33500-Series Waveform Generator

This manual provides the documentation for the following instruments:
33509B, 33510B, 33511B, 33512B, 33519B, 33520B, 33521B, 33522B, 33521A, 33522A

This document describes instrument security features and the steps to declassify an instrument through memory clearing, sanitization, or removal.

KEYSIGHT

MEMORY INFORMATION AND PROCEDURES

Notices

Trademark Acknowledgements

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Warranty

This Keysight technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Keysight Technologies will, at its option, either repair or replace products that prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by Keysight Technologies. Buyer shall prepay shipping charges to Keysight Technologies, and Keysight Technologies shall pay shipping charges to return the product to Buyer. For products returned to Keysight Technologies from another country, Buyer shall pay all shipping charges, duties, and taxes.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, see the following URLs:

http://www.keysight.com/find/trueform

To receive the latest updates by email, subscribe to Keysight Email Updates:

http://www.keysight.com/find/MyKeysight

Information on preventing instrument damage can be found at:

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

http://www.keysight.com/find/techsupport

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Contacting Keysight Sales and Service Offices

Assistance with test and measurement needs, and information on finding a local Keysight office, is available on the Internet at:

http://www.keysight.com/find/assist

If you do not have access to the Internet, please contact your field engineer.

NOTE In any correspondence or telephone conversation, refer to the instrument by its model number and full serial number. With this information, the Keysight representative can determine whether your unit is still within its warranty period.

Products Covered by this Document

Product Family Name	Product Names	Model Numbers
Trueform Waveform Generator	33500-Series Waveform Generator	33509B, 33510B, 33511B, 33512B, 33519B, 33520B, 33521B, 33521A, 33522A

This document describes instrument security features and the steps to declassify an instrument through memory clearing, sanitization or removal.

NOTE Option SEC is required.

For additional information, go to:

http://www.keysight.com/find/security

NOTE Be sure that all information stored by the user in the instrument that needs to be saved is properly backed up before attempting to clear any of the instrument memory. Keysight Technologies cannot be held responsible for any lost files or data resulting from the clearing of memory. Be sure to read this document entirely before proceeding with any file deletion or memory clearing.

Security Terms and Definitions

Term	Definition
Clearing	As defined in Section 8-301a **of** DoD **5220.22-M**, clearing is the process of eradicating the data on media before reusing the media so that the data can no longer be retrieved using the standard interfaces on the instrument. Clearing is typically used when the instrument is to remain in an environment with an acceptable level of protection.
Instrument Declassification	A term that refers to procedures that must be undertaken before an instrument can be removed from a secure environment, such as is the case when the instrument is returned for calibration. Declassification procedures include memory sanitization or memory removal, or both. Keysight declassification procedures are designed to meet the requirements specified in **DoD 5220.22-M**, Chapter 8.
Sanitization	As defined in Section 8-301b of **DoD 5220.22-M**, 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 to the factory for calibration. Keysight memory sanitization procedures 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 5.2.5.5.5 of the **ISFO Process Manual**.
Secure Erase	Secure Erase is a term that is used to refer to either the clearing or sanitization features of Keysight instruments.

Instrument Memory

This section contains information on the types of memory available in your instrument. It explains the size of memory, how it is used, its location, volatility, and the sanitization procedure.

Table 1: Summary of instrument memory

Memory Type and Size	Writable During Normal Operation?	Data Retained When Powered Off?	Purpose/ Contents	Data Input Method	Location in Instrument and Remarks	Sanitization Procedure
NAND Flash Part A (OS) 58 MB	Yes	Yes	Contains Microsoft Windows CE Embedded Operating System, instrument firmware, and the firmware recovery image	Factory Install / Firmware Upgrade	CPU Board	No method, not user accessible, and contains no application-specific information.
NAND Flash Part B (Keysight Flash) 69 MB	Yes	Yes	Built-in arbitrary waveforms, user arbitrary waveforms, user data files, and user instrument states	User-saved data	CPU board (same chip as firmware memory, but managed separately.)	See Table 2 on page 10

NAND Flash Part C (Keysight Flash2) 1 MB	Yes	Yes	Calibration constant storage, calibration count, calibration security code, and calibration message	Factory or Service Only	CPU board (same chip as firmware memory, but managed separately.)	No method, not user accessible, and contains no application-specific information.
Flash 4 MB	Yes	Yes	Bootloader components that load the operating firmware from the NAND flash memory	Factory Programmed	Serial SPI	No method, not user accessible, and contains no application-specific information.
Flash 7 KB	Yes	Yes	Program memory	Factory Install / Firmware Upgrade	PIC16F690 Controller (U304)	No method, not user accessible, and contains no application-specific information.
EEPROM 256 Bytes	Yes	Yes	Data memory (Model Number / Serial Number and license string)	Factory Install / Firmware Upgrade	PIC16F690 Controller (U304)	No method, not user accessible, and contains no application-specific information.
RAM 256 Bytes	Yes	Yes	Power management	Factory Install / Firmware Upgrade	PIC16F690 Controller (U304)	No method, not user accessible, and contains no application-specific information.

Flash 4 KB	Yes	Yes	Code storage	Factory Install / Firmware Upgrade	Front Panel micro-processor	No method, not user accessible, and contains no application-specific information.
EEPROM 512 Bytes	Yes	Yes	Temporary execution data	Operating System	Front Panel micro-processor	No method and not user accessible
RAM 4 MB	Yes	No	Temporary execution data	Operating System	Front Panel micro-processor	Power cycle
SDRAM 64 MB	Yes	No	Synthesizer waveform memory for Channel 1	Application loads memory	U1101	Power cycle
SDRAM 64 MB	Yes	No	Synthesizer waveform memory for Channel 2 (2-Channel instrument only)	Application loads memory	U1101	Power cycle
FPGA 1.1 MB	Yes	No	Block RAMs in FPGA, Tables of control data and registers	Factory Install / Firmware Upgrade	FPGA	Power cycle
FPGA 1 KB	Yes	Yes	FPGA support chip	Factory Install / Firmware Upgrade	FPGA	No method, not user accessible, and contains no application-specific information.

Summary of Memory Declassification Procedures

This section explains how to clear, sanitize, and remove memory from your instrument, for all classes of memory that are writeable during normal operation.

NOTE Read this entire document before using any sanitization procedure. Failure to do so may necessitate returning the instrument to an Authorized Keysight Service Center for firmware downloads and recalibration.

Table 2: NAND Flash Part B (Keysight Flash)

Description and purpose	Built-in arbitrary waveforms, user arbitrary waveforms, user data files, and user instrument states
Size	69 MB
Memory clearing	To remove files from the file system: On the front panel press: System > System Setup > Manage Files On the remote interface use: MMEMory:DELete <file> See the 33500 series programming reference for more information.
Memory sanitization	On front panel press: System > Instr Setup > NISPOM Secure > Erase On the remote interface use: SYSTem:SECurity:IMMediate This procedure clears all instrument memory except for the instrument's firmware, MAC address and serial number and calibration data, and then reboots the instrument to the new memory state. This routine writes all 0s to memory and then performs a full chip erase as per manufacturer's data sheet. This procedure is not recommended for use in routine applications because of the possibility of unintended loss of data. See the 33500 Series Programming Reference for more information.
Memory removal	Remove the processor board per the 33500 Series Service Guide disassembly instructions.
Memory validation	N/A
Remarks	N/A

Memory Sanitization Procedures

Secure Erase All

NOTE This command is recommended for customers, such as military contractors, who must comply with NISPOM. Excessive use of this command may cause premature failure of the flash memory. See the 33500 Series Programming Reference for more information.

The following procedure destroys all user-defined state information, user-defined arbitrary waveforms and user-defined I/O settings such as the IP address. This procedure should be performed only when the instrument is to be removed from a secure area.

On front panel press: System > Instr Setup > NISPOM Secure > Erase
On the remote interface use: SYSTem:SECurity:IMMediate

This procedure clears all instrument memory except for the instrument's firmware, MAC address and serial number and calibration data, and then reboots the instrument to the new memory state. This routine writes all 0s to memory and then performs a full chip erase as per manufacturer's data sheet. This procedure is not recommended for use in routine applications because of the possibility of unintended loss of data. See the 33500 Series Programming Reference for more information.

User and Remote Interface Security Measures

Screen and Annotation Blanking

Not supported

USB Mass Storage Device Security

Not supported

Remote Access Interfaces

The user is responsible for providing security for the I/O ports for remote access by controlling physical access to the I/O ports. The I/O ports must be controlled because they provide access to most user settings, user states, and the display memory.

The I/O ports include USB, GPIB, and LAN.

The LAN port provides the following services, which can be selectively disabled:

a) VXI-11
b) Sockets
c) Telnet
d) Web
e) mDNS

To disable LAN services:
On the front panel press: System > I/O Config > LAN Settings > LAN Services
On the remote interface use: SYSTem:COMMunicate:ENABle <state>, <interface>
See the 33500 Series Programming Reference for more information.

To disable USB and/or GPIB:
On the front panel press: System > I/O Config > USB/GPIB Settings
On the remote interface use: SYSTem:COMMunicate:ENABle <state>, <interface>
See the 33500 Series Programming Reference for more information.

Procedure for Declassifying a Faulty Instrument

If the instrument is not functioning and you are unable to use the security functions, you must physically remove the processor board from the instrument. Once this assembly is removed, you can proceed with one the following options:

- If you have another working instrument, install the processor board into an instrument and erase the memory. Then reinstall the processor board back into the non-working instrument and send it out for repair and calibration. If you discover that the processor board does not function in the working instrument, indicating that it caused the instrument failure, discard the processor board and send the original failed instrument to a repair facility. Be sure to inform the repair facility that the processor board did not function in the working instrument. If the instrument is still under warranty, the repair facility will install a new processor board without charge.
- If you do not have another working instrument, discard the processor board and send the instrument to a repair facility. If the repair facility determines that a new processor board fixes the problem and the instrument is still under warranty, you will not be charged for the new board. If they determine that the failure was caused by something other than the processor board, you will be charged for the new board even though the instrument is still under warranty. The customer is responsible for removing and replacing the storage media assemblies at their secure location. Refer to the service guide for assembly replacement procedures.

References

1. **DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)"**

   United States Department of Defense. Revised February 28, 2006.

   May be downloaded in Acrobat (PDF) format from:

   http://www.dss.mil/isp/fac_clear/download_nispom.html

2. **ISFO Process Manual for the Certification and Accreditation of Classified Systems under the NISPOM**

   Defense Security Service.

   DSS-cleared industries may request a copy of this document via email, by following the instructions at:

   http://www.dss.mil/isp/odaa/request.html