TELEDYNE LECROY
Everywhereyoulook™

WaveStation™ Function/Arbitrary Waveform Generators

Key Features

- High performance with 14-bit resolution, up to 500 MS/s sample rate and up to 512 kpts memory
- 2 channels on all models
- Large color display for easy waveform preview
- Over 40 built-in arbitrary waveforms
- Linear & Logarithmic sweeps and burst operation
- USB and GPIB connectivity
- Graphical waveform editing software for PC

With 5 basic signal types, and over 40 built-in arbitrary waveforms the WaveStation is a versatile waveform generator. A variety of modulation schemes, intuitive waveform editing software and remote control capabilities, enable versatile waveform generation of waveforms up to 160 MHz. The large color display and simple user interface make it easy to generate a wide range of waveforms.

High Performance and Signal Fidelity

High performance hardware enables WaveStation to create accurate stable waveforms. High sample rate and resolution combined with low jitter and harmonic distortion means waveforms seen on the display are accurately created and outputted by the hardware.

Connectivity and Communication

With standard USB and GPIB connectivity it is easy to control WaveStation remotely or integrate it in to a test system. All necessary I/O for synchronization can be accessed on the rear panel. A front panel USB port provides an easy way to save waveforms.

Extensive Waveform Library

Easily create basic sine, square, ramp, pulse, and noise waveforms. In addition, access over 40 advanced arbitrary waveforms preloaded on WaveStation. Edit waveforms using the WaveStation PC software with point-by-point manual waveform design or waveform drawing tools. Use digital filtering tools for advanced waveform creation.

Simple, Fast Waveform Creation

The intuitive front panel provides easy access to waveforms, modulation and operating modes. The large display shows all relevant waveform parameters and waveform shape. Included PC software provides a graphical interface for quickly modifying waveforms with point-by-point editing, digital filtering and waveform drawing tools.

POWERFUL COMBINATION OF PERFORMANCE AND FLEXIBILITY

1. Dual Output
Two synchronous outputs for additional waveform flexibility and ability to create differential waveforms.

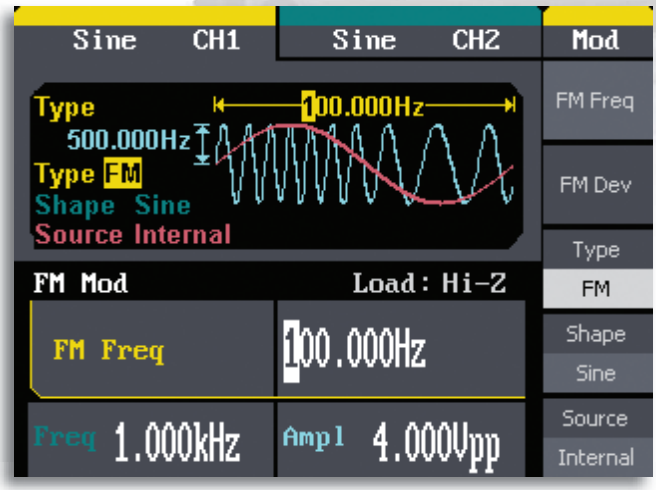
2. Color Display
Large display provides a single view to see waveform preview, parameters and menus with a single glance.

3. Waveform Preview
Helpful display provides preview of the waveform to be generated.

4. USB Connectivity
Front panel USB port to quickly save and transfer waveforms.

5. Display Menu
Quick access to various parameters with one touch to soft button on the front panel.

Variety of Modulation Schemes
Built-in modulation capabilities include AM, PM, FM, ASK, PSK and FSK. View the modulated waveform on the display and see how it changes when varying output frequency, carrier waveform or modulation type.



6. On-Screen Parameter Readout

View all relevant parameters at the same time on a single screen.

7. Quick Waveform Access

Dedicated, backlit buttons for quick access to the most common waveforms.

8. Easy to Use Front Panel

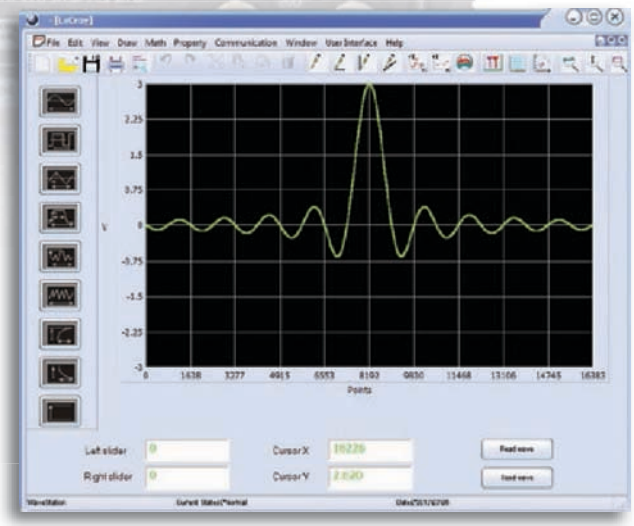
Intuitive front panel allows for quick waveform parameter entry and editing.

9. Adjustable Handle

Easily adjust handle for easy transport, optimal viewing and comfortable use.

10. Connectivity

All necessary I/O for synchronization can be accessed from rear panel.



Graphical Waveform Creation

Easily create and edit waveforms on the PC with mathematical operations, filters, and point-by-point editing or draw a waveform with a mouse. Transfer waveforms to WaveStation over USB and view it on the large display. Additionally, connecting a WaveAce oscilloscope to the same PC enables seamless transfer of real world signals from oscilloscope to the WaveStation.

SPECIFICATIONS

	WaveStation 2012	WaveStation 2022	WaveStation 2052	WaveStation 3082	WaveStation 3122	WaveStation 3162
Bandwidth	10 MHz	25 MHz	50 MHz	80 MHz	120 MHz	160 MHz
Channels	2					
Waveforms	Sine, Square, Ramp, Pulse, Noise, Arbitrary: Stairup, Stairdown, Positive Pulse, Negative Pulse, Up Ramp, Down Ramp, Sinc, Gaussian, LogFall, LogRise, Sqrt, TwoTone, etc					

Waveform Characteristics

Sine						
Frequency Range	1 µHz - 10 MHz	1 µHz - 25 MHz	1 µHz - 50 MHz	1 µHz - 80 MHz	1 µHz - 120 MHz	1 µHz - 160 MHz
Harmonic Distortion	CH1 / CH2					
DC - 1 MHz	-60 dBc			< -56 dBc		
1 MHz - 5 MHz	-53 dBc			< -46 dBc		
5 MHz -10 MHz	NA			< -46 dBc		
10 MHz - 25 MHz	-35 dBc			< -35 dBc		
25 MHz - 50 MHz	-32 dBc			< -35 dBc		
50 MHz -100 MHz	NA			< -35 dBc		
100 MHz - 160 MHz	NA			< -26 dBc		
Total Harmonic Waveform Distortion	DC - 20 kHz, 1 Vpp < 0.2%			DC - 20 KHz, 1 Vpp < 0.2%		
Spurious Signal (Non-harmonic)	DC - 1 MHz, < -70 dBc			DC - 160 MHz, < -70 dBc + 20 dB / decade		
Spurious Signal (Non-harmonic)	1 MHz - 10 MHz, < -70 dBc + 6 dB / spectrum phase			DC - 160 MHz, < -70 dBc + 20 dB / decade		
Phase Noise	10 kHz Offset, -108 dBc / Hz (typical value)			100 kHz Offset, -116 dBc / Hz (typical value)		
Square						
Frequency Range	1 µHz - 10 MHz	1 µHz - 25 MHz		1 µHz - 50 MHz		
Duty Cycle Range	20% - 80%	1 uHz - 10 MHz, 20% - 80% 10 MHz - 20 MHz, 40% - 60% 20 MHz - 25 MHz, 50%		≤10 MHz, 20% - 80% 10 MHz - 40 MHz, 40 - 60% 40 MHz - 50 MHz, 50%		
Rise / Fall Time	<12 ns (10% - 90%)			< 6 ns (10% - 90%)		
Overshoot	< 5% (typical, 1 kHz, 1 Vpp)			< 3 %		
Asymmetric (50% Duty Cycle)	1% of period + 20 ns (typical, 1 kHz, 1 Vpp)			1% of period + 5 ns (typical, 1 kHz, 1 Vpp)		
Jitter	0.4% of period (typical, 1 kHz, 1 Vpp)			DC - 1 MHz, ≤ 200 ps ± 2 ppm 1 MHz - 50 MHz, ≤ 500 ps		
Pulse						
Frequency Range	500 µHz - 5 MHz			1 µHz - 40 MHz		
Duty Cycle Range	0.1 % resolution			0.0001% resolution		
Rise / Fall Time	7 ns (10% - 90% typical 1 kHz, 1 Vpp)			6 ns ~ 6 s, 100 ps resolution		
Pulse Width	1800 s max 16 ns min 1 ns resolution			1,000,000 s max 25 ns min ≥ 12 ns, 100 ps resolution		
Overshoot	< 5%			< 3%		
Jitter	8 ns (pk - pk)			DC - 1 MHz, ≤ 200 ps ± 2 ppm 1 MHz - 50 MHz, ≤ 500 ps		
Triangle/Ramp						
Frequency Range	1 µHz - 300 kHz			1 µHz - 4 MHz		
Ramp Symmetry	0% - 100%					
Linearity	< 0.1% of peak value output (typical, 1 kHz, 1 Vpp, 100% symmetric)					
Arbitrary Waveforms						
Frequency Range	1 µHz - 5 MHz			1 µHz - 40 MHz		
Waveform Length	16 kpts / Ch			Ch1: 16 Kpts Ch2: 16 Kpts or 512 Kpts		
Vertical Resolution	14 bits					
Sample Rate	125 MS/s			500 MS/s		
Min. Rise / Fall time	7 ns (typical)			6 ns		
Jitter (pk - pk)	8 ns (typical)			DC - 40 MHz, ≤ 2.1 ns ± 10 ppm		
Storage in Non-volatile RAM memory	10 waveforms			8 waveforms @ 512 kpts; 24 waveforms @ 16 kpts		

SPECIFICATIONS

	WaveStation 2012	WaveStation 2022	WaveStation 2052	WaveStation 3082	WaveStation 3122	WaveStation 3162
Modulation, Sweep, Burst Capabilities						
Amplitude Modulation						
Source	Internal / External					
Carrier	Sine, Square, Ramp, Arbitrary (except DC)					
Modulation Waveform	Sine, Square, Ramp, Arbitrary (2 mHz - 20 kHz)			50% duty-cycle square waveform (1 mHz - 50 kHz)		
Modulation Depth	0% - 120%					
Modulation Resolution	0.1%			1 mHz		
Modulating Waveform Sample Clock @ Max Sampling Rate	3.90625 MHz					
Memory Size	4 k x 12 bit					
Frequency Modulation						
Source	Internal / External					
Carrier	Sine, Square, Ramp, Arbitrary (except DC)					
Modulation Waveform	Sine, Square, Ramp, Arbitrary (2 mHz - 20 kHz)			50% duty-cycle square waveform (1 mHz - 50 kHz)		
Frequency Deviation	0 - .5 * BW, 10 uHz resolution			0 - .5* BW, 1 mHz resolution		
Phase Deviation	0 - 360 deg, .1 deg resolution					
Frequency Resolution	1 mHz					
FSK Modulation						
Source	Internal / External					
Carrier	Sine, Square, Ramp, Arbitrary (except DC)					
Modulation Waveform	50% duty-cycle square waveform (2 mHz - 50 kHz)			50% duty-cycle square waveform (1 mHz - 1 MHz)		
ASK Modulation						
Source	Internal / External					
Carrier	Sine, Square, Ramp, Arbitrary (except DC)					
Modulation Waveform	50% duty-cycle square waveform (2 mHz - 50 kHz)			50% duty-cycle square waveform (1 mHz - 1 MHz)		
PWM Modulation						
Source	Internal / External					
Frequency	2 mHz - 20 MHz			1 mHz - 50 kHz		
Modulation Waveform	Sine, Square, Ramp, Arbitrary (except DC)					
External Modulation	-6 V to +6 V (max without deviation)			-4.5 V to +4.5 V max (max with deviation)		
Duty Cycle Modulating Frequency	2 mHz - 20 kHz			2 mHz - 50 kHz		
Duty Cycle Deviation	0% to 100% of Pulse Width, 0.1% resolution			100%*DutyCycle - 15 ns.		
Sweep						
Carrier	Sine, Square, Ramp, Arbitrary (except DC)					
Type	Linear / Logarithmic					
Direction	Up / Down					
Sweep Time	1 ms - 500 s			1 ms - 500 s ± 0.1%		
Trigger Source	Manual, External, Internal					
Sweep Range @ Max Sample Rate	1 uHz to Bandwith frequency @ 125 MS/s			1 uHz to Bandwidth frequency @ 500 MS/s		
Burst						
Waveform	Sine, Square, Ramp, Pulse and Noise, Arbitrary (except DC)					
Type	Count (1 - 50,000 Periods, Infinite, Gated)			Count (1 - 1,000,000 Periods) Infinite, Gated		
Start / Stop Phrase	0° - 360°					
Internal Period	1 µs - 500 s			1 us - 1000 s		
Gated Source	External Trigger					
Trigger Source	Manual, External or Internal					

SPECIFICATIONS

	WaveStation 2012	WaveStation 2022	WaveStation 2052	WaveStation 3082	WaveStation 3122	WaveStation 3162
Channel Characteristics						
Output Connector	BNC					
Output Impedance	50 Ω, High Impedance					
External Clock						
Input Connector	BNC					
Frequency Range	10 MHz ± 100 Hz			10 MHz ± 1 kHz		
Min Input Voltage Swing	Input voltage swing range: 3.3 Vpp - 5.5 Vpp			2.3 V		
Sync Output						
Voltage Level	TTL compatible			VOH (min) > 4.5 V, VOL (max) < 0.5 V; (IOL / IOH = 8 mA)		
Pulse Width	> 50 ns, not adjustable					
Output Impedance	50 Ω (typical)					
Maximum Frequency	2 MHz			10 MHz		
Trigger Output						
Voltage Level	TTL compatible			CMOS compatible		
Pulse Width	> 400 ns			> 60 ns		
Output Impedance	50 Ω (typical)					
Maximum Frequency	1 MHz					
Output Connector	Through Rear Panel Ext Trig / Gate / FSK / Burst					
External Trigger						
Trigger Input Level	TTL compatible *Note: The external input voltage can't be over ±6 V, otherwise instrument gets damaged*			CMOS compatible		
Trigger Slope	Up or down (optional)					
Trigger Pulse Width	> 100 ns			> 50 ns		
Trigger Input Impedance	> 5 kΩ, DC coupling					
External Modulation	±6 V = 100% modulation > 5 kΩ input impedance			±(4.5 ~ 5)V = 100% modulation >10 kΩ input impedance		
External Trigger	TTL compatible			CMOS compatible		
Max. Voltage Input	Note: The external input voltage can't be over ±6 V, otherwise instrument gets damaged			Input: 0 - 5 V		
Assignable to Both Channels 1 or 2, 1 AND 2	Ext Trig in: Assignment Channel 1, Channel 2 or Both Ext Trig out: Assignment Channel 1 or Channel 2					
Max Frequency	Ext Trig in: 1 MHz Ext Trig out: 1 MHz			External Trig out: 1 MHz		
Input Latency	< 300 ns			Ch1 - 366 ± 30 nS CH2 - 386 ± 30 nS		
Polarity Selectable	Selectable, rising edge and falling edge					
General Characteristics						
Standard Interface	USB Host, USB Device and GPIB (IEEE 488)					
Front Panel Connectors	Output BNC and USB host					
Rear Panel Connectors	BNC and USB device					
State on Power On/Off	Selectable factory default / last state					
Frequency Accuracy	Within 90 days ± 50 ppm within 1 year ±100 ppm 18° C ~ 28° C			±1 ppm / year		
Temperature Coefficient	< 5 ppm / °C			±1 ppm, 0° C ~ 55° C		

	WaveStation 2012	WaveStation 2022	WaveStation 2052	WaveStation 3082	WaveStation 3122	WaveStation 3162
General Characteristics (cont'd)						
Output						
Amplitude - CH1	2 mVpp - 3 Vpp (50 Ω) 4 mVpp - 6 Vpp (high impedance)			DC - < 40 MHz: 1 mVpp - 10 Vpp (50 Ω) 40 MHz - < 100 MHz: 1 mVpp - 5 Vpp (50 Ω) 100 MHz - < 130 MHz: 1 mVpp - 1.5 Vpp (50 Ω) 130 MHz - 160 MHz: 1 mVpp - 1.5 Vpp (50 Ω) DC - < 40 MHz: 1 mVpp - 20 Vpp (Hi Z) 40 MHz - < 100 MHz: 1 mVpp - 10 Vpp (Hi Z) 100 MHz - < 130 MHz: 1 mVpp - 2.7 Vpp (Hi Z) 130 MHz - 160 MHz: 1 mVpp - 2.2 Vpp (Hi Z)		
Amplitude - CH2	2 mVpp - 10 Vpp (50 Ω, ≤ 10 MHz) 2 mVpp - 5 Vpp (50 Ω, > 10 MHz) 4 mVpp - 20 Vpp (high impedance, ≤ 10 MHz) 4 mVpp - 10 Vpp (high impedance, > 10 MHz)			DC - < 40 MHz: 1 mVpp - 10 Vpp (50 Ω) 40 MHz - < 100 MHz: 1 mVpp - 5 Vpp (50 Ω) 100 MHz - < 130 MHz: 1 mVpp - 1.5 Vpp (50 Ω) 130 MHz - 160 MHz: 1 mVpp - 1.5 Vpp (50 Ω) DC - < 40 MHz: 1 mVpp - 20 Vpp (Hi Z) 40 MHz - < 100 MHz: 1 mVpp - 10 Vpp (Hi Z) 100 MHz - < 130 MHz: 1 mVpp - 2.7 Vpp (Hi Z) 130 MHz - 160 MHz: 1 mVpp - 2.2 Vpp (Hi Z)		
Amplitude Resolution	1 mV					
Vertical Accuracy (Compared to 100 kHz sine)	15° C to 40° C, ≤ 40 MHz: ± (2 mV + 0.4 dB) Less than 15° C, > 40 MHz: ± (2 mV + 0.65 dB)			± (0.5 dB+1.5 mV)		
Amplitude Flatness (Compared to 100 kHz sine, 5 Vpp)	10° C to 35° C: ± 0.45 dB All other cases: ± 0.9 dB			≤ 10 MHz ± 0.1 dB ≤ 80 MHz ± 0.2 dB ≤ 160 MHz ± 0.3 dB		
Cross Talk	< -70 dBc			< -60 dB		
Output Current Max - Ch 1 only	± 60 mA			± 200 mA		
Output Current Max - Ch 2 only	± 200 mA			± 200 mA		
Output Connector	BNC					
DC Offset						
Range DC - CH1	± 1.5 V (50 Ω) ± 3 V (high impedance)			± 5 V (50 Ω) ± 10 V (high impedance)		
Range (DC) - Ch2	± 5 V (50 Ω) ±10 V (high impedance)					
Offset Accuracy	±(|setting offset value|*1% + 3 mV)			±(|setting offset value|*1% + 2 mV)		
Resolution	1 mV			0 .1 mV		
Waveform Output						
Impedance	50 Ω (typical), High Z					
Protection	short-circuit protection					
Display						
Characteristics	3.5 inch TFT-LCD, 320 x 240, RGB			4.3 inch TFT-LCD, 480 x 272, RGB		
Physical Characteristics						
Dimensions (H x W x D)	105 mm x 229 mm x 281 mm (4.1" x 9.0" x 11.1")			105 mm x 261 mm x 344 mm (4.1" x 10.3" x 13.5")		
Weight	2.6 kg (5.7 lbs)			2.8 kg (6.1 lbs)		
Power						
Voltage	100 - 240 V_{rms} (± 10%), 50 / 60 Hz 100 - 120 V_{rms} (± 10%), 400 Hz					
Consumption (nominal)	50 W Max					
Environment						
Temperature - Operating	0° C to 40° C					
Temperature - Storage	-20° C to 60° C					
Humidity Range - Operating	5% to 90% relative humidity (non-condensing) up to +30° C Upper limit derates to 50% relative humidity (non-condensing) at +40° C					
Humidity Range - Non-operating	5% to 95% relative humidity (non-condensing) as tested per MIL-PRF-28800F					
Altitude - Operating	3,048 m (10,000 ft) max at ≤ 30° C					
Altitude - Non-operating	Up to 15,000 meters (49,200 ft)					
Compliance						
Certifications	CE Compliant, UL and cUL listed. Conforms to EN 61326-1, EN 61010-1, UL 61010-1 3rd edition, and CSA C22.2 No. 61010-1-12					

ORDERING INFORMATION

Product Description	Product Code
WaveStation Function/Arbitrary Waveform Generators	
10 MHz, 2 Ch, 14 bit, 125 MS/s Function/Arbitrary Waveform Generator	WaveStation 2012
25 MHz, 2 Ch, 14 bit, 125 MS/s Function/Arbitrary Waveform Generator	WaveStation 2022
50 MHz, 2 Ch, 14 bit, 125 MS/s Function/Arbitrary Waveform Generator	WaveStation 2052
80 MHz, 2 Ch, 14 bit, 500 MS/s Function/Arbitrary Waveform Generator	WaveStation 3082
120 MHz, 2 Ch, 14 bit, 500 MS/s Function/Arbitrary Waveform Generator	WaveStation 3122
160 MHz, 2 Ch, 14 bit, 500 MS/s Function/Arbitrary Waveform Generator	WaveStation 3162

Product Description	Product Code
Included with Standard Configuration	
Power Cable for the Destination Country	
USB 2.0 Cable Type A to B (Black, 1 m)	
USB to GPIB Converter	
Getting Started Manual	
Performance Certificate	
Declaration of Conformity	
WaveStation PC Software CD	
Product Registration Card	
Accessories	
Rack Mount Kit for WaveStation 2000 / 3000	WSTA-RACK

Customer Service

Teledyne LeCroy instruments are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our waveform generators are fully warranted for three years.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

For more information, please contact:

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1-800-5-LeCroy
teledynelecroy.com

**Local sales offices are located throughout the world.
Visit our website to find the most convenient location.**