

R&S®RTO

Digital Oscilloscope

Resolving Security Issues When Working in Secure Areas

Based upon the user's security requirements, this document describes the Rohde&Schwarz options available to address the user's oscilloscope analysis needs. It also covers the different memory types and locations where user information can be stored in the digital oscilloscope R&S®RTO.

For secure environments, it describes an approach to physically remove the user data from the oscilloscope.

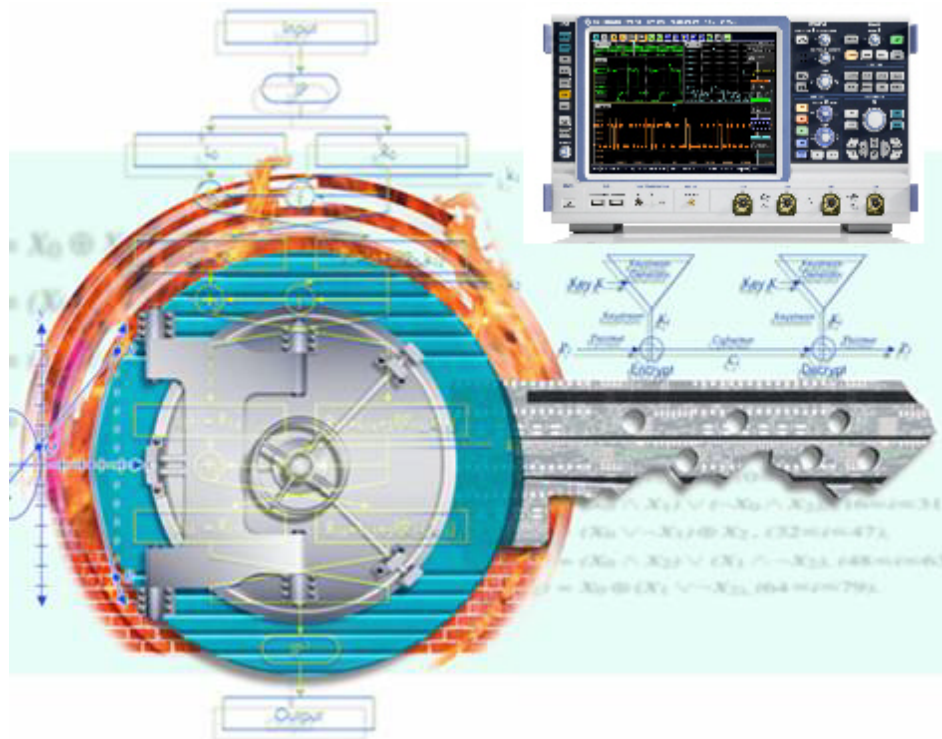


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1 Overview

In many cases it is imperative that the R&S®RTO digital oscilloscope be used in a secured environment. Generally these highly secured environments will not allow any test equipment to leave the area unless it can be proven that no user information will leave with the test equipment. Security concerns can arise when digital oscilloscopes need to leave a secured area to be calibrated or serviced.

This document describes the types of memory and their usage in the R&S®RTO digital oscilloscope. It also addresses methods of ensuring that no user data will leave the secured area should the product be removed for calibration or service needs.

2 Instrument Models Covered

All models R&S®RTO10xx.

3 Battery Information

There are no batteries in the R&S®RTO digital oscilloscope other than the one on the CPU board used to power the clock in the chipset.

4 Types of Memory in the R&S®RTO Digital Oscilloscope and Their Security Concerns

SDRAM

The R&S®RTO digital oscilloscope has 2 GByte of SDRAM/DDR3 on the CPU board. In addition, the main board is equipped with 1024 MByte (2-channel models R&S®RTO10x2) or 1920 MByte (4-channel models R&S®RTO10x4) of SDRAM/DDR2.

SDRAM is volatile memory and it loses its memory as soon as power is removed. The SDRAM will be unreadable within one minute after the power is removed from the instrument. **The SDRAM is not a security concern.**

EEPROM

Each board assembly in the R&S®RTO digital oscilloscope has one serial EEPROM device. These devices hold 32 kByte up to 1 MByte and contain information related to the installed hardware, such as board serial number, options, correction constants, etc.

The EEPROM does not hold user data nor can the user access the EEPROM storage. **The EEPROM is not a security concern.**

FLASH

The CPU board of the R&S®RTO digital oscilloscope has one 512 kByte flash memory device which contains the BIOS.

The Flash memory does not hold user data nor can the user access the Flash memory.
The Flash memory is not a security concern.

Removable Hard Drive

The R&S®RTO digital oscilloscope is equipped with a removable Hard Drive. The Hard Drive disk is used to store:

- Instrument operating system (Windows® XP)
- Instrument firmware and firmware options (measurement personalities) with option license keys
- Instrument states and setups
- Trace data (Measurement and Math)
- Limit Lines, Limit Masks
- Screen images

The Hard Drive content is non-volatile, so nothing is lost when power is removed from the instrument.

The Hard Drive is not a security concern because it can be physically removed from the instrument and left in the secure area.

5 Information Storage within the R&S®RTO Digital Oscilloscope

Data	SDRAM	EEPROM	FLASH	Removable Hard Drive
	Not a security concern	Not a security concern	Not a security concern	Not a security concern
Temporary Information storage for the functioning of the CPU (CPU Cache, and Swap area)	X			X
Hardware Info, Serial Number, Product Options and Calibration Correction Constants		X		
BIOS			X	
Operating System and Instrument Firmware				X
Instrument states, setups, Limit Lines and Limit Masks				X
Trace data, Measurement Results and Screen Images				X

6 Information Security in Highly Sensitive Areas

Since the SDRAM is erased when power is removed from the digital oscilloscope it does not pose a security risk. No user data is written to the EEPROM and FLASH memories; hence, it is deemed that they do not pose a risk either.

The REMOVABLE HARD DRIVE is the only device that does not lose its memory when power is removed and can contain user data. It can be removed from the digital oscilloscope leaving the customer assured that no user data is stored within the digital oscilloscope.

The R&S®RTO digital oscilloscope equipped with the REMOVABLE HARD DRIVE address the needs of customers working in highly sensitive areas.

7 Performing Service, Calibration and Maintenance on the R&S®RTO Digital Oscilloscope

R&S®RTO digital oscilloscope equipped with the removable hard drive

Remove the **classified** hard drive (with the user data). This can be done without opening the instrument.

To remove the hard drive, perform the following steps:

1. **IMPORTANT:** Switch off the instrument and disconnect the power plug before removing the hard drive!
2. Unscrew the two knurled screws and remove the hard drive at the rear of the device.



This removes all user data from the oscilloscope. The oscilloscope, **without** the removable hard drive, can now leave the secured area. Once the oscilloscope is outside the secured area, installing a second **non-classified** removable hard drive (without any user data), allows the digital oscilloscope to function properly for service or other needs.

Prior to re-entering the secured area, the **non-classified** removable hard drive (without the user data), is removed. When the digital oscilloscope is back within the secured area, the original **classified** removable hard drive can be reinstalled.

To hold **classified** user data in the secure areas, use the **REMOVABLE HARD DRIVE** which comes with the instrument.

To hold **non-classified** user data in the non-secure areas, use a second **REMOVABLE HARD DRIVE** (Option RTO-B19).

Calibration and the validity of the oscilloscope's calibration after exchange of the REMOVABLE HARD DRIVE

The calibration ensures a user that their measurements are traceable to a government standard. Rohde & Schwarz highly recommends that users follow the calibration cycle suggested for their instrument.

The EEPROM is the only location used to hold permanent adjustment values required to maintain the validity of the oscilloscope's calibration. Hence, replacing one removable hard drive with another, does not affect the validity of the instrument's calibration.

After an exchange of the removable hard drive, the self-alignment function has to be executed once. This is done with selecting the menu

FILE ► Self Alignment

and then tap **Start Alignment**. Using the permanent and temporary values, the necessary adjustment information is then stored on the removable hard drive. Rohde & Schwarz recommends that users perform the self-alignment function on a weekly basis after the oscilloscope has had sufficient time to warm-up or after any major temperature changes occur (>5° Celsius).

8 Performing Firmware Updates and Backing-Up User Data in Sensitive Areas

Rohde & Schwarz highly recommends, but does not require, the users of its products, to maintain their products with the latest updates and to regularly back-up important user data that can be erased. Firmware updates are available from the R&S website. How does a user perform firmware updates and back-up user data in sensitive areas? There are several options available for the user to safely perform these operations without compromising the security of the sensitive areas.

Via the USB port

Rohde & Schwarz oscilloscopes are equipped with USB ports as standard equipment. The instrument firmware update can be performed directly from the USB stick. The USB stick can likewise hold or transport user data back-ups to an approved storage medium. As described below, users can disable the capability of the USB ports for saving data (set to "read only"). For users that have not elected to disable the USB ports for writing data a memory stick can be used for backing-up user data.

Via the LAN interface

The R&S®RTO digital oscilloscope is equipped with a LAN interface as standard equipment. A user can transport the firmware update into the secure area via a CD or another medium that meets the security requirements. The update can then be placed on a system on the LAN within the secure area. The digital oscilloscope can be updated directly from the LAN. The LAN can likewise be used to back-up user data to an approved storage medium.

9 Special Considerations for USB ports

USB ports can pose a security threat in high-security locations. Generally, this threat comes from small USB pen drives (a.k.a. memory sticks, key drives, etc) which can be very easily concealed, yet can quickly read/write several GBytes of data.

Disable USB Ports for Writing User Data

The R&S®RTO digital oscilloscope can be updated with an utility to disable the write capability on any USB Port for storage devices. This utility is available from Rohde & Schwarz RTO web site w/o any charge. To disable the write capability copy the utility software to the digital oscilloscope and run it once. After reboot of the instrument the write capability on any USB memory device is disabled.

About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. For more than 75 years, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

Energy -efficient products

- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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