



Phase Coherent MIMO Acquisition and Generation Measurement System

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Introduction

Measurement system designed for multi channel phase-coherent RF signal acquisition and multi channel phase-coherent RF signal generation . This measurement system allows to continuously record the signal with 50 MHz bandwidth and play back the signal with 100 MHz bandwidth, which can be use for recording in electromagnetic environment and for further playback in laboratory conditions.

Application

This measurement system can be used in the following fields:

- Measurement of the delay line
- Calibration of the active antenna array
- Imitation radio environment



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Phase-coherent MIMO generation measurement system

This measurement system designed for multi channel phase-coherent RF signal generation.



<i>Phase -coherent MIMO generation measurement system</i>			
<i>Number of channels</i>			
Minimum	2		
Maximum	can be modified up to necessary number of channels		
<i>Frequency range</i>			
Minimum	85 MHz		
Maximum	6,6 GHz <i>by using RF vector signal generator NI PXIe-5673E</i>	12 GHz <i>by using upconverter</i>	26 GHz <i>by using upconverter</i>
<i>Phase mismatch</i>	Less than 0.1°		

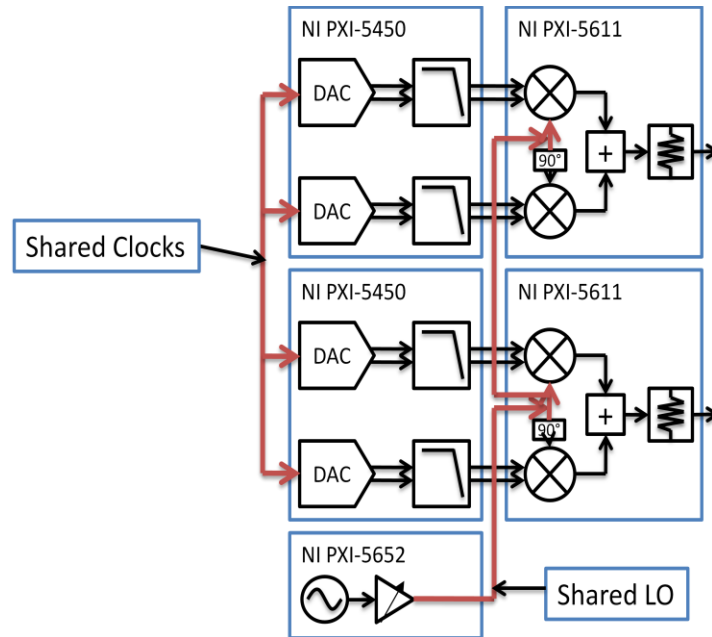
Phase-Coherent RF Signal Generation

The configuration of any phase-coherent RF system requires synchronization of every clock signal present on the devices. Figure illustrates the basic architecture of a two-

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channel RF vector signal generator. Note that both baseband sample clock and the local oscillators (LOs) must be shared between both channels.



Phase-coherent MIMO acquisition measurement system

This measurement system designed for multi channel phase-coherent RF signal acquisition.





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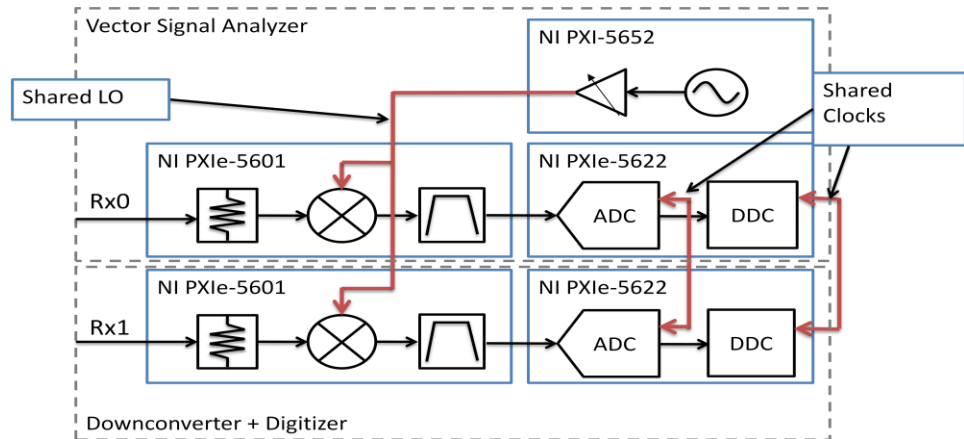
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Phase-coherent MIMO acquisition measurement system				
Number of channels				
Minimum	2			
Maximum	can be modified up to necessary number of channels			
Frequency range				
Minimum	20 Hz			
Maximum	6,6 GHz by using RF vector signal analyzer NI PXIe-5663E	7 GHz by using RF vector signal analyzer NI PXIe-5667	14 GHz by using RF vector signal analyzer NI PXIe-5665	26.5 GHz by using NI Phase Matrix 26.5 GHz
Phase mismatch				
Less than 0.1°				

Phase-coherent RF signal acquisition

When configure RF vector signal analyzer for phase-coherent RF signal acquisition, you must ensure that both LO and baseband/intermediate frequency (IF) signal are synchronized. Figure illustrates the basic architecture of a two-channel RF vector signal analyzer.





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Software

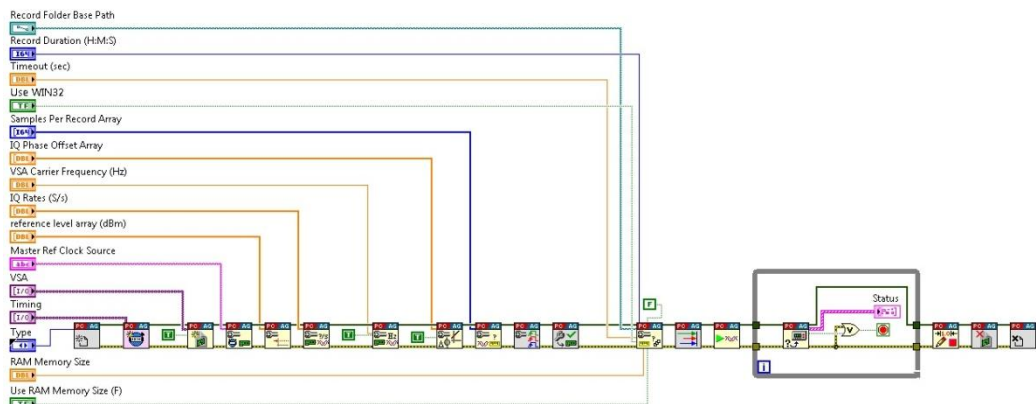
Software is developed in the LabVIEW graphical programming environment.

Software consist of:

- Phase Coherent MIMO Acquisition and Generation (PCAG) Toolkit
- Software for analyze (PCAG VSA Front Panel)
- Software for generation (PCAG VSG Front Panel)

Phase coherent MIMO acquisition and generation toolkit (PCAG Toolkit)

Phase Coherent MIMO Acquisition and Generation (PCAG) Toolkit is a driver library, which you can used with NI hardware and make phase coherent generation and/or acquisition of RF signals.



Software for analyze (PCAG VSA Front Panel)

PCAG VSA Front Panel performs coherent acquisition and analysis of RF signals and:

- Displays the signals on various graphs (I/Q versus Time, I versus Q, Power versus Time, Phase versus Time, Phase Delta versus Time, Power Spectra) Displaying of the phase difference
- Displays the phase difference
- Saves the file after calibration of channels
- Records and saves the file after data acquisition
- Operates the PCAG VSA Front Panel and downconverter jointly

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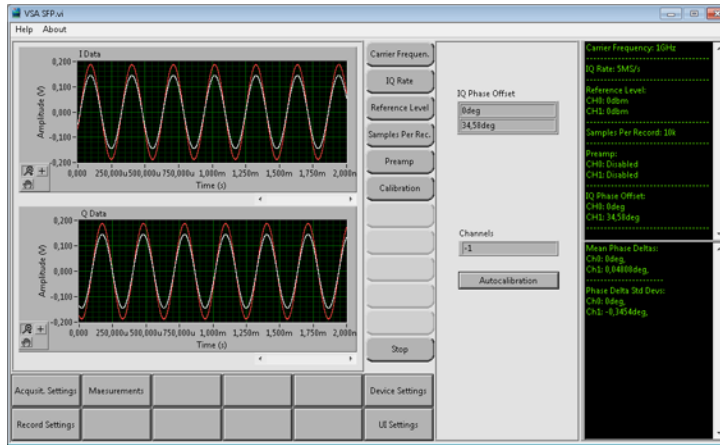
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Software for generation (PCAG VSG Front Panel)

PCAG VSG Front Panel performs coherent generation of RF signals for:

- Continuous waveform signal generation
- Arbitrary waveform generation
- Generation of signal with parameters read from the recorded file
- Joint operation of PCAG VSG Front Panel and upconverter

