WAVE STANDARD SERIES

40 Years Celebration

MODEL WS8251

250MHz Single Channel Arbitrary Function Generator

- Single-channel Arbitrary / Function Generator
- 250MHz sine and 150MHz square waves
- Triangle, ramp, sin(x)/x, Gaussian, exponential, noise, pulse and DC waveforms
- 4Vp-p into 50Ω, 8Vp-p into open circuit
- 12 Bit, 625MS/s, 512k points arbitrary waveforms
- Linear & logarithmic sweeps
- Continuous, triggered, gate and burst
- FM, FSK, and PSK modulation
- High resolution 3.8” LCD, color display
- Ethernet, USB and GPIB interfaces
- ArbConnection software for easy waveform creation

The Tabor WS8251 is a Single Channel Arbitrary / Function Generator with a 250MHz bandwidth and the functionality of a Function generator, arbitrary generator and Pulse generator all in one easy to use high performance unit. It is a compact stand alone bench top unit that will satisfy all of the industry and education standard testing needs for years to come.

Standard Waveforms
The WS8251 has 11 built in functions for quick and easy wave generation. Front panel operations allows for easy selection of wave form and editing of all wave parameters. All of the standard waves can reach up to 50MHz with Sine and Square going as high as 250MHz and 150MHz respectively.

User Defined Waveforms
For more advanced users the WS8251 with its 12-bit vertical resolution offers a standard 512k points memory depth and a 625MS/s sample clock for designing waveforms. With the ability to control and edit the value of each and every point any wave is possible. The memory can be divided into segments for storing all of the user defined waveforms.

Modulated Waveforms
Agility and modulation capabilities open the door to diverse applications. In addition to the capability of generating any shape and style of waveform with the arbitrary waveform generation power, the products can also do standard modulation schemes such as FM, FSK, sweep and PSK without sacrificing the power of the instrument control and output run modes.

Accuracy and Stability
As standard, the instrument is equipped with an internal frequency reference that has 1ppm accuracy and stability over a period of 1 year. An external frequency reference is provided on the rear panel for applications requiring greater accuracy or stability, supported by the instrument’s 9 digits resolution.

Easy to Use
Large and user-friendly 3.8” back-lit color LCD display facilitates browsing through menus, updating parameters and displaying detailed and critical information for your waveform output. Combined with numeric keypad, cursor position control and a dial, the front panel controls simplify the often complex operation of an arbitrary function generator.

Remote Control
Model WS8251 comes standard with a variety of interfaces: Ethernet, USB and GPIB allowing the user to freely select the interface best suited to his individual requirements. The included ArbConnection software is a powerful editorial tool for designing waveforms and provides the user with full control of instrument functions, modes and features.

Multiple Environments to Write Your Code
Model WS8251 comes with a complete set of drivers, allowing you to write your application in various environments such as: Labview, CVI, C++, VB, and MATLAB. You may also link the supplied dll to other Windows based API’s or, use low level SCPI commands (Standard Commands for Programmable Instruments) to program the instrument, regardless if your application is written for Windows, Linux or Macintosh operating systems.

Automated External Self-Calibration
Leading-edge technology is implemented to allow calibration from any interface, USB, GPIB or LAN and calibration factors are stored in a flash memory thus eliminating the need to open instrument covers.

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Specification

CONFIGURATION

Output Channels	1

STANDARD WAVEFORMS

Waveforms:	Sine, Triangle, Square, Pulse, Ramp, Sine(x)/x, Gaussian, Exponential, Repetitive Noise, DC.
Frequency Range:	
Sine	50Hz to 250MHz, continuous 50Hz to 125MHz, triggerable
Square, Pulse	50Hz to 150MHz
All others	50Hz to 50MHz

SINE

Start Phase:	0 to 360°
Phase Resolution:	0.1°
Harmonics Distortion (1Vp-p, typ.):	
1MHz to 5MHz	<-50dBc
5MHz to 50MHz	<-47dBc
50MHz to 100MHz	<-45dBc
100MHz to 250MHz	<-35dBc
Non-Harmonics Distortion (1Vp-p, typ.):	
1MHz to 50MHz	<-65dBc
50MHz to 100MHz	<-63dBc
100MHz to 200MHz	<-55dBc
200MHz to 250MHz	<-45dBc
Total Harmonic Distortion:	
DC to 100kHz	0.3%
Flatness (1MHz, 1Vp-p, typ.):	
1MHz to 25MHz	<0.3dBc
25MHz to 100MHz	<0.5dBc
100MHz to 250MHz	<1dBc
SSB Phase Noise (10kHz offset, typ.):	
1MHz Carrier	<-115dBc
10MHz Carrier	<-108dBc
100MHz Carrier	<-90dBc
250MHz Carrier	<-85dBc
350MHz Carrier	<-80dBc

TRIANGLE

Start Phase:	0 to 360°
Phase Resolution:	0.1°

SQUARE

Duty cycle Range:	1.0% to 99.9%
Resolution:	0.1%
Rise/Fall time:	<1ns (<900ps typ.)
Overshoot:	<5%, typ.
Jitter (rms):	<10ps

RAMP

Time Range:	1.0% to 99.9%

SINC (Sine(x)/x)

"0 Crossings"	4 to 100 cycles

GAUSSIAN

Time Constant	10 to 200

EXPONENTIAL PULSE

Type:	Rise or Decay, selectable
Time Constant:	-100 to 100

NOISE

Type:	Repetitive
Bandwidth:	50MHz

DC

Range:	-3V to +3V

PULSE

Pulse Mode:	Single or double, programmable
Polarity:	Normal, inverted or complement
Period:	4ns to 1000s
Resolution:	1ns
Pulse Width:	2ns to 1000s
Rise/Fall Time:	
Fast	<600ps, typ.
Linear	1ns to 1000s
High Time, Delay & Double Pulse Delay:	1ns to 1000s
Impedance:	50Ω
Amplitude Window:	50mVp-p to 4Vp-p
Low Level	-3V to +2.975V
High Level	-2.975V to +3V

(1) Double into high impedance

NOTES:

1. All pulse parameters, except rise and fall times, may be freely programmed within the selected pulse period provided that the ratio between the period and the smallest incremental unit does not exceed the ratio of 512,000 to 1, hence the specifications above do not show maximum limit as each must be computed from the above relationship.
2. Rise and fall times, may be freely programmed provided that the ratio between the rise/fall time and the smallest incremental unit does not exceed the ratio of 100,000 to 1.
3. The sum of all pulse parameters must not exceed the pulse period setting

ARBITRARY WAVEFORMS

Sample Rate:	50kS/s to 625MS/s
Vertical Resolution:	12 bits
Waveform Memory:	512k points
Min. Segment Size:	64 points
Resolution:	16 points
No. of Segments:	1 to 1k
Waveform Granularity:	1 point

MODULATION

Carrier Waveform:	Sine wave
Carrier Frequency:	1Hz to 250MHz
Modulation Source:	
Internal	FM, Arbitrary FM, Sweep
External	FSK, PSK

FM

Modulating Shape:	Sine, square, triangle, ramp
Modulating Freq.:	1mHz to 100kHz
Peak Deviation:	Up to 249MHz

FSK/PSK

Baud Rate:	DC to 10Mbits/sec
Resolution:	Frequency dependent.
Carrier Phase:	0 to 360° (Up to 125MHz)

SWEEP

Sweep Type:	Linear or log
Sweep Direction:	Up or down
Sweep Time:	1ms to 1000s

COMMON CHARACTERISTICS

FREQUENCY

Resolution:	9 digits
Accuracy/Stability:	Same as reference

ACCURACY REFERENCE CLOCK

Internal	0.0001% (1 ppm TCXO) 1ppm/year
External	10 MHz TTL, 50% 2%,

AMPLITUDE

Range:	50 mV to 4Vp-p into 50Ω; Double into open circuit
Resolution:	4 digits
Accuracy (1kHz):	±(3% + 5 mV)
Rise/Fall Time:	1ns (typically <900ps)
Overshoot:	5%, typical

OFFSET

Range:	0 to ±2V, into 50Ω
Resolution:	4 digits
Accuracy:	±(3% + 50 mV)

OUTPUTS

MAIN OUTPUT

Coupling:	DC coupled
Type:	Single-ended
Connector:	Front panel SMA
Impedance:	50Ω ±1%
Protection:	Short Circuit to Ground, 10s max

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SYNC / MARKER OUTPUT

Connector:	Front panel SMA
Source:	Channel 1
Type:	Single ended
Waveform Type:	BIT (16 points wide)
Impedance:	50Ω
Amplitude:	>2 V into 50Ω, 3V nominal into high impedance
Variable Position Control:	
Range	0 to segment length
Resolution	16 points

INPUTS

TRIGGER INPUT

Connector:	Front panel SMA
Input Impedance:	50Ω, ±2%
Polarity:	Positive or negative
Level:	±5V, programmable
Sensitivity:	250mV
Damage Level:	±8V
Min. Pulse Width:	20ns

EXTERNAL REFERENCE INPUT

Connector:	Rear panel BNC
Frequency:	10MHz
Impedance & Level:	
Default	10kΩ ±2%, TTL, 50% ±2%
Option	50Ω ±5%, 0dBm Sinewave

FILTERS

Type:	50MHz, 125MHz

RUNMODES

Continuous:	Free-run output of a waveform.
Triggered:	Upon trigger, outputs one waveform cycle. Last cycle always completed.
Gated	External signal enables generator. First output cycles synchronous with the active slope of the triggering signal. Last cycle of output waveform always completed
Burst:	Upon trigger, outputs a Dual or multiple pre-programmed number of waveform cycles from 1 through 1M.

TRIGGER CHARACTERISTICS

System Delay:	1 SCLK + 100ns
Trigger Delay:	0 to 512k SCLK
Delay Resolution:	1 sample clock

EXTERNAL

Input:	Front panel SMA
Frequency:	DC to 10 MHz
Threshold Level:	±5V, programmable
Damage Level:	±8V
Sensitivity:	250mV
Min Pulse Width:	20 ns
Slope:	Positive or negative
Trigger Jitter:	±1 sample clock

INTERNAL

Range:	0.1µs to 100s
Resolution:	4 digits, limited by 0.1µs
Accuracy:	0.1%
Software:	Soft trigger

MANUAL

Source:	Soft trigger command from the front panel or remote

GENERAL

Voltage Range:	85 to 265 VAC, 47-63 Hz
Power Consumption:	60W
Display Type:	Reflective Color LCD, back-lit
Size	3.8”
Resolution	320 x 240 pixels
Interfaces:	
USB	1 x rear, USB device, (A type)
LAN	100/10 BASE-T
GPIB	IEEE-488.2 - SCPI – 1993.0
Dimensions:	
With Feet	212 x 102 x 415 mm (WxHxD)
Without Feet	212 x 88 x 415 mm (WxHxD)
Weight:	
Without Package	3.5 kg
Shipping Weight	4 kg
Temperature:	
Operating	0°C - 50°C
Storage	-40°C to + 70°C.
Humidity:	85% RH, non condensing
Safety:	CE Marked, IEC61010-1
Calibration:	1 year
Warranty [1]:	3 years standard

ORDERING INFORMATION

MODEL	DESCRIPTION
WS8251	250MHz Single Channel Arbitrary Function Generator

ACCESSORIES

S-Rack Mount:	19" Single Rack Mounting Kit
D-Rack Mount:	19" Dual Rack Mounting Kit
Case Kit:	Professional Carrying Bag

Note: Options and Accessories must be specified at the time of your purchase.

[1] Standard warranty in India is 1 year.