M9484C VXG Signal Generator

This document describes instrument memory types and security features. It provides a statement regarding the volatility of all memory types, and specifies the steps required to declassify an instrument through memory clearing, sanitization, or removal.

KEYSIGHT

SECURITY GUIDE

Notices

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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.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about this instrument, including firmware upgrades, application information, and product information, click the website link below.

http://www.keysight.com/find/m9484c

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

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

Information on preventing analyzer damage can be found at:

www.keysight.com/find/PreventingInstrumentRepair

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

Safety Information

The following safety precautions should be observed before using this product and any associated instrumentation. This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product.

WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

The types of product users are:

- Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring operators are adequately trained.
- Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument.They must be protected from electric shock and contact with hazardous live circuits.
- Maintenance personnel perform routine procedures on the product to keep it operating properly (for example, setting the line voltage or replacing consumable materials). Maintenance procedures are described in the user documentation.The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.
- Service personnel are trained to work on live circuits, perform safe installations, and repair products.Only properly trained service personnel may perform installation and service procedures.

WARNING

Operator is responsible to maintain safe operating conditions. To ensure safe operating conditions, assemblies should not be operated beyond the full temperature range specified in the Environmental and physical specification. Exceeding safe operating conditions can result in shorter lifespans, improper assembly performance and user safety issues. When the assemblies are in use and operation within the specified full temperature range is not maintained, assembly surface temperatures may exceed safe handling conditions which can cause discomfort or burns if touched. In the event of a assembly exceeding the full temperature range, always allow the assembly to cool before touching or removing assemblies from chassis.

Keysight products are designed for use with electrical signals that are rated Measurement Category I and Measurement Category II, as described in the International Electro-technical Commission (IEC) Standard IEC 60664. Most measurement, control, and data I/O signals are Measurement Category I and must not be directly connected to mains voltage or to voltage sources with high transient over-voltages. Measurement Category II connections require protection for high transient over-voltages often associated with local AC mains connections.Assume all measurement, control, and data I/O connections are for connection to Category I sources unless otherwise marked or described in the user documentation.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

The instrument and accessories must be used in accordance with its specifications and operating instructions, or the safety of the equipment may be impaired.

WARNING

Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.

When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as safety earth ground connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits - including the power transformer, test leads, and input jacks - must be purchased from Keysight. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. Other components that are not safety related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keysight to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call an Keysight office for information.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers. For continued protection against fire hazard, replace fuse with same type and rating.

Product Markings

Symbol	Definition
	The CE mark is a registered trademark of the European Community.
	Australian Communication and Media Authority mark to indicate regulatory compliance as a registered supplier.
	This symbol indicates product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). It also identifies the product is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	South Korean Class A EMC Declaration. This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home. A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용 (A 급) 전자파적합기 기로서 판 매자 또는 사용자는 이 점을 주 의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으 로 합니다.
	This product complies with the WEEE Directive marketing requirement. The affixed product label (above) indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE directive Annex 1, this product is classified as “Monitoring and Control instrumentation” product. Do not dispose in domestic household waste. To return unwanted products, contact your local Keysight office, or for more information see http://about.keysight.com/en/companyinfo/environment/takeback.shtml
	This symbol indicates the instrument is sensitive to electrostatic discharge (ESD). ESD can damage the highly sensitive components in your instrument. ESD damage is most likely to occur as the assembly is being installed or when cables are connected or disconnected. Protect the circuits from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any builtup static charge by touching the outer shell of any grounded instrument chassis before touching the port connectors.
	This symbol on an instrument means caution, risk of danger. You should refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.
	This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.

Contacting Keysight

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:

https://www.keysight.com/us/en/product/M9484C/m9484c.html

Information on preventing instrument damage can be found at:

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

Is your product software up-to-date?

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

Contacting Keysight Sales and Service Offices

Assistance with test and measurement needs, and information to help you find a local Keysight office, is available via the internet at, http://www.keysight.com/find/assist. If you do not have internet access, please contact your designated Keysight representative.

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.

Memory Declassification Procedure

Some test equipment users have a need to “declassify” or “sanitize” their instruments for security purposes. This involves following a procedure to clear all user data from the instrument’s memory. The result is a sanitized instrument that can be removed from a secure area without any chance of classified data being recovered from it. This document details the internal memory locations of the M9484C VXG. It describes instrument security features and the steps necessary to declassify the products through memory sanitization or removal. For additional information on a particular product, the Keysight Instrument Security Database may be accessed here: www.keysight.com/find/security. For general information, the Keysight Aerospace and Defense web page may be found at www.keysight.com/find/ad.

What you will find in this section:

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.

Product Memory Sanitization

Sanitization processes for the following Keysight product models are covered in this document:

Instrument:

- M9484C Microwave Signal Generator

Assemblies:

- M9044A Chassis Assembly
- M9044A Frequency Reference
- M9453A Direct Digital Synthesizer and Source Output
- M9454A Upconverter (20 GHz)
- M9455A Upconverter (54 GHz)
- M9032A System Sync
- M9465A Analog IO Assembly

M9484C Microwave Vector Signal Generator

Disk Drive Partitioning and Use

The drive is partitioned into 3 sections: C, D, and E.

- The C: partition contains the Windows 10 operating system, licenses, and software installed by Keysight. This is an Open System, this means you can install additional software. Additional software should be installed on the C: drive, however; only a limited set of software applications are tested for use with the Keysight measurement software. If instrument repair is ever needed, the Keysight version of the C: drive is the only part of the instrument software restored by the Instrument Recovery process. You must reload any other software that you have added in the instrument.
- The D: partition is reserved for data storage. The User Accounts that are configured by Keysight have their Documents file system mapped to the D: drive. This is for the convenience of backing-up the measurement data. You should always backup the data on the D: drive to an external device. This allows you to restore the data if you ever need to replace the disk drive.
- The E: partition is reserve for Keysight's use. The primary use of the E: drive is for housing the Calibration and Alignment data. Do not change or overwrite the files on this drive. This could cause your instrument to not meet specifications, or even to stop functioning correctly. Do not use this drive for data storage.

Methods for Memory Sanitization

There are three methods you can use to sanitized your VXG.

- Erase manually with Windows. Refer to "SSD Manual Sanitization" on page 17.
- Erase the SSD using commercially available software. Refer to "SSD Data Destruction Disk" on page 18.
- Remove the SSD. Refer to "SSD Removal and Installation" on page 18.

SSD Manual Sanitization

Memory Type 1	
Memory Type: Controller Hard Drive	**Memory Size:** Configuration Dependent
Memory Function: Stores device drivers, instrument software, licenses, example programs, example waveforms, and user documentation.	
User Modifiable? Yes	**Volatile?** No
Memory Erase Processes: To uninstall the PathWave instrument driver from the controller, perform the relevant procedure below. To erase: 1. Select **Start** > **Control Panel** > **Programs and Features** 4. Select **Keysight PathWave Signal Generator** 5. Select **Uninstall**	

Memory Type 2	
Memory Type: RAM Main Memory	**Memory Size:** Configuration Dependent
Memory Function: Stores Frequency start/stop/step, power, waveform, and impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 3	
Memory Type: Controller Hard Drive	**Memory Size:** Configuration Dependent
Memory Function: Stores state files.	
User Modifiable? Yes	**Volatile?** No
Memory Erase Processes: Manually erase state files.	
Location: The initial value of the current state file directory is D:\Users\Instrument\Documents\Keysight\PathWave\SignalGenerator\States	

Memory Type 4	
Memory Type: Controller Hard Drive	**Memory Size:** Configuration Dependent
Memory Function: Stores waveform files.	
User Modifiable? Yes	**Volatile?** No
Memory Erase Processes: Manually erase waveform files.	
Location: The initial value of the current state file directory is D:\Users\Instrument\Documents\Keysight\PathWave\SignalGenerator\States	

SSD Data Destruction Disk

Keysight provides a removable Solid State Drive (SSD) for your M9484C VXG. If you order Y1127A along with your M9484C VXG, follow the instructions below.

The SSD is mounted in a receptacle on the rear panel of the M9484C chassis and can be easily inserted or removed. This is convenient when multiple people are using the same VXG and they do not want to interfere with the other person's project or for use in a controlled secure environment.

Putting the Additional SSD Into Service

When ordered at the time of an instrument purchase, the additional SSD will have the following already installed:

- The same version of instrument software/firmware that is also installed in the instrument.
- The instruments computer name.
- Instrument specific configurations.

Contact Keysight to install existing M9484C options onto the new SSD drive.

Refer to "Contacting Keysight Sales and Service Offices" on page 11.

SSD Interconnect Life Expectancy

The life expectancy of both the connector on the removable SSD and the mating connector internal to the instrument is 100 cycles. If this is exceeded it is very likely that a failure will occur between these connections. Keysight highly recommends that this cycle limit not be exceeded to prevent an unwanted failure of the instrument.

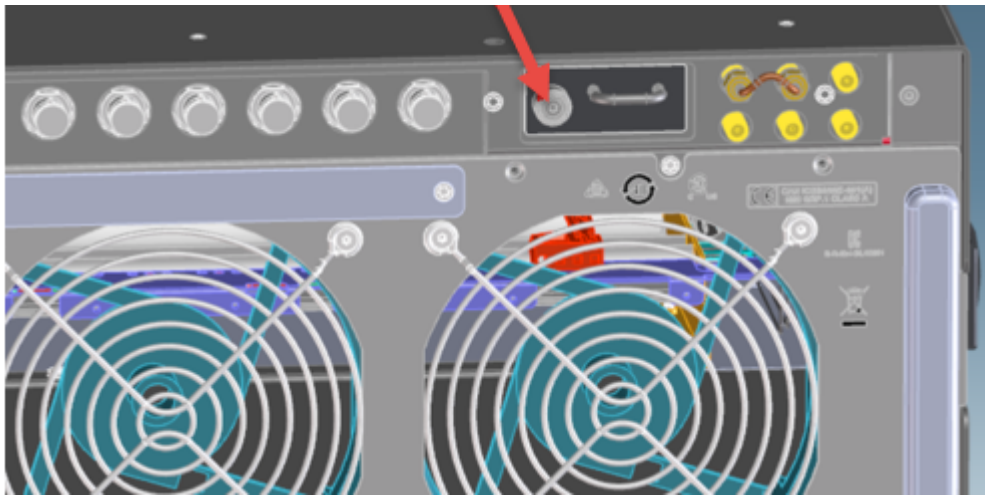
SSD Removal and Installation

CAUTION

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to the documentation that pertains to your instrument for information about static-safe workstations and ordering static-safe accessories.

1. **Turn the instrument off and remove the AC power cord.**

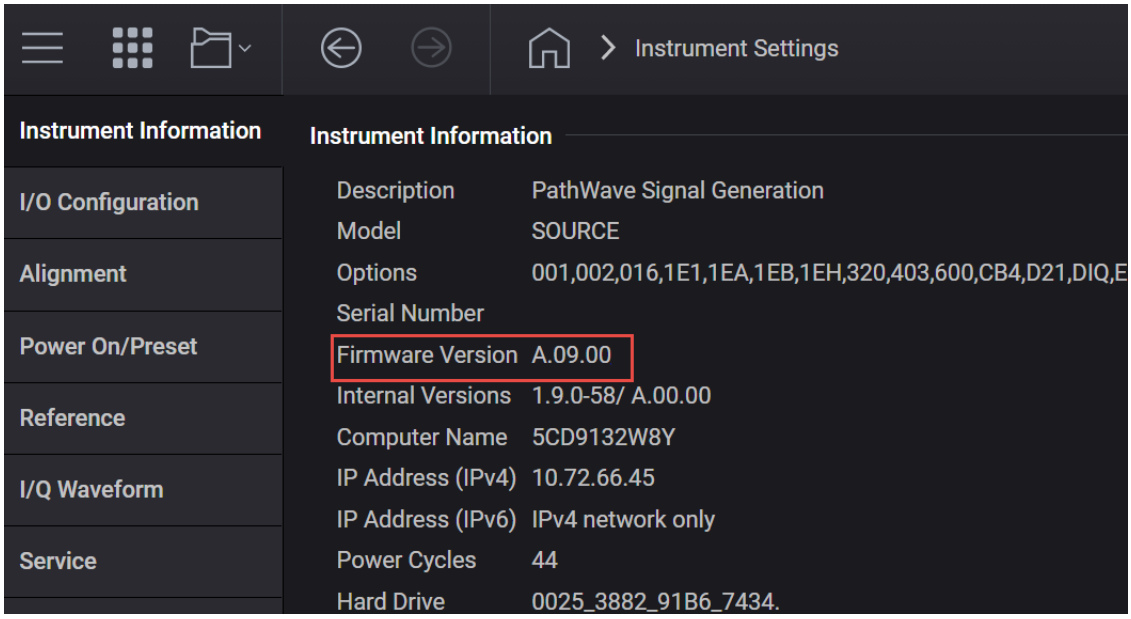
2. Remove the screw as shown in the figure below. Use a T10 Torx driver if necessary.



3. Pull on the handle to unseat the SSD and remove the SSD.
4. Install the new SSD by aligning the SSD PC board edges with the card guides. Insert the SSD completely.
5. Tighten the screw to no more than 9 in-lbs.

Firmware Updates

To determine the currently installed instrument firmware version on the VXG, select the **Triple-bar** icon > **Settings** > **Firmware Version**.



If an instrument firmware update is required, the latest revision of the firmware can be found by going to:

https://www.keysight.com/us/en/product/M9484C/m9484c.html

and selecting the **Drivers, Firmware, and Software** tab.

Instrument Security Information

Information on the instrument security features and the instrument volatility can be found at:

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

M9484C Detailed Memory Allocations

This section contains information on the types of memory used in the M9484C. It explains the size of memory, how it is used, its location, volatility, and the sanitization procedure. All volatile memory in the M9484C will be erased by removing power for 30 seconds.

M9044A Chassis Assembly

Memory Type 1	
Memory Type: SRAM	**Memory Size:** 32 k Bit
Memory Function: Volatile runtime driver state data. Stores only a small subset of runtime operating parameters related to the state of the chassis.	
User Modifiable? No	**Volatile?** Yes
Memory Erase Processes: Cycle chassis power.	

Memory Type 2	
Memory Type: SRAM	**Memory Size:** 32 k Bit
Memory Function: DC DC switcher control FPGA operating RAM. Use of the chassis driver can change operation mode like voltage and frequency, but all configuration changes are volatile and are cleared when the chassis is powered down.	
User Modifiable? No	**Volatile?** Yes
Memory Erase Processes: Cycle chassis power.	

Memory Type 3	
Memory Type: Flash	**Memory Size:** 128 M Bit
Memory Function: Chassis FPGA firmware, NV storage. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 4	
Memory Type: EEPROM (x2)	**Memory Size:** 64 k Bit(x2)
Memory Function: PCIe fabric image for internal PCIe switch configuration. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 5	
Memory Type: SRAM	**Memory Size:** 8 k Bit
Memory Function: Chassis monitor processor operating RAM. All configurations changes are volatile and are cleared when the chassis is powered down.	
User Modifiable? No	**Volatile?** Yes
Memory Erase Processes: Cycle chassis power.	

Memory Type 6	
Memory Type: EEPROM	**Memory Size:** 2 k Bit
Memory Function: Power Riser board manufacturing ID information.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 7	
Memory Type: Complex Programmable Logic Device (CPLD)	**Memory Size:** 240 k Bit
Memory Function: Rear panel trigger routing CPLD. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 8	
Memory Type: EEPROM	**Memory Size:** 8 k Bit
Memory Function: Rear panel trigger board manufacturing ID information.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 9	
Memory Type: EEPROM	**Memory Size:** 2 k Bit
Memory Function: USB-C riser board identification information.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 10	
Memory Type: EEPROM	**Memory Size:** 2 k Bit
Memory Function: Stores PICMG standard EEPROM information.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 11	
Memory Type: EEPROM	**Memory Size:** 2 k Bit
Memory Function: PCI bridge configuration.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 12	
Memory Type: Flash	**Memory Size:** 2240 k Bit
Memory Function: Backplane Left trigger bridge FPGA. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 13	
Memory Type: Flash	**Memory Size:** 2240 k Bit
Memory Function: Backplane Right trigger bridge FPGA. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 14	
Memory Type: Flash	**Memory Size:** 5888 k Bit
Memory Function: Power controller FPGA firmware. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 15	
Memory Type: Flash	**Memory Size:** 128 M Bit
Memory Function: Power controller FPGA micro-controller firmware. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 16	
Memory Type: Flash	**Memory Size:** 128 M Bit
Memory Function: Stores M9484C model number, serial number, manufacturing number, PCB part and version numbers, and calibration data for the high performance reference module.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 17	
Memory Type: Flash	**Memory Size:** 128 M Bit
Memory Function: Stores device firmware for high performance reference module. Images can be changed during VXG software updates. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 18	
Memory Type: Flash	**Memory Size:** 128 M Bit
Memory Function: DC DC Switcher Control FPGA firmware. Contains no user data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 19	
Memory Type: CPLD	**Memory Size:** N/A
Memory Function: Backplane trigger routing.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

M9044A Frequency Reference Assembly

Memory Type 1	
Memory Type: Flash Memory	**Memory Size:** 128 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: Flash Memory	**Memory Size:** 128 M Bit
Memory Function: Stores Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 3	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: Reference frequency, external reference lock.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

M9453A Direct Digital Synthesizer and Output Assembly

Memory Type 1	
Memory Type: Flash Memory	**Memory Size:** 1 G Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: Flash Memory	**Memory Size:** 1 G Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 3	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 9 kHz to 8.5 GHz frequency start/stop/step, and power impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle Power	

Memory Type 4	
Memory Type: CPLD	**Memory Size:** N/A
Memory Function: Backplane trigger routing.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 5	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 6	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 9 kHz to 8.5 GHz frequency start/stop/step, and power impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 7	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 8	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 9	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 9 kHz to 8.5 GHz frequency start/stop/step, and power impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

M9454A Upconverter (20 GHz) Assembly

Memory Type 1	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 3	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 8 to 20 GHz Frequency start/stop/step, power, impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

M9455A Upconverter (54 GHz) Assembly

Memory Type 1	
Memory Type: DRAM	**Memory Size: 8 G Bit**
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 3	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 20 to 54 GHz Frequency start/stop/step, power, impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 4	
Memory Type: Flash Memory	**Memory Size:** 128 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 5	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 6	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 20 to 54 GHz Frequency start/stop/step, power, impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 7	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 8	
Memory Type: Flash Memory	**Memory Size:** 256 M Bit
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 9	
Memory Type: FPGA	**Memory Size:** N/A
Memory Function: 20 to 54 GHz Frequency start/stop/step, power, impairments.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 10	
Memory Type: DRAM	**Memory Size: 8 G Bit**
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

M9032A System Sync Assembly

Memory Type 1	
Memory Type: Config ROM	**Memory Size:** 512 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: DDR Random Access Memory	**Memory Size: 8 G Bit**
Memory Function: Stores IO data and associated information.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle Power	

Memory Type 3	
Memory Type: FPGA Memory	**Memory Size:** Total Block RAM - 25.3 M bit Ultra RAM - 90 M bit
Memory Function: Stores firmware image.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 4	
Memory Type: EEPROM	**Memory Size:** 1024 k Bit
Memory Function: Storage firmware and configuration data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

M9465A Analog IO Assembly

Memory Type 1	
Memory Type: Flash Memory	**Memory Size:** 512 M Bit
Memory Function: Stores assembly model number, serial number, manufacturing number, PCB part and version numbers, and calibration and alignment data.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

Memory Type 2	
Memory Type: DDR Random Access Memory	**Memory Size: 8 G Bit**
Memory Function: Device firmware. Images can be changed during VXG software updates.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle Power	

Memory Type 3	
Memory Type: FPGA Memory	**Memory Size:** Total Block RAM - 25.3 M bit Ultra RAM - 90 M bit
Memory Function: Stores firmware image.	
User Modifiable? Yes	**Volatile?** Yes
Memory Erase Processes: Cycle power	

Memory Type 4	
Memory Type: EEPROM	**Memory Size:** 1024 k Bit
Memory Function: Storage firmware.	
User Modifiable? No	**Volatile?** No
Memory Erase Processes: None, this is not user accessible.	

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