[MSO-28 Oscilloscope, Logic Analyzer, Spectrum Analyzer]

The compact MSO-28 operates as both a 2 GSa/s Oscilloscope and a 200 MSa/s Logic Analyzer. All channels sample simultaneously at a max rate of 200 MSa/s.

the MSO-28 includes probes, clips, wires, and software. It connects to any PC via USB. Being USB powered means, no external power supply is necessary.

Following the successful deployment of the MSO-19 on the International Space Station (ISS), the MSO-28 was recently delivered to the ISS via Orbital Science's ORB2 mission to join the MSO-19 in expanding the debugging capabilities of astronauts on the ISS.

The MSO-28 appeals to a large audience, including:

- Engineers that need a 2GSa/s Mixed Signal Oscilloscope
- Students
- Hobbyists
- Field service technicians
- Field application engineers
- Consumers who need a small travel scope or logic analyzer
- Customers who require a powerful trigger box to use with other instruments

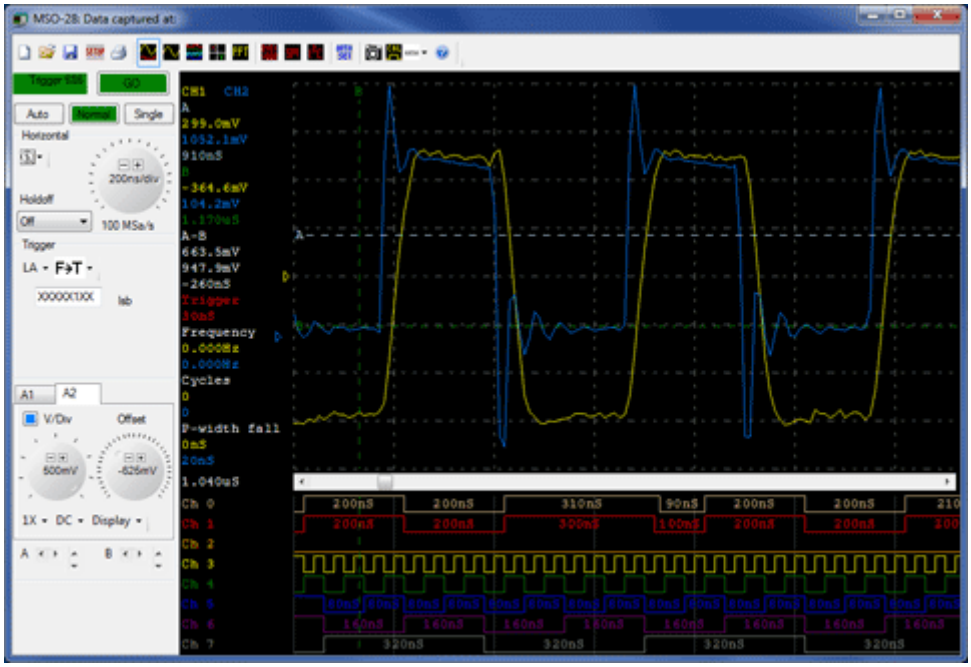
---

Overview

- Inputs
  2 DSO
  8 LA and PG
- High speed sampling
  Single shot: 200 MSa/s
  Repetitive mode: 2 GSa/s
  Bandwidth: 60 MHz
- USB Communication and USB powered
- Autosetup
- Fast, accurate measurement
- 100 MHz Spectrum Analyzer / FFT

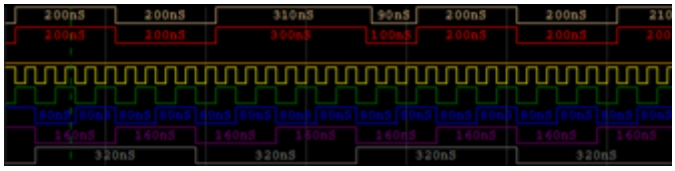
- Advanced triggering
  Level / Edge
  Glitch
  Pulse width
  8 bit Logic Analyzer
  SPI
  I2C
- SPI and I2C decoding
- Data storage with save and export capabilities
- Simple operation
- FrontPanel® Oscilloscope software supports Windows
- DLL libraries (optional)

MSO-28: Time-Synchronized Oscilloscope and Logic Analyzer Inputs



All 10 channels are sampled at the same time and displayed together. This is better than using multiple separate instruments because the analog and digital waveforms are acquired with the same sample clock, assuring accurate time correlation between the two. Even through cabling two individual instruments together, samples would not be within 5 ns of each other, and the triggering would not be as tightly coupled as it would be with a single instrument.

Since the software displays the oscilloscope and logic analyzer data on the same screen, it stays synchronized no matter how much a user scrolls or zooms.



The Logic Analyzer display can show individual pulse width and frequency information.

Advanced Triggering

The MSO-28 can trigger on the Oscilloscope, Logic Analyzer, SPI or I2C inputs. All 10 inputs sample at the same time, and they are displayed together. The external trigger can be used to output to trigger other instruments.

Triggering options include:

- Trigger level rising edge
- Trigger level falling edge
- Pulse width
- 8 bit Logic Analyzer
- SPI
- I2C

High-Speed Sampling

High-speed sampling is key to getting a good capture. An accurate capture of a 60 MHz signal can be obtained with the 200 MSa/s single shot sample rate and 60 MHz bandwidth. With RIS mode sampling, one can capture even faster signals.

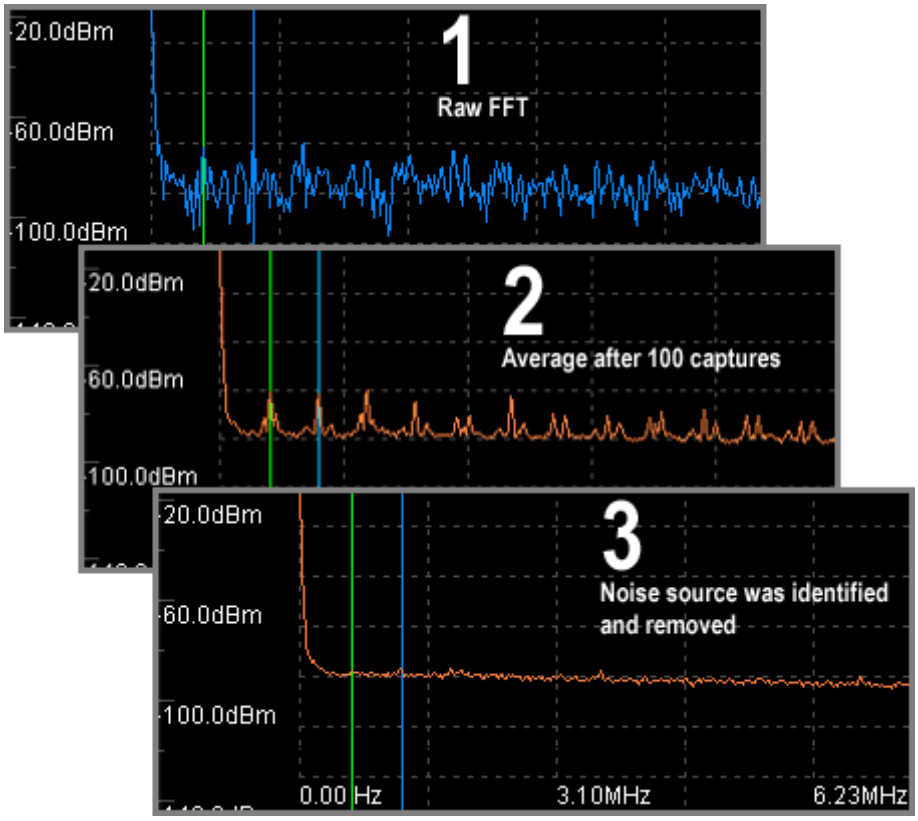
Spectrum Analyzer / FFT

The FFT Spectrum Analyzer has controls for FFT window, FFT type, and FFT resolution.

The software also supports averaging, memory, and plot subtraction. This allows for a whole range of spectral analysis, including: frequency response analysis, power supply noise analysis, etc.

The maximum FFT frequency analysis is 100 MHz.

FFT data can be saved to disk and exported to other programs such as Excel, Mathcad, etc.

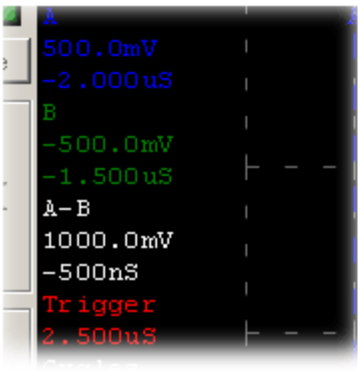


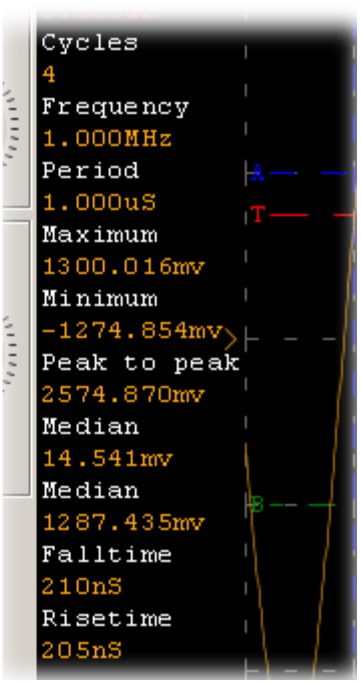
This example shows use of FFT averaging to identify and reduce noise.

Waveform Measurements

Standard waveform measurements are included and can be displayed on the screen right next to the traces.

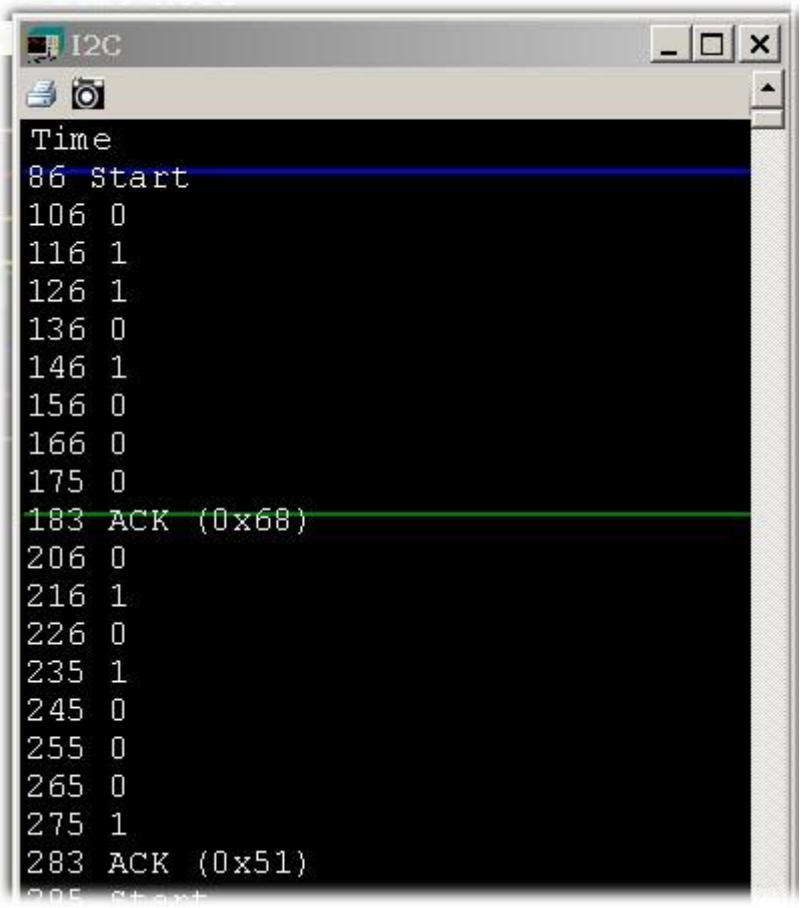
Measurement results can be saved with the data files.





SPI and I2C Decoding

The MSO-28 can display and decode SPI and I2C serial bus protocols as well as trigger on them. SPI and I2C signals can also be viewed as timing waveforms and statelist-style displays.



Simple Operation

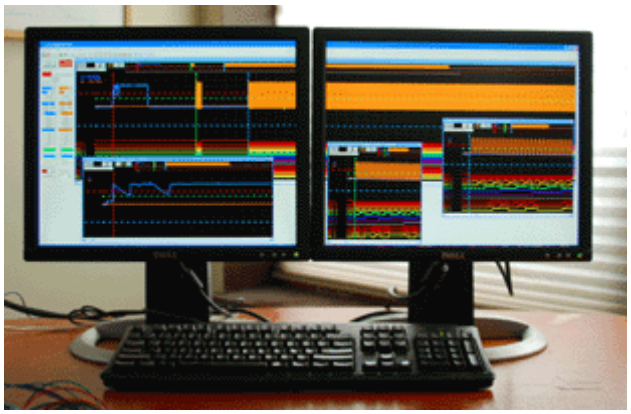
- Fast installation
- Quick measurements
- Simple controls make operation intuitive.

- Perform sophisticated operations that cannot be done with a knob-based DSO.
- Save default setups to disk for easy recall at a future date.
- Screen shots can be pasted into documents and annotated in a preferred image-editing program.

Data Storage

- Data can be exported in "CSV" format to programs like Mathcad, Excel, Word, etc.
- Users can paste screen images into their reports using programs like Word, Excel, image editors, etc.
- Data can even be shared with other computers. One can capture data in the lab and view it in your office or e-mail it to other engineers at remote locations for analysis. There is no need to be connected to our instrument in order to view a file.

Link's Windows-Based Oscilloscope Software Takes Advantage of a Computer's Large Color Screen



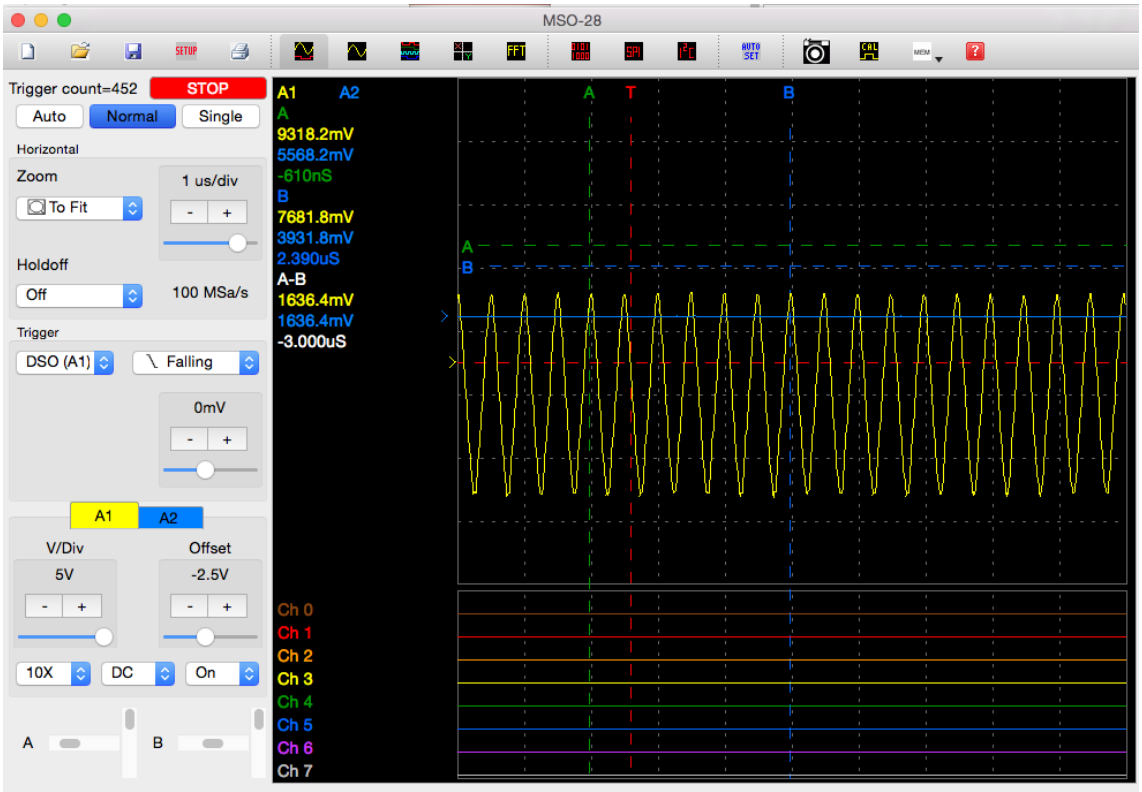
Stand-alone oscilloscope display screens represent a compromise at best. Few people would choose a 7″ or 9″ monitor as the screen for their PC. So why use a small monitor for an oscilloscope? Our software will also work with dual-monitor PCs. Imagine having a 30″ wide trace window!

PC Speed Does Not Significantly Affect the Performance of Our Instruments

All of the high-speed acquisition is done with the MSO hardware; the speed of a PC is not a factor. The PC is simply used for the display and user interface. If a PC is fast enough and has enough memory to run Windows well, it will also run our products well.

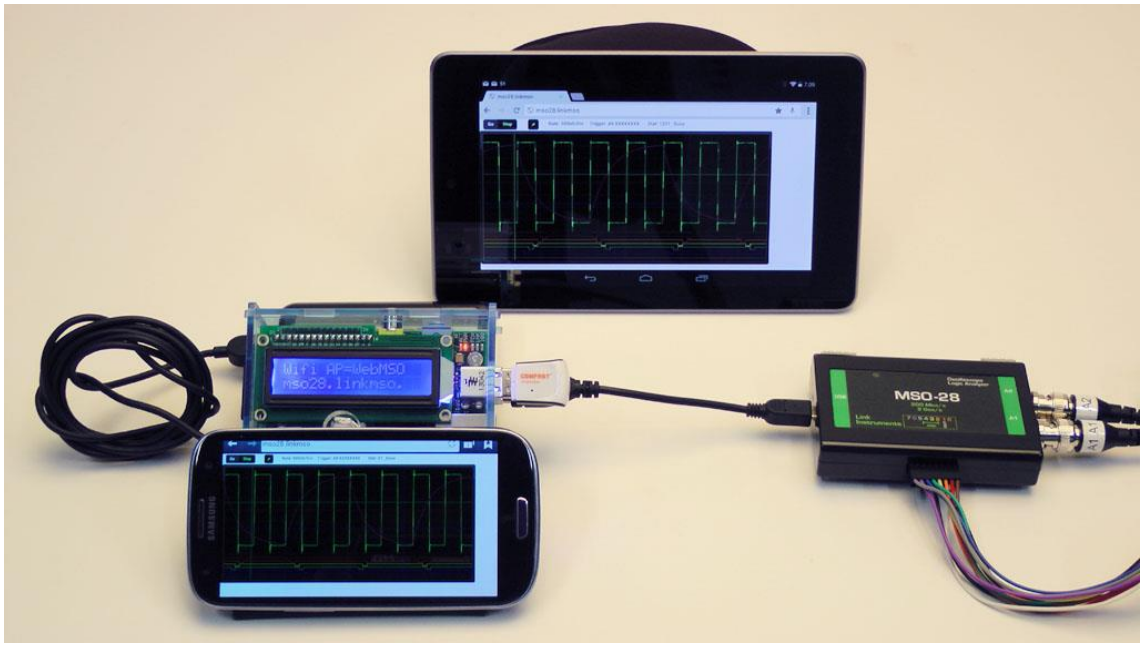
The instrument has high-speed samplers and buffers. It can acquire information at up to 200 MSa/s and stores the data in its own internal data buffers. When these buffers are full, the data is transferred to the PC.

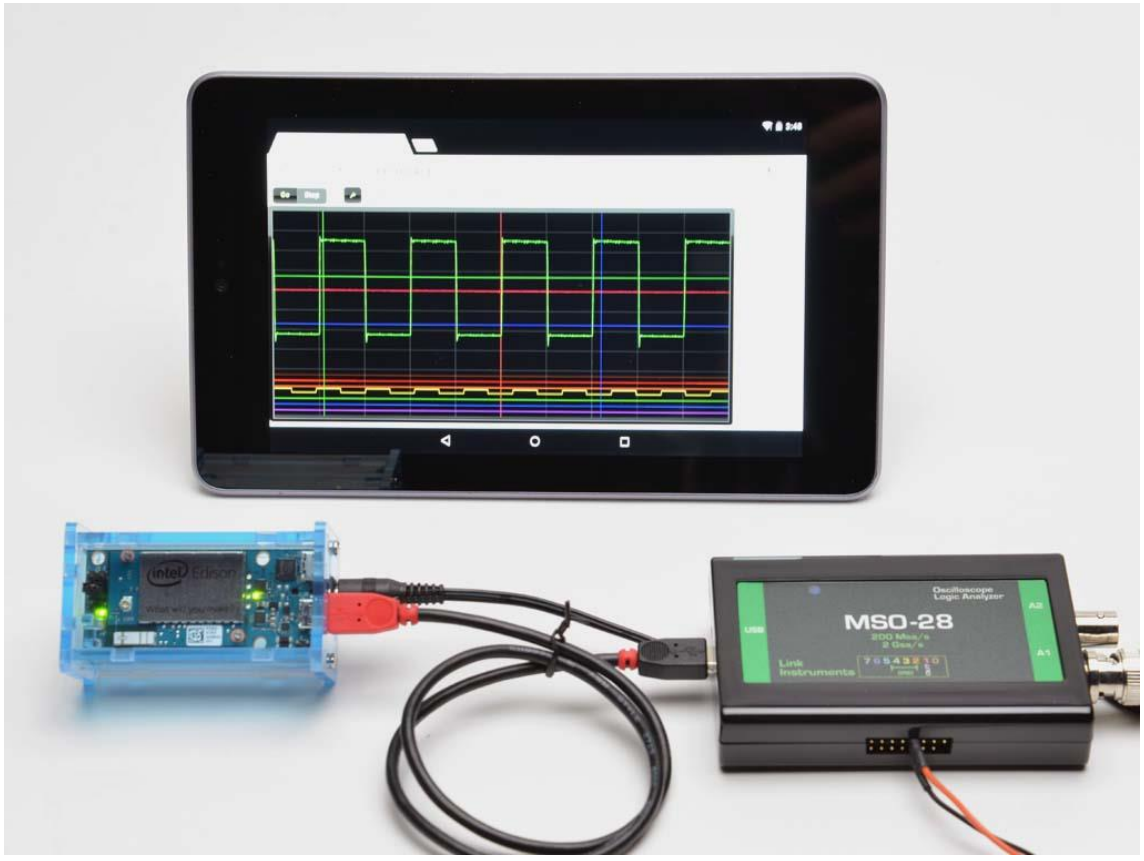
OS X and Linux compatible



In addtion to being Windows compatible, the MSO-28 control software is also available for OS X and Linux operating systems.

Remote data collection via the web





Add a RaspberryPi or Intel Edison for remote operation via the web. Control the MSO-28 remotely from your Android, IOS or web browser. Folllow the links to roll your own PiMSO and Edison-Scope.

Specifications

Timebase

Rate (single shot)

200 MSa/s... 100Sa/s

5 ns / sample to 10ms/sample

50 ns / division to 100ms / division

Rate (Repetitive)

2 GSa/s and 1GSa/s

5 ns/division to 100ns/division

Accuracy

+/- 0.01%

Resolution

5 ns

Skew

< 5 ns

Inputs

DSO channels

2

Logic Analyzer channels

8

Oscilloscope (Analog)

Bandwidth

60 MHz

Gain Range

(per division)full scale = 8 divisions

BNC or Probe (1X)

Voltage per division: 5 mV to 500 mV

Full scale voltage: 40 mV to 4 V

Probe (10X)

Voltage per division: 50 mV to 5 V

Full scale voltage: 400 mV to 40 V

Max Input Voltage

max input voltage at probe tip depends on probe type (1x, 10x, 100x, etc.)

BNC or Probe (1X)

Continuous: ± 20 V DC

Probe (10X)

Continuous: ± 200 V DC

Vertical Range

8 divisions

Offset Range

± 4 divisions

Offset Resolution

1.25mV

Coupling

AC and DC

Impedance

1 MΩ // 15pF

DC Accuracy

± 2%

Memory Channel

Yes

Logic Analyzer (Digital)

Impedance

100K ohm || 2pF

Sensitivity

<500 mv

Max. input voltage

+ 5.5V DC

Bandwidth

100 MHz

Threshold voltage

0.6V to 1.65 V (1.2, 1.5, 1.8,2.5,3.0, 3.3, 5.0 V Logic Families)

Memory channels

Yes

SPI

Trigger

Yes, 32 bit wide trigger word, Mode 0..3 supported

Decoding window

Yes

I2C

Trigger

Yes, 32 bit wide trigger word, Mode 0..3 supported

Decoding window

Yes

Spectrum Analyzer (FFT)

Frequency range

0..100 MHz (with 3dB roll-off at 60 MHz)

Resolution

0.098Hz to 195KHz depending on frequency range setting.

Window

Rectangular, Tapered Rectangular, Triangular, Hamming, Hanning, Flat top and Blackman-Harris.

Plot

Magnitude, Power Spectrum, Power Density, Real and Imaginary.

Zoom

Vertical and Horizontal.

Memory channel

Yes

Averaging channel

Yes

Cursors and Measurements

2

Memory

Buffer size

1000 points/channel

Trigger

Type

Rising Edge (Adjustable level),

Falling Edge (Adjustable level),

Pulse Width

8 bit wide Logic Analyzer

I2C

SPI

External trigger input

Any of the digital inputs can be used as an external trigger.

External trigger out

Yes

Mode

Auto, Normal and Single.

Autosetup

Yes

Range (vertical)

8 divisions

Resolution

1.25 mV

Software

Windows

Win 10,Win 8.1,Win 8,

Win 7-32,Win 7-64,Vista 32,

Vista 64,XP,2 K,

OS X,

Linux

Yes

Spectrum Analysis/FFT

Yes

Measurements

Yes

Physical

Interface

USB

Probes

Two 1x/10x switchable probes, LA wire harness and 10 clips are included.

Connectors

BNC: 2

Logic Analyzer: 8

USB

Calibration point

Yes

Power Requirements

USB powered

Dimensions

4.0″ x 2.4″ x 0.8″ (102mm x 61 mm x 20 mm)

2.5oz. (70g) (MSO only)

Shipping box: 9″ x 6″ x 2″

Shipping weight: 14oz.

Part Number
Description
Price

MSO-28
MSO-28
(includes: MSO, oscilloscope probe, wire harness, logic analyzer clips, USB cable)

Accessories

UX-01
USB Isolator

LX-08
8Ch High Voltage Opto Isolator

MSO28-DLL

C# library DLL library for Visual Studio .NET

DSO-probe-dif-kit2
10x/100x Differential Probe
(includes: probe, power supply, clips and carrying case)

P-PROBE-P60
1x/10x Probe
(60 MHz)

DSO-PROBE-X100
100x Probe
(100 MHz, 2 meters)

MSO-28-WIRES-CLIPS
Wire harness + standard clips
(includes: 1 Wire harness and 10 Clips)

LA-NANOCLIPS-11
11 Nano-clips

LA-NANOCLIPS-4
4 Nano-clips

MSO-28

Software updates

Demo software

User Manuals

MSO-28			
	Version	**Release Date**	**Filename**
Win 10, Win 8.1, Win 8, Win 7 (64 bit), Vista 64 Control software, drivers and users manual.	1.61	07-20-2018	For serial numbers: **1 225100xxxxxx** **MSO28_SETUP_WEB_64bit.exe**
			For serial numbers: **1 125100xxxxxx** 64bit installer **MSO28_64bit_workaroundVID280.exe** Instructions for 64bit install **MSO28-64bit-workaround.pdf**
Win 7(32bit), Vista 32, XP 32 Control software,	1.61	07-20-2018	For serial numbers: **1 225100xxxxxx** **MSO28_SETUP_WEB_32BIT.exe** For serial numbers: **1 125100xxxxxx** **MSO28_SETUP_WEB.exe**

drivers and users manual.			
Users manual			The manual is included with the control software. Download control software.
Demo software			The control software will operate in demo mode when no hardware is connected.
MAC OSX	1.00	10-6-2015	**MSO-28 OSX software update**
Linux	1.01	10-09-2015	**mso-28.deb** A self install .deb package. **VMware Player** can be used to set up a Windows Virtual Machine. VMware also has a product called **VMware vCenter Converter**. It can build an image of an existing Windows computer that can be installed into the Virtual Machine.