

R&S® NGA100

Power Supply

Instrument Security Procedures



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Version 01

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This document describes the types of memory and their usage in the R&S®NGA100 Power Supply.

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1 Overview

Securing important information is crucial in many applications.

In many cases, it is imperative that the R&S NGA100 instruments are used in a secured environment. Generally, 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, e.g. to be calibrated.

"Regarding sanitization, the principal concern is ensuring that data is not unintentionally released" [1].

This document provides a statement regarding the volatility of the memory types used and specifies the steps required to sanitize an instrument.

The procedures in this document follow "NIST Special Publication 800-88: Guidelines for Media Sanitization" [1].

In addition, recommendations are provided to safeguard information on the R&S NGA100.

References

See the following literature for further information.

- [1] **Kissel Richard L. [et al.]** Guidelines for Media Sanitization = Special Publication (NIST SP) = NIST SP - 800-88 Rev 1. - Gaithersburg : [s.n.], December 17, 2014.
- [2] **National Industrial Security Program Authorization Office** Defense Security Service (DSS) Assessment and Authorization Process Manual (DAAPM). - May 6, 2019.
- [3] **ACSC Australian Cyber Security Centre** Australian Government Information Security Manual, January 2020.

2 Instrument Models Covered

Table 2-1: R&S NGA100 models

Product name	Order number
NGA101	5601.8002.02
NGA102	5601.8002.04
NGA141	5601.8002.03
NGA142	5601.8002.05

3 Security Terms and Definitions

Terms defined in Guidelines for Media Sanitization

NIST Special Publication 800-88 [1]

- **Sanitization**
"Media sanitization refers to a process that renders access to target data on the media infeasible for a given level of effort."
- **Clear**
"Clear applies logical techniques to sanitize data in all user-addressable storage locations for protection against simple non-invasive data recovery techniques; typically applied through the standard Read and Write commands to the storage device, such as by rewriting with a new value or using a menu option to reset the device to the factory state (where rewriting is not supported)."
- **Purge**
"Purge applies physical or logical techniques that render Target Data recovery infeasible using state of the art laboratory techniques."
- **Destroy**
"Destroy renders Target Data recovery infeasible using state of the art laboratory techniques and results in the subsequent inability to use the media for storage of data."

Control of media

Another option is to keep physical media holding sensitive information within the classified area, see [1], paragraph 4.4.

Volatile memory

"Memory components that do not retain data after removal of all electrical power sources, and when reinserted into a similarly configured system, are considered volatile memory components." [2]

The volatile memory in the instrument does not have battery backup. It loses its contents when power is removed from the instrument.



If the instrument is battery operated, e.g. handhelds, it retains data in the volatile memory as long as the battery is installed.

Typical examples are RAM, e.g. SDRAM.

Non-volatile memory

"Components that retain data when all power sources are discontinued are non-volatile memory components." [2].

In the context of this document, non-volatile memory components are non-user accessible internal memory types, e.g. EEPROM, Flash, etc.

Media

Media are types of non-volatile memory components. Media are user-accessible and retain data when you turn off power.

In the context of this document, media types are Hard Disk Drives (**HDD**), Solid State Drives (**SSD**), Memory Cards, e.g. **SD**, **microSD**, **CFast**, etc., USB removable media, e.g. Pen Drives, Memory Sticks, Thumb Drives, etc. and similar technologies.

4 Statement of Volatility

The R&S NGA100 contains various memory components. See the subsequent sections for a detailed description regarding type, size, usage and location.



Notes on memory sizes

Due to the continuous development of memory components, the listed values of memory sizes may not represent the current, but the minimal configuration.

4.1 Volatile Memory

Volatile memory modules are considered as non-accessible internal memory devices, as described in [Security Terms and Definitions > Volatile Memory](#). It requires power to retain data and when the power is turned off, all data is erased.

Table 4-1: Types of volatile memory

Memory type	Location	Size	Content	User data	Sanitization procedure
DDR2 SDRAM	Front Controller	2 x 512 Mbit	Operating instructions, user and program data	Yes	Power Off
MPU Internal SRAM	Front Controller	128 kbyte	Operating instructions, user and program data	Yes	Power Off
MCU Internal SRAM	Mainboard	4 kbyte	Channel operating data	No	Power Off
PSoC Internal SRAM	Front Controller	1 kbyte	PSoC operating data	No	Power Off

4.2 Non-Volatile Memory

Non-volatile memory modules are considered as non-accessible internal memory devices, as described in [Security Terms and Definitions > Non-volatile Memory](#). It does not require power to maintain the stored data.

Table 4-2: Types of non-volatile memory

Memory type	Location	Size	Content	User data	Sanitization procedure
NAND	Front Controller	1 x 2 Gbit	Board and device IDs, instrument firmware, calibration data, instrument settings, state and user data	Yes	See Instrument Sanitization Procedure
MPU Internal ROM	Front Controller	160 kbyte	Boot loader	No	None required (no user data)
MCU Flash	Mainboard	32 + 4 kbyte	Channel control firmware	No	None required (no user data)

Memory type	Location	Size	Content	User data	Sanitization procedure
MCU EEPROM	Mainboard	1 kbyte	Channel calibration data	No	None required (no user data)
PSoC Flash	Front Controller	16 kbyte	Firmware for instrument peripherals	No	None required (no user data)

4.3 Media

Media are considered as non-volatile memory devices, as described in [Security Terms and Definitions > Media](#).

Table 4-3: Types of media memory modules

Memory type	Location	Size	Content	User data	Sanitization procedure
USB	Front panel	n.a.	n.a.	Yes	Remove memory device and keep it under organizational control. See Instrument Sanitization Procedure

5 Instrument Sanitization Procedure

5.1 Volatile Memory

Removing power

- ▶ Turn off the R&S NGA100.

Leave the instrument powered off at least for 10 minutes to make sure that all volatile memory modules lose their contents, see [3].

5.2 Non-volatile Memory

The Flash does not lose its contents when power is removed. It can contain user data.

Sanitizing the non-volatile memory

The Flash is **cleared** by executing the sanitizing procedure provided on the instrument. The sanitizing procedure complies to the definition of NIST [1], see "[Terms defined in Guidelines for Media Sanitization](#)" on page 7.

1. **NOTICE!** Risk of losing data. The sanitization procedure clears all user data and resets the instrument.
Back up all data you want to keep.
2. Remove all media:
 - a) Disconnect USB mass memory.
3. Keep the media memory devices under organizational control.
4. **NOTICE!** Risk of instrument damage when interrupting the sanitizing procedure. Do not turn off or disconnect the R&S NGA100 from the mains while the sanitizing procedure is running.
Wait until the instrument confirms the completed sanitizing.
To activate the sanitizing procedure, press the [Menu] key on the front panel of the R&S NGA100.
5. Select "Device" > "Reset" menu item.
6. Select "Yes" to proceed when prompted to reset all settings to factory defaults.
7. Wait for the "Device reset" message to appear at the top left corner of the screen.
All user data will be removed and factory default settings restored.

6 Validity of Instrument Calibration after Sanitization

The validity of the R&S NGA100 power supply's calibration is maintained throughout the sanitization.

Glossary: Terminology for Instrument Security Procedures

C

CFast: Compact Fast - compact flash mass memory device.

D

DRAM: Dynamic Random Access Memory.

H

HDD: Hard disk drive.

M

microSD: Micro Solid State Drive - memory card.

S

SD: Solid-state Drive - memory card.

SSD: ATA Solid State Drives (including PATA, SATA, eSATA, mSATA,...).

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