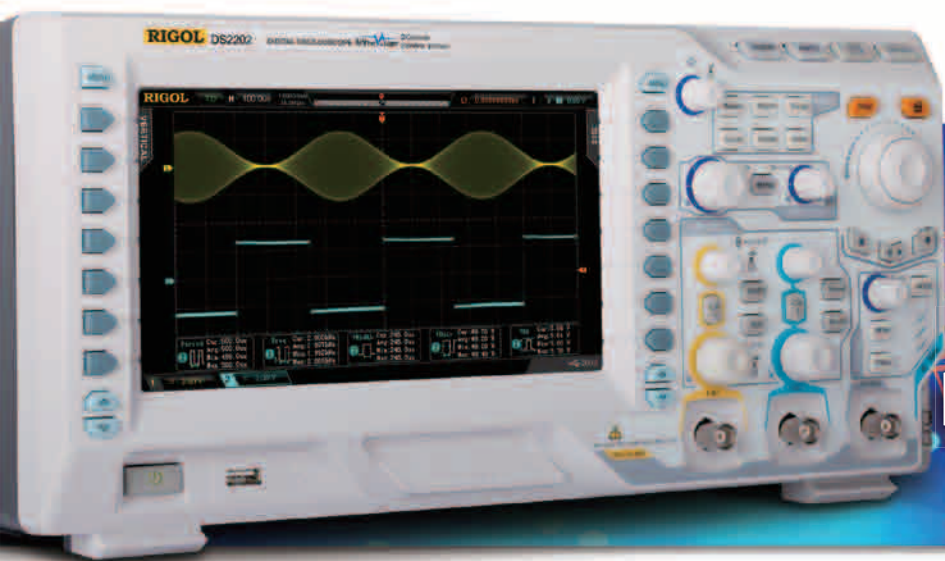




No.1  
2012



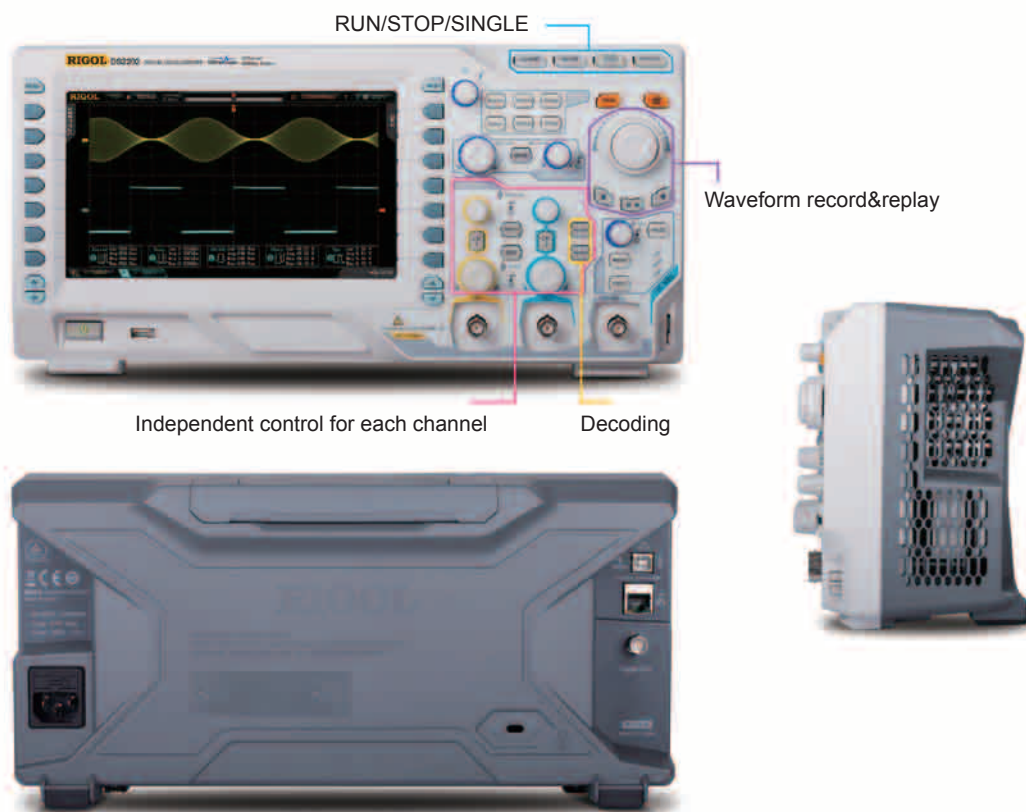
# DS2000 Series Digital Oscilloscope



- Wider vertical range(500uV/div ~ 10V/div), lower noise floor, Better for small signal capturing
- Full bandwidth, lower overshoot(<5%),perfect frequency response design
- Bandwidth 70MHz,100MHz,200MHz
- Max. Sample Rate 2G Sa/s
- Standard Memory Depth up to14Mpts,Optional Memory Depth up to 56Mpts
- Innovative "UltraVision" technology
- Waveform capture rate up to 50,000 wfs/s
- Up to 256 Levels intensity grading waveform display
- Up to 65,000 frames Hardware based Real Time waveform Record,Replay & Analysis functions(Std.)
- A variety of trigger and serial bus decoding functions (RS232,I2C,SPI)
- Complete connectivities: USB Host,USB Device,LAN(LXI),AUX
- Compact size, light weight, easy to use
- 8 inch TFT (800x480) WVGA

DS2000 Series is the new mainstream digital scope to meet the customer's applications with its innovative technology, industry leading specifications, powerful trigger functions and broad analysis capabilities.

# DS2000 Series Digital Oscilloscope



Product Dimensions: Width X Height X Depth=361.6 mm×179.6 mm×130.8 mm Weight: 3.9 kg ± 0.2 kg(Without Package)

## ► Innovative UltraVision technology



- Deeper Memory Depth (Std. 14Mpts, Opt. 56Mpts)
- Higher Waveform Capture Rate (Up to 50,000 wfms/s)
- Realtime Waveform Record, Replay & Analysis (Up to 65,000 frames)
- Multi-level Intensity Grading Display (Up to 256 Levels)

## ► Models and Key Specifications

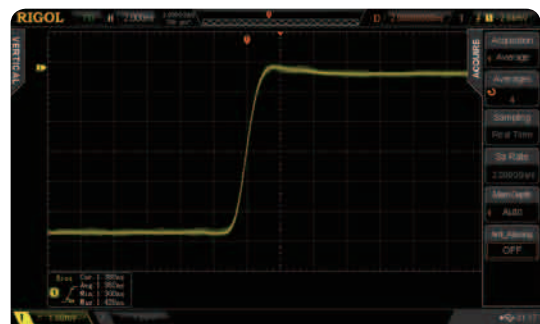
Model Number	DS2072	DS2102	DS2202
Analog BW	70 MHz	100MHz	200 MHz
Channels	2		
Sample Rate (Max. )	2GSa/s (single-channel), 1GSa/s (dual-channel)		
Memory Depth (Max. )	14Mpts (Std.), 56Mpts(Opt.)		
Waveform Capture Rate	50,000 wfms/s (Max. )		
Vertical Scale	500 uV/div to 10 V/div		
Realtime Waveform Recorded	Max. 65,000 frames (Std.)		
Standard Probe	RP3300 350MHz BW Passive Probe: 2 sets		

► Features and Benefits

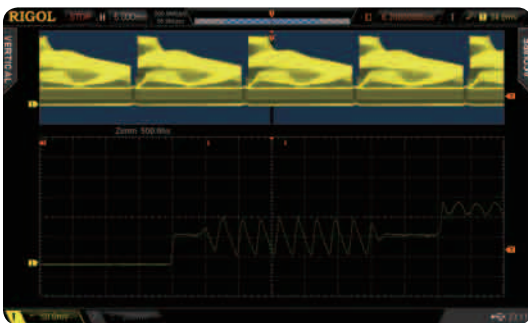
Wider Vertical range(500uV/div~10V/div),Lower noise floor, Better for small signal capturing



Full bandwidth,Lower Overshoot(<5%),Perfect frequency response design



UltraVision: Deeper memory(Std.14Mpts,Opt.56Mpts)



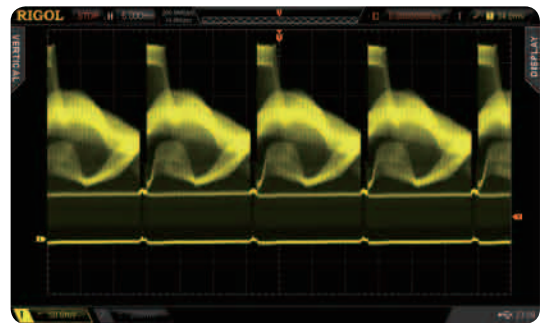
UltraVision: Up to 50,000 wfms/s Waveform capture rate



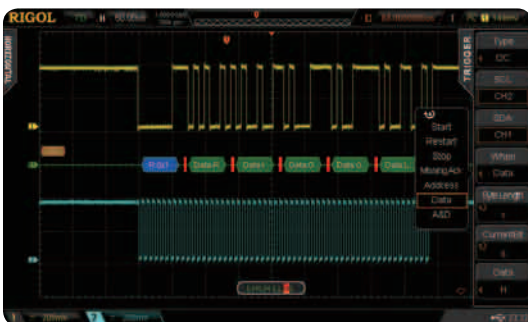
UltraVision:Realtime waveform record,replay,analysis function (std.)



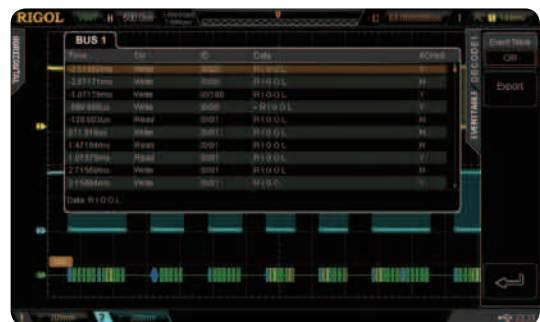
UltraVision: Deeper Memory with Multi-Level intensity grading display(Up to 256 levels)



Std. serial bus trigger functions(RS232,I2C,SPI)



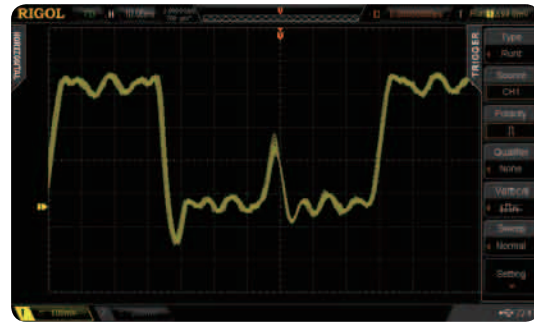
Optional Serial bus decoding function with listing display



Versatile Trigger Functions(Runt, Nth Edge,Setup/ Hold ...)



Runt Trigger



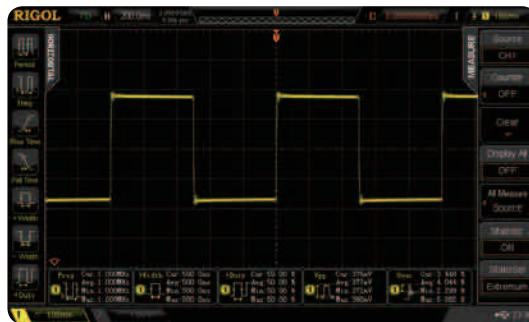
Std. Advanced Math Function



Std. Mask Test Function



Automatic measurements with statistics



Complete Connectivity(USB Host,USB Device,LAN,AUX)



► RIGOL Probes supported by DS2000 Series:

Model Number	Attenuation Ratio	Bandwidth	Input R	Max.Input voltage	Recommended applications
RP2200	1:1 or 10:1	1X: DC~7 MHz 10X:DC~150 MHz	1X: 1MΩ ±2% 10X: 10 MΩ±2%	1X: CAT II 150 V AC 10X: CAT II 300V AC	Small signal test (1X) General purpose test
RP3300	1:1 or 10:1	1X: DC~8 MHz 10X:DC~350 MHz	1X: 1 MΩ ±2% 10X: 10 MΩ±2%	1X: CAT II 150 V AC 10X: CAT II 300V AC	Small signal test (1X) General purpose test
RP3500	10:1	DC~500 MHz	10 MΩ±2%	CAT II 300VAC	General purpose test
RP1300H	100:1	DC~300 MHz	100 MΩ	CAT I 2000V (DC+AC), CAT II 1500 V (DC+AC)	High voltage test
RP1050H	1000:1	DC~50 MHz	10 MΩ±0.5%	DC: 0~15KV DC AC: pulse <=30 KVp-p AC: sine wave <=10 KVrms	High voltage test

RP2200 150MHz Passive Probe



RP3300 350MHz Passive Probe



RP3500 500MHz Passive Probe



RP1300H 300MHz High Voltage Probe



RP1050H 50MHz High Voltage Probe



RT50J 50ohm Impedance adapter (2W,1GHz)



## ► Specifications

All the specifications are guaranteed except parameters marked with "Typical" and the oscilloscope needs to operate for more than 30 minutes under the specified operation temperature.

Sample	
Sample Mode	Real-time sample
Real Time	2 GSa/s (single-channel)
Sample Rate	1 GSa/s (dual-channel)
Peak Detect	500 ps (single-channel) 1 ns (dual-channel)
Averaging	After both channels finish N samples at the same time, N can be 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 or 8192.
High Resolution	12 bit of resolution When $\geq 5 \mu\text{s}/\text{div}$ @ 1 GSa/s (or $\geq 10 \mu\text{s}/\text{div}$ @ 500 MSa/s).
Memory Depth	Single-channel: Auto, 14k pts, 140k pts, 1.4M pts, 14M and 56M pts (option) are available Dual-channel: Auto, 7k pts, 70k pts, 700k pts, 7M pts and 28M pts (option) are available
Input	
Number of Channels	dual-channel
Input Coupling	DC, AC or GND
Input Impedance	$(1M\Omega \pm 1\%) \parallel (16 \text{ pF} \pm 3 \text{ pF})$
Probe Attenuation	0.01X-1000X 1-2-5 step
Coefficient	
Max Input Voltage (1M $\Omega$ )	Maximum input voltage of the analog channel CAT I 300 Vrms, CAT II 100 Vrms, transient overvoltage 1000 Vpk With RP2200 10:1 probe: CAT II 300 Vrms With RP3300 10:1 probe: CAT II 300 Vrms With RP3500 10:1 probe: CAT II 300 Vrms With RP5600 10:1 probe: CAT II 300 Vrms
Horizontal	
Time Base Scale	DS2202: 2 ns/div to 1000 s/div DS2102/DS2072: 5 ns/div to 1000 s/div
Time Base Accuracy <sup>1</sup>	$\leq \pm 25 \text{ ppm}$
Clock Drift	$\leq \pm 5 \text{ ppm/year}$
Max Delay Range	Pre-trigger (negative delay): $\geq 1$ screen width Post-trigger (positive delay): 1 s to 100,000 s
Time Base Mode	Y-T, X-Y, Roll, Delayed
Number of X-Ys	1 path
Waveform Capture Rate <sup>2</sup>	50,000 wfms/s (dots display)
Vertical	
Bandwidth (-3dB)	DS2202: DC to 200 MHz DS2102: DC to 100 MHz DS2072: DC to 70 MHz
Single Bandwidth	DS2202: DC to 200 MHz DS2102: DC to 100 MHz DS2072: DC to 70 MHz
Vertical Resolution	8 bit
Vertical Scale	500 uV/div to 10 V/div
Offset Range	500 uV/div to 50 mV/div: $\pm 2 \text{ V}$ 51 mV/div to 200 mV/div: $\pm 10 \text{ V}$ 205 mV/div to 2 V/div: $\pm 50 \text{ V}$ 2.05 V/div to 10 V/div: $\pm 100 \text{ V}$
Bandwidth Limit <sup>1</sup>	DS2202: 20 MHz/100 MHz DS2102: 20 MHz DS2072: 20 MHz

Low Frequency Response	$\leq 5 \text{ Hz}$ (on BNC)
(AC coupling, -3dB) Rise Time <sup>1</sup>	DS2202: 1.8 ns DS2102: 3.5 ns DS2072: 5 ns
DC Gain Accuracy	$\pm 2\%$ full scale
DC Offset Accuracy	$\pm 0.1 \text{ div} \pm 2 \text{ mV} \pm 1\%$ offset
Channel to Channel Isolation	DC to maximum bandwidth: $>40 \text{ dB}$
Trigger	
Trigger Level	Internal $\pm 5 \text{ div}$ from the center of the screen
Range	EXT $\pm 4 \text{ V}$
Trigger Mode	Auto, Normal, Single
Holdoff Range	100 ns to 10 s
High	75 kHz
Frequency Rejection <sup>1</sup>	
Low	75 kHz
Frequency Rejection <sup>1</sup>	
Trigger Sensitivity	1div (below 10mV or noise rejection is enabled) 0.3div (above 10mV and noise rejection is disabled)
Edge Trigger	
Edge Type	Rising, Falling, Rising&Falling
Pulse Trigger	
Pulse Condition	Positive Pulse Width (greater than, lower than, within specified interval) Negative Pulse Width (greater than, lower than, within specified interval)
Pulse Width Range	2 ns to 4 s
Runt Trigger	
Pulse Condition	None, > (greater than), < (lower than), <> (within the specified interval)
Polarity	Positive, Negative
Pulse Width Range	2 ns to 4 s
Windows Trigger	
Windows Type	Rising, Falling, Rising&Falling
Trigger Position	Enter, Exit, Time
Windows Time	16 ns to 4 s
Nth Edge Trigger	
Edge Type	Rising, Falling
Idle Time	16 ns to 10 s
Number of Edges	1 to 65, 535
Slope Trigger	
Slope Condition	Positive Slope (greater than, lower than, within specified interval) Negative Slope (greater than, lower than, within specified interval)
Time Setting	2 ns to 4 s
Video Trigger	
Signal Standard	Support standard NTSC, PAL and SECAM broadcasting standards Support 480P, 576P, 720P, 1080P and 1080I HDTV standards
Pattern Trigger	
Pattern Setting	H, L, X, Rising Edge, Falling Edge
Delay Trigger	
Edge Type	Rising, Falling
Delay Type	> (greater than), < (lower than), <> (within the specified interval), >> (outside the specified interval)
Delay Time	2 ns to 4 s
TimeOut Trigger	
Edge Type	Rising, Falling, Rising&Falling

TimeOut Value	16 ns to 4 s
Duration Trigger	
Pattern Setting	H, L, X
Trigger Condition	> (greater than), < (lower than), <> (within the specified interval)
Duration	2 ns to 4 s
Setup/Hold Trigger	
Edge Type	Rising, Falling
Data Pattern	H, L
Setup Time	2 ns to 1 s
Hold Time	2 ns to 1 s
RS232/UART Trigger	
Polarity	Negative, Positive
Trigger Condition	Start, Error, Check Error, Data
Baud	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, User
Data Bits	5 bit, 6 bit, 7 bit, 8 bit
I2C Trigger	
Trigger Condition	Start, Restart, Stop, Missing Ack, Address, Data, A&D
Address Bits	7 bit, 10 bit
Address Range	0 to 127, 0 to 1023
Byte Length	1 to 5
SPI Trigger	
Trigger Condition	TimeOut
Timeout Value	100 ns to 1 s
Data Bits	4 bit to 32 bit
Data Line Setting	H, L, X
USB Trigger	
Signal Speed	Low Speed, Full Speed
Trigger Condition	SOP, EOP, RC, Suspend, ExitSuspend

#### Measure

Cursor	Manual mode	Voltage deviation between cursors ( $\Delta V$ ) Time deviation between cursors ( $\Delta T$ ) Reciprocal of $\Delta T$ (Hz) ( $1/\Delta T$ )
	Track mode	Voltage and time values of the waveform point
	Auto mode	Allow to display cursors during auto measurement
Auto Measurement		Measurements of Maximum, Minimum, Peak-Peak Value, Top Value, Bottom Value, Amplitude, Average, Mean Square Root, Overshoot, Pre-shoot, Area, Period Area, Frequency, Period, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A $\rightarrow$ B $\downarrow$ , Delay A $\rightarrow$ B $\uparrow$ , Phase A $\rightarrow$ B $\downarrow$ , Phase A $\rightarrow$ B $\uparrow$
Number of Measurements		Display 5 measurements at the same time
Measurement Range		Screen Region or Cursor Region
Measurement Statistic		Average, Max, Min, Standard Deviation, Number of Measurements
Counter		Hardware 6 bits counter (channels are selectable)

#### Math

Waveform	A+B, A-B, AxB, A/B, FFT, Editable Advanced
Operation	Operation, Logic Operation
FFT Window	Rectangle, Hanning, Blackman, Hamming
FFT Display	Split, Full Screen
FFT Vertical	Linear Vrms, dBV rms
Scale	
Logic Operation	AND, OR, NOT, XOR
Math Function	Intg, Diff, Log, Exp, Sqrt, Sine, Cosine, Tangent

Number of Buses for Decoding	2
Decoding Type	Parallel (standard), RS232/UART (option), I2C (option), SPI (option)

Display	
Display Type	8.0 inches (203 mm) TFT LCD display
Display Resolution	800 horizontal $\times$ RGB $\times$ 480 vertical pixel
Display Color	160,000 Color (TFT)
Persistence Time	Min, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, Infinite
Display Type	Dots, Vectors
Real-time Clock	Time and Date (user adjustable)

I/O	
Standard Ports	USB HOST (support USB-GPIB), USB DEVICE, LAN, Aux Output (TrigOut /PassFail)
Printer Compatibility	PictBridge

#### General Specifications

Probe Compensation Output	
Output Voltage <sup>1</sup>	About 3 V, peak-peak
Frequency <sup>1</sup>	1 kHz
Power	
Power Voltage	100-240 V, 45-440 Hz
Power	Maximum 50 W
Fuse	2 A, T degree, 250 V

Environment	
Temperature Range	In operation: 0 °C to +50 °C Out of operation: -20 °C to +70 °C
Cooling Method	Fan
Humidity Range	Under +35 °C : $\leq$ 90 % relative humidity +35 °C to +50 °C : $\leq$ 60 % relative humidity
Altitude	In operation: under 3,000 meters Out of operation: under 15,000 meters

Mechanical	
Dimensions <sup>3</sup>	Width $\times$ Height $\times$ Depth =361.6 mm $\times$ 179.6 mm $\times$ 130.8 mm
Weight <sup>4</sup>	Without package   3.9 kg $\pm$ 0.2 kg With package   4.5 kg $\pm$ 0.5 kg

Adjustment Interval	The recommended calibration interval is one year.
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Regulation Standards	
Electromagnetic Compatibility	2004/108/EC Execution standard EN 61326-1:2006 EN 61326-2-1:2006
Safety	UL 61010-1:2004; CAN/CSA-C22.2 NO. 61010-1-2004; EN 61010-1:2001; IEC 61010-1:2001

1. Typical.
2. Maximum value with 20 ns, single-channel, dots display and auto memory depth.
3. Tilt tabs and handle folded, knob height included.
4. Standard configuration.

## ► Ordering Information

	Description	Order Number
Model	DS2072(70MHz,2-channel)	DS2072
	DS2102(100MHz,2-channel)	DS2102
	DS2202(200MHz,2-channel)	DS2202
Standard Accessories	Power Cord conforming to the standard of the country	-
	USB Data Cable	CB-USB-150
	2 Passive Probes (350 MHz)	RP3300
	Quick Guide	-
	Resource CD (User's Guide and Application Software)	-
Optional Accessories	Rack Mount Kit	RM-DS-2
Deep Memory Option	56Mpts(single channel)	MEM-DS2
	/28Mpts(dual channel)	
Advanced trigger functions	Windows, Nth Edge,HDTV,Delay, Time Out, Duration, USB	AT-DS2
Decoding Options	RS232,I2C,SPI Decoding Kit	SD-DS2

## Warranty

Three-year warranty,excluding probes and accessories.

**RIGOL**