

Analog Generator & Analyzer

Level flatness

(generator & analyzer combined)

- 20 Hz – 20 kHz < ± 0.2 dB
- 100 Hz – 10 kHz < ± 0.1 dB

Analog Generator

<i>Generator type</i>	Multitone arbitrary
<i>No. of frequencies (bins) per signal</i>	1 – 31
<i>Sampling rate</i>	48 kHz
<i>Number of channels</i>	2 independent channels with individual levels
<i>Level range (balanced)</i>	–60 dBVp to +29 dBVp / 0.1 mVp to 28 Vp / –60.8 dBm to +28.1 dBm @ 600 Ω , sine signal (1-tone)
<i>Level setting resolution</i>	0.1 dB steps
<i>Variable binlevel dynamic range</i>	60 dB
<i>Level accuracy @ 1 kHz</i>	< ± 0.1 dB
<i>Level flatness</i>	
• 20 Hz – 20 kHz	< ± 0.2 dB
• 100 Hz – 10 kHz	< ± 0.1 dB
<i>Frequency range</i>	20 Hz – 20 kHz
<i>Frequency resolution</i>	5.85 Hz – 93.6 Hz (depending on blocklength)
<i>Frequency accuracy</i>	< ± 50 ppm
<i>Blocklength</i>	512, 1024, 2048, 4096, 8192
<i>Residual distortion</i>	< –86 dB
<i>Number of signal memories</i>	4 (stereo / dual-channel)
<i>Output impedances per channel, selectable</i>	150 Ω , 600 Ω
<i>Output impedance accuracy</i>	Return Loss ≥ 46 dB or 1% of resistor value

Absolute Maximum External Output Loading

Absolute maximum DC loading

- High/Low to GND ± 10 VDC
- High to Low ± 20 VDC

Absolute maximum AC loading

- High/Low to GND Not permissible
- High to Low Not permissible

Analog Analyzer

<i>Sampling rate</i>	48 kHz	
<i>Number of channels</i>	2 independent channels with individual input range	
<i>Level range</i>	-60 dBVp to +40 dBVp / 0.1 mVp to 100 Vp	
<i>Level accuracy @ 1 kHz</i>	< ±0.1 dB	
<i>Level flatness</i>		
• 20 Hz – 20 kHz	< ±0.2 dB	
• 100 Hz – 10 kHz	< ±0.1 dB	
<i>Level resolution at full scale</i>	20 bit	
<i>Bandwidth</i>	20 Hz – 20 kHz	
<i>Filters</i>	C-message weighting filter according to north american standard, CCITT psophometric weighting filter according to ITU O.41, A-weighting filter according to IEC 651, 750 µs De-emphasis filter	
<i>Measurement functions</i>	Level vs. frequency, Selective Level, Gain vs. frequency, Distortion vs. frequency, Noise vs. frequency, Phase vs. frequency and Crosstalk vs. frequency (measured simultaneously), MT-SINAD, Return Loss vs. frequency, Echo Return Loss, Frequency (full band or selective)	
<i>Residual distortion, level +25 dBVp to -10 dBVp</i>		
• THD+Noise (1-tone)	< -86 dB	
• MT-SINAD (3-tone)	> 86 dB (3-tone: 4969 Hz, 10031 Hz, 15000 Hz)	
<i>Residual noise</i>	< -100 dBV / 10 µV	
<i>Phase accuracy (interchannel)</i>	±1 deg @ 20 Hz – 20 kHz	
<i>Residual interchannel crosstalk @ level +25 dBVp to -20 dBVp</i>		
• 20 Hz – 10 kHz	< -80dB	
• 10 kHz – 20 kHz	< -75dB	
<i>Return loss (RL) @ reference impedances 600 Ω</i>	<i>Result range</i>	<i>Error limit</i>
	0 – 20 dB	< ±1 dB
	20 – 30 dB	< ±3 dB
<i>Internal frequency resolution</i>	<i>Blocklength</i>	<i>Frequency resolution</i>
	512	46.9 Hz
	1024	23.4 Hz
	2048	11.7 Hz
	4096	5.86 Hz
	8192	2.93 Hz
<i>Internal frequency accuracy</i>	±50 ppm	

Synchronization / trigger modes

- Internal with header (RT triggers to internally generated proprietary header signal)
- Internal without header (no header signal expected)
- External with header (RT triggers to internal generated signal from external signal source)
- Threshold (RT triggers to custom-defined input threshold level)

Frequency measurement accuracy of externally generated signal	Blocklength	Accuracy	Measurement range
	512	$\pm (0.4 \text{ Hz} + 25 \text{ ppm of } f_m^1)$	187.5 Hz – 19968.8 Hz
	1024	$\pm (0.2 \text{ Hz} + 25 \text{ ppm of } f_m)$	93.8 Hz – 19968.8 Hz
	2048	$\pm (0.1 \text{ Hz} + 25 \text{ ppm of } f_m)$	46.8 Hz – 19992.2 Hz
	4096	$\pm (0.05 \text{ Hz} + 25 \text{ ppm of } f_m)$	23.45 Hz – 19992.2 Hz
	8192	$\pm (0.025 \text{ Hz} + 25 \text{ ppm of } f_m)$	23.43 Hz – 19998.05 Hz

Input impedances per channel, selectable

100 k Ω , 600 Ω

Input impedance accuracy

- 100 k Ω , 600 Ω

Return Loss \geq 46dB or 1% of resistor value accuracy

Input impedance coupling

- 600 Ω
- 100 k Ω

DC coupled
AC coupled

Phantom power voltage

48 VDC or 15 VDC

Phantom voltage accuracy

$\pm 1 \text{ V}$

Phantom power inward resistance

- 48 V
- 15 V

6.8 k Ω
1.0 k Ω

Signal transmission time

260 ms – 960 ms (depending on blocklength)

Test cycle time @ blocklength 512, 3 signal bins

typ. 500 ms

Absolute maximum External Input Loading

Absolute maximum DC loading

- a) @ input impedance 100 k Ω
- High/Low to GND 120 VDC
 - High to Low 240 VDC
- b) @ input impedance 600 Ω , High/Low to GND or High to Low
- maximum DC loading 65 VDC

Absolute maximum AC loading

- a) @ input impedance 100 k Ω
- High/Low to GND 120 V_{RMS} (sine signal)
 - High to Low 240 V_{RMS} (sine signal)
- b) @ input impedance 600 Ω , High/Low to GND or High to Low
- maximum AC loading 65 V_{RMS}*

¹ f_m = measured frequency (example: 48kHz sampling rate, blocklength = 2048, f_m = 2100 Hz \Rightarrow accuracy = ± 0.1525 Hz)

* Example: 65 VAC \cong 38 dBm @ 600 Ω , sine signal

<i>Absolute max. AC + DC loading</i>	assuming the absolute max. AC + DC loading specifications are met
a) @ input impedance 100 k Ω	
• High/Low to GND	165 Vp
• High to Low	335 Vp
b) @ input impedance 600 Ω , High/Low to GND or High to Low	maximum loading 90 Vp

DTMF Generator

<i>DTMF availability</i>	Analog and digital mode
<i>DTMF tones (4 x 4 keys)</i>	1..9, *, 0, #, A – D
<i>Frequency deviation</i>	$\pm 5\%$ selectable in 0.01% steps
<i>Frequency accuracy</i>	± 25 ppm
<i>Amplitude ratio</i>	0.1 – 10 selectable
<i>DTMF tone length</i>	1 ms – 5000 ms selectable

DTMF Analyzer

<i>DTMF key recognition</i>	Analog
<i>Valid input signal levels</i>	maximum –20 dB below input range
<i>Freq. deviation acceptance</i>	$\pm 1.5\%$
<i>Tone duration acceptance</i>	minimum 50 ms
<i>Interdigit pause acceptance</i>	minimum 50 ms

Options

<i>XLR Adapter</i>	Hook-up box for input Banana connectors. Provides 2 pcs. XLR inputs, e.g. to connect a NTI measuring microphone.
<i>3382 measuring microphone</i>	Balanced ¼" omnidirectional measuring microphone 100 Hz – 10 kHz, flatness ± 2.5 dB, 15 V Phantom power required.
<i>3384 measuring microphone</i>	Balanced ½" omnidirectional measuring microphone 100 Hz – 10 kHz, flatness ± 1.0 dB, 48 V Phantom power required.
<i>NTI RS232 cable</i>	RS232 cable to operate RAPID-TEST from a PC or to download new firmware versions to the unit.

General

<i>Dimensions</i>	483 mm x 318 mm x 22 mm (19" x 12.5" x 3.5", i.e. 1 rack units high)
<i>Weight</i>	7 kg / 15.5 lbs.
<i>Remote control interfaces</i>	GPIB (IEEE-488.2) RS232 (38400 bps, 8 databits, 1 stopbit, no parity; protocol RTS/CTS; requires NTI RS232 cable)
<i>Software</i>	RT-EVAL evaluation software package National Instruments LabView© & LabWindows CVI drivers
<i>Power requirements</i>	100 / 120 / 230V, 50 / 60 Hz, 60 VA
<i>Calibration</i>	One (1) year recommend calibration interval
<i>Operating temperature</i>	5° - 45°C (40 – 110 F), R.H. < 90 % non condensing