TEKTRONIX

AFG3251

The Tektronix AFG3251 is a single-channel 240 MHz Arbitrary/Function Generator from the AFG3000 series. Featuring a 2 GS/s sampling rate, 14-bit vertical resolution, and a 128 kpoint arbitrary memory depth, it provides high performance, versatility, and precise signal generation. It incorporates a highly stable timebase with a drift of only ±1 ppm per year, a 5.6-inch color TFT display, and versatile interface options including USB, LAN, and GPIB.

SPECIFICATIONS

General

Interfaces	USB, LAN, GPIB
Display	5.6 in. Color TFT LCD, 320 × 240 pixels
Warm-up Time	20 minutes

Physical

Power Supply	100 V to 240 V AC, 47 Hz to 63 Hz / 115 V AC, 360 Hz to 440 Hz, power consumption < 120 W
Operating Temperature	0 °C to +50 °C °C
Dimensions (W×H×D)	329.5 mm × 156.3 mm × 168.0 mm mm
Weight	4.5 kg kg

Channels and Configuration

Number of Channels	1
Output Connector Type	BNC

Frequency Specifications

Sine Wave Frequency Range	1 µHz to 240 MHz
Square Wave Frequency Range	1 µHz to 120 MHz
Pulse Wave Frequency Range	1 mHz to 120 MHz
Ramp Wave Frequency Range	1 µHz to 2.4 MHz
Arbitrary Waveform Frequency Range	1 mHz to 120 MHz
Noise Bandwidth	240 MHz
Frequency Resolution	1 µHz or 12 digits
Frequency Accuracy	±1 ppm of setting
Long-term Aging Rate	±1 ppm per year

Arbitrary Waveform Specifications

Waveform Memory Depth	128,000 points
Vertical Resolution	14 bits
Sampling Rate	2 GS/s
Minimum Segment Length	2 points
Non-volatile Memory Capacity	4 waveforms

Amplitude and Output Characteristics

Amplitude Range into 50 Ohms	50 mVp-p to 5 Vp-p (≤ 200 MHz), 50 mVp-p to 4 Vp-p (> 200 MHz)
Amplitude Range into Open Circuit	100 mVp-p to 10 Vp-p (≤ 200 MHz), 100 mVp-p to 8 Vp-p (> 200 MHz)
Amplitude Resolution	0.1 mVp-p, 0.1 mVrms, 1 mV, 0.1 dBm or 4 digits
Amplitude Accuracy	±(1% of setting + 1 mV) at 1 kHz, 1 Vp-p, 50 Ohms load
DC Offset Range	±2.5 Vpk (into 50 Ohms, ≤ 200 MHz), ±2 Vpk (into 50 Ohms, > 200 MHz)
DC Offset Resolution	1 mV
DC Offset Accuracy	±(1% of |setting| + 2 mV + 0.5% of amplitude (Vp-p))
Output Impedance	50 Ohms
Output Protection	Short-circuit protected
Amplitude Flatness	±0.15 dB (≤ 5 MHz), ±0.3 dB (> 5 MHz to 100 MHz), ±0.5 dB (> 100 MHz to 200 MHz), ±1.0 dB (> 200 MHz to 240 MHz)

Signal Purity and Waveform Characteristics

Sine Wave Harmonic Distortion	<-40 dBc (10 MHz to 100 MHz, 1 Vp-p)
Square Wave Rise/Fall Time	≤ 2.5 ns
Square Wave Overshoot	< 5%
Pulse Width Range	4.0 ns to 999.9 s
Pulse Width Resolution	10 ps or 5 digits
Pulse Duty Cycle Range	0.001% to 99.999% (limitations of min pulse width apply)
Pulse Edge Time Range	2.5 ns to 625 s
Pulse Jitter (RMS)	< 100 ps (typical 30 ps)
Ramp Wave Linearity	≤ 0.1% of peak output at 1 kHz
Ramp Wave Symmetry Range	0.0% to 100.0%

Modulation, Sweep, and Burst

Modulation Types	AM, FM, PM, FSK, PWM
AM Modulation Depth Range	0.0% to 120.0%
FM Frequency Deviation Range	1 µHz to 120 MHz
PM Phase Deviation Range	0.0° to 180.0°
FSK Keying Rate Range	2 mHz to 1 MHz
PWM Duty Cycle Deviation Range	0.0% to 50.0% of pulse period
Internal Modulation Source Frequency	2 mHz to 50.00 kHz
External Modulation Input Impedance	10 kOhms
External Modulation Sensitivity	±1 V for full scale modulation
Sweep Type	Linear, Logarithmic
Sweep Time Range	1 ms to 300 s
Sweep Trigger Source	Internal, External, Manual
Burst Type	Triggered, Gated
Burst Count Range	1 to 1,000,000 cycles, or Infinite
Burst Phase Range	-360.0° to +360.0°

Inputs and Outputs (I/O)

Trigger Input Voltage Level	TTL compatible
Trigger Input Impedance	10 kOhms
Trigger Output Voltage Level	TTL compatible into ≥ 50 Ohms
Trigger Output Impedance	50 Ohms
External Reference Input Frequency Range	10 MHz, ±10 kHz
External Reference Input Impedance	1 kOhms
External Reference Output Frequency	10 MHz
External Reference Output Level	1.2 Vp-p into 50 Ohms (typical)

System Connectivity and UI

GPIB Interface	Yes (IEEE-488.2)
LAN Interface	Yes (10Base-T/100Base-TX)
USB Host Port (Front)	USB 2.0 Host
USB Device Port (Rear)	USB 2.0 Device
Programming Language Support	SCPI-compatible

Power and Mechanical

Form Factor	Benchtop
Shipping Weight	5.9 kg

Environmental and Compliance

Storage Temperature Range	-30 °C to +70 °C
Operating Humidity Range	≤ 80% R.H. (0 °C to 30 °C), ≤ 75% R.H. (30 °C to 40 °C), ≤ 45% R.H. (40 °C to 50 °C)
Operating Altitude Limit	Up to 3,000 m (10,000 ft)
Safety Certificates	UL 61010-1, CAN/CSA-C22.2 No. 61010-1, EN 61010-1, IEC 61010-1
Electromagnetic Compatibility (EMC) Compliance	EN 61326-1:2006, Class A

Frequency

Phase Adjustment Range	-180.00° to +180.00°
Phase Adjustment Resolution	0.01°
Timebase Temperature Stability	±1 ppm (0 °C to 50 °C)

Memory

Instrument Setup Memory	10 settings

Sweep

Sweep Direction	Up / Down
Sweep Hold/Return Time Range	0 ms to 300 s
Sweep Time Resolution	1 ms or 4 digits
Sweep Time Accuracy	0.4%

Inputs & Outputs

External Adding Input Bandwidth	DC to 10 MHz (-3 dB)
External Adding Input Impedance	50 Ω
External Adding Input Voltage Range	-1.0 V to +1.0 V
External Modulation Input Level	±1 V full scale
Trigger Input Minimum Pulse Width	100 ns
External Reference Input Amplitude Range	100 mVp-p to 5 Vp-p

Performance

Phase Noise	<-110 dBc/Hz at 10 kHz offset (10 MHz, 0 dBm)
Non-harmonic Spurious	<-60 dBc (10 Hz to 1 MHz), <-50 dBc (1 MHz to 240 MHz) at 1 Vp-p
Run Modes	Continuous, Modulation, Sweep, Burst

Power

Power Consumption	120 W (maximum)
Mains Frequency	47 Hz to 63 Hz (100 V to 240 V), 360 Hz to 440 Hz (115 V)

Waveforms

Noise Type	White Gaussian Noise

Display

Display Resolution	320 × 240 pixels (QVGA)

Sine Wave

Sine Wave Total Harmonic Distortion	< 0.2% (10 Hz to 20 kHz, 1 Vp-p)

Arbitrary Waveform

Arbitrary Waveform Minimum Edge Time	<= 2.5 ns
Arbitrary Waveform Jitter (RMS)	< 100 ps (typical)

Trigger

Internal Trigger Period Range	1.0 µs to 500.0 s
Internal Trigger Period Resolution	10 ns or 5 digits
Trigger Delay Range	0.0 ns to 85.000 s
Trigger Delay Resolution	100 ps or 5 digits
Trigger Delay Jitter (RMS)	< 100 ps (typical)

TECHNOLOGY

Arbitrary Function Generator (AFG)

APPLICATIONS

Electronic test, signal simulation, sensor emulation, R&D, and education