InfiniiVision 3000 X-Series Oscilloscopes

Data Sheet

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Anticipate — Accelerate — Achieve

Agilent Technologies

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Breakthrough technology for budget conscious customers

Agilent Technologies is the fastest growing scope vendor in the market for good reason: we deploy our investments in technology to solve your measurement problems. This commitment to superior technology brings you the InfiniiVision X-Series oscilloscopes – engineered to deliver value, functionality and flexibility at prices that fit into your existing budgets. Whether you are looking for a basic entry-level oscilloscope or a more sophisticated model to get your job done, you want the most you can get for your money. The full line of InfiniiVision X-Series oscilloscopes – 30 models – ensure that you get exactly what you need today with room to grow in the future.

Overview of the Agilent InfiniiVision X-Series oscilloscopes

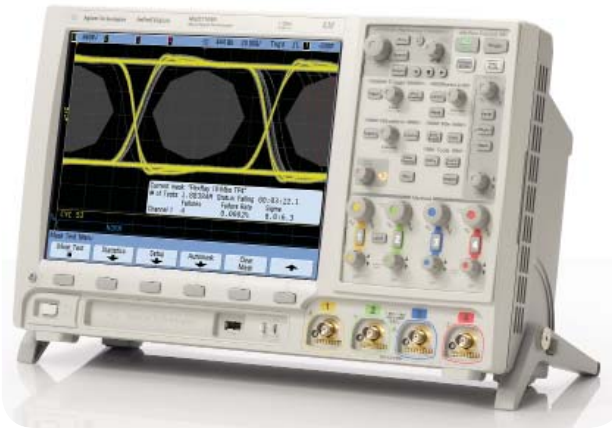
	InfiniiVision 2000 X-Series	InfiniiVision 3000 X-Series
Analog channels	2 and 4 analog channels	
Bandwidth (upgradable)	70, 100, 200 MHz	100, 200, 350, 500 MHz, 1 GHz
Maximum sample rate	1 GSa/s per channel 2 GSa/s half-channel interleaved mode	2 GSa/s per channel (2.5 GSa/s on 1 GHz models) 4 GSa/s half-channel interleaved mode (5 GSa/s on 1 GHz models)
Maximum memory depth	100 kpts (standard)	2 Mpts standard, 4 Mpts optional (Option DSOX3MemUp)
Waveform update rate	50,000 waveforms per second	1,000,000 waveforms per second
Digital timing channels	8 on MSO models or with DSOX2MSO upgrade	16 on MSO models or with DSOX3MSO (for 500 MHz models and below) and DSOXPERFMSO for 1 GHz models upgrade
WaveGen built-in 20 MHz function/arbitrary waveform generator	Yes (Option DSOX2WAVEGEN) No AWG capability	Yes (Option DSOX3WAVEGEN) With AWG capability
Integrated Digital Voltmeter	Yes (option DSOXDVM)	Yes (option DSOXDVM)
Search and navigate	No	Yes
Serial protocol analysis	No	Yes (multiple options), see page 18
Segmented memory	Yes (Option DSOX2SGM)	Yes (Option DSOX3SGM)
Mask limit testing	Yes (Option DSOX2MASK)	Yes (Option DSOX3MASK)
AutoProbe interface	No	Yes
Power Analysis	No	Yes (Option DSOX3PWR)
Advanced Waveform Math	No	Yes (Option DSOX3ADVMATH)

Need more memory or a bigger screen?

See the InfiniiVision 7000B Series oscilloscopes

- 12" display - nearly 40% larger than the nearest competitor.
- 100 MHz to 1 GHz DSO and MSO models
- 8 Mpts memory standard.
- Upgradability for MSO channels and measurement applications
- Hardware-based measurement applications including serial decode
- Xilinx FPGA dynamic probe support
- Altera FPGA dynamic probe support
- Standard LAN, USB, and XGA video out connectivity

See **www.agilent.com/find/7000** for more details



Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

More scope

The InfiniiVision 3000 X-Series offers entry-level price points to fit your budget with superior performance and optional capabilities that are not available in any other oscilloscope in its class. Our breakthrough technology delivers more scope for the same budget.

With more scope, you can:

- **See more** of your signal more of the time with the largest screen in its class, the deepest memory and the fastest waveform update rates
- **Do more** with the power of 5 instruments in 1: oscilloscope, logic timing analyzer, WaveGen built-in 20 MHz function/arbitrary waveform generator (optional), integrated digital voltmeter and protocol analyzer (optional)
- Get more investment protection with the industry's only fully upgradable scope, including bandwidth and the most measurement applications available

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

See more of your signal, more of the time

Largest display

Engineering for the best signal visibility starts with the largest display. Our 8.5-inch WVGA display offers 50% more viewing area with 4 times the resolution (WVGA 800x480 versus WQVGA 400x240) so you can view analog, digital and serial signals easily on screen.

Fastest update rate

With Agilent-designed MegaZoom IV custom ASIC technology, the 3000 X-Series updates waveforms up to 1 million times per second.
If an oscilloscope updates waveforms slowly, it can make using the oscilloscope very frustrating. Fast waveform update rates can improve oscilloscope display quality to show subtle waveform details such as noise and jitter with display intensity modulation. Most importantly, fast waveform update rates improve the probability of capturing random and infrequent events that would not be captured using an oscilloscope with a lower waveform update rate.

Notice that the Agilent 3000 X-Series allows you to see more of your signals, and captures the infrequent glitch and jitter that you are unable to see on other oscilloscopes in this class.

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

See more of your signal, more of the time

Deeper memory for longer time capture

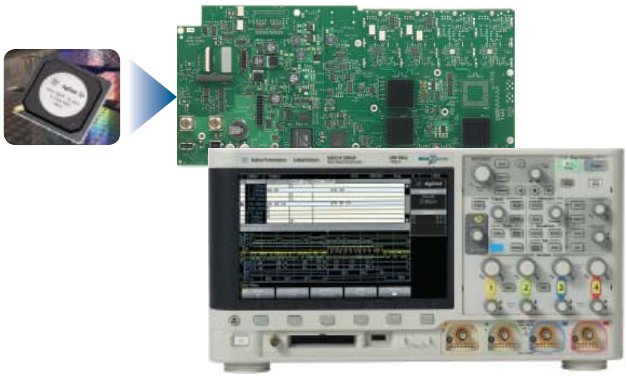
With up to 4 Mpts of MegaZoom IV deep memory, you can capture long, non-repeating signals while maintaining a high sample rate, then quickly zoom in on areas of interest.

The InfiniiVision X-Series optimizes your deep memory oscilloscope measurements by using MegaZoom IV technology to make the most effective trade-offs in sample rate, memory depth and waveform update rate. Although you may think deeper memory is always better, using deep memory means making tradeoffs for many other scopes on the market today.

Scopes with deep memory are typically priced higher, and require additional waveform processing time to acquire deep memory waveforms. This typically means waveform update rates will be reduced, sometimes significantly. For this reason, most other scopes have manual memory-depth selections, and the typical default memory depth setting is usually relatively shallow (10 to 100 kpts). If you want to use deep memory in these other scopes, you must manually turn it on and deal with the update rate tradeoff. So you have to know when it is important to use deep memory and when it is not.

Agilent's exclusive MegaZoom IV technology automatically selects deeper memory when needed in order to maintain fast sample rates while also updating quickly.

How does Agilent do that?



Agilent-designed *MegaZoom* IV custom ASIC technology combines the capabilities of an oscilloscope, logic analyzer, protocol analyzer, and WaveGen built-in function generator in a compact form factor at an affordable price. 4th generation *MegaZoom* technology enables the industry's fastest waveform update rate with responsive deep memory acquisitions.

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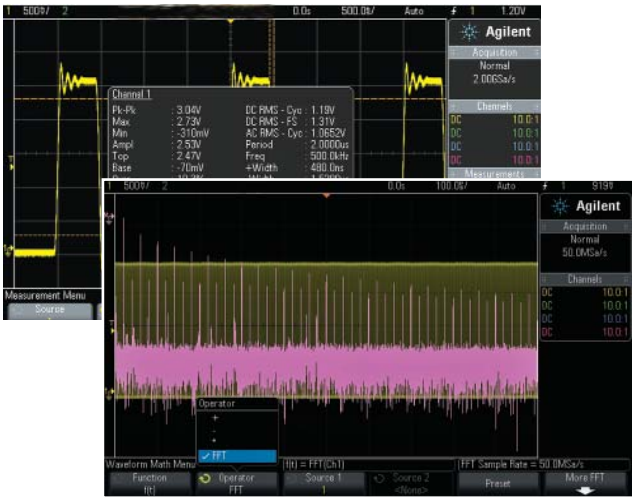
Do more with the power of 5 instruments in 1

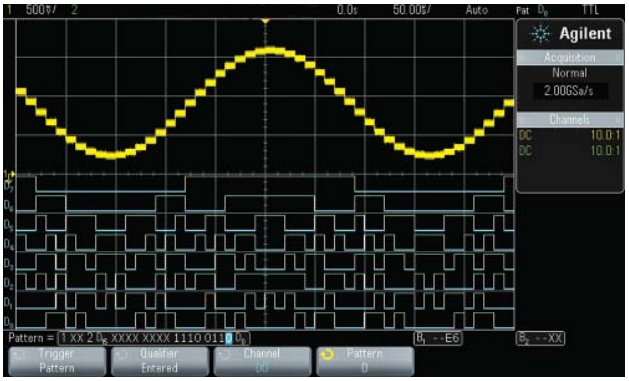
Best-in-class oscilloscope



The InfiniiVision 3000 X-Series features the deepest memory in its class with up to 4 Mpts of Agilent's patented *MegaZoom* IV technology that is always enabled and always responsive providing the industry's fastest update rate at up to 1 million waveforms per second, with no compromise if you turn on measurements or add digital channels.

In addition, the 3000 X-Series offers 33 automated measurements, nine parametric triggers, serial protocol triggers, as well as waveform math functions including FFT. All of this at a comparable price to the Tektronix DPO2000 oscilloscope.

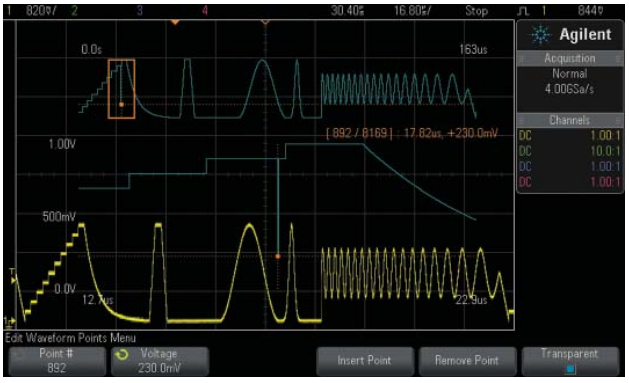
Industry's only upgradable, integrated mixed signal oscilloscope (MSO)



The 3000 X-Series is the first instrument in its class to offer an integrated and upgradable logic timing analyzer. Digital content is everywhere in today's designs and traditional 2 and 4 channel oscilloscopes do not always provide enough channels for the job at hand.

With an additional 16 integrated digital timing channels, you now have up to 20 channels of time-correlated triggering, acquisition and viewing on the same instrument. Buy a 2 or 4 channel DSO and at anytime, upgrade it yourself to an MSO with a license to turn on those integrated 16 digital timing channels.

Industry-exclusive WaveGen built-in 20 MHz function/arbitrary waveform generator



An industry first, the 3000 X-Series offers an integrated built-in 20 MHz function/arbitrary waveform generator. The integrated function generator provides stimulus output of sine, square, ramp, pulse, DC, Sinc (x) exponential rise/fall, cardiac, Gaussian Pulse and noise waveforms to your device under test.

With AWG functionality, you can store the waveforms from analog channels or reference memory to the arbitrary memory and output from WaveGen. Easily create/edit the waveform using built-in editor or by using Agilent's free Benchlink Waveform Builder Basic: www.agilent.com/find/33503.
Turn on WaveGen at any time by ordering the DSOX3WaveGen option and install the license yourself.

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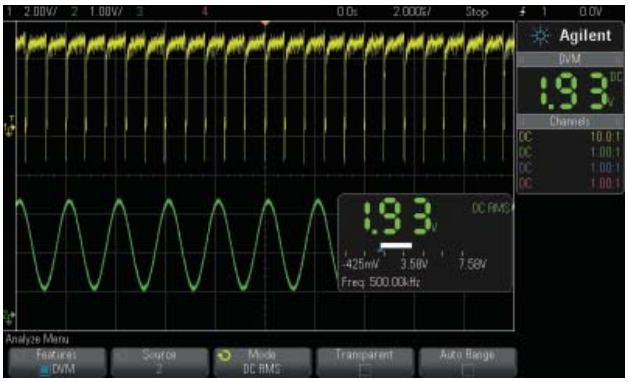
Do more with the power of 5 instruments in 1

Integrated digital voltmeter

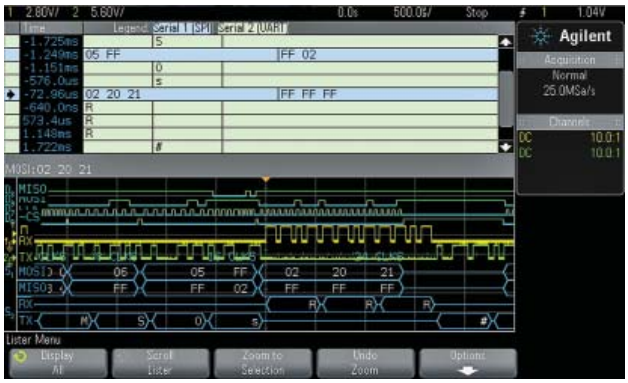
An industry first, the 3000 X-Series offers an integrated 3-digit voltmeter (DVM) and 5-digit frequency counter inside the oscilloscopes. The voltmeter operates through the same probes as the oscilloscope channels, however, the measurements are de-coupled from the oscilloscope triggering system so that both the DVM and triggered oscilloscope measurements can be made with the same connection. The voltmeter results are always displayed, keeping these quick characterization measurements at your fingertips. Turn on DVM at any time by ordering the DSOXDVM option.



Hardware-based serial protocol decode and triggering

- Embedded serial triggering and analysis (I^2C, SPI)
- Computer serial triggering and analysis (RS232/422/485/UART)
- Automotive and industrial serial triggering and analysis (CAN,LIN)
- FlexRay automotive triggering and analysis
- Audio serial triggering and analysis (I^2S)
- Aerospace and Defense serial triggering and analysis (MIL-STD 1553 and ARNC 429)

Agilent's InfiniiVision Series oscilloscopes are the industry's only scopes to use hardware-based serial protocol decoding. Other vendors scopes use software post-processing techniques to decode serial packets/ frames. With these software techniques, waveform and decode-update rates tend to be slow (sometimes seconds per update). That's especially true when using deep memory, which is often required to capture multiple packetized serial bus signals. Faster decoding with hardware-based technology enhances scope usability, and more importantly, the probability of capturing infrequent serial communication errors.



After capturing a long record of serial bus communication using the InfiniiVision scope's MegaZoom IV deep memory, you can easily perform a search operation based on specific criteria, and then quickly navigate to bytes/frames of serial data that satisfy that search criteria. Sometimes it may be necessary to correlate data from one serial bus to another. Agilent's InfiniiVision 3000 X-Series oscilloscope can decode and list two serial buses simultaneously using hardware-based decoding. as well as display the captured data in a time interleaved "Lister" display.

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Get more investment protection with the industry's only fully upgradable oscilloscope

Upgradability:

Project needs change, but traditional oscilloscopes are fixed – you get what you pay for at the time of purchase. With the 3000 X-Series, your investment is protected. If you need more bandwidth (up to 1 GHz), digital channels, WaveGen, DVM or measurement applications in the future, you can easily add them all after the fact.

See pages 32 and 33 for more detailed information on available upgrades.

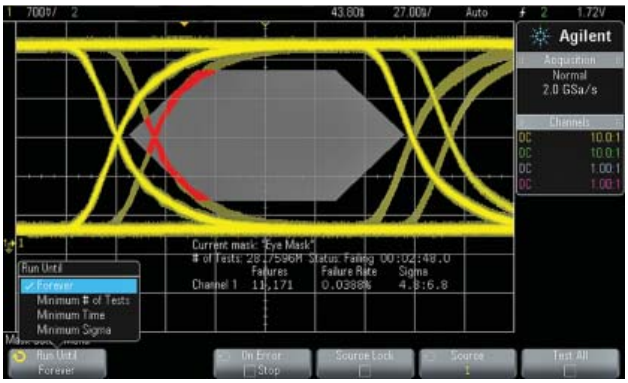
Add at the time of your purchase or upgrade later:

- Bandwidth
- Digital channels (MSO)
- WaveGen built-in 20 MHz function/arbitrary waveform generator
- Integrated digital voltmeter
- Measurement applications
  - Serial protocol analysis
  - Power measurement analysis
  - HDTV video triggering and analysis
  - Advanced math analysis
  - Mask testing
  - Segmented memory
  - Educators' lab kit

Mask testing

Whether performing pass/fail tests to specified standards in manufacturing or testing for infrequent signal anomalies in R&D debug, the mask test option can be a valuable productivity tool. The 3000 X-Series features the industry's only hardware-based mask testing and can perform up to 200,000 tests per second.

Multiple test criteria can be selected including the ability to run tests for a specific number of acquisitions, time, or until detection of a failure. Pass/fail masks can be automatically created based on an input reference waveform along with user-specified tolerance bands, or can be created on a PC and then imported via a USB memory stick.



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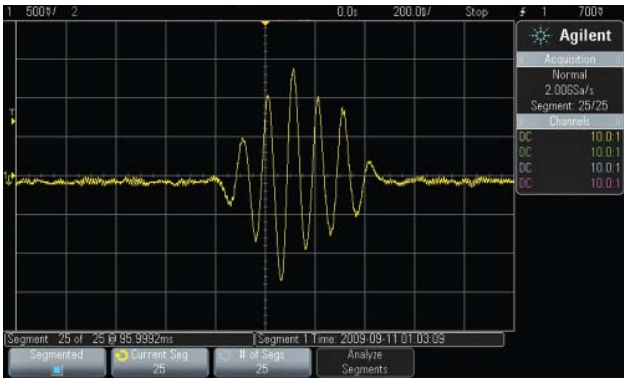
Segmented memory

When capturing low-duty cycle pulses or data bursts, you can use segmented memory acquisition to optimize acquisition memory. Segmented memory acquisition lets you selectively capture and store important segments of signals without capturing unimportant signal idle/dead-time. Segmented memory acquisition is ideal for applications including packetized serial buses, pulsed laser, radar bursts and high-energy physics experiments. Up to 1000 segments can be captured on the 3000 X-Series models with a minimum re-arm time under 1 µs.

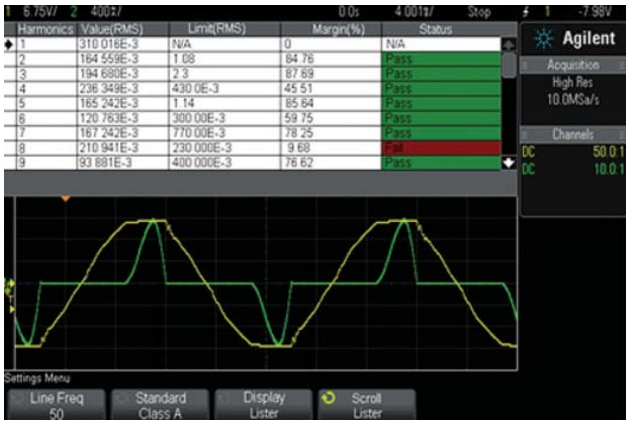


Power Measurement and Analysis

When working with switching power supplies and power devices, the DSOX3PWR power measurements application provides a full suite of power measurements and analysis that runs in the oscilloscope. Measurements include:

- Current harmonics
- Efficiency
- Inrush current
- Modulation
- Power quality
- Switching response
- Transient response
- Turn on/turn off
- Output ripple
- Power Supply Rejection Ratio (PSRR)
- Slew rate

Also included at no additional charge is a license for the U1881A PC-based power analysis software package which provides additional offline measurements and report generation.



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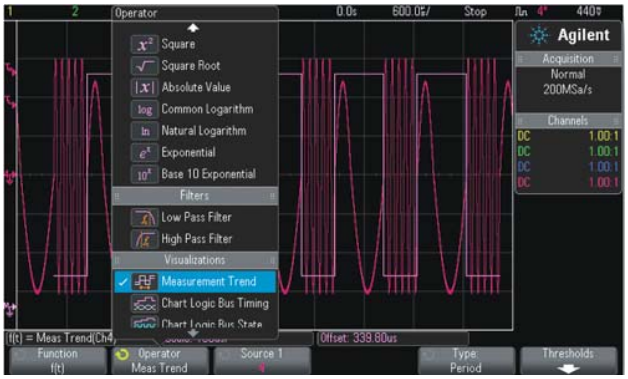
HDTV video triggering and measurement analysis.

Whether debugging consumer electronics with HDTV or characterizing a design, the DSOX3VID measurement application provides support for a variety of HDTV standards including:

- 480p/60
- 567p/50
- 720p/50
- 720p/60
- 1080i/50
- 1080i/60
- 1080p/24
- 1080p/25
- 1080p/30
- 1080p/50
- 1080p/60
- Generic (custom bi-level and tri-level sync video standards)

Advanced math analysis



In addition to the standard waveform math functions (add, subtract, multiply, integrate, differentiate, square root, FFT), the optional DSOX3ADVMATH application provides additional advanced waveform transforms, filters, and visualization tools including:

Transforms

- Ax + B
- Square (x^2)
- Absolute value (|x|)
- Common logarithm (log)
- Natural logarithm (ln)
- Exponential (e^X)
- Base 10 exponential (10^X)

Filters

- Low pass filter (4th order Bessel-Thompson filter with selectable -3dB frequency)
- High pass filter (single-pole high pass filter with selectable -3dB frequency)

Visualizations Tools

- Magnify
- Measurement trend
- Chart logic bus timing
- Chart logic bus state

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Get more investment protection with the industry's only fully upgradable oscilloscope

InfiniiView Oscilloscope Analysis Software (N8900A)

Agilent's InfiniiView PC-based analysis oscilloscope software allows you to do additional signal viewing, analysis and documentation tasks away from your scope. Capture waveforms on your scope, save to a file, and recall the waveforms into InfiniiView. The application supports a variety of popular waveform formats from multiple oscilloscope vendors and includes the following features:

View and analyze away from your scope and target system

Navigate

- Pan and zoom to anywhere in the data record. Navigate in time, or between bookmarks.

View

- Up to 8 waveforms simultaneously, 1, 2, or 4 grids (stacked, side by side, custom layout, zoom)

Measurements

- Over 50 automated measurements
- View up to 20 simultaneously
- User-customizable result window (size, position, information)
- X & Y markers with dynamic delta values

Analyze

- 20 math operators including FFT and filters
- Up to four independent/cascaded math functions
- Measurement histogram

View windows

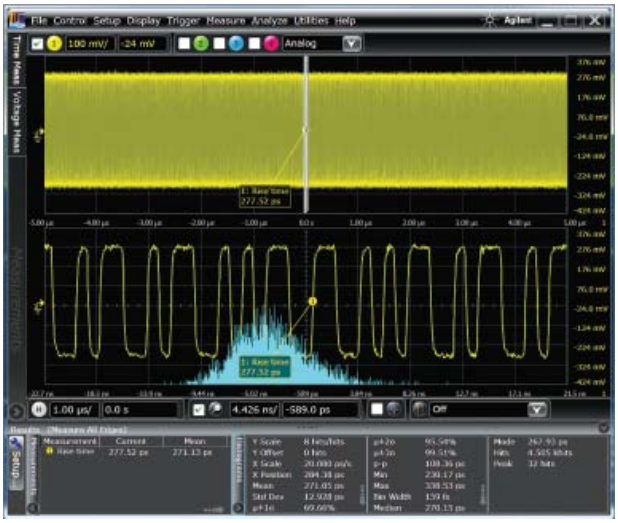
- Analog, math, spectral, measurement results (simultaneous, tabbed, or undocked)

Documentation

- Right-click to copy
- Up to 100 bookmarks
- Annotated axis values
- Markers with dynamic delta value updates when moved
- One step save/load setup and all waveforms

Analysis upgrades (optional)

- Protocol decode for I²C/SPI, RS232/UART, CAN/ LIN/FlexRay, SATA, 8B/10B, digRF v4, JTAG , MIPI D-Phy, SVID, Ehernet 10G KR, PCIe 1, 2, 3, USB 2, 3, HSIC
- Jitter analysis
- Serial data analysis



Use familiar scope controls to quickly navigate and zoom in to any event of interest.

Add bookmarks and call outs to produce friendly and useful documentation.

Other productivity tools

Agilent Spectrum Visualizer (ASV) Software

This PC-based software package connects to the scope via USB or ethernet connection and uses the Agilent I/O libraries to communicate. It provides advanced FFT frequency domain analysis at a cost-effective price as well as spectrum and spectrogram analysis with an intuitive user interface that RF engineers are familiar with. Tools include:

Spectrum measurements

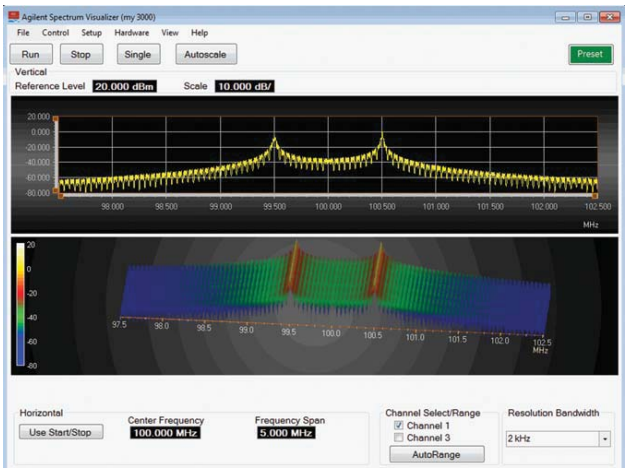
- Power (dBm) vs. frequency
- Horizontal (x-axis): Specify center frequency and frequency span, or start and stop frequencies
- Vertical (y-axis): Specify reference level (dBm) and scale (dB/div)
- Settable resolution bandwidth
- Flat top, Guassian, or Hanning windows applied to the time domain data for the FFT analysis
- Marker to peak amplitude, and marker to center frequency.
- Marker peak search can be enabled for time-varying signals
- Multiple marker, with delta X and delta Y readouts

Acquisition and display modes

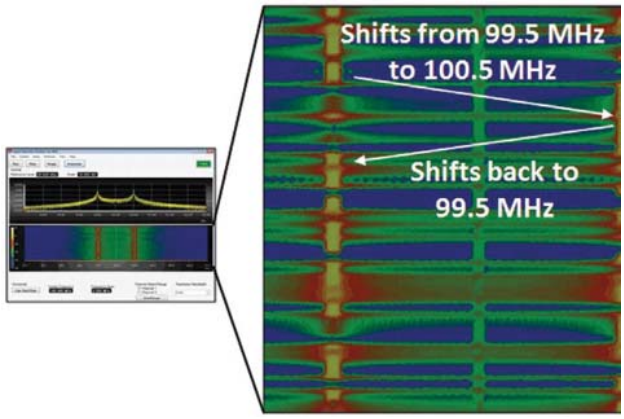
- Free Run (continuous), triggered, stop, single, preset
- Triggered mode: specify trigger power level (dBm), single or continous sweep
- Enable/disable y-axis label
- Enable/disable main trace display
- Max hold display mode
- Gated measurements
- Multiple viewing options
  - Spectrogram
  - waterfall
  - 3D
- Changeable scaling settings on main window
- Local language support
- Multiple oscilloscopes can be configured to allow user to rapidly switch between multiple instruments

Arbitrary waveform generator source control

- 20 MHz sine wave
- 10 MHz square wave
- Pulsed waveform
- WaveGen source settings can be altered while ASV is running for interactive signal source and analysis capability



Waterfall view for ASV spectrogram measurement

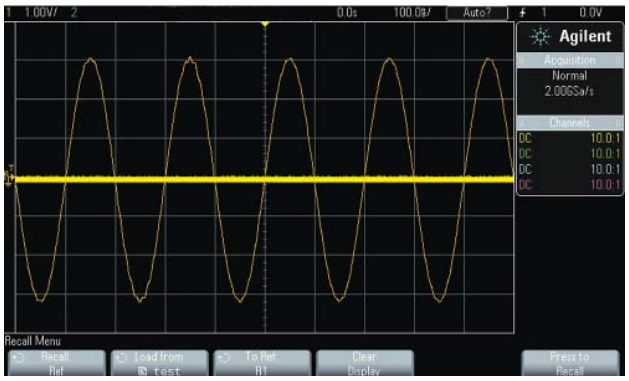


Close-up detail on frequency shift keying (FSK) characteristics with the ASV spectrogram measurement

Other productivity tools

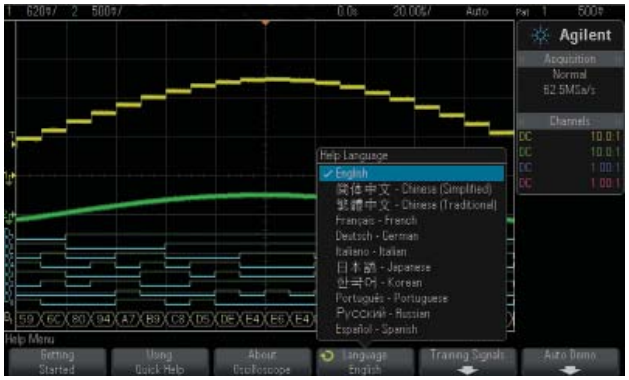
Reference waveforms

Store up to two waveforms in the scope's non-volatile reference waveform memory locations. Compare these reference waveforms with live waveforms, and perform post analysis and measurements on stored data. You can also store waveforms on a removable USB memory device in *.h5 format and recall them back into scope's reference waveform memory later. Save and/or transfer waveforms to a PC as XY data pairs in a comma-separated values format (*.csv) or store bitmap images and transfer them to a PC for documentation purposes in a variety of image formats including: 8-bit bitmaps (*.bmp), 24-bit bitmaps (*.bmp), and PNG 24-bit images (*.png).



Localized GUI and help

Operate the scope in the language most familiar to you. The graphical user interface, built-in help system, front panel overlays, and user's manual are available in 11 languages. Choose from: English, Japanese, simplified Chinese, traditional Chinese, Korean, German, French, Spanish, Russian, Portuguese and Italian. During operation, access the built-in help system just by pressing and holding any button.



Probe solutions and compatibility

Get the most out of your 3000 X-Series scope, by using the right probes and accessories for your application. Agilent offers a complete family of innovative probes and accessories for the InfiniiVision 3000 X-Series scopes. For the most up-to-date and complete information about Agilent's probes and accessories, visit our Web site at www.agilent.com/find/scope_probes.

Also available is the N2744A T2A (Tektronix TekProbe® interface to Agilent AutoProbe) probe interface adapter. This adapter allows users of Tektronix TekProbe active probes to connect directly to the InfiniiVision 3000 X-Series AutoProbe interface BNC input. Protect your previous probe investment while taking advantage to the InfiniiVision 3000 X-Series' unique capabilities and value.

Autoscale

Quickly display any active signals and automatically set the vertical, horizontal and trigger controls for optimal viewing with the press of the autoscale button. (This feature can be disabled or enabled for the education environment).

Other productivity tools

Connectivity and LXI compatibility

Built-in USB host (one front, one back) and USB device ports make PC connectivity easy. Operate the scope from your PC and save/recall stored waveforms as well as set-up files via LAN. The optional LAN/VGA module gives you network connectivity and complete LXI class C support as well as the ability to connect to an external monitor. An optional GPIB module is also available. Only one module may be used at a time.

Intuilink toolbars and Data Capture gives you a quick way to move screen shots and data into Microsoft Word and Excel. These toolbars can be installed from www.agilent.com/find/intuilink

Virtual front panel

Use the VNC viewer via your internet browser to remotely control your oscilloscope from your computers web browser. The virtual front panel looks and acts as the real front panel on the oscilloscope with the same associated keys and knobs. Use this capability in cases where remote training and learning of the oscilloscope are required. This instrument is fully LXI complaint with the LAN/VGA connection module.

Warranty and calibration

Through improved quality processes and rigorous testing, the Agilent InfiniiVision X-Series oscilloscopes are now able to perform at specification for two years without yearly calibration thereby reducing cost of ownership to you.

Secure Environment Mode (SEC)

The secure environment mode comes standard with all models and provides the highest level of security by ensuring that internal non-volatile memory is clear of all setup and trace settings. This option stores setups and traces to internal volatile memory only, and volatile memory is cleared during the power off cycle of the instrument. This procedure ensures that all setup and trace settings are removed from memory.

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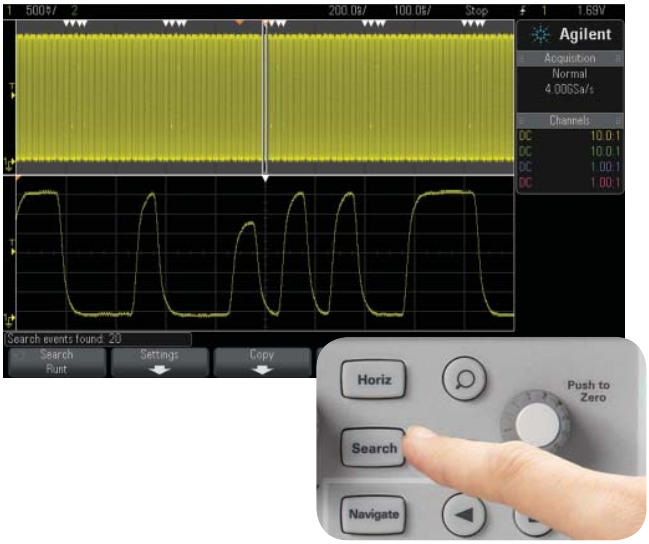
Designed with research and development in mind

Find more glitches and infrequent events quickly

Debugging and fixing designs is one of the most important tasks of R&D engineers so that they can ship reliable products to their customers. Finding the infrequent and random circuit problem is often like looking for a needle in a haystack. In addition to fast waveform updates, which improve a scope's probability of capturing infrequent anomalies, it is often necessary to search waveform records and/or trigger on specific pulse parametric violation conditions. Agilent's InfiniiVision 3000 X-Series oscilloscope provide the most comprehensive set of search & navigation capabilities, as well as the most advanced set of pulse parameter triggering selections of any oscilloscope in its class. Get a long scope life and keep repair costs to a minimum with a standard 3-year warranty and an instrument reliability you've come to expect from the leader in test and measurement equipment.

Search and navigation



When capturing long complex waveforms using the scope's deep acquisition memory, manually scrolling through stored waveform data to find specific events of interest can be slow and cumbersome. But with the InfiniiVision 3000 X-Series scope's automatic search & navigation capability, you can easily set up specific search criteria and then quickly navigate to "found and marked" events using the scope's front panel forward and back navigation keys. Available search criteria include: edges, pulse width (time-qualified), rise/fall times (time-qualified), runt pulses (time- and level-qualified), and serial.

In the example shown in the screen image on the right, the scope was set up to capture a 1 millisecond time-span of a complex digital data stream. Using the scope's search & navigation capability, the scope was able to find, mark (white triangles shows location of each runt), and then quickly navigate to 20 occurrences of "runt" pulses.

Advanced parametric and serial bus triggering

With today's more complex signals, it is also often necessary to trigger on complex signal conditions in order to synchronize the scope's acquisition on specific events of interest. Agilent's InfiniiVision 3000 X-Series scopes can trigger on the following conditions: edge, pulse width (time-qualified), pattern, rise/rall time, Nth edge burst, runt, setup & hold, video, USB, Serial1, and Serial2.

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

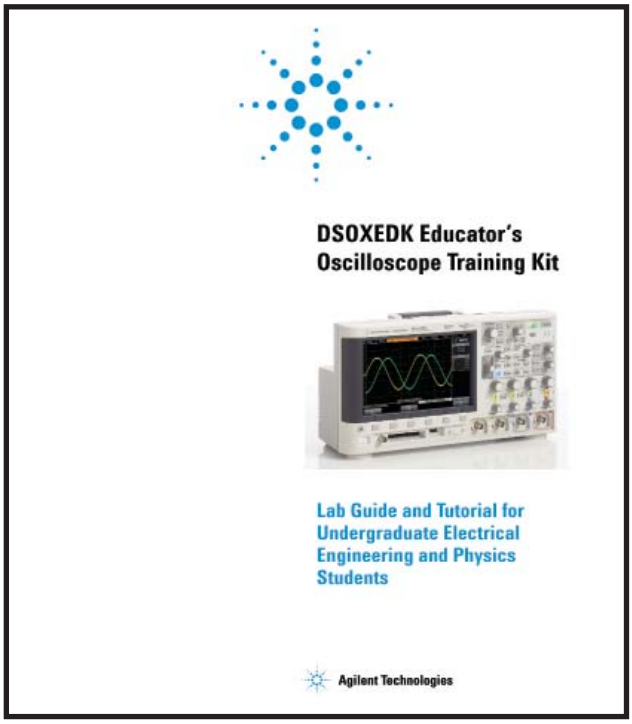
Designed with education in mind

Quickly and easily set up or upgrade a teaching lab

Teach your students what an oscilloscope is and how to perform basic measurements with the Educator's Oscilloscope Training Kit (DSOXEDK). It includes training tools created specifically for electrical engineering and physics undergraduate students and professors. It contains an array of built-in training signals, a comprehensive oscilloscope lab guide and tutorial written specifically for the undergraduate student and an oscilloscope fundamentals PowerPoint slide set for professors and lab assistants. For more information, refer to: www.agilent.com/find/EDK. With features such as the ability to disable autoscale and the 50 Ohm input path, the InfiniiVision X-Series is a perfect choice for education

Get your students to quickly put the scope to work

Intuitive localized front panel design with pushable knobs for quick access to commonly used oscilloscope functions, help students spend more time learning the concepts and less time learning how to use the oscilloscope. Enable your students to answer their own questions with the localized built-in help system that provides quick access by simply pressing and holding any button.

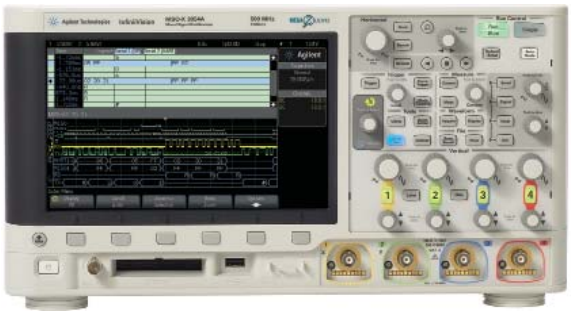


Stretch your budget over the long term

Save money with an industry-exclusive built-in WaveGen function/arbitrary waveform generator instead of buying a separate function generator. Buy what you need today and protect your investment in the future with the only oscilloscopes in this class with upgradable bandwidth, 16 digital channels (MSO), upgradable WaveGen, integrated digital voltmeter and measurement applications. Get a long scope life and keep repair costs to a minimum with a standard 3-year warranty and an instrument reliability you've come to expect from the leader in test and measurement equipment.

Optimize lab bench space

With 5 instruments in 1, you will save on precious lab bench space by getting an oscilloscope, logic timing analyzer, protocol analyzer, WaveGen built-in 20 MHz function/arbitrary waveform generator and integrated digital voltmeter all in one innovative instrument with a footprint that is only 5.57 inches deep. With the large 8.5-inch WVGA display, you can easily view all signals on one screen with enough viewing area for more than one student to view.



Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

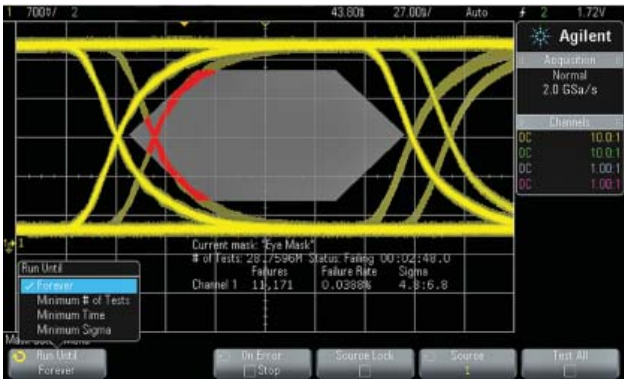
Designed with manufacturing in mind

Stretch a limited budget

Production needs change, but traditional oscilloscopes are fixed – you get what you pay for at time of purchase. With the 3000 X-Series, your investment is protected. If you need more bandwidth (up to 1 GHz) or measurement applications like mask testing in the future, you can easily add them all when you need it.

Get your technicians to quickly put the scope to work

Intuitive localized front panel design and pushable knobs for quick access to commonly used oscilloscope functions, allow technicians to spend more time testing and less time learning where the menus are on the oscilloscope. Enable your technicians to answer their own questions with the localized built-in help system that provides quick access by simply pressing and holding any button.



Get a long scope life and keep repair costs to a minimum with a standard 3-year warranty and a 2-year calibration interval, you get the instrument reliability you've come to expect from the leader in test and measurement equipment.

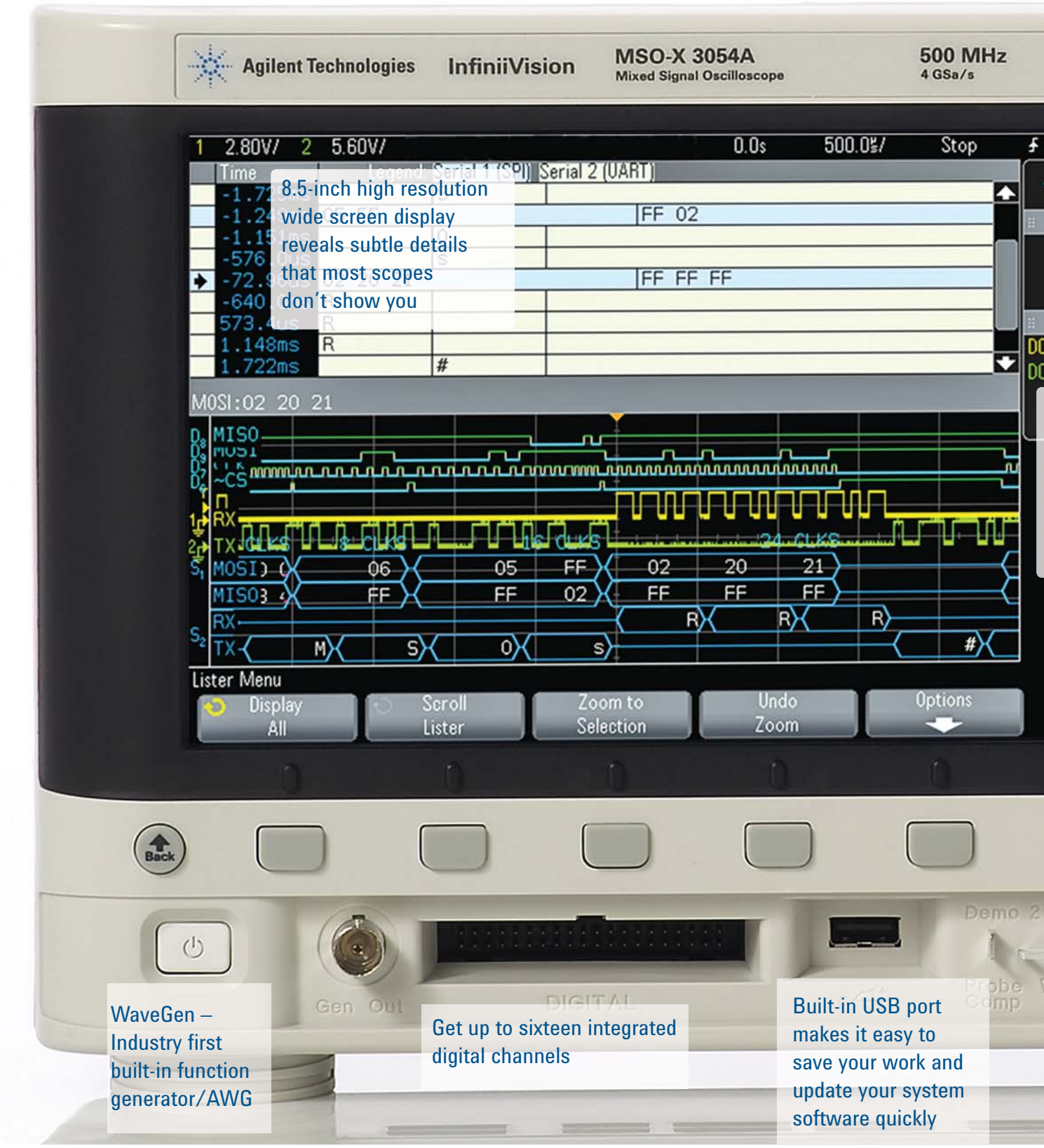
Faster, low failed device escape test throughput

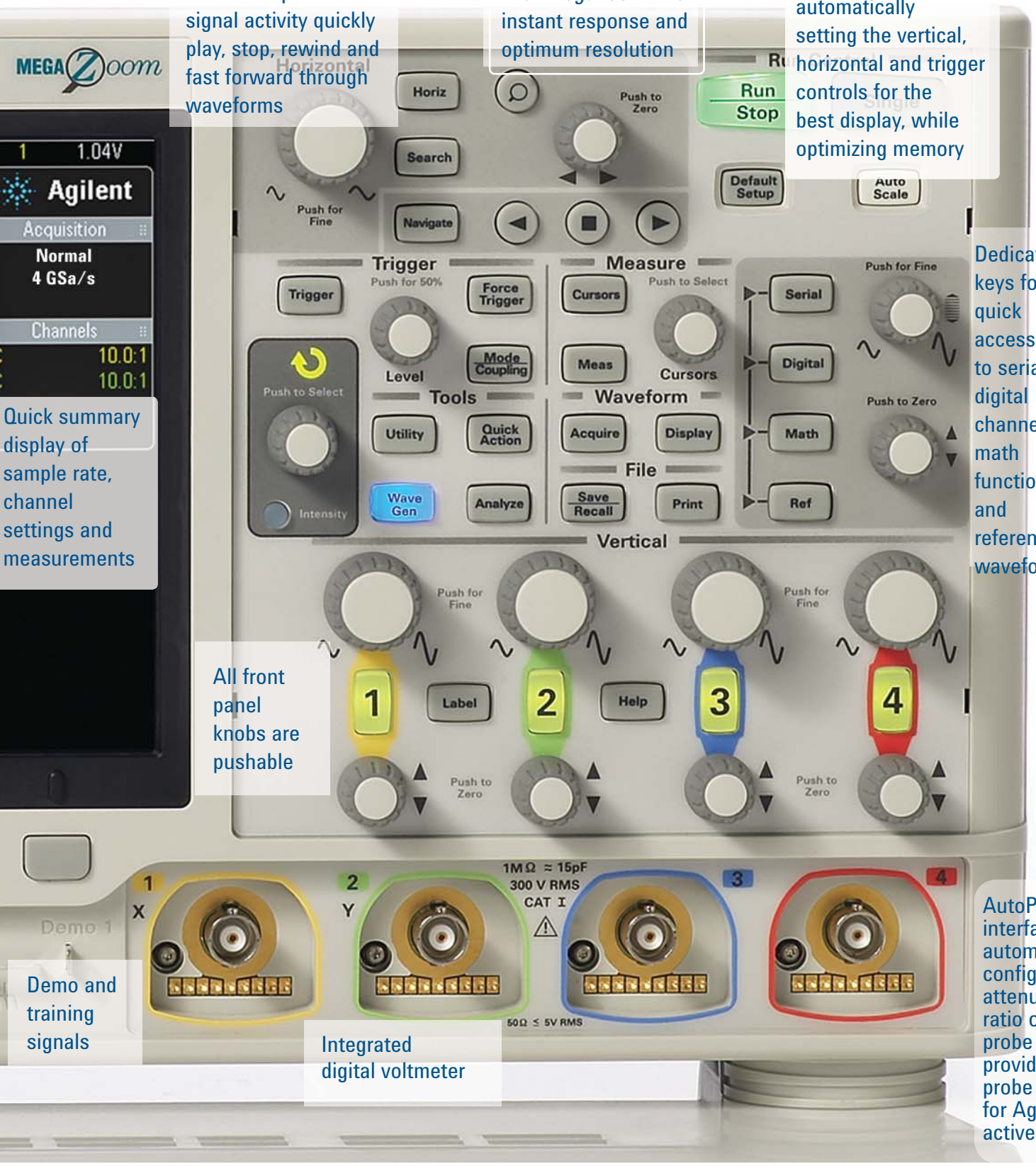
With the fastest architecture in its class, featuring up to 1,000,000 waveforms/sec, you will capture more of those elusive problems you worry about and ensure they don't ship to customers. With the mask limit testing measurement application, you can quickly test up to 200,000 waveforms per second to a known good waveform with a quick go/no-go test results, saving you valuable test time while having more certainty.

Optimize test bench space

With 5 instruments in 1, you will save on precious line bench space by getting an oscilloscope, logic timing analyzer, protocol analyzer, WaveGen built-in 20 MHz function/arbitrary waveform generator, and integrated digital voltmeter all in one innovative instrument with a footprint that is only 5.57 inches deep. With the large 8.5-inch WVGA display, you can easily view all signals on one screen even when the scope is sitting far away from the operator.

Oscilloscope shown actual size




Search and navigate front panel controls make it easy to find and view specific signal activity quickly play, stop, rewind and fast forward through waveforms
Quickly pan and zoom for analysis with *MegaZoom* IV's instant response and optimum resolution
Autoscale lets you quickly display any analog or digital active signals, automatically setting the vertical, horizontal and trigger controls for the best display, while optimizing memory
Dedicated keys for quick access to serial, digital channels, math functions and reference waveforms
Quick summary display of sample rate, channel settings and measurements
All front panel knobs are pushable
Demo and training signals
Integrated digital voltmeter
AutoProbe interface automatically configures the attenuation ratio of the probe and provides the probe power for Agilent's active probes
MEGAZoom
Agilent
Acquisition
Normal
4 GSa/s
Channels
10.0:1
10.0:1
1.04V
Horizontal
Horiz
Search
Navigate
Push for Fine
Push to Zero
Run
Stop
Default Setup
Auto Scale
Trigger
Push for 50%
Force Trigger
Mode Coupling
Level
Measure
Push to Select
Cursors
Meas
Serial
Digital
Math
Ref
Tools
Utility
Quick Action
Analyze
Wave Gen
Waveform
Acquire
Display
File
Save Recall
Print
Intensity
Vertical
Label
Help
1
2
3
4
1M Ω ≈ 15pF
300 V RMS
CAT I
50Ω ≤ 5V RMS
X
Y
Demo 1

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Configuring your InfiniiVision X-Series oscilloscope

Step 1. *Choose your bandwidth, number of channels and memory depth.*

InfiniiVision 3000 X-Series scopes									
	DSOX3012A MSOX3012A	DSOX3014A MSOX3014A	DSOX3024A MSOX3024A	DSOX3032A MSOX3032A	DSOX3034A MSOX3034A	DSOX3052A MSOX3052A	DSOX3054A MSOX3054A	DSOX3102A MSOX3102A	DSOX3104A MSOX3104A
Bandwidth (upgradable)*	100 MHz	100 MHz	200 MHz	350 MHz	350 MHz	500 MHz	500 MHz	1 GHz	1 GHz
Analog channels	2	4	4	2	4	2	4	2	4
Digital channels (MSO)	16 integrated digital channels (optional)*								
Memory	2 Mpts half-channel standard, or 4 Mpts half-channel (DSOX3MEMUP)*								

* See pages 26 and 27 for more detailed upgradability information.

Step 2. *Tailor your scope with measurement applications to save time and money.*

Application	3000 X-Series
WaveGen (built-in function/arbitrary waveform generator)	DSOX3WAVEGEN
Integrated digital voltmeter	DSOXDVM
Benchlink Waveform Builder Pro and Basic	33503A
Educator's kit	DSOXEDK
Mask testing	DSOX3MASK
Segmented memory	DSOX3SGM
Embedded serial triggering and analysis (I^2C, SPI)	DSOX3EMBD
Computer serial triggering and analysis (RS232/422/485/UART)	DSOX3COMP
Automotive serial triggering and analysis (CAN, LIN)	DSOX3AUTO
Automotive triggering and analysis (FlexRay)	DSOX3FLEX
Audio serial triggering and analysis (I^2S)	DSOX3AUDIO
Aerospace and defense serial triggering and analysis (MIL-STD 1553 and ARINC429)	DSOX3AERO
Power measurement and analysis	DSOX3PWR
HDTV Video triggering and analysis	DSOX3VID
Advanced math analysis	DSOX3ADVMATH
InfiniiView oscilloscope analysis software	N8900A
Agilent spectrum visualizer (ASV)	64997A
Vector signal analyzer software	89601B (Version 15 and higher only)

* See pages 27 and 28 for more detailed upgradability information, and installation process.

Configuring your InfiniiVision X-Series oscilloscope

Step 3. *Choose your probes - For complete list of compatible probes, see Agilent document 5968-8153EN.*

Probes	3000 X-Series
N2862B Passive probe 150 MHz 10:1 attenuation	1 per channel included 100 MHz models
N2863B Passive probe 300 MHz, 10:1 attenuation	1 per channel included 200 MHz models
N2890A Passive probe 500 MHz, 10:1 attenuation	1 per channel included 350/500 MHz/1 GHz models
N6450-60002 16 digital channel MSO cable	1 per scope included on all MSO models and DSOX3MSO (500MHz models and below) DSOXPERFMSO (1 GHz model) upgrades
N2889A Passive probe 350 MHz 10:1/1:1 switchable attenuation	Optional
10076B Passive probe 250 MHz 100:1 attenuation	Optional
N2771B Passive probe 50 MHz 1000:1 attenuation	Optional
N2795A Single-ended active probe 1 GHz ±8 V with AutoProbe interface	Optional
N2790A Differential active probe 100 MHz ±1.4 kV with AutoProbe interface	Optional
N2791A Differential active probe 25 MHz ±700 V	Optional
N2792A Differential active probe 200 MHz ±20 V	Optional
N2793A Differential active probe 800 MHz ±15 V	Optional
1146A AC/DC Current probe 100 kHz 100 A	Optional
1147A AC/DC Current probe 50 MHz 15 A with AutoProbe interface	Optional
N2893A AC/DC Current probe 100 MHz 15 A with AutoProbe interface	Optional

* See page 27 for probe compatability table

Step 4. *Add the final touches.*

Recommended accessories	3000 X-Series
LAN/VGA connection module	DSOXLAN
GPIB connection module	DSOXGPIB
Rack mount kit	N6456A
Soft carrying case and front panel cover	N6457A
Hard transit case for 2000 and 3000 X-Series	CaseCruzer 3F1112-1510J (available from http://www.casecruzer.com/)
Hard copy manual	N6459A
Front panel cover only	N2747A

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Performance characteristics

DSOX3000 Series (digital signal oscilloscope) MSOX3000 Series (mixed signal oscilloscope)									
	DSOX3012A MSOX3012A	DSOX3014A MSOX3014A	DSOX3024A MSOX3024A	DSOX3032A MSOX3032A	DSOX3034A MSOX3034A	DSOX3052A MSOX3052A	DSOX3054A MSOX3054A	DSOX3102A MSOX3102A	DSOX3104A MSOX3104A
Characteristics									
Bandwidth* (-3dB)	100 MHz	100 MHz	200 MHz	350 MHz	350 MHz	500 MHz	500 MHz	1 GHz	1 GHz
Analog input channels	2	4	4	2	4	2	4	2	4
Calculated rise time	≤ 3.5 ns	≤ 3.5 ns	≤ 1.75 ns	≤ 1 ns	≤ 1 ns	≤ 700 ps	≤ 700 ps	≤ 450 ps	≤ 450 ps

	All 3000 X-Series models
Hardware bandwidth limits	20 MHz selectable
Input coupling	AC, DC
Input impedance	Selectable: 1 MΩ ± 1%; II 14 pF, 50 Ω ± 1.5%
Input sensitivity range	100 MHz to 500 MHz: 1 mV/div to 5 V/div** (1 MΩ and 50 Ohm) 1 GHz model: 1 mV/div to 5 V/div** (1 MΩ), 1mV/div to 1V/div (50 Ohm)
Maximum sample rate	2 GSa/s per channel, 4 GSa/s half-channel interleaved (100 to 500MHz models) 2.5 GSa/s, 5 GSa/s half-channel interleaved (1 GHz models)
Maximum memory depth (record length)	1 Mpt per channel, 2 Mpts half-channel interleaved (standard), 2 Mpts per channel, 4 Mpts half-channel interleaved (optional with DSOX3MEMUP)
Display	8.5-inch WVGA with 64 levels of intensity grading
Waveform update rate (max)	1,000,000 waveforms/s
Vertical resolution	8 bits
Horizontal resolution	2.5 ps
Maximum input voltage	CAT I 300 Vrms, 400 Vpk; transient overvoltage 1.6 kVpk CAT II 300 Vrms, 400 Vpk With N2862A, N2863A or N2890A 10:1 probe: 300 Vrms
DC vertical accuracy	±[DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale] **
DC vertical gain accuracy*	±2% full scale**
Channel-to-channel isolation	> 100:1 from DC to maximum specified bandwidth of each model (measured with same V/div and coupling on channels)
Offset range	±2 V (1 mV/div to 200 mV/div) ±50 V (> 200 mV/div to 5 V/div)
DC vertical offset accuracy	±0.1div ± 2mV ± 1% of offset setting

* Denotes warranted specifications, all others are typical.
Specifications are valid after a 30-minute warm-up period and ±10 °C from firmware calibration temperature.

** 1 mV/div and 2 mV/div are a magnification of 4 mV/div setting. For vertical accuracy calculations, use full scale of 32 mV for 1 mV/div and 2 mV/div sensitivity setting.

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Performance characteristics

Vertical system digital channels	
	All MSO 3000 X-Series models and on all DSO 3000 X-Series models with after purchase upgrade
Characteristics	
Digital input channels	16 digital (D0 to D15)
Thresholds	Threshold per set of 8 channels
Threshold selections	TTL (+1.4 V) 5 V CMOS (+2.5 V) ECL (–1.3 V) User-definable (selectable by pod)
User-defined threshold range	±8.0 V in 10 mV steps
Maximum input voltage	±40 V peak CAT I; transient overvoltage 800 Vpk
Threshold accuracy*	±(100 mV + 3% of threshold setting)
Maximum input dynamic range	±10 V about threshold
Minimum voltage swing	500 mVpp
Input impedance	100 kΩ ±2% II at probe tip
Probe loading	~8 pF
Vertical resolution	1 bit

Horizontal system analog channels	
	All 3000 X-Series models
Characteristics	
Maximum sample rate	4 GSa/s half-channel interleaved, 2 Gsa/s per channel (100 to 500MHz models) 5 GSa/s half-channel interleaved, 2.5 Gsa/s per channel (1GHz models)
Maximum record length	2 Mpts half-channel interleaved, 1 Mpts per channel (Standard) 4 Mpts half-channel interleaved, 2 Mpts per channel (Optional with DSOX3MEMUP)
Maximum duration of time captured at highest sample rate (all channels)	500Kpts (analog and digital channels) with 4M memory upgrade (DSOX3MEMUP)

	DSOX3012A MSOX3012A	DSOX3014A MSOX3014A	DSOX3024A MSOX3024A	DSOX3032A MSOX3032A	DSOX3034A MSOX3034A	DSOX3052A MSOX3052A	DSOX3054A MSOX3054A	DSOX3102A MSOX3102A	DSOX3104A MSOX3104A
Time base range (s/div)	5 ns/div to 50 s/div	5 ns/div to 50 s/div	2 ns/div to 50 s/div	2 ns/div to 50 s/div	2 ns/div to 50 s/div	1 ns/div to 50 s/div	1 ns/div to 50 s/div	500 ps/div to 50 s/div	500 ps/div to 50 s/div

	All 3000 X-Series models
Time base delay time range	Pre-trigger – Greater of 1 screen width or 250 µs Post-trigger – 1 s to 500 s
Channel-to-channel deskew range	± 100 ns
Time base accuracy*	25 ppm ± 5 ppm per year (aging)
Δ Time accuracy (using cursors)	±(time base acc. x reading) ± (0.0016 x screen width) ± 100 ps
Modes	Main, zoom, roll, XY
XY	On channels 1 and 2 only Z Blanking on Ext Trigger Input, 1.4 V threshold Bandwidth: Maximum bandwidth Phase error at 1 MHz: < 0.5 degree

* Denotes warranted specifications, all others are typical.
Specifications are valid after a 30-minute warm-up period and ±10 °C from firmware calibration temperature.

Performance characteristics

Horizontal system digital channels	
	All MSO models and DSO models with MSO upgrade
Characteristics	
Maximum sample rate	1 GSa/s; 1.25 GSa/s (1 GHz models)
Maximum record length	1 Mpts per channel standard, max 1.25 GSa/s for the 1 GHz model (with digital channels only) 2 Mpts per channel with DSOX3MEMUP memory upgrade option(with digital channels only)
Minimum detectable pulse width	5 ns
Channel-to-channel skew	2 ns (typical); 3 ns (maximum)

Trigger system	
	All 3000 X-Series models
Characteristics	
Trigger modes	• Normal (triggered): requires trigger event for scope to trigger • Auto: triggers automatically in absence of trigger event • Single: triggers only once on a trigger event, press **[Single]** again for scope to find another trigger event, or press **[Run]** to trigger continuously in either Auto or Normal mode • Force: front panel button that forces a trigger
Trigger coupling	DC: DC coupled trigger AC: AC coupled trigger, cutoff frequency: < 10 Hz (internal); <50 Hz (external) HF Reject: High frequency reject, cutoff frequency ~ 50 kHz LF Reject: Low frequency reject, cutoff frequency ~ 50 kHz Noise Reject: Selectable OFF or ON, decreases sensitivity 2x
Trigger holdoff range	40 ns to 10.00 s
Trigger sensitivity	
Internal*	<10 mV/div: greater of 1 div or 5 mV; ≥ 10 mV/div: 0.6 div
External*	200 mVpp from DC to 100 MHz 350 mVpp 100 MHz to 200 MHz
Trigger level range	
Any channel	± 6 div from center screen
External	± 8 V

* Denotes warranted specifications, all others are typical.
Specifications are valid after a 30-minute warm-up period and ±10 °C from firmware calibration temperature.

Performance characteristics

Trigger type selections	
	All 3000 X-Series models
Characteristics	
Edge	Trigger on a rising, falling, alternating or either edge of any source
Pulse width	Trigger on a pulse on a selected channel, whose time duration is less than a value, greater than a value, or inside a time range • Minimum duration setting: 2 ns- 10 ns (depends on bandwidth) • Maximum duration setting: 10 s
Runt	Trigger on a position runt pulse that fails to exceed a high level threshold. Trigger on a negative runt pulse that fails to exceed a low level threshold. Trigger on either polarity runt pulse based on two threshold settings. Runt triggering can also be time-qualified (< or >) with a minimum time setting of 4 ns and maximum timesetting of 10 s.
Setup and hold	Trigger and clock/data setup and/or hold time violation from < 0.0 to 10 s
Rise/fall time	Trigger on rise time or fall time edge speed violations (< or >) based on user-selectable threshold. Time settings range from (< or >) or 2 ns to 10 s.
N^{th} edge bust	Trigger on the N^{th} edge of a burst that occurs after a specified idle time.
Pattern	Trigger when a specified pattern of high, low, and don't care levels on any combination of analog, digital , or trigger channels is [entered | exited]. Pattern must have stabilized for a minimum of 2 ns to qualify as a valid trigger condition.
Time-qualified pattern	Trigger on a multi-channel pattern whose time duration is less than a value, greater than a value, greater than a time value with a timeout, or inside or outside of a set of time values. • Minimum duration setting: 2 ns - 10 ns (depends on bandwidth) • Maximum duration setting: 10 s
OR Trigger	Trigger on any selected edge across multiple analog or digital channels
Edge then Edge (B Trigger)	Arm on a selected edge, wait a specified time, then trigger on a specified count of another selected edge
Video (Standard)	Trigger on all lines or individual lines, odd/even or all fields from composite video, or broadcast standards (NTSC, PAL, SECAM, PAM-M)
Enhanced Video (optional)	Trigger on lines and fields of enhanced and HDTV standards (480p/60, 567p/50, 720p/50, 720p/60, 1080p/24, 1080p/25, 1080p/30, 1080p/50, 1080p/60, 1080i/50, 1080i/60).
USB	Trigger on start of packet, end of packet, reset complete, enter suspend, or exit suspend. Support USB low-speed and full-speed.
I^2C (optional)	Trigger on I^2C (Inter-IC bus) serial protocol at a start/stop condition or user defined frame with address and/or data values. Also trigger on missing acknowledge, address with no accq, restart, EEPROM read, and 10-bit write.
SPI (optional)	Trigger on SPI (Serial Peripherial Interface) data pattern during a specific framing period. Supports positive and negative Chip Select framing as well as clock Idle framing and user-specified number of bits per frame.
RS-232/422/485/UART (optional)	Trigger on Rx or Tx start bit, stop bit or data content
I^2S (optional)	Trigger on 2's complement data of audio left channel or right channel (=, ≠, <, >, > <, < >, increasing value, or decreasing value)
CAN (optional)	Trigger on CAN (controller area network) version 2.0A and 2.0B signals. Trigger on the start of frame (SOF) bit (standard). Remote frame ID (RTR), data frame ID (~RTR), remote or data frame ID, data frame ID and data, error frame, all errors, acknowledge error and overload frame.
LIN (optional)	Trigger on LIN (Local Interconnect Network) sync break, sync frame ID, or frame ID and data.
FlexRay (optional)	Trigger on FlexRay signals based on frame ID, frame type (sync, start-up, null, normal), cycle-repetitive, cycle-base, and errors.
MIL-STD 1553 (optional)	Trigger on MIL-STD 1553 signals based on word type (Data or Command/Status), Remote Terminal Address, data, and errors (parity, sync, Manchester encoding).
ARINC 429 (optional)	Trigger on ARINC 429 signals based on label, data, and errors (parity, word, gap).

Oscilloscopes redefined: Breakthrough technology delivers more scope for the same budget

Performance characteristics

Acquisition modes	
	All 3000 X-Series models
Characteristics	
Normal	
Peak detect	Capture glitches as narrow as 250-ps at all timebase settings
Averaging	Selectable from 2, 4, 8, 16, 64, ... to 65,536
High Resolution Mode	12 bits of resolution when ≥10 µs/div at 4 GSa/s and 5 GSa/s (1 GHz models) or ≥20-µs/div at 2 GSa/s
Segmented (optional)	Re-arm time = 1 µs (minimum time between trigger events)

Waveform measurements	
	All 3000 X-Series models
Characteristics	
Cursors**	• Single cursor accuracy: ±[DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale] • Dual cursor accuracy: ±[DC vertical gain accuracy + 0.5% full scale]* • Units: Seconds(s), Hz (1/s), Phase (degrees), Ratio (%)
Automatic measurements	Measurements continuously updated with statistics. Cursors track last selected measurement. Select up to four measurements from the list below: • Voltage: peak-to-peak, maximum, minimum, amplitude, top, base, overshoot, pre-shoot, average- N cycles, average- full screen, DC RMS- N cycles, DC RMS- full screen, AC RMS- N cycles, AC RMS- full screen (standard deviation), ratio (RMS1/RMS2) • Time: period, frequency, counter, + width, - width, burst width, duty cycle, rise time, fall time, delay, phase, X at min Y, X at Max Y • Count: positive pulse count, negative pulse count, rising edge count, falling edge count • Mixed: area- N cycles, area- full screen
Counter	Built-in frequency counter: • Source: on any analog or digital channel • Resolution: 5 digits • Maximum frequency: bandwidth of scope

Waveform math	
	All 3000 X-Series models
Characteristics	
Arithmetic	f (g(t)) g(t): { add, subtract, multiply between any 2 channels} f(t): {FFT(g(t)), differentiate d/dt g(t), integrate $\int$ g(t) dt, square root $\sqrt{}$g(t) } Enabled between any combination of two channels
Arithmetic	DSOX3ADVMath advanced waveform math option adds Ax + B, Square, Absolute, Common Log, Natural Log, Exponential, Base 10 Exponential, LP Filter, HP Filter, Magnify, Measurement Trend, Chart Logic Bus (Timing or State).
FFT	Up to 64 kpts resolution Set FFT Window to: Hanning, Flat Top, Rectangular, Blackman-Harris

* Denotes warranted specifications, all others are typical.
Specifications are valid after a 30-minute warm-up period and ±10 °C from firmware calibration temperature.

** 1 mV/div and 2 mV/div is a magnification of 4 mV/div setting. For vertical accuracy calculations, use full scale of 32 mV for 1 mV/div and 2 mV/div sensitivity setting.

Performance characteristics

Display characteristics	
	All 3000 X-Series models
Characteristics	
Display	8.5-inch WVGA
Resolution	800 (H) x 480 (V) pixel format (screen area)
Graticules	8 vertical divisions by 10 horizontal divisions with intensity controls.
Format	YT and XY
Maximum waveform update rate	> 1,000,000 wfms/s
Persistence	Off, infinite, variable persistence (100 ms - 60 s)
Intensity gradation	64 intensity levels

Input/output ports	
	All 3000 X-Series models
Port	
USB 2.0 hi-speed host port	Two USB 2.0 hi-speed host ports, front and real panel Supports memory devices and printers
USB 2.0 hi-speed device port	One USB 2.0 hi-speed device port on rear panel
LAN port	10/100Base-T (requires DSOXLAN module)
Video out port	Connect oscilloscope display to an external monitor or projector (requires DSOXLAN module)
GPIB port	To allow easy migration into existing test systems (requires DSOXGPIB)
Probe compensator output	Square wave: 2.5 Vpp, 1 kHz
Kensington style lock	Rear-panel security slot connects to standard Kensington-style lock
WaveGen out	Front-Panel BNC Connector

WaveGen – Built-in function/arbitrary waveform generator	
Waveforms	Sine, Square, Ramp, Pulse, DC, Noise, Sine Cardinal (Sinc), Exponential Rise, Exponential Fall, Cardiac, Gaussian Pulse, and Arbitrary.
Sine	• Frequency range: 0.1 Hz to 20 MHz • Amplitude flatness: ±0.5 dB (relative to 1 kHz) • Harmonic distortion: –40 dBc • Spurious (non harmonics): –40 dBc • Total harmonic distortion: 1% • SNR (50 ohm load, 500 MHz BW) : 40 dB (Vpp > = 0.1 V); 30 dB (Vpp < 0.1V)
Square wave /pulse	• Frequency range: 0.1 Hz to 10 MHz • Duty cycle: 20 to 80% • Duty cycle resolution: Larger of 1% or 10 ns • Pulse width: 20 ns minimum • Rise/fall time: 18 ns (10 to 90%) • Pulse width resolution: 10 ns or 5 digits, whichever is larger • Overshoot: < 2% • Asymmetry (at 50% DC): ±1% ± 5 ns • Jitter (TIE RMS): 500 ps
Ramp/triangle wave	• Frequency range: 0.1 Hz to 200 kHz • Linearity: 1% • Variable symmetry: 0 to 100% • Symmetry resolution: 1%
Noise	Bandwidth: 20 MHz typical

Performance characteristics

WaveGen – Built-in function/arbitrary waveform generator	
Sine Cardinal (Sinc)	Frequency range: 0.1 Hz to 1.0 MHz
Exponential Rise/Fall	Frequency range: 0.1 Hz to 5.0 MHz
Cardiac	Frequency range: 0.1 Hz to 200.0 kHz
Gaussian Pulse	Frequency range: 0.1 Hz to 5.0 MHz
Arbitrary	• Waveform length: 1 to 8k points • Amplitude Resolution: 10 bits (including sign bit)*** • Repetition Rate: 0.1Hz to 12MHz • Sample Rate: 100 MSa/s • Filter Bandwidth: 20 MHz
Frequency	• Sine wave and ramp accuracy: ◦ 130 ppm (frequency < 10 kHz) ◦ 50 ppm (frequency > 10 kHz) • Square wave and pulse accuracy: ◦ [50+frequency/200] ppm (frequency < 25 kHz) ◦ 50 ppm (frequency ≥ 25 kHz) • Resolution: 0.1 Hz or 4 digits, whichever is larger
Amplitude	• Range: ◦ 20 mVpp to 5 Vpp into Hi-Z** ◦ 10 mVpp to 2.5 Vpp into 50 ohms** • Resolution: 100 µV or 3 digits, whichever is higher • Accuracy: 2% (frequency = 1 kHz)
DC offset	• Range: ◦ ±2.5 V into Hi-Z** ◦ ±1.25 V into 50 ohms** • Resolution: 100 µV or 3 digits, whichever is higher • Accuracy: ±1.5% of offset setting ±1.5% of amplitude ±1 mV
Trigger output	Trigger output available on Trig out BNC
Main Output	• Impedance : 50 ohms typical • Isolation: not available, main output BNC is grounded • Protection: overload automatically disables output

*** Gaussian Pulse: 4 Vpp maximum into Hi-Z; 2 Vpp maximum into 50 ohms.**
**** Sinc, Cardiac and Gaussian Pulse: ±1.25 V into Hi-Z; +- 625 mV into 50ohms**
***** Full resolution is not available at output due to internal attenuator stepping.**

Integrated digital voltmeter	
Functions	ACrms, DC, DCrms, Frequency
Resolution	ACV/DCV: 3 digits Frequency: 5.5 digits
Measuring Rate	100 times/ second
Autoranging	Automatic adjustment of vertical amplification to maximize the dynamic range of measurements.
Range Meter	Graphical display of most recent measurement, plus extrema over the previous 3 seconds.

	Frequency Range	Vertical Range	Vertical Accuracy
ACRms	20 Hz-100KHz	100 MHz to 500 MHz: 1 mV/div to 5 V/div** (1 MΩ and 50 Ohm) 1 GHz model: 1 mV/div to 5 V/div** (1 MΩ), 1mV/div to 1V/div (50 Ohm)	[DC vertical gain accuracy + 0.5% full scale
DCRms	20 Hz-100KHz		[DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale]
DC	NA		[DC vertical gain accuracy + DC vertical offset accuracy + 0.25% full scale]
Frequency counter	1Hz – BW of Scope	<10 mV/div: greater of 1 div or 5 mV; ≥ 10 mV/div: 0.6 div	25 ppm ± 5 ppm per year (aging)

InfiniiVision X-Series physical characteristics

Instrument		
Dimensions	mm	Inches
Width	380.6	14.98
Height	204.4	8.05
Depth	141.5	5.57
Weight	kg	lb
Instrument only	3.85	8.5
With accessories	4.08	9.0
Instrument shipping – package dimensions	mm	Inches
Width	450	17.7
Height	250	9.84
Depth	360	14.17
Rack mount	mm	Inches
Width	481.6	18.961
Height	221.5	8.72
Depth	189.34	7.454

Environmental	
Characteristic	
Power line consumption	100 watts
Temperature	Operating: 0 to +55 °C Nonoperating: -30 to +71 °C
Humidity	Operating: Up to 80% RH at or below +40 °C; up to 45% RH up to +50 °C Non-operating: Up to 95% RH up to 40 °C; up to 45% RH up to 50 °C
Altitude	Operating and non-operating: up to 4,000 m
Electromagnetic compatibility	Meets EMC Directive (2004/108/EC), meets or exceeds IEC 61326-1:2005/EN 61326-1:2006 Group 1 Class A requirement CISPR 11/EN 55011 IEC 61000-4-2/EN 61000-4-2 IEC 61000-4-3/EN 61000-4-3 IEC 61000-4-4/EN 61000-4-4 IEC 61000-4-5/EN 61000-4-5 IEC 61000-4-6/EN 61000-4-6 IEC 61000-4-11/EN 61000-4-11 Canada: ICES-001:2004 Australia/New Zealand: AS/NZS
Safety	UL61010-1 2nd edition, CAN/CSA22.2 No. 61010-1-04
Vibration	Meets IEC60068-2-6 and MIL-PRF-28800; class 3 random
Shock	Meets IEC 60068-2-27 and MIL-PRF-28800; class 3 random;(operating 30g, ½ sine. 11 ms duration, 3 shocks/axis along major axis, total of 18 shocks

InfiniiVision X-Series physical characteristics

Connectivity

Standard ports	One USB 2.0 high-speed device port on rear panel Two USB 2.0 high-speed host ports, front and rear panel Supports memory devices and printers
Optional ports	GPIB, LAN, VGA

Nonvolatile storage

Reference waveform display	2 internal waveforms or USB thumb drive
Waveform storage	Setup, .bmp, .png, .csv, ASCII, XY, reference waveforms .alb, .bin, lister, mask, HDFS
Max USB flash drive size	Supports industry standard flash drives
Set ups without USB flash drive	10 internal setups
Set ups with USB flash drive	Limited by size of USB drive

Accessories included

Standard 3- year warranty	
Standard SEC mode (Secure Environment) Certificate of Calibration Documentation CD	
Standard Probe	
N2862B Passive probe 150 MHz 10:1 attenuation	1 per channel included 100 MHz models
N2863B Passive probe 300 MHz, 10:1 attenuation	1 per channel included 200 MHz models
N2890A Passive probe 500 MHz, 10:1 attenuation	1 per channel included 350/500 MHz and 1 GHz models
N6450-60001 16 digital channel MSO cable	1 per scope included on all MSO models and DSOX3MSO (for 500 MHz models and below) DSOX3PERFMSO (for 1 GHz Models)

Built-in help language support for English, Japanese, simplified Chinese, traditional Chinese, Korean, German, French, Spanish, Russian, Portuguese and Italian

Interface language support

GUI menus: English, Japanese, simplified Chinese, traditional Chinese, Korean, German, French, Spanish, Russian, Portuguese and Italian

Localized power cord

For MET/CAL procedures, click on the Cal Labs solutions link below
http://www.callabsolutions.com/MetCALandCLS.asp
These procedures are FREE to customers

Related literature

Publication title	Publication type	Publication number
Serial Bus Applications for Agilent InfiniiVision 3000 X-Series Oscilloscopes	Data sheet	5990-6677EN
Power Measurements for Agilent InfiniiVision 3000 X-Series oscilloscope	Data sheet	5990-8869EN
Mask/Waveform Limit Testing For Agilent InfiniiVision Series Oscilloscopes	Data sheet	5990-3269EN

Probe Compatibility Table

To assist you in selecting the proper probe for your application: Use our probe compatibility table below to find the probes that are recommended for use with your 2000 and 3000 X-Series InfiniiVision oscilloscope. For more information about the probes and accessories for InfiniiVision Series oscilloscope, check out the InfiniiVision oscilloscope probes and accessories data sheet with the Agilent literature number, 5968-8153EN.

Probe Type	Probe Model	MSO/DSO 2000 X-Series[1]	MSO/DSO 3000 X-Series
Passive probes,	N2862B 10:1 150 MHz (included in 70/100 MHz models) N2863B 10:1 300 MHz (included in 200 MHz models) N2890A 10:1 500 MHz (included in 350/500 MHz and 1 GHz models models)	Recommended	Recommended
	N2889A 1:1/10:1 350 MHz	Recommended	Recommended
High-voltage passive probes,	10076B 4 kV	Recommended	Recommended
	N2771B 30 kV	Recommended	Recommended
Differential active probes,	1130A 1.5 GHz	Incompatible	Compatible
	1141A 200 MHz (use with 1142A)	Incompatible	Recommended
	N2791A 25 MHz	Recommended	Recommended
	N2891A 70 MHz	Recommended	Recommended
	N2790A 100 MHz (with AutoProbe)	Incompatible	Recommended
	N2792A 200 MHz	Recommended[2]	Recommended
	N2793A 800 MHz	Recommended[2]	Recommended
Single-ended active probes,	N2795A 1 GHz (with AutoProbe)	Incompatible	Recommended (limit 2)
	1157A 2.5 GHz (with AutoProbe)	Recommended	Recommended
MSO logic probes,	01650-61607 16-channel	Incompatible	Compatible
	N6459-60001 8-channel MSO cable (included in 2000 X-Series MSOs)	Recommended	Compatible
	N6450-60002 16-channel MSO cable (included in 3000 X-Series MSOs)	Incompatible	Recommended
Current probes,	1146A 100 kHz	Recommended	Recommended
	N2780B 2 MHz (use with N2779A)	Recommended	Recommended
	N2781B 10 MHz (use with N2779A)	Recommended	Recommended
	N2782B 50 MHz (use with N2779A)	Recommended	Recommended
	N2783B 100 MHz (use with N2779A)	Recommended	Recommended
	1147A 50 MHz (with AutoProbe)	Incompatible	Recommended
	N2893A 100 MHz (with AutoProbe)	Incompatible	Recommended

1. The 2000 X-Series does not support AutoProbe interface active probes.
2. Use a 50 ohm feedthrough terminator.

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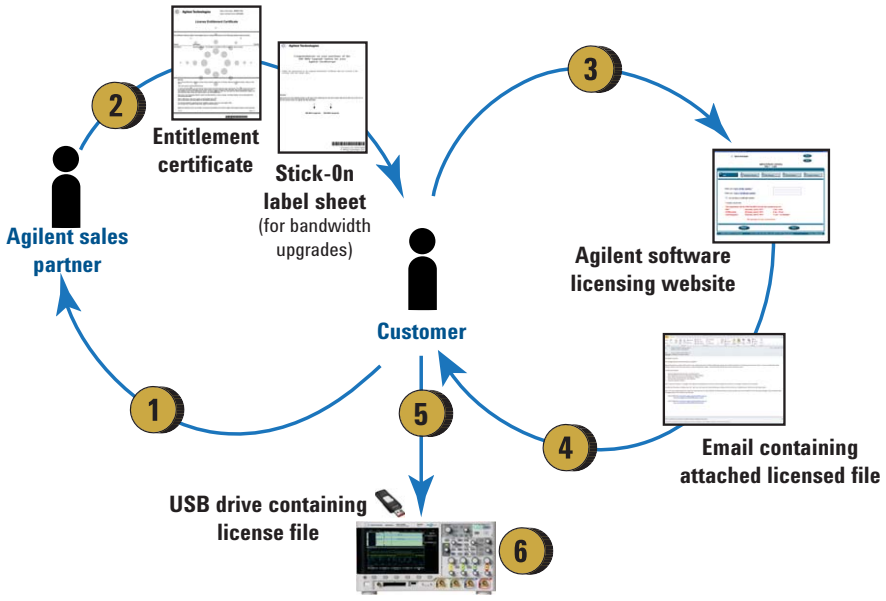
License-only bandwidth upgrades and measurement applications



Bandwidth Upgrade Models

3000 X-Series

DSOX3BW24	**100 MHz to 200 MHz, 4 ch, License only**
DSOX3BW32*	100 MHz to 350 MHz, 2 ch, Service center
DSOX3BW34*	200 MHz to 350 MHz, 4 ch, Service center
DSOX3BW52	**350 MHz to 500 MHz, 2 ch, License only**
DSOX3BW54	**350 MHz to 500 MHz, 4 ch, License only**
DSOX3BW12*	500 MHz to 1 GHz, 2 ch, Service center
DSOX3BW14*	500 MHz to 1 GHz, 4 ch, Service center

Measurement Applications

DSOX3WAVEGEN	WaveGen (built -in function generator with AWG)
DSOXDVM	Integrated digital voltmeter
DSOXEDK	Educator's kit
DSOX3MASK	Mask testing
DSOX3SGM	Segmented memory
DSOX3ADVMATH	Advanced waveform math
DSOX3VID	Enhanced video triggering
DSOX3EMBD	Embedded serial triggering and analysis (I^2C, SPI)
DSOX3COMP	Computer serial triggering and analysis (RS232/422/485/UART)
DSOX3AUDIO	Audio serial triggering and analysis (I^2S)
DSOX3AUTO	Automotive serial triggering and analysis (CAN, LIN)
DSOX3FLEX	FlexRay serial triggering and analysis
DSOX3AERO	Aerospace serial triggering and analysis (MIL-STD 1553, ARINC 429)
DSOX3PWR	Power measurements and analysis
DSOX3MSO	MSO upgrade: add 16 digital timing channels (for 500 MHz and below models)
DSOXPERFMSO	MSO upgrade: add 16 digital timing channels (for 1 GHz models)

Process Description

1. Place order for a license only bandwidth upgrade or measurement application product to an Agilent sales partner. If multiple bandwidth upgrade steps are needed, order all the corresponding upgrade products required to get from current bandwidth to desired bandwidth. In the case where the new bandwidth requires higher bandwidth passive probes, they are included with the upgrade. For the DSOX3BW24, the N2863B 10:1 300 MHz passive probes (1 per channel) will be sent with the upgrade. DSOX3BW32, DSOX3BW34, DSOX3BW52, DSOX3BW54, DSOX3BW12 and DSOX3BW14, the N2890A 10:1 500MHz passive probe (1 per channel) will be sent with the upgrade.
2. For measurement applications, you will receive a paper or electronic .pdf Entitlement Certificate. For bandwidth upgrades only, you will receive a stick-on label document indicating upgraded bandwidth specification in addition to a paper Entitlement Certificate.
3. Use Entitlement Certificate containing instructions and certificate number needed to generate a license file for a particular 2000 or 3000 X-Series oscilloscope model number and serial number unit.
4. Receive the licensed file and installation instructions via email.
5. Copy license file (.lic extension) from email to a USB drive and follow instructions in email to install the purchased bandwidth upgrade or measurement application on the oscilloscope.
6. For bandwidth upgrades only, attach bandwidth upgraded stick-on label to front and rear panels of the oscilloscope. Model number and serial number of the oscilloscope do not change.

* See page 30 for return-to-Agilent service center upgrade process for these products

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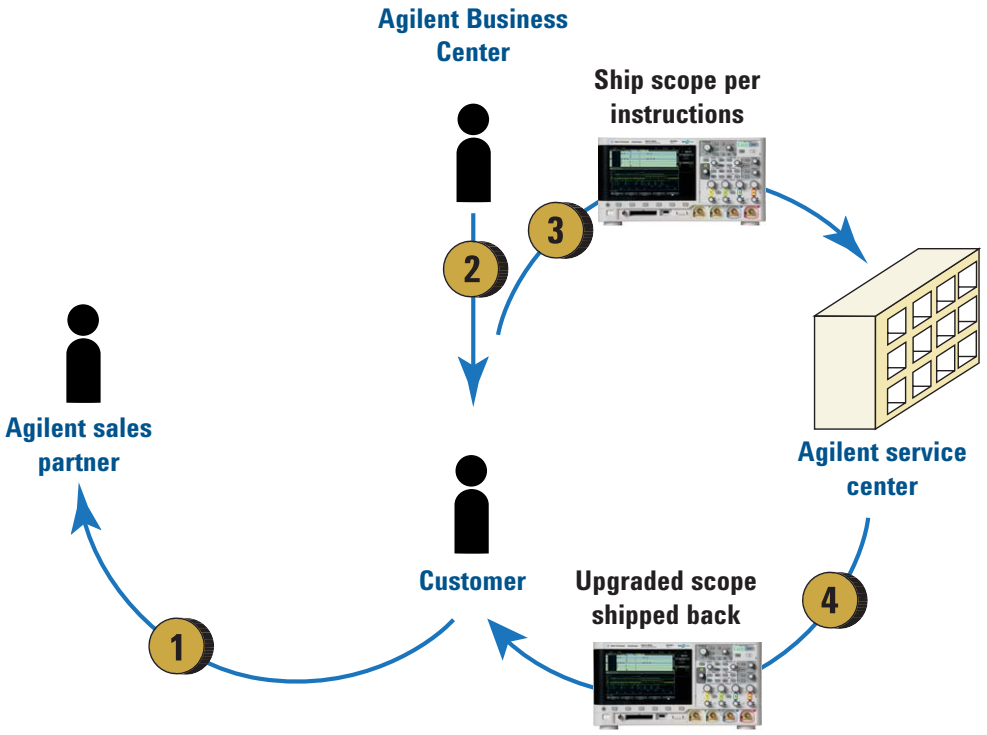
Return-to-Agilent Service Center Bandwidth Upgrades



Bandwidth Upgrade Models	
3000 X-Series	
DSOX3BW24*	100 MHz to 200 MHz, 4 ch, License only
DSOX3BW32	**100 MHz to 350 MHz, 2 ch, Service center**
DSOX3BW34	**200 MHz to 350 MHz, 4 ch, Service center**
DSOX3BW52*	350 MHz to 500 MHz, 2 ch, License only
DSOX3BW54*	350 MHz to 500 MHz, 4 ch, License only
DSOX3BW12	**500 MHz to 1 GHz, 2 ch, Service center**
DSOX3BW14	**500 MHz to 1 GHz, 4 ch, Service center**

Process Description

1. Place order for a return-to-Agilent Service Center bandwidth upgrade product to an Agilent sales partner. Service Center installation cost is in addition to bandwidth upgrade product price. Service Center calibration is included in the bandwidth upgrade product price. If multiple upgrade steps are needed, order all the corresponding upgrade products required to get from current bandwidth to desired bandwidth. In the case where the new bandwidth requires higher bandwidth passive probes, they are included with the upgrade. For the DSOX3BW24, the N2863B 10:1 300 MHz passive probes (1 per channel) will be sent with the upgrade. DSOX3BW32, DSOX3BW34, DSOX3BW52, DSOX3BW54, DSOX3BW12 and DSOX3BW14, the N2890A 10:1 500MHz passive probe (1 per channel) will be sent with the upgrade.
2. Agilent Business Center will contact you regarding process and timing of the Service Center installation. Continue to use oscilloscope until contacted again later when parts are available at Service Center.
3. Ship the oscilloscope per provided instructions (freight paid by Agilent) to Service Center.
4. Service Center ships back upgraded oscilloscope with stick-on labels applied to front and rear panels indicating upgraded bandwidth specification. Model number and serial number of the oscilloscope do not change.

* See page 29 for license-only upgrade process for these products

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Revised: January 6, 2012

Product specifications and descriptions in this document subject to change without notice.

Published in USA, July 10, 2012
5990-6619EN

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