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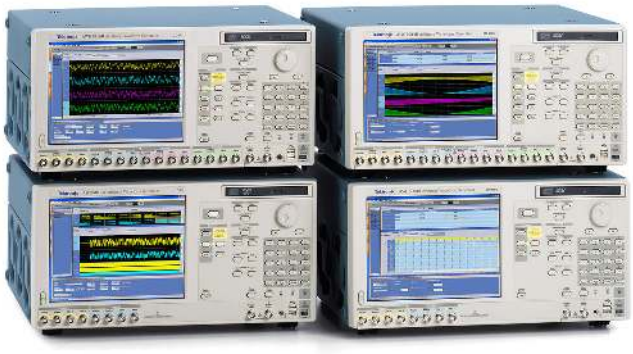
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Arbitrary Waveform Generators

AWG5000B Series Data Sheet



AWG5000B Series

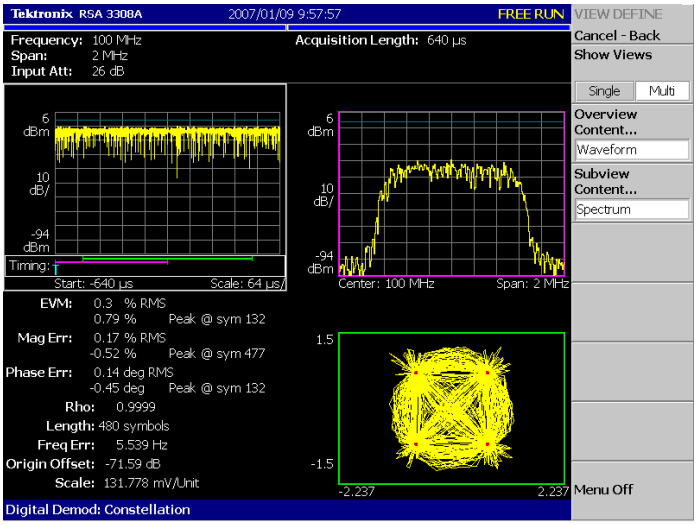
Features & Benefits

- 370 MHz Effective RF Frequency Output
- 1.2 GS/s and 600 MS/s Models
- 14-bit Vertical Resolution
- 2 or 4 Arbitrary Waveform Differential/Single-ended Outputs
  - Up to 4.5 V_{pk-pk} Single-ended and 9 V_{pk-pk} at Differential Output into 50 Ω
  - 0.95 ns Tr/Tf (10 - 90%) at 0.6 V_{pk-pk}
  - ±5 ns Range (50 ps Resolution) Interchannel Skew Control
  - SFDR: 80 dBc (1 MHz), 64 dBc (10 MHz)
- 4 or 8 Variable Level Marker Outputs
  - Up to 3.7 V_{pk-pk} Single-ended Output into 50 Ω
  - 300 ps Tr/Tf (20 - 80%) at 0 to 1 V
  - Up to 1 ns Range (50 ps Resolution) Delay Control
- 28-bit CH1/CH2 Variable-level Digital Data Output
  - Up to 3.7 V_{pk-pk} Single-ended Output into 50 Ω
  - 300 ps Tr/Tf (20 - 80%) at 0 to 1 V
- Up to 32 Mpoint Record Length For Longer Data Streams
- Down to 800 ps Resolution Edge Timing Shift Control
- 8,000 Steps Real-time Sequencing Creates Infinite Waveform Loops, Jumps, and Conditional Branches
- Easy to Use and Learn, Shortens Test Time
- Intuitive User Interface Based on Windows XP
- Convenient Benchtop Form Factor
- Integrated PC Supports Network Integration and Provides a Built-in DVD, Removable Hard Drive, LAN, and USB Ports

Applications

- Designing, Testing, and Deploying
- Wireless Communications:
  - High-fidelity Quadrature Modulation I&Q Baseband Signals (Polar Modulation: I/Q + Magnitude Control, Two Pair of I/Q for MIMO)
- Imaging
  - Stimulus Signals for Imaging Display and Recording Devices (CCD, LCD)
- Data Conversion
  - Stimulus Signals for Data Conversion Devices (ADC, DAC)
- Mixed-signal Design and Test
  - 2/4 ch Analog + 4/8 ch Marker Outputs + 28 bit Digital Data Outputs
- Real-world, Ideal, or Distorted Signal Generation – Including all the Glitches, Anomalies, and Impairments
- Enhanced/Corrupted Playback of DSO Captured Signals
- Waveform Vectors Imported from Third-party Tools such as MathCAD, MATLAB, Excel, and Others

Tektronix®



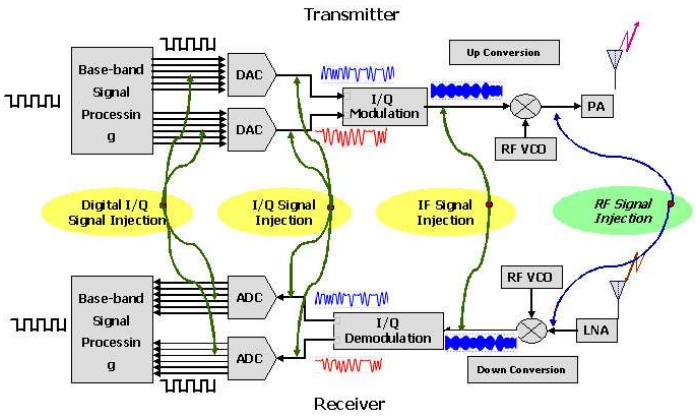
EVM/Constellation Measurement

Industry's Best Mixed-signal Stimulus Solution for Today's Complex Measurement Challenges

The AWG5000B Series of Arbitrary Waveform Generators delivers the optimal combination of industry leading sample rate, vertical resolution, signal fidelity, and waveform memory length, all in an easy-to-use self-contained package. The series offers the industry's best solution to the challenging signal stimulus issues faced by designers verifying, characterizing, and debugging sophisticated electronic designs.

Meeting the needs of today's design engineers, the series provides excellent signal dynamic range and integrity. AWG5000B Series models, with a 14 bit DA-converter-based sample rate from 600 MS/s to 1.2 GS/s, 2 to 4 output channels, synchronized 4 to 8 digital marker outputs, and 28 channels of digital data outputs, easily solve the toughest measurement challenges in wireless baseband I/Q communications, digital consumer product design such as imaging devices, data conversion equipment, and semiconductor design and test.

The open windows (Windows XP) based instruments are easy and convenient to use and connect easily with peripherals and third-party software.

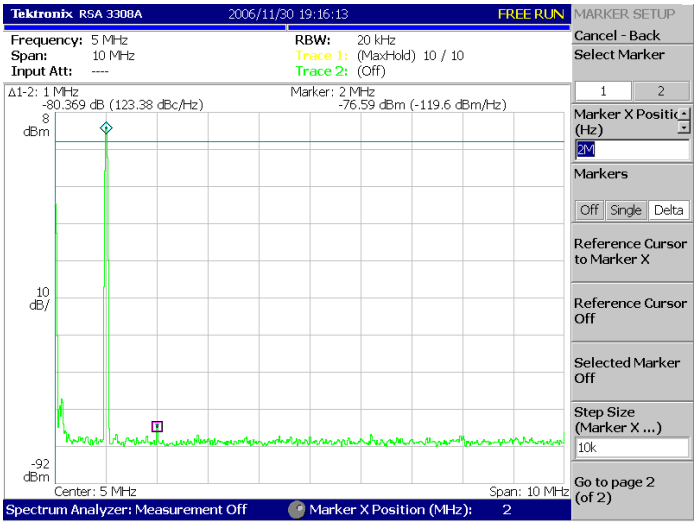


Typical Signal Injection

Wireless I/Q and IF Signal Generation

Tektronix AWGs support "Wireless Everywhere" by enabling the latest Digital RF technology, increasing wireless network capacity, and delivering the performance that supports higher modulation bandwidth and modulation schemes.

The AWG5000B Series addresses narrowband IQ to broadband IF applications with up to 1.2 GS/s, 14-bit resolution, and sufficient SFDR. The AWG5000B is able to generate not only analog IQ/IF signals, but digital data IQ/IF. The MIMO (Multiple Input Multiple Output) system that supports W-LAN/Wi-Max using space multiplex with multiple antennas is a leading-edge technology for reliable and faster data rate communication. The AWG5000B Series generates up to 4 analog channels (8 channels through two instruments) to simultaneously generate MIMO signals. The series can generate two pairs of IQ signals (4 pairs with two instruments) as an IQ generator, and four pairs of IF signals (8 pairs with two instruments) as an IF generator. With the two channel models, CH1 and CH2, digital data output is available as an option.



RTSA Spectrum view

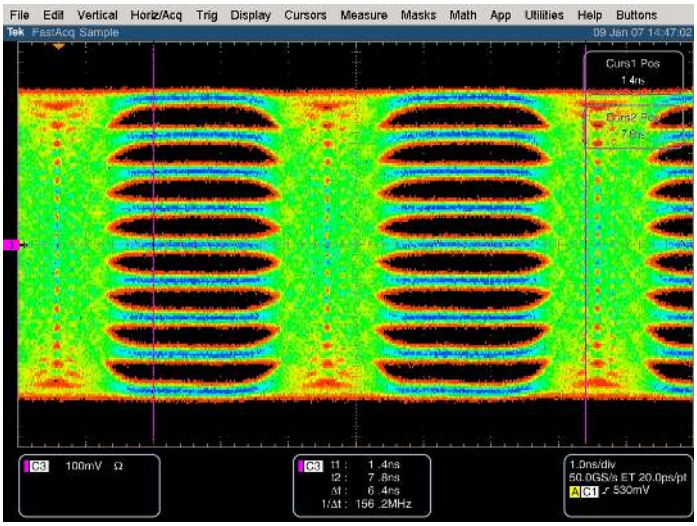
Spurious Performance

The 14-bit vertical resolution and sophisticated design of the AWG5000B Series provides ample signal dynamic range and purity. The SFDR performance is 80 dBc for 1 MHz signal and 64 dBc for 10 MHz signal.

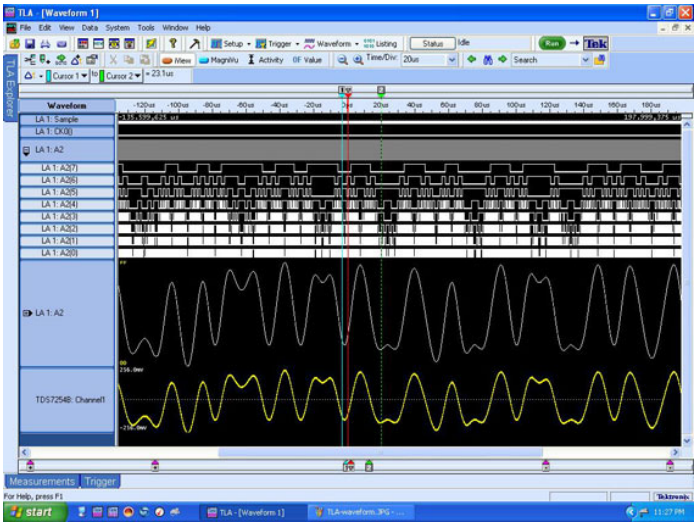
Multilevel Logic Signal

One technique to increase the data rate without increasing the transition rate is applying multilevel signals, wherein a signal can assume more than the standard binary 2 levels. In multilevel signaling, one can think of multilevel discrete amplitudes of a signal. This phenomenon is known as Pulse Amplitude Modulation or PAM. A 9-PAM signal, a signal with 9 different amplitudes, increases the data rate by four without increasing the transition rate of the signal.

The AWG5000B Series enables you to test your latest design by generating any kind of mixed or multilevel signal.



9-PAM with 250 Mb/s



Mixed-signal test by TDS/TLA iView

Mixed-signal Generation

AWG5012B and AWG5002B models can generate two analog signals with four digital marker outputs, supporting 28 digital outputs (CH1 and CH2 data) as an option. They deliver a mixed analog and digital signal generator and the most versatile solution for a broad range of applications, including consumer electronics such as ADC/DAC converter and imaging or display devices.

Additional Software Application Tools to Extend Waveform Generation

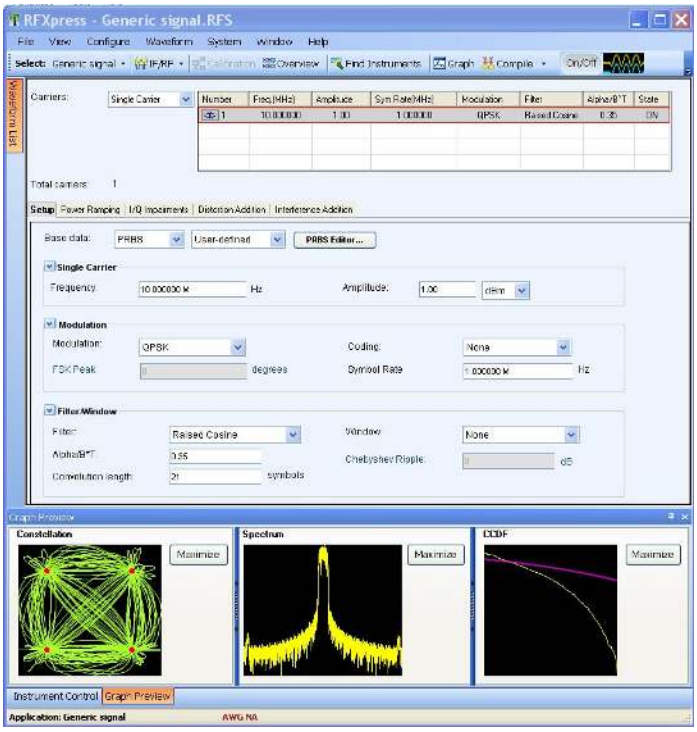
RFXpress® (RFX100)

RFXpress® is a software package that synthesizes digitally modulated baseband IQ and IF signals. It takes IQ and IF signal generation to the next level and fully exploits the wideband signal generation capabilities of Arbitrary Waveform Generators (AWGs). Supporting a wide range of modulations, as well as the symbol map functions, the software allows you to define your own modulation.

SPARA is an option for RFXpress that provides emulation of RF components from touchstone files. You can cascade multiple touchstone files to emulate a RF chain. The effect of the RF component can also be de-embedded by selecting the Inversion option.

Radar Signal Creation is a software module for RFXpress that gives you the ultimate flexibility in creating Pulsed Radar waveforms. It gives you the ability to build your own Radar Pulse suite starting from pulse-to-pulse trains to pulse groups. It supports a variety of modulation schemes including LFM, Barker and Polyphase Codes, User-defined Codes, Step FM, Nonlinear FM, User-defined FM, and Custom modulation. It also has the ability to generate pulse trains with staggered PRI to resolve Range and Doppler ambiguity, frequency hopping for Electronic Counter-Counter Measures (ECCM), and pulse-to-pulse amplitude variation to simulate Swerling target models including antenna scan patterns and multipath effects.

RFXpress is a powerful easy-to-use software package to synthesize IQ and IF signals for Arbitrary Waveform Generators (AWG). It runs as an integral part of the AWG5000B Series arbitrary waveform generators or from an external PC.



Characteristics

Arbitrary Waveform Output

Characteristic	AWG5014B	AWG5012B	AWG5004B	AWG5002B
Digital-to-Analog Converter				
Resolution	14 bit			
Number of Outputs	4	2	4	2
Output Type	Differential			
Output Impedance	50 Ω			
Output Connector Type	BNC (front panel)			
Sampling Rate	10 MS/s to 1.2 GS/s		10 to 600 MS/s	
Frequency				
Effective RF Frequency (Fmax)	Fmax determined as the lower of "Effective bandwidth (-6 dB)" or "Max sampling rate / 2.5 points per cycle"			
(Typical)	370 MHz		240 MHz	
Effective Freq Switching Time	Minimum frequency switching time (from selected frequencies F_1 to F_2) is determined as "1 / Fmax"			
Standard (typical)	400 ns		800 ns	
Option 08 (typical)	2.7 ns		4.2 ns	
Sinewave	1.2 GS/s clock, 32 points per waveform 37.50 MHz carrier frequency, 1.0 V_{pk-pk}		0.6 GS/s clock, 32 points per waveform 18.75 MHz carrier frequency, 1.0 V_{pk-pk}	
Amplitude				
Rise Time Bandwidth (-3 dB)	Analog bandwidth converted from rise time characteristics through analog output and filtering circuitry			
(typical)	Normal: 250 MHz Direct: 370 MHz			
Low Pass Filter	Normal: 20 MHz, 100 MHz (Bessel type) Direct: N/A			
Amplitude				
Range	Normal: 20 mV to 4.5 V_{pk-pk} Direct: 20 mV to 0.6 V_{pk-pk}			
Resolution	1 mV			
Accuracy	±(2.0% of amplitude ±2 mV) at offset = 0 V			
Offset				
Range	Normal: -2.25 V to +2.25 V Direct: N/A			
Resolution	1 mV			
Accuracy	±(2% of offset ±10 mV) at minimum amplitude			
Distortion				
Harmonic Distortion	Normal: ≤ -40 dBc Direct: ≤ -49 dBc		Normal: ≤ -46 dBc Direct: ≤ -55 dBc	
Nonharmonic Spurious	≤ -60 dBc (DC to 600 MHz)		≤ -60 dBc (DC to 300 MHz)	
Spurious Free Dynamic Range	1.2 GS/s clock, Amplitude: 1 V_{pk-pk}, Offset: 0 V 14 bit DAC operational mode, DC to 600 MHz		0.6 GS/s clock, Amplitude: 1 V_{pk-pk}, Offset: 0 V 14 bit DAC operational mode, DC to 300 MHz	
(Typical)	50 dBc (Normal: 37.5 MHz, 1.2 GS/s, 2.0 V_{pk-pk}) 60 dBc (Normal: 10 MHz, 600 MS/s, 1.0 V_{pk-pk}) 80 dBc (Normal: 1 MHz, 600 MS/s, 1.0 V_{pk-pk}) 64 dBc (Direct: 10 MHz, 600 MS/s, 0.6 V_{pk-pk}) 80 dBc (Direct: 1 MHz, 600 MS/s, 0.6 V_{pk-pk})		56 dBc (Normal: 18.75 MHz, 600 MS/s, 2.0 V_{pk-pk}) 60 dBc (Normal: 10 MHz, 600 MS/s, 1.0 V_{pk-pk}) 80 dBc (Normal: 1 MHz, 600 MS/s, 1.0 V_{pk-pk}) 64 dBc (Direct: 10 MHz, 600 MS/s, 0.6 V_{pk-pk}) 80 dBc (Direct: 1 MHz, 600 MS/s, 0.6 V_{pk-pk})	
Phase Noise	1.2 GS/s clock, Amplitude: 1 V_{pk-pk}, Offset: 0 V Carrier Frequency: 37.50 MHz		0.6 GS/s clock, Amplitude: 1 V_{pk-pk}, Offset: 0 V Carrier Frequency: 18.75 MHz	
(typical)	≤ -85 dBc/Hz at 10 kHz offset			
Random Jitter	1010 clock pattern			
RMS (typical)	Normal: 5 ps			
Total Jitter	2^{-15} - 1 PN data pattern (at 10^{-12} BER)			
Peak-to-Peak (typical)	Normal: 150 ps			
Pulse				
Pulse Response				
Rise/Fall Time (10 to 90%)	Normal: 1.4 ns (at 2.0 V_{pk-pk}) Direct: 0.95 ns (at 0.6 V_{pk-pk})			
Overshoot	Less than 10% (at 0.6 V_{pk-pk})			

Characteristic	AWG5014B	AWG5012B	AWG5004B	AWG5002B
Arbitrary Waveforms				
Waveform Length	1 to 16,200,000 points (or 1 to 32,400,000 points, Option 01)			
Number of Waveforms	1 to 16,000			
Sequence Length	1 to 8,000 steps total			
Sequence Repeat Counter	1 to 65,536 or infinite			
Sequence Control	Repeat count, Wait for Trigger, Go-to-N and Jump The standard model requires “wait for trigger ON” for all sequence step definition, the Option 08 (fast sequence switching) selectable On or Off for each sequence step.			
Jump Mode	Synchronous and Asynchronous			
Run Modes				
Continuous	Waveform is iteratively output. If a sequence is defined, the sequence order and repeat functions are applied			
Triggered	Waveform is output only once when an external, internal, GPIB, LAN, or manual trigger is received			
Gated	Waveform begins output when gate is true and resets to beginning when false			
Sequence	Waveform is output as defined by the sequence			
Sampling Clock				
Resolution	8 digits			
Internal Clock				
Accuracy	Within ±(1 ppm + Aging) Aging: within ±1 ppm/year			
Internal Trigger Generator				
Internal Trigger Rate				
Range	1.0 µs to 10.0 s			
Resolution	3 digits, 0.1 µs minimum			
Skew Control Between Outputs				
Range	-5 ns to +5 ns			
Resolution	5 ps			

Auxiliary Outputs

Characteristic	AWG5014B	AWG5012B	AWG5004B	AWG5002B
Marker Output				
Number of Outputs	8 (2 per ch)	4 (2 per ch)	8 (2 per ch)	4 (2 per ch)
Output Style	Single Ended			
Output Impedance	50 Ω			
Connector	BNC Front			
Level (into 50 Ω) (Twice for Hi_Z input)				
Output Windows	-1.00 V to +2.7 V			
Amplitude	0.10 V_{pk-pk} to 3.7 V_{pk-pk}			
Resolution	10 mV			
DC Accuracy	±(10% of setting +120 mV)			
Maximum Output Current	±54 mA/ch			
Rise/Fall Time (20% to 80%)	300 ps (1.0 V_{pk-pk}, Hi: +1.0 V, Low: 0 V)			
Skew Adjust Between Markers				
Range	0 to 1000 ps			
Resolution	50 ps			
Random Jitter (Typical)	1010 clock pattern			
RMS (Typical)	5 ps_{RMS}			
Total Jitter	2^{15} - 1 PN data pattern			
Peak-to-Peak (pk-pk) (Typical)	80 ps_{pk-pk}			
Clock (VCO) Out				
Range	600 MHz to 1.2 GHz			
Amplitude	0.4 V_{pk-pk} into 50 Ω to GND			
Impedance	50 Ω, AC coupling			
Connector	BNC Rear			
10 MHz Reference Out				
Amplitude	1.2 V_{pk-pk} into 50 Ω. Max 2.5 V_{pk-pk} open			
Impedance	50 Ω, AC coupling			
Connector	BNC Rear			
DC Outputs				
Number of Outputs	4: independently controlled outputs			
Range	-3.0 to +5.0 V			
Resolution	10 mV			
Output Voltage Accuracy	±(3% of the setting + 120 mV)			
Max Current	±100 mA			
Connector	2×4 pin header on front panel			
Digital Data Output (Option 03)				
Number of Output	NA	14 bit output on channel 1 and channel 2 (28 total)	NA	14 bit output on channel 1 and channel 2 (28 total)
Output Style		Single ended		Single ended
Output Impedance		50 Ω		50 Ω
Connector		SMB rear		SMB rear
Level (into 50 Ω) (Twice for Hi_Z Input)				
Output Windows		-1.00 V to +2.7 V		-1.00 V to +2.7 V
Amplitude		0.10 V_{pk-pk} to 3.7 V_{pk-pk}		0.10 V_{pk-pk} to 3.7 V_{pk-pk}
Resolution		10 mV		10 mV
DC Accuracy		±(10% of setting +120 mV)		±(10% of setting +120 mV)
Maximum Output Current		±54 mA/ch		±54 mA/ch
Rise/Fall Time (20% to 80%)		300 ps (1.0 V_{pk-pk}, Hi: +1.0 V, Low: 0 V)		300 ps (1.0 V_{pk-pk}, Hi: +1.0 V, Low: 0 V)
Delay from Marker		-41 ns to -82 ns		-41 ns to -82 ns
Skew Between Digital Outputs		Less than 400 ps		Less than 400 ps

Auxiliary Inputs

Characteristic	AWG5014B/AWG5012B	AWG5004B/AWG5002B
Trigger In		
Impedance	1 kΩ or 50 Ω	
Polarity	POS or NEG	
Connector	BNC Front	
Input Voltage Range	1 kΩ: ±10 V 50 Ω: ±5 V	
Threshold		
Level	-5.0 V to 5.0 V	
Resolution	0.1 V	
Trigger Jitter	2.0 ns to 4.5 ns (Typical)	
Asynchronies Between Internal/External Clock and Trigger Timing (Typical)	2.0 ns to 4.5 ns	
Trigger Mode		
Minimum Pulse Width	20 ns	
Trigger Holdoff	160 * sampling_period - 200 ns	
Delay to Analog Out	48 * sampling_period + 500 ns	
Gate Mode		
Minimum Pulse Width	1024 * sampling_period + 10 ns	
Delay to Analog Out	240 * sampling_period + 500 ns	
Event Input		
Impedance	1 kΩ or 50 Ω	
Polarity	POS or NEG	
Connector	BNC Front	
Input Voltage Range	1 kΩ: ±10 V 50 Ω: ±5 V	
Threshold	-5.0 V to 5.0 V	
Resolution	0.1 V	
Sequence Mode		
Minimum Pulse Width	20 ns	
Event Hold Off	200 * Sampling Period + 500 ns (Jump timing: Asynchronous jump)	
Delay to Analog Out	260 * Sampling Period + 300 ns	
External Clock IN		
Input Voltage Range	0.2 V_{pk-pk} to 0.8 V_{pk-pk}	
Impedance	50 Ω, AC coupled	
Frequency Range	600 MHz to 1.2 GHz	
Clock Divider	1/1, 1/2, 1/4……1/32	1/2, 1/4……1/32
Connector	BNC Rear	
Reference Clock IN		
Input Voltage Range	0.2 V_{pk-pk} to 3.0 V_{pk-pk}	
Impedance	50 Ω, AC coupled	
Frequency Range	10 MHz, 20 MHz, 100 MHz (with ±0.5%)	
Connector	BNC Rear	
Phase Lock IN		
Input Ranges	5 MHz to 600 MHz (acceptable frequency drift is ±0.5%)	
Input Voltage Range	0.2 V_{pk-pk} to 3 V_{pk-pk}	
Impedance	50 Ω, AC coupled	
Multiple Rate	1 to 240	1 to 120
Connector	BNC Rear	
Add IN	For each analog channel	
Impedance	50 Ω, DC coupled	
DC Gain	1	
Bandwidth	DC to 100 MHz at -3 dB	
Input Voltage Range	±1.0 V	
Connector	BNC Rear	

AWG5000B Series Common Features

Characteristic	Description
Waveform File Import Capability	Tektronix TDS5000/6000/7000, DPO4000/7000/70000, DSA70000 (*.wfm). TDS3000 (*.wfm) AWG400s/500s/610/615/710/710B (*.wfm, *.pat, *.seq), DTG5000s (*.DAT) Text data file (third-party software creation waveform data: MATLAB, MathCad, Excel)
S/W Driver for Third-party S/W	IVI-com driver and MATLAB library
Instrument Control / Data Transfer Ports	
GPIB	Remote control and data transfer. (Conforms to IEEE-Std 488.1, compatible with IEEE 488.2 and SCPI-1999.0).
Ethernet (10/100/1000Base-T)	Remote control and data transfer. (Conforms to IEEE 802.3). RJ-45
Computer System and Peripherals	Windows XP Professional, 2 GB SDRAM, 80 GB removable Hard Drive at rear (available front mount kit), CD-RW/DVD drive at front, included USB compact keyboard and mouse
PC I/O Ports	USB 2.0 compliant ports (6 total, 2 front, 4 rear), PS/2 mouse and keyboard connectors (rear panel), RJ-45 Ethernet connector (rear panel) supports 10/100/1000 BASE-T, XGA out
Display	10.4 inch, LCD color display with touch screen, 1024 (H) × 768 (V) (XGA).
Power Supply	100 to 240 VAC, 47 to 63 Hz
Power Consumption	450 W
Safety	UL61010-1, CAN/CSA-22.2, No.61010-1-04, EN61010-1, IEC61010-1
Emissions	EN 55011 (Class A), IEC61000-3-2, IEC61000-3-3
Immunity	IEC61326, IEC61000-4-2/3/4/5/6/8/11
Regional Certifications	
Europe	EN61326
Australia / New Zealand	AS/NZS 2064

Physical Characteristics

Dimension	mm	in.
Height	245	9.6
Width	465	18.0
Length	500	19.7
Weight (approx.)	**kg**	**lb.**
Net	19.5	43.0
Net with Package	28.5	62.8
Mechanical Cooling		
Required Clearance	**cm**	**in**
Top and Bottom	2	0.8
Side	15	6
Rear	7.5	3

Environmental

Characteristic	Operating	Nonoperating
Temperature	+10° C to +40° C	-20° C to +60° C
Humidity	5% to 80% relative humidity (% RH) at up to +30° C, 5% to 45% RH above +30° C up to +50° C,	5% to 90% RH (Relative Humidity) at up to +30° C, 5% to 45% RH above +30° C up to +50° C,
Altitude	Up to 3,048 meters (10,000 feet)	Up to 12,192 meters (40,000 feet)
Random Vibration	0.27 G_{RMS}, 5 to 500 Hz, 10 minutes per axis	2.28 G_{RMS}, 5 to 500 Hz, 10 minutes per axis
Sine Vibration	0.33 mm_{pk-pk} (0.013 $inch_{pk-pk}$) constant displacement, 5 to 55 Hz	NA
Mechanical Shock	Half-sine mechanical shocks, 30 g peak amplitude, 11 ms duration, 3 drops in each direction of each axis	NA

Ordering Information

Arbitrary Waveform Generator Mainframe

AWG5014B
1.2 GS/s, 14-bit resolution, 16 Mpoint per channel, 4-channel arbitrary waveform generator

AWG5012B
1.2 GS/s, 14-bit resolution, 16 Mpoint per channel, 2-channel arbitrary waveform generator

AWG5004B
600 MS/s, 14-bit resolution, 16 Mpoint per channel, 4-channel arbitrary waveform generator

AWG5002B
600 MS/s, 14-bit resolution, 16 Mpoint per channel, 2-channel arbitrary waveform generator

All Models Include: Accessory pouch, front cover, USB mouse, compact USB keyboard, lead set for DC output, stylus for touch screen (2 ea), AWG5000B Series product software CD and instructions, documentation CD with browser, Quick Start User Manual and registration card, Certificate of Calibration, and power cable.
Note: Please specify power cord and language option when ordering.

Instrument Options

Option	Description
AWG5014B/AWG5012B/AWG5004B/AWG5002B	
Opt. 01	Waveform Length Expansion (from 16 M to 32 M)
Opt. 08	Fast sequence switching (requires export control license) ECCN:3A002
AWG5012B/AWG5002B	
Opt. 03	28 bit digital data outputs (digital data of CH1 and CH2)
AWG5012B	
Opt. 09	Subsequencing and table jump functionality (includes LVDS to TTL TekLink Connector Adapter)

Common Options
Note: Please specify power cord and language option at time of order.

International Power Plugs

Option	Description
Opt. A0	North America
Opt. A1	Universal EURO
Opt. A2	United Kingdom
Opt. A3	Australia
Opt. A5	Switzerland
Opt. A6	Japan
Opt. A10	China
Opt. A11	India
Opt. A99	No power cord or AC adapter

Language Options

Option	Description
Opt. L0	English
Opt. L5	Japanese
Opt. L7	Simplified Chinese
Opt. L8	Traditional Chinese
Opt. L10	Russian

Application Software

Model	Option	Description
RFX100		General-purpose IQ, IF, and RF Signal Creation Software Package
	Opt. UWBCF	RFXpress plug-in for UWB-WiMedia IQ, IF, and RF conformance signal creation (requires RFX100 as prerequisite)
	Opt. UWBCT	RFXpress plug-in for UWB-WiMedia IQ, IF, and RF custom and conformance signal creation (requires RFX100 as prerequisite and includes Opt. UWBCF)
	Opt. RDR	RFXpress plug-in for Radar signal creation (requires RFX100 as prerequisite)
	Opt. SPARA	S-Parameter emulation and DUT characterization (requires RFX100 as prerequisite)
SDX100		Jitter Generation Software Package (includes USB dongle)
	Opt. ISI	S-Parameter and ISI creation (requires SDX100 as prerequisite)
	Opt. SSC	Spread Spectrum Clock addition option (requires SDX100 as prerequisite)

Service Options

Option	Description
Opt. CA1	A single calibration event
Opt. C3	Calibration service 3 years
Opt. C5	Calibration service 5 years
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. R3	Repair service 3 years
Opt. R5	Repair service 5 years
Post-sales Service Options: (e.g. AWG5012-CA1)	
CA1	A single calibration event
R3DW	Repair service coverage 3 years
R5DW	Repair service coverage 5 years
R2PW	Repair service coverage 2 years post-warranty
R1PW	Repair service coverage 1 year post-warranty

Product Upgrade

Product	Options to Upgrade		Description
AWG5014B	AWG50BUP	Opt. M14	Waveform Length Expansion from 16 Mpoint to 32 Mpoint
		Opt. S48	Upgrade from standard to Option 08 (fast sequence switching) requires export license
AWG5012B	AWG50BUP	Opt. M12	Waveform Length Expansion from 16 Mpoint to 32 Mpoint
		Opt. D13	Digital Data Outputs
		Opt. S38	Upgrade from Standard to Option 08 (fast sequence switching) requires export license
		Opt. S09	Upgrade from Standard to Option 09 (Subsequencing and table jump functionality, includes LVDS to TTL TekLink Connector Adapter)
AWG5004B	AWG50BUP	Opt. M04	Waveform Length Expansion from 16 Mpoint to 32 Mpoint
		Opt. S28	Upgrade from Standard to Option 08 (fast sequence switching) requires export license
AWG5002B	AWG50BUP	Opt. M02	Waveform Length Expansion from 16 Mpoint to 32 Mpoint
		Opt. D03	Digital Data Outputs
		Opt. S18	Upgrade from Standard to Option 08 (fast sequence switching) requires export license

Recommended Accessories

Item	Description	Part Number
Pin Header Cable		
SMA Cable	102 cm (40 inch)	012-1690-xx
SMB Cable	51 cm (20 inch)	012-1503-xx
Rackmount Kit	Rackmount Kit with instruction	016-1983-xx
Front Removable HDD Bay	Front Removable HDD Bay	016-1979-xx
Replacement Hard Disk for AWG5000/7000 Series	SATA disk assembly (no software installation), instruction sheet	065-0811-xx
Quick Start User Manual	English	071-2481-xx
	Japanese	071-2482-xx
	Simplified Chinese	071-2483-xx
	Traditional Chinese	071-2484-xx
	Russian	020-2971-xx
Programmer Manual	English	077-0061-xx
Option 09 User Manual	English	071-2674-xx
Service Manual	English	Visit Tektronix website

Warranty

One-year parts and labor.

CE

ISO 9001

Product(s) are manufactured in ISO registered facilities.

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

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Updated 30 October 2008

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.tektronix.com**

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15 Jul 2009 76W-22260-4

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