

# Declassification of the InfiniiVision X-Series Oscilloscopes

# Notices

© Keysight Technologies, Inc. 2012-2020

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies, Inc. as governed by United States and international copyright laws.

## Manual Part Number

75010-97014

## Edition

Third edition, January 2020

Available in electronic format only

Published by:

Keysight Technologies, Inc.  
1900 Garden of the Gods Road  
Colorado Springs, CO 80907 USA

## Print History

5990-8184EN, April 2017

75010-97013, October 2018

75010-97014, January 2020

## Warranty

**The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Keysight disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Keysight shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Keysight and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.**

## Technology License

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

## U.S. Government Rights

The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at [www.keysight.com/find/sweula](http://www.keysight.com/find/sweula). The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater

than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

## 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.

---

# Contents

## 1 Declassification and Security

Products Covered by this Document	/ 6
Security Terms and Definitions	/ 10
Instrument Memory	/ 11
NAND Flash Organization Table	/ 12
Memory Clearing, Sanitization, and/or Removal Procedures	/ 15
To perform a Secure Erase	/ 16
User and Remote Interface Security Measures	/ 17
USB Mass Storage Device Security	/ 17
Remote Access Interfaces	/ 17
6000 X-Series Microphone Security	/ 17
Procedure for Declassifying a Faulty Instrument	/ 18



# 1 Declassification and Security

Products Covered by this Document / 6

Security Terms and Definitions / 10

Instrument Memory / 11

Memory Clearing, Sanitization, and/or Removal Procedures / 15

User and Remote Interface Security Measures / 17

Procedure for Declassifying a Faulty Instrument / 18

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

## Products Covered by this Document

**Table 1** InfiniiVision 1000 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX1102A	70/100 MHz	2 GSa/s	1 Mpts	2	1
DSOX1102G	70/100 MHz	2 GSa/s	1 Mpts	2	1
EDUX1002A	50 MHz	1 GSa/s	100 kpts	2	1
EDUX1002G	50 MHz	1 GSa/s	100 kpts	2	1
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 1000 X-Series Oscilloscope					
Alternate product numbers: N/A					

**Table 2** InfiniiVision 1200 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX1202A	70/100/200 MHz	2 GSa/s	2 Mpts	2	1
DSOX1202G	70/100/200 MHz	2 GSa/s	2 Mpts	2	1
DSOX1204A	70/100/200 MHz	2 GSa/s	2 Mpts	4	–
DSOX1204G	70/100/200 MHz	2 GSa/s	2 Mpts	4	–
EDUX1052A	50 MHz	1 GSa/s	200 kpts	2	1
EDUX1052G	50 MHz	1 GSa/s	200 kpts	2	1
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 1200 X-Series Oscilloscope					
Alternate product numbers: N/A					

**Table 3** InfiniiVision 2000 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX2002A	70 MHz	2 GSa/s	1 Mpts	2	–
MSOX2002A	70 MHz	2 GSa/s	1 Mpts	2	8
DSOX2004A	70 MHz	2 GSa/s	1 Mpts	4	–
MSOX2004A	70 MHz	2 GSa/s	1 Mpts	4	8
DSOX2012A	100 MHz	2 GSa/s	1 Mpts	2	–
MSOX2012A	100 MHz	2 GSa/s	1 Mpts	2	8
DSOX2014A	100 MHz	2 GSa/s	1 Mpts	4	–

**Table 3** InfiniiVision 2000 X-Series Oscilloscopes (continued)

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
MSOX2014A	100 MHz	2 GSa/s	1 Mpts	4	8
DSOX2022A	200 MHz	2 GSa/s	1 Mpts	2	–
MSOX2022A	200 MHz	2 GSa/s	1 Mpts	2	8
DSOX2024A	200 MHz	2 GSa/s	1 Mpts	4	–
MSOX2024A	200 MHz	2 GSa/s	1 Mpts	4	8
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 2000 X-Series Oscilloscope					
Alternate product numbers: N/A					

**Table 4** InfiniiVision 3000 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX3012A	100 MHz	2 GSa/s	2 Mpts	2	–
MSOX3012A	100 MHz	2 GSa/s	2 Mpts	2	16
DSOX3014A	100 MHz	2 GSa/s	2 Mpts	4	–
MSOX3014A	100 MHz	2 GSa/s	2 Mpts	4	16
DSOX3024A	200 MHz	2 GSa/s	2 Mpts	4	–
MSOX3024A	200 MHz	2 GSa/s	2 Mpts	4	16
DSOX3032A	350 MHz	2 GSa/s	2 Mpts	2	–
MSOX3032A	350 MHz	2 GSa/s	2 Mpts	2	16
DSOX3034A	350 MHz	2 GSa/s	2 Mpts	4	–
MSOX3034A	350 MHz	2 GSa/s	2 Mpts	4	16
DSOX3052A	500 MHz	2 GSa/s	2 Mpts	2	–
MSOX3052A	500 MHz	2 GSa/s	2 Mpts	2	16
DSOX3054A	500 MHz	2 GSa/s	2 Mpts	4	–
MSOX3054A	500 MHz	2 GSa/s	2 Mpts	4	16
DSOX3104A	1 GHz	5 GSa/s	2 Mpts	2	–
MSOX3104A	1 GHz	5 GSa/s	2 Mpts	2	16
DSOX3104A	1 GHz	5 GSa/s	2 Mpts	4	–

**Table 4** InfiniiVision 3000 X-Series Oscilloscopes (continued)

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
MSOX3104A	1 GHz	5 GSa/s	2 Mpts	4	16
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 3000 X-Series Oscilloscope					
Alternate product numbers: N/A					

**Table 5** InfiniiVision 3000T X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX3012T	100 MHz	5 GSa/s	4 Mpts	2	–
MSOX3012T	100 MHz	5 GSa/s	4 Mpts	2	16
DSOX3014T	100 MHz	5 GSa/s	4 Mpts	4	–
MSOX3014T	100 MHz	5 GSa/s	4 Mpts	4	16
DSOX3022T	200 MHz	5 GSa/s	4 Mpts	2	–
MSOX3022T	200 MHz	5 GSa/s	4 Mpts	2	16
DSOX3024T	200 MHz	5 GSa/s	4 Mpts	4	–
MSOX3024T	200 MHz	5 GSa/s	4 Mpts	4	16
DSOX3032T	350 MHz	5 GSa/s	4 Mpts	2	–
MSOX3032T	350 MHz	5 GSa/s	4 Mpts	2	16
DSOX3034T	350 MHz	5 GSa/s	4 Mpts	4	–
MSOX3034T	350 MHz	5 GSa/s	4 Mpts	4	16
DSOX3052T	500 MHz	5 GSa/s	4 Mpts	2	–
MSOX3052T	500 MHz	5 GSa/s	4 Mpts	2	16
DSOX3054T	500 MHz	5 GSa/s	4 Mpts	4	–
MSOX3054T	500 MHz	5 GSa/s	4 Mpts	4	16
DSOX3104T	1 GHz	5 GSa/s	4 Mpts	2	–
MSOX3104T	1 GHz	5 GSa/s	4 Mpts	2	16
DSOX3104T	1 GHz	5 GSa/s	4 Mpts	4	–
MSOX3104T	1 GHz	5 GSa/s	4 Mpts	4	16
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 3000T X-Series Oscilloscope					
Alternate product numbers: N/A					



**Table 6** InfiniiVision 4000 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX4022A	200 MHz	5 GSa/s	4 Mpts	2	–
MSOX4022A	200 MHz	5 GSa/s	4 Mpts	2	16
DSOX4024A	200 MHz	5 GSa/s	4 Mpts	4	–
MSOX4024A	200 MHz	5 GSa/s	4 Mpts	4	16
DSOX4032A	350 MHz	5 GSa/s	4 Mpts	2	–
MSOX4032A	350 MHz	5 GSa/s	4 Mpts	2	16
DSOX4034A	350 MHz	5 GSa/s	4 Mpts	4	–
MSOX4034A	350 MHz	5 GSa/s	4 Mpts	4	16
DSOX4052A	500 MHz	5 GSa/s	4 Mpts	2	–
MSOX4052A	500 MHz	5 GSa/s	4 Mpts	2	16
DSOX4054A	500 MHz	5 GSa/s	4 Mpts	4	–
MSOX4054A	500 MHz	5 GSa/s	4 Mpts	4	16
DSOX4104A	1 GHz	5 GSa/s	4 Mpts	4	–
MSOX4104A	1 GHz	5 GSa/s	4 Mpts	4	16
DSOX4154A	1.5 GHz	5 GSa/s	4 Mpts	4	–
MSOX4154A	1.5 GHz	5 GSa/s	4 Mpts	4	16
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 4000 X-Series Oscilloscope					
Alternate product numbers: N/A					

**Table 7** InfiniiVision 6000 X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX6002A	1 GHz	20 GSa/s	4 Mpts	2	–
MSOX6002A	1 GHz	20 GSa/s	4 Mpts	2	16
DSOX6004A	1 GHz	20 GSa/s	4 Mpts	4	–
MSOX6004A	1 GHz	20 GSa/s	4 Mpts	4	16
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 6000 X-Series Oscilloscope					
Alternate product numbers: N/A					

## Security Terms and Definitions

Term	Definition
Clearing	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.
Sanitization	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.
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 8** Instrument Memory

Memory type: size (X-Series)	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Location in instrument and remarks	Sanitization procedure
Acquisition memory: <ul style="list-style-type: none"> <li>▪ 200 kpts (EDUX1000)</li> <li>▪ 2 MB (DSOX1000, 1200, 2000 2-ch models)</li> <li>▪ 4 MB (2000 4-ch models)</li> <li>▪ 8 MB (3000, 3000T, 4000)</li> <li>▪ 9/10 MB (6000)</li> </ul>	Yes	No	Scope channel acquisition memory for analog channels	Input signal data (ADC output)	System ASIC(s)	Cycle power
Display memory: <ul style="list-style-type: none"> <li>▪ 1 MB</li> </ul>	Yes	No	Display/screen memory	Input signal data and system software	System ASIC(s)	Cycle power
DDR2:	Yes	No	Holds GUI display planes and caches	Input signal data	System ASIC(s)	Cycle power
Main memory: <ul style="list-style-type: none"> <li>▪ 128 MB (1000, 1200, 2000, 3000)</li> <li>▪ 256 MB (3000T, 4000)</li> <li>▪ 1024 MB (6000)</li> </ul>	Yes	No	CPU system firmware and variables memory	Operating system	Main system board in CPU area	Cycle power

**Table 8** Instrument Memory (continued)

Memory type: size (X-Series)	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Location in instrument and remarks	Sanitization procedure
NAND flash: <ul style="list-style-type: none"> <li>▪ 128 MB (1000, 2000, 3000)</li> <li>▪ 256 MB (1200, 3000T, 4000)</li> <li>▪ 1024 MB (6000)</li> </ul>	Yes	Yes	See NAND flash organization table	See NAND flash organization table	Main system board in CPU area	Secure erase
NOR flash: <ul style="list-style-type: none"> <li>▪ 512 KB (1000, 1200, 2000, 3000, 3000T, 4000)</li> <li>▪ 4 KB (6000)</li> </ul>	No	Yes	Boot loader 1000, 1200, 2000, 3000, 3000T, 4000 X-Series  MAC address 2000, 3000, 3000T, 4000, 6000 X-Series	Firmware upgrades	Main system board in CPU area	No user data is stored

### NAND Flash Organization Table

**Table 9** NAND Flash Organization Table – 1000, 2000, 3000, 3000T, 4000, and 6000 X-Series

Memory type: size (X-Series)	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Sanitization procedure
Public FAT file system: <ul style="list-style-type: none"> <li>▪ 40 MB (1000, 2000, 3000)</li> <li>▪ 106 MB (3000T, 4000)</li> <li>▪ 479.75 MB (6000)</li> </ul>	Yes	Yes	User settings, masks, labels, and reference waveforms	Firmware operations	Secure erase
Internal FAT file system: <ul style="list-style-type: none"> <li>▪ 40 MB (1000, 2000, 3000)</li> <li>▪ 64 MB (3000T, 4000)</li> <li>▪ 192 MB (6000)</li> </ul>	No	Yes	System software, calibration data, license data, and FPGA firmware backup	Firmware upgrades, license installations, and calibration	No user data is stored

**Table 9** NAND Flash Organization Table – 1000, 2000, 3000, 3000T, 4000, and 6000 X-Series (continued)

Memory type: size (X-Series)	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Sanitization procedure
Windows CE image: <ul style="list-style-type: none"> <li>40 MB (1000)</li> <li>42 MB (2000, 3000)</li> <li>80 MB (3000T, 4000)</li> <li>300 MB (6000)</li> </ul>	No	Yes	Windows CE kernel image loaded by boot loader	Firmware upgrade	No user data is stored
Software database: <ul style="list-style-type: none"> <li>2.5 MB (1000, 2000, 3000, 3000T, 4000)</li> <li>14 MB (6000)</li> </ul>	No	Yes	Model and serial numbers (not user modifiable), factory sealed state (not user modifiable), and Autoscale Disable state (user modifiable)	Firmware operation	
FPGA firmware: <ul style="list-style-type: none"> <li>1.1 MB (1000, 2000, 3000, 3000T, 4000)</li> <li>4.5 MB (6000)</li> </ul>	No	Yes	FPGA firmware loaded into the FPGA by boot loader	Firmware upgrade	No user data is stored
Unused: <ul style="list-style-type: none"> <li>4.3 MB (1000)</li> <li>2.3 MB (2000, 3000)</li> <li>0.4 MB (3000T, 4000)</li> </ul>					
Boot splash screen: <ul style="list-style-type: none"> <li>1.75 MB (6000)</li> </ul>		Yes	First splash screen displayed during boot	Firmware upgrade	No user data is stored
Boot loader: <ul style="list-style-type: none"> <li>32 MB (6000)</li> </ul>		Yes	Perform initial boot tasks and load the Windows CE kernel image	Firmware upgrade	No user data is stored

**Table 10** NAND Flash Organization Table – 1200 X-Series

Memory type: size	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Sanitization procedure
User-storage ubifs volume: 111.375 MB	Yes	Yes	User settings, masks, labels, and reference waveforms	Firmware operations	Secure erase
Firmware-data ubifs volume: 8 MB	No	Yes	Calibration data	Instrument calibration	No user data is stored
Firmware-bin: 32 MB	No	Yes	Instrument software	Firmware upgrade	No user data is stored
System-storage: 16 MB	No	Yes	License data, model and serial numbers (not user modifiable), and Autoscale Disable state (user modifiable)	Firmware operation	
Linux root file system: 64 MB	No	Yes	System software	Firmware upgrade	Read-only during normal operation
Linux kernel: 4 MB	No	Yes	System software	Firmware upgrade	Read-only during normal operation
Platform-rescue: 18 MB	No	Yes	Firmware upgrade and instrument recovery	Firmware upgrade	Read-only during normal operation
FPGA firmware: 2.25 MB	No	Yes	FGPA firmware loaded into the FGPA by boot loader	Firmware upgrade	Read-only during normal operation
Unused: 384 KB					

## Memory Clearing, Sanitization, and/or Removal Procedures

**Table 11** Main Memory

<b>Description and purpose</b>	Used to store setups, masks, and reference waveforms when the oscilloscope is powered on
<b>Size (X-Series)</b>	<ul style="list-style-type: none"> <li>▪ 128 MB (1000, 1200, 2000, 3000)</li> <li>▪ 256 MB (3000T, 4000)</li> <li>▪ 1024 MB (6000)</li> </ul>
<b>Memory clearing</b>	Memory is cleared upon power down
<b>Memory sanitization</b>	Not necessary
<b>Memory removal</b>	Not necessary
<b>Write protecting</b>	The memory is not accessible
<b>Memory validation</b>	Not necessary
<b>Remarks</b>	N/A

**Table 12** NAND Flash

<b>Description and purpose</b>	Main persistent memory used to store system firmware, calibration data, and user data
<b>Size (X-Series)</b>	<ul style="list-style-type: none"> <li>▪ 128 MB (1000, 2000, 3000)</li> <li>▪ 256 MB (1200, 3000T, 4000)</li> <li>▪ 1024 MB (6000)</li> </ul>
<b>Memory clearing</b>	User data via Secure erase
<b>Memory sanitization</b>	User data via Secure erase
<b>Memory removal</b>	No
<b>Write protecting</b>	No
<b>Memory validation</b>	No
<b>Remarks</b>	See NAND flash organization table

**Table 13** NOR Flash

<b>Description and purpose</b>	Secondary persistent memory used to store boot loaders and MAC address
<b>Size (X-Series)</b>	<ul style="list-style-type: none"> <li>▪ 512 KB (1000, 1200, 2000, 3000, 3000T, 4000)</li> <li>▪ 4 KB (6000)</li> </ul>
<b>Memory clearing</b>	Not necessary
<b>Memory sanitization</b>	Not necessary
<b>Memory removal</b>	Not necessary

**Table 13** NOR Flash (continued)

<b>Write protecting</b>	The memory is not accessible
<b>Memory validation</b>	Not necessary
<b>Remarks</b>	N/A

### To perform a Secure Erase

- 1 On the oscilloscope's front panel, press the **[Save/Recall]** key.
- 2 In the Save/Recall Menu, press **Default/Erase**.
- 3 In the Default menu, press **Secure Erase**.  
This will perform a secure erase of all non-volatile memory.
- 4 You must confirm the secure erase, and the oscilloscope will reboot when finished.

For the InfiniiVision 1200 X-Series oscilloscopes, secure erase performs the following sequential steps:

- 1 Writes a random pattern to the flash memory blocks specified.
- 2 Writes zeros to the flash memory blocks specified.
- 3 Writes ones to the flash memory blocks specified.
- 4 Performs a block erase of the specified memory blocks.

For all other products covered by this document, secure erase performs the following sequential steps:

- 1 Writes zeros to the flash memory blocks specified.
- 2 Performs a block erase of the specified memory blocks.



## User and Remote Interface Security Measures

### USB Mass Storage Device Security

The user is responsible for providing security for the I/O ports for remote access by controlling physical access to the USB ports.

### 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. Instrument should only be connected to a secure network or left unconnected. The I/O ports must be controlled because they provide access to all user settings, user states and the display images.

The I/O ports include USB device, GPIB (2000 and 3000 X-Series only), and LAN. LAN is not available on 1000 X-Series.

### 6000 X-Series Microphone Security

Microphone data is stored in the Main Memory. The data is cleared on cycling power. The voice control service maintains a command log in the Public FAT File System. Use "secure erase" to remove the file and sanitize the file system.

## Procedure for Declassifying a Faulty Instrument

If the oscilloscope is not functioning and it needs to be declassified, contact Keysight technical support.