

# 1510A

## Precision Signal/Function Generator



Portable signal source for calibrating electronic equipment and machinery monitoring systems

### Remarkable Functionality

- Signals - Voltage, Charge and Machinery Speed Signals
- Waveforms - SINE, SQUARE, TRIANGLE and PULSE from 0.1Hz to 100kHz in 0.1 Hz increments
- Automatic Thermal Compensation - ensuring accuracy in different environments from laboratory, control room to factory environments
- Jog Function - slowly vary the signal frequency to determine filter response or vary the signal amplitude in increments to determine system gain
- Low Voltage Bridge Simulation - easily command microvolts with its 24-bit closed loop control to simulate strain gauges
- High Accuracy - Voltage and charge signals with accuracies to 0.05%

### Applications

- Cabling and wiring troubleshooting
- Audio signal simulation
- Vibration signal simulation - accelerometers and velocity probes
- Machinery speed signal simulation
- Low-voltage bridge sensor signal simulation
- Calibration of:
  - Monitoring systems
  - Charge amplifiers
  - Avionics equipment

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# Technical Specifications

Waveform: Sine Wave	Channel A	Channel B Standard Signal Types <i>(for speed synthesizers signals, refer to table on the right)</i>
<b>Voltage Range</b> (0.1 Hz to 100 kHz)	0 to 9.9999 Volts pk	
<b>Voltage Accuracy (of setting, 10mV to 10V)</b> (1Hz to 20Hz)	0.15%±0.1mV	
(20Hz to 30kHz)	0.05%±0.1mV	
(30kHz to 50kHz)	0.07%±0.1mV	
(50kHz to 80kHz)	0.08%±0.1mV	
(80kHz to 100kHz)	0.10%±0.1mV	
<b>Charge Range</b> (1 Hz to 100 kHz)	1 to 9,999.9 pC pk	
<b>Charge Accuracy (of setting)</b> (10pC to 10,000pC, 10Hz to 30kHz)	0.20%±0.1pC	
<b>Resolution</b>	0.1mV	
<b>Level Types</b>	RMS, peak or pk-pk units	
<b>Frequency Range</b>	0.1 Hz - 99,999.9 Hz	
<i>Chan. B frequency can also be set and locked to any ratio of Chan.A.</i>		
<i>Refer to Speed synthesizer specifications.</i>		
<b>Distortion</b> (10 Hz to 50 kHz)	<0.5%	<0.75%
(50 kHz to 100 kHz)	<3.0%	
<b>Frequency Accuracy (of setting)</b> (3 Hz to 100 kHz)	±0.005%	
Variable phase (all waveform types)	0 to 360°	
<i>Chan A phase on any waveform type can be synchronized and locked to Chan B phase, at any phase setting 0-360°, Step 1°.</i>		
<i>In Sweep mode, Chan A &amp; Chan B can be swept together, preserving phase relationship.</i>		

Waveform: Square Wave		
<b>Voltage Range</b>	0 to 9.9999 Volts pk	
<b>Charge Range</b>	0 to 9,999.9 pC pk	
<b>Resolution (voltage &amp; charge)</b>	0.1mV or 0.1 pC	
<b>Level Types</b>	RMS, peak or pk-pk units	
<b>Frequency Range</b>	0.1 Hz - 20 kHz	
<b>Frequency Accuracy (of setting)</b> (3 Hz to 100 kHz)	±0.005%	
<b>Rise/Fall Time</b> (10% to 90%)	≤3.0 μsec.	
<b>Asymmetry</b>	Less than 3% at 10 kHz	
<b>Overshoot</b>	Less than 2%	
<b>Voltage Accuracy (of setting)</b>	0.1% typical, 0.25% max	

Waveform: Triangle Wave		
Waveform: Saw-Tooth Wave		
<b>Voltage Range</b>	0 to 9.9999 Volts pk	
<b>Charge Range</b>	0 to 9,999.9 pC pk	
<b>Resolution (voltage &amp; charge)</b>	0.1mV or 0.1 pC	
<b>Level Types</b>	RMS, peak or pk-pk units	
<b>Frequency Range</b>	0.1 Hz to 20 kHz	
<b>Frequency Accuracy (of setting)</b> (3 Hz to 100 kHz)	±0.005%	
<b>Voltage Accuracy (of setting)</b>	0.1% typical, 0.25% max	

Output Connectors		
<b>Impedance</b>	50 ohms	
<b>Connector</b>	BNC coaxial	
<b>Differential Charge (DE)</b>	MS3102A-10SL-3P	
<b>Single-ended Charge (SE)</b>	50 Ohm 10-32 MicroDot coaxial	

DC Output (and DC offset)		
<b>Voltage Range</b>	±9.9999 VDC	
<b>Voltage Accuracy (of setting)</b>	0.05%±0.1mV	
<b>Resolution</b>	0.1 mV	
<i>DC voltage can be generated alone or simultaneously with AC signal to simulate offsets</i>		

Microvolt DC Output – Bridge Mode		
<b>Voltage Range</b>	±1 μvolt to ±99.999 mVDC	
<b>Voltage Accuracy (of setting)</b>	0.05% ±5 μvolt	
<b>Resolution</b>	0.1 μvolt	
<i>Bridge mode operates under 24-bit closed-loop control to ensure accuracy for testing of strain gage and other low-level bridge circuits.</i>		

Channel B Speed Synthesizers Signals	
<b>Ratio Speed Signal Function</b>	
<b>Signal Type</b>	Sine, Square, Single pulse, Odd Pulse
<b>Signal Range</b>	0 to 9.9999 Volts Pk
<b>Resolution</b>	0.1 mV
<b>Frequency Range (ratio)</b>	0.1 to 100X Chan A frequency, Step 0.1
<b>Units</b>	RMS, peak, or pk-pk

Single Pulse Signal Function	
<b>Signal Type</b>	1-cycle sine or ½ cycle square (TTL)
<b>Signal Range</b>	0 to 9.9999 Volts Pk
<b>Resolution</b>	0.1 mV
<b>Pulse Duty Cycle</b>	3% to 100%
<b>Frequency Range (ratio)</b>	0.1x to 100x Ch. A frequency, Step 0.1
<b>Frequency Range (fixed)</b>	1Hz to 100kHz
<b>Units</b>	RMS, peak, or pk-pk

Odd Pulse Signal Function	
<b>Odd Pulse Type</b>	Long or Short
<b>Odd Pulse Size</b>	0 to 999% of Base Pulse
<b>Number of Base Pulses between Odd Pulse</b>	1 - 100
<b>Frequency Range (ratio)</b>	0.1x to 100x Ch. A frequency, Step 0.1
<b>Frequency Range (fixed)</b>	1 Hz to 99,999.9 Hz
<b>Range</b>	0 to 9.9999 Volts Pk
<b>Resolution</b>	0.1 mV
<b>Voltage Units</b>	RMS, peak, or pk-pk
<b>Waveform</b>	Sine wave

Sweep Function (Channels A & B)	
<b>Sweep time</b>	1 to 999 sec (16.67 min)
<b>Sweep time Step</b>	1 Second
<b>User Controls</b>	Set START Frequency Set STOP Frequency Set SWEEP time (seconds) GO PAUSE CANCEL
<b>Channels</b>	A alone or A & B together
<i>Chan B can be swept synchronously with Chan A, if Chan B frequency is set to any Ratio of Chan A frequency.</i>	
<i>Phase between Chan A and Chan B is preserved during sweep.</i>	

Controls and Features	
<b>User Display</b>	Graphical, 128x64 pixel B&W transfective LCD white backlight
<b>Computer Port</b>	USB-A Connector USB 1.0 for remote control programming and calibration
<b>Battery Charger Port</b>	For battery charging and operation 115/230VAC power
<b>Key Pad Functions</b>	Numbers: 0 through 9 Function Keys (soft keys): 4 - functions change depending upon operating mode
<b>On/Off</b>	Momentary Hold "soft" button
<b>Set-Up Memory</b>	40 locations to save settings for all outputs and functions
<b>Memories (non-volatile)</b>	Save program setups - any combination of instrument settings
<b>Dimensions</b>	7.5"H x 4.25W x 2.25"D 19cm x 11cm x 5.7cm
<b>Power</b>	External charger operates from 115/230VAC, 50-60Hz Approx 5 watts. Battery Pack – NiMH, 2500mAh Size AA (Qty 4)

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