MDO4000C Series Oscilloscope Declassification and Security

Instructions

Tektronix

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Preface

If you have data security concerns, this document helps you to sanitize or remove memory devices from the Tektronix MDO4000C Series Mixed Domain Oscilloscopes and Modules.

The MDO4000C Series products have data storage (memory) devices and data output devices (USB ports). These instructions tell you how to clear or sanitize the memory devices, and also tell you how to declassify an instrument that is not functioning.

Instrument code and calibration settings reside in nonvolatile flash memory. Instrument setups and reference waveforms may also be stored in flash memory or on USB drives connected to the instrument.

If you have any questions, contact the Tektronix Technical Support Center at www.tektronix.com/support.

Reference   The procedures in this document are written to meet the requirements specified in:

- NISPOM, DoD 5220.22–M, Chapter 8

- ISFO Process Manual for Certification & Accreditation of Classified Systems under NISPOM

Products   The following Tektronix products are covered by this document:

Oscilloscopes:

- MDO4104C

- MDO4054C

- MDO4034C

- MDO4024C

Application Modules:

- DPO4AERO

- DPO4AUDIO

- DPO4AUTO

- DPO4AUTOMAX

- DPO4BND

- DPO4COMP

- DPO4EMBD

- DPO4ENET

- DPO4LMT

- DPO4PWR

- DPO4USB

- DPO4VID

- MDO4TRIG

- MDO4AFG

- MDO4MSO

Related documents   Other manuals for your instrument are available on the Tektronix Web site at www.tektronix.com/download.

Terms   The following terms may be used in this document:

- **Clear.** This removes data on media/memory before reusing it in a secured area. All reusable memory is cleared to deny access to previously stored information by standard means of access.

- **Demo setups.** These setups come loaded in the instrument, and cannot be modified by the customer.

- **Erase.** This is equivalent to clear.

- **Instrument Declassification.** A term that refers to procedures that must be undertaken before an instrument can be removed from a secure environment. Declassification procedures include memory sanitization and memory removal, and sometimes both.

- **Media storage/data export device.** Any of several devices that can be used to store or export data from the instrument, such as a USB port.

- **Nonvolatile memory.** Data is retained when the instrument is powered off.

- **Power off.** Some instruments have a "Standby" mode, in which power is still supplied to the instrument. For the purpose of clearing data, putting the instrument in Standby mode does not qualify as powering off. For these products, you will need to remove the power source from the instrument.

- **Protected user data area.** Contains data that is protected by a password.

- **Remove.** This is a physical means to clear the data by removing the memory device from the instrument. Instructions are available in the product Service Manual.

- **Sanitize.** This eradicates the data from media/memory so that the data cannot be recovered by other means or technology. This is typically used when the device will be moved (temporarily or permanently) from a secured area to a nonsecured area.

- **Scrub.** The user is able to directly retrieve the memory device contents.

- **User-modifiable.** The user can write to the memory device during normal instrument operation, using the instrument interface or remote control.

- **Volatile memory.** Data is lost when the instrument is powered off.

Declassification and Security Instructions

Clear and Sanitize Procedures

The following terms are used in the tables in this section:

Type of User Info Stored This column describes the type of user information that is stored in the device:

- **User data.** Waveforms and other measurement data that represent signals that users connect to the instrument.
- **User settings.** Instrument settings that the user can change.
- **Both.** Both user data and user settings are stored in the device.
- **None.** Neither user data nor user settings are stored in the device.

Method of Modification This column indicates the method of modifying data:

- **Direct.** The user can modify the data.
- **Indirect.** The instrument system resources modify the data. The user cannot modify the data.

User Accessible This column indicates whether you can retrieve the device contents:

- **Yes.** You can directly retrieve the memory device contents.
- **No.** You cannot retrieve the memory device contents.

To Clear This column tells how to clear data from the media or memory device before reusing it in a secured area. All reusable memory is cleared to deny access to previously stored information by standard means of access.

To Sanitize This column tells how to eradicate the data from the media or memory device so that the data cannot be recovered by other means or technology. This is typically used when the device will be moved (temporarily or permanently) from a secured area to a nonsecured area.

Memory Devices

The following tables list the volatile and nonvolatile memory devices in the standard instrument and listed options. Detailed procedures to clear or sanitize these devices, if any, are shown following each table.

Table 1: Volatile memory devices

Type and minimum size	Function	Type of user info stored	Backed up by battery	Method of modifi-cation	Data input method	Location	User accessible	To clear or sanitize
CMOS, SDRAM, 128 Mbit x 16, 8 devices, 2 Gb ea, 16 Gb total, DDR2, 1.8 V, 400 MHz (Effective 800 MHz); MT47H128M16RT-25E, BGA [1]	Contains waveform main data during operation	Both	No	Indirect	Front panel control and oscilloscope input channels	Main Acquisition board	No	Remove power from the instrument for at least 20 seconds
CMOS, SDRAM, 64 Mbit x 16, 8 devices 1 Gb ea, 8 Gb total, DDR2, 1.8 V, 400 MHz (Effective 800 MHz); MT47H64M16HR-25E BGA [2]	Contains waveform main data during operation	Both	No	Indirect	Front panel control and oscilloscope input channels	Main Acquisition board	No	Remove power from the instrument for at least 20 seconds
CMOS, SDRAM, 64M x 16, 1024 Mb DDR2, 1.8 V, 400 MHz (Effective 800 MHz); MT47H64M16HR-25E [3]	Contains instrument code and data during operation	Both	No	Indirect	Front panel control and oscilloscope input channels. Data inputs through USB port and Ethernet port.	Main acquisition board	No	Remove power from the instrument for at least 20 seconds
CMOS, SDRAM, 64M x 16, 1024 Mb DDR2, 1.8 V, 400 MHz (Effective 800 MHz); MT47H64M16HR-25E [4]	Contains display images during operation	Both	No	Indirect	Front panel control and oscilloscope input channels.	Main acquisition board	No	Remove power from the instrument for at least 20 seconds
CMOS, DRAM; 4M X 32,128 Mb, SDRAM, 3.3 V; MT48LC4M32B2B\5-7, 90-BALL FBGA (11 MM X 13 MM), DS4	Contains code for digital waveform processor	None	No	Indirect	System	Main acquisition board	No	Remove power from the instrument for at least 20 seconds

Table 1: Volatile memory devices (cont.)

Type and minimum size	Function	Type of user info stored	Backed up by battery	Method of modifi- cation	Data input method	Location	User accessible	To clear or sanitize
CMOS, DRAM; 16M x 16, 256 Mb, SDRAM, 3.3 V; MT48LC16M16A2TG-8E, TSOP54 [5]	Contains digital waveform acquisition memory	Both	No	Indirect	Front panel control and digital input channels	Main acquisition board	No	Remove power from the instrument for at least 20 seconds
ADG395	SRAM 256 kB (standard)	Arbitrary waveform storage, not backed up by battery	User data	Indirect	Firmware operations	IO board	No	Remove power from the instrument for at least 20 seconds

[1]   DEMUX memory on RF ADC. Only used on products with option SA3 or SA6.

[2]   Product with option SA3 or SA6. - 8 devices on analog channel DEMUX. 1GHz non RF - 16 devices. <1GHz non RF - 8 devices.

[3]   Main processor memory. 4 devices, 1Gb ea.

[4]   SDIA video memory

[5]   MSO memory. Common to all versions.

Table 2: Nonvolatile memory devices

Type and minimum size	Function	Type of user info stored	Method of modification	Data input method	Location	User accessible	To sanitize or clear
IC, Memory; CMOS, EEPROM; 128 bits x 8, 1024 bits, Serial; 24C01, SO8.15 [1]	Contains PowerPC hardware configuration	None	Indirect	System	Main acquisition board	No	Not applicable - no user data or settings
CMOS, FLASH; C, 512 Mb, 150 NS, 3 V, StrataFlash; PC48F4400P0TB00A, BGA64 [2]	Contains the instrument firmware, calibration constants, reference waveforms, instrument setups, and protected user data (PUD)	Both	Indirect	Front panel control and oscilloscope input channels. Data inputs through USB port and Ethernet port.	Main acquisition board	User can access only the reference part; not the program	Not applicable for calibration constants. Use TekSecure to clear reference waveforms and instrument setups. (See page 9.) You can disable the LAN Ethernet and clear information, such as IP addresses. (See page 11.) You can disable the USB Device port. (See page 12.) You can overwrite protected user data (PUD). (See page 10.)

[1] Boot load EEPROM. Common to all versions.

[2] Flash memory for program. Common to all models.

Table 3: Nonvolatile memory devices – Application Modules

Module	Type and minimum size	Function	Type of user info stored	Method of modification	Data input method	Location	User accessible	To clear or sanitize
DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4AUTOMAX, DPO4BND, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID, MDO4TRIG, MDO4AFG, MDO4MSO	IC, MEMORY; CMOS, EEPROM; 256 bits X 8, 2048 bits; SERIAL; 24C02, SO8.15	Option key	None	Indirect	System		No	**To sanitize** Refer to the procedure, *Sanitizing an Application Module.* (See page 7.)
EEPROM	EEPROM 1 Kbit	Holds signal generator calibration data	None	Indirect	Not applicable	IO board	Not applicable	Not applicable, no user data
Serial Real-Time Clock	Serial real-time clock	Real-time clock with battery backup	Time and date	Indirect	Not applicable	Main board	Not applicable	Not applicable, no user data

Data Export Devices

The following table lists the data export devices.

Table 4: Data export devices

Type	Function	Method of modification	Data input method	Location	User accessible	To disable
USB host ports	Supports the removable USB flash drive; user storage of reference waveforms, screen images, and instrument setups	Direct	System resources	USB host ports on the front and rear of the instrument	Yes	Files can be deleted or overwritten on the instrument or a PC; the USB flash drive can be removed and destroyed. The USB host ports cannot be disabled.
Ethernet	User storage of reference waveforms, screen images, and instrument setups.	Direct	System resources	LAN port on rear of instrument	Yes	Disconnect from network cable. The Ethernet port can be disabled. (See page 11.)
USB device port	Supports remote control and data transfer to a PC	Direct	Remote control via USBTMC	USB device port on rear of instrument	No	The USB Device port can be disabled. (See page 12.)

Sanitizing an Application Module

To sanitize an application module, follow this procedure to return the module to the default state.

NOTE. This procedure is for an application module that has its license transferred to an oscilloscope. If the module license is not installed in an oscilloscope, the module is already in the default state.

1. With the application module installed in an oscilloscope that contains the module's license, push the front-panel oscilloscope **Utility** button.

2. Use the **Multipurpose a** knob to select **Config**.

3. Select **Application Module Licenses**.

4. Under the Transfer Licenses menu, select to transfer the license to the desired application module. For example, to sanitize the DPO4AERO module, select: **Transfer DPO4AERO License to Module**.

NOTE. If the module cannot be selected in the menu, this indicates that the module license is not contained in that oscilloscope. Install the module in an oscilloscope that does contain the module license and then perform step 4.

5. The module is returned to the default state.

Built-In Security Features

You can use the TekSecure function to erase setup and reference waveform data stored in internal flash memory.

The MDO4000C Series models have four USB host ports (two on the front and two on the rear panel) and one USB device port on the rear panel. Any USB devices can be removed and stored or destroyed.

What TekSecure Does

NOTE. TekSecure does not erase or change factory calibration constants, Ethernet settings, Demo setups, or protected user data. To overwrite protected user data, use the provided procedure. (See page 10, To Overwrite Protected User Data.)

The TekSecure function does the following:

- Erases the flash sector containing the reference waveforms and saved setups (except Demo setups), setting all bytes to the value 0xff.

- Replaces all waveforms in all reference waveform memories with the null sample value of 0x8000.

- Replaces the current front-panel setup and all stored setups (except Demo setups) with the default setup values

- Calculates the checksums of all reference waveform memory and setup memory locations to verify successful completion of waveform and setup erasure.

- Displays a dialog box indicating whether the secure erase was successful or unsuccessful.

To Use TekSecure

1. Push the front-panel **Utility** button.

2. Push the **Utility Page** lower-bezel button and use the **Multipurpose a** knob to select **Config**.

3. Push the **TekSecure Erase Memory** lower-bezel button.

4. Push the **OK Erase Setup and Ref Memory** side-bezel button. Wait for the "TekSecure operation complete" dialog box to display.

5. Push the **Menu Off** front-panel button to close the dialog box.

To Reset the Instrument RAM

1. Power off the instrument.

2. Power on the instrument.

To Overwrite Protected User Data

This procedure overwrites everything that is stored in the protected user data area.

Send the following commands to the oscilloscope:

:PASSWORD "XYZZY" *(or current password if changed from the default of "XYZZY")*

:NEWPASS "ANYTHING"

:PASSWORD "ANYTHING"

*PUD #3300xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx[repeat for a total of 300 x's]

NOTE. If you do not have access to a program that supports sending programmatic commands to the instrument, copy the preceding commands to a text file that ends in ".set" and recall the file from the Recall Setup menu.

For more information on using programming commands, refer to the Programmer Manual for this instrument, available at www.tektronix.com/downloads.

Disable the LAN Port and Clear LAN Ethernet Settings

To disable the LAN port and clear LAN Ethernet settings, such as IP addresses, follow these steps:

⚠️ **CAUTION.** *Write down all setting values before clearing them, to enable you to restore network connectivity later.*

1. Remove the network cable from the LAN port on the rear of the instrument.

2. Push the front-panel **Utility** button.

3. Push the **Utility Page** lower-bezel button and use the **Multipurpose a** knob to select **I/O**.

4. *Clear the passwords as follows:*

   a. Push the **Ethernet & LXI** lower-bezel button.

   b. Go to page 2 of the menu.

   c. Push the **e*Scope Password** right-bezel button.

   d. Use the **Multipurpose a** knob to select **Disabled**.

   e. Push the **Change e*Scope & LXI Password** right-bezel button.

   f. Push the **Clear** lower-bezel button.

   g. Push the **OK Accept** right-bezel button.

5. *Clear the IP addresses as follows:*

   a. Push the **Network Configuration** lower-bezel button.

   b. Push the **Set IP Addresses Manually** size-bezel button.

   c. Select the **Instrument IP Address** by pushing the ↑ or ↓ arrow side-bezel button, and then push the **Clear** lower-bezel button.

   d. Select and clear the remaining addresses (**Gateway IP**, **Subnet Mask**, and **DNS IP Address**).

   e. Push the **OK Accept** right-bezel button.

6. *Clear the user and domain names as follows:*

   a. Push the **Ethernet & LXI** lower-bezel button.

   b. Push the **Change Names** right-bezel button.

   c. Clear the **Host Name** and **Domain Name** using the same method that you used to clear the IP addresses.

   d. Push the **OK Accept** right-bezel button.

The LAN system is disabled and no longer allows data traffic in or out. The relevant LAN Ethernet settings are also cleared.

Disable the USB Device Port

To disable the USB device port, follow these steps:

1. Remove any USB cable or device from the USB device port on the rear of the instrument.

2. Push the front-panel **Utility** button.

3. Push the **Utility Page** lower-bezel button and use the **Multipurpose a** knob to select **I/O**.

4. Push the **USB** lower-bezel button.

5. Push the **Disabled (Off Bus)** side-bezel button to disable the USB device port.

Note that the USB lower-bezel button shows "Disabled." The USB device port is disabled and no longer allows data traffic in or out.

Use the MDO4SEC option to disable all I/O ports

If your instrument has the MDO4SEC option installed, use the following procedure to turn off all of the I/O ports.

1. Push the front panel **Utility** button.

2. Push the **Utility Page** lower-bezel button and use the **Multipurpose a** knob to select **Security**.

3. Push the **Security Password** lower-bezel button.

4. Use the Multipurpose knob to enter a password.

5. Push the **I/O Ports** lower-bezel button.

   To disable all USB and Ethernet ports on the oscilloscope, push the OK Disable All Ports on the side-bezel button.

6. Push the **Menu Off** front-panel button to close the dialog box.

7. Power off the oscilloscope, and then power it back on to complete the process.

To reset the instrument RAM, do the following:

1. Power off the instrument for at least 20 seconds.

2. Power on the instrument.

Clear and Sanitize a Nonfunctional Instrument

If your instrument is not functioning and you need to clear or sanitize it, proceed as follows:

NOTE. *The Analog board must be calibrated with the Main board by Tektronix. Please contact Tektronix before returning your instrument.*

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1. Remove the USB flash drive from your oscilloscope. Refer to your company's internal policies regarding handling or disposal of the flash drive.

2. Remove the Main board from your oscilloscope. For removal instructions, refer to the Service manual for the instrument, which is available on the Tektronix Web site at www.tektronix.com/manuals. Refer to your company's internal policies regarding handling or disposal of the board.

3. Return the oscilloscope to Tektronix. A new Main board will be installed, and the oscilloscope will be repaired. The oscilloscope will be adjusted as necessary, which includes adjusting (calibrating) the new Main board and the Analog board together.

4. Replacement of any missing hardware will be charged according to the rate at the time of replacement.