R&S®IQR
I/Q Data Recorder
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 *I/Q data recorder* needs. It also covers the different memory types and locations where user information can be stored in the *I/Q data recorder* R&S®IQR.

For secure environments, it describes an approach to physically remove the user data from the *I/Q data recorder*.
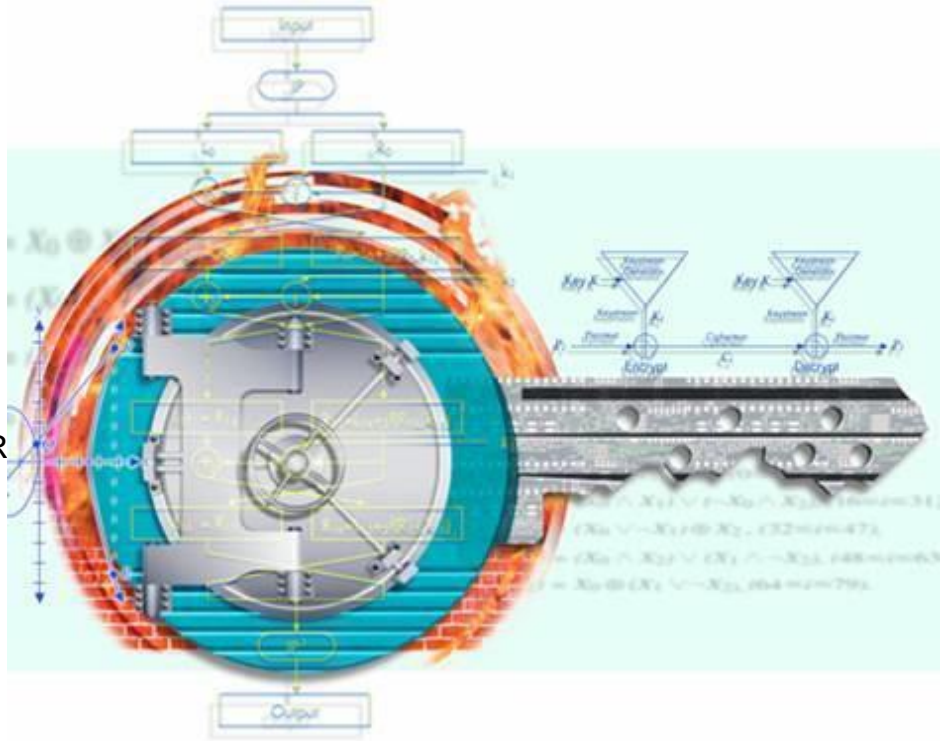
ROHDE&SCHWARZ

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1 Overview

In many cases it is imperative that the R&S®IQR 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 I/Q data recorders 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®IQR. 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

R&S®IQR
R&S®IQR20
R&S®IQR100

3 Battery Information

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

4 Types of Memory in the R&S®IQR and Their Security Concerns

SDRAM

The R&S®IQR has 2 GByte of SDRAM on the CPU board. In addition, the R&S®IQR is equipped with 1 to 4 GByte of SDRAM/DDR3 on the I/Q Stream board.

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®IQR has one serial EEPROM device. These devices hold 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®IQR has 1 MByte 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 solid-state drives

The R&S®IQR is equipped with removable solid-state (Flash) drives (options R&S®IQR-B010/-B020/-B110/-B109F/-B119F). The solid-state drive is used to store:

recorded I/Q data,

other data like GPS positions, RF level, and others

The Solid-state drive content is non-volatile, so nothing is lost when power is removed from the instrument.

The removable solid-state drive is not a security concern because it can be physically removed from the instrument and left in the secure area.

Non removable solid-state drives

The R&S®IQR is equipped with a 8 GB internal SATA solid-state (Flash) drives. This solid-state drive is used to store:
- Windows XP operating system
- R&S®IQR firmware
- preliminary meta data (GPS positions, RF levels, etc) before this data is written to the data disks.

This disk can only be removed by opening the R&S®IQR. After that it is not security concern, see chapter 5.
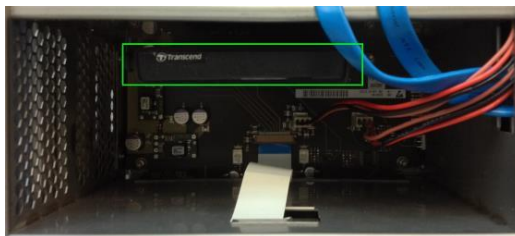
Smartcard

The CPU board of the R&S®IQR is equipped with a smartcard containing 32 KByte of memory. It contains instrument specific data like serial number, personality and SW options.
The smartcard is initialized during production and later is modified only when the user installs an option. Data can not be accessed by the user.

The smartcard memory is not a security concern.

5 Information Storage within the R&S®IQR

Data	SDRAM	EEPROM	Smart card	FLASH	Non Removable Solid State Drive	Removable Solid-State Drives (R&S®IQR memory pack)
Temporary information storage for the functionment of the CPU (CPU cache, and swap area)	N					
Temporary I/Q data buffer	N					
Hardware info, serial number, product options			N			
Module specific data like serial number, revision and options		N				
Initial CPU configuration data		N		N		
Operating system and instrument firmware					S *)	
Recorded I/Q data Meta Data						N
Instrument states and settings/setups					S *)	

*) This SATA disk can only be removed by opening the R&S®IQR
Legend:　　　　　　**N = No security concern**
　　　　　　　　　　　S = Security concern

6 Information Security in Highly Sensitive Areas

Since the SDRAM is erased when power is removed from the I/Q data recorder 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 SOLID-STATE DRIVE and the NON REMOVABLE SOLID-STATE DRIVE are the only devices that do not lose its memory when power is removed and can contain user data. The REMOVABLE SOLID-STATE DRIVE can be removed from the I/Q data recorder.

7 Performing Service, Calibration and Maintenance on the R&S®IQR

- Remove the **classified** R&S®IQR memory pack (with the recorded I/Q data). This can be done without opening the instrument.

  To remove the R&S®IQR memory pack, perform the following steps:

  1. **IMPORTANT**: Switch off the instrument and disconnect the power plug before removing the solid-state drive!

  2. Unscrew the two knurled screws and remove the R&S®IQR memory pack containing the two solid-state drives at the front of the device.

  This removes all recorded I/Q data from the I/Q data recorder.

- The internal solid state drive containing the OS, the R&S®IQR firmware and buffered meta data. It's mounted within the instrument and **can not be removed without opening the instrument.**

- **The updates could be performed by customer with a USB drive.**

- **Calibration of the I/Q data recorder**

  There are **no** adjustable parts inside the R&S®IQR, so a calibration only verifies the precision of the reference clock.

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 I/Q data recorders are equipped with USB ports 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 instrument firmware update can be performed directly from the USB stick or USB CDROM.

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.

The USB or Ethernet ports are required for the export of I/Q data to external devices or LAN (option R&S®IQR-K101).

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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