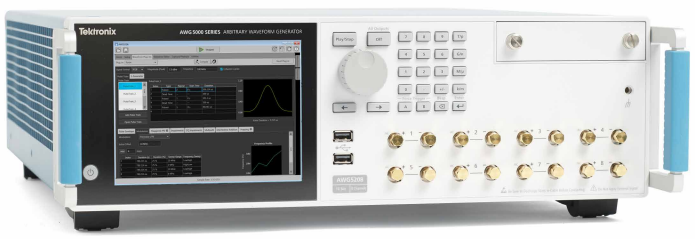
Arbitrary Waveform Generators

AWG5200 Series Datasheet



The AWG5200 Series arbitrary waveform generator (AWG) leads the way in signal generation by enabling bleeding-edge innovation for engineers and researchers. The AWG5200 Series of AWGs delivers unparalleled signal fidelity coupled with class-leading sample rate and memory depth, giving you the industry's best signal stimulus solution for complex RF baseband signal generation and precision experimental applications. With up to 5 GS/s sample rate (10 GS/s with interpolation) and 16-bit vertical resolution, the AWG5200 Series offers easy generation of complex signals as well as accurate playback of existing captured signals.

Key performance specifications

- Sample rates up to 10 GS/s (with 2x interpolation)
- 2, 4, and 8 channel configurations
- -70 dBc spurious free dynamic range
- 16 bits vertical resolution
- 2 GSample waveform memory per channel

Key features

- Complete solution for complex RF signal generation in a single box
  - Direct generation of signals with carriers up to 4 GHz, removing the need for external RF conversion
- Simulate real-world analog effects on high speed digital data streams
- Generate high precision RF signals
  - Spurious Free Dynamic Range performance better than -70 dBc
- Create long complex waveforms without compromising bandwidth
  - Up to 2 GSamples of Waveform Memory plays 400 ms of data at 5 GS/s and 800 ms of data at 2.5 GS/s
- Synchronize multiple units to achieve a multi-channel high speed AWG system
- Fully operational without external PC
  - Built-in display and buttons make it possible to quickly select, edit, play waveforms and trigger on events directly from the AWG front panel
- Simulate real-world environments by playing back captured signals
  - Waveforms captured with Oscilloscopes or Real-Time Spectrum Analyzers can be played back, edited or re-sampled on the AWG
- Smooth transition from simulation to the real-world testing environment
  - Waveform vectors imported from third-party tools such as MATLAB

Applications

- RF/MW waveform generation for communications and defense electronics testing and development
  - Output RF signals directly up to 4 GHz
- Leading edge research in electronics, physics & chemistry
  - High speed, low jitter signal source generates uniquely specified analog signals, fast pulses, data streams and clocks

Seamless transition from simulation to generation

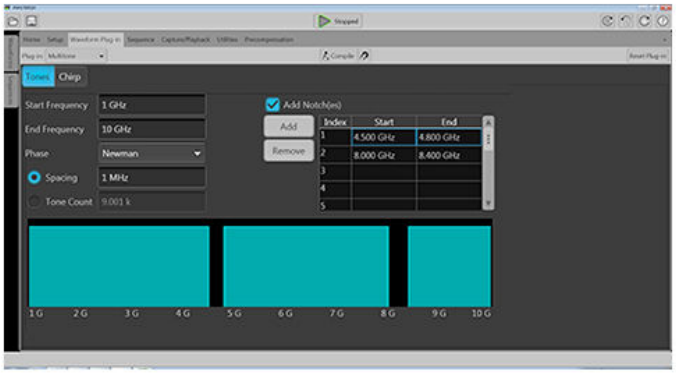
If a waveform can be defined or captured, then the AWG5200 can reproduce this signal. The creation of the waveform can happen in many ways. An extensive and growing library of waveform generation plugins which are optimized to work specifically with the Tektronix AWG family, provide specific waveform creation capabilities, while 3rd party solutions like MATLAB, Excel, or others, have the flexibility to create and import any waveform you desire. Waveforms created in any of these packages can be imported and played back in the AWG5200, seamlessly transitioning from the simulation world to the real world.

Advanced remote instrument control and waveform generation

The new SourceXpress platform brings all of your AWG instrument control and waveform generation capabilities to your Microsoft® Windows PC. Load waveforms, create sequences, and enable playback without ever having to touch an AWG. All waveform creation plug-ins run natively on the SourceXpress platform, allowing you to quickly iterate through test signals without having to set foot in the lab.

RF signal generation

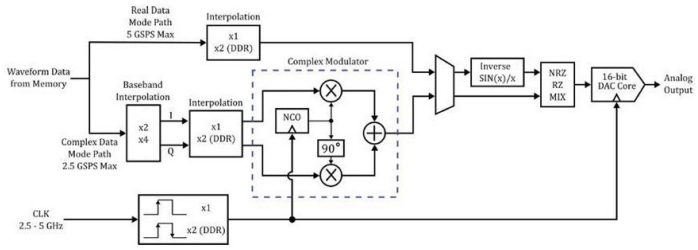
RF signals are becoming more and more complex, making it difficult for RF engineers to accurately create the signals required for conformance and margin testing. When combined with the RF Generic waveform creation plug-in, the AWG5200 Series can address these tough design challenges. The RF Generic plug-in is a software package that digitally synthesizes modulated baseband, IF, and RF signals taking signal generation to new levels by fully exploiting the advanced signal generation capabilities of the AWG5200 Series arbitrary waveform generators.



Built in digital IQ modulator

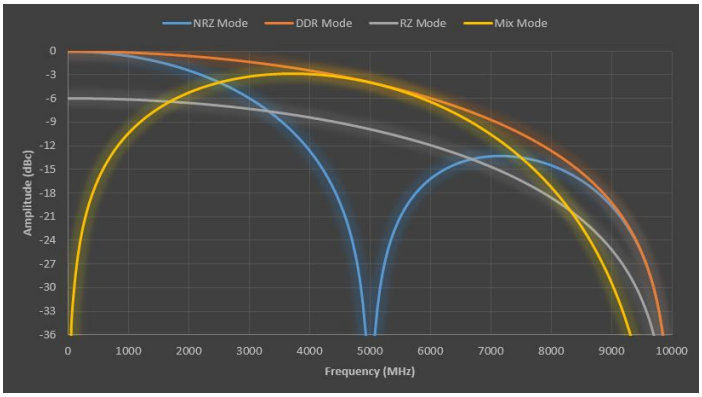
Reducing the size and cost for telecommunication and military systems is driving the evolution of modern DAC's to integrate more functionality into a single chip. Some of the more advanced high-speed DAC's also incorporate digital signal processing and conditioning functionalities such as digital interpolation, complex modulation, and numerically controlled oscillators (NCO). This enables direct generation of complex RF signals in an efficient and compact way.

The Tektronix AWG5200 series features a digital complex modulator and multi-rate interpolation. With this internal IQ modulation feature, you remove the IQ mismatches that are attributed to external modulators and mixers. Also with this modulator, there is no in-band carrier feed-through, and there are no images. With its built in interpolators, it also affords the ability to create waveforms most efficiently reducing waveform size and compilation times as well as extending playback time.



Several DAC modes available

With the AWG5200 DAC there are several modes that enable you to output your signal at the cleanest portion of the DAC BW and frequency roll off positions.



Environment signal generation

The mission-critical nature of many radar signals requires that they coexist with standards-based commercial signals sharing the same spectrum without performance degradation. To meet this expectation, a radar designer has to thoroughly test all the corner cases at the design/debug stage. The AWG5200 offers the extreme flexibility and precision needed to play back these worst-case scenarios.

Specifications

All specifications are typical unless noted otherwise. All specifications apply to all models unless noted otherwise.

Hardware characteristics

Number of analog outputs	
AWG5202	2
AWG5204	4
AWG5208	8
Analog output connector type	SMA female
Analog output impedance	50 Ω
Number of marker outputs	
AWG5202	8
AWG5204	16
AWG5208	32
Resolution (nominal)	16 bits with no markers active, 15 bits with 1 marker active, 14 bits with 2 markers active, 13 bits with 3 markers active, 12 bits with 4 markers active
Waveform memory	2 GS/channel
Waveform granularity	1 sample
Waveform minimum size	2400 samples
Run modes	
Continuous	Waveform is continuously repeated
Triggered	Waveform is output only once after a trigger is received
Triggered Continuous	Waveform is continuously repeated after a trigger is received
Gated	Waveform is continuously repeated while the trigger is enabled
Sample rate (nominal)	300 S/s to 5 GS/s (10 GS/s Interpolated - Double Data Rate)
Sin(x)/x (-3dB)	2.22 GHz @ 5 GS/s, 4.44 GHz Interpolated @ 10 GS/s

Computer characteristics

Operating system / peripherals / IO	Microsoft® Windows OS USB 2.0 compliant ports (2 front) USB 3.0 compliant Host ports (4 rear) USB 3.0 compliant Device port (1 rear) RJ-45 Ethernet connector (rear panel) supports 10/100/1000BASE-T VGA video (rear panel) for external monitor eSATA (rear panel)
Display characteristics	LED backlit touch screen display, 165 mm (6.5 in.) diagonal, 1024 × 768 XGA
Software driver for third-party applications	IVI-COM driver IVI-C driver

Analog output characteristics

Effective frequency output

Fmaximum (specified) is determined as "sample rate / oversampling rate" or "SR / 2.5".
2 GHz
4 GHz (Double Data Rate - DDR mode)

DC High Bandwidth output

Amplitude levels are measured as singled-ended outputs. Output doubles when using differential (both) outputs.

Amplitude range	25 mV_{p-p} to 0.75 V_{p-p} (single ended, 50 Ω terminated)
	50 mV_{p-p} to 1.5 V_{p-p} (differential mode, 100 Ω terminated)
Amplitude accuracy (guaranteed)	±2% of setting ≥ 100 mV_{p-p}
	±5% of setting < 100 mV_{p-p}
Offset	±2 V (50 Ω into gnd), ±4 V into DC voltage terminated
Offset accuracy	±(2% of |offset| + 10 mV); into 50 Ω to Gnd. (Common mode, guaranteed.)
	±25 mV; into 100 Ω differential. (Differential mode.)
Analog bandwidth	At 750 mV_{p-p}: DC to 2 GHz (3 dB), DC to 4 GHz (6 dB)
Rise/fall time	Rise/fall time measured at 20% to 80% levels.
	< 115 ps at 750 mV_{p-p} single-ended termination

DC High Bandwidth Amplified output (option)

Amplitude levels are measured as singled-ended outputs. Output doubles when using differential (both) outputs.

Amplitude range	25 mV_{p-p} to 1.5 V_{p-p} (single ended, 50 Ω terminated)
	50 mV_{p-p} to 3.0 V_{p-p} (differential mode, 100 Ω terminated)
Amplitude accuracy (guaranteed)	±2% of setting ≥ 100 mV_{p-p}
	±5% of setting < 100 mV_{p-p}
Offset	±2 V (50 Ω into gnd), ±4 V into DC voltage terminated
Offset accuracy	±(2% of |offset| + 10 mV); into 50 Ω to Gnd. (Common mode, guaranteed.)
	±25 mV; into 100 Ω differential. (Differential mode.)
Analog bandwidth	At 750 mV_{p-p}: DC to 2 GHz (3 dB), DC to 4 GHz (6 dB)
	At 1.5 V_{p-p}: DC to 1.3 GHz (3 dB)
Rise/fall time	Rise/fall time measured at 20% to 80% levels.
	< 180 ps at 1.5 V_{p-p} single-ended

DC High Voltage output

Amplitude levels are measured as singled-ended outputs. Output doubles when using differential (both) outputs.

Amplitude range	10 mV_{p-p} to 5.0 V_{p-p} (single ended, 50 Ω terminated)
	20 mV_{p-p} to 10.0 V_{p-p} (differential mode, 100 Ω terminated)
Amplitude accuracy (guaranteed)	±2% of amplitude ≥ 160 mV_{p-p}
	±5% of amplitude < 160 mV_{p-p}
Offset	±2 V (50 Ω into gnd), ±4 V into high resistance or matching voltage terminated
Offset accuracy	±(2% of |offset| + 1% of amplitude + 20 mV). (50 Ω-to-Gnd) (Common mode guaranteed.)
	± 88 mV; into 100 Ω. (Differential mode.)
Analog bandwidth	DC – 370 MHz (3 dB) (at 2 V_{p-p}) DC – 200 MHz (3 dB) (at 4 V_{p-p})
Rise/fall time	Rise/fall time measured at 20% to 80% levels.
	< 1.3 ns, at 5 V_{p-p} single-ended.
	< 1.1 ns, at 4 V_{p-p} single-ended.
	< 0.8 ns, at 3 V_{p-p} single-ended.
	< 0.6 ns, at 2 V_{p-p} single-ended.

AC Direct output

Amplitude levels are measured as singled-ended outputs.

Amplitude range	-17 dBm to -5 dBm
Amplitude accuracy	±0.5 dBm at 100 MHz
DC bias	±5 V at 150 mA
DC bias accuracy (guaranteed)	±(2% of bias + 20 mV); into an open circuit (zero load current)
Analog bandwidth	10 MHz - 2 GHz (-3 dB), 10 MHz - 4 GHz (-6 dB)

AC Amplified output (option)

Amplitude levels are measured as singled-ended outputs.

Amplitude range	-85 dBm to +10 dBm (10 MHz to 3.5 GHz)
	-50 dBm to +10 dBm (>3.5 GHz to 5 GHz)
Amplitude accuracy	±0.5 dBm at 100 MHz
DC bias	±5 V at 150 mA
DC bias accuracy (guaranteed)	±(2% of bias + 20 mV); into an open circuit (zero load current)
Analog bandwidth	10 MHz - 2 GHz (-3 dB), 10 MHz - 4 GHz (-6 dB)

Output match VSWR

Output path	Specification
DC High Bandwidth (including DCHB Amplified option)	DC to 1 GHz < 1.25:1 1 GHz to 3 GHz < 1.9:1 3 GHz to 4 GHz < 2.3:1
DC High Voltage	DC to 400 MHz < 1.6:1 400 MHz to 1 GHz < 1.75:1 1 GHz to 2 GHz < 2.3:1
AC Direct	10 MHz to 300 MHz < 2.0:1 300 MHz to 1.4 GHz < 1.6:1 1.4 GHz to 3 GHz < 2.2:1 3 GHz to 4 GHz < 2.5:1
AC Amplified, +3 dBm	10 MHz to 500 MHz < 2.4:1 500 MHz to 1.5 GHz < 1.75:1 1.5 GHz to 4 GHz < 1.9:1

Bit rate Bit rate determined as "sample rate / 4 points per cycle", allowing full impairment generation. 1.25 Gb/s at 5 GS/s

Channel timing characteristics

Skew

Channel to channel skew (DC high bandwidth mode only) ±25 ps

Skew adjust

- **Range** ±2 ns
- **Resolution** 250 fs

Sequencer characteristics

Sequencer

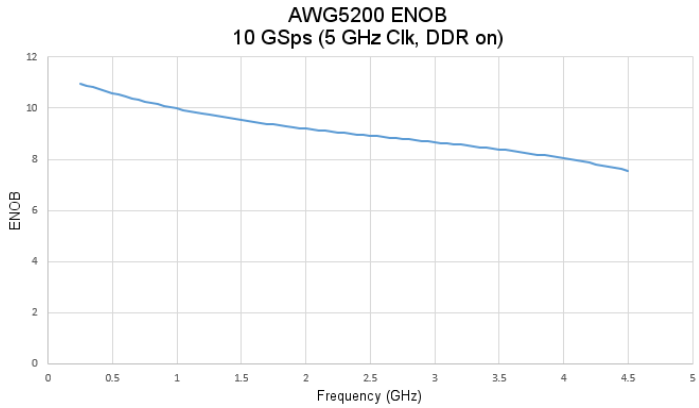
Maximum sequencing steps 16,384

Sub sequencing Single level of depth

Spurious Free Dynamic Range (SFDR) characteristics

ENOB

Effective number of bits (ENOB)



SFDR

SFDR characteristics

SFDR is determined as a function of the directly generated carrier frequency.

Harmonics not included. Measured with a balun and with output amplitude set to 500 mV.

DC High Bandwidth 500 mV_{pp}

2.5 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	–	–
	10 to <155 MHz	10 to <1250 MHz	–80 dBc	–	–
	155 to <1000 MHz	10 to <1000 MHz	–53 dBc	1000 to <1250 MHz	–60 dBc
	1000 to <1250 MHz	1000 to <1250 MHz	–50 dBc	10 to <1000 MHz	–50 dBc

5 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	1250 to <2500 MHz	–75 dBc
	10 to <310 MHz	10 to <1250 MHz	–80 dBc	1250 to <2500 MHz	–70 dBc
	310 to <1250 MHz	10 to <1250 MHz	–67 dBc	1250 to <2500 MHz	–64 dBc
	1250 to <2000 MHz	1250 to <2000 MHz	–53 dBc	10 to <1250 MHz	–38 dBc
		–	–	2000 to <2500 MHz	–58 dBc
	2000 to <2500 MHz	2000 to <2500 MHz	–33 dBc	10 to <2000 MHz	–31 dBc

10 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	1250 to <5000 MHz	–69 dBc
	10 to <625 MHz	10 to <1250 MHz	–74 dBc	1250 to <5000 MHz	–63 dBc
	625 to <1250 MHz	10 to <1250 MHz	–69 dBc	1250 to <5000 MHz	–59 dBc
	1250 to <2000 MHz	1250 to <2000 MHz	–63 dBc	10 to <1250 MHz	–60 dBc
		–	–	2000 to <5000 MHz	–54 dBc
	2000 to <3500 MHz	2000 to <3500 MHz	–50 dBc	10 to <2000 MHz	–47 dBc
		–	–	3500 to <5000 MHz	–50 dBc
	3500 to <4000 MHz	3500 to <4000 MHz	–53 dBc	10 to <3500 MHz	–43 dBc
		–	–	4000 to <5000 MHz	–54 dBc

AC Direct Out

–5.0 dBm. Harmonics not included. Measured at the maximum output amplitude.

2.5 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	–	–
	10 to <155 MHz	10 to <1250 MHz	–80 dBc	–	–
	155 to <1000 MHz	10 to <1000 MHz	–62 dBc	1000 to <1250 MHz	–66 dBc
	1000 to <1250 MHz	1000 to <1250 MHz	–60 dBc	10 to <1000 MHz	–62 dBc

5 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	1250 to <2500 MHz	–75 dBc
	10 to <310 MHz	10 to <1250 MHz	–80 dBc	1250 to <2500 MHz	–70 dBc
	310 to <1250 MHz	10 to <1250 MHz	–67 dBc	1250 to <2500 MHz	–60 dBc
	1250 to <2000 MHz	1250 to <2000 MHz	–58 dBc	10 to <1250 MHz	–55 dBc
		–	–	2000 to <2500 MHz	–60 dBc
	2000 to <2500 MHz	2000 to <2500 MHz	–62 dBc	10 to <2000 MHz	–51 dBc

10 GS/s		In band performance		Adjacent band performance	
	Analog channel output frequency	**Measured across**	**Specification**	**Measured across**	**Specification**
	100 MHz	10 to <1250 MHz	–80 dBc	1250 to <5000 MHz	–64 dBc
	10 to <625 MHz	10 to <1250 MHz	–78 dBc	1250 to <5000 MHz	–59 dBc
	625 to <1250 MHz	10 to <1250 MHz	–71 dBc	1250 to <5000 MHz	–57 dBc
	1250 to <2000 MHz	1250 to <2000 MHz	–67 dBc	10 to <1250 MHz	–60 dBc
		–	–	2000 to <5000 MHz	–55 dBc
	2000 to <3500 MHz	2000 to <3500 MHz	–52 dBc	10 to <2000 MHz	–48 dBc
		–	–	3500 to <5000 MHz	–56 dBc
	3500 to <4000 MHz	3500 to <4000 MHz	–55 dBc	10 to <3000 MHz	–41 dBc
		–	–	4000 to <5000 MHz	–58 dBc

Clock characteristics

Clock in

Connector SMA (rear panel)

Input impedance 50 Ω, AC coupled

Frequency range 2.5 GHz to 5 GHz

Input amplitude 0 dBm to +10 dBm

Clock output

Connector SMA on rear-panel

Output impedance 50 Ω AC Coupled

Frequency range 2.5 GHz to 5 GHz

Output amplitude +3 dBm to +10 dBm

Sampling clock

Resolution Up to 8 digits

Accuracy Dependent on reference frequency accuracy

Synchronization clock output

Frequency External clock output /32

Amplitude 0.85 V to 1.25 V_{p-p} into 50 Ω

Connector SMA (rear panel)

Impedance 50 Ω, AC coupled

Trigger in

Inputs 2 (A and B)

Polarity	Pos or Neg
Impedance	50 Ω, 1 kΩ
Input range	50 Ω: <5 V_{rms}
	1 kΩ: ±10 V
Connector	SMA (rear panel)

Threshold

Range	-5.0 V to 5.0 V
Resolution	0.1 V
Accuracy	±(5% +100 mV)

Trigger Delay to Analog Output

Synchronous	8275 / fclk + 30 ns ±20 ns

Synchronous Trigger Jitter

Synchronous mode	50 Ω or 1 kΩ
Frame synchronized	< 100 ps peak-to-peak

Trigger minimum pulse width	20 ns
Trigger hold-off (maximum)	2432/F_{CLK} + 20 ns
	506.4 ns at 5 GS/s
	992.8 ns at 2.5 GS/s

Reference in

Input amplitude	–5 dBm to +5 dBm
Fixed frequency range	10 MHz, ±40 Hz
Variable frequency range	35 MHz to 240 MHz
Connector	SMA (rear panel)
Impedance	50 Ω, AC coupled

10 MHz reference

Connector	SMA (rear panel)
Impedance	50 Ω, AC coupled
Amplitude	+4 dBm ±2 dBm
Frequency (guaranteed)	Within ±(1 ppm + Aging), Aging: ±1 ppm per year

Auxiliary outputs (Flags)

Number	AWG5202: 4 AWG5204: 4
	AWG5208: 8
Connector	SMB on rear-panel
Output amplitude	High 2.0 V into 50 Ω
	Low 0.7 V when sinking 10 mA

Output impedance	50 Ω

Markers

Number	AWG5202: Total of 8 (4 per channel) AWG5204: Total of 16 (4 per channel)
	AWG5208: Total of 32 (4 per channel)
Marker sample rate	2.5 GS/s to 5 GS/s
Minimum pulse width	400 ps
Max data rate	2.5 GS/s
Type	Single-ended
Connector	SMA (rear panel)
Impedance	50 Ω
Output into 50 Ω	Window: -0.5 V to 1.7 V Amplitude: 200 mV to 1.75 V
	Resolution: 100 µV
Rise time	(20% - 80%): 150 ps
Skew between markers of the same channel	<25 ps
Delay control	±2 ns
Random jitter	5 ps

Pattern jump

Pin assignments

Pin		Pin		Pin	
1	GND	6	GND	11	Jump bit 5, input
2	Jump bit 0, input	7	Strobe, input	12	Jump bit 6, input
3	Jump bit 1, input	8	GND	13	Jump bit 7, input
4	Jump bit 2, input	9	GND	14	GND
5	Jump bit 3, input	10	Jump bit 4, input	15	GND

Input impedance	1 kΩ pull-down to +5 VDC
Input levels	3.3 V LVC
	5 V TTL compliant
Number of destinations	256
Strobe polarity	Negative and positive edge (selectable)
Strobe Minimum Pulse Width	20 ns
Strobe Setup and Hold	Setup: 20 ns
	Hold: 20 ns

Waveform capability

Waveform import

Waveform file import capability	Import waveform format by series: .AWGX file created by Tektronix AWG5200/70000 Series
	.AWG file created by Tektronix AWG5000 or AWG7000 Series

.PAT and *.WFM file formats created by Tektronix AWG400/500/600/700 Series

.IQT file format created by Tektronix RSA3000 Series

.TIQ file format created by Tektronix RSA6000/5000 Series or MDO4000 Series

.WFM or *.ISF file formats created by Tektronix TDS/DPO/MSO/DSA Series

.TXT file format

.MAT Matlab file format

.SEQX file format created by Tektronix AWG5200 Series

.SEQ file format created by the Tektronix AWG400/500/600/700 Series

.TMP or .PRM file formats; Midas Blue (Data Type 1000/1001; Scalar and complex data; 8-,16-, 32-, and 64-bit integer and 32- and 64-bit float data format types)

Waveform export

Waveform file export capability	.WFMX file format, AWG5200/70000 series native format .WFM file format, AWG400/500/600/700 waveform file
	.TIQ file format, RSA6000 IQ Pair
	.TXT file format

Physical characteristics

Dimensions	
Height	153.6 mm (6.05 in)
Width	460.5 mm (18.13 in)
Depth	603 mm (23.76 in)
Weight	
AWG5202	44 lb (19.96 kg), 46.35 lb (21.02 kg) with packaging
AWG5204	45.45 lb (20.62 kg), 47.75 lb (21.66 kg) with packaging
AWG5208	50.7 lb (23 kg), 53 lb (24.04 kg) with packaging
Cooling clearance	
Top	0 in
Bottom	0 in
Left side	50 mm (2 in)
Right side	50 mm (2 in)
Rear	0 in
Power supply	
AC line input	100 to 240 V AC, 50/60 Hz
Consumption	750 Watts, maximum

EMC, Environment, Safety

Temperature	
Operating	0 ºC to +50 ºC (+32 ºF to +122 ºF)
Non-operating	-20 ºC to +60 ºC (-4 ºF to +140 ºF)

Humidity

Operating	5% to 90% relative humidity (% RH) at up to 30 °C 5% to 45% relative humidity above 30 °C up to 50 °C Non-condensing
Non-operating	5% to 90% relative humidity (% RH) at up to 30 °C 5% to 45% relative humidity above 30 °C up to 60 °C Non-condensing

Altitude

Operating	Up to 3,000 meters (9,843 feet) Derate maximum operating temperature by 1 °C per 300 meters above 1500 meters.
Nonoperating	Up to 12,000 meters (39,370 feet)

Mechanical shock

Operating	Half-sine mechanical shocks, 30 g peak, 11 ms duration, 3 drops in each direction of each axis.

Regulatory

Safety	UL61010-1, CAN/CSA-22.2, No.61010-1-04, EN61010-1, IEC61010-1
Emissions	EN55011 (Class A), IEC61000-3-2, IEC61000-3-3
Immunity	IEC61326, IEC61000-4-2/3/4/5/6/8/11
Regional certifications	

Europe	Australia/New Zealand
EN61326	AS/NZS 2064

Ordering information

AWG5200 family

AWG5202

16 bit, 2 GSamples/channel record length, 2-channel arbitrary waveform generator

AWG5200-250	5 GS/s (10 GS/s interpolated)
AWG5200-2DC	High Bandwidth Amplified outputs
AWG5200-2HV	High Voltage outputs
AWG5200-2AC	AC Amplified outputs
AWG5200-2DIGUP	Digital up conversion (requires AWG5200-250)
AWG5200-SEQ	Sequencing

AWG5204

16 bit, 2 GSamples/channel record length, 4-channel arbitrary waveform generator

AWG5200-425	2.5 GS/s
AWG5200-450	5 GS/s (10 GS/s interpolated)
AWG5200-4DC	High Bandwidth Amplified outputs
AWG5200-4HV	High Voltage outputs
AWG5200-4AC	AC Amplified outputs
AWG5200-4DIGUP	Digital up conversion (requires AWG5200-450)
AWG5200-SEQ	Sequencing

AWG5208

16 bit, 2 GSamples/channel record length, 8-channel arbitrary waveform generator

AWG5200-825	2.5 GS/s
AWG5200-850	5 GS/s (10 GS/s interpolated)
AWG5200-8DC	High Bandwidth Amplified outputs
AWG5200-8HV	High Voltage outputs
AWG5200-8AC	AC Amplified outputs
AWG5200-8DIGUP	Digital up conversion (requires AWG5200-850)
AWG5200-SEQ	Sequencing

Standard accessories

Specify power cord and language option at time of order

136-7162-xx	Two 50 Ω, 18 GHz, SMA terminators per channel
071-3529-xx	Installation and safety manual (English)
—	Certificate of calibration
—	Power cord

Options

Power plug options

Opt. A0	North America power plug (115 V, 60 Hz)
Opt. A1	Universal Euro power plug (220 V, 50 Hz)
Opt. A2	United Kingdom power plug (240 V, 50 Hz)
Opt. A3	Australia power plug (240 V, 50 Hz)
Opt. A4	North America power plug (240 V, 50 Hz)
Opt. A5	Switzerland power plug (220 V, 50 Hz)
Opt. A6	Japan power plug (100 V, 50/60 Hz)
Opt. A10	China power plug (50 Hz)
Opt. A11	India power plug (50 Hz)
Opt. A12	Brazil power plug (60 Hz)
Opt. A99	No power cord

Language options

Opt. L0	English manual
Opt. L5	Japanese manual
Opt. L7	Simplified Chinese manual
Opt. L8	Traditional Chinese manual
Opt. L10	Russian manual
Opt. L99	No manual

Service options

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. CA1	Single Calibration or Functional Verification
Opt. D1	Calibration Data Report
Opt. D3	Calibration Data Report 3 Years (with Opt. C3)
Opt. D5	Calibration Data Report 5 Years (with Opt. C5)
Opt. G3	Complete Care 3 Years (includes loaner, scheduled calibration, and more)
Opt. G5	Complete Care 5 Years (includes loaner, scheduled calibration, and more)
Opt. IF	Upgrade Installation Service
Opt. R3	Repair Service 3 Years (including warranty)
Opt. R5	Repair Service 5 Years (including warranty)

Post sales service options

CA1	Single calibration or functional verification
R5DW	Repair service coverage 5 years
R2PW	Repair service coverage 2 years post warranty

R1PW	Repair service coverage 1 year post warranty

Recommended accessories

Item	Description	Part number
GPIB to Ethernet Instrument Interface	GPIB to USB Adapter enables GPIB control through USB B port	ICS Model 4865B
Power Splitters	1.5 kHz - 18 GHz	Mini-Circuits ZX10-2-183-S+
	DC-18 GHz	Varies
Amplifiers	2.5 kHz - 10 GHz, 26 dB gain	Varies
	0.01 - 20 GHz, 30 dB gain	RF-Lambda RAMP00G20GA
Adapter	SMB female to SMA female	Mouser 565-72979
Pelican case	Hard transit case for AWG5200 series, AWG70000 series	016-2127-00
Programmer manual	Programming commands, English only	Visit Tektronix website

Rack mount kit

GF-RACK3U	Rack mount kit

Product upgrades

AWG5202

AWG52UP Opt SSD	Provides an additional (or replacement) preprogrammed solid state drive
AWG52UP SSD-SPARE	Spare (or replacement) SSD with a Win10 OS image for AWG5200 products
AWG52UP SSD-WIN10	SSD with Win10 OS image and license; functions as an upgrade for AWG5200 Win7
AWG5200-2-2550	Increases sampling rate from 2.5 GS/s to 5 GS/s (10 GS/s interpolated)
AWG5200-2DC	Adds DC High Bandwidth Amplified outputs
AWG5200-2HV	Adds DC High Voltage outputs (SN B020000 and above only)
AWG5200-2AC	Adds AC Amplified outputs
AWG5200-2DIGUP	Adds digital up conversion (requires AWG5200-250 or AWG5200-2-2550)
AWG5200-SEQ	Adds Sequencing

AWG5204

AWG52UP Opt SSD	Provides an additional (or replacement) preprogrammed solid state drive
AWG52UP SSD-SPARE	Spare (or replacement) SSD with a Win10 OS image for AWG5200 products
AWG52UP SSD-WIN10	SSD with Win10 OS image and license; functions as an upgrade for AWG5200 Win7
AWG5200-4-2550	Increases sampling rate from 2.5 GS/s to 5 GS/s (10 GS/s interpolated)
AWG5200-4DC	Adds DC High Bandwidth Amplified outputs
AWG5200-4HV	Adds DC High Voltage outputs (SN B020000 and above only)
AWG5200-4AC	Adds AC Amplified outputs
AWG5200-4DIGUP	Adds digital up conversion (requires AWG5200-450 or AWG5200-4-2550)

AWG5200-SEQ	Adds Sequencing

AWG5208

AWG52UP Opt SSD	Provides an additional (or replacement) preprogrammed solid state drive
AWG52UP SSD-SPARE	Spare (or replacement) SSD with a Win10 OS image for AWG5200 products
AWG52UP SSD-WIN10	SSD with Win10 OS image and license; functions as an upgrade for AWG5200 Win7
AWG5200-8-2550	Increases sampling rate from 2.5 GS/s to 5 GS/s (10 GS/s interpolated)
AWG5200-8DC	Adds DC High Bandwidth Amplified outputs
AWG5200-8HV	Adds DC High Voltage outputs (SN B020000 and above only)
AWG5200-8AC	Adds AC Amplified outputs
AWG5200-8DIGUP	Adds digital up conversion (requires AWG5200-850 or AWG5200-8-2550)
AWG5200-SEQ	Adds Sequencing

Plug-ins

Plug-ins increase the capabilities of the arbitrary waveform generators. Various plug-ins are available providing unique types of waveforms or additional compensation. Each plug-in has its own installation file which installs seamlessly into the generators. After installation, it simply becomes a new menu selection. No other configuration is necessary.

Plug-in	Description	Nomenclature	Licensed enhancements
Multitone & Chirp plug-in	Create chirps, notches, and tones	MTONENL-SS01 MTONEFL-SS01	
PreCompensation plug-in	Create correction coefficients that can be applied on waveforms to get flat frequency and linear phase response	PRECOMNL-SS01 PRECOMFL-SS01	
High Speed Serial plug-in	Create pre-distorted waveforms to test a device's conformance to standards	HSSNL-SS01 HSSFL-SS01 HSSPACKNL-SS01 HSSPACKFL-SS01	S-Parameters and Intersymbol Interference unlocked with S-Parameters plug-in license Spread Spectrum Clocking unlocked with Spread Spectrum Clocking plug-in license (Licensed enhancements are included with HSSPACK)
RF Generic plug-in	Create digitally modulated signals with multiple carrier groups	RFGENNL-SS01 RFGENFL-SS01	S-Parameters unlocked with S-Parameters plug-in license
Optical plug-in	Create waveforms with complex modulation schemes for optical testing	OPTICALNL-SS01 OPTICALFL-SS01	S-Parameters unlocked with S-Parameters plug-in license Spread Spectrum Clocking unlocked with Spread Spectrum Clocking plug-in license

Table continued…

Plug-in	Description	Nomenclature	Licensed enhancements
OFDM plug-in	Create Single or Multiple OFDM based Frames with one or more bursts	OFDMNL-SS01 OFDMFL-SS01	S-Parameters unlocked with S-Parameters plug-in license
RADAR plug-in	Create RADAR pulsed waveforms with various modulations and impairments	RADARNL-SS01 RADARFL-SS01	S-Parameters unlocked with S-Parameters plug-in license
	RADAR and Environment waveform creation plug-ins packaged together	RDRPACK1NL-SS01 RDRPACK1FL-SS01	
	RADAR, Environment, and OFDM waveform creation plug-ins packaged together	RDRPACK2NL-SS01 RDRPACK2FL-SS01	
RADAR plug-in	Create RADAR pulsed waveforms with various modulations and impairments	RADARNL-SS01 RADARFL-SS01	S-Parameters unlocked with S-Parameters plug-in license
Environment plug-in	Create real world scenarios for commercial, electronic warfare, and simulations for monitoring and receiver testing	ENVNL-SS01 ENVFL-SS01	
Spread Spectrum Clocking plug-in	Adds SSC capability to the High Speed Serial and Optical plug-ins	SSCFLNL-SS01 SSCFLFL-SS01	
S-Parameters plug-in	Adds S-Parameter capability to the RF Generic, High Speed Serial, Optical, OFDM, and RADAR plug-ins	SPARANL-SS01 SPARAFL-SS01	
Pattern Generator, Pulse, & LVDS Video Signal Generator plug-ins		Free web download	

Plug-ins require the purchase of a license before they are fully functional.

There are two types of licenses available for each plug-in: node-locked (NL) and floating (FL).

- Node Locked Licenses (NL) provide your own copy of the application on your instrument and are permanently assigned to a product model/serial number.
- Floating Licenses (FL) can be moved between product models.

Warranty

One-year parts and labor.

Tektronix is ISO 14001:2015 and ISO 9001:2015 certified by DEKRA.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit *www.tek.com*.

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