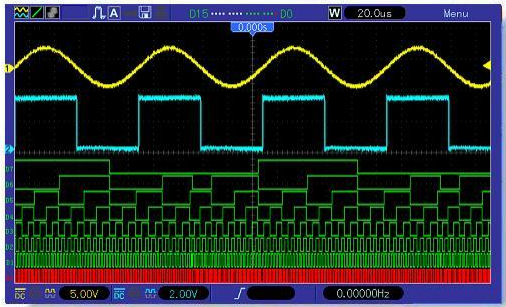


MSO5000D Series Mixed Signal Digital Oscilloscope



Feature

- 16 channels logic analyzer + 2 channels oscilloscope + external trigger.
- Big and clear display (7.0-inch color LCD, high resolution 800 x 480), clear lifelike waveform display.
- 1GSa/s real time sampling rate.
- 60MHz-200MHz bandwidth, 1M memory depth.
- Powerful trigger function.
- USB host, support flash memory card storage and USB interface system upgrade.
- Ultrathin design, handy volume, easily portable.

* Oscilloscope Function

- Bandwidth 60MHz-200MHz.
- Each channel record length up to 1M.
- Real time sampling rate up to 1GSa/s.
- Powerful trigger function.
- More than 20 kinds of automatic measurement function.

* Logic Analyzer Function

- 16 channels divided into 2 groups which is able to setup threshold level individually.
- Real time sampling rate up to 500MSa/s.
- Powerful trigger function: edge, duration, pulse width, code-type, queen, repeat.

5. Specification

Oscilloscope Specification			
Horizontal			
Model	MSO5062D	MSO5102D	MSO5202D
Bandwidth	60MHz	100MHz	200MHz
Sampling Rate Range	Max. 1GS/s		
Waveform Interpolation	(sin x) / x		
Memory Depth (Sample Points)	Single-channel: maximum 1M; Dual-channel: maximum 512K		

		(4K, 16K, 40K optional)						
SEC/DIV Range		8ns/div-40s/div (stepping in a sequence: 2,4,8)						
Sampling Rate and Delay Time Accuracy		±50ppm in any ≥1ms time intervals						
Delta Time Measurement Accuracy (full bandwidth)		Single, "sampling" mode ± (1 sampling interval + 100ppm × readings + 0.6 ns) > 16 times above average ± (1 sampling interval + 100ppm × readings + 0.4 ns) Sampling interval = SEC/DIV÷200						
Vertical								
A/D Converter		8-bit resolution, each channel sampled simultaneously						
VOLTS/DIV Range		2mV/div ~ 5V/div at input BNC						
Position Range		±400mV (2mV/div ~20mV/div) ±2V (50mV/div ~200mV/div) ±40V (500mV/div ~2V/div) ±50V (5V/div)						
Optional Analog Bandwidth Limit (typical)		20MHz						
Low Frequency Response (-3db)		≤10Hz at output BNC						
Rising Time at output BNC (typical)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">60MHz</td> <td style="width: 33%;">100MHz</td> <td style="width: 33%;">200MHz</td> </tr> <tr> <td>≤ 5.8ns</td> <td><3.5ns</td> <td><1.8ns</td> </tr> </table>	60MHz	100MHz	200MHz	≤ 5.8ns	<3.5ns	<1.8ns
60MHz	100MHz	200MHz						
≤ 5.8ns	<3.5ns	<1.8ns						
Vertical Gain Accuracy		±3% for sample or average acquisition mode, 5V/div to 10mV/div; ±4% for sample or average acquisition mode, 5mV/div to 2mV/div						
DC Measurement Accuracy Average Acquisition Mode		Measuring type: ≥16 zero vertical position waveform average . Accuracy: ± (3%× reading+ 0.1div+ 1 mV), applicable to 10 mV/div or above units. Measuring type: ≥16 non-zero vertical position waveform average. Accuracy: ± [3%× (readings+ vertical position)+1%×vertical position+0.2div]. For the setting from 2mV/div to 200mV/div, +2mV; for 200mV/div to 5V/div, +50mV.						
Voltage Measurement Repeatability Average Acquisition Mode		In the same settings and environmental conditions, acquisition ≥ the voltage increment between any two groups average of 16 above waveforms : ± (3% × readings + 0.05 div)						
Trigger								
Trigger Sensitivity (Edge Trigger Type)	Coupling	Sensitivity						
		Source	60MHz	100MHz	200MHz			
	DC	CH1 CH2	1div from DC to 10MHz, 1.5div from 10MHz to Full			1.5div from 10MHz to 100MHz, 2div from 100MHz to Full		
		EXT	200mV from DC to 100MHz			200mV from DC to 100MHz, 350mV from 100MHz to 200MHz		
		EXT/5	1V from DC to 100MHz			1V from DC to 100MHz, 1.75V from 100MHz to 200MHz		
	AC	Attenuates signals below 10Hz						
	HF Reject	Attenuates signals when above 80kHz						
	LF Reject	The same as DC coupling limit when frequency above 150kHz; Attenuates signals when below 150kHz.						
Trigger Level Range	Source CH1, CH2	Range ±8 divisions from center of screen						

	EXT	±1.2V
	EXT/5	±6V
Trigger Level Accuracy, typical (Accuracy is for signals having rise and fall time ≥ 20ns)	Source	Accuracy
	CH1, CH2	±(0.2div × V/div) (within ±4 divisions from center of screen)
	EXT	±(6% of setting+40mV)
	EXT/5	±(6% of setting+200mV)
Set Trigger Level to 50% (typical)	For the input signals ≥ 50Hz	
Video Trigger Type	Source	Range
	CH1, CH2	The amplitude of 2 points peak-peak
	EXT	400mV
	EXT/5	2V
Signal Format , Field Rate and Video Trigger Type	Any field or any line support NTSC PAL and SECAM	
Holdoff Range	100ns-10s	
Pulse Width Trigger		
Mode	When <, >, =, or ≠ trigger; positive or negative pulses.	
	=: Triggers when pulse falling edge over trigger level.	
	≠: If the pulse narrower than the appointed width, the trigger point is the falling edge; or triggers when the pulse duration longer than the width setting time.	
	< : Triggers when the pulse duration less than the width setting time.	
	>(Also called overtime trigger): Triggers when pulse is greater than width setting.	
Range	20ns ~10s	
Slope Trigger		
mode	When <, >, =, or ≠ trigger; positive or negative slopes.	
	=: Triggers when waveform slope is equal to slope setting.	
	≠: Triggers when waveform slope is not equal to slope setting.	
	<: Triggers when waveform slope is less than slope setting.	
	>: Triggers when waveform slope is greater than slope setting.	
Range	20ns-10s	
Overtime Trigger	From the rising or falling edge; Setup time: 20-10 s	
Alternative Trigger		
CH1	Internal trigger: edge, pulse, video, or slop	
CH2	Internal trigger: edge, pulse, video, or slop	
Trigger Frequency Counter		
Readout Resolution	6bit	
Accuracy (typical)	±30ppm (Including all of the frequency reference error and ±1 calculation error)	
Frequency Range	AC coupling, from minimum 4Hz to specified bandwidth	
Source	<p>"Pulse width" or "edge trigger" mode: all available trigger source</p> <p>"Frequency counter" is always measuring the trigger source, even when oscilloscope acquisition paused because of the operation state's changing, or when a single acquisition finished.</p> <p>The "pulse width" trigger mode: the oscilloscope calculates the pulses whose window having effective amplitude, which measure at 1s and meet trigger condition. For example, if the PWM pulse line is set to < mode, and width is correspondingly set to smaller time, then the narrow pulse among them is the one to be calculated.</p> <p>"Edge trigger" mode: the oscilloscope calculates all the edge with sufficient amplitude and correct polarity.</p> <p>"Video trigger" mode: "frequency counter" doesn't work.</p>	
Acquisition		
Mode	Sample, Peak value detection and Average	
SINGLE SEQ	Acquisition Mode	Acquisition Stop Time
	Sample, peak value detect	All communications start to single acquisition simultaneously
	Average	All communications start to N times acquisition simultaneously, and N could be 4, 8, 16, 32, 64 or 128

Input		
Input Coupling	DC, AC or GND	
Input Impedance, DC Coupling	1M Ω \pm 2% for 20pF \pm 3 pF	
Probe Attenuation	1X, 10X	
Support Probe Attenuation Coefficients	1X, 10X, 100X, 1000X	
Max. Input Voltage	Overvoltage Type	Max. Voltage
	CAT I and CAT II	Installation type: 300V _{RMS} (10 \times)
	CAT III	150V _{RMS} (1 \times)
	Installation type II : Take 20 dB/decade as slope, from 100kHz above begins to decline to \geq 3MHz *, the AC peak value is 13V. For the non-sine waveforms, the peak value must less than 450V. Above 300V the offset duration should be less than 100ms. RMS signal level (including all the DC component delete by the AC coupling) must be limited to 300V. If beyond these values, it may damage the device.	
Measurement		
Cursors	The difference between voltage cursors Δ V; the difference between time cursors Δ T; 1/ Δ T calculated by Hz.	
Automatic(32)	Frequency, Period, Mean, Pk-Pk, Cycli RMS, Minimum, Maximum, Rise time, Fall Time, +Pulse Width, -Pulse Width, Delay1-2Rise, Delay1-2Fall, +Duty, -Duty, Vbase, Vtop, Vmid, Vamp, Overshoot, Preshoot, Preiod Mean, Preiod RMS, FOVShoot, RPREShoot, BWIDTH, FRF, FFR, LRR, LRF, LFR, LFF	
General		
Display		
Type	7" TFT, 64K true color LCD	
Resolution	800x480 dots	
Contrast	16 gears with the progress bar to show adjustment	
Probe Compensator Output		
Output Voltage (typical)	About 5Vpp input \geq 1 M Ω load	
Frequency (typical)	1kHz	
Power Supply		
Voltage	100-120VAC _{RMS} (\pm 10%),45Hz to 440Hz, CAT II 120-240VAC _{RMS} (\pm 10%),45Hz to 66Hz, CAT II	
Power	< 30W	
Fuse	2A, T rating, 250V	
Environment		
Temperature	Working: 32 $^{\circ}$ F to 122 $^{\circ}$ F (0 $^{\circ}$ C to 50 $^{\circ}$ C) Not working: -40 $^{\circ}$ F to 159.8 $^{\circ}$ F (-40 $^{\circ}$ C to +71 $^{\circ}$ C)	
Cooling Type	Convection	
Humidity	+ 104 $^{\circ}$ F or below (+ 40 $^{\circ}$ C or below) : \leq 90% relative humidity + 106 $^{\circ}$ F to 122 $^{\circ}$ F (+ 40 $^{\circ}$ C to 50 $^{\circ}$ C) : \leq 60% relative humidity	
Sea Level Height	Working and Not working	3,000m (10,000 foot)
	Random Vibration	50 Hz to 500 Hz: 0.31 g RMS, each axial: 10 minutes
	Not working	5 Hz to 500 Hz: 2.46 g RMS, each axial: 10 minutes
Mechanical Shock	Working	50g, 11ms, half-sine wave
Mechanical		
Dimension	Length	313mm
	Height	142mm
	Thickness	108mm
Weight	Not including the weight of package and accessories	2.08Kg
Packing Dimension	Length	395mm
	Width	410mm

	Height	275mm
Gross Weight	Including all accessories	about 3.2kg
Logic Analyzer Specification		
Sampled Channels	16 (divided into 2 groups)	
Max. Input Impedance	200K (C=10p)	
Input Voltage Range	-60V~60V	
Logic ThresholdRange	-8V~8V	
Max. Sample Rate	500MHz	
Compatible Input	TTL, CMOS, ECL	
Sample Depth	512KSample	
Cursors	The difference between voltage cursors ΔV ; the difference between time cursors ΔT ; $1/\Delta T$ calculated by Hz.	
Measurement	Period and Frequency	
Record Position	RefA RefB	
Trigger	Edge	D0-D15 select slope (rising or falling edge)
	Pulse Width	D0-D15 select pulse polarity (positive or negative pulse), trigger when (=, \neq , >, <), trigger pulse width
	Code-type	D0-D15 select code-type (H, L, X)
	Duration	D0-D15 select persist time and trigger when (data terminate, data start, and data delay)
	Queue	D0-D15 select specific data index (0-3) and code-type (H, L, X)
	Repeat	D0-D15 select code-type (H, L, X) and repeat times

6. Software

Operating system: Windows 7, Windows NT, Windows 2000, Windows XP, VISTA.