R&S®ESSENTIALS

MXO 3 Series OSCILLOSCOPE

Next generation oscilloscope:
Fast. Precise. Compact.

dataTec
Mess- und Prüftechnik. Die Experten.

Ihr Ansprechpartner / Your Partner:

dataTec AG
E-Mail: info@datatec.eu
datatec.eu



Four- and eight-channel models

Product Brochure
Version 10.00

ROHDE&SCHWARZ
Make ideas real

MXO 3 SERIES OSCILLOSCOPE

FAST. PRECISE. COMPACT.

Get big capabilities in a small package. Gain the freedom and versatility your work demands without compromising on results. Enjoy unmatched performance to quickly and easily gain expert understanding of your device under test.



8-channel model



4-channel model

Bandwidth:
100 MHz to 1 GHz

Fast:
4.5 million acquisitions/s, up to 99 % real time capture

Precise:
12-bit ADC, 18-bit HD mode, digital trigger

Compact:
11.6" Full HD display and feature-packed

WHY ENGINEERS LOVE ROHDE&SCHWARZ OSCILLOSCOPES

- A trusted, global high-quality company with a long-standing commitment to customers and continuous technological innovation
- The newest oscilloscope portfolio from 60 MHz to 16 GHz
- In-house ASICs for the world's most responsive oscilloscopes
- Frontend technology development for pristine signal integrity
- 18-bit architecture with HD mode for the highest resolution
- Digital triggers for the world's most sensitive event isolation
- Superior user interface and front panel to streamline workflows

WHY THE MXO 3 SERIES

- Gain the freedom and versatility your work demands without compromising on results. Equipped with next-generation MXO technology, the MXO 3 series delivers fast and precise measurements in a small package
- **Fast**
  - Industry's fastest update rate of up to 4.5 million acquisitions/s
  - The highest real-time signal capture up to 99 %
  - Fast in both the time and frequency domains
- **Precise**
  - 12-bit ADC at all sample rates, 18-bit in HD mode
  - Advanced and flexible digital trigger
  - Deep 125 Mpoints standard memory
- **Compact**
  - Save space with all models that fit comfortably on your bench
  - See and share easily with the large 11.6" Full HD display
  - Rackmount with 5U height for all models

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- 4- and 8-channel models
- 100 MHz to 1 GHz bandwidth
- 5 Gsample/s sample rate
- 125 Mpoints per channel standard memory
- 12-bit ADC at all sample rates

MXO 3 OSCILLOSCOPE TECHNOLOGY

FAST. PRECISE. COMPACT.

MXO 3 series oscilloscopes blend cutting-edge hardware and software technology for fast and precise results in a compact format.



Fast.

All MXO oscilloscopes incorporate cutting-edge ASIC technology. Get the world's fastest update rate of up to 4.5 million acquisitions/s enabled by the Rohde&Schwarz MXO-EP ASIC that processes 400 Gbit/s. This chip also enables hardware-accelerated functions including math, spectrum, zone triggering and mask testing.



Precise.

The low-noise frontend Rohde&Schwarz ASIC technology, 12-bit vertical resolution in Rohde&Schwarz proprietary ADC technology and 18-bit resolution and digital trigger that is so sensitive it can trigger on smallest signal details combine to make the most precise oscilloscope in its class. The 125 Mpoints standard memory and up to 500 Mpoints option can capture hundreds of milliseconds of time while retaining a fast sample rate and full bandwidth.



Pencil size compared to oscilloscope dimensions

Compact.

The innovative technology in both the 4-channel and 8-channel models comes in a surprisingly small package even though MXO 3 oscilloscopes still have a large 11.6" Full HD display. The small footprint and light weight mean the oscilloscope is easy to place on a crowded bench or quickly move to a new measurement location. For rackmounting, it is just 5U high.

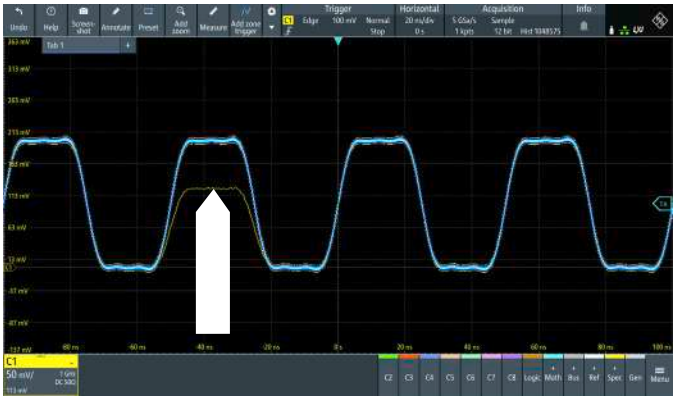
FAST

SEE MORE SIGNAL DETAILS AND SUBTLE CHANGES INSTANTLY.

- **Up to 99 % real-time capture**
- **Hardware-accelerated functionality**
- **Industry's fastest spectrum**

Up to 99 % real-time capture

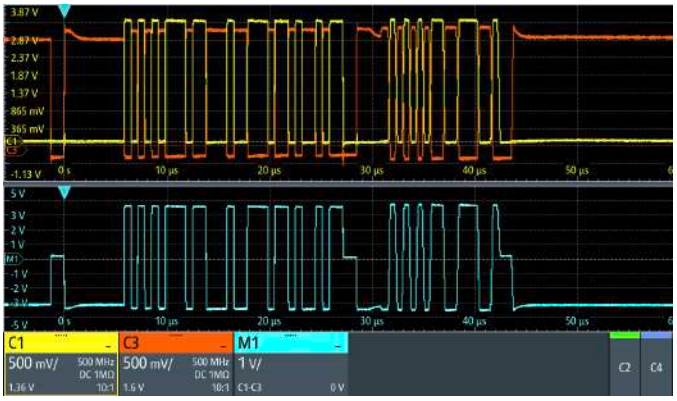
While most oscilloscopes capture less than 2 % of real-time system activity, MXO oscilloscopes capture up to 99 % of your signal's activity. Instantly see details that other oscilloscopes miss. With 4.5 million waveforms/s, quickly see rare events and anomalies that other oscilloscopes mask. Minimum trigger re-arm time is just 21 ns versus microseconds on other oscilloscopes.



Hardware-accelerated functionality

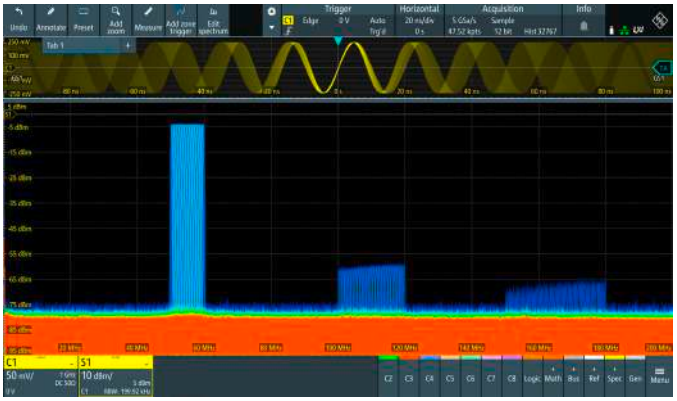
What other companies do with software, MXO oscilloscopes do with hardware. The MXO 3 incorporates hardware accelerated:

- Math (up to 700 000 operations/s)
- FFTs (up to 50 000 FFTs/s)
- HD filters (up to 4.5 million acquisitions/s)
- Zone triggering (up to 600 000 triggers/s)
- Mask testing (up to 4 000 000 tests/s)
- XY mode (up to 2 000 000 plots/s)
- Protocol decode



Industry's fastest spectrum

MXO 3 processes FFTs in hardware to created it spectrum display. See details in the frequency domain, including dynamic signal changes that other oscilloscopes cannot show. The free-run trigger mode is only found on Rohde & Schwarz oscilloscopes and ensures the fastest spectrum performance available of 50 000 FFTs/s.



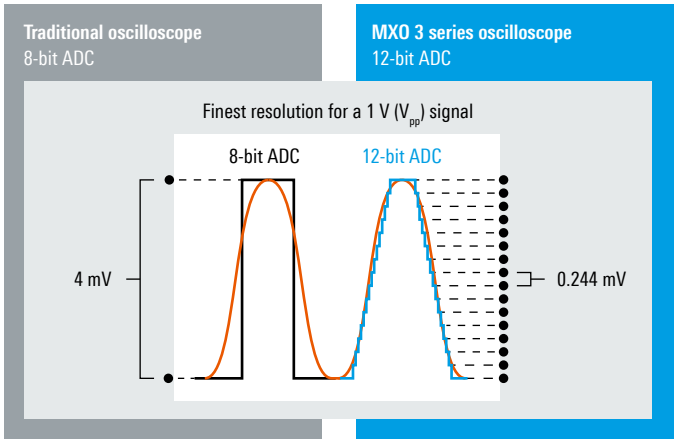
PRECISE
NOTHING GETS PAST YOU.

- **Low noise plus more vertical resolution**
- **Sharper view of signals in HD mode**
- **Biggest offset in the industry for higher SNR**

Low noise plus more vertical resolution

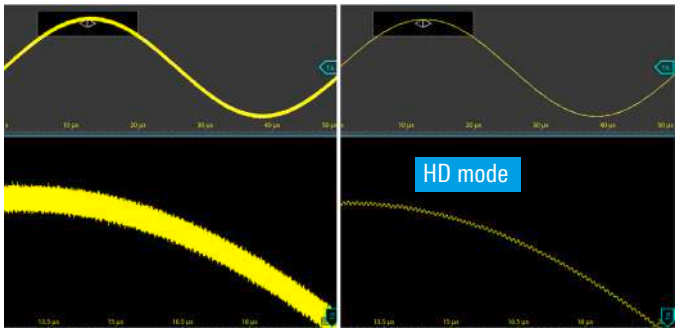
See small signal changes in the presence of larger signals:

- With 12-bit vertical resolution in hardware at all sample rates, 16x more resolution than 8-bit oscilloscopes
- Low-noise: only < 50 µV RMS noise on 1 MΩ and 50 Ω paths at 1 mV/div with 100 MHz bandwidth



Sharper view of signals in HD mode

Use HD mode to see signal detail that would normally be buried in noise. HD mode offers both noise reduction and up to 18 bit vertical resolution. Unlike other oscilloscopes, HD mode runs at full sample rate and is done in hardware so it's both precise and fast.



Biggest offset in the industry for higher SNR

The most sensitive vertical scale reveals more of a signal and less measurement system noise. MXO 3 oscilloscopes have large ±3 V offset at 1 mV/div on both 50 Ω and 1 MΩ paths. Zoom in on small-amplitude signals to get best SNR. The offset is 2x to 3x better than other leading models in the industry.



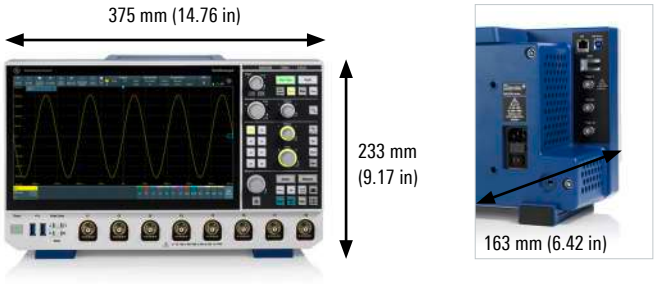
COMPACT

GET BIG CAPABILITIES IN A SURPRISINGLY SMALL PACKAGE.

- **Fits anywhere**
- **Lots of capabilities in a small size**
- **Still has vibrant large 11.6" Full HD display**

Fits anywhere

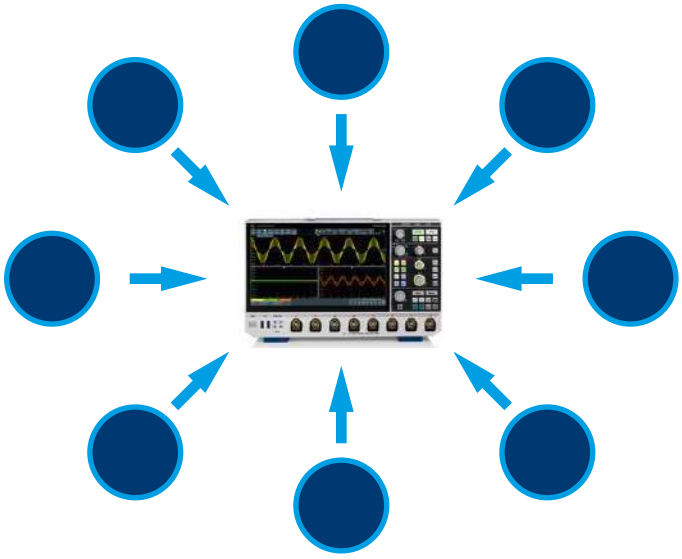
Small MXO 3 oscilloscope footprint and light weight make them easy to fit anywhere – even on crowded benches. The small footprint leaves more space for the creative mess of engineering. The instrument only uses 5U on a rack.



Lots of capabilities in a small size

Use your MXO 3 oscilloscope for a wide variety of challenges with n-in-1 instrument integration:

- Spectrum analyzer
- Logic analyzer (MSO)
- Protocol analyzer (serial buses)
- DMM
- Function generator
- FRA (Bode plot frequency response analyzer)



Still has vibrant large 11.6" Full HD display

Though small, the MXO 3 still has a 11.6" Full HD display and a front panel harmonized with other MXO oscilloscopes to make it easy to use and share measurement insight with others.



DEEP ACQUISITION MEMORY

OSCILLOSCOPE STAYS RESPONSIVE, EVEN WITH DEEP MEMORY.

- **Deep memory when you need it**
- **Accurately capture long time without the headaches**
- **Independent sample rate, record length and timebase settings**

Deep memory when you need it

MXO 3 comes standard with 125 Mpoints of memory per channel and an option to upgrade to 500 Mpoints. At any sample rate, deeper memory lets your oscilloscope acquire more time. You may not know how much time you need to capture for a particular challenge and having deep memory is a great insurance policy.



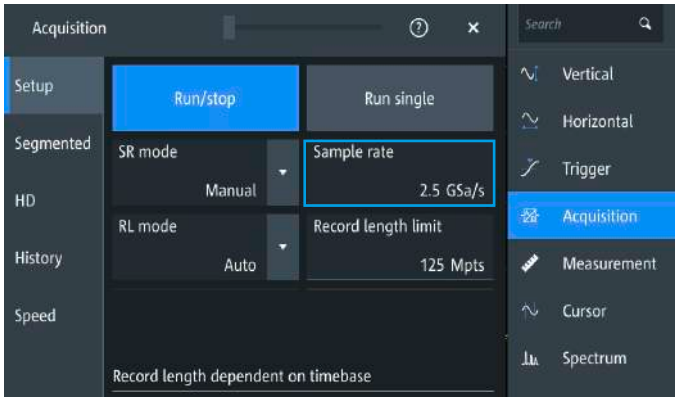
Accurately capture long time without the headaches

Capturing milliseconds or longer on most oscilloscopes often results in an inaccurate capture. When an oscilloscope runs out of memory, it compensates by reducing sample rate often aliasing captured signals. The MXO 3 memory of 125 Mpoints captures 50 ms of time at full 1 GHz bandwidth with 2.5 Gsample/s without any worry. Or 200 ms of time with optional 500 Mpoints at 2.5 Gsample/s.



Independent sample rate, record length and timebase settings

Make sure you have the right sample rate for your measurement. While most oscilloscopes restrict sample rate and memory with timebase settings, MXO oscilloscopes offer both automated and manual sample rate controls, record lengths and timebases that are all independent of each other.



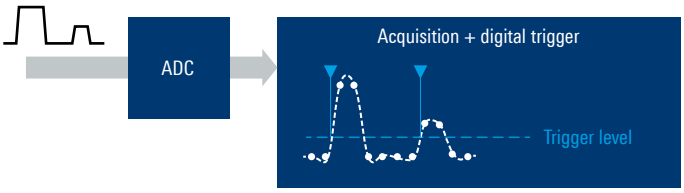
DIGITAL TRIGGER

GREATER TRIGGER SENSITIVITY, REDUCED JITTER, WIDER FILTERING OPTIONS

- **Single signal path**
- **Industry's most precise and sensitive trigger**
- **Adjustable digital trigger filters**

Single signal path

The digital trigger, pioneered and patented by Rohde&Schwarz, uses a single signal path for measurement and triggering. Older analog triggers that have separate measurement and trigger paths with limitations. Users cannot see the actual trigger circuit signal, trigger levels are restricted and noise reduction is severely limited. MXO digital triggering enables faster and more precise triggering.



Industry's most precise and sensitive trigger

Isolate small changes in the presence of large signals with trigger sensitivity down to 0.0001 vertical divisions. Trigger precisely on any analog level with interpolated based trigger detection between ADC samples. MXO oscilloscopes have an industry best < 1 ps trigger jitter for additional precision. Minimum trigger re-arm time is just 21 ns compared to other oscilloscopes with a rearm time in the microseconds.



Adjustable digital trigger filters

Use 18-bit HD mode to suppress broadband noise. Unlike conventional oscilloscopes where the filter is only applied to the signal path and not the trigger path, MXO oscilloscopes allow for both HD and bandwidth filters. A single path for triggering and measurement means the oscilloscope trigger can turn precisely on/off the signal that is used as a filter.



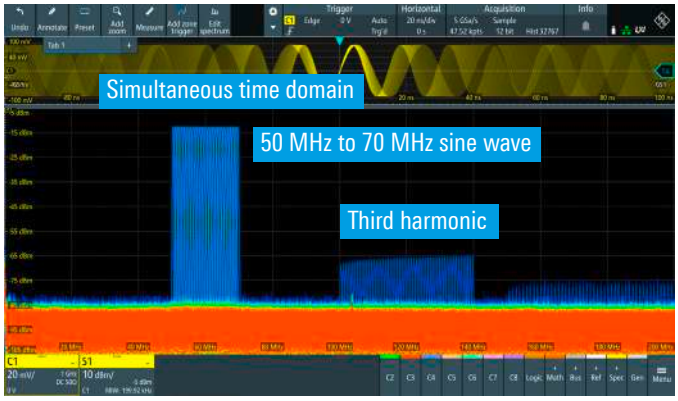
SPECTRUM

FAST AND PRECISE FREQUENCY DOMAIN MEASUREMENTS

- **Fast: up to 50 000 FFTs/s**
- **Independent of time domain settings**
- **Free run for effective harmonics and EMI debugging**

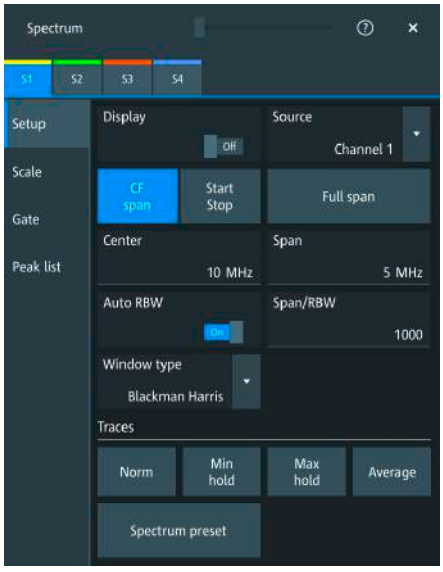
Fast: up to 50 000 FFTs/s

MXO spectrum is hardware accelerated. Up to 50 000 FFTs/s make for fast and accurate frequency domain analysis. The analysis bandwidth matches the oscilloscope frequency (max. 1 GHz) and up to four spectra can be used simultaneously.



Independent of time domain settings

Unlike other oscilloscopes where time and frequency controls are subordinate, MXO 3 spectrum settings are independent of time domain settings, so both time and frequency events are easy to see simultaneously. Select CF/span or start/stop as with a spectrum analyzer. Choose your window type and adjust the resolution bandwidth (RBW) if needed. Use averaging, peak list, max. hold and other spectrum settings.



Free run for effective harmonics and EMI debugging

MXO 3 includes a special triggerless free run mode for frequency domain debugging. Maximize FFTs/s for faster signal build-up. Quickly see spurs, harmonics and other frequency domain signals. Combine with a near-field probe for EMI emission debugging. CF/span/RBW can be adjusted to match EMI test needs.



SUPERIOR USER INTERFACE

R&S®SmartGrid UI: DESIGNED FOR HIGH PRODUCTIVITY

- **Customize your layout, fast**
- **Quick access to settings and capabilities**
- **Short learning curve**

Customize your layout, fast

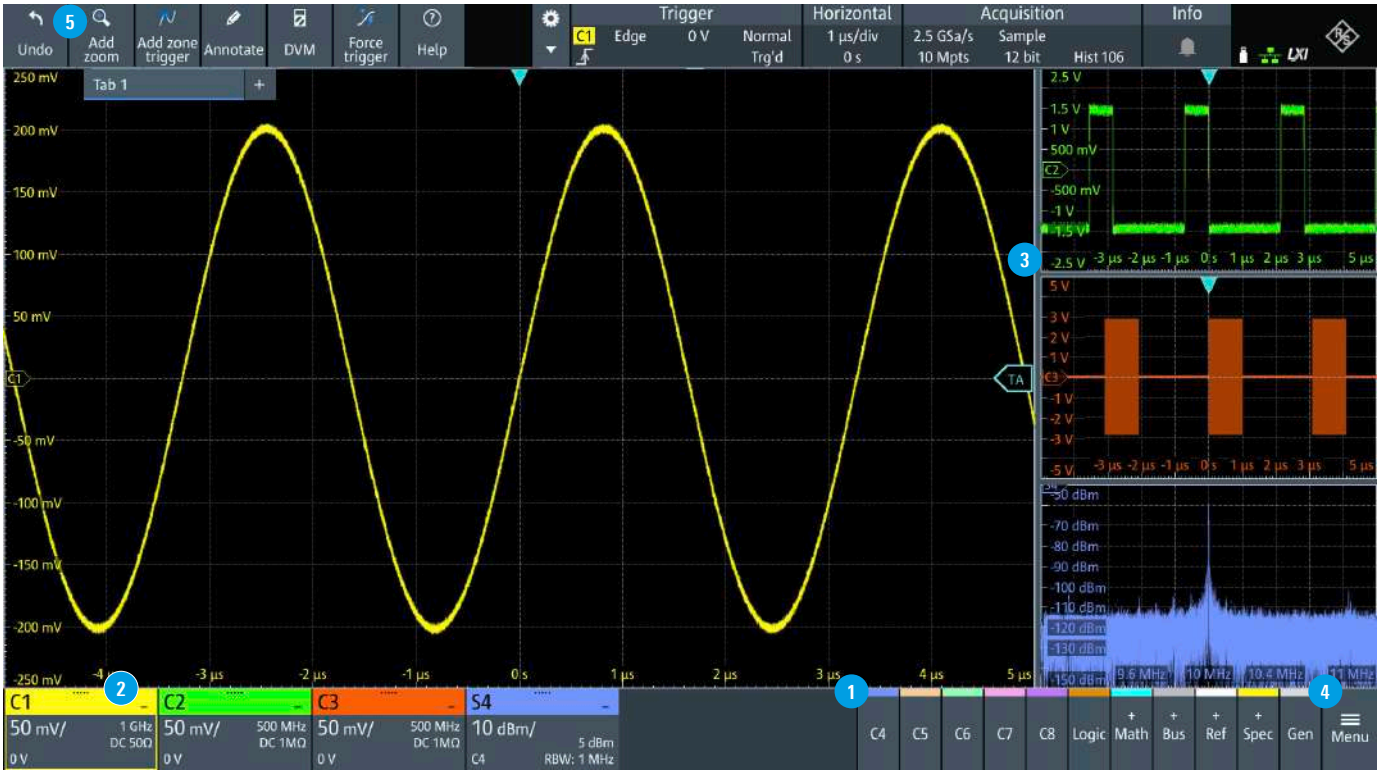
1. Tap to turn on sources and other functions
2. Quickly customize your display layout with drag & drop using R&S®SmartGrid
3. Adjust grid and result table boundaries using sliders

Quick access to settings and capabilities

4. Easily navigate to all settings using the main menu
5. Quickly access important tools with the customizable toolbar

Short learning curve

The MXO user interface has a minimal learning curve for users of other oscilloscopes. Anyone who needs a function description or who programs with the oscilloscope for programing just needs to press the help button on the toolbar to see a description of the function and the associated SCPI command.



INTUITIVE USER INTERFACE

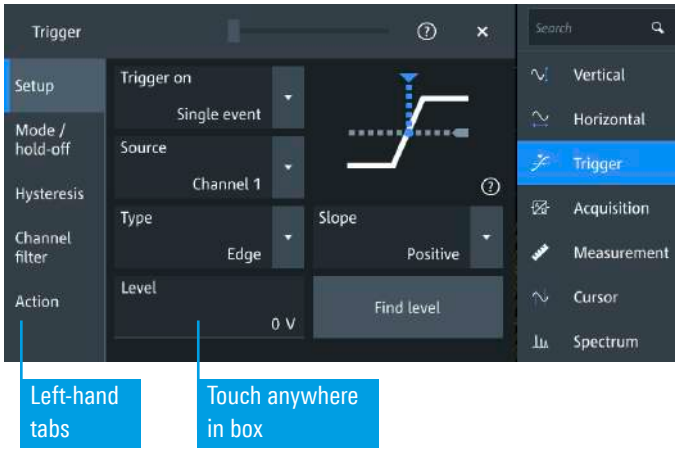
FAST, EASY AND SMART

- **Left-hand tab maximizes waveform area**
- **Quickly customize your toolbar**
- **Fast search**

Left-hand tab maximizes waveform area

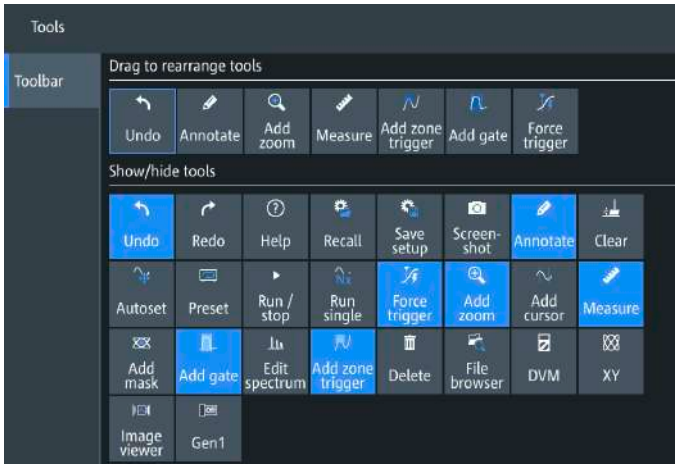
The MXO user interface was designed using extensive user feedback, competitive comparisons and research into the latest user interface concepts outside of test and measurement:

- Dialog has left-hand tab design maximize waveform viewing
- Anywhere-in-box touch allow you to activate a field by touching a large target area



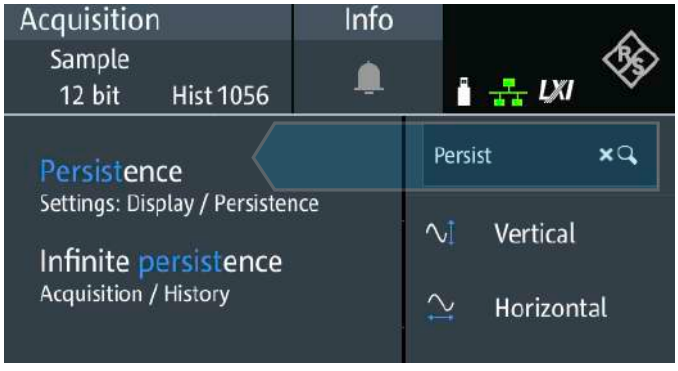
Quickly customize your toolbar

The MXO toolbar has quick toolbar access. Pick from a wide range of available tools to customize the display.



Fast search

MXO oscilloscopes pioneered menu search integration. Simply start typing the setting you want and linked list appears. Simply tap on your item for instant navigation.



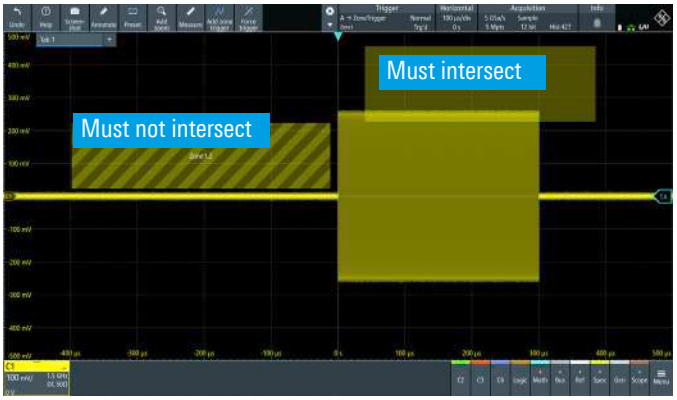
ZONE TRIGGER

GET INFINITE OSCILLOSCOPE TRIGGER TYPES WITH ZONE TRIGGERING

- **Draw to trigger**
- **Trigger in the frequency domain**
- **Trigger on math waveforms**

Draw to trigger

Zone triggering quickly creates triggers that are impossible for traditional types. Simply draw where a signal should or should not intersect. Hardware acceleration means the MXO zone trigger can react to up to 600 000 events/s for an average blind time of 1.6 µs, far shorter than the zone triggering blind times on other oscilloscopes.



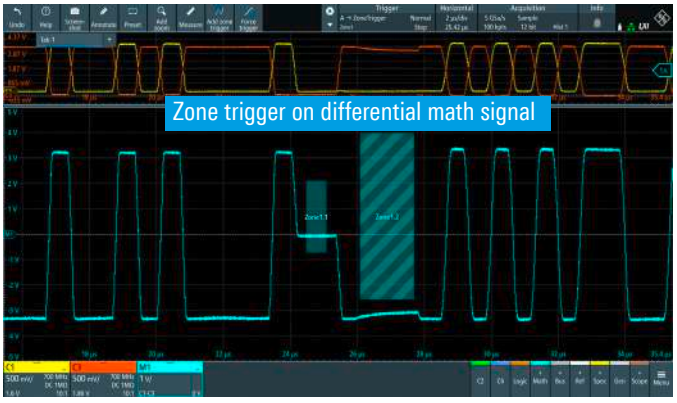
Trigger in the frequency domain

The Rohde&Schwarz zone trigger works in both the time domain and frequency domain or across both. Use zone triggering for EMI debugging to see what tones exceed certain power levels. Interestingly, zone triggering works in free run mode for a fast 50 000 FFTs/s. The speed lets you quickly and easily see small details and dynamic changes that other oscilloscopes miss.



Trigger on math waveforms

The Rohde&Schwarz zone trigger also works on math waveforms. Trigger on power (current × voltage) or other math functions. Math triggering can be used independently or combined with zone triggering on individual sources.



MXO 3 Series AT A GLANCE

11.6" high resolution, multitouch display

- ► High resolution: 1920 × 1080 pixel (Full HD)
- ► Gesture support speeds up scaling and zooming
- ► Easy-to-see signal details



Interfaces on front side

- ► Two USB 3.0 ports

Active probe interfaces

- ► Support for over 30 Rohde&Schwarz current and voltage probes
- ► 50 Ω and 1 MΩ path enable support of an even wider range of passive and active probes, including ones from third parties

Connectivity
- ► USB port
- ► HDMI video output
- ► Ethernet

Integrated arbitrary waveform generator
- ► 50 MHz arbitrary waveform generator
- ► Wide range of waveforms and modulation types
- ► Easy configuration of frequency, amplitude, offset and noise



Clear orientation with color-coded LEDs
- ► Color-coded keys and rotary knobs for fast correlation with signal sources
- ► Shows currently selected channel
- ► Simple election between fine/course adjustment

Interface on instrument side
- ► MSO logic probe connectors



Intuitive front panel increases productivity
- ► Fast, direct access to primary instrument settings
- ► Quickly adjust settings with knobs and keys
- ► Sectional layout makes finding the right function easy

SERIAL BUS TRIGGER AND DECODE

SERIAL BUS TRIGGER AND DECODE OPTIONS

Triggering and decoding for a wide range of serial buses

Choose from one or more of the MXO 3 serial bus trigger and decode options. The options convert physical layer digital or analog waveforms into packets for specific buses. MXO 3 supports a wide range of serial buses and as your bus support needs change, the MXO 3 has you covered. MXO 3 allows up to four simultaneous serial bus decodes all time correlated in the waveform area.



Fast decode with multiple views

Easily see dynamic bus activity with hardware-accelerated decode. View bus packets in the main waveform window, in a time-correlated zoom window or a listing table. Expand the table view with a slider. Select a specific decode table row to see additional packet details in the lower right side of the table.



Trigger at the packet level

Each supported bus also includes packet-level triggering. Hardware based triggering analyzes packet fields in real time and you can specify a packet-level trigger. Software based triggers search each acquisition and stop the instrument when the acquisition includes the specified trigger event.



Trigger and decode packages

Option	Description	Buses
R&S®MXO3-K500	bus analysis	
R&S®MXO3-K510	low speed serial buses	I²C/SPI/UART/RS-232/RS-422/RS-485/NRZ clocked/NRZ unclocked/Manchester/QuadSPI/OctoSPI
R&S®MXO3-K520	automotive buses	CAN/CAN FD/CAN XL/LIN/SENT
R&S®MXO3-K530	aerospace protocols	ARINC 429/MIL-STD-1553/SpaceWire
R&S®MXO3-K550	MIPI low speed protocols	SPMI/RFFE/I³C
R&S®MXO3-K560	automotive Ethernet buses	10BASE-T1S
R&S®MXO3-K570	USB protocols	USB 1.1/2.0

LOGIC ANALYSIS (MSO)

ADD LOGIC ANALYSIS TO YOUR OSCILLOSCOPE

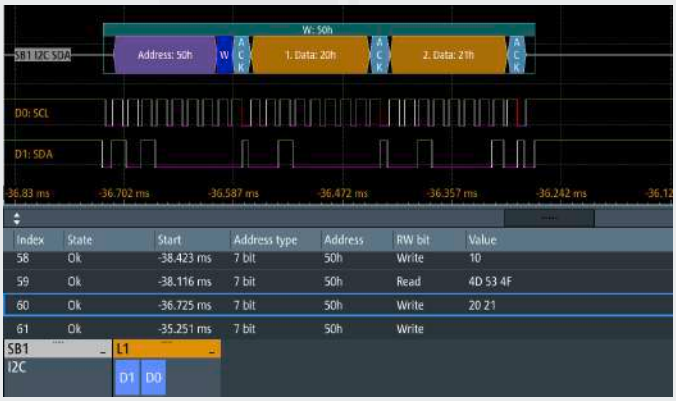
Built-in logic analysis

Every MXO 3 series oscilloscope is enabled for MSO logic analysis. Just add the R&S®MXO3-B1 mixed signal option for 16 digital channels.



Timing relationships and serial bus test

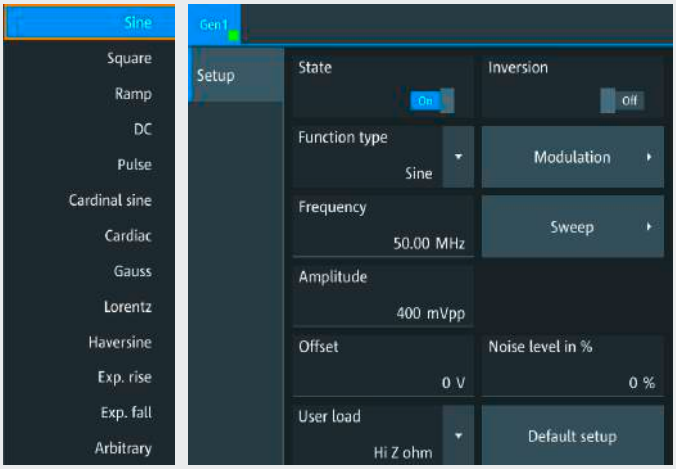
Capture long periods while retaining a fast sample rate of up to 5 Gsample/s with 125 Mpoints of memory per logic channel. Use the MSO to see precise timing relationships or to trigger and decode serial buses such as the I²C here on the left.



ARBITRARY WAVEFORM GENERATOR

Function and arbitrary waveform generator

Add an integrated 50 MHz arbitrary waveform generator with the R&S®MXO3-B6 option. Choose from a variety of wave shapes or load your own arbitrary waveform file. The modulation feature lets you explore advanced signal variations.



R&S®MXO3-B6 arbitrary waveform generator option	
Analog output	1 output with 50 Ω or 1 MΩ selection
Maximum frequency	50 MHz
Arbitrary waveform length	128 ksample
Maximum sample rate	312.5 Msample/s
Vertical resolution	14 bit
Waveform types	sine, square, ramp, DC, pulse, cardinal sine, cardiac, Gauss, Lorentz, haversine, exponential rise/fall, arbitrary
Modulation and sweep	PWM on square, AM, FM, FSK on sine, frequency sweep on sine

FREQUENCY RESPONSE AND IMPEDANCE ANALYSIS

Characterize control loops, filters and passive components with the MXO 3 series

Low frequency response analysis

The R&S®MXO3-K36 frequency response analysis (FRA) option uses the integrated waveform generator for fast and intuitive Bode plot measurements.

By measuring gain and phase across frequency, users can characterize:

- Control loop response (CLR)
- Power supply rejection ratio (PSRR)
- Filters and resonant networks
- Amplifier frequency behavior

The MXO performs swept measurements from 10 mHz to 100 MHz and displays gain and phase plots logarithmically for quick stability evaluations.

Low frequency impedance analysis

The R&S®MXO3-K337 impedance analysis option covers frequency-domain characterization along with passive and power electronic components.

Swept sine excitation can be used to measure:

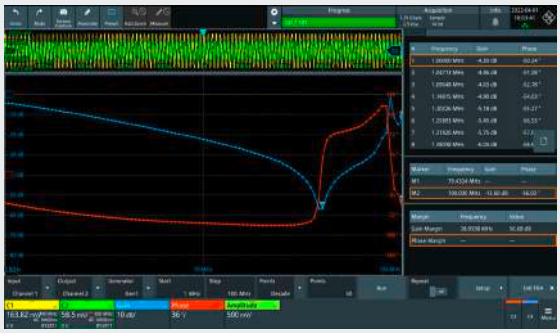
- Impedance magnitude
- Resonance and anti-resonance behavior
- ESR and inductive/capacitive regions
- Frequency-dependent characteristics of components and networks

Applications include:

- DC-link capacitor evaluation
- Power distribution network analysis
- Filter characterization
- Magnetic component analysis

Features and functions

- Adaptive amplitude profiles to automatically optimize SNR across the sweep for high-dynamic-range PSRR measurements
- High-resolution sweeps with configurable points per decade for precise phase/gain margin identification
- Marker support for marker-based resonance and crossover analysis
- Integrated time domain to simultaneously view stimulus and response and detect signal distortions early





Shared platform capabilities

- 10 mHz to 100 MHz sweep range
- Up to 500 points per decade
- Single sweep, repeated sweep and single frequency
- Integrated waveform generator stimulus (R&S®MXO3-B6 option)

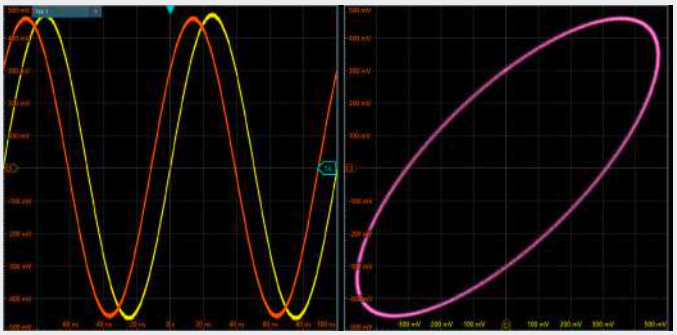
Option	Description	Analysis
R&S®MXO3-K36	frequency response analysis	Bode plot, CLR, PSRR
R&S®MXO3-K337	impedance analysis	shunt through, series through, voltage current measurement methods



XY MODE, MASK TEST AND DIGITAL VOLTMETER

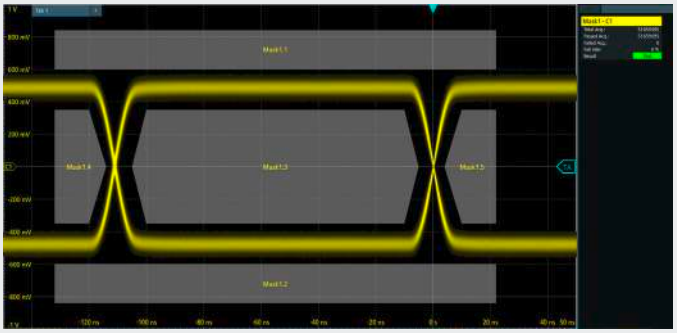
Hardware-accelerated XY mode

Use XY mode to quickly see the graphic relationship between two signals. Hardware-accelerated XY means you get up to 600 000 plots/s, similar or faster than analog oscilloscopes. Use XY mode to plot Lissajous and I-V curves. Select any channel, math or track signals as sources to plot. Looking for an entertaining hobby? Check out oscilloscope music and oscilloscope art in XY mode and try it out with an MXO 3.



Fastest mask test

Quickly determine how well your signals conform to physical layer requirements. The instrument provides a statistical record of all waveforms that pass and/or fail the mask test. Hardware-accelerated mask testing is among the fastest in the industry. Mask testing supports up to 4 million mask tests/s as well as single-channel and multichannel testing.



Digital voltmeter (DVM)

Want a quick check of DC values? The digital voltmeter updates even when the channel is turned off. Dock the results on either side or at the bottom of the display. Each DVM per channel shares a global configurable measurement bandwidth and time period.



POWER ANALYSIS

Characterizing input power quality

The R&S®MXO3-K31 power analysis option enables power-quality measurements and provides concurrent analysis of three pairs of voltage and current sources. The option eliminates many of the manual and tedious calculations needed to determine real, apparent and reactive power.



Harmonic current analysis in line with standards

AC power supplies have different standards for limiting harmonic current. Identifying distortion from harmonic content can be tedious without the right tool. The R&S®MXO3-K31 includes current harmonic analysis for testing in line with all common standards. You can setup three concurrent harmonic measurements.



R&S®MXO3-K31 power analysis option	
Power quality	active, apparent and reactive power, crest factor and phase angle
Current harmonics	THD RMS and fundamental functions, in line with EN 61000-3-2 classes A, B, C, D, MIL-STD-1399 and RTCA DO-160
Switching loss	automated measurement for power devices identifying turn on, turn-off, conduction and non-conduction region
Turn on/off time	measure time taken for device to transition from their on/off state to another
More analysis functions will be added in future.	

3-PHASE ANALYSIS FOR POWER AND DRIVES

The MXO 3 series oscilloscopes combined with the R&S®MXO3-K333 3-phase power analysis option enable comprehensive characterization of 3-phase power systems. Automated measurements cover total power, harmonics, phase quantities and distortion, with flexible wiring configurations to quickly visualize waveforms, harmonic spectra, numerical results and phasor diagrams.

Full system transparency from power results to signal behavior

Get comprehensive 3-phase power quality measurements while preserving full time-domain visibility. Automated 3-phase measurements are never isolated from the waveform. Engineers can immediately trace RMS values, power factors and harmonic content back to the original signals for faster root-cause analysis when results deviate from expectations.



Harmonics analysis with diagnostic depth

Perform detailed 3-phase harmonics and THD analysis in line with IEC 61000-3-2 while retaining access to time-domain and frequency-domain views. Instead of relying solely on pass/fail results, engineers can investigate the origin, distribution and phase relationship of harmonic components with FFT, statistics and waveform inspection within the same environment for diagnosing the root cases of harmonics and move beyond simple compliance verification.

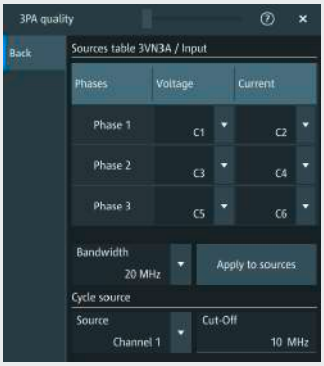


Flexible wiring configurations and cycle source filtering for real systems

Support common three-phase wiring configurations without having to re-engineer the measurement setup:

- Two-wire, three-wire and four-wire systems (2V2A, 3V3A, 3VN3A)
- Flexible voltage and current combination that support sources from math and reference input

Cycle source filtering also helps identify fundamental frequencies in the presence of noisy converter signals, essential for accurate power and harmonic computation. Such flexibility simplifies measurements across power distribution, converters and industrial power systems.



Option	Description	Analysis
R&S®MXO3-K333	3-phase analysis	3-phase power quality analysis with phasor diagram and harmonic testing in line with IEC 61000-3-2, efficiency

REMOTE CONTROL AND CONNECTIVITY

ANYTIME, ANYWHERE.

Easy remote access

Remotely control the oscilloscope and view its display on your web browser and VNC viewer with the same user interface as the instrument, including the front panel. Mount a network drive for storage.



WebDAV support

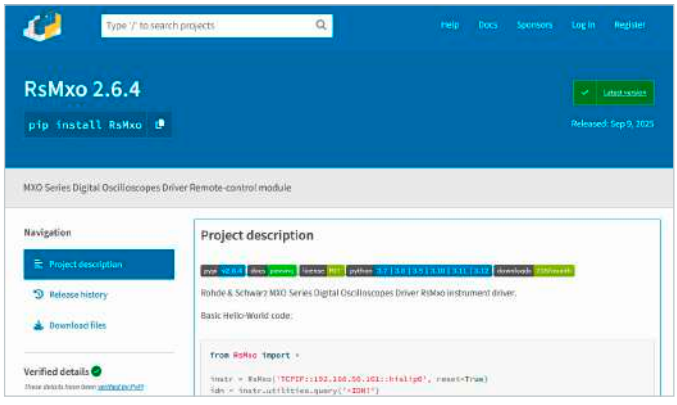
You can easily access instrument data with the web-distributed authoring and versioning (WebDAV) protocol to share, copy, move and edit files on the instrument through a web server. A WebDAV client can be a file transfer client or file manager such as Dolphin or Nemo in Linux, Finder in Mac OS X and File Explorer in Windows. The clients are all capable of accessing the device through IP addresses or device hostnames.

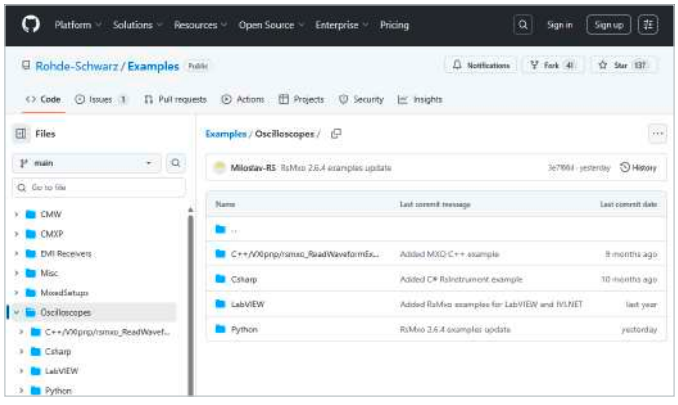
Remotely control using LabView, and python drivers

All oscilloscope functions can be accessed remotely via Ethernet or USB-TMC interface. LabVIEW, VXI, C# and Python instrument drivers are also available, for which sample codes can be found on GitHub and PyPi websites.

```
#   SYSTem:DISPlay:UPDate ON
mxo.system.display.set_update(True)
#   TRIGger:MODE AUTO
mxo.trigger.set_mode(trigger_mode=TriggerMode.AUTO)
#   ACQuire:SRATe:MODE AUTO
mxo.acquire.sampleRate.set_mode(sample_rate_mode=AutoManualMode.AUTO)
```

Relevant links
github.com/Rohde-Schwarz/ Examples/tree/main/Oscilloscopes
plugins. jetbrains.com/plugin/19828-rohde--schwarz-instrument-connectivity
pypi.org/project/RsMxo/
www.nuget.org/packages/RsMxo
RsMxo.readthedocs.io/





FIRMWARE UPDATES AND SECURITY

Rohde&Schwarz closed-system Linux OS

MXO incorporates a closed Linux operating system for more equipment security. Created and maintained by Rohde&Schwarz, the operating system has been hardened by the company for use across a wide range of Rohde&Schwarz instruments. No external applications or scripts can be executed in the system for a high security level that corporate IT teams can work with.





Regular firmware updates that are free

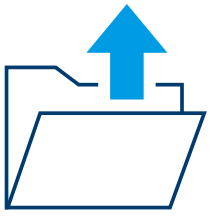
Regular firmware updates add new functions to MXO 3 oscilloscopes. Download the latest firmware version at www.rohde-schwarz.com. Use a USB storage device or LAN connection for installation.





Software based upgrades

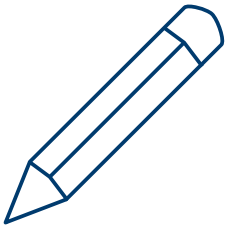
Easy-to-install software licenses upgrade memory, turn on additional serial bus trigger and decode options, enable the generator, digital channels and the frequency response analysis (Bode plot). Upgrade bandwidth with a software license.





Secure erase for media sanitization

Working in a high-security environment? The MXO 3 includes media sanitization procedures in line with NIST Special Publication 800-88: Guidelines for Media Sanitization. Find instructions in the MXO 3 security procedures.





KEY APPLICATIONS

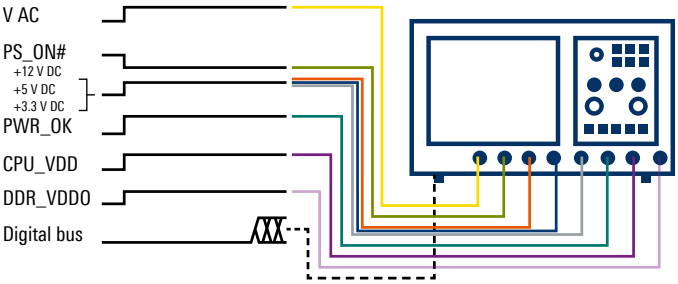
Power electronics

Combine MXO 3 with current probes, high voltage probes and/or optically isolated probes for power electronic measurements. The MXO 3 excels in power electronic measurements with HD mode noise suppression, rich math and 8-channel models.



PMIC, power integrity and sequencing

With its industry-best high offset, low noise and extensive time and frequency domain capabilities, MXO 3 excels in a variety of power measurements. Combine with an R&S®RT-ZPR power rail probe for excellent power integrity measurements. Use with passive probes for power sequencing testing. Use for voltage regulator and other on-board power tests.



Embedded hardware testing

The MXO 3 puts big capabilities in a small form to excel at a variety of embedded hardware development testing needs. These include board bring up, hardware integration testing and software/hardware integration tasks. The MXO 3 has robust capabilities for embedded hardware manufacturing and troubleshooting and repair.

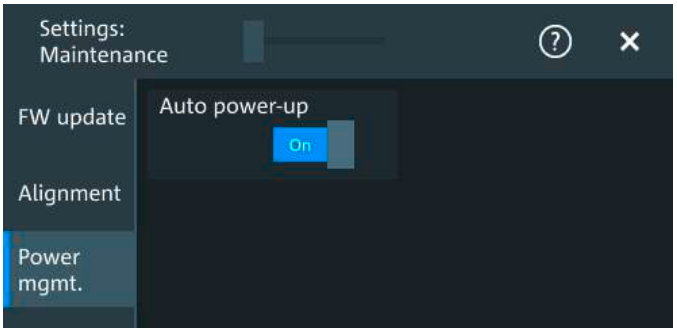


QUIET AND SUSTAINABLE PERFORMANCE

KEEP POWER CONSUMPTION IN CHECK

Reduce power consumption

Reducing power consumption is important now and will be in the future. The electrical power used over the life-cycle of an electronic device can make up 90 % of its CO_2 footprint. Minimizing power consumption reduces the environmental impact of an oscilloscope. Rising energy prices make reducing power consumption essential to long-term affordability.



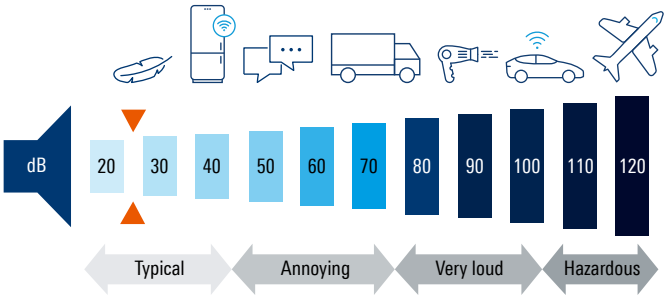
Remotely turn on/off your Rohde&Schwarz oscilloscope

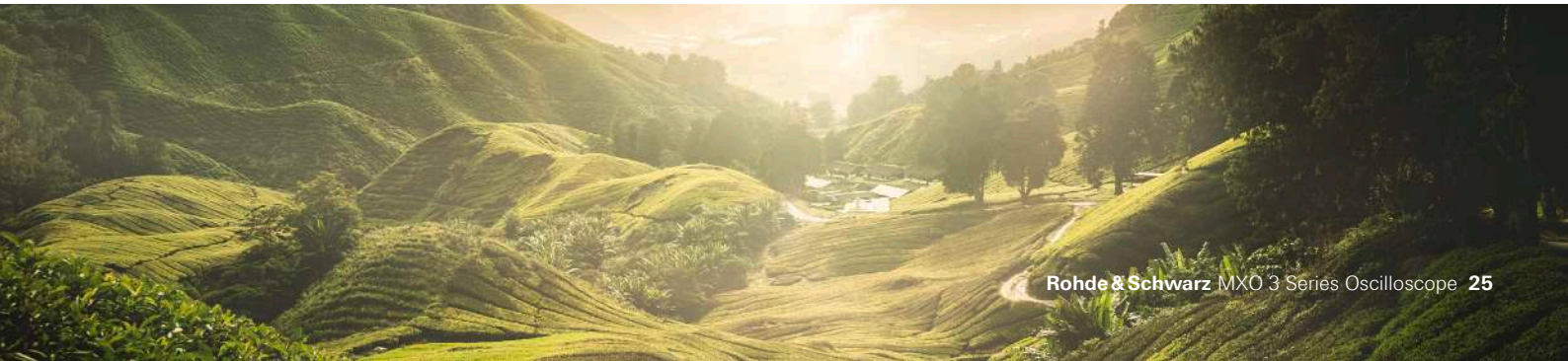
When working remotely, keeping the unit powered in the lab 24/7 can waste a lot of energy. While remote IP controlled socket power supplies are possible, most electronic equipment will only power up to a standby state with the main power switched on. The MXO 3 provides a convenient feature that allows it to be turned on automatically as soon as electric power is switched on. By simply connecting it into a smart socket system, you can enable the option of remotely turning on the device only when you intend to use it, while keeping it powered off at other times.



Peace and quiet

Need a quiet space? Do loud instruments or loud equipment disturb others? The MXO 3 series has a very low operating audible noise level and sounds like a soft whisper. You might not even notice that it's turned on.





EXTENSIVE PROBE PORTFOLIO

THE RIGHT PROBE FOR THE YOUR MEASUREMENT

MXO 3 oscilloscope comes standard with one 500 MHz passive probe for each channel. Choose from a comprehensive portfolio of high-quality passive and active probes from Rohde&Schwarz for other probe needs



Complete portfolio for power measurements

The portfolio of dedicated probes for power measurements includes active and passive probes for different voltage and current ranges – from µA to kA and from µV to kV. Dedicated power rail probes can detect small and sporadic distortions on DC power rails. High voltage differential probes allow isolated floating measurements.

High voltage differential probes

The R&S®RT-ZHD series high voltage differential probes have an excellent common mode rejection ratio (CMRR) for a broad frequency with 200 MHz bandwidth and can safely measure up to 6000 V peak voltage. Low noise makes it an ideal probe for switching power analysis with ground reference.

Micro button and R&S®ProbeMeter for easy control

Our active probes feature a micro button, cleverly located on the probe tip. You can assign various functions to the micro button, such as run/stop, autoset and adjust offset to directly control the oscilloscope from the probe.

Most Rohde&Schwarz active probes come with the R&S®ProbeMeter that takes precision to a whole new level. The probes impressive accuracy of 0.1% ensures reliable and trustworthy measurements. When Rohde&Schwarz designs a probe, thermal drifts, filters and usability are usually the best overall. Make measurements a breeze and get precise results with confidence.



With high CMRR, R&S®RT-ZISO isolated probing excels for WBG and faster IGBT switch node testing applications.

Rohde&Schwarz has a comprehensive probe portfolio to meet every probing need.

► For more information, see product brochure "Probes and accessories for Rohde&Schwarz oscilloscopes" (PD 3606.8866.12)



Passive probes included as standard (38 MHz to 700 MHz)

R&S®RT-ZP11, R&S®RT-ZP1X, R&S®RT-ZP05M

Passive probes come standard with every Rohde&Schwarz oscilloscope. They are low cost, general purpose probes for a broad range of applications.



Passive broadband probes (8 GHz)

R&S®RT-ZZ80

These are an economical yet powerful alternative to active probes for measuring high speed signals on low impedance lines. Their input impedance is low and remains practically constant over the entire bandwidth. They feature extremely low input capacitance, very low noise and high linearity.



Active single-ended broadband probes (1 GHz to 6 GHz)

R&S®RT-ZS10E, R&S®RT-ZS10, R&S®RT-ZS20, R&S®RT-ZS30, R&S®RT-ZS60

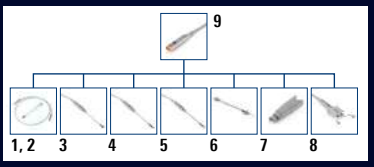
A very high dynamic range and exceptionally low offset and gain errors combined with the right accessories make these probes ideal for Rohde&Schwarz oscilloscopes.



Active differential broadband probes (1 GHz to 4.5 GHz)

R&S®RT-ZD10, R&S®RT-ZD20, R&S®RT-ZD30, R&S®RT-ZD40 and R&S®RT-ZA15 external attenuator

A flat frequency response and high input impedance with low input capacitance permit precise measurements on differential signals while maintaining a low load on the DUT. The CMMR for the entire probe bandwidth has high interference immunity. Special browser adapters allow flexible contacting with high signal fidelity.



1 R&S®RT-ZMA50; 2 R&S®RT-ZMA11; 3 R&S®RT-ZMA10; 4 R&S®RT-ZMA12; 5 R&S®RT-ZMA15; 6 R&S®RT-ZMA14; 7 R&S®RT-ZMA30; 8 R&S®RT-ZMA40; 9 R&S®RT-ZM

Modular broadband probes (1.5 GHz to 16 GHz)

R&S®RT-ZM15, R&S®RT-ZM30, R&S®RT-ZM60, R&S®RT-ZM90, R&S®RT-ZM130, R&S®RT-ZM160

Current probing requirements need a technically sophisticated, yet easy-to-handle solution. The various probing solutions meet the demands for high probe bandwidths and dynamic range along with the need for low capacitive load.



Power rail probes (2 GHz and 4 GHz)

R&S®RT-ZPR20, R&S®RT-ZPR40

Wide bandwidth, high sensitivity, very low noise and extra-large DC offset make these probes an excellent tool for characterizing power rails. The integrated high-precision DC voltmeter (R&S®ProbeMeter) provides instantaneous DC voltage readout.



High voltage probes (100 MHz to 400 MHz; ±750 V to ±6000 V)

R&S®RT-ZH03, R&S®RT-ZH10, R&S®RT-ZH11, R&S®RT-ZHD07, R&S®RT-ZHD15, R&S®RT-ZHD16, R&S®RT-ZHD60

The Rohde&Schwarz portfolio of high voltage probes includes passive single-ended and active differential probes for voltages up to 6000 V (peak). Different models allow measurements in up to CAT IV environments. Differential probes provide exceptional common mode rejection over a wide bandwidth.



Current probes (20 kHz to 120 MHz; ±1 mA to ±2000 A)

R&S®RT-ZC02, R&S®RT-ZC03, R&S®RT-ZC05B, R&S®RT-ZC10, R&S®RT-ZC10B, R&S®RT-ZC15B, R&S®RT-ZC20, R&S®RT-ZC20B, R&S®RT-ZC30, R&S®RT-ZC31

Rohde&Schwarz current probes enable accurate, non-intrusive measurements of DC and AC currents. Different models are available to measure currents in the range from 1 mA to 2000 A with a bandwidth of up to 120 MHz. Current probes are available with the Rohde&Schwarz probe interface or a BNC connector for an external power supply.



EMC near-field probes (30 MHz to 3 GHz)

R&S®HZ-15, R&S®HZ-17

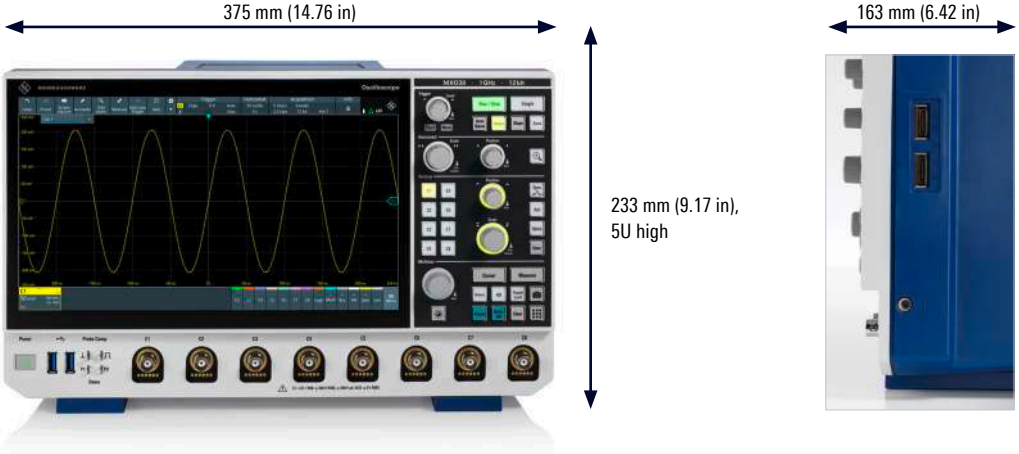
Powerful E and H near-field probes for the frequency range from 30 MHz to 3 GHz with an optional preamplifier expand the application range of the MXO 3 series oscilloscope to include EMI debugging.

ACCESSORIES AND RACKMOUNT

Safe transport and easy rack mounting

An extensive selection of storage and transportation accessories means the MXO 3 series oscilloscopes are always fully protected and easy to transport. The rackmount kit allows easy installation of the oscilloscope in integrated environments.





SPECIFICATIONS OF BASE UNIT

Vertical system: analog channels		
Input channels		4 channels or 8 channels
Input impedance		50 Ω ± 1.5%, 1 MΩ ± 1% || 12 pF (meas.)
Analog bandwidth (–3 dB)	MXO 34, 4-channel instrument	
	at 50 Ω input impedance	
	MXO 3	≥ 100 MHz
	MXO 3 with -B242 option	≥ 200 MHz
	MXO 3 with -B243 option	≥ 350 MHz
	MXO 3 with -B245 option	≥ 500 MHz
	MXO 3 with -B2410 option	≥ 1 GHz
	at 1 MΩ input impedance	
	MXO 3	≥ 100 MHz (meas.)
	MXO 3 with -B242 option	≥ 200 MHz (meas.)
	MXO 3 with -B243 option	≥ 350 MHz (meas.)
	MXO 3 with -B245 option	≥ 500 MHz (meas.) [1]
	MXO 3 with -B2410 option	≥ 500 MHz (meas.) [1]
	MXO 38, 8-channel instrument	
	at 50 Ω input impedance	
	MXO 3	≥ 100 MHz
	MXO 3 with -B282 option	≥ 200 MHz
	MXO 3 with -B283 option	≥ 350 MHz
	MXO 3 with -B285 option	≥ 500 MHz
	MXO 3 with -B2810 option	≥ 1 GHz
	at 1 MΩ input impedance	
	MXO 3	≥ 100 MHz (meas.)
	MXO 3 with -B282 option	≥ 200 MHz (meas.)
	MXO 3 with -B283 option	≥ 350 MHz (meas.)
	MXO 3 with -B285 option	≥ 500 MHz (meas.) [1]
	MXO 3 with -B2810 option	≥ 500 MHz (meas.) [1]
Additional bandwidth filters available up to instrument bandwidth		500/350/200/100/50/20 MHz (meas.)
Rise/fall time (calculated)	10% to 90% at 50 Ω	
	MXO 34, 4-channel instrument	
	MXO 3	< 3.5 ns
	MXO 3 with -B242 option	< 1.75 ns
	MXO 3 with -B243 option	< 1 ns
	MXO 3 with -B245 option	< 700 ps
	MXO 3 with -B2410 option	< 350 ps
	MXO 38, 8-channel instrument	
	MXO 3	< 3.5 ns
	MXO 3 with -B282 option	< 1.75 ns
	MXO 3 with -B283 option	< 1 ns
	MXO 3 with -B285 option	< 700 ps
	MXO 3 with -B2810 option	< 350 ps
Vertical resolution		12 bit, up to 18 bit for high definition mode
Input sensitivity	at 50 Ω	1 mV/div to 1 V/div, entire analog bandwidth supported for all input sensitivities
	at 1 MΩ	1 mV/div to 10 V/div, entire analog bandwidth supported for all input sensitivities
DC gain accuracy	offset and position set to 0 V, after self-alignment	
	input sensitivity > 5 mV/div	±1% full scale
	input sensitivity ≤ 5 mV/div to ≥ 1 mV/div	±1.5% full scale
Input coupling	at 50 Ω	DC
	at 1 MΩ	DC, AC (> 7 Hz)

[1] With R&S®RT-ZP05M passive probe.

Vertical system: analog channels						
Maximum input voltage	at 50 Ω				5 V (RMS), 30 V (V_p)	
	at 1 MΩ				300 V (RMS), 400 V (V_p), derates at 20 dB/decade to 5 V (RMS) above 250 kHz	
	at 1 MΩ with R&S®RT-ZP05M passive probe				300 V (RMS), 450 V (V_p), for derating and details, see R&S®RT-Zxx Standard Probes specifications (PD 3607.3851.22)	
Position range					±5 div	
Offset range at 50 Ω	input sensitivity					
	70 mV/div to 1 V/div				±20 V	
	1 mV/div to < 70 mV/div				±3 V	
Offset range at 1 MΩ	input sensitivity					
	1 V/div to 10 V/div				±250 V	
	60 mV/div to < 1 V/div				±30 V	
	1 mV/div to < 60 mV/div				±3 V	
Offset accuracy					±(0.35 % × |net offset| + 0.5 mV + 0.1 div × input sensitivity) (net offset = offset – position × input sensitivity)	
DC measurement accuracy	after adequate suppression of measurement noise using high definition (HD) mode or waveform averaging or a combination of both				±(DC gain accuracy × |reading – net offset| + offset accuracy)	
Channel-to-channel isolation (each channel with same input sensitivity)	input frequency within instrument bandwidth				> 60 dB (1:1000)	
RMS noise floor[2]						
At 50 Ω (meas.)	Input sensitivity	Analog bandwidth (–3 dB)				
		100 MHz	200 MHz	350 MHz	500 MHz	1 GHz
	1 mV/div	50 µV	64 µV	76 µV	83 µV	136 µV
	2 mV/div	53 µV	68 µV	81 µV	88 µV	143 µV
	5 mV/div	64 µV	78 µV	92 µV	101 µV	166 µV
	10 mV/div	91 µV	107 µV	121 µV	133 µV	224 µV
	20 mV/div	156 µV	174 µV	195 µV	213 µV	371 µV
	50 mV/div	380 µV	418 µV	468 µV	516 µV	901 µV
	100 mV/div	923 µV	1.06 mV	1.20 mV	1.31 mV	2.01 mV
	200 mV/div	1.60 mV	1.76 mV	1.96 mV	2.12 mV	3.46 mV
	500 mV/div	3.69 mV	3.96 mV	4.32 mV	4.75 mV	8.00 mV
	1 V/div	7.28 mV	7.82 mV	8.50 mV	9.30 mV	15.77 mV
At 1 MΩ (meas.)	Input sensitivity	Analog bandwidth (–3 dB)				
		20 MHz	100 MHz	200 MHz	350 MHz	500 MHz
	1 mV/div	35 µV	46 µV	53 µV	62 µV	65 µV
	2 mV/div	34 µV	48 µV	55 µV	66 µV	70 µV
	5 mV/div	47 µV	60 µV	70 µV	81 µV	88 µV
	10 mV/div	74 µV	88 µV	102 µV	118 µV	129 µV
	20 mV/div	138 µV	157 µV	180 µV	205 µV	226 µV
	50 mV/div	334 µV	372 µV	422 µV	477 µV	524 µV
	100 mV/div	715 µV	849 µV	1.00 mV	1.13 mV	1.23 mV
	200 mV/div	1.37 mV	1.56 mV	1.79 mV	2.02 mV	2.21 mV
	500 mV/div	3.37 mV	3.76 mV	4.23 mV	4.77 mV	5.20 mV
	1 V/div	7.08 mV	8.29 mV	9.70 mV	11.18 mV	12.05 mV
	2 V/div	13.78 mV	15.70 mV	18.04 mV	20.40 mV	22.39 mV
	5 V/div	34.20 mV	37.64 mV	42.92 mV	48.16 mV	52.09 mV
	10 V/div	68.50 mV	75.54 mV	85.48 mV	96.27 mV	104.25 mV

[2] HD mode active for bandwidth ≤ 500 MHz.

Horizontal system

Timebase range		selectable between 200 ps/div and 10 000 s/div, time per div settable to any value within range
Deskew range (channel deskew)	between analog channels	±20 ms
	between digital channels	±100 ns
Reference position		0 % to 100 % of measurement display area
Horizontal position range (trigger offset range)	max.	50 000 s
	min.	–50 000 s
Modes		normal, roll
Channel-to-channel skew	between analog channels	< 100 ps (meas.)
	between digital channels	< 500 ps (meas.)
Timebase accuracy	after delivery/calibration, at +23 °C	±2.5 ppm
	during calibration interval	±3.5 ppm
Delta time accuracy	corresponds to time error between two edges on same acquisition and channel; signal amplitude greater than 5 divisions, measurement threshold set to 50 %, vertical gain 10 mV/div or greater; rise time lower than four sample periods; waveform acquired in real-time mode	±(0.20/real-time sampling rate + timebase accuracy × |reading|) (peak) (meas.)

Acquisition system

Sampling rate	analog channels (real time)	
	MXO 34	max. 5 Gsample/s on 2 channels, max. 2.5 Gsample/s on 4 channels
	MXO 38	max. 5 Gsample/s on 4 channels, max. 2.5 Gsample/s on 8 channels
	analog channels (interpolated)	max. 5 Tsample/s
	digital channels	max. 5 Gsample/s on each channel
Waveform acquisition rate	max.	> 4 500 000 waveforms/s
Trigger rearm time	min.	< 21 ns
Memory depth [3]	standard	125 Mpoints
	R&S®MXO34-B105 option	500 Mpoints with 4 active channels (single capture), 500 Mpoints with 2 active channels (run continuous)
	R&S®MXO38-B105 option	500 Mpoints with 8 active channels (single capture), 500 Mpoints with 4 active channels (run continuous)
Acquisition modes	sample	middle sample in decimation interval
	peak detect	largest and smallest sample in decimation interval
	average	average of acquired waveforms
	number of averaged waveforms	2 to 16 777 215
	envelope	envelope of acquired waveforms
Sampling modes	real-time mode	max. sampling rate set by digitizer
	interpolated time	enhancement of sampling resolution by interpolation; max. sampling rate is 5 Tsample/s
Interpolation modes		linear, sin(x)/x, sample & hold
Fast segmentation mode	continuous recording of waveforms in acquisition memory without interruption due to visualization	
	max. real-time waveform acquisition rate	> 4 600 000 waveforms/s
	min. blind time between consecutive acquisitions	< 21 ns

[3] The maximum available memory depth depends on the bit depth of the acquired data and, therefore, on the settings of the acquisition system, such as decimation mode, waveform math or high definition mode.

High definition mode		
General description	The high definition mode increases the bit resolution of the waveform signal by using digital filtering, leading to reduced noise. Because of the digital trigger concept of the MXO 3, signals with increased numeric resolution are used as the input for triggering.	
Numeric resolution	bandwidth, at 5 Gsample/s	bit resolution
	1 kHz to 10 MHz	18 bit
	100 MHz	16 bit
	200 MHz	15 bit
	500 MHz	14 bit
Real-time sampling rate	MXO 34	max. 5 Gsample/s on 2 channels, max. 2.5 Gsample/s on 4 channels
	MXO 38	max. 5 Gsample/s on 4 channels, max. 2.5 Gsample/s on 8 channels

Trigger system		
Trigger sources		analog channels (C1 to C4), digital channels (D0 to D15), external trigger input, line trigger, serial bus
Trigger level range		±5 div from center of screen
Trigger modes		auto, normal, single, n single
Trigger sensitivity		0.0001 div, from DC to instrument bandwidth for all vertical scales
Trigger jitter	full-scale sine wave of frequency set to –3 dB bandwidth	< 1 ps (RMS) (meas.)
Coupling mode	standard	same as selected channel
	HF reject	cutoff frequency selectable from 1 kHz to 500 MHz
	LF reject	attenuates frequencies < 50 kHz
Trigger hysteresis	modes	auto (default setting) or manual
	adjustment resolution	0.0001 div, from DC to instrument bandwidth for all vertical scales
Holdoff range	time	100 ns to 10 s, fixed and random
Main trigger modes		
Edge	triggers on specified edge (positive, negative or either) and level	
Glitch	triggers on glitches of positive, negative or either polarity that are shorter or longer than specified width	
	glitch width	200 ps to 1000 s
Width	triggers on positive or negative pulse of specified width; width can be shorter, longer, inside or outside a specified range	
	pulse width	200 ps to 1000 s
Runt	triggers on pulse of positive, negative or either polarity that crosses one threshold but fails to cross a second threshold before crossing the first one again; runt pulse width can be arbitrary, shorter, longer, inside or outside a specified range	
	runt pulse width	200 ps to 1000 s
Window	triggers when signal enters or exits a specified voltage range; triggers also when signal stays inside or outside the voltage range for a specified period of time	
Timeout	triggers when signal stays high, low or unchanged for a specified period of time	
	timeout	0 ps to 1000 s
Interval	triggers when time between two consecutive edges of same slope (positive or negative) is shorter, longer, inside or outside a specified range	
	interval time	200 ps to 1000 s
Slew rate	triggers when the time required by a signal edge to toggle between user-defined upper and lower voltage levels is shorter, longer, inside or outside a specified range; edge slope may be positive, negative or either	
	toggle time	0 ps to 1000 s
Setup & hold	triggers on setup time and hold time violations between clock and data present on any two input channels; monitored time interval may be specified by the user in the range from –100 s to 100 s around a clock edge and must be at least 200 ps wide	
Pattern	triggers when a logical combination (and, nand, or, nor) of the input channels stays true for a period of time shorter, longer, inside or outside a specified range	
State	triggers when a logical combination (and, nand, or, nor) of the input channels stays true at a slope (positive, negative or either) in one selected channel	

Trigger system

Advanced trigger modes

Zone trigger	triggers on user-defined zones drawn on the display	
	source	acquired waveforms (input channels), math waveforms (including power analysis waveforms), spectrum waveforms, XY plots
	number of zones/areas	up to 4 zones with up to 8 areas each
	area shapes	polygons with up to 16 points
	area types	must intersect, must not intersect
	combination of zones	logical combination of zones of multiple sources using Boolean expressions
	trigger compatibility	requires sequence trigger A ▷ zone trigger where primary A condition can be: edge, glitch, width, runt, window, timeout, interval, slew rate, setup&hold, state, pattern
Sequence trigger (A/B/R trigger)	triggers on B event after occurrence of A event; delay condition after A event specified as time interval; an optional R event resets the trigger sequence to A	
	A event	edge, glitch, width, runt, window, timeout, interval, slew rate
	B event	edge, glitch, width, runt, window, timeout, interval, slew rate
	R event	edge, glitch, width, runt, window, timeout, interval, slew rate
Serial bus trigger	optional	see dedicated triggering and decoding options
Trigger input	input impedance	50 Ω (meas.) or 1 MΩ (meas.) || 11 pF (meas.)
	max. input voltage at 50 Ω	30 V (V_p)
	max. input voltage at 1 MΩ	300 V (RMS), 400 V (V_p), derates at 20 dB/decade to 5 V (RMS) above 250 kHz
	trigger level	±5 V
	sensitivity	
	input frequency ≤ 100 MHz	300 mV (V_{pp}) (meas.)
	input frequency > 100 MHz and ≤ 500 MHz	500 mV (V_{pp}) (meas.)
	input coupling	AC, DC (50 Ω and 1 MΩ)
	trigger filter	HF reject (attenuates > 50 kHz), LF reject (attenuates < 50 kHz), noise reject
	trigger modes	edge (positive, negative or either)
Trigger output	functionality	A pulse is generated for each event triggering signal acquisition.
	output voltage	0 V to 5 V (nom.) at high impedance; 0 V to 2.5 V (nom.) at 50 Ω
	pulse width	selectable between 16 ns and 50 ms
	pulse polarity	low active or high active
	output delay	depends on trigger settings

Spectrum analysis

General description	Spectrum analysis allows signal analysis in the frequency domain.	
Spectrum	sources	channel 1 to channel 4, math waveforms, reference waveforms
	setup parameters	center frequency, frequency span, resolution bandwidth (automatic or manual), gate position, gate width, vertical scaling, vertical position
	scaling	dBm, dBV, dBµV, V (RMS)
	span	1 Hz to 1.2 GHz[4]
	resolution bandwidth (RBW)	span/4 ≥ RBW ≥ span/6000
	windows	flat top, Hanning, Hamming, Blackman, rectangular, Kaiser Bessel, Gaussian
	trace types	normal, max. hold, min. hold, average
	max. real-time waveform acquisition rate	> 40 000 waveforms/s
Gate	delimits the display region used for spectrum analysis	
Peak list	The values in the peak list are also shown in the diagram to allow easy correlation.	

[4] The stop frequency depends on the analog bandwidth of the instrument.

RF characteristics		
Sensitivity/noise density	at 1 GHz (measurement of the power spectral density at 1 GHz at input sensitivity 2 mV/div, corresponding to –30 dBm input range of the oscilloscope, using spectrum analysis with center frequency 1 GHz, span 500 kHz, RBW 3 kHz)	–157 dBm (1 Hz) (meas.)
Noise figure	at 1 GHz (calculated based on the noise power density above)	16 dB (meas.)
Dynamic range	measured for a 1 GHz input carrier with level –3 dBm at input of oscilloscope, using spectrum analysis with center frequency 1 GHz, span 2 MHz, RBW 400 Hz at +20 MHz from center frequency	106 dB (meas.)
Absolute amplitude accuracy	0 Hz to 800 MHz	±1 dB (meas.)
Spurious-free dynamic range (excluding harmonics)	measured for a 250 MHz input carrier and level –3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 600 MHz, span 1.2 GHz, RBW 300 kHz	65 dBc (meas.)
Second harmonic distortion	measured for a 250 MHz input carrier and level –3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 600 MHz, span 1.2 GHz, RBW 300 kHz	–59 dBc (meas.)
Third harmonic distortion	measured for a 250 MHz input carrier and level –3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 600 MHz, span 1.2 GHz, RBW 300 kHz	–60 dBc (meas.)

Waveform measurements		
Automatic measurements	measurements on acquired waveforms (input channels), math waveforms, reference waveforms	amplitude, high, low, maximum, minimum, peak-to-peak, mean, RMS, sigma, positive overshoot, negative overshoot, area, rise time, fall time, positive pulse width, negative pulse width, period, frequency, positive duty cycle, negative duty cycle, delay, phase, burst width, pulse count, edge count, pulse train, positive switching, negative switching, cycle area, cycle mean, cycle RMS, cycle sigma, setup, hold, setup/hold time, setup/hold ratio, slew rate rising, slew rate falling, delay to trigger
	gate	delimits the display region evaluated for automatic measurements
	reference levels	user-configurable vertical levels define support structures for automatic measurements
	statistics	displays maximum, minimum, mean, standard deviation and measurement count for each automatic measurement
	track	measurement results are displayed as a continuous trace that is time-correlated to the measurement source
	limit check	measurements tested against user-defined limits; pass or fail conditions may trigger automatic response: beep, stop acquisition, save waveform, save results, screenshot, trigger output pulse
	number of active measurements	16
	result line annotation	
Cursor measurements	available cursors	up to two cursor sets on screen, each set with two horizontal and two vertical cursors
	target waveforms	acquired waveforms (input channels), math waveforms, reference waveforms, XY diagrams
	operating modes	vertical measurements, horizontal measurements, or both; vertical cursors either set manually or locked to waveform

Waveform measurements		
	source mode	single source, use second source, multiple sources (multichannel cursor)
	multiple sources mode selection	acquired waveforms (input channels), math waveforms, reference waveforms
Waveform histogram	number of diagrams	up to 8
	sources	acquired waveforms (input channels), math waveforms, reference waveforms
	mode	vertical, horizontal
	windowing	user-defined

Waveform math		
General features	number of math equations	up to 8
	number of reference waveforms	up to 8
	sources	channel 1, channel 2, channel 3, channel 4, channel 5, channel 6, channel 7, channel 8, math waveforms 1 to 8, reference waveforms 1 to 8
Functions	operators	add, subtract, multiply, divide, absolute value, square, square root, integrate, differentiate, $\log_{10}$, $\log_e$, $\log_2$, reciprocal, invert, low pass, high pass, rescale (a * x+b)
	filter	low pass, high pass
	filter types	Gaussian, rectangular
	gate	delimits the display region used for waveform math

Digital voltmeter		
Accuracy		related to channel settings of voltmeter source
Measurements		DC, DC RMS, AC RMS
Sources		C1, C2, C3, C4, C5, C6, C7, C8
Number of measurements		up to 4
Resolution		up to 6 digits
Bandwidth		up to 20 MHz

Display characteristics	
Diagram types	Yt, XY, zoom, spectrum
Display configuration (waveform layout)	The display area can be split into separate diagram areas by dragging and dropping signal icons. Each diagram area can hold any number of signals. Diagrams can be stacked on top of each other and later accessed via dynamic tabs (Tab 1, etc.).
Signal icons	Each active waveform is represented by a signal icon on the signal bar; the signal icon displays the individual vertical and acquisition settings.
Toolbar	enables quick access to important tools; allows to set the most common parameters directly in a simple menu and gives access to more detailed parameters in the main menu; user-defined selection of tools in the toolbar
Upper menu bar	displays trigger, horizontal and acquisition system settings; allows quick access to these settings
Main menu	provides access to all instrument settings in a compact menu structure
Axis label	The x-axis and y-axis are labeled with values and physical unit.
Diagram label	Diagrams can be individually labeled with a descriptive, user-defined name.
Diagram layout	The grid, crosshair, axis labeling and diagram labeling can be switched on and off separately.
Persistence	50 ms to 50 s, or infinite
Zoom	vertical and horizontal; touch interface simplifies resize and drag operations on zoom window; display of several zoomed signals: overlapping, stacked on top of each other or lined up next to each other
Signal colors (waveform coding)	predefined or user-defined color tables for persistence display

History and segmented memory			
Acquisition memory	automatic	automatic setting of segment size and sample rate	
	manual	user-defined setting of segment size and sample rate	
Memory segmentation	function	memory segments for the acquisition	
	number of segments	record length	segments [5] (up to)
		1 kpoints	1 048 575
		2 kpoints	524 287
		5 kpoints	262 143
		10 kpoints	131 071
		20 kpoints	65 535
		50 kpoints	32 767
		100 kpoints	16 383
		200 kpoints	9361
		500 kpoints	4095
		1 Mpoints	2113
		2 Mpoints	1056
		5 Mpoints	427
		10 Mpoints	213
		20 Mpoints	106
		50 Mpoints	41
		100 Mpoints	20
		200 Mpoints	9
		400 Mpoints	4
		500 Mpoints	3
	Segmentation is available on all analog and logic channels, protocol decoding and spectrum analysis.		
Fast-segmented mode	continuous recording of waveforms in acquisition memory without interruption due to visualization; blind time between consecutive acquisitions, see Acquisition system		
History mode	function	provides access to past acquisitions in the segmented memory	
	timestamp resolution	1 ns	
	history player	replays the recorded waveforms; repetition possible; adjustable speed; manual next/previous segment; numerical segment number input	
	analyze options	overlay all segments, average all segments, envelope all segments	

Mask testing		
Test definition	number of masks	up to 8 simultaneously
	source	acquired waveforms (input channels), math waveforms, reference waveforms, spectrum waveforms, XY plots
	fail condition	waveform hit
	test rate	up to 4 million waveforms/s
	action on error	acquisition stop, beep, save waveform, pulse on trigger out
Mask definition with segments	number of segments per mask test	up to 8
	segment definition	array of at least 3 points defines an inner region
Result statistics	category	total completed acquisition, failed acquisition, passed acquisition, fail rate, overall test result (pass/fail)
Visualization options	waveform style	vectors, dots
	mask colors	predefined colors for mask without violation (translucent gray), mask with violation (translucent red)

[5] With R&S®MXO3-B105 memory option. The maximum number of segments depends on the number of active channels and the bit resolution of the acquired data and, therefore, on the acquisition system settings such as decimation mode, use of waveform math or high definition (HD) mode. The maximum number of segments without R&S®MXO3-B105 memory option is limited to 10000.

Miscellaneous		
Remote control	web interface	full operation of the instrument's touch interface, keys and multifunction wheel via web browser
	VNC	control of the instrument through virtual network computing
	SCPI	standard instrument programming interface through VISA
Languages	available languages for the user interface	English, German, French, Simplified Chinese, Traditional Chinese, Japanese, Russian, Spanish, Italian, Portuguese, Korean, Czech, Polish
	online help on the instrument	English

Input and output		
Front		
Channel inputs		BNC; for details, see Vertical system
	probe interface	auto detection of passive probes, Rohde&Schwarz active probe interface
Digital channel inputs	D15 to D8, D7 to D0	interface for R&S®RT-ZL03X logic probe
Probe compensation output	signal shape	rectangle, V_{low} = 0 V, V_{high} = 3.3 V amplitude 3.3 V (V_{pp}) ± 5 % (meas.)
	frequency	1 kHz ± 1 % (meas.)
Demo P1	analog signal output for demo apps	$V_p \leq \pm 5$ V (meas.)
Demo P2	digital signal output demo apps	$V_p \leq 3.3$ V (meas.)
USB interface		2 × USB 3.1 Gen 1 ports, type A plug
Rear		
Trigger input		BNC; for details, see Trigger system
Trigger out		BNC; for details, see Trigger system
Waveform generator output (requires R&S®MXO3-B6 option)		BNC; for details, see R&S®MXO3-B6 option
USB interface		1 × USB 3.1 Gen 1 port, type B plug
LAN interface		RJ-45 connector, supports 10/100/1000BASE-T, LXI compliant
External monitor interface		HDMI, 1920 × 1080 pixel at 60 Hz, output of oscilloscope display
Security slot		for standard Kensington style lock
VESA mount		VESA compatibility mounting interface, 100 mm × 100 mm pattern size
Right side		
Ground jack		connected to ground

General data		
Display	type	11.6" LC TFT color display with capacitive touchscreen
	resolution	1920 × 1080 pixel (Full HD)
Temperature		
Temperature range	operating temperature range	0 °C to +45 °C
	storage temperature range	–40 °C to +70 °C
		in line with MIL-PRF-28800F section 4.5.5.1.1.1 class 3 tailored to +45 °C for operation
Climatic resistance	damp heat	+25 °C/+45 °C at 95 % relative humidity cyclic, in line with IEC 60068-2-30
Altitude		
Operating		up to 3000 m above sea level
Nonoperating		up to 4600 m above sea level

The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing, LLC in the United States and other countries.

General data		
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 150 Hz, max. 1.8 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz, in line with EN 60068-2-6
		10 Hz to 55 Hz, in line with MIL-PRF-28800F, section 4.5.5.3.2 class 3
	random	8 Hz to 500 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
		5 Hz to 500 Hz, acceleration 2.058 g (RMS), in line with MIL-PRF-28800F, section 4.5.5.3.1 class 3
Shock		40 g shock spectrum, in line with MIL-STD-810G, method no. 516.6, procedure I
		30 g functional shock, halfsine, duration 11 ms, in line with MIL-PRF-28800F, section 4.5.5.4.1
Electromagnetic compatibility (EMC)		
RF emissions		in line with CISPR 11/EN 55011 group 1, class A (for a shielded test setup); the instrument complies with the emission requirements stipulated by EN 55011, EN 61326-1 and EN 61326-2-1 class A, mak- ing the instrument suitable for use in industrial environments
Immunity		in line with IEC/EN 61326-1 table 2, immunity test requirements for industrial environment[6)]
Certifications		VDE, $_{C}$CSA$_{US}$, KC
Calibration interval		1 year
Power supply		
AC supply		100 V to 240 V ±10 % at 50 Hz to 60 Hz and 400 Hz ±5 %, max. 2.8 A to 1.8 A, in line with MIL-PRF 28800F, section 3.5
Power consumption	maximum	280 W
Safety		in line with IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1, UL 61010-1
Mechanical data		
Dimensions	W × H × D	375 mm × 233 mm × 163 mm (14.76 in × 9.17 in × 6.42 in)
Weight	without options, nominal	4.0 kg (8.82 lb)
Rackmount height	with R&S®ZZA-MXO3 rackmount kit	5 HU

[6)] Test criterion is displayed noise level within ±1 div for input sensitivity of 5 mV/div.

ORDERING INFORMATION

Designation	Type	Order No.
Choose your base model		
Oscilloscope, 100 MHz, 4 channels	MXO 34	1335.2050.04
Oscilloscope, 100 MHz, 8 channels	MXO 38	1335.2050.08
Base unit (including standard accessories: 500 MHz passive probe (10:1) per channel, accessories bag, quick start guide, power cord)		
Choose your bandwidth upgrade		
Upgrade of MXO 34 to 200 MHz bandwidth	R&S®MXO3-B242	1335.2221.02
Upgrade of MXO 34 to 350 MHz bandwidth	R&S®MXO3-B243	1335.2244.02
Upgrade of MXO 34 to 500 MHz bandwidth	R&S®MXO3-B245	1335.2267.02
Upgrade of MXO 34 to 1 GHz bandwidth	R&S®MXO3-B2410	1335.2280.02
Upgrade of MXO 38 to 200 MHz bandwidth	R&S®MXO3-B282	1335.2815.02
Upgrade of MXO 38 to 350 MHz bandwidth	R&S®MXO3-B283	1335.2821.02
Upgrade of MXO 38 to 500 MHz bandwidth	R&S®MXO3-B285	1335.2838.02
Upgrade of MXO 38 to 1 GHz bandwidth	R&S®MXO3-B2810	1335.2844.02
Choose your options		
Mixed signal option for MXO 3 series with 16 digital channels	R&S®MXO3-B1	1335.2073.02
Arbitrary waveform generator, 50 MHz, 1 analog channel	R&S®MXO3-B6	1335.2850.02
Memory upgrade to 500 Mpoints	R&S®MXO3-B105	1335.3105.02
Basic jitter analysis	R&S®MXO3-K12	1335.3170.02
Power analysis	R&S®MXO3-K31	1335.2880.02
Frequency response analysis	R&S®MXO3-K36	1335.2896.02
3-phase analysis	R&S®MXO3-K333	1335.3334.02
Impedance analysis	R&S®MXO3-K337	1335.3370.02
Motor drive analysis	R&S®MXO3-K360	1335.3434.02
Bus analysis	R&S®MXO3-K500	1335.2980.02
Low speed serial buses (I²C/QuadSPI/OctoSPI/SPI/UART/RS-232/RS-422/RS-485/NRZ clocked/NRZ unclocked/Manchester)	R&S®MXO3-K510	1335.2867.02
Automotive protocols (CAN/CAN FD/CAN XL/LIN/SENT)	R&S®MXO3-K520	1335.2873.02
Aerospace protocols (ARINC 429/MIL-STD-1553/SpaceWire)	R&S®MXO3-K530	1335.2996.02
MIPI low speed protocols (SPMI/RFFE/I³C)	R&S®MXO3-K550	1335.5214.02
Automotive Ethernet protocols (10BASE-T1S)	R&S®MXO3-K560	1335.5943.02
USB protocols (USB 1.1/2.0)	R&S®MXO3-K570	1335.3186.02
R&S®ScopeStudio Software	R&S®MXO-PC	1801.9005.02
R&S®ScopeStudio Protocol Decode Option	R&S®MXO-PC-K1	1804.8874.02
Application bundle, consists of the following options: R&S®MXO3-B6, R&S®MXO3-B105, R&S®MXO3-K31, R&S®MXO3-K36, R&S®MXO3-K510, R&S®MXO3-K520, R&S®MXO3-K530, R&S®MXO3-K550, R&S®MXO3-K560	R&S®MXO3-PK1	1335.2909.02
Choose your additional probes		
Single-ended passive probes		
700 MHz, 10 MΩ, 10:1, 400 V, 9.5 pF, 2.5 mm	R&S®RT-ZP11	1803.0005.02
500 MHz, 10 MΩ, 10:1, 400 V, 9.5 pF, 2.5 mm	R&S®RT-ZP10	1409.7550.00
500 MHz, 10 MΩ, 10:1, 300 V, 10 pF, 5 mm	R&S®RT-ZP05M	1335.3505.02
700 MHz, 14.9 MΩ, 25:1, 30 V, 4 pF, MMCX	R&S®RT-ZPMMCX	1803.1599.02
38 MHz, 1 MΩ, 1:1, 55 V, 39 pF, 2.5 mm	R&S®RT-ZP1X	1333.1370.02
Active broadband probes: single-ended		
1.0 GHz, active, 1 MΩ, Rohde&Schwarz probe interface	R&S®RT-ZS10E	1418.7007.02
1.0 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZS10	1410.4080.02
1.5 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZS20	1410.3502.02
Active broadband probes: differential		
1.0 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, incl. 10:1 external attenuator, 1 MΩ, 60 V DC, 42.4 V AC (peak), Rohde&Schwarz probe interface	R&S®RT-ZD10	1410.4715.02
1.5 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZD20	1410.4409.02
Power rail probe		
2.0 GHz, 1:1, 50 kΩ, ±0.85 V, ±60 V offset, Rohde&Schwarz probe interface	R&S®RT-ZPR20	1800.5006.02
High voltage probes: passive		
250 MHz, 100:1, 100 MΩ, 850 V, 6.5 pF	R&S®RT-ZH03	1333.0873.02
400 MHz, 100:1, 50 MΩ, 1000 V, 7.5 pF	R&S®RT-ZH10	1409.7720.02
400 MHz, 1000:1, 50 MΩ, 1000 V, 7.5 pF	R&S®RT-ZH11	1409.7737.02

Designation	Type	Order No.
High voltage probes: differential		
200 MHz, 250:1/25:1, 5 MΩ, 750 V (peak), 300 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD07	1800.2307.02
100 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD15	1800.2107.02
200 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD16	1800.2207.02
100 MHz, 1000:1/100:1, 40 MΩ, 6000 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD60	1800.2007.02
Current probes		
20 kHz, AC/DC, 0.01 V/A and 0.001 V/A, ±200 A and ±2000 A, BNC interface	R&S®RT-ZC02	1333.0850.02
100 kHz, AC/DC, 0.1 V/A, 30 A, BNC interface	R&S®RT-ZC03	1333.0844.02
2 MHz, AC/DC, 0.01 V/A, 500 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC05B	1409.8204.02
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), BNC interface	R&S®RT-ZC10	1409.7750.02
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC10B	1409.8210.02
50 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC15B	1409.8227.02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), BNC interface	R&S®RT-ZC20	1409.7766.02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC20B	1409.8233.02
120 MHz, AC/DC, 1 V/A, 5 A (RMS), BNC interface	R&S®RT-ZC30	1409.7772.02
EMC near-field probe		
Probe set for E and H near-field measurements, 30 MHz to 3 GHz	R&S®HZ-15	1147.2736.02
Logic probe [1]		
300 MHz logic probe, 8 channels	R&S®RT-ZL03X	1335.3005.02
Probe accessories		
Accessory set for R&S®RT-ZP10/-ZP11 passive probe (2.5 mm probe tip)	R&S®RT-ZA1	1409.7566.02
Probe power supply for R&S®RT-ZC10/-ZC20/-ZC30	R&S®RT-ZA13	1409.7789.02
External attenuator 10:1, 2.0 GHz, 1.3 pF, 60 V DC, 42.4 V AC (peak), for R&S®RT-ZD20/-ZD30 probes	R&S®RT-ZA15	1410.4744.02
Probe pouch for the logic probes	R&S®RT-ZA19	1335.7875.02
Power deskew and calibration test fixture	R&S®RT-ZF20	1800.0004.02
Tripod positioner with central tensioning knob for easy clamping and positioning of probes (span width: 200 mm, clamping range: 15 mm)	R&S®RT-ZAP	1326.3641.02
Choose your accessories		
Front cover	R&S®MXO3-Z1	1335.1902.02
Soft case	R&S®MXO3-Z3	1335.1919.02
Transit case	R&S®MXO3-Z4	1335.1925.02
Rackmount kit, for MXO 3 oscilloscopes with 5 HU	R&S®ZZA-MXO3	1335.2715.02
VESA mount (compatible with standard 100 mm × 100 mm pattern)	Choose industry standard mounts	

[1] The R&S®MXO3-B1 mixed signal option contains two R&S®RT-ZL03X logic probes.

Service at Rohde&Schwarz

YOU'RE IN GREAT HANDS

	SERVICE PLANS	ON DEMAND
Calibration	Up to five years [1]	Pay per calibration
Warranty and repair	Up to five years [1]	Standard price repair

[1] For extended periods, contact your Rohde&Schwarz sales office.

Instrument management made easy

The R&S®InstrumentManager makes it easy to register and manage your instruments. It lets you schedule calibration dates and book services.

Find out more about our service portfolio:

OUR OSCILLOSCOPE PORTFOLIO



OSCILLOSCOPE PORTFOLIO






	R&S®RTH1000	R&S®RTC1000	R&S®RTB 2	MXO 3
Vertical system				
Bandwidth [1]	60/100/200/350/500 MHz	50/70/100/200/300 MHz	70/100/200/300 MHz	100/200/350/500 MHz/1 GHz
Number of channels	2 plus DMM/4	2	2/4	4/8
Vertical resolution; system architecture	10 bit; 16 bit	8 bit; 16 bit	10 bit; 16 bit	12 bit; 18 bit
V/div, 1 MΩ	2 mV to 100 V	1 mV to 10 V	1 mV to 5 V	1 mV to 10 V
V/div, 50 Ω	–			1 mV to 1 V
Digital channels	8	8	16	16
Horizontal system				
Sampling rate per channel (in Gsample/s)	1.25 (4-channel model); 2.5 (2-channel model); 5 (all channels interleaved)	1; 2 (2 channels interleaved)	1.25; 2.5 (2 channels interleaved)	2.5; 5 (2 channels interleaved)
Maximum memory (per channel; 1 channel active)	125 kpoints (4-channel model); 250 kpoints (2-channel model); 500 kpoints	1 Mpoints; 2 Mpoints	10 Mpoints; 20 Mpoints	standard: 125 Mpoints; max. upgrade: 500 Mpoints [2]
Segmented memory	standard, 50 Mpoints	–	standard, 160 Mpoints	standard: 10 000 segments; option: 1 000 000 segments
Acquisition rate (in waveforms/s)	50 000	10 000	50 000 (300 000 in fast segmented memory mode)	> 4 500 000
Trigger				
Types	digital	analog	analog	advanced (includes zone trigger), digital trigger (15 trigger types)
Sensitivity	–	–	at 1 mV/div: > 2 div	0.0001 div, across full bandwidth, user controllable
Analysis				
Mask test	tolerance mask	tolerance mask	tolerance mask	user configurable, hardware based, tolerance mask
Mathematics	elementary	elementary	basic (math on math)	advanced (formula editor)
Serial protocols triggering and decoding [1]	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, CAN FD, SENT	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, CAN FD, CAN XL, LIN, ARINC 429, MIL-STD-1553, SPMI, 10BASE-T1S, QUAD-SPI, OCTO-SPI, SENT, RFFE I³C, NRZ, Manchester, SpaceWire, USB 1.1/2.0
Applications [1, 2]	high-resolution frequency counter, advanced spectrum analysis, harmonics analysis, user scripting	digital voltmeter (DVM), component tester, fast Fourier transform (FFT)	digital voltmeter (DVM), fast Fourier transform (FFT), frequency response analysis	power, digital voltmeter (DVM), frequency response analysis, basic jitter analysis, 3-phase analysis, impedance analysis
Compliance testing [1, 2]	–	–	–	–
Display and operation				
Size and resolution	7" touchscreen, 800 × 480 pixel	6.5", 640 × 480 pixel	10.1" touchscreen, 1280 × 800 pixel	11.6" touchscreen, 1920 × 1080 pixel (Full HD)
General data				
Dimensions in mm (W × H × D)	201 × 293 × 74	285 × 175 × 140	390 × 220 × 152	375 × 233 × 163
Weight in kg	2.4	1.7	2.5	4
Battery	lithium-ion, > 4 h	–	–	–

[1] Upgradeable. [2] Requires an option.






MXO 4	MXO 5/MXO 5C	R&S®RTO6	R&S®RTP
200/350/500 MHz/1/1.5 GHz	100/200/350/500 MHz/1/2 GHz	600 MHz/1/2/3/4/6 GHz	4/6/8/13/16 GHz
4	4/8	4	4
12 bit; 18 bit	12 bit; 18 bit	8 bit; 16 bit	8 bit; 16 bit
500 µV to 10 V	500 µV to 10 V	1 mV to 10 V (HD mode: 500 µV to 10 V)	
500 µV to 1 V	500 µV to 1 V	1 mV to 1 V (HD mode: 500 µV to 1 V)	2 mV to 1 V (HD mode: 1 mV to 1 V)
16	16	16	16
2.5; 5 (2 channels interleaved)	5 on 4 channels; 2.5 on 8 channels (2 channels interleaved)	10; 20 (2 channels interleaved in 4 GHz and 6 GHz model)	20; 40 (2 channels interleaved)
standard: 400 Mpoints; max. upgrade: 800 Mpoints [2)]	standard: 500 Mpoints max. upgrade: 1 Gpoints [2)]	standard: 200 Mpoints/800 Mpoints; max. upgrade: 1 Gpoints/2 Gpoints	standard: 100 Mpoints/400 Mpoints; max. upgrade: 3 Gpoints
standard: 10000 segments; option: 1000000 segments	standard: 10000 segments; option: 1000000 segments	standard	standard
> 4500000	> 4500000	1000000 (2500000 in ultra-segmented memory mode)	750000 (> 3000000 in ultra-segmented memory mode)
advanced (includes zone trigger), digital trigger (15 trigger types)	advanced (includes zone trigger), digital trigger (15 trigger types)	advanced (includes zone trigger), digital trigger (15 trigger types), high speed serial pattern trigger including 5 Gbit/s clock data recovery (CDR) [2)]	advanced (includes zone trigger), digital trigger (14 trigger types) with real-time deembedding [2)], high speed serial pattern trigger including 8/16 Gbit/s clock data recovery (CDR) [2)]
0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable
user configurable, hardware based, tolerance mask	user configurable, hardware based, tolerance mask	user configurable, hardware based	user configurable, hardware based
advanced (formula editor)	advanced (formula editor)	advanced (formula editor, Python interface)	advanced (formula editor, Python interface)
I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, CAN FD, CAN XL, LIN, ARINC 429, MIL-STD-1553, SPMI, 10BASE-T1S, QUAD-SPI, OCTO-SPI, SENT, RFFE, I³C, NRZ, Manchester, SpaceWire, USB 1.1/2.0	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, CAN FD, CAN XL, LIN, ARINC 429, MIL-STD-1553, SPMI, 10BASE-T1S, 100/1000BASE-T1, QUAD-SPI, OCTO-SPI, 8b10b, SENT, RFFE, I³C, NRZ, Manchester, SpaceWire, USB 1.1/2.0, MIPI D-PHY (CSI2/DSI)	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, I²S, MIL-STD-1553, ARINC 429, FlexRay, CAN FD, CAN XL, MIPI RFFE, USB 2.0/HSIC, MDIO, 8b10b, Ethernet, Manchester, NRZ, SENT, MIPI D-PHY, SpaceWire, MIPI M-PHY/UniPro, CXPI, USB 3.1 Gen 1, USB-SSIC, PCIe 1.1/2.0, USB Power Delivery, Automotive Ethernet 10BASE-T1S, 100/1000BASE-T1, I³C	I²C, SPI, UART/RS-232/RS-422/RS-485, SENT, CAN, LIN, CAN FD, CAN XL, MIL-STD-1553, ARINC 429, SpaceWire, USB 2.0/HSIC/PD, USB 3.1 Gen 1/Gen 2/SSIC, PCIe 1.1/2.0/3.0, 8b10b, MIPI RFFE, MIPI D/M-PHY/UniPro, Automotive Ethernet 10BASE-T1S, 100/1000BASE-T1, Ethernet 10/100BASE-TX, MDIO, Manchester, NRZ, I³C
power, digital voltmeter (DVM), frequency response analysis, basic jitter analysis, 3-phase analysis, impedance analysis	power, digital voltmeter (DVM), frequency response analysis, basic jitter analysis, eye analysis, 3-phase analysis, impedance analysis	power, advanced spectrum analysis and spectrogram, jitter and noise decomposition, clock data recovery (CDR), I/Q data and RF analysis (R&S®VSE), deembedding, embedding, equalization, PAM-N, TDR/TDT analysis, advanced eye diagram, EMC/ESD test	advanced spectrum analysis and spectrogram, jitter and noise decomposition, real-time deembedding, embedding, equalization, PAM-N, TDR/TDT analysis, I/Q data and RF analysis (R&S®VSE), advanced eye diagram, EMC/ESD test
–	see specifications (PD 3683.8196.22, PD 3684.1472.22)	see specifications (PD 5216.1640.22)	see specifications (PD 3683.5616.22)
13.3" touchscreen, 1920 × 1080 pixel (Full HD)	for MXO 5 only: 15.6" touchscreen, 1920 × 1080 pixel (Full HD)	15.6" touchscreen, 1920 × 1080 pixel (Full HD)	13.3" touchscreen, 1920 × 1080 pixel (Full HD)
414 × 279 × 162	MXO 5: 445 × 314 × 154 MXO 5C: 445 × 105 × 405	450 × 315 × 204	441 × 285 × 316
6	MXO 5: 9 MXO 5C: 8.7	10.7	18
–	–	–	–

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