# N109x/N107x DCA-M Sampling Oscilloscopes and Clock Recovery

This manual provides the documentation for the following instruments:

N1090A/N1092A/B/C/D/E/N1094A/B
N1076A/B/N1077A/N1078A

User's Manual

**KEYSIGHT**
TECHNOLOGIES

## Manual Part Number

Nxxxx-xxxxx

## Print Date

December 2018

Supersedes: None

Published in USA

Keysight Technologies Inc.
1400 Fountaingrove Parkway
Santa Rosa, CA 95403

## Warranty

## Technology Licenses

## Restricted Rights Legend

## 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/N1090A

http://www.keysight.com/find/N1092A

http://www.keysight.com/find/N1092B

http://www.keysight.com/find/N1092C

http://www.keysight.com/find/N1092D

http://www.keysight.com/find/N1092E

http://www.keysight.com/find/N1094A

http://www.keysight.com/find/N1094B

http://www.keysight.com/find/N1076A

http://www.keysight.com/find/N1076B

http://www.keysight.com/find/N1077A

http://www.keysight.com/find/N1078A

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

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

## 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

# Table of Contents

# 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.

**KEYSIGHT**
TECHNOLOGIES

# Products Covered by this Document

| Product Family Name | Product Names | Model Numbers |
|---|---|---|
| Oscilloscopes | DCA-M Sampling Oscilloscopes | N1090A, N1092A/B/C/D/E, N1094A/B |
| Oscilloscopes | DCA-M Clock Recovery Modules | N1076A/B, N1077A, N1078A |

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

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.

**KEYSIGHT**
TECHNOLOGIES

# Security Terms and Definitions

| Term | Definition |
|------|------------|
| **Clearing** | As defined in Section 8-301a **of** Error! Reference source not found., 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 **Error! Reference source not found.**, Chapter 8. |
| **Sanitization** | As defined in Section 8-301b of **Error! Reference source not found.**, 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.<br><br>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 **Error! Reference source not found.**. |
| **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.

Note: For the DCA-M product family, nearly all user data is stored on the host PC (or 86100D/N1000A DCA-X frame) running the FlexDCA software. The exceptions, as indicated in the tables below, are the files resulting from user-performed calibrations and the accumulated power-on timer. The host PC is not required for DCA-M service and is not included in the scope of this document.

*Table 1: Summary of N1090A 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 |
|---|---|---|---|---|---|---|
| EEPROM 16 kByte | Yes | Yes | Descriptors to enable USB communication, instrument identification, and Widows driver function<br><br>Accumulated power-on timer | Primarily programmed by vendor before assembly<br><br>Contents can be modified by FlexDCA through higher level USB protocol<br><br>No direct user access | Interface Board | N/A |

| 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 |
|---|---|---|---|---|---|---|
| Flash 16 Mbit | Yes | Yes | FPGA configuration device | Primarily programmed by vendor before assembly<br><br>Contents programmable by FlexDCA for FPGA Rev Updates through higher level USB protocol<br><br>No direct user access | Interface Board<br><br>Contains no user data | N/A |
| Flash 16 Mbit | Yes | Yes | Instrument Memory:<br>-Model and serial number<br>-Factory calibration data<br>-User calibration results, including settings derived from all user-performed calibrations | Controlled by FlexDCA directly through higher level USB protocol<br><br>No direct user access | Interface Board | User Optical Calibrations (including user-defined wavelengths) can be deleted from the Optical Calibrations window (see figure 1 below). |

| 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 |
|---|---|---|---|---|---|---|
| SRAM 16 Mbit | Yes | No | Data acquisition control, storage, and associated calibration tables | Shared control between FlexDCA and FPGA<br><br>No direct user access | Interface Board | N/A (volatile memory) |
| Flash 16 Mbit | Yes | Yes | FPGA configuration device | Exclusively programmed by vendor before assembly<br><br>No FlexDCA or user access | Sampler Board<br><br>Contains no user data | N/A |
| EEPROM 32 kByte | No | Yes | Not used in this configuration | N/A | Sampler Board<br><br>Contains no data | N/A |

*Table 2: Summary of N1092x/94x 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 |
|---|---|---|---|---|---|---|
| Flash 16 Mbit | Yes | Yes | Instrument Memory: -Model and serial number -Factory calibration data -User calibration results, including settings derived from all user-performed calibrations | Controlled directly by FlexDCA through higher level USB protocol<br><br>No direct user access | Digital Board | User Optical Calibrations (including user-defined wavelengths) can be deleted from the Optical Calibrations window (see figure 1 below). |
| Flash 16 Mbit | Yes | Yes | FPGA Configuration Device | Primarily programmed by vendor before assembly<br><br>Contents programmable by FlexDCA for FPGA updates through higher level USB protocol<br><br>No direct user access | Digital Board<br><br>Contains no user data | N/A |

| 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 |
|---|---|---|---|---|---|---|
| EEPROM 16 kByte | Yes | Yes | Descriptors to enable USB communication, instrument identification, and Widows driver function<br><br>Accumulated power-on timer | Primarily programmed by vendor before assembly<br><br>Contents can be modified by FlexDCA through higher level USB protocol<br><br>No direct user access | Digital Board | N/A |
| SRAM 16 Mbit | Yes | No | Data acquisition control, storage, and associated calibration tables | Shared control between FlexDCA and FPGA<br><br>No direct user access | Digital Board | N/A (volatile memory) |

*Table 3: Summary of N1076x/77x/78x 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 |
|---|---|---|---|---|---|---|
| EEPROM 16 kByte | Yes | Yes | Descriptors to enable USB communication, instrument identification, and Widows driver function<br><br>Accumulated power-on timer | Primarily programmed by vendor before assembly<br><br>Contents can be modified by FlexDCA through higher level USB protocol<br><br>No direct user access | Interface Board | N/A |
| Flash 16 Mbit | Yes | Yes | FPGA configuration device | Primarily programmed by vendor before assembly<br><br>Contents programmable by FlexDCA for FPGA Rev Updates through higher level USB protocol<br><br>No direct user access | Interface Board<br><br>Contains no user data | N/A |

| 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 |
|---|---|---|---|---|---|---|
| Flash 16 Mbit | Yes | Yes | Instrument Memory: -Model and serial number -Factory calibration data -User calibration results, including settings derived from all user-performed calibrations | Controlled by FlexDCA directly through higher level USB protocol No direct user access | Interface Board | N/A |
| SRAM 16 Mbit | Yes | No | Data acquisition control, storage, and associated calibration tables | Shared control between FlexDCA and FPGA No direct user access | Interface Board | N/A (volatile memory) |
| EEPROM 4 Mbit | No | Yes | FPGA configuration device | Exclusively programmed by vendor before assembly No FlexDCA or user access | CDR Board Contains no user data | N/A |
| EEPROM 32 kByte | No | Yes | Not used in this configuration | N/A | CDR Board Contains no data | N/A |

# 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.

*Table 4: Instrument Memory Flash*

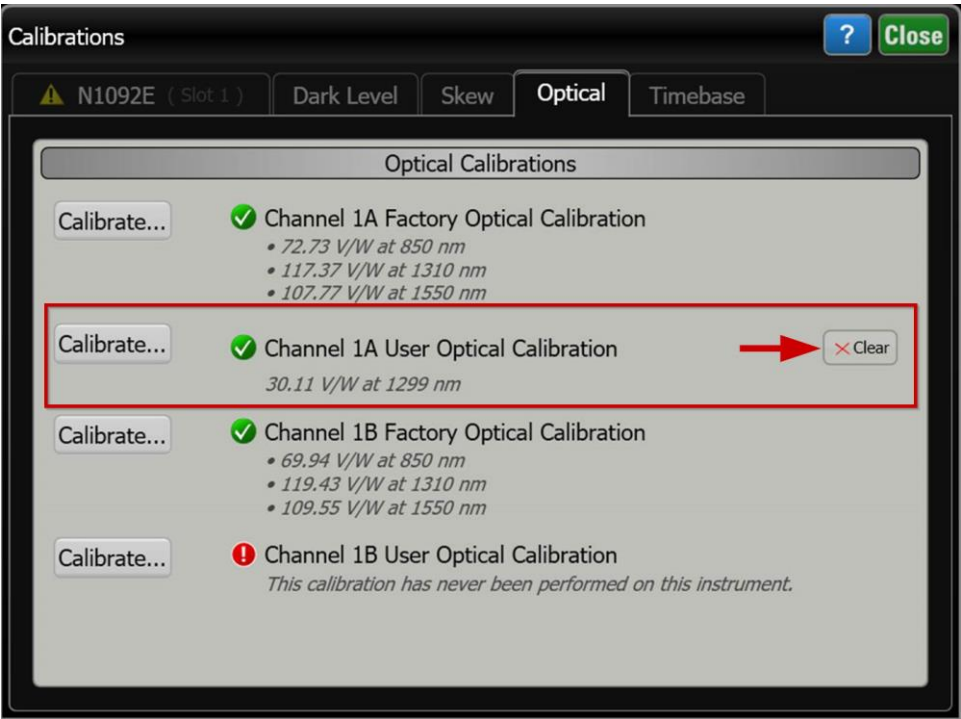| | |
|---|---|
| **Description and purpose** | This memory is used to store model and serial number, factory calibration data, and user calibration results, including settings derived from all user-performed calibrations. |
| **Size** | 16 Mbit |
| **Memory clearing** | Only User Optical Calibrations can be deleted using the Clear feature (see figure 1 below). Other data stored in the DCA-M instrument cannot be deleted by the user. |
| **Memory sanitization** | N/A |
| **Memory removal** | N/A |
| **Memory validation** | When the User Optical Calibration has been cleared, the User Calibration will no longer be shown in the Optical Calibration Window. |
| **Remarks** | This applies only to instruments for which User Optical Calibrations may be performed. FlexDCA version 6.00 or later is required. |



*Figure 1: Optical Calibration Window: Clear button may be used to delete User Optical Calibrations.*