Software
Release Notes

Keysight M938x PXIe Vector Signal Generator

KEYSIGHT TECHNOLOGIES

Notices

Copyright Notice

Manual Part Number

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Regulatory Compliance

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. To review the Declaration of Conformity, go to http://www.keysight.com/go/conformity.

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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.

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, modules 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 module performance and user safety issues. When the modules are in use and operation within the specified full temperature range is not maintained, module surface temperatures may exceed safe handling conditions which can cause discomfort or burns if touched. In the event of a module exceeding the full temperature range, always allow the module to cool before touching or removing modules 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 Electrotechnical 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.

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:

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) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 , 가정외의 지역에서 사용하는 것을 목적으로 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 module 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 built-up 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.

CLEANING PRECAUTIONS:

WARNING

To prevent electrical shock, disconnect the Keysight Technologies instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally. To clean the connectors, use alcohol in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

Contents

Contents vii
M938x Release Notes 9
Version 2.1 9
Version 2.1.85.0 9
Enhancements 9
Version 2.0 9
Version 2.0.332.0 9
Enhancements 9
Critical Fixes 10
Version 1.4 10
Version 1.4.400.0 10
Enhancements 10
Critical Fixes 10
Version 1.4.405.1 11
Version 1.3 11
Version 1.3.300.0 11
Enhancements 11
Critical Fixes 11
Version 1.2 11
Version 1.2.525.1 11
Critical Fixes 11
Version 1.2.500.0 12
Enhancements 12
Version 1.1 13
Version 1.1.199.3 13
Enhancements 13
Critical Fixes 13
Version 1.1.196.2 13
Enhancements 13
Critical Fixes 13
Version 1.1.186.1 13
Version 1.1.184.0 14

M938x Release Notes

- Version 2.1 (page 9)
- Version 2.0 (page 9)
- Version 1.4 (page 10)
- Version 1.3 (page 11)
- Version 1.2 (page 11)
- Version 1.1 (page 13)

Version 2.1

Version 2.1.85.0

Release Date: July 2015

Enhancements

- Added support for eight PXIe VSGs in two chassis sharing a single controller. The following configurations are supported:
  - Time-synchronous multi-channel operations using independent Local Oscillators (LOs).
  - Time-synchronous and phase coherent multi-channel operations using output from a single LO routed through a V2802A LO Distribution Network to split the signal to the eight channels.
- Added support for multichannel synchronized ArbRestart for up to four channels in a single chassis.
- Added the SCPI command :CALibration:LO:LEVel

Version 2.0

Version 2.0.332.0

Release Date: May 2015

Enhancements

- Updated help file, added IVI-2014 Compliance, rebranded as Keysight Technologies.
- Added support for a maximum of 4 PXI VSGs in a single chassis sharing a single controller.
- Added MultiChannelSync IVI interface, enabling improved multichannel timing synchronization.

- Added phase synchronous operation via M9301A Synthesizer sharing capability, along with new IVI method and properties:
  - Calibration2.LOLevelAlignment.AlignLoLevel
  - Modulation3.BasebandPhase adjustment
  - Modules.Synthesizer3.SharedRole
  - Modules.Synthesizer.OutputPort
- Added Multichannel example program to demonstrate time and phase synchronous operation.
- Added Reference3.AlignExternalReferenceAnd10MHzOut method to align phase of the 10 MHz Output with the External Reference input.
- Added ArbMemory IVI interface to enable manual management of ARB memory usage.
- Added Triggers.ExternalTrigger3.ArbRestart property.
- Enhanced SCPI interface with additional commands including multichannel operation.

Critical Fixes

- Fix to enable using Modules.Reference.ProgrammableOutputTrigger properties when sharing M9300A Reference between multiple instruments.

Version 1.4

Following section provides information on various M938x 1.4.x versions released.

Version 1.4.400.0

Release Date: July 2014

Enhancements

- Added SCPI interface with support for commonly used commands
- Added support for Signal Studio 802.154g Wi-SUN
- Improved Seed Performance
- M9300A FPGA 1.0.1.0 available – Optional, not currently required for any new software features

Critical Fixes

- Fix enabling Modules.Reference.ProgrammableOutputTrigger properites to take effect.
- Fix to eliminate undesired Apply() performed within List.End() which previously could result in unintended signal output.

Version 1.4.405.1

Release Date: January 2014

- Fix to List mode operation with external trigger timeout enabled.

Version 1.3

Version 1.3.300.0

Release Date: October 2013

Enhancements

- Added support for Signal Studio envelop tracking waveforms, N7624B-KFP(-KTP) and N7625B-KFP(-KTP)
- Expanded Synchronization Output Trigger functions to include the use of backplane triggers 0-7
- M9311A Modulator FPGA was updated to improve trigger jitter (FPGA version 1.0.0.4)
- Added external triggering delay capability (see Modulation2.BasebandDelay and Triggers2.ExternalTrigger2.Delay)

Critical Fixes

- Fix to improve Power Search accuracy
- Fixes to improve Fixture Loss performance
- Fixes IVI Config Store to remember options and "simulate" mode
- Fix BackPlaneReferenceEnabled value to be unaffected by Reset

Version 1.2

Version 1.2.525.1

Release Date: May 2013

Critical Fixes

- Fix to prevent problems caused by simultaneous creation/initialization of the M9300 Reference when it is shared by ≥ two multi-module instruments.
- Fix to prevent the RF power from being turned on unexpectedly during the learn phase of a List.
- Fix to shorten application startup time by preventing Windows signature verification on application startup.

Version 1.2.500.0

Release Date: April 2013

Keysight IO Libraries Suite version 16.3.16603.3 or later is required for the M9381A, M9380A and M9300A products.

Enhancements

- Phase Lock Loop (PLL) Mode enhancement: The "Normal" option (default) should be adequate for most measurements. The "Best Wide Offset" option sets the M9301A Synthesizer's PLL for narrow bandwidth, which can yield better ORFS and EVM measurements for wide modulation. Note, however, that this option increases the M9301A Synthesizer's settling time by approximately 10%. Driver impact: Modules.Synthesizer.PLLMode property (IVI), Get/Set AttributeViInt32_Modules VIs (LabVIEW).
- Reference sharing enhancement: Reference Sharing is now enabled by default. The M9300A Reference module can be shared by more than one instance of the AgM938x driver. If you connect to a hardware configuration that includes a currently connected M9300A (either independently or as part of another hardware configuration) the latest instance of the AgM938x driver will take control of the M9300A. You will see no warning or error message. If you would prefer to be keep the reference control with the first instance of the AgM938x driver so that a subsequent instance will not take control of the reference module unintentionally, set the *OptionString* parameter to ShareReferenceVisaSession=0. Driver impact Initialize property (IVI), Initialize With Options VI (LabVIEW). Added enum (STATUS_EVENT_REFERENCE_STATE_CHANGED) to the Event parameter in AgM938x and AgM9300 drivers to track when sharing the Reference module across processes or sessions and the state of the module configuration was changed by another controlling entity. *(WIT 179482)*
- Garbage collection enhancement: Driver impact Added System.GcTimingOptimizationEnabled property (IVI), added GC_TIMING_OPTIMIZATION_ENABLED attribute (LabVIEW). Indicates whether the hardware driver should change the .NET garbage collector state to optimize hardware settling times. Default = TRUE. For details, see the respective driver documentation.
- IQ Arb information management enhancement: New functionality was added to get or edit parameter information in an ARB that has been uploaded into an M9381A instrument. Driver impact: Added Modulation.IQ.ArbInformation and Modulation.IQ.EditArbInformation methods (IVI), added IQ Arb Information and IQ Edit Arb Information VIs (LabVIEW).

- List management enhancement: Driver impact Added List.Exists method (IVI), added List Exists VI (LabVIEW). Enables you to check to see if a specific list exists.
- M9381A SFP enhancement: Added the Sync Output Trigger control to the M9381A SFP (Arb tab). This trigger is generated in synch with ARB playback. *(WIT 178526)*Options are:
  - None (default). No trigger is generated
  - Per Arb. The synchronization trigger is generated at the beginning of the ARB on each repetition of playing the ARB.
  - Marker n. If you would like to generate the trigger based on the marker attached to the ARB, choose Marker 1, 2, 3, or 4.

Version 1.1

Version 1.1.199.3

Release Date: December 12, 2012

Enhancements

- Changed the defaults of the Synchronization Output Trigger to be Enabled = true and Pulse Width = 1.0e-5 (10 µs).

Critical Fixes

- Fixed implementation of Driver.Modules.Item.Nonvolatile.* to avoid corrupting nonvolatile memory contents.

Version 1.1.196.2

Release Date: November 1, 2012

Enhancements

- Miscellaneous cosmetic improvements to the Soft Front Panels for enhanced usability

Critical Fixes

- Added self-test checks for more robust instrument error checking

Version 1.1.186.1

Release Date: September 26, 2012

- Minor licensing update.

Version 1.1.184.0

Release Date: August 27, 2012

- Initial public software release.

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M9300-90008
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