GETTING STARTED GUIDE

NI PXIe-5644R

6 GHz Reconfigurable RF Vector Signal Transceiver

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

This document explains how to install, configure, and test the NI 5644R. The NI 5644R is an RF vector signal transceiver (VST), and ships with the following software options, which you use to program the device.

- NI-RFmx driver software
- NI-RFSA and NI-RFSG driver software
- NI LabVIEW Instrument Design Libraries for Vector Signal Transceivers (instrument design libraries)

Caution The protection provided by this equipment may be impaired if it is used in a manner not described in the documentation.

Contents

NATIONAL INSTRUMENTS

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 5644R, 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.
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.

⚠ **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted.

📝 **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.

Preparing the Environment

Ensure that the environment you are using the NI 5644R 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-5644R Specifications* at *ni.com/manuals* for complete specifications.

Verifying the Kit Contents

Figure 1. NI 5644R Kit Contents
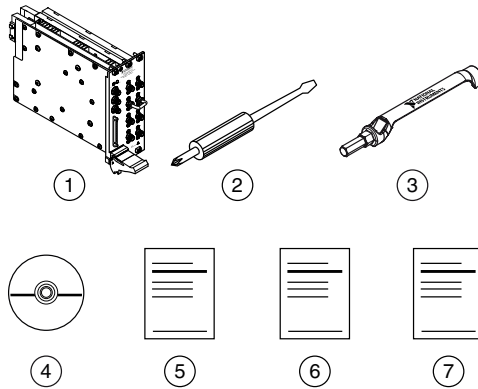
1. NI PXIe-5644R Module
2. Screwdriver, Part Number 772006-01
3. SMA Driver Bit, Part Number 780895-01
4. Driver Software DVD

5. Read Me First: Safety and Electromagnetic Compatibility
6. Maintain Forced-Air Cooling Note to Users
7. NI PXIe-5644R Getting Started Guide

Other Equipment

There are several required items not included in your device kit that you need to operate the NI 5644R. Your application may require additional items not included in your kit to install or operate your device.

Required Items

- A PXI Express chassis and chassis documentation. The NI PXIe-1075 chassis is one available option for your PXI Express device. For more information about compatible chassis options, visit *ni.com/info* and enter the Info Code pxiechassis.
- A PXI Express embedded controller or PC with MXI controller system that meets the system requirements specified in this guide and chassis documentation.

Optional Items

- PXI Chassis Slot Blocker kit (NI part number 199198-01)
- SMA (m)-to-SMA (m) cables

Choosing and Installing the Software

Software Options

NI provides three software options for programming the NI 5644R—NI-RFmx, NI-RFSA and NI-RFSG instrument driver software, and the instrument design libraries.

Table 1. NI 5644R Software Options

Software Option	Description	Use Case
NI-RFmx	Provides a single-handle instrument driver with built-in measurements. You can use instrument driver FPGA extensions to customize the device FPGA using precompiled bitfiles.	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 and NI-RFSG instrument driver	The NI-RFSA and NI-RFSG APIs each provide a fixed API for interacting with your NI 5644R device. NI-RFSA and NI-RFSG provide standard IVI-based functionality needed for most vector signal analyzer and vector signal generator applications. You can use NI-RFSA and NI-RFSG instrument driver FPGA extensions to customize the device FPGA using precompiled bitfiles.	Use NI-RFSA to create custom measurements or applications that require I/Q data. Use NI-RFSG to generate continuous or modulated waveforms. Use NI-RFSA and NI-RFSG with the NI Modulation Toolkit to develop software-defined radio transmitters and receivers. Use NI-RFSG with the NI Modulation Toolkit to create and generate modulated signals to test receivers.
Instrument design libraries	The instrument design libraries allow you to customize your NI 5644R device to suit the needs of your application. Sample projects, which allow you to take common measurements with your device, are included with the installation.	Use the instrument design libraries with the LabVIEW FPGA Module to customize the behavior of the device FPGA to create application-specific instrument designs.

Note You can use either NI-RFmx or NI-RFSA and NI-RFSG instrument driver software in combination with the instrument design libraries in a single application; however, only one software option can access the device at a time.

Related Information

Refer to the NI RF Vector Signal Analyzers Help or the NI RF Signal Generators Help for more information about using the NI-RFSA and NI-RFSG instrument driver FPGA extensions.

Comparison of Software Features

NI-RFmx, NI-RFSA and NI-RFSG instrument driver software, and the instrument design libraries vary in the features they support.

Table 2. Comparison of Software Features

Feature	NI-RFmx	NI-RFSA and NI-RFSG	Instrument Design Libraries
Customization of onboard FPGA	Supported using the instrument driver FPGA extensions	Supported using the instrument driver FPGA extensions	Supported using the LabVIEW FPGA Module
Source availability	Closed source	Closed source	Open source
LabVIEW support	Yes	Yes	Yes
Microsoft .NET support	Yes	Yes	No
RF Standards Toolkits support	No	Yes	Additional programming required for integration.
NI-RFSA and NI-RFSG Soft Front Panels support	Yes	Yes	Yes
LabVIEW examples or sample projects	Includes LabVIEW examples	Includes LabVIEW examples	Includes LabVIEW sample projects, with additional examples available at *ni.com/vstgettingstarted*.

Installing the Software

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

1. Install NI LabVIEW.
2. (Recommended) Install NI LabVIEW FPGA Module.

> **Note** Installation of the LabVIEW FPGA Module is required to customize the behavior of the device FPGA if you are using the instrument design libraries.

3. (Optional) Install NI LabVIEW Real-Time Module.
4. (Recommended) Install the latest service pack for LabVIEW and any LabVIEW modules you are using.
5. 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`.

6. 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.

> **Note** The default installation installs NI LabVIEW Instrument Design Libraries for Vector Signal Transceivers, NI-RFmx, NI-RFSA, and NI-RFSG.

7. When the installer completes, select **Restart** in the dialog box that prompts you to restart, shut down, or restart later.

Installing the NI 5644R

> **Caution** To prevent damage to the NI 5644R caused by ESD or contamination, handle the module using the edges or the metal bracket.

You must install the software 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. This document is also available at *ni.com/manuals*.

The NI 5644R is a three-slot module with two backplane connectors. The module must be installed into three adjacent chassis slots, and the left two slots must be PXI Express compatible.

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. If the chassis has multiple fan speed settings, ensure the fans are set to the highest setting.

> **Note** Inadequate air circulation could cause the temperature inside the chassis to rise above the optimal operating temperature for the device, potentially causing thermal shutdown, shorter lifespans, or improper performance.

5. Position the chassis so that inlet and outlet vents are not obstructed.

> **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted.

6. Remove the black plastic covers from all the captive screws on the module front panel.

7. Identify a supported slot in the chassis. The following figure shows the symbols that indicate the slot types.

Figure 2. Chassis Compatibility Symbols
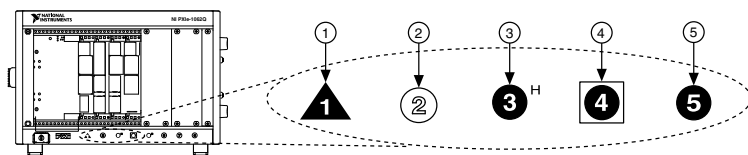
1. PXI Express System Controller Slot
2. PXI Peripheral Slot
3. PXI Express Hybrid Peripheral Slot
4. PXI Express System Timing Slot
5. PXI Express Peripheral Slot

The NI 5644R can be placed in PXI Express peripheral slots, PXI Express Hybrid peripheral slots, or PXI Express system timing slots.

8. Touch any metal part of the chassis to discharge static electricity.

9. Ensure that the ejector handle is in the unlatched (downward) position.

10. Hold the module by the edges and slide it into the empty compatible slots. Ensure the base engages with the guides in the chassis.

Figure 3. NI 5644R Module Installation
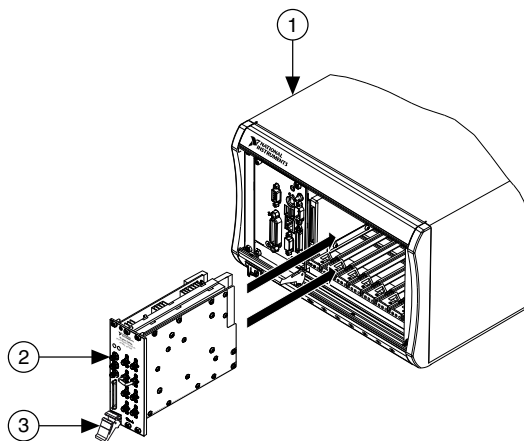
1. PXI Express Chassis
2. NI PXIe-5644R Module
3. Ejector Handle in Down Position

11. Latch the module in place by pulling up on the ejector handle.

12. 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.

13. Cover all empty slots using filler panels or fill using slot blockers to maximize cooling air flow.

14. Power on the chassis.

Direct Connections to the NI 5644R

The NI 5644R is a precision RF instrument that is sensitive to ESD and transients. Ensure you take the following precautions when making direct connections to the NI 5644R to avoid damaging the device.
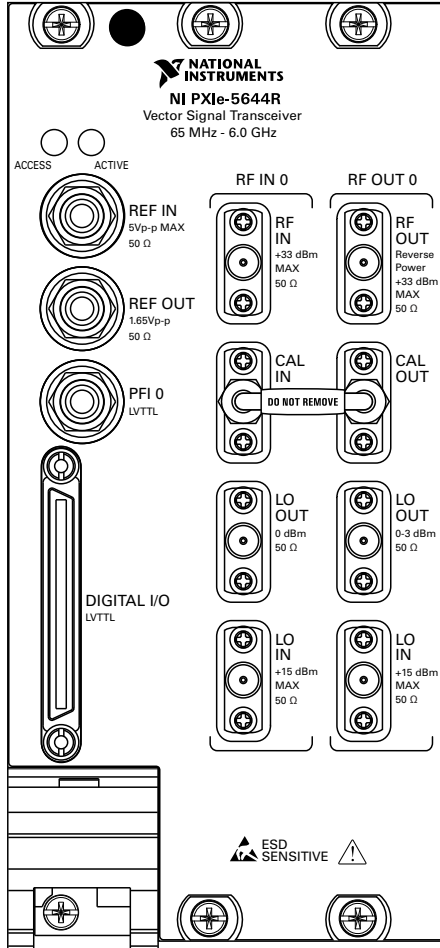
⚠ **Caution** Apply external signals only while the NI 5644R is powered on. Applying external signals while the device is powered off may cause damage.

• Ensure you are properly grounded when manipulating cables or antennas connected to the NI 5644R RF IN connector.
• If you are using nonisolated devices, such as a nonisolated 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 5644R RF IN connector, ensure that the device cannot generate signal transients greater than the RF and DC specifications of the NI 5644R RF IN connector.

Hardware Front Panel Connectors and Indicators

Figure 4. NI 5644R Front Panel

⚠ **Caution** Apply external signals only while the NI 5644R is powered on. Applying external signals while the device is powered off may cause damage.

Table 3. 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 4. NI 5644R General Front Panel Connectors

Connector	Use
REF IN	Input terminal that allows for the use of an external 10 MHz Reference Clock.
REF OUT	Output terminal that can export a 10 MHz Reference Clock or the 120 MHz Sample Clock.
PFI 0	Programmable-function digital I/O (DIO) connector for use with triggers or events.
DIGITAL I/O	DIO terminal that contains general-purpose 3.3 V LVTTL DIO signals. DIO lines are direction-configurable as input or output.

Table 5. NI 5644R RF Front Panel Connectors

Connector		Use
RF IN 0	RF IN	Input terminal for RF signals.
	CAL IN	⚠ **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted. Terminal that is used when running self-calibration on the device.
	LO OUT	Output terminal for exporting the RF IN 0 LO source.
	LO IN	Input terminal that allows the use of an external LO for RF IN 0.

Table 5. NI 5644R RF Front Panel Connectors (Continued)

Connector		Use
RF OUT 0	RF OUT	Output terminal for RF signals.
	CAL OUT	⚠ **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted. Connector that is used when running self-calibration on the device.
	LO OUT	Output terminal for exporting the RF OUT 0 LO source.
	LO IN	Input terminal that allows for the use of an external LO for RF OUT 0.

Table 6. NI 5644R Front Panel LEDs

LED	Indications
ACCESS	Indicates the basic hardware status of the device.
	Off—The device is not yet functional or has detected a problem with a PXI Express power rail.
	Amber—The device is being accessed. *Accessed* means that you are writing to the device setup registers to control the device, reading from the device to monitor the device status, or transferring data to/from the device.
	Green—The device is controllable through the software.
ACTIVE	The device behavior is programmable using the instrument design libraries and the LabVIEW FPGA Module. If no behavior is defined, the LED will be OFF.
	When using NI-RFSA and NI-RFSG, the ACTIVE LED indicates the state of the device.
	Off—The device is idle.
	Solid green—The device is generating a waveform.
	Dim amber—The device is waiting for an acquisition Reference Trigger.
	Solid amber—The device is acquiring a waveform.
	Solid red—The device has detected an error. The LED remains red until the error condition is removed.
	Note The indicators are listed in increasing order of priority. For example, if you are generating a waveform using NI-RFSG and waiting on an acquisition Reference Trigger in NI-RFSA, the LED is dim amber.

Related Information

Refer to your device specifications document for more information about front panel connectors and LEDs.

Configuring the Hardware in MAX

Use Measurement & Automation Explorer (MAX) to configure your National Instruments hardware. MAX informs other programs about which devices reside in the system and how they are configured. MAX is automatically installed with the instrument design libraries and NI-RFSA and NI-RFSG.

1. Launch MAX by navigating to **Start**»**All Programs**»**National Instruments**»**NI MAX** or by clicking the NI MAX desktop icon.

2. In the Configuration pane, double-click **Devices and Interfaces** to see the list of installed devices. Installed devices appear under the name of their associated chassis.

3. Expand your **Chassis** tree item.

    MAX lists all devices installed in the chassis. NI 5644R devices appear as NI-RIO devices in the list. Your default device names may vary.

    Note If you do not see your hardware listed, refer to the *Troubleshooting* section of this document.

4. Record the device identifier MAX assigns to the hardware. Use this identifier when programming the NI 5644R.

    Caution When you install, uninstall, or move an NI-RIO device in your system, resource identification of your NI-RIO devices may change. Whenever any of these changes occur, verify resource identification of all your NI-RIO devices in MAX, and, if necessary, make changes to your software and documentation.

Self-Calibration

Self-calibration adjusts the NI 5644R for variations in the module environment using an onboard high-precision calibration tone. Perform a complete self-calibration after first installing your module and letting it warm up for 30 minutes.

Note Warm up begins when the PXI Express chassis has been powered on and the operating system has completely loaded.

The NI 5644R modules are externally calibrated at the factory; however, you should perform a self-calibration in any of the following situations:

•   After first installing the NI 5644R into your chassis
•   After any module in the chassis is installed, uninstalled, or moved
•   When the system is in an environment where the ambient temperature varies or the module temperature has drifted more than ±5 °C from the temperature at the last self-calibration
•   To periodically adjust for small performance drifts that occur with product aging

NI recommends you perform the self-calibration from the installed self-calibration executable located at **Start**»**All Programs**»**National Instruments**»**Vector Signal Transceivers**»**VST Self Calibrate**. When using LabVIEW, you can also use the niVST Self-Calibrate VI, located on the **Functions**»**Instrument I/O**»**Instrument Drivers**»**NI VST Calibration** palette.

Related Information

Refer to the NI RF Vector Signal Transceivers Help for more information about self-calibration and self-calibrating in text-based languages.

Locating the Software and Examples

Software Locations

Table 7. Location of NI 5644R Software Options

Software Option	ADE	Location
NI-RFmx	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.

Table 7. Location of NI 5644R Software Options (Continued)

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`.

Table 7. Location of NI 5644R Software Options (Continued)

Software Option	ADE	Location
NI-RFSG	LabVIEW	Available on the LabVIEW Functions palette at **Measurement I/O»NI-RFSG**.
	LabWindows/CVI	Available in the `<IVIROOTDIR32>\Drivers \niRFSG` 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`.
Instrument design libraries	LabVIEW	Available in one of the following directories: • Windows 10 (32-bit)/8.1 (32-bit)/7 (32-bit)—`Program Files\National Instruments \LabVIEW 2014\instr.lib\RF-RIO` • Windows 10 (64-bit)/8.1 (64-bit)/7 (64-bit)—`Program Files(x86\National Instruments\LabVIEW 2014\instr.lib \RF-RIO`

Programming Examples Locations

Using the NI Example Finder

If you're using NI-RFmx, NI-RFSA, or NI-RFSG 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.

Using LabVIEW Sample Projects

If you're using the instrument design libraries, use the included LabVIEW sample projects to begin programming the NI 5644R.

1. Launch LabVIEW.
2. In the **New Project** dialog box, select **Sample Projects** in the left pane.
3. Navigate to and open the project that best matches your application requirements.

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 8. 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.

NI 5644R First Measurement Options

You can verify proper installation and configuration of your device using the NI-RFSG Soft Front Panel and NI-RFSA Soft Front Panel. Additionally, if you installed the instrument design libraries, you can make a measurement using a LabVIEW sample project.

Making a Measurement with Soft Front Panels

Use the NI-RFSG Soft Front Panel and NI-RFSA Soft Front Panel to verify proper installation and configuration of the NI 5644R hardware.

1. Connect the RF IN port to the RF OUT port using an SMA (m)-to-SMA (m) cable.

   ⚠ **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted.

2. Select **Start**»**All Programs**»**National Instruments**»**NI-RFSG**»**NI-RFSG Soft Front Panel** to launch the NI-RFSG Soft Front Panel.

3. Select the device identifier assigned to the NI 5644R in MAX in the **Device** drop-down menu.

4. Click the **RF On/Off** button to generate a 1 GHz continuous wave (CW) tone RF signal at the RF output terminal of your device.

5. Select **Start**»**All Programs**»**National Instruments**»**NI-RFSA**»**NI-RFSA Soft Front Panel** to launch the NI-RFSA Soft Front Panel.

6. Select the device identifier assigned to the NI 5644R in MAX in the **Device** drop-down menu.

7. Verify that the NI-RFSA Soft Front Panel is receiving the CW tone.

8. Close the NI-RFSA Soft Front Panel and NI-RFSG Soft Front Panel.

Related Information

Refer to the NI-RFSG Soft Front Panel Help for more information about using the NI-RFSG Soft Front Panel.

Refer to the NI-RFSA Soft Front Panel Help for more information about using the NI-RFSA Soft Front Panel.

Making a Measurement with a Sample Project

This measurement requires installation of the instrument design libraries.

1. Launch LabVIEW.

2. Select **File**»**Create Project**.

3. On the left side of the **Create Project** window, select **Vector Signal Transceiver (VST)**.

4. On the right side of the **Create Project** window, select the **Simple VSA and VSG** sample project for your device and click **Next**.

5. Specify a name and location for the project in the **Create Project** window and click **OK**.

   LabVIEW creates, configures, and opens a new Simple VSA and VSG project.

6. In the project tree, navigate to **My Computer**»**Project Documentation**, open `Simple VSA and VSG.html`, and navigate to the *Running this Sample Project* section of the documentation.

7. Follow the instructions in the project documentation for making the measurement.

Troubleshooting

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

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 5644R 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 5644R is powered on. Applying external signals while the device is powered off may cause damage.

1. Disconnect any signals from the PXI Express module front panels.

⚠ **Caution** Do not disconnect the cable that connects CAL IN to CAL OUT. Removing the cable from or tampering with the CAL IN or CAL OUT front panel connectors voids the product calibration and specifications are no longer warranted.

2. Power off the PXI Express chassis.

3. Remove the module from the PXI Express chassis and inspect it for damage. Do not reinstall a damaged device.

4. Install the module in a different PXI Express chassis slot from which you removed it.

5. Power on the PXI Express chassis.

6. Restart your computer.

7. Verify that the device appears in MAX.

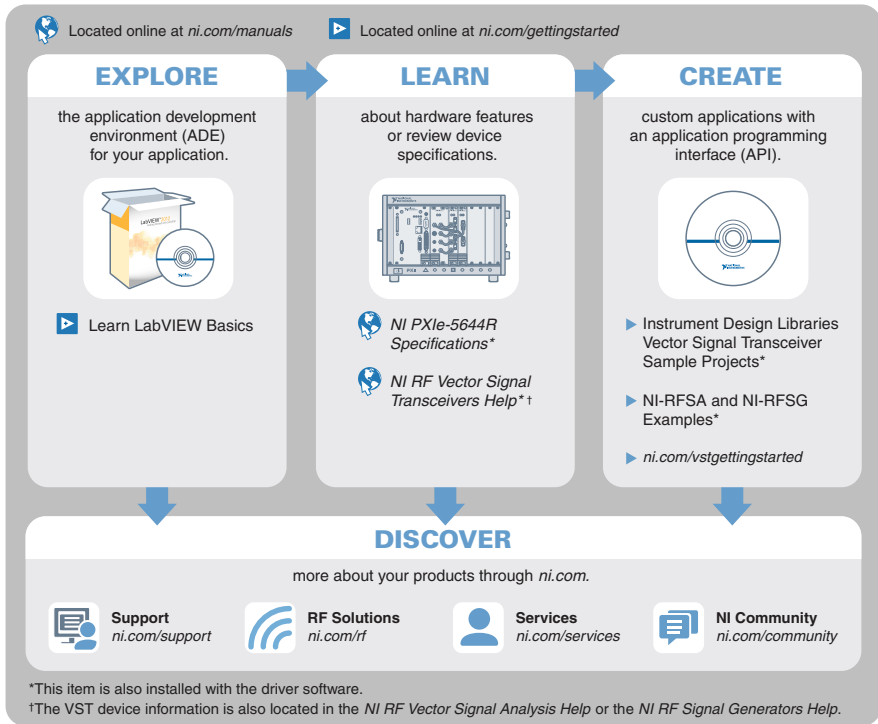## What Should I Do if the NI 5644R Doesn't Appear in MAX?

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	Select **Start»Control Panel»Device Manager**.
Windows 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 controller, verify that a **National Instruments** entry appears in the system device list. If error conditions appear in the list, right-click the **NI PXIe-5644R** and **NI-RIO FPGA Device** nodes and select **Update Driver**. 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.

6. Restart your computer.

Where to Go Next

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

🌐 Located online at *ni.com/manuals*   ▶ Located online at *ni.com/gettingstarted*

EXPLORE
the application development environment (ADE) for your application.

▶ Learn LabVIEW Basics

LEARN
about hardware features or review device specifications.

🌐 *NI PXIe-5644R Specifications**

🌐 *NI RF Vector Signal Transceivers Help** †

CREATE
custom applications with an application programming interface (API).

▶ Instrument Design Libraries Vector Signal Transceiver Sample Projects*

▶ NI-RFSA and NI-RFSG Examples*

▶ *ni.com/vstgettingstarted*

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*This item is also installed with the driver software.
†The VST device information is also located in the *NI RF Vector Signal Analysis Help* or the *NI RF Signal Generators Help*.

💡 **Tip** The *NI RF Vector Signal Transceivers Help* is an HTML version of a traditional user manual that includes detailed information about RF fundamentals, device features, and programming with NI LabVIEW Instrument Design Libraries for Vector Signal Transceivers.

Worldwide Support and Services

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