MXO
Oscilloscope
Getting Started
for 5C Series

ROHDE & SCHWARZ

Make ideas real

This manual describes the following MXO models with firmware version 2.1 and higher:

- MXO 54C, 4 channels (1802.3000k04)
- MXO 58C, 8 channels (1802.2000k08)

1   Safety and regulatory information

The product documentation helps you to use the product safely and efficiently.

Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

- In Chapter 1.1, "Safety instructions", on page 3. The same information is provided in many languages in printed format. The printed "Safety Instructions" for "Oscilloscopes and Accessories" are delivered with the product.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

Intended use

The MXO oscilloscope is designed for measurements on circuits that are only indirectly connected to the mains or not connected at all. It is not rated for any measurement category.

The product is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

Target audience

The target audience of this document includes developers and technicians, administrators and maintenance personnel using oscilloscopes and probes. The required skills and experience of the users depend on the test setup and application of the product.

1.1   Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the specifications document, manuals and the printed "Safety Instructions" document. If you are unsure about the appropriate use, contact Rohde & Schwarz customer support.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the specifications document. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Rohde & Schwarz customer support at https://www.rohde-schwarz.com/support.

In these safety instructions, the term "product" covers instruments (oscilloscopes), probes and their accessories.

Lifting and carrying the instrument

Check the specifications document for the maximum weight of the instrument. A single person can only carry a maximum of 18 kg safely depending on age, gender and physical condition. If your instrument is heavier than 18 kg, do not move or carry it by yourself.

Use the instrument handles to move or carry the instrument. Do not use the mounted accessories instead of the handles. Accessories are not designed to carry the weight of the instrument.

To move the instrument safely, you can use lifting or transporting equipment such as lift trucks and forklifts. Follow the instructions provided by the equipment manufacturer.

Choosing the operating site

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing with live parts, which can lead to electric shock, serious personal injury or death if you touch the casing.

If Rohde & Schwarz provides accessories designed for outdoor use of your product, e.g. a protective cover, you can use the product outdoors.

You can operate the product up to an altitude of 2000 m above sea level. If a higher altitude is permissible, the value is provided in the specifications document. The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the specifications document.

Setting up the product

Always place the product on a stable, flat and level surface with the bottom of the product facing down. If the product is designed for different positions, secure the product so that it cannot fall over.

If the product has foldable feet, always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

If stacking is possible, keep in mind that a stack of products can fall over and cause injury.

If you mount products in a rack, ensure that the rack has sufficient load capacity and stability. Observe the specifications of the rack manufacturer. Always install the products from the bottom shelf to the top shelf so that the rack stands securely. Secure the product so that it cannot fall off the rack.

Connecting the product

Before connecting the interfaces and measuring inputs of the product to other products or electrical circuits, make sure that the other products or electrical circuits provide special protection against electric shock. This protection principle is referred to as SELV (safety extra-low voltage) and is based on a low voltage level and increased insulation. Exceptions are indicated by a measurement category on the product and given in the specifications document.

Connecting to power and grounding

The mains power supply input of the instrument complies with overvoltage category II. Connect the product to a fixed installation used to supply energy-consuming equipment such as household appliances and similar loads. Keep in mind that electrically powered products have risks, such as electric shock, fire, personal injury or even death.

Take the following measures for your safety:

- Do not use an isolating transformer to connect the instrument to the mains power supply.

- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source. If the power adapter does not adjust automatically, set the correct value and check the rating of the fuse.

- If a product has an exchangeable fuse, its type and characteristics are indicated next to the fuse holder. Before changing the fuse, switch off the product and disconnect it from the power source. How to change the fuse is described in the product documentation.

- Only use the power cable delivered with the product. It complies with country-specific safety requirements. Only insert the plug into an outlet with protective conductor terminal.

- Only use intact cables and route them carefully so that they cannot be damaged. Check the power cables regularly to ensure that they are undamaged. Also ensure that nobody can trip over loose cables.

- If you connect the product to an external power supply, use the one delivered with the product or recommended in the product documentation. The external power supply must conform to the country-specific regulations.

- Ensure that you can disconnect the product from the power source at any time. Pull the power plug to disconnect the product. The power plug must be easily accessible. If the product is integrated into a system that does not meet these requirements, provide an easily accessible circuit breaker at the system level.

- Replace parts that are relevant to safety only by original parts, e.g. power cables or fuses.

Performing measurements

Take the following measures for your safety:

- To ascertain a voltage-free state, use an appropriate voltage tester. Any measurement setup including an oscilloscope is not suitable for this purpose.

- The maximum input voltage on channel inputs and the external trigger input must not exceed the value specified in the specifications document.

- Observe all voltage and current ratings of the instrument, the probes, and the accessories. Exceeding the allowed voltages can lead to an electric shock.

Limits and ratings are marked on the products and listed in the specifications documents.

Consider that the rated voltage depends on the frequency. The voltage limitation curves or values are provided in the specifications document.

- Never cause any short circuits when measuring sources with high output currents.

- Use only probes and accessories that comply with the measurement category (CAT) of your measurement task. If the product is rated for any measurement category, the permitted category is indicated on the product and in the specifications document. If you use other than Rohde & Schwarz accessories, make sure that they are suitable for the instrument and the measurement task.

- Set the correct attenuation factor on the instrument according to the probe being used. Otherwise, the measurement results do not reflect the actual voltage level, and you might misjudge the actual risk.

- When working with high voltages and current probes, observe the additional operating conditions specified in these safety instructions.

- The probe pins are extremely pointed and can easily penetrate clothes and the skin. Handle the probe pins with great care. To exchange a probe pin, use tweezers or pliers to avoid injuries. When transporting the accessories, always use the box supplied with the probe.

- Prevent the probe from receiving mechanical shock. Avoid putting excessive strain on the probe cable or exposing it to sharp bends. Touching a broken cable during measurements can cause injuries.

- Set up all probe connections to the instrument before applying power.

Working with hazardous voltages

Voltages higher than 30 V RMS, or 42 V peak, or 60 V DC are regarded as hazardous contact voltages. Direct contact with them can cause serious injuries.

Make sure that only electrically skilled persons use the products for measurements on hazardous contact voltages. These working conditions require special education and experience to perceive risks and to avoid hazards which electricity can create.

When working with hazardous contact voltages, use protective measures to preclude direct contact with the measurement setup:

- Do not touch exposed connections and components when power is applied.

- Switch off the test circuit while connecting and disconnecting probe leads.

- Use only insulated voltage probes, test leads and adapters.
- Make sure that the input leads fulfill the safety requirements for your measurement.
  The delivered input leads might have a jacket wear indicator that indicates a worn jacket by different jacket color. In this case, do not use the input lead. Replace it with a new one.
- When connecting to the DUT, keep your fingers behind finger guard. Remove jewelry, watches, and other metallic objects. Only use 4 mm safety banana plugs.

Working with current probes

When working with current probes, you can measure high-frequency currents or currents that contain high-frequency components.

- Switch off the test circuit while connecting the probe.
- Do not attach the clamp to bare unisolated conductors. To avoid injury from a short circuit, measure at a location on an insulated wire where the insulation is sufficient for the circuit voltage.
- Connect the probe only to the secondary side of a breaker. With this measure, you can avoid injury if a short circuit occurs.
- The following effects can cause burns and fire or damage to the measurement site:
  - Eddy current loss can cause heating of the sensor head.
  - Dielectric heating can cause heating of cord insulation and other materials.
- When measuring current that includes a high-frequency component, consider the derating characteristics of the probe. Do not measure any current that exceeds the rated current.
- Using the probes with high frequencies or strong magnetic fields may cause the device to become abnormally hot, resulting in fire, equipment damage, or burns.

Measurement categories

IEC 61010-2-030 defines measurement categories that rate instruments on their ability to resist short transient overvoltages that occur in addition to the working voltage. Use the measurement setup only in electrical environments for which they are rated.

- 0 - Instruments without rated measurement category

For measurements performed on circuits not directly connected to mains, for example, electronics, circuits powered by batteries, and specially protected secondary circuits. This measurement category is also known as CAT I.

- CAT II:
  For measurements performed on circuits directly connected to the low-voltage installation by a standard socket outlet, for example, household appliances and portable tools.

- CAT III:
  For measurements performed in the building installation, such as junction boxes, circuit breakers, distribution boards, and equipment with permanent connection to the fixed installation.

- CAT IV:
  For measurements performed at the source of the low-voltage installation, such as electricity meters and primary overcurrent protection devices.
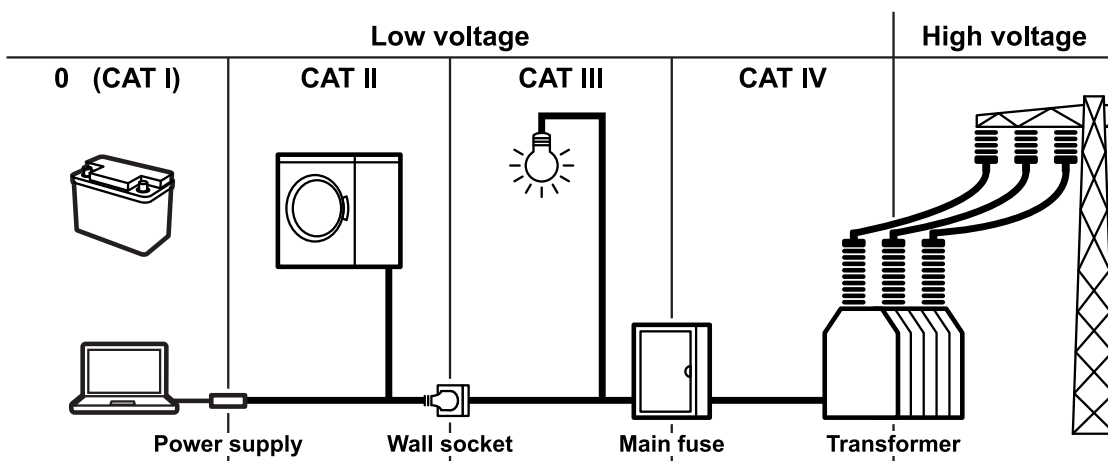
Cleaning the product

Use a dry, lint-free cloth to clean the product. When cleaning, keep in mind that the casing is not waterproof. Do not use liquid cleaning agents.

Meaning of safety labels

Safety labels on the product warn against potential hazards.

⚠	Potential hazard
	Read the product documentation to avoid personal injury or product damage.

	Electrical hazard
	Indicates live parts. Risk of electric shock, fire, personal injury or even death.

	Protective conductor terminal
	Connect this terminal to a grounded external conductor or to protective ground. This connection protects you against electric shock if an electric problem occurs.

1.2   Labels on the product

Labels on the casing inform about:

- Personal safety, see "Meaning of safety labels" on page 9
- Product and environment safety, see Table 1-1
- Identification of the product

Table 1-1: Labels regarding product and environment safety

	Chassis grounding terminal
	Take care when handling electrostatic sensitive devices.
	Labeling in line with EN 50419 for disposal of electrical and electronic equipment after the product has come to the end of its life.
	For more information, see the product user manual, chapter "Disposal".

1.3   Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

WARNING

Potentially hazardous situation. Could result in death or serious injury if not avoided.

CAUTION

Potentially hazardous situation. Could result in minor or moderate injury if not avoided.

NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

1.4   Where to find key documents on Rohde & Schwarz

Certificates issued to Rohde & Schwarz that are relevant for your country are provided at www.rohde-schwarz.com/key-documents, e.g. concerning:

● Quality management
● Environmental management
● Information security management
● Accreditations

1.5   Korea certification class A

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

2 Documentation overview

This section provides an overview of the MXO user documentation.

2.1 Manuals and instrument help

You find the manuals on the product page at:

www.rohde-schwarz.com/manual/mxo5C

Getting started manual

Introduces the MXO and describes how to set up the product. A printed English version is included in the delivery.

User manual and help

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance and instrument interfaces. Includes the contents of the getting started manual.

The contents of the user manual are available as help in the MXO. The help offers quick, context-sensitive access to the complete information on the instrument and its firmware.

The user manual is available for download or immediate display on the internet.

Safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

Instrument security procedures manual

Deals with security issues when working with the MXO in secure areas. It is available for download on the internet.

Service manual

Describes the performance test for checking compliance with rated specifications, firmware update, adjustments, installing options and maintenance. The service

manual is available for registered users on the global Rohde & Schwarz information system (GLORIS, https://gloris.rohde-schwarz.com).

2.2   Specifications and product brochure

The specifications document, also known as the data sheet, contains the technical specifications of the MXO. It also lists the firmware applications and their order numbers, and optional accessories. The product brochure provides an overview of the instrument and deals with the specific characteristics.

www.rohde-schwarz.com/brochure-datasheet/mxo5C

2.3   Calibration certificate

The document is available on https://gloris.rohde-schwarz.com/calcert. You need the device ID of your instrument, which you can find on a label on the rear panel.

2.4   Release notes, open source acknowledgment

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation. The open source acknowledgment document provides verbatim license texts of the used open source software. It can also be read directly on the instrument.

www.rohde-schwarz.com/firmware/mxo5C

3 Preparing for use

Here, you can find basic information about setting up the instrument for the first time or when changing the operating site.

3.1 Lifting and carrying

See: "Lifting and carrying the instrument" on page 4.

3.2 Unpacking and checking

1. Unpack the product carefully.

2. Retain the original packing material. Use it when transporting or shipping the product later.

3. Using the delivery notes, check the equipment for completeness.

4. Check the equipment for damage.

   If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

3.3 Choosing the operating site

Specific operating conditions ensure proper operation and avoid damage to the product and connected devices. For information on environmental conditions such as ambient temperature and humidity, see the specifications document.

For safety information, see "Choosing the operating site" on page 4.

Electromagnetic compatibility classes

The electromagnetic compatibility (EMC) class indicates where you can operate the product. The EMC class of the product is given in the specifications document.

- Class B equipment is suitable for use in:
  - Residential environments
  - Environments that are directly connected to a low-voltage supply network that supplies residential buildings
- Class A equipment is intended for use in industrial environments. It can cause radio disturbances in residential environments due to possible conducted and radiated disturbances. It is therefore not suitable for class B environments.
  If class A equipment causes radio disturbances, take appropriate measures to eliminate them.

3.4 Setting up the product

When setting up the instrument, follow the safety instructions:
- "Setting up the product" on page 5
- "Intended use" on page 3

3.4.1 Placing the product on a bench top

For standalone operation, place the instrument on a horizontal bench with even, flat surface. The instrument can be used in horizontal position, standing on its feet, or with the support feet on the bottom extended.

To place the product on a bench top

1. Place the product on a stable, flat and level surface. Ensure that the surface can support the weight of the product. For information on the weight, see the specifications document.

2. **CAUTION!** Foldable feet can collapse. For safety information, see "Setting up the product" on page 5.

   Always fold the feet completely in or out. With folded-out feet, do not place anything on top or underneath the product.

3. **WARNING!** A stack of products can fall over and cause injury. Never stack more than three products on top of each other. Instead, mount them in a rack.

   Stack as follows:

   ● If the products have foldable feet, fold them in completely.
   ● All products must have the same dimensions (width and length).
   ● Do not exceed a total load of 50 kg placed on the product at the bottom of the stack.
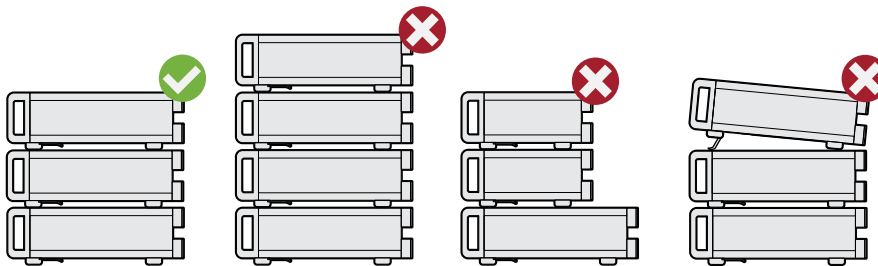
   Left　　　　　= Stacked correctly
   Middle left　= Stacked incorrectly, too many products
   Middle right = Stacked incorrectly, different dimensions
   Right　　　　= Stacked incorrectly, folded-out feet

4. **NOTICE!** Overheating can damage the product.

   Prevent overheating as follows:

   ● Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity to provide sufficient airflow and ventilation.
   ● Do not place the product next to heat-generating equipment such as radiators or other products.

3.4.2　Mounting the product in a rack

To prepare the rack

1. Observe the requirements and instructions in

2. **NOTICE!** Insufficient airflow can cause overheating and damage the product.

   Design and implement an efficient ventilation concept for the rack.

To mount the oscilloscope in a rack

1. Use a rackmount kit to prepare the instrument for rack mounting.

    a) Order the rackmount kit designed for your oscilloscope. For the order number, see specifications document.
    b) Mount the rackmount kit. Follow the assembly instructions provided with the rackmount kit.

2. Lift the product to shelf height. If the rack is high, use a safe climbing aid when placing on upper shelves.

3. Grip the product by the handles. Slide the product onto the shelf until the rack brackets fit closely to the rack.

4. Tighten all screws at the rack brackets with a tightening torque of 1.2 Nm to secure the product at the rack.

To unmount the product from a rack

1. Loosen the screws at the rack brackets.

2. Remove the product from the rack.

3. If placing the product on a bench top again, unmount the rackmount kit from the product. Follow the instructions provided with the rackmount kit.

3.5   Considerations for test setup

Observe safety instructions, see "Performing measurements" on page 6.

Cable selection and electromagnetic interference (EMI)

Electromagnetic interference (EMI) can affect the measurement results.

To suppress electromagnetic radiation during operation:
* Use high-quality shielded cables, for example, double-shielded RF and LAN cables.
* Always terminate open cable ends.
* Ensure that connected external devices comply with EMC regulations.

Measuring accessories

Use only probes and measuring accessories that comply with IEC 61010-031.

Signal input and output levels

Information on signal levels is provided in the specifications document. Keep the signal levels within the specified ranges to avoid damage to the product and connected devices.

During operation, if the firmware observes a serious unexpected disturbance (e.g. due to ESD), it resets some hardware components and initiates a new alignment to ensure proper instrument functioning. Then it restores the user settings to the state before the disturbance.

3.6   Connecting to power

For safety information, see "Connecting to power and grounding" on page 5.

The MXO can be used with different AC power voltages and adapts itself automatically to it.

The nominal ranges are indicated on a label near the power connector on the instrument and in the specifications document.

1. Plug the AC power cable into the AC power connector on the rear panel of the product. Only use the AC power cable that is delivered with the product.

2. Plug the AC power cable into a power outlet with ground contact.

If the voltage dips at the AC power connector (according to EN 61326-2-1 6.4.101), a restart of the MXO can happen. All instrument settings are restored after the restart.

3.7   Connecting to LAN

For remote operation of the instrument using a computer, you need a local area network (LAN) connection.

Network environment

Before connecting the product to a LAN, consider the following:
* Install the latest firmware to reduce security risks.

- For internet or remote access, use secured connections if applicable.

- Ensure that the network settings comply with the security policies of your company. Contact your local system administrator or IT department before connecting your product to your company LAN.

- When connected to the LAN, the product may potentially be accessed from the internet, which may be a security risk. For example, attackers might misuse or damage the product.

To connect a LAN cable

► Connect an RJ-45 cable to the LAN connector on the rear panel, and to the LAN.

For supported LAN interfaces, refer to the specifications document.

By default, the MXO is configured to use DHCP. Configuration of a static IP address is not required.

3.8   Connecting a monitor, mouse and keyboard

For direct operation of the MXO 5C series oscilloscope, connect a mouse, keyboard and monitor. If you use a touchscreen, mouse and keyboard are redundant. If you operate the oscilloscope only remotely, you do not need these devices.

Using the HDMI and DisplayPort connectors on the rear panel, you can connect one or two external monitors or projectors to the oscilloscope. The display connectors are *not* plug & play, the monitors are recognized by the instrument during the boot process.

1. **NOTICE!** Missing ground contact can damage the oscilloscope.

   Ensure that the monitor and the oscilloscope are connected to a ground contact. See also: Chapter 3.6, "Connecting to power", on page 18.

2. **NOTICE!** Use only standard-compliant monitor cables.

   Connect the monitor or projector to a display connector.

3. Switch on the oscilloscope. See also "To switch on the product" on page 20.

   The oscilloscope recognizes the external monitor. During the running session, you can disconnect the monitor and connect it again.

If the monitor provides touch functionality, an additional connection can be required, e.g. a USB connection. Refer to the documentation of your monitor.

To connect a mouse and a keyboard

► Connect the mouse and the keyboard to any of the USB connectors.

3.9 Switching on or off

The instrument is switched on or off with the power switch and the [Power] key. The [Power] key is located in the bottom left corner of the front panel. The power switch is located at the rear panel of the instrument.

Table 3-1: Overview of power states

Status	LED	Power switch
Off	⚪ (unlighted)	[0] (off)
Standby	🟡 yellow	[I] (on)
Ready	🟢 green	[I] (on)

To switch on the product

The product is off but connected to power.

1. Set the switch on the power supply to position [I].

    The power key on the front panel lights up.

2. Press the [Power] key on the front panel.

    The instrument performs a system check, boots the operating system, and then starts the MXO firmware.
    The [Power] key turns green and the illuminated keys on the front panel light up. If the previous session was terminated regularly, the oscilloscope uses the last settings.

Before you start measurements, be sure to comply with the warm-up phase specified in the specifications document.

To shut down the product

The product is in the ready state.

► Press the [Power] key.

All current settings are saved, and the software shuts down. The [Power] key turns yellow. The standby power supplies only the power switch circuits.

The ⏻ "Power" icon in the "Menu" shuts down only the firmware application. To shut down the instrument completely, use the [Power] key.

To disconnect from power

The product is in the standby state.

1. **NOTICE!** Risk of data loss. If you disconnect the product from power when it is in the ready state, you can lose settings and data. Shut it down first.

   Set the switch on the power supply to position [0].

   The LED of the [Power] key is switched off.

2. Disconnect the product from the power source.

4   Instrument tour

This section describes the front and rear view of the instrument including all connectors.

4.1   Front view

This section describes the instrument's front panel.
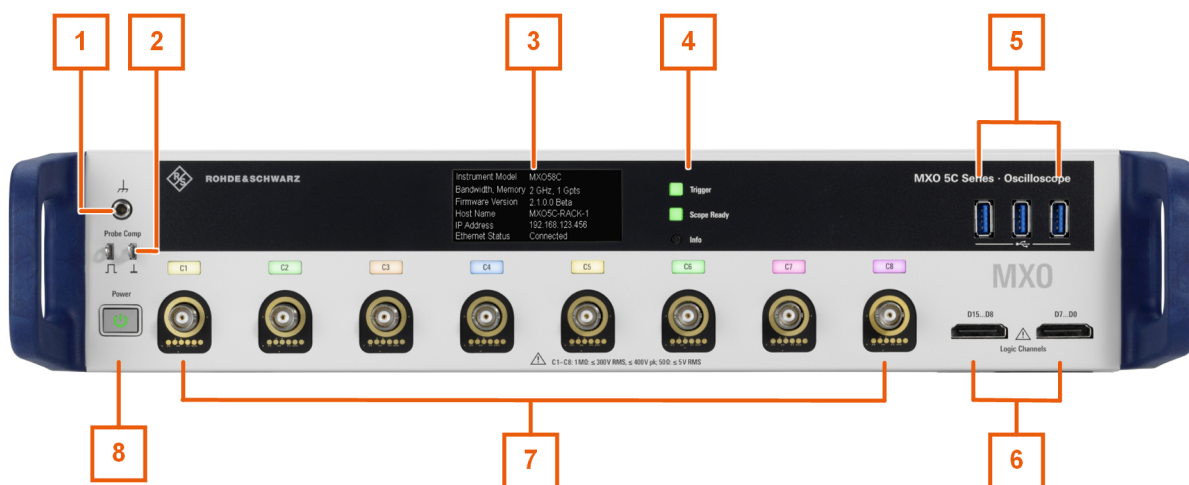
Figure 4-1: Front view of MXO 58C with 8 input channels

1 = Chassis grounding terminal
2 = Connectors for probe compensation
3 = E ink display
4 = Information LEDs and "Info" key to turn display pages
5 = USB connectors
6 = Connectors for logic probe (R&S MXO5C-B1 Mixed Signal option)
7 = Analog input channels
8 = [Power] key

[Power] key

The [Power] key is located on the lower left corner of the front panel. It starts up and shuts down the instrument's software.

The light of the key shows the instrument state, see Chapter 3.9, "Switching on or off", on page 20.

Analog channel inputs

The MXO has 4 or 8 channel inputs to connect the input signals, depending on the model.

You can connect probes with Rohde & Schwarz probe interface or BNC connectors. The input impedance is selectable, the values are 50 Ω and 1 MΩ.

The maximum input voltage on channel inputs is:
- 400 V (V_p) and 300 V (RMS) at 1 MΩ input impedance
- 30 V (V_p) and 5 V (RMS) at 50 Ω input impedance

E ink display and Info key

The electronic ink display shows the basic information of the MXO 5C series oscilloscope, for example, IP address, host name, and LAN connection status.

Information LEDs: Trigger and Scope App

The "Trigger" indicates if the instrument has triggered, according to the selected trigger mode.

The "Scope App" LED lights up when the firmware is running.

Logic Channels

Two connectors for logical probes with 8 digital channels each (D0 to D7 and D8 to D15). Using logic channels requires the Mixed Signal Option R&S MXO5C-B1.

The maximum input voltage is 40 V (Vp) at 100 kΩ input impedance. The maximum input frequency for a signal with the minimum input voltage swing and medium hysteresis of 800 mV (Vpp) is 400 MHz.

USB

Three USB 3.0 interfaces type A. They are used to:
- Directly connect a computer to control the oscilloscope
- Connect USB flash drive for storing and reloading instrument settings, and to update firmware
- Connect touchscreen control

Probe Comp.

Probe compensation terminal to adjust passive probes to the input channel.

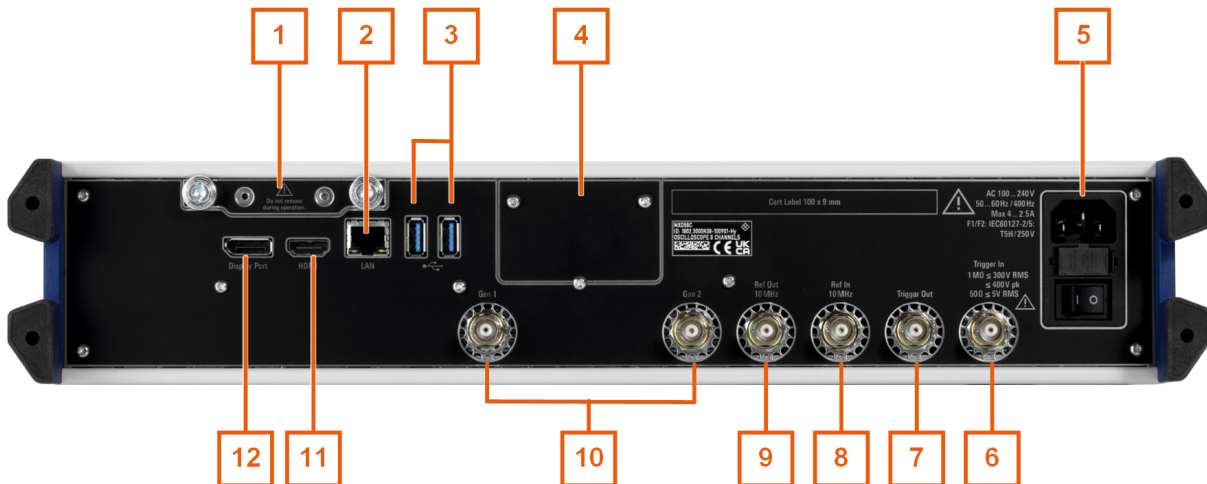| ⊓ | Square wave signal for probe compensation. |
| ⊥ | Ground connector for probes. |

Grounding terminal ⏚

4 mm banana jack to connect ground of DUT and test fixtures, and wrist strap.

4.2   Rear view

On the instrument's rear panel, you find more connectors and the power supply switch.

Figure 4-2: Rear panel view of MXO 5C series oscilloscope

1 = Solid state disk (SSD)
2 = LAN connector
3 = USB connector
4 = Option slot
5 = AC power supply connector and mains power switch
6 = External trigger input
7 = Trigger Out connector
8 = Ref In 10 MHz
9 = Ref Out 10 MHz
10 = Connector for optional function generator output (BNC, R&S MXO5C-B6 arbitrary waveform generator option)
11 = HDMI display output
12 = DisplayPort display output

AC power supply connector and mains power switch

The instrument supports a wide range power supply. It automatically adjusts to the correct range for the applied voltage. There is no line voltage selector.

The AC mains power switch disconnects the instrument from the AC power line.

When you power up the instrument, be sure to comply with the warm-up phase specified in the specifications document before you start measurements.

LAN
8-pin connector RJ-45 used to connect the instrument to a Local Area Network (LAN). It supports up to 1 Gbit/s.

USB
Two USB 3.0 interfaces type A.

Trigger In
The external trigger input is a BNC connector that is used to control the measurement by an external signal. The trigger level can be set from -5 V to 5 V.

For the external trigger input, the maximum input voltage is 400 V (V_p) and 300 V (RMS) at 1 MΩ input impedance.

Transient overvoltages on all input connectors must not exceed 400 V (V_p).

Trigger Out
BNC output that can function as pass/fail output or trigger output.

Ref In 10 MHz
BNC input connector for 10 MHz reference frequency signals.

Ref Out 10 MHz
BNC output for 10 MHz frequency reference. Can be switched between internal and external reference.

Gen1, Gen2: Function generator
BNC output of the function generator, requires option R&S MXO5C-B6.

HDMI
HDMI Version 2.0 connector for an external monitor or projector. The monitor shows the complete content of the instrument's screen.

DisplayPort
DisplayPort connector for an external monitor or projector. It supports DisplayPort ++ version 1.3.

5 Starting operation

There are several ways to operate the MXO 5C series oscilloscope.

- Remote control
  Create programs to automatize repeating settings, tests, and measurements. The instrument is connected to a computer that runs the program.

- Remote operation
  For remote monitoring and operation of the instrument, a VNC server is installed on the oscilloscope. You need a LAN connection to the computer, and a VNC client or web browser to connect to the instrument, and to access the GUI.

- Local operation
  To get access to the GUI, you need a monitor, mouse and keyboard connected to the instrument. Alternatively, you can connect a touchscreen.

5.1 Accessing the GUI

You can access the GUI locally using a connected monitor, or via LAN and a browser or VNC client.

To access the GUI using a connected monitor

1. Connect a monitor, mouse and keyboard to the oscilloscope.
   See Chapter 3.8, "Connecting a monitor, mouse and keyboard", on page 19.

2. Start the instrument.

   The monitor displays the GUI. You can operate the instrument using the menu, dialogs, signal bar and other means of interaction in the GUI.

To access the GUI via LAN

1. Connect the oscilloscope to the LAN.
   See Chapter 3.7, "Connecting to LAN", on page 18.

2. Switch on the oscilloscope.

3. Open a browser on a computer connected to the instrument via LAN.

4. Enter the IP address of the MXO 5C series oscilloscope.

The IP address is shown on the display of the oscilloscope, on one of the display pages.

5. Select "Web control".

    The computer shows the instrument display. You see a live image of the instrument, and you can operate the instrument remotely.

To get comprehensive information on usage and functionality of the oscilloscope, open the instrument's help.

5.2   Getting user assistance

If you need information on the instrument's functionality, you can use the instrument help. It provides contextual information on a setting or dialog. If the help window is open, you can browse and search for further information using links, table of contents, and search.

5.2.1   Displaying help

To display the context help

1. Enable the "Help" icon on the toolbar.
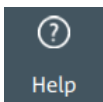
2. Tap the parameter for which you need information.

    The "Help" window opens and displays the comprehensive description and the corresponding remote command. You can browse the help for further information.

To open a dialog help

1. Open a dialog.

2. Tap the ⊚ "Help" icon in the dialog header.

3. Tap a subtab or menu item.

The help window opens with the dialog help page, where you can select the topics.
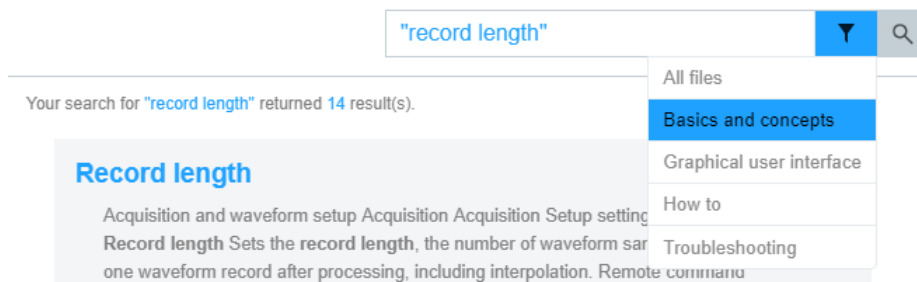
5.2.2   Using help

You can find a specific information and navigate the contents by following means:

- Table of contents
- Buttons in the help window title:

  - "Home": Go to the start page
  - "Back", "Forward": Browse the pages that you visited before
- Search with filter:

  - Enter the word to be found, or a phrase in quotes.
  - Tap the filter icon and select the information type.

6   Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:

Figure 6-1: QR code to the Rohde & Schwarz support page