Agilent Technologies

M9703A Hardware Extension of 89600 VSA Software

Configuration and Measurement Instructions

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Notices

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Please refer to the Startup Guide or User Manual which was delivered with your product for safety information.

Agilent M9703A Hardware Extension of 89600 VSA Software

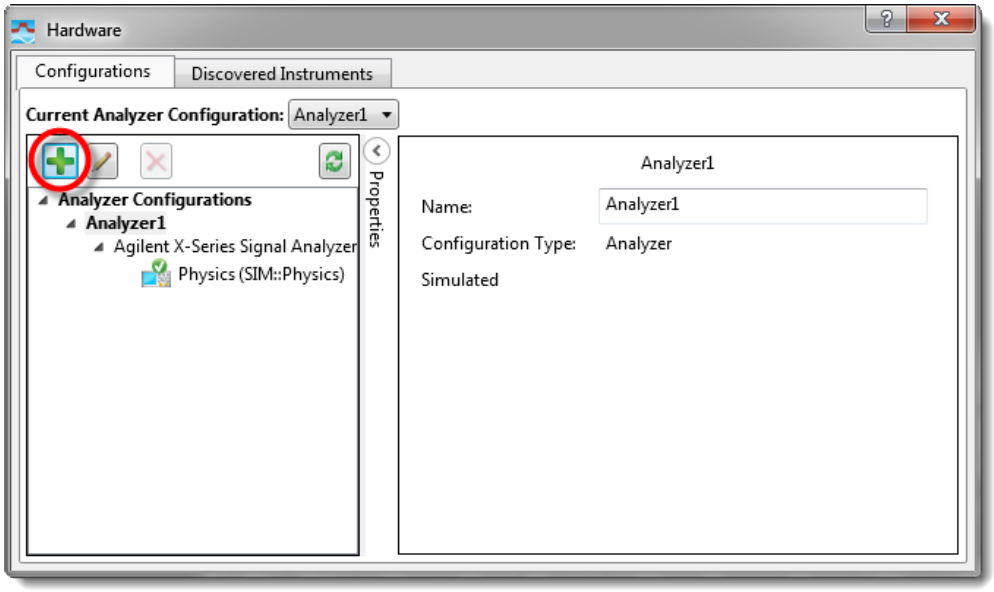
The 89601B: 89600 VSA software supports the Agilent M9703A AXIe High-Speed Digitizer. This VSA measurement hardware configuration offers broadband vector signal analyzer measurements up to 625 MHz of analysis bandwidth (model dependent).

Model	Bandwidth
M9703A-SR1	390 MHz
M9703A-SR2	625 MHz

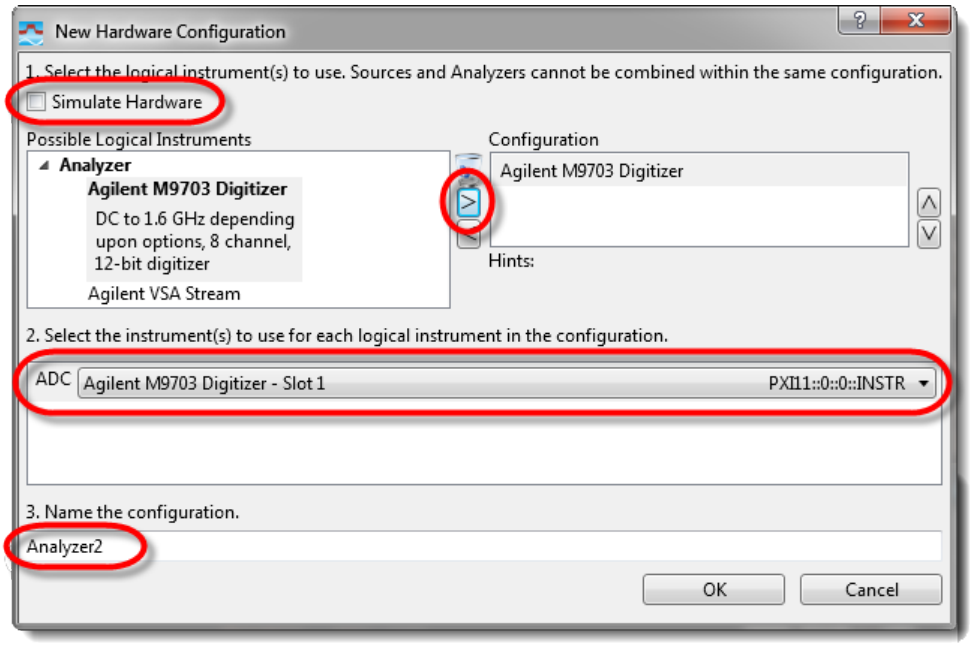
NOTE That the M9703A is not supported by the earlier 89601A VSA software, neither by the 32-bit version of the current software i.e. You must use the 64-bit version of the 89600 VSA software with M9703A.

Configuring the 89600 VSA software application to use the M9703A hardware

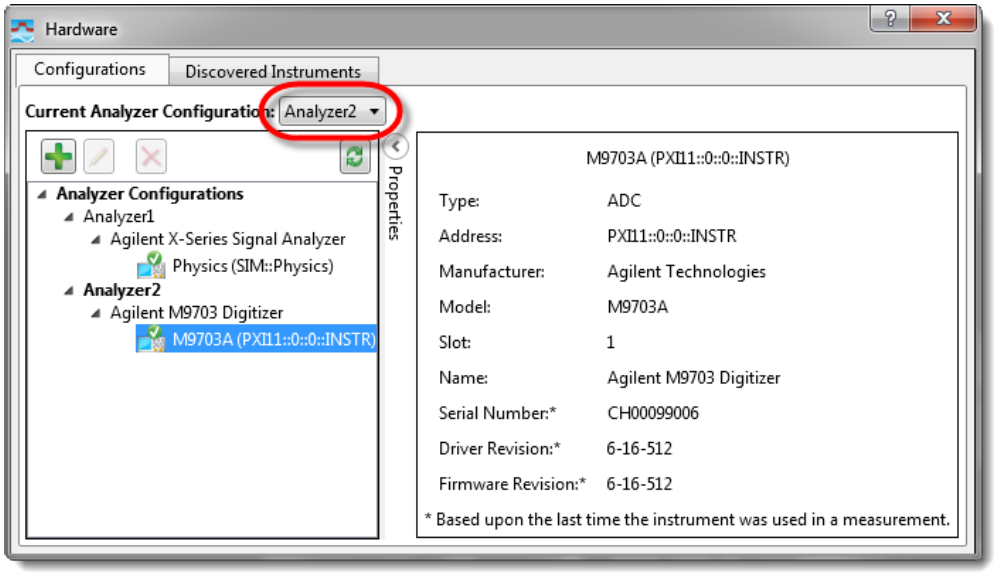
1. Start the 64-bit version of the 89600 VSA software application.
2. Configure the M9703A digitizer as the VSA measurement input by creating an *'Analyzer Configuration'* that uses the M9703A digitizer as the *Logical Instrument* (ADC) by performing the following steps:
   a. From the menu, go to **Utilities** > **Hardware** > **Configurations**, and click on **Add New Configuration** button ( ). This will open the 'New Hardware Configuration' dialog.



   b. De-select 'Simulate Hardware' if it is selected.
   c. Select the M9703A digitizer from the list of *'Possible Logical Instrument'* and drag it or click on the > button to add it to the *'Configuration'* box.



d. In the box below ensure that M9703A appears as the 'ADC' entry, and if you have more than one M9703A connected - select the required unit using the drop-down list.
e. You may either use the default name or specify another name for this analyzer configuration.
f. Click OK to close the *'New Hardware Configuration'* dialog.
g. But before closing the 'Hardware Configurations' dialog, use the **Current Analyzer Configuration** drop-down to select the newly created *M9703A Digitizer* as the current item.



3. Review and configure the Measurement Setup Parameters.

Multi-Channel Measurements

When using the M9703A digitizer in VSA configuration, the digitizer forms the measurement front-end data acquisition hardware for the 89600 VSA software. The M9703A digitizer supports single channel I+jQ, multi-channel Dual I + jQ, and cross channel measurement configurations. The analysis bandwidth and maximum sample rate depend on whether the digitizer model is M9703A-SR1 or M9703A-SR2.

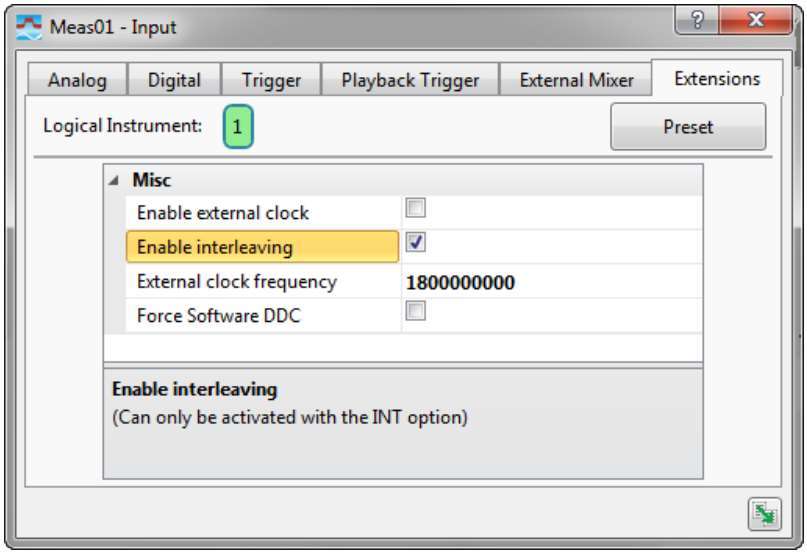
Interleaved Mode

The option of using two channels of the M9703A in Interleaved mode is provided if your product has been ordered with the -INT option. This in effect provides double the sampling rate with the trade-off of halving the available center frequency range. As shown in the table:

Mode	Model Option	Center Frequency Range	Sampling Rate
Normal (Non-Interleaved)	-SR1	0 - 1 GHz	1 GS/s
	-SR2	0 - 1.6 GHz	1.6 GS/s
Interleaved	-SR1	0 - 1 GHz	2 GS/s
	-SR2		3.2 GS/s

NOTE For best measurement fidelity you should ensure that the center frequency + analog bandwidth/2 does not cross the Nyquist frewquency.

Interleaved mode may be enabled by opening the **Input** > **Extensions..** window from the menu bar. Then select the **Enable Interleaving** option, changes are applied immediately.



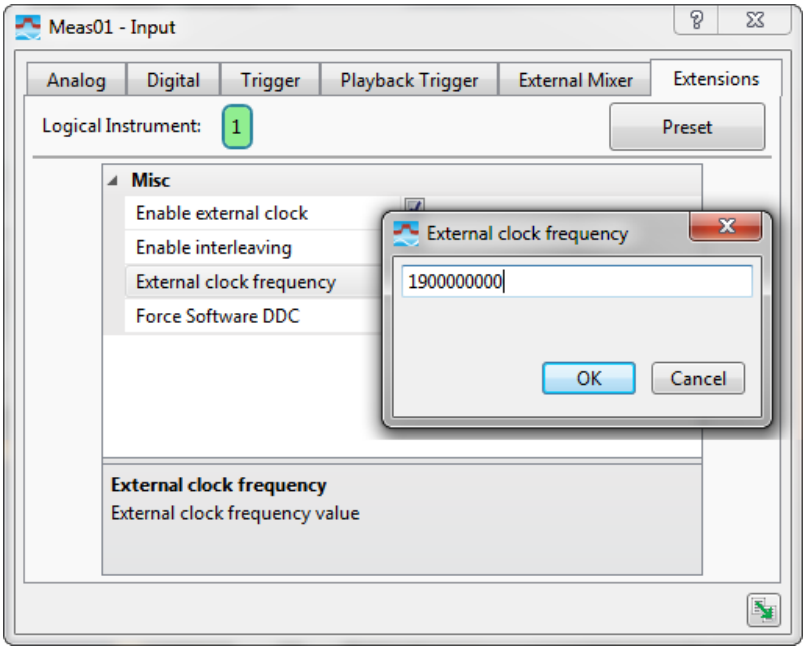
External Clock

The option of using an external sampling clock is provided. This clock must be continuously present if the mode is selected otherwise an error will occur. The range of clock input frequency is model dependent, as shown in the table below:

Model option	Frequency Range
-SR1 models	1.8 to 2 GHz
-SR2 models	1.8 to 3.2 GHz

To use this option, first connect an external clock signal in the accepted range to the CLK IN connector on the M9703A front panel. The signal must be in the range +5 to +15 dBm.

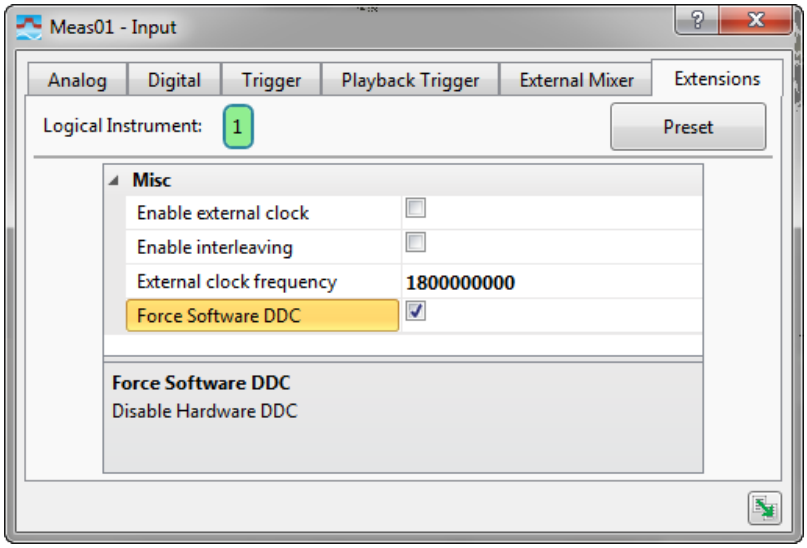
Then open the **Input** > **Extensions...** window from the menu bar. Select the **Enable external clock option**, and double click the **External clock frequency** value to bring up the editing window. You may then set the value of the external clock frequency being applied. As shown below:



Force Software DDC

This function overrides the hardware processing which is normally performed by the M9703A, and forces the VSA software to perform the DDC operation. It is provided simply as a demonstration of the difference in performance between hardware DDC and software.

It can be enable as shown in the screen capture below by ticking the **Force Software DDC** option.



Measurement Setup Parameters

This section provides measurement and parameter setup information which are specific to the 89600 VSA software when used along with the M9703A AXIe High-Speed Digitizer. This information will help you to properly setup the VSA in this hardware configuration to make measurements using the M9703A digitizer.

Measurement Setup Parameters:

Alignment / Calibration	Preset
Channels	Range
Connection	Recording
Coupling	Setup Save/Recall
Center Frequency Limits	Span
Frequency Counter	Trigger Holdoff
Hardware	Triggering
Overlap	

Alignment/Calibration: If required, an internal calibration may be performed. Note that this operation may require several minutes to complete. Accessed from the menu **Utilities > Calibration**.

Channels: From the menu **Input > Channels**, available options:

- 1 channel through 8 channels,
- I+jQ (IN1+jIN2)
- Dual I+jQ (IN1+jIN2, IN3+jIN4)
- Triple I+jQ (IN1+jIN2, IN3+jIN4, IN5+jIN6)
- Quad I+jQ (IN1+jIN2, IN3+jIN4, IN5+jIN6, IN7+jIN8)

The custom channel configuration may be used to specify a non-standard mapping between the digitizer input and the VSA logical channel. The default mapping of logical channel to digitizer input is:

Logical Channel	Digitizer Input
1	IN1
2	IN3
3	IN5
4	IN7
5	IN2
6	IN4
7	IN6
8	IN8

From the menu **Input > Analog** the following parameters can be set:

Range: The M9703A digitizer has two range settings: 2 V (10 dBm) and 1 V (4 dBm).
Coupling: DC
Input Impedance: 50 Ohms.

Connection: Single Ended.

The frequency measurement parameters may be configured from the **MeasSetup > Frequency** menu.

Frequency:

Digitizer Model	Band	Center	Span	Start	Stop
M9703A-SR1	0 to 390.625 MHz	195.3125 MHz	390.625 MHz	0	390.625 MHz
M9703A-SR2	0 to 625 MHz	312.5 MHz	625 MHz	0	625 MHz

Span: The maximum span is dependent upon the maximum sample rate of the particular M9703A digitizer model.

Model	Max span
M9703A-SR1	390.625MHz
M9703A-SR2	625 MHz

ResBW: 3 MHz

Main Time Length: 1.273125 µs

Center Frequency Limits: The limits depend on which model you are using:

Model	Limits
M9703A-SR1	0 to 1.0 GHz
M9703A-SR2	0 to 1.6 GHz

Frequency Counter: Not available.

Trigger settings may be accessed via the **Input > Trigger** menu:

The following trigger parameters are available:

- **Style:** Free Run, External, and Magnitude*
- **Slope:** available for External and Magnitude*
- **Level:** available for External and Magnitude*
- **Delay:** available for External and Magnitude*

Trigger levels:

Trigger Type	Level	Default
External	-5 V to +5 V	2V
Magnitude*	0 to 1.414 V	10 mV

*M9703A-DDC option is required for Magnitude triggering.

Trigger Holdoff: The trigger holdoff is not supported by the M9703A digitizer.

Soft Front Panel Control: The 'Disconnect' feature can be used to pause the VSA and release its control of the M9703A digitizer. Then the digitizer can be used independently from the VSA, for example, using the MD1 SFP

application. Independent control must be released before resuming VSA measurements. When returning to the VSA and starting or resuming a measurement, the VSA will restore the digitizer state that was set before disconnected.

Hardware: Set up an Analyzer Configuration with the M9703A digitizer as the Logical Instrument, as described in Measurement Configuration Setup.

Overlap: The M9703A digitizer does not support overlap processing. However, overlap processing is available during recording playback.

Preset: The default parameter settings that are different from the 'Preset Setup' settings are listed below. (Any parameters not listed here are set to the same value as Preset Setup.)

Recording: the VSA application enables time data recording from the M9703A digitizer to the PC's disk drive. The length of time waveform recording is limited by the memory available on the M9703A digitizer.

Setup Save/Recall: The M9703A digitizer state is not saved when the VSA application is closed. When a setup is recalled into the VSA, the M9703A digitizer state is set appropriately based on the recalled VSA setup.