
Declassification of the InfiniiVision X-Series Oscilloscopes

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1 Declassification and Security

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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 3000G X-Series Oscilloscopes

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
DSOX3012G	100 MHz	5 GSa/s	4 Mpts	2	–
MSOX3012G	100 MHz	5 GSa/s	4 Mpts	2	16
DSOX3014G	100 MHz	5 GSa/s	4 Mpts	4	–
MSOX3014G	100 MHz	5 GSa/s	4 Mpts	4	16
DSOX3022G	200 MHz	5 GSa/s	4 Mpts	2	–
MSOX3022G	200 MHz	5 GSa/s	4 Mpts	2	16
DSOX3024G	200 MHz	5 GSa/s	4 Mpts	4	–
MSOX3024G	200 MHz	5 GSa/s	4 Mpts	4	16
DSOX3032G	350 MHz	5 GSa/s	4 Mpts	2	–
MSOX3032G	350 MHz	5 GSa/s	4 Mpts	2	16
DSOX3034G	350 MHz	5 GSa/s	4 Mpts	4	–
MSOX3034G	350 MHz	5 GSa/s	4 Mpts	4	16
DSOX3052G	500 MHz	5 GSa/s	4 Mpts	2	–
MSOX3052G	500 MHz	5 GSa/s	4 Mpts	2	16
DSOX3054G	500 MHz	5 GSa/s	4 Mpts	4	–
MSOX3054G	500 MHz	5 GSa/s	4 Mpts	4	16
DSOX3104G	1 GHz	5 GSa/s	4 Mpts	2	–
MSOX3104G	1 GHz	5 GSa/s	4 Mpts	2	16
DSOX3104G	1 GHz	5 GSa/s	4 Mpts	4	–
MSOX3104G	1 GHz	5 GSa/s	4 Mpts	4	16
Product name: X-Series Oscilloscope					
Product family name: InfiniiVision 3000G X-Series Oscilloscope					
Alternate product numbers: N/A					

Table 7 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

Table 7 InfiniiVision 4000 X-Series Oscilloscopes (continued)

Model number	Bandwidth	Sample rate	Memory	Analog channels	Digital channels
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 8 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 9 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"> ▪ 200 kpts (EDUX1000) ▪ 2 MB (DSOX1000, 1200, 2000 2-ch models) ▪ 4 MB (2000 4-ch models) ▪ 8 MB (3000, 3000T, 3000G, 4000) ▪ 9/10 MB (6000) 	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"> ▪ 1 MB 	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"> ▪ 128 MB (1000, 1200, 2000, 3000) ▪ 256 MB (3000T, 3000G, 4000) ▪ 1024 MB (6000) 	Yes	No	CPU system firmware and variables memory	Operating system	Main system board in CPU area	Cycle power

Table 9 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"> ▪ 128 MB (1000, 2000, 3000) ▪ 256 MB (1200, 3000T, 3000G, 4000) ▪ 1024 MB (6000) 	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"> ▪ 512 KB (1000, 1200, 2000, 3000, 3000T, 3000G, 4000) ▪ 4 KB (6000) 	No	Yes	Boot loader 1000, 1200, 2000, 3000, 3000T, 3000G, 4000 X-Series MAC address 2000, 3000, 3000T, 3000G, 4000, 6000 X-Series	Firmware upgrades	Main system board in CPU area	No user data is stored

NAND Flash Organization Table

Table 10 NAND Flash Organization Table – 1000, 2000, 3000, 3000T, 3000G, 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"> 40 MB (1000, 2000, 3000) 106 MB (3000T, 3000G, 4000) 479.75 MB (6000) 	Yes	Yes	User settings, masks, labels, and reference waveforms	Firmware operations	Secure erase
Internal FAT file system: <ul style="list-style-type: none"> 40 MB (1000, 2000, 3000) 64 MB (3000T, 3000G, 4000) 192 MB (6000) 	No	Yes	System software, calibration data, license data, and FPGA firmware backup	Firmware upgrades, license installations, and calibration	No user data is stored
Windows CE image: <ul style="list-style-type: none"> 40 MB (1000) 42 MB (2000, 3000) 80 MB (3000T, 3000G, 4000) 300 MB (6000) 	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"> 2.5 MB (1000, 2000, 3000, 3000T, 3000G, 4000) 14 MB (6000) 	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"> 1.1 MB (1000, 2000, 3000, 3000T, 3000G, 4000) 4.5 MB (6000) 	No	Yes	FPGA firmware loaded into the FPGA by boot loader	Firmware upgrade	No user data is stored

Table 10 NAND Flash Organization Table – 1000, 2000, 3000, 3000T, 3000G, 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
Unused: <ul style="list-style-type: none"> ▪ 4.3 MB (1000) ▪ 2.3 MB (2000, 3000) ▪ 0.4 MB (3000T, 3000G, 4000) 					
Boot splash screen: <ul style="list-style-type: none"> ▪ 1.75 MB (6000) 		Yes	First splash screen displayed during boot	Firmware upgrade	No user data is stored
Boot loader: <ul style="list-style-type: none"> ▪ 32 MB (6000) 		Yes	Perform initial boot tasks and load the Windows CE kernel image	Firmware upgrade	No user data is stored

Table 11 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

Table 11 NAND Flash Organization Table – 1200 X-Series (continued)

Memory type: size	Writable during normal operation?	Data retained when powered off?	Purpose/ contents	Data input method	Sanitization procedure
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 12 Main Memory

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

Table 13 NAND Flash

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

Table 14 NOR Flash

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

Table 14 NOR Flash (continued)

Write protecting	The memory is not accessible
Memory validation	Not necessary
Remarks	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.