 kHz</td>
</tr>
<tr>
<td>4 Channel Mode (option AY6 only)</td>
<td>97.7 mHz to 25.6 kHz</td>
</tr>
</tbody>
</table>

### Minimum Resolution

<table>
<thead>
<tr>
<th>Mode</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel Mode</td>
<td>122 µHz (1600 line display)</td>
</tr>
<tr>
<td>2 Channel Mode</td>
<td>61 µHz (1600 line display)</td>
</tr>
<tr>
<td>4 Channel Mode (option AY6 only)</td>
<td>122 µHz (880 line display)</td>
</tr>
</tbody>
</table>

### Maximum Real-Time Bandwidth

(FFT Span for Continuous Data Acquisition) (Preset, Fast Averaging)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel Mode</td>
<td>25.6 kHz</td>
</tr>
<tr>
<td>2 Channel Mode</td>
<td>12.8 kHz</td>
</tr>
<tr>
<td>4 Channel Mode (option AY6 only)</td>
<td>6.4 kHz</td>
</tr>
</tbody>
</table>

### Measurement Rate

(Typical) (Preset, Fast Averaging)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Channel Mode</td>
<td>≥70 Averages/Second</td>
</tr>
<tr>
<td>2 Channel Mode</td>
<td>≥33 Averages/Second</td>
</tr>
<tr>
<td>4 Channel Mode (option AY6 only)</td>
<td>≥15 Averages/Second</td>
</tr>
</tbody>
</table>

### Display Update Rate

Typical (Preset, Fast Average OFF)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>≥5 Updates/Second</td>
</tr>
</tbody>
</table>

(Maximum & Fast Average Off, Single Channel, Single Display, Undisplayed Trace Displays set to Data Registers)

### Accuracy

±30 ppm (.003%)
FFT Dynamic Range

Spurious Free Dynamic Range 90 dB typical (<-80 dBfs)
(Includes Spurs, Harmonic Distortion, Intermodulation Distortion, Alias Products)
Excludes alias responses at extremes of span.
Source impedance = 50Ω.
800 Line Display.

Full Span FFT Noise Floor (typical)
Flat Top Window, 64 RMS Averages, 800 Line Display.

Harmonic Distortion
<-80 dBfs
Single Tone (in band), ≤ 0 dBfs

Intermodulation Distortion
<-80 dBfs
Two tones (in-band), each ≤ -6.02 dBfs

Spurious and Residual Responses
<-80 dBfs
Source impedance = 50Ω.

Frequency Alias Responses
Single Tone (out of displayed range), ≤ 0 dBfs, ≤ 1 MHz
(≤ 200 kHz with IEPE transducer power supply On)
2.5% to 97.5% of the Frequency Span ≤ -80 dBfs
Lower and Upper 2.5% of Frequency Span ≤ -65 dBfs

Input Noise
Input Noise Level
Flat Top Window, -51 dBVRms range
Source Impedance = 50Ω
Above 1280 Hz ≤ -140 dBVRms/√Hz
160 Hz to 1280 Hz ≤ -130 dBVRms/√Hz

Note: To calculate Noise as dB below Full Scale:
Noise [dBfs] = Noise [dB/√Hz] + 10LOG(NBW) - Range[dBVRms]; where NBW is the Noise Equivalent BW of the Window (see below).

<table>
<thead>
<tr>
<th>Window Parameters</th>
<th>Uniform</th>
<th>Hann</th>
<th>Flat Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3 dB Bandwidth*</td>
<td>0.125% of Span</td>
<td>0.185% of Span</td>
<td>0.450% of Span</td>
</tr>
<tr>
<td>Noise Equivalent Bandwidth*</td>
<td>0.125% of Span</td>
<td>0.1875% of Span</td>
<td>0.4775% of Span</td>
</tr>
<tr>
<td>Attenuation at ±1/2 Bin</td>
<td>4.0 dB</td>
<td>1.5 dB</td>
<td>0.01 dB</td>
</tr>
<tr>
<td>Shape Factor</td>
<td>716</td>
<td>9.1</td>
<td>2.6</td>
</tr>
<tr>
<td>(-60 dB BW/3 dB BW)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For 800 line displays. With 1600, 400, 200, or 100 line displays, multiply bandwidths by 0.5, 2, 4, and 8, respectively.

Single Channel Phase
Phase Accuracy Relative to ±4.0 deg
External Trigger
16 Time Averages
Center of Bin, DC Coupled
0 dBfs to -50 dBfs Only
0 Hz < freq ≤ 10.24 kHz Only

For Hann and Flat Top windows, phase is relative to a cosine wave at the center of the time record.
For the Uniform, Force, and Exponential windows, phase is relative to a cosine wave at the beginning of the time record.

Cross-Channel Amplitude
FFT Cross-Channel ±0.04 dB (0.46%)
Gain Accuracy

Frequency Response Mode
Same Amplitude Range
At Full Scale: Tested with 10 RMS
Ranges, and 100 RMS Averages on the -51 dBVRms Range

Cross-Channel Phase
Cross-Channel Phase Accuracy ±0.5 deg
(Same conditions as Cross-Channel Amplitude)
### Input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Ranges (full scale)</td>
<td>+27 dBVrms (31.7 Vpk) to -51 dBVrms (3.99 mVpk) in 2 dB steps</td>
</tr>
<tr>
<td>Maximum Input Levels</td>
<td>42 Vpk</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>1 MΩ ±10% (90 µF nominal)</td>
</tr>
<tr>
<td>Low Side to Chassis Impedance</td>
<td>1 MΩ ±30% (typical)</td>
</tr>
<tr>
<td>Floating Mode</td>
<td>&lt;0.010 µF</td>
</tr>
<tr>
<td>Grounded Mode</td>
<td>≤100Ω</td>
</tr>
<tr>
<td>AC Coupling Rolloff</td>
<td>&lt;3 dB rolloff at 1Hz</td>
</tr>
<tr>
<td>Common Mode Rejection Ratio</td>
<td>Single Tone at or below 1 kHz</td>
</tr>
<tr>
<td>-51 dBVrms to -11 dBVrms Ranges</td>
<td>&gt;75 dB typical</td>
</tr>
<tr>
<td>-9 dBVrms to +9 dBVrms Ranges</td>
<td>&gt;60 dB typical</td>
</tr>
<tr>
<td>+11 dBVrms to +27 dBVrms Ranges</td>
<td>&gt;50 dB typical</td>
</tr>
<tr>
<td>Common Mode Range (floating mode)</td>
<td>±4V pk</td>
</tr>
<tr>
<td>IEPE Transducer Power Supply</td>
<td>Current Source: 4.25 ± 1.5 mA, Open Circuit Voltage: +26 to +32 Vdc</td>
</tr>
<tr>
<td>A-Weight Filter</td>
<td>Conforms to ANSI Standard S1.4-1983; and to IEC 651-1979; 10 Hz to 25.6 kHz</td>
</tr>
<tr>
<td>Crosstalk</td>
<td>Between Input Channels, and Source-to-Input (Receiving Channel Source Impedance = 50Ω)</td>
</tr>
<tr>
<td>Time Domain</td>
<td>Specifications apply in Histogram/Time Mode, and unfiltered time display</td>
</tr>
<tr>
<td>DC Amplitude Accuracy</td>
<td>±5.0 %fs</td>
</tr>
<tr>
<td>Rise Time of -1V to 0V Test Pulse</td>
<td>&lt;11.4 µSec</td>
</tr>
<tr>
<td>Setting Time of -1V to 0V Test Pulse</td>
<td>&lt;16 µSec to 1%</td>
</tr>
<tr>
<td>Peak Overshoot of -1V to 0V Test Pulse</td>
<td>&lt;3%</td>
</tr>
<tr>
<td>Sampling Period</td>
<td>1 Channel Mode: 3.815 µSec to 2 Sec in 2x Steps, 2 Channel Mode: 7.629 µSec to 4 Sec in 2x Steps, 4 Channel Mode (Option AY6 Only): 15.26 µSec to 8 Sec in 2x Steps</td>
</tr>
</tbody>
</table>

### Trigger

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Modes</td>
<td>Internal, Source, External (analog setting) GPIB</td>
</tr>
<tr>
<td>Maximum Trigger Delay</td>
<td>Post Trigger: 8191 seconds, Pre Trigger: 8191 sample periods</td>
</tr>
<tr>
<td>No two channels can be further than ±7188 samples from each other.</td>
<td></td>
</tr>
<tr>
<td>External Trigger Max Input</td>
<td>±42 Vpk</td>
</tr>
<tr>
<td>External Trigger Range</td>
<td>Low Range: -2V to +2V, High Range: -10V to +10V</td>
</tr>
<tr>
<td>External Trigger Resolution</td>
<td>Low Range: 15.7 mV, High Range: 78 mV</td>
</tr>
<tr>
<td>Tachometer</td>
<td>Pulses per Revolution: 0.5 to 2048, RPM: 5 ≤ RPM ≤ 491,519, RPM Accuracy: ±100 ppm (0.01%) (Typical)</td>
</tr>
<tr>
<td>Tach Level Range</td>
<td>Low Range: -4V to +4V, High Range: -20V to +20V</td>
</tr>
<tr>
<td>Tach Level Resolution</td>
<td>Low Range: 39 mV, High Range: 197 mV</td>
</tr>
<tr>
<td>Maximum Tach Input Level</td>
<td>±42 Vpk</td>
</tr>
<tr>
<td>Minimum Tach Pulse Width</td>
<td>600 nSec</td>
</tr>
<tr>
<td>Maximum Tach Pulse Rate</td>
<td>400 kHz (Typical)</td>
</tr>
<tr>
<td>Source Output</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td><strong>Source Types</strong></td>
<td>Sine, Random Noise, Chrip, Pink Noise, Burst</td>
</tr>
<tr>
<td><strong>Amplitude Range</strong></td>
<td>AC: ±5V peak*</td>
</tr>
<tr>
<td></td>
<td>DC: ±10V*</td>
</tr>
<tr>
<td></td>
<td>* $V_{acpk} +</td>
</tr>
<tr>
<td><strong>AC Amplitude Resolution</strong></td>
<td>Voltage &gt; 0.2 Vrms: 2.5 mVpeak</td>
</tr>
<tr>
<td></td>
<td>Voltage &lt; 0.2 Vrms: 0.25 mVpeak</td>
</tr>
<tr>
<td><strong>DC Offset Accuracy</strong></td>
<td>±15 mV ± 3% of (</td>
</tr>
<tr>
<td><strong>Pink Noise Adder</strong></td>
<td>Add 600 mV typical when using pink noise</td>
</tr>
<tr>
<td><strong>Output Impedance</strong></td>
<td>&lt; 5Ω</td>
</tr>
<tr>
<td><strong>Maximum Loading</strong></td>
<td>Current: ±20 mA peak</td>
</tr>
<tr>
<td></td>
<td>Capacitance: 0.01 µF</td>
</tr>
<tr>
<td><strong>Sine Amplitude Accuracy at 1 kHz</strong></td>
<td>±4% (0.34 dB) of setting</td>
</tr>
<tr>
<td>Rload &gt; 250Ω</td>
<td></td>
</tr>
<tr>
<td>0.1 Vpk to 5 Vpk</td>
<td></td>
</tr>
<tr>
<td><strong>Sine Flatness (relative to 1 kHz)</strong></td>
<td>±1 dB</td>
</tr>
<tr>
<td>0.1V to 5V peak</td>
<td></td>
</tr>
<tr>
<td><strong>Harmonic and Sub-Harmonic Distortion and Spurious Signals (In Band)</strong></td>
<td>0.1 Vpk to 5 Vpk Sine Wave</td>
</tr>
<tr>
<td>Fundamental &lt; 30 kHz</td>
<td>&lt; -60 dBc</td>
</tr>
<tr>
<td>Fundamental &gt; 30 kHz</td>
<td>&lt; -40 dBc</td>
</tr>
<tr>
<td><strong>Digital Interfaces</strong></td>
<td>Compatible with PC-style 101-key keyboard</td>
</tr>
<tr>
<td><strong>External Keyboard</strong></td>
<td>IEEE 488.1 (SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C1, C2, C3, C12, E2)</td>
</tr>
<tr>
<td><strong>GPIB</strong></td>
<td>IEEE 488.2-1987 Complies with SCPI 1992</td>
</tr>
<tr>
<td><strong>Data Transfer Rate</strong></td>
<td>&lt;45 mSec for a 401 point trace</td>
</tr>
<tr>
<td><strong>Serial Port</strong></td>
<td>REAL 64 Format</td>
</tr>
<tr>
<td><strong>Parallel Port</strong></td>
<td></td>
</tr>
<tr>
<td><strong>External VGA Port</strong></td>
<td></td>
</tr>
</tbody>
</table>
Computed Order Tracking - Option 1D0

Maximum Order x Maximum RPM ≤ 60

Online (Real Time)
- 1 Channel Mode: 25,600 Hz
- 2 Channel Mode: 12,800 Hz
- 4 Channel Mode: 6,400 Hz

Capture Playback
- 1 Channel Mode: 102,400 Hz
- 2 Channel Mode: 51,200 Hz
- 4 Channel Mode: 25,600 Hz

Number of Orders ≤ 200
- 5 ≤ RPM ≤ 491,519

Delta Order: 1/128 to 1/1

Resolution ≤ 400

Maximum RPM Ramp Rate: 1000 RPM / second real-time (typical)

1000 - 10,000 RPM Run Up
- Maximum Order: 10
- Delta Order: 0.1
- RPM Step: 30 (1 Channel), 60 (2 Channel), 120 (4 Channel)

Order Track Amplitude Accuracy ±1 dB (typical)

Real Time Octave Analysis - Option 1D1

Standards:
- Conforms to ANSI Standard S1.11 - 1986, Order 3, Type 1-D, Extended and Optional Frequency Ranges
- Conforms to IEC 651-1979 Type 0 Impulse, and ANSI S1.4

Frequency Ranges (at centers)

Online (Real Time):

<table>
<thead>
<tr>
<th>Octave</th>
<th>1/1 Channel</th>
<th>2 Channel</th>
<th>4 Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1 Octave</td>
<td>0.063 - 16 kHz</td>
<td>0.063 - 6 kHz</td>
<td>0.063 - 4 kHz</td>
</tr>
<tr>
<td>1/3 Octave</td>
<td>0.08 - 40 kHz</td>
<td>0.08 - 20 kHz</td>
<td>0.08 - 10 kHz</td>
</tr>
<tr>
<td>1/12 Octave</td>
<td>0.0997 - 12.338 kHz</td>
<td>0.0997 - 6.169 kHz</td>
<td>0.0997 - 3.084 kHz</td>
</tr>
</tbody>
</table>

Capture Playback:

<table>
<thead>
<tr>
<th>Octave</th>
<th>1/1 Channel</th>
<th>2 Channel</th>
<th>4 Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1 Octave</td>
<td>0.063 - 16 kHz</td>
<td>0.063 - 16 kHz</td>
<td>0.063 - 16 kHz</td>
</tr>
<tr>
<td>1/3 Octave</td>
<td>0.08 - 31.5 kHz</td>
<td>0.08 - 31.5 kHz</td>
<td>0.08 - 31.5 kHz</td>
</tr>
<tr>
<td>1/12 Octave</td>
<td>0.0997 - 49.35 kHz</td>
<td>0.0997 - 49.35 kHz</td>
<td>0.0997 - 49.35 kHz</td>
</tr>
</tbody>
</table>

One to 12 octaves can be measured and displayed.

1/1, 1/3-, and 1/12-octave true center frequencies related by the formula: f(i+1)/f(i) = 2^n(1/n); n=1, 3, or 12; Where 1000 Hz is the reference for 1/1, 1/3 Octave, and 1000*2^n(1/24) Hz is the reference for 1/12 octave. The marker returns the ANSI standard preferred frequencies.

Accuracy
- 1 Second Stable Average: ≤ ± 0.20 dB
- Readings are taken from the Linear Total Power Spectrum Bin.
- It is derived from sum of each filter.

Swept Sine Measurements - Option 1D2

Dynamic Range 130 dB

Tested with 11 dBVrms source level at: 100 mSec integration

Arbitrary Waveform Source - Option 1D4

Amplitude Range
- AC: ±5V peak*
- DC: ±10V*
*|Vacp+| |Vdc| ≤ 10V

Record Length
- # of Points = 2.56 x Lines of Resolution, or # of Complex Points = 1.28 x Lines of Resolution

DAC Resolution
- 0.2828 Vpk to 5 Vpk: 2.5 mV
- 0 Vpk to 0.2828 Vpk: 0.25 mV

Arbitrary Waveform Source - Option 1D5

Amplitude Range
- AC: ±5V peak*
- DC: ±10V*
*|Vacp+| |Vdc| ≤ 10V

Record Length
- # of Points = 2.56 x Lines of Resolution, or # of Complex Points = 1.28 x Lines of Resolution

DAC Resolution
- 0.2828 Vpk to 5 Vpk: 2.5 mV
- 0 Vpk to 0.2828 Vpk: 0.25 mV

Arbitrary Waveform Source - Option 1D6

Amplitude Range
- AC: ±5V peak*
- DC: ±10V*
*|Vacp+| |Vdc| ≤ 10V

Record Length
- # of Points = 2.56 x Lines of Resolution, or # of Complex Points = 1.28 x Lines of Resolution

DAC Resolution
- 0.2828 Vpk to 5 Vpk: 2.5 mV
- 0 Vpk to 0.2828 Vpk: 0.25 mV
General Specifications

Safety Standards
CSA Certified for Electronic Test and Measurement Equipment per CSA
C22.2, NO. 231
This product is designed for compliance to:
UL1244, Fourth Edition

EMI / RFI Standards
CISPR 11

Acoustic Power
LpA < 55 dB (Cooling Fan at High Speed Setting)
< 45 dB (Auto Speed Setting at 25 °C)

Fan Speed Settings of High, Automatic, and Off are available. The Fan Off setting can be enabled for a short period of time, except at higher ambient temperatures where the fan will stay on.

Environmental Operating Restrictions

<table>
<thead>
<tr>
<th>Operating</th>
<th>Disk In Drive</th>
<th>Operating: No Disk In Drive</th>
<th>Storage &amp; Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temp.</td>
<td>4 °C to 45 °C</td>
<td>0 °C to 55 °C</td>
<td>-40 °C to 70 °C</td>
</tr>
<tr>
<td>Relative Humidity (non-condensing)</td>
<td>20%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Minimum</td>
<td>80% at 32 °C</td>
<td>95% at 40 °C</td>
<td>95% at 50 °C</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.6 Grms</td>
<td>1.5 Grms</td>
<td>3.41 Grms</td>
</tr>
<tr>
<td>Vibration (5 - 500 Hz)</td>
<td>5G (10 mSec 1/2 sine)</td>
<td>5G (10 mSec 1/2 sine)</td>
<td>40G (3 mSec 1/2 sine)</td>
</tr>
<tr>
<td>Shock</td>
<td>4600 meters (15,000 ft.)</td>
<td>4600 meters (15,000 ft.)</td>
<td>4600 meters (15,000 ft.)</td>
</tr>
</tbody>
</table>

AC Power
90 Vrms - 264 Vrms (47 - 440 Hz)
350 VA maximum

DC Power
12 VDC to 28 VDC Nominal
200 VA maximum

DC Current at 12V
standard: <10A typical
4 channel: <12A typical

Warm-Up Time
15 minutes

Weight
15 kg (33 lb) net
29 kg (64 lb) shipping

Dimensions
(Excluding Bail Handle and Impact Cover)
Height 190 mm (7.5")
Width 340 mm (13.4")
Depth 465 mm (18.3")

Abbreviations
dBVrms = dB relative to 1 Volt rms.
dBfs = dB relative to full scale amplitude range. Full scale is approx. 2 dB below ADC overload.

Typical = typical, non-warranted, performance specification included to provide general product information.

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