R&S®RTB2000
Digital Oscilloscope
Instrument Security Procedures

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ROHDE&SCHWARZ

Contents

1 Overview 2

2 Instrument Models Covered 2

3 Security Terms and Definitions 3

4 Types of Memory and Information Storage in the R&S RTB2000 3

5 Secure Erase Procedure 5

6 Instrument Declassification 6

1 Overview

In many cases, it is imperative that the R&S RTB2000 Digital Oscilloscopes are used in a secured environment. Generally these highly secured environments do not allow any test equipment to leave the area unless it can be proven that no user information leaves with the test equipment. Security concerns can arise when devices need to leave a secured area e.g. to be calibrated or serviced.

This document describes the types of memory and their usage in the R&S RTB2000. It provides a statement regarding the volatility of all memory types and specifies the steps required to declassify an instrument through memory clearing or sanitization procedures. These sanitization procedures are designed for customers who need to meet the requirements specified by the US Defense Security Service (DSS).

2 Instrument Models Covered

Table 2-1: Digital Oscilloscope models

Product name	Order number
R&S RTB2002	1333.1005.02
R&S RTB2004	1333.1005.04

3 Security Terms and Definitions

Clearing

The term "clearing" is defined in Section 8-301a of DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)". Clearing is the process of eradicating the data on media so that the data can no longer be retrieved using the standard interfaces on the instrument. Therefore, clearing is typically used when the instrument is to remain in an environment with an acceptable level of protection.

Sanitization

The term "sanitization" is defined in Section 8-301b of DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)". Sanitization is the process of removing or eradicating stored data so that the data cannot be recovered using any known technology. Instrument sanitization is typically required when an instrument is moved from a secure to a non-secure environment, such as when it is returned for service of calibration.

The memory sanitization procedures described in this document are designed for customers who need to meet the requirements specified by the US Defense Security Service (DSS). These requirements are specified in the "Clearing and Sanitization Matrix" in Section 14.1.16 of the ISFO "Manual for the Certification and Accreditation of Classified Systems under the NISPOM".

Instrument declassification

The term "instrument declassification" refers to procedures that must be undertaken before an instrument can be removed from a secure environment, for example when the instrument is returned for calibration. Declassification procedures include memory sanitization or memory removal, or both. The declassification procedures described in this document are designed to meet the requirements specified in DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)", Chapter 8.

4 Types of Memory and Information Storage in the R&S RTB2000

The Digital Oscilloscope contains various memory components.

The following table provides an overview of the memory components that are part of your instrument. For a detailed description regarding type, size, usage and location, refer to the subsequent sections.

Memory type	Size	Content	Volatility	User Data	Sanitization procedure
SDRAM (main board)	64 Mb (1 chip)	• Display (video) memory • Measurement data	Volatile	Yes	Turn off instrument power
SDRAM (main board)	512 Mbyte (2 chips)	• Operating system • Measurement control data and measurement data	Volatile	Yes	Turn off instrument power
SDRAM (main board)	R&S RTB2002: 768 Mbyte (3 chips) R&S RTB2004: 1.25 Gbyte (5 chips)	• Intermediate measurement data	Volatile	Yes	Turn off instrument power
Flash (main board)	512 Mbyte (1 chip)	• Instrument firmware • Instrument settings • Factory calibration data • Factory/current alignment data • Active instrument state and setup • Board and device IDs • User data	Non-volatile	Yes	Secure Erase procedure (see Chapter 5, page 5)
Flash (front controller board)	64 kbyte (microcontroller)	• Front controller firmware	Non-volatile	No	None required (no user data)
SRAM (front controller board)	16 kbyte (microcontroller)	• Front controller control data	Volatile	No	Turn off instrument power

4.1 Volatile Memory

The volatile memory in the instrument loses its contents as soon as power is removed from the instrument. The volatile memory is not a security concern.

Removing power from this memory meets the memory sanitization requirements specified in the "Clearing and Sanitization Matrix" in Section 5.2.5.5.5 of the ISFO Process Manual for the Certification and Accreditation of Classified Systems under the NISPOM.

SDRAM

The R&S RTB2000 main board has one SDRAM memory device with 64 Mbyte, which contains the measurement and the display (video) data. The main board has also two SDRAM memory devices with 256 Mbyte each, which contain the operating system, measurement control data, and measurement data.

In addition, the R&S RTB2002 main board has three memory devices with 256 Mbyte each (768 Mbyte in total). The R&S RTB2004 has five memory devices with 256 Mbyte each (1.25 Gbyte in total). These SDRAMs contain intermediate measurement data.

SDRAM loses its memory as soon as power is removed.

Sanitization procedure: Turn off instrument power

SRAM

The R&S RTB2000 front controller board has one SRAM device with a size of 64 kbyte, which is integrated in the microcontroller. The SRAM contains the control and status data of the front controller firmware. SRAM loses its memory as soon as power is removed.

Sanitization procedure: Turn off instrument power

4.2 Non-Volatile Memory

The R&S RTB2000 contains non-volatile flash memories. The user data can be removed from the Digital Oscilloscope with the Secure Erase procedure.

All non-volatile memories of the R&S RTB2000 are not a security concern.

Flash

The front controller board has one microcontroller with an integrated 64 kbyte flash memory. The flash memory contains the front controller firmware. It does not hold user data nor can the user access the storage.

Sanitization procedure: None required (no user data)

Flash

The R&S RTB2000 has one 512 Mbyte flash memory device on the main board. It contains board and device IDs, the instrument firmware, the factory calibration/alignment data and the current alignment data. In addition, this flash memory stores all the instrument settings, the instrument state, and user data.

The flash can hold user data and is non-volatile. Hence, user data is not erased when power is removed from the instrument.

The R&S RTB2000 provides a sanitizing procedure that ensures that user data is irretrievably removed from the instrument.

Sanitization procedure: Secure Erase procedure (see Chapter 5, "Secure Erase Procedure", on page 5)

5 Secure Erase Procedure

To sanitize the internal flash memory, perform the following steps:

1. Tap the R&S Logo in the lower right corner of the display to open the main menu.

2. Scroll down to "Setup". Tap "Setup" to open the setup menu.
3. Scroll down to "Secure Erase" and tap this item.
4. To start the secure erase procedure, tap "Yes".
   All user data is removed and the factory default settings are restored.

Do **not** turn off the instrument during the Secure Erase process!

The Secure Erase procedure meets the memory sanitization requirements specified in the "Clearing and Sanitization Matrix" in Section 14.1.16 of the ISFO Process Manual for the Certification and Accreditation of Classified Systems under the NISPOM.

6 Instrument Declassification

Before you can remove the Digital Oscilloscope from a secured area (for example to perform service or calibration), all classified user data needs to be removed. You can declassify the Digital Oscilloscope as follows:

1. Sanitize the non-volatile memory as described in Chapter 5, "Secure Erase Procedure", on page 5.
2. Turn off the Digital Oscilloscope. This will sanitize the volatile memory.

Following these steps removes all user data from the Digital Oscilloscope. The Digital Oscilloscope can now leave the secured area.

These declassification procedures meet the needs of customers working in secured areas.

Validity of instrument calibration after declassification

The calibration makes sure that measurements comply to government standards. Rohde & Schwarz recommends that you follow the calibration cycle suggested for your instrument.

The permanent adjustment values required to maintain the validity of the R&S RTB2000's calibration are not affected by the Secure Erase procedure. Therefore, performing the declassification procedure, does not affect the validity of the instrument's calibration.

After the declassification procedure, perform a self-alignment:

Make sure that the instrument has been running and warming up before you start the self-alignment.

1. Tap the R&S Logo in the lower right corner of the display to open the main menu.
2. Scroll down to "Setup". Tap "Setup" to open the setup menu.
3. Press the SETUP key.
4. Tap "Self Alignment".
5. Tap "Start"

Using the permanent and temporary values, the necessary adjustment information is then stored in the R&S RTB2000. Rohde & Schwarz recommends that you perform the self-alignment function once a week.

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