ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *National Instruments PXIe-5663E* at our website: *Click HERE*

GETTING STARTED GUIDE

NI PXIe-5663E

6.6 GHz RF Vector Signal Analyzer with Digital Downconversion

Note Before you begin, install and configure your chassis and controller.

This document explains how to install, configure, and test the NI 5663E. The NI 5663E is a modular 6.6 GHz RF vector signal analyzer (VSA) with digital downconversion. The NI 5663E ships with the NI-RFSA instrument driver, which you use to program the device. You can also use NI-RFmx, available at *ni.com/downloads*, to program the device.

The NI 5663E comprises the following devices:

- NI PXIe-5601 (NI 5601) RF downconverter module
- NI PXIe-5622 (NI 5622) IF digitizer module
- NI PXIe-5652 (NI 5652) LO source module

Caution The protection provided by this product may be impaired if it is used in a manner not described in this document.

Hot Surface If the NI 5663E has been in use, it may exceed safe handling temperatures and cause burns. Allow the NI 5663E to cool before removing it from the chassis.

Contents

Electromagnetic Compatibility Guidelines....2
Verifying the System Requirements....2
Unpacking the Kit....2
    Verifying the Kit Contents....4
Preparing the Environment....5
Choosing and Installing the Software....5
    Software Options....5
    Installing the Software....6
Installing the NI 5663E....7
    Interconnecting the NI 5663E Modules....8
Configuring the NI 5663E in MAX....18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Locating the Software and Examples....20
Software Locations....20
Programming Examples Locations....22
Troubleshooting....23
Installation....23
Configuration....24
Measurements....25
Where to Go Next....26
Worldwide Support and Services....26

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Caution To ensure the specified EMC performance, operate this product only with cables less than 3 meters in length.

Verifying the System Requirements

To use the NI 5663E, your system must meet certain requirements. For more information about minimum system requirements, recommended system, and supported application development environments (ADEs), refer to the readme, which is available on the software media or online at *ni.com/updates*.

Unpacking the Kit

Caution To prevent electrostatic discharge (ESD) from damaging the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis.

1. Touch the antistatic package to a metal part of the computer chassis.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2. Remove the device from the package and inspect the device for loose components or any other sign of damage.



Caution Never touch the exposed pins of connectors.



Note Do not install a device if it appears damaged in any way.

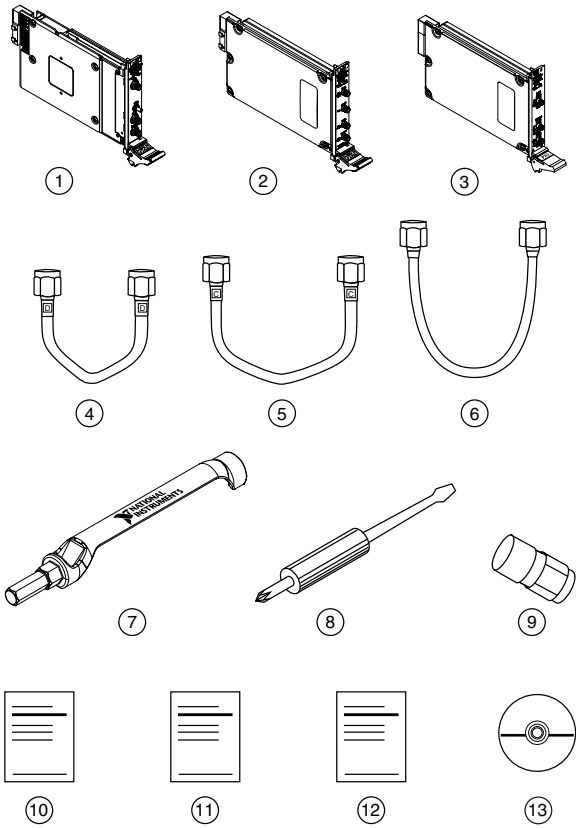
3. Unpack any other items and documentation from the kit.

Store the device in the antistatic package when the device is not in use.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Verifying the Kit Contents

Figure 1. NI 5663E Kit Contents



1. NI 5601 RF Downconverter Module
2. NI 5622 IF Digitizer Module
3. NI 5652 LO Source Module
4. Short, Semi-Rigid SMA-to-SMA Cable, Labeled D, Part Number 198776A-01
5. Medium, Semi-Rigid SMA-to-SMA Cable, Labeled C, Part Number 198775A-01
6. Flexible SMA-to-SMA Cable, Part Number 190412B-03
7. SMA Driver Bit, Part Number 190487A-01
8. Screwdriver, Part Number 772006-01
9. 50 Ω Termination Load, Part Number 778353-01, Connected to the NI 5601 LO OUT Terminal
10. Read Me First: Safety and Electromagnetic Compatibility
11. Maintain Forced-Air Cooling Note to Users
12. NI PXIe-5663E Getting Started Guide (This Document)
13. Driver Software DVD

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Other Equipment

There are several required items not included in your device kit that you need to install or operate the NI 5663E.

Required Items

- A PXI Express chassis and chassis documentation. The NI PXIe-1075 chassis is one available option for your device. For more information about compatible chassis options, refer to *ni.com*.
- A PXI Express embedded controller or MXI controller system that meets the system requirements specified in this guide and chassis documentation.

Optional Items

- A 1 N · m standard SMA torque wrench (NI part number 780487-01).

Preparing the Environment

Ensure that the environment you are using the NI 5663E in meets the following specifications.

Operating ambient temperature (IEC 60068-2-1, IEC 60068-2-2)	0 °C to 55 °C
Operating relative humidity (IEC 60068-2-56)	10% to 90%, noncondensing
Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

Caution Clean the hardware with a soft, nonmetallic brush or lint free cloth. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Note Refer to the *NI PXIe-5663E Specifications* at *ni.com/manuals* for complete specifications.

Choosing and Installing the Software

Software Options

NI provides several software options for the NI 5663E—NI-RFmx, the NI-RFSA instrument driver software, and the NI-RFSA Soft Front Panel (SFP).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 1. NI 5663E Software Options

Software Option	Description	Use Case
NI-RFmx	Provides a single-handle instrument driver with built-in measurements.	Use NI-RFmx SpecAn to perform spectral measurements. Use NI-RFmx Demod to perform modulation quality measurements, such as EVM. Use NI-RFmx cellular personalities to perform physical layer measurement analysis on supported cellular signals.
NI-RFSA instrument driver	The NI-RFSA APIs each provide a fixed API for interacting with your NI 5663E device. NI-RFSA provides standard IVI-based functionality needed for most vector signal analyzer applications.	Use NI-RFSA to create custom measurements or applications that require I/Q data. Use NI-RFSA along with the NI Modulation Toolkit to analyze modulated signals to test receivers.
NI-RFSA SFP	Controls, analyzes, and presents data similar to stand-alone RF vector signal analyzers. The NI-RFSA SFP operates on the PC, so it provides processing, storage, and display capabilities.	Use the NI-RFSA SFP to interactively acquire data.

Installing the Software

You must be an Administrator to install NI software on your computer.

1. Install an ADE, such as LabVIEW or LabWindows™/CVI™.
2. Insert the driver software media into your computer. The installer should open automatically.

   If the installation window does not appear, navigate to the drive, double-click it, and double-click `autorun.exe`.
3. Follow the instructions in the installation prompts.

   Note Windows users may see access and security messages during installation. Accept the prompts to complete the installation.
4. When the installer completes, select **Restart** in the dialog box that prompts you to restart, shut down, or restart later.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the NI 5663E

Caution To prevent damage to the NI 5663E caused by ESD or contamination, handle the module using the edges or the metal bracket.

You must install NI-RFSA before installing the hardware.

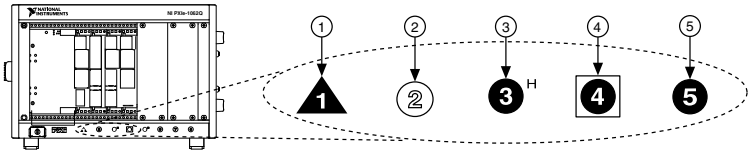
Before you install the hardware, refer to the guidelines in the *Maintain Forced-Air Cooling Note to Users* included with the module to ensure that the device can cool itself effectively.

To use the included cables, you must install the NI 5622 IF digitizer module immediately to the right of the NI 5601 RF downconverter module, and you must install the NI 5652 LO source module immediately to the left of the NI 5601 RF downconverter module.

1. Ensure the AC power source is connected to the chassis before installing the module.

   The AC power cord grounds the chassis and protects it from electrical damage while you install the module.
2. Power off the chassis.
3. Inspect the slot pins on the chassis backplane for any bends or damage prior to installation. Do not install a module if the backplane is damaged.
4. Remove the black plastic covers from all the captive screws on the module front panel.
5. Identify a supported slot in the chassis. The following figure shows the symbols that indicate the slot types.

Figure 2. Chassis Compatibility Symbols

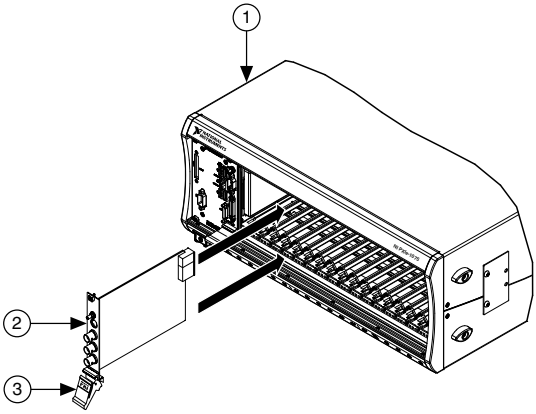


1. PXI Express System Controller Slot
2. PXI Peripheral Slot
3. PXI Express Hybrid Peripheral Slot
4. PXI Express System Timing Slot
5. PXI Express Peripheral Slot

   NI 5663E modules can be placed in PXI Express peripheral slots, PXI Express hybrid peripheral slots, or PXI Express system timing slots.
6. Touch any metal part of the chassis to discharge static electricity.
7. Ensure that the ejector handle is in the downward (unlatched) position.
8. Place the module edges into the module guides at the top and bottom of the chassis. Slide the module into the slot until it is fully inserted.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Figure 3. Module Installation



1. Chassis
2. Hardware Module
3. Ejector Handle in Downward (Unlatched) Position

9. Latch the module in place by pulling up on the ejector handle.
10. Secure the module front panel to the chassis using the front-panel mounting screws.

Note Tightening the top and bottom mounting screws increases mechanical stability and also electrically connects the front panel to the chassis, which can improve the signal quality and electromagnetic performance.

11. Cover all empty slots using filler panels or fill using slot blockers to maximize cooling air flow.
12. Power on the chassis.

Related Information

Installing the Software on page 6

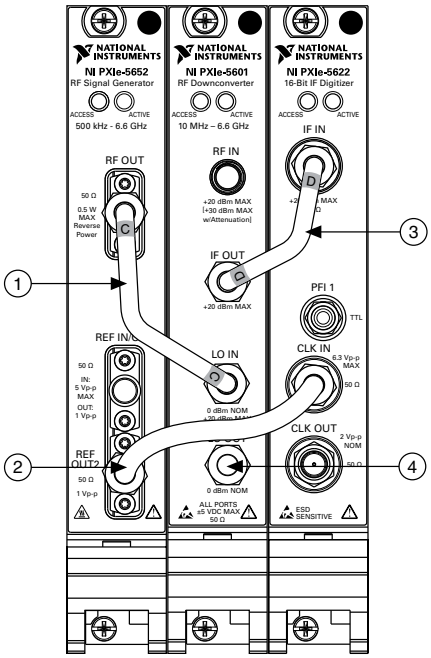
Interconnecting the NI 5663E Modules

Caution The signal pins of this product's input/output ports can be damaged if subjected to ESD. To prevent damage, remove power from the product before

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

connecting cables and employ industry-standard ESD prevention measures during installation, maintenance, and operation.

Figure 4. NI 5663E Front Panel Interconnection



1. Medium, Semi-Rigid SMA-to-SMA Cable, Labeled C
2. Flexible SMA-to-SMA Cable
3. Short, Semi-Rigid SMA-to-SMA Cable, Labeled D
4. 50 Ω Termination Load

1. Using the center pin of a medium semi-rigid SMA-to-SMA cable labeled C, connect the RF OUT connector on the NI 5652 LO source front panel to the LO IN connector on the NI 5601 RF downconverter front panel.
2. Using the center pin of a flexible SMA-to-SMA cable, connect the REF OUT2 connector on the NI 5652 LO source front panel to the CLK IN connector on the NI 5622 IF digitizer front panel.
3. Using the center pin of a short semi-rigid SMA-to-SMA cable labeled D, connect the IF OUT connector on the NI 5601 front panel to the IF IN connector on the NI 5622 IF digitizer front panel.
4. Hand-tighten all SMA cable ends on the SMA connectors after the cable center pins are correctly aligned and connected. The cable connectors should tighten without much torque or effort. If a cable bends due to incorrect alignment, remove the cable from the front panel connector and reconnect the cable center pin on the SMA cable to the SMA connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. Carefully complete tightening all SMA connectors to 1 N · m using an appropriate torque wrench (not included) or torque screwdriver and SMA driver bit. Tighten only until the wrench clicks.

   Caution Incorrect torque at SMA connections can degrade signal fidelity and phase-locked loop (PLL) performance and may cause insertion loss. Use an appropriate torque wrench or torque screwdriver and SMA driver bit to ensure all SMA connections are properly torqued. SMA connectors for connections to external equipment may require torque different from 1 N · m, depending on the connector type, material, and manufacturer.

6. Power on the PXI Express chassis and controller system.
7. Verify that the ACCESS LED is on for all modules.

Related Information

Troubleshooting on page 23

If an issue persists after you complete a troubleshooting procedure, contact NI technical support or visit *ni.com/support*.

Refer to the NI RF Vector Signal Analyzers Help for more information about how to connect the NI 5663E using an external clock, how to connect multiple NI 5663E modules, or how to connect the NI 5663E to the NI PXIe-5673E RF vector signal generator.

Direct Connections to the NI 5601

The NI 5601 is a precision RF instrument that is sensitive to ESD and transients. Ensure you are making proper direct connections to the NI 5601 to avoid damaging the device.

Caution Apply external signals only while the NI 5601 is powered on. Applying external signals while the device is powered off may cause damage.

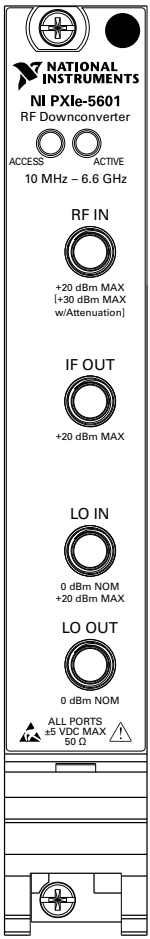
- Ensure you are properly grounded when manipulating cables or antennas connected to the NI 5601 RF IN connector.
- If you are using noninsulated devices, such as an RF antenna, ensure the devices are maintained in a static-free environment.
- If you are using an active device, such as a preamplifier or switch routed to the NI 5601 RF IN connector, ensure that the device cannot generate signal transients greater than the RF and DC specifications of the NI 5601 RF IN connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NI 5601 RF Downconverter Module Front Panel

The NI 5601 RF downconverter module front panel contains four connectors and two LEDs.

Figure 5. NI 5601 RF Downconverter Module Front Panel



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 2. Device Front Panel Icon Definitions

	Refer to the user documentation for required maintenance measures to ensure user safety and/or preserve the specified EMC performance.
	The signal pins of this product's input/output ports can be damaged if subjected to ESD. To prevent damage, turn off power to the product before connecting cables and employ industry-standard ESD prevention measures during installation, maintenance, and operation.

Table 3. NI 5601 RF Downconverter Module Front Panel Connectors

Connector	Use
RF IN	Connects to the analog RF input signal to be measured by the NI 5663.
IF OUT	Connects to the IF IN connector on the NI 5622 IF digitizer module front panel. This connector is the output terminal for the frequency-translated IF signal for digitization.
LO IN	Connects to the RF OUT connector on the NI 5652 LO source front panel. This connector is the input terminal for the LO source.
LO OUT	Exports the signal received at LO IN to other NI 5601 modules for multichannel systems. This connector enables phase coherent operation of multiple devices by allowing the use of a common LO signal when daisy-chaining the signal to other NI 5601 RF downconverters. When not in use, connect a 50 Ω termination load to LO OUT.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 4. NI 5601 RF Downconverter Module Front Panel LEDs

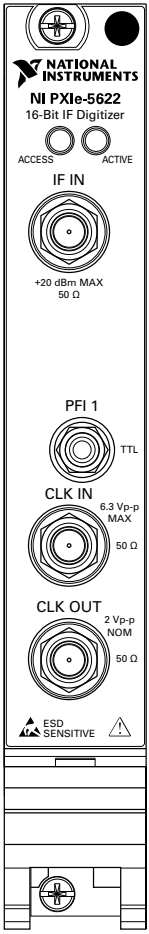
LED	Indications
ACCESS	Indicates the basic hardware status of the module. OFF—The module is not yet functional, or the module has detected a problem with a +3.3 V power rail. AMBER—The module is being accessed. *Accessed* means that the device setup registers are being written to in order to control the device. GREEN—The module is ready to be programmed by NI-RFSA.
ACTIVE	Indicates the module state. OFF—The module is in a state other than thermal shutdown or power supply failure. RED—The module has detected an error state. An error state may indicate the module has exceeded approved operating temperature and thermal shutdown has occurred or that the module has detected a power supply failure. If the power supply fails, contact NI technical support.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NI 5622 IF Digitizer Module

The NI 5622 IF digitizer module front panel contains four connectors and two LEDs.

Figure 6. NI 5622 IF Digitizer Module Front Panel



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 5. Device Front Panel Icon Definitions

	Refer to the user documentation for required maintenance measures to ensure user safety and/or preserve the specified EMC performance.
	The signal pins of this product's input/output ports can be damaged if subjected to ESD. To prevent damage, turn off power to the product before connecting cables and employ industry-standard ESD prevention measures during installation, maintenance, and operation.

Table 6. NI 5622 IF Digitizer Module Front Panel Connectors

Connector	Use
IF IN	Connects to the IF OUT connector on the NI 5601 RF downconverter module front panel. This connector is the input terminal for a frequency-translated IF waveform from the NI 5601 RF downconverter for digitization and measurement.
CLK IN	Connects to the REF IN/OUT connector on the NI 5652 LO source module front panel. This connector is the input terminal for the Reference Clock or Sample Clock.
CLK OUT	This connector is the output terminal for the NI 5622 Reference Clock or Sample Clock.
PFI 1	This connector receives a digital trigger from an external source.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 7. NI 5622 IF Digitizer Module Front Panel LEDs

LED	Indication
ACCESS	Indicates the basic hardware status of the module. OFF—The module is not yet functional, or the module has detected a problem with a power rail. AMBER—The module is being accessed. *Accessed* means that the device setup registers are being written to in order to control the device. GREEN—The module is ready to be programmed by NI-RFSA.
ACTIVE	Indicates the module state. OFF—The module is in a quiescent state. AMBER—The module is waiting for the Advance Trigger from the configuration list. GREEN—The module is triggered and is running a step from the configuration list. RED—The module has detected an error state. An error state may indicate the module has exceeded approved operating temperature and thermal shutdown has occurred or that the module has detected a power supply failure. If the power supply fails, contact NI technical support.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NI 5652 LO Source Module

The NI 5652 LO source module contains three connectors and two multicolor LEDs.

Figure 7. NI 5652 RF Signal Generator Module Front Panel

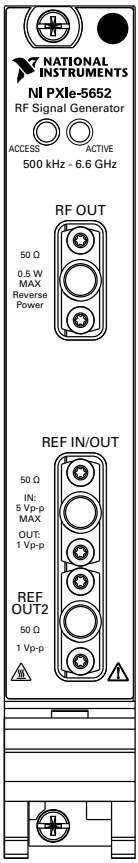


Table 8. Device Front Panel Icon Definitions

⚠	Refer to the user documentation for required maintenance measures to ensure user safety and/or preserve the specified EMC performance.
♨	If this device has been in use, it may exceed safe handling temperatures and cause burns. Allow the device to cool before removing it from the chassis.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 9. NI 5652 RF Signal Generator Module Front Panel Connectors

Connector	Use
RF OUT	Output terminal for the RF signal at the requested frequency and power level.
REF IN/OUT	Routes a frequency reference signal to or from the NI 5652 module. This connector can be configured as an external frequency reference input or as an output for the onboard 10 MHz Reference Clock.
REF OUT2	Routes a frequency reference signal from the NI 5652 module.

Table 10. NI 5652 RF Signal Generator Module Front Panel LEDs

LED	Indications
ACCESS	Indicates the basic hardware status of the NI 5652 module. OFF—The module is not yet functional or has detected a problem with a power rail. AMBER—The module is being accessed. *Accessed* means that the device setup registers are being written to in order to control the device. GREEN—The module is ready to be programmed.
ACTIVE	Indicates the state of the NI 5652 module. OFF—The module is not generating a signal. AMBER—The module PLLs are attempting to lock. GREEN—The module is generating a signal; applicable PLLs are locked. RED—The module has detected an error state; this may indicate a PLL lock failure or a thermal shutdown condition.

Configuring the NI 5663E in MAX

Use Measurement & Automation Explorer (MAX) to configure your NI hardware. MAX informs other programs about which NI hardware products are in the system and how they are configured. MAX is automatically installed with NI-RFSA.

1. Launch MAX.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2. In the configuration tree, expand **Devices and Interfaces** to see the list of installed NI hardware.

   Note If you are using the NI 5663E with the LabVIEW Real-Time Module, expand **Remote Systems**. Find your target IP address or name, expand it, and then expand **Devices and Interfaces**.

   Installed modules appear under the name of their associated chassis.
3. Expand your **Chassis** tree item.

   MAX lists all modules installed in the chassis. Your default names may vary.

   Note If you do not see your module listed, press <F5> to refresh the list of installed modules. If the module is still not listed, power off the system, ensure the module is correctly installed, and restart.
4. Record the identifier MAX assigns to the hardware. Use this identifier when programming the NI 5663E.
5. Associate the hardware modules that comprise your device.
   a) Select the NI 5601 that is identified as not configured in the configuration tree.
   b) In the Associated Devices section, select the appropriate module from each system component drop-down listbox.

      For the NI 5663E, you must associate the NI 5622 IF digitizer module and the NI 5652 LO source module with the NI 5601 RF downconverter.
   c) Click **Save** in the MAX toolbar.

   Note Module associations may be lost when you move the modules to different chassis slots.
6. Self-test the device modules by selecting the modules in the configuration tree, and clicking **Self-Test** in the MAX toolbar. Repeat this step for all modules in your NI 5663E system.

   The MAX self-test performs a basic verification of hardware resources.

Related Information

Troubleshooting on page 23
If an issue persists after you complete a troubleshooting procedure, contact NI technical support or visit *ni.com/support*.

Interconnecting the NI 5663E Modules on page 8

Refer to the NI RF Vector Signal Analyzers Help for more information about renaming devices.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Locating the Software and Examples

Software Locations

Table 11. Locations of NI-RFmx Software

ADE	Location
LabVIEW	Available on the LabVIEW Functions palette at **Measurement I/O»NI-RFmx**.
LabWindows/CVI	NI-RFmx functions are available from the LabWindows/CVI **Library** menu at **Library»RFmx SpecAn Library** and **Library»RFmx Demod Library**.
Microsoft Visual C/C++	Use the header files located in the *<NIDir>*\Shared\ExternalCompilerSupport\C\include directory and import library files located in one of the following directories: • Windows 10 (32-bit)/8.1 (32-bit)/7 (32-bit)—*<NIDir>*\Shared\ExternalCompilerSupport\C\include • Windows 10 (64-bit)/8.1 (64-bit)/7 (64-bit): – 32-bit installation—*<NIDir>*\Shared\ExternalCompilerSupport\C\lib32\msvc – 64-bit installation—*<NIDir>*\Shared\ExternalCompilerSupport\C\lib64\msvc where *<NIDir>* is one of the following locations: • Windows 10 (32-bit)/8.1 (32-bit)/7 (32-bit)—Program Files\National Instruments • Windows 10 (64-bit)/8.1 (64-bit)/7 (64-bit)—Program Files (x86)\National Instruments
Microsoft .NET	For the location of .NET class libraries, refer to the installed NI-RFmx readme.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 12. Locations of NI-RFSA and NI-RFSA SFP Software

Software Option	ADE	Location
NI-RFSA	LabVIEW	Available on the LabVIEW Functions palette at **Measurement I/O»NI-RFSA**.
	LabWindows/CVI	Available in the *<IVIROOTDIR32>*\Drivers\niRFSA directory, where *<IVIROOTDIR32>* is one of the following locations: • Windows 10 (32-bit)/8.1 (32-bit)/7 (32-bit)—Program Files\IVI Foundation\IVI • Windows 10 (64-bit)/8.1 (64-bit)/7 (64-bit)—Program Files (x86)\IVI Foundation\IVI
	Microsoft Visual C/C++	Use the header files located in the *<IVIROOTDIR32>*\Include directory and import library files located in the *<IVIROOTDIR32>*\Lib directory, where *<IVIROOTDIR32>* is one of the following directories: • Windows 10 (32-bit)/8.1 (32-bit)/7 (32-bit)—Program Files\IVI Foundation\IVI • Windows 10 (64-bit)/8.1 (64-bit)/7 (64-bit)—Program Files (x86)\IVI Foundation\IVI
	Microsoft .NET	To use the .NET API, you must install the .NET class libraries. For download and installed file locations, visit *ni.com/info* and enter Info Code NETAPIdriversupport.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 12. Locations of NI-RFSA and NI-RFSA SFP Software (Continued)

Software Option	ADE	Location
NI-RFSA SFP	LabVIEW	Available from the Start Menu at **Start»All Programs»National Instruments»NI-RFSA» NI-RFSA Soft Front Panel**.

Related Information

Refer to the Getting Started with NI-RFSA section of the NI RF Vector Signal Analyzers Help for detailed instructions about how to acquire data in a specific ADE.

Refer to the Creating an Application with Microsoft Visual C and C++ topic of the NI RF Vector Signal Analyzers Help if you prefer to manually add all required include and library files to the project.

Programming Examples Locations

Using the NI Example Finder

If you're using NI-RFmx or NI-RFSA with LabVIEW or LabWindows/CVI, use the NI Example Finder to locate programming examples.

1. Launch LabVIEW or LabWindows/CVI.
2. Select **Help»Find Examples** to open the NI Example Finder.
3. Navigate to **Hardware Input and Output»Modular Instruments**.
4. Open the example that best matches your application requirements.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Using Microsoft Visual C/C++

If you're using NI-RFmx or NI-RFSA with Microsoft Visual C/C++, locate examples in the following directories.

Table 13. Location of Microsoft Visual C/C++ Programming Examples

Software Option	Examples Location
NI-RFmx	*<NIDocDir>*\RFmx\Demod\Examples *<NIDocDir>*\RFmx\SpecAn\Examples where *<NIDocDir>* is the Users\Public\Public Documents\National Instruments directory.
NI-RFSA	*<NIDocDir>*\NI-RFSA\examples where *<NIDocDir>* is the Users\Public\Public Documents\National Instruments directory.

Note LabVIEW examples that demonstrate integration of the NI 5663E with NI RF vector signal generators and NI toolkit software, including the NI Modulation Toolkit, are also available online at *ni.com/examples*.

Troubleshooting

If an issue persists after you complete a troubleshooting procedure, contact NI technical support or visit *ni.com/support*.

Installation

Why Is the ACCESS LED Off When the Chassis Is On?

The LEDs may not light until the device has been configured in MAX. Before proceeding, verify that the NI 5663E appears in MAX.

If the ACCESS LED fails to light after you power on the chassis, a problem may exist with the chassis power rails, a hardware module, or the LED.

Caution Apply external signals only while the NI 5663E is powered on. Applying external signals while the device is powered off may cause damage.

1. Disconnect any signals from the module front panels.
2. Power off the chassis.
3. Remove the module from the chassis and inspect it for damage. Do not reinstall a damaged device.
4. Reinstall the module in a different chassis slot.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. Power on the chassis.
6. Verify that the device appears in MAX.
7. Reset the device in MAX and perform a self-test.

What Should I Do if the NI 5663E Doesn't Appear in MAX?

1. In the MAX configuration tree, expand **Devices and Interfaces**.
2. Expand the **Chassis** tree to see the list of installed hardware, and press <F5> to refresh the list.
3. If the module is still not listed, power off the system, ensure that all hardware is correctly installed, and restart the system.
4. Navigate to the Device Manager.

Operating System	Description
Windows 10/8.1	Right-click the Start button, and select **Device Manager**.
Windows 7	Select **Start»Control Panel»Device Manager**.

5. If you are using a PXI or PXI Express controller, verify that a **National Instruments** entry appears in the **System Devices** list. Reinstall NI-RFSA and the module if error conditions appear in the list. If you are using an MXI controller, right-click **PCI-to-PCI Bridge**, and select **Properties** from the shortcut menu to verify that the bridge is enabled.

What Should I Do if the Module Fails the Self-Test?

1. Restart the system.
2. Launch MAX, and perform the self-test again.
3. Power off the chassis.
4. Reinstall the failed module in a different slot.
5. Power on the chassis.
6. Perform the self-test again.

Configuration

What Should I Do if the Device Does Not Initialize?

Failure to initialize may indicate a problem with module interconnections or with MAX. If the niRFSA Initialize VI or the `niRFSA_init` function returns an error and the NI 5663E fails to initialize, complete the following steps:

1. Reconnect the NI 5663E hardware module front panel cables securely.
2. Power on your system and run the MAX configuration and self-test procedures.

Related Information

Interconnecting the NI 5663E Modules on page 8
Configuring the NI 5663E in MAX on page 18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

What Should I Do if the NI 5622 IF Digitizer Module Does Not Phase-Lock to the NI 5652 LO Source Module?

If the NI 5622 IF digitizer module fails to phase-lock to the NI 5652 LO source module internal reference through the front panel, complete the following steps:

1. Verify that the cable is not faulty and that all cables are connected to the correct terminals.
2. Verify that there is a reference signal generated from the NI 5652 REF IN/OUT front panel connector.

   If there is a frequency reference signal coming from the NI 5652 REF IN/OUT front panel connector, the NI 5622 phase-lock circuitry may be at fault.

If failures continue and there is no signal at these output terminals, there may be a problem with the NI 5652 hardware. Contact NI technical support or visit *ni.com/support*.

What Should I Do if the NI-RFSA Soft Front Panel Does Not Launch?

1. Verify the front panel interconnections for your RF vector signal analyzer.
2. Verify the MAX device association for your NI 5663E.
3. If you have verified the interconnections and associations of your device and you are still unable to launch the NI-RFSA SFP, try uninstalling and then reinstalling NI-RFSA.

Related Information

Interconnecting the NI 5663E Modules on page 8
Configuring the NI 5663E in MAX on page 18

Measurements

What Should I Do if the Device Amplitude Reading Does Not Match the Source?

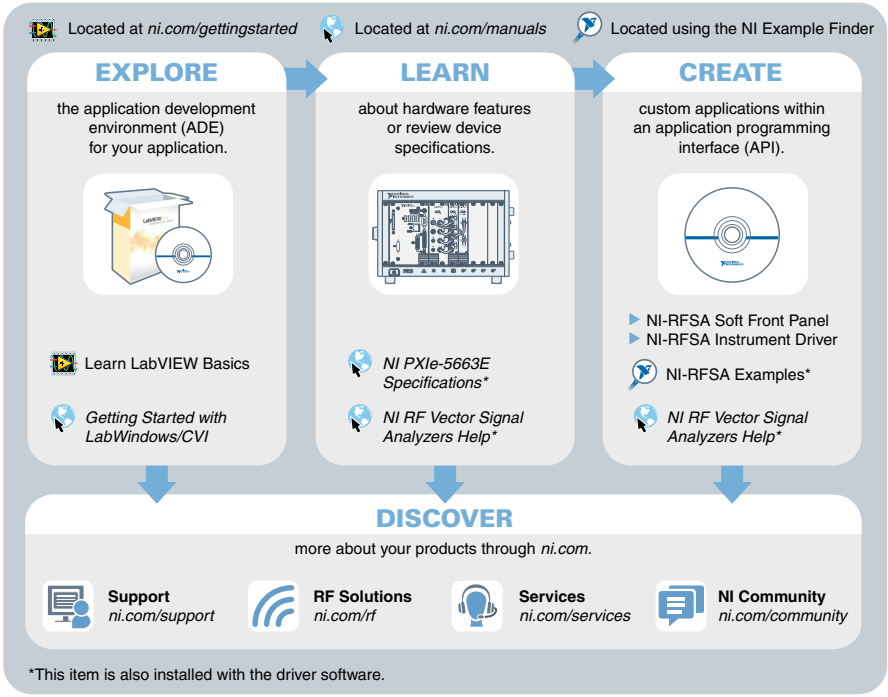
1. Verify that the discrepancy between the NI 5663E and the source is within the error limits of the devices.
   a) Verify the absolute amplitude accuracy of the NI 5663E using the appropriate value.
   b) Verify the level accuracy of the input signal into the receiver.
2. Check for cable loss, which can be substantial. For example, an RG58 coaxial cable loses about 2.1 dB of signal amplitude per foot at 2 GHz. Unless you are using high-quality cables, expect losses when working with high-frequency signals.
3. Perform a self-calibration for the NI 5663E.

If errors continue, contact NI technical support or visit *ni.com/support*.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Where to Go Next

Refer to the following figure for information about other product tasks and associated resources for those tasks.



Tip The *NI RF Vector Signal Analyzers Help* is an HTML version of a traditional user manual that includes detailed information about RF fundamentals, device features, and programming with NI-RFSA.

Worldwide Support and Services

The NI website is your complete resource for technical support. At *ni.com/support*, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit *ni.com/services* for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit *ni.com/register* to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting *ni.com/certification*. If your product supports calibration, you can obtain the calibration certificate for your product at *ni.com/calibration*.

NI corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For telephone support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the *Worldwide Offices* section of *ni.com/niglobal* to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Refer to the *NI Trademarks and Logo Guidelines* at ni.com/trademarks for information on NI trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering NI products/technology, refer to the appropriate location: **Help**»**Patents** in your software, the patents.txt file on your media, or the *National Instruments Patent Notice* at ni.com/patents. You can find information about end-user license agreements (EULAs) and third-party legal notices in the readme file for your NI product. Refer to the *Export Compliance Information* at ni.com/legal/export-compliance for the NI global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7014, and DFAR 252.227-7015.

© 2014—2016 National Instruments. All rights reserved.

376120D-01 Jul16

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP