

GETTING STARTED GUIDE



NI Signal Generators

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Conventions

The following conventions are used in this manual:

- » The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.
- ◆ The ◆ symbol indicates that the following text applies only to a specific product, a specific operating system, or a specific software version.
-  This icon denotes a note, which alerts you to important information.
-  This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash. When this symbol is marked on the hardware product, refer to the *Safety Information* section for information about precautions to take.
- bold** Bold text denotes items that you must select or click in the software, such as menu items and dialog box options.
- italic* Italic text denotes emphasis or a cross reference.
- module Refers to an NI PXI/PCI-5401, NI PXI-5404, NI PXI/PCI-5411, NI PXI-5421, or NI PXI/PCI-5431.
- monospace Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for disk drives, paths, directories, filenames and extensions, and functions.
- NI signal generator(s) Refers to an NI PXI/PCI-5401, NI PXI-5404, NI PXI/PCI-5411, NI PXI-5421, or NI PXI/PCI-5431.

Introduction

This document explains how to install, configure, and test National Instruments signal generators to generate various waveforms. For more information about your module, such as features and programming, refer to the *NI Signal Generators Help* at **Start»Programs»National Instruments»NI-FGEN»Documents»NI Signal Generators Help**.

For your NI signal generator specifications, refer to the specifications document included with your module.

For free downloads of the most current versions of documentation and example programs, visit ni.com/instruments.

Unpack the Module

The NI signal generators ship in an antistatic package to prevent electrostatic damage. Electrostatic discharge (ESD) can damage several components on the module.



Caution *Never* touch the exposed pins of connectors.

To avoid damage in handling the module, take the following precautions:

- Ground yourself using a grounding strap or by holding a grounded object.
- Touch the antistatic package to a metal part of your computer chassis before removing the module from the package.

Remove the module from the package and inspect it for loose components or any sign of damage. Notify NI if the module appears damaged in any way. Do *not* install a damaged module into your computer.

Store the module in the antistatic envelope when not in use.

Verify the Components

To install and use your module, make sure you have the following:

- If developing applications, one of the following application development environments (ADEs) and its documentation:
 - NI LabVIEW
 - LabWindows™/CVI™
 - Microsoft Visual Basic or Visual C/C++
 - NI-FGEN 2.0 or later
 - NI 5431 only—NI Composite Video Generator CD
 - NI signal generator and its documentation
 - A PXI chassis, a PXI/SCXI combination chassis, or a PXI/CompactPCI chassis—with a controller and the chassis documentation
- OR
- A desktop computer with its documentation
 - 1/8 in. flathead screwdriver
 - Cables appropriate for use with your module

Install the Software

The NI-FGEN CD, included with your kit, contains the instrument driver for all NI signal generators. Also included on the NI-FGEN CD is the FGEN Soft Front Panel (SFP). The FGEN SFP is a fast, easy, and interactive tool that helps you to start working with the NI signal generators quickly.

To install NI-FGEN, complete the following steps:

1. (optional) Install an ADE, such as NI LabVIEW or LabWindows/CVI, if you are developing an application for the NI signal generator.
2. Insert the NI-FGEN CD into your CD drive, and follow the instructions in the installation window.



Note If the installation window does not appear, navigate to the CD drive, double-click the drive, and double-click `setup.exe`.

- ◆ For NI 5431 modules only, complete the following steps:
3. Insert the NI Composite Video Generator CD into your CD drive.
 4. Click **Install** in the installation window that appears, and follow the instructions in the dialog boxes.

Install the Hardware

To prevent damage to the module caused by ESD or contamination, handle the module using the edges or the metal bracket. Refer to the [Safety Information](#) section for more information. To ensure optimal forced-air cooling, refer to the guidelines in the *Maintain Forced-Air Cooling Read Me First* included in your NI signal generator kit.

PXI Installation

To install the module in either a PXI chassis, a PXI/SCXI combination chassis, or a PXI/CompactPCI chassis, refer to Figure 1 and complete the following steps:

1. Verify that NI-FGEN is installed.
2. Power off and unplug the PXI chassis.
3. Insert the module into an available PXI slot until the ejector handle locks in the up position, and tighten the captive screw(s).
4. Plug in and power on the PXI chassis.

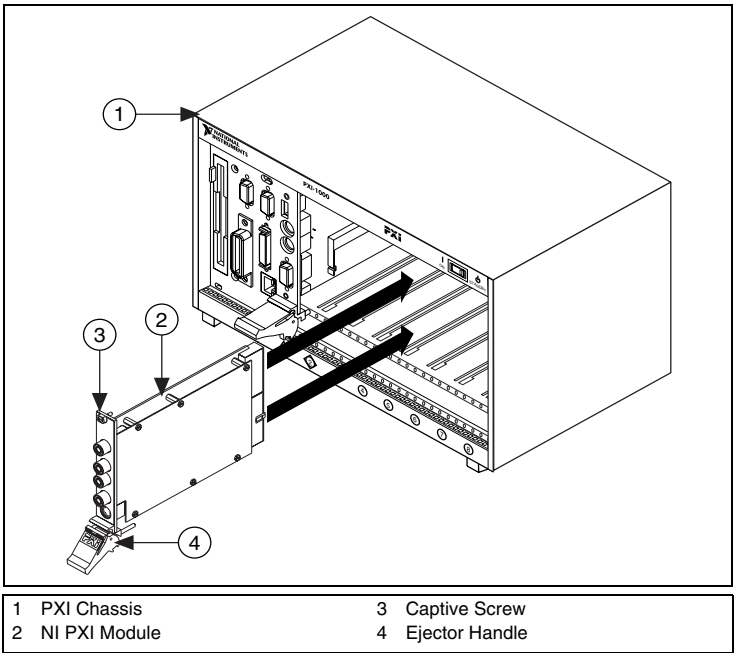


Figure 1. PXI Installation

PCI Installation

To install the module, refer to Figure 2 and complete the following steps:

1. Verify that NI-FGEN is installed.
2. Power off and unplug the PC.
3. Remove the PC cover.
4. Insert the module into an open PCI slot.
5. Secure the module with the screw provided in the kit.
6. Replace the PC cover.
7. Plug in and power on the PC.

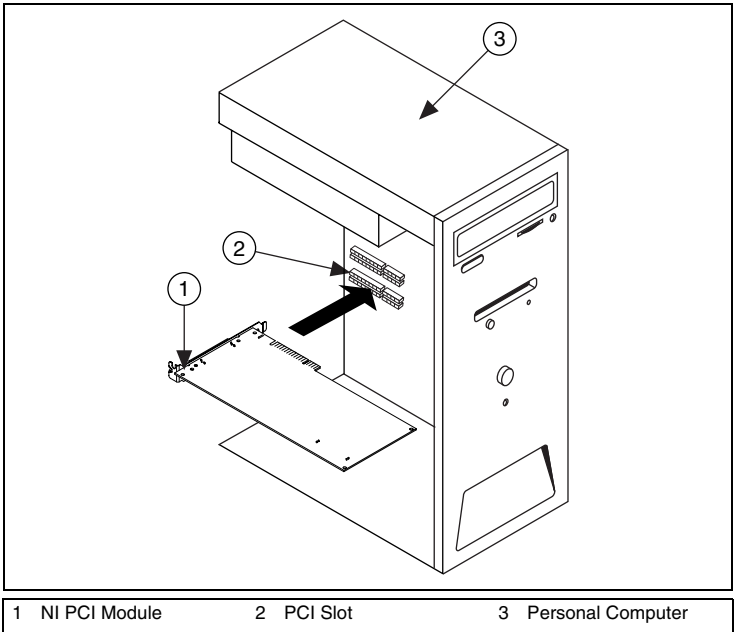


Figure 2. PCI Installation

Configure Your Module

To configure and test your module, complete the following steps:

1. Launch Measurement & Automation Explorer (MAX).
2. Double-click **Devices and Interfaces** to see the list of installed devices. MAX automatically detects the module you installed.



Note If you do not see your module listed, press <F5> to refresh. If your module is still not listed, repeat the steps in the [Install the Hardware](#) section. For more information about using MAX, refer to the available help files within MAX.

3. Right-click your NI signal generator in the list, and select **Properties** to launch the Configuring Device window.
4. Notice the device number and resources assigned to the module, and write it down. You may need this number later.



Note If you are using the MXI-3 interface to control the PXI chassis, the MXI-3 Optimization Application must be run prior to using the NI signal generator. By default, this application runs automatically when Windows starts. If you have an initialization or performance issue with your module, or if you are not certain that the application ran, select **Start»Programs»National Instruments MXI-3»MXI-3 Optimization** to run the application. If you continue to have initialization or performance issues, refer to the MXI-3 documentation at **Start»Programs»National Instruments MXI-3**, or visit NI Technical Support at ni.com/support.

5. Click **Test Resources** to test the module resources. A dialog box appears and indicates if the module has passed the resource test.



Note If the module does not pass the test, repeat the steps in the [Install the Hardware](#) section. If the device still does not pass the test, visit NI Technical Support at ni.com/support.

6. Click **Close** when you finish testing the module.
7. Click **OK** in the Configuring Device window.
8. Exit MAX.

Connect Signals

This section contains front panel connector figures and connector description tables that describe the signal connection options for NI signal generators.

NI PXI-5401

The NI PXI-5401 has four connectors—two BNC connectors and two SMB connectors, as shown in Figure 3. Signal descriptions are listed in Table 1.

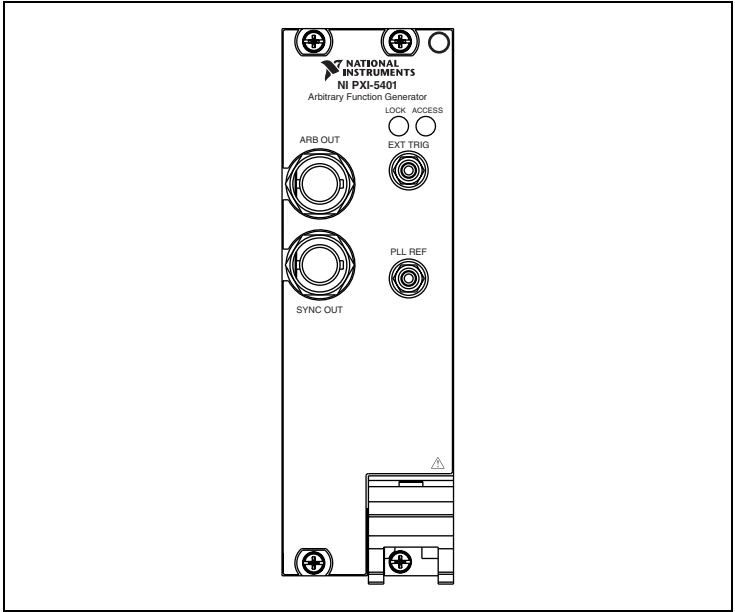


Figure 3. NI PXI-5401 Front Panel Connectors

Table 1. NI PXI-5401 Connectors

Connector	Access	Function
ARB OUT	Output	Provides the waveform output.
SYNC OUT	Output	Provides a TTL version of the sine waveform being generated at the ARB OUT connector.
EXT TRIG	Input	Accepts a TTL-level signal that you can use to start or step through a waveform generation.
PLL REF	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PXI-5401 internal clock to the external reference clock.

NI PCI-5401

The NI PCI-5401 has four connectors—three SMB connectors and one 50-pin digital connector, as shown in Figure 4. Signal descriptions are listed in Table 2.

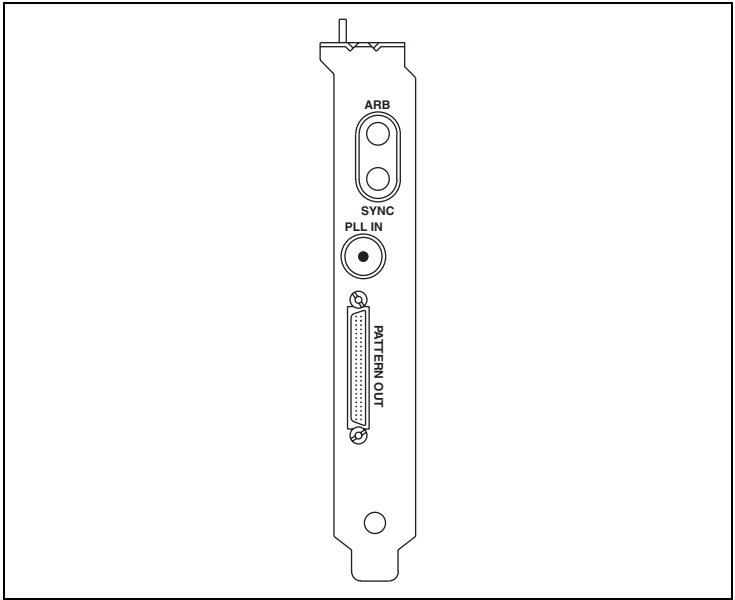


Figure 4. NI PCI-5401 Front Panel Connectors

Table 2. NI PCI-5401 Connectors

Connector	Access	Function
ARB	Output	Provides the waveform output.
SYNC	Output	Provides a TTL version of the sine waveform being generated at the ARB connector.
PLL IN	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PCI-5401 internal clock to the external reference clock.
PATTERN OUT	Input	Supplies the external trigger input to the device. Refer to the <i>NI Signal Generators Help</i> for connector pin assignments and signal descriptions.

NI PXI-5404

The NI PXI-5404 has five SMB connectors, as shown in Figure 5. Signal descriptions are listed in Table 3.

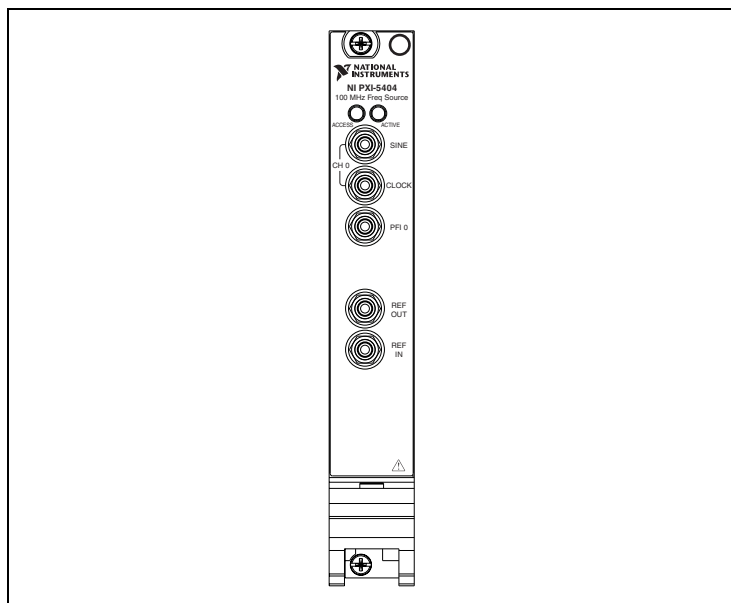


Figure 5. NI PXI-5404 Front Panel Connectors

Table 3. NI PXI-5404 Connectors

Connector	Access	Function
SINE	Output	Provides a sine waveform of the desired frequency output.
CLOCK	Output	Provides a TTL version of the sine waveform being generated at the SINE connector.
PFI 0	Input/ Output	Accepts either a TTL signal to start waveform generation, or provides an output to synchronize—or trigger—other devices at a certain time within waveform generation.

Table 3. NI PXI-5404 Connectors (Continued)

Connector	Access	Function
REF OUT	Output	Routes signals from the PXI backplane clock, PXI trigger lines, or a divided-down version of the internal NI 5404 clock.
REF IN	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PXI-5404 internal clock to the external reference clock.

NI PXI-5411/5431

NI PXI-5411/5431 have six connectors—two BNC connectors, three SMB connectors, and one 50-pin digital connector, as shown in Figure 6. Signal descriptions are listed in Table 4.

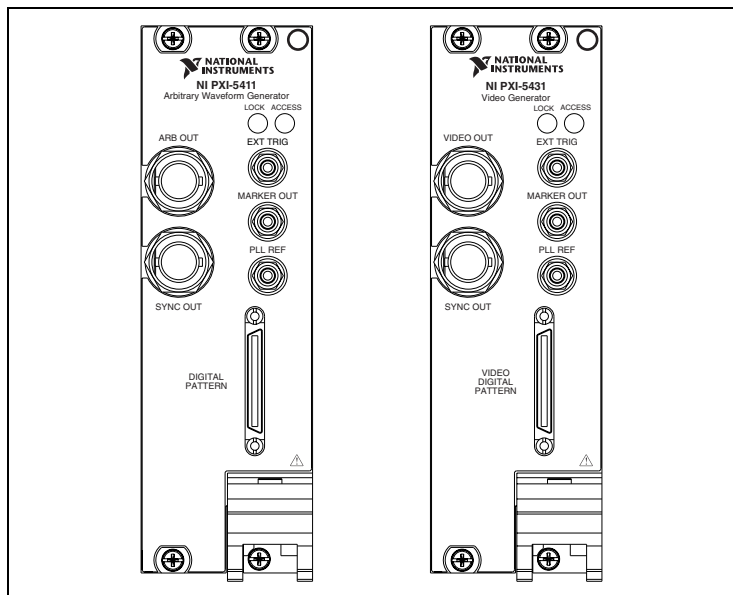


Figure 6. NI PXI-5411/5431 Front Panel Connectors

Table 4. NI PXI-5411/5431 Connectors

Connector	Access	Function
ARB/ VIDEO OUT	Output	Provides the waveform output.
SYNC OUT	Output	Provides a TTL version of the waveform being generated at the ARB/VIDEO OUT connector.
EXT TRIG	Input	Accepts a TTL-level signal that you can use to start or step through a waveform generation.
MARKER OUT	Output	Sends a TTL-level signal that you can set at any point in the waveform being generated. You can use this signal to synchronize or trigger other devices at a certain time within waveform generation.
PLL REF	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PXI-5411/5431 internal clock to the external reference clock. You can also use this connector as a source of the module sample clock from an external device.
DIGITAL PATTERN/ VIDEO DIGITAL PATTERN	Input/ Output	Routes 16-bit digital pattern outputs, digital pattern clock output, marker output, external trigger input, and +5 V power output. Refer to the <i>NI Signal Generators Help</i> for connector pin assignments and signal descriptions.

NI PCI-5411/5431

The NI PCI-5411/5431 have four connectors—three SMB connectors and one 50-pin digital connector, as shown in Figure 7. Signal descriptions are listed in Table 5.

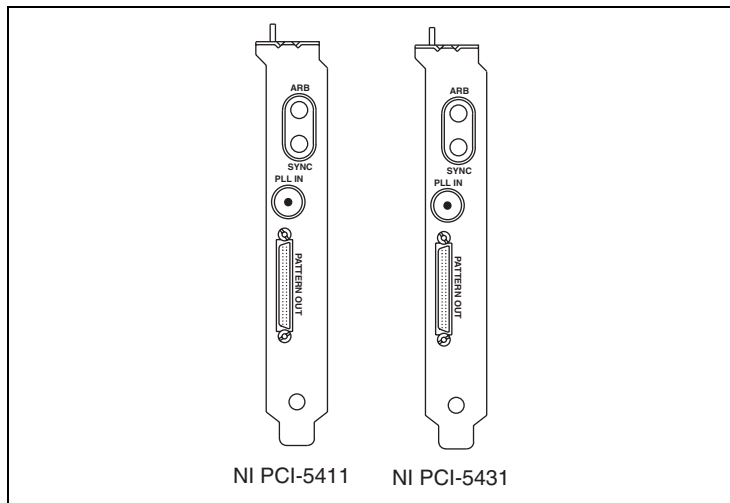


Figure 7. NI PCI-5411/5431 Front Panel Connectors

Table 5. NI PCI-5411/5431 Connectors

Connector	Access	Function
ARB	Output	Provides the waveform output.
SYNC	Output	Provides a TTL version of the sine waveform being generated at the ARB connector.
PLL IN	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PCI-5411/5431 internal clock to the external reference clock.
PATTERN OUT	Input/ Output	Routes the 16-bit digital pattern outputs, digital pattern clock output, marker output, external trigger input, and +5 V power output. Refer to the <i>NI Signal Generators Help</i> for connector pin assignments and signal descriptions.

NI PXI-5421

The NI PXI-5421 has five connectors—four SMB connectors and one 68-pin male VHDCI connector, as shown in Figure 8. Signal descriptions are listed in Table 6.

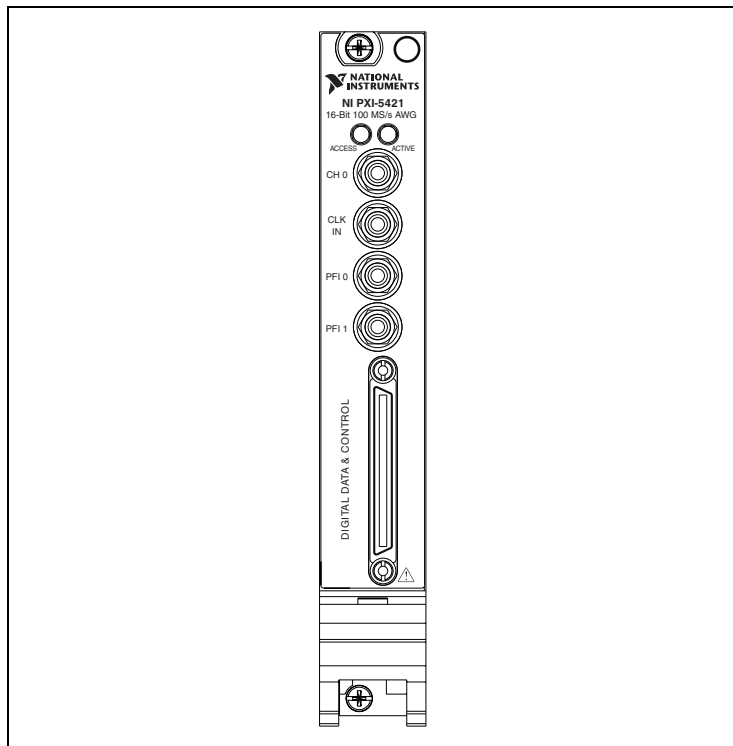


Figure 8. NI PXI-5421 Front Panel Connectors

Table 6. NI PXI-5421 Connectors

Connector	Access	Function
CH 0	Output	Provides the waveform output.
CLK IN	Input	Accepts a PLL reference clock from an external source and can frequency lock the NI PXI-5421 internal clock to the external reference clock. You can also use this connector as a source of the module sample clock from an external device.
PFI 0	Input/ Output	Accepts a trigger from an external source that can start or step through waveform generation, or can route signals out from several clock, event, and trigger sources. Refer to the <i>NI Signal Generators Help</i> for signal descriptions and routing information.
PFI 1	Input/ Output	Accepts a trigger from an external source that can start or step through waveform generation, or can route signals out from several clock, event, and trigger sources. Refer to the <i>NI Signal Generators Help</i> for signal descriptions and routing information.
Digital Data & Control (DDC)	Input/ Output	Routes the 16-bit digital pattern outputs, digital pattern clock output, trigger outputs, trigger inputs, and a clock input. Refer to the <i>NI Signal Generators Help</i> for connector pin assignments and signal descriptions.

Generate Waveforms

To programmatically generate waveforms, use NI-FGEN. Refer to the *NI Signal Generators Help* for more information about using NI-FGEN to generate waveforms.

To interactively generate waveforms, use the FGEN SFP.

- ◆ NI 5431—In addition to generating waveforms with the NI 5431, you can generate video signals using the NI Video Generator Wizard. To generate a video signal with your NI 5431, complete the steps in the [Generate a Video Signal with the NI 5431](#) section of this document.

Generate a Standard Waveform

- ◆ NI 5401/5404/5411/5431—To generate a standard waveform with your module, complete the following steps:
 1. Launch MAX.
 2. Verify that the module you want to test appears under Devices and Interfaces.



Note If the module is not in the Devices and Interfaces list, press <F5> to refresh. If the module is still not in the list, repeat the instructions in the *Configure Your Module* section.

3. Launch the FGEN SFP by one of the following two methods:
 - Select **Start»Programs»National Instruments»NI-FGEN»FGEN Soft Front Panel**.
 - Select **Tools»Soft Front Panels»NI-FGEN Soft Front Panel** from the menu bar in MAX.
4. Verify that the module you installed appears on the FGEN SFP display, as shown in Figure 9.

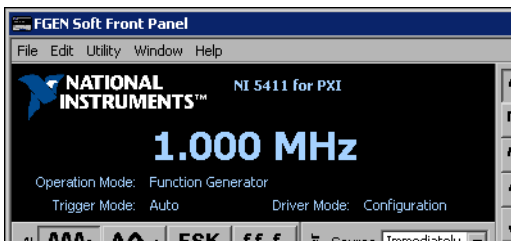


Figure 9. FGEN SFP Display with the NI PXI-5411 Selected



Note If your device is not listed, or if you have more than one type of NI signal generator installed, select **Edit»Device Configuration**. In the Device Configuration dialog box, shown in Figure 10, click the Device listbox drop-down arrow, and select your module from the list. Click **OK** to close the Device Configuration dialog box.

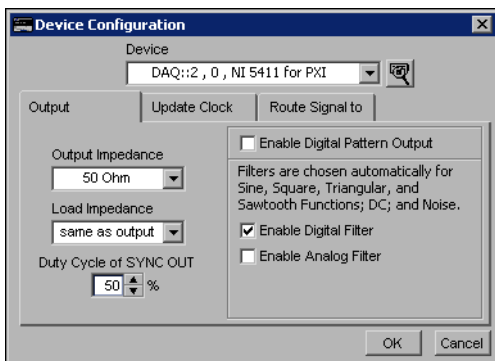




Figure 10. Device Configuration Dialog Box

5. Verify that the standard function waveform mode button  is selected.
6. Select the frequency, amplitude, offset, and type of waveform generated that you want to generate.
7. Click the run button  to initiate waveform generation.

The FGEN SFP default settings instruct the NI 5401/5404/5411/5431 to generate a continuous sine wave at a frequency of 1 MHz, with a peak-to-peak amplitude of 1 V into a 50 Ω load, and no offset. Adjust the sine waveform settings in the FGEN SFP to match your needs. For more information about the FGEN SFP, launch the FGEN SFP and then press <Ctrl-H>.

Generate an Arbitrary Waveform

- ◆ NI 5411/5421/5431—To generate an arbitrary waveform with your module, complete the following steps:
 1. Launch MAX.
 2. Verify that the module you want to test appears under Devices and Interfaces.



Note If the module is not in the Devices and Interfaces list, press <F5> to refresh. If the module is still not in the list, repeat the instructions in the *Configure Your Module* section.

3. Select **Start»Programs»National Instruments»NI-FGEN»FGEN Soft Front Panel**.
4. Verify that the module you installed appears on the FGEN SFP display, as shown in Figure 11.
 - ◆ NI 5411/5431—Verify that the single arbitrary waveform output button located in the Mode section is selected, as shown in Figure 11.
 - ◆ NI 5421—The signal arbitrary waveform output button located in the Mode section is automatically selected.

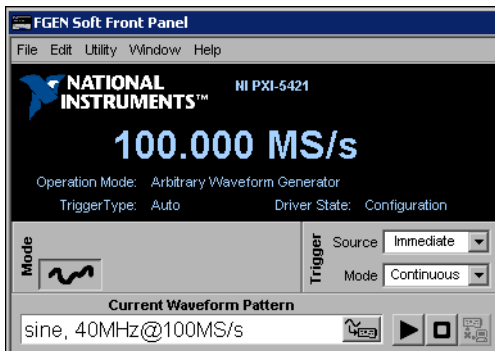


Figure 11. FGEN SFP Display with NI PXI-5421 Selected




Note If your device is not listed, or if you have more than one type of NI signal generator installed, select **Edit»Device Configuration**. In the Device Configuration dialog box, shown in Figure 10, click the Device listbox drop-down arrow, and select your module from the list. Click **OK** to close the Device Configuration dialog box.

- To download a waveform to the module onboard memory, click in the Current Waveform Pattern listbox, and select **Load Waveform from disk**. The File Load dialog box and Select File window both open. The Select File window displays waveform example files.



Note You can also download a waveform by selecting **File»Load New Waveform**. The default location for example waveforms is \\Program Files\IVI\Drivers\niFgen\Waveform\Examples.

- Select `arbMode-sine.lvm`, and click **OK**. A preview of the waveform launches. You can close or minimize the waveform preview window.
- In the File Load dialog box, select one of the following settings from the **Waveform** drop-down list:
 - ◆ NI-PXI-5411/5431—sine, 16MHz@40MS/s
 - ◆ NI-PXI-5421—sine, 40MHz@100MS/s
- Click **OK** in the File Load dialog box.
- Click the run button  to initiate waveform generation. To optimize the sine wave shape, select **Edit»Device Configuration**, and change the filter settings.

The FGEN SFP default settings instruct the NI 5411/5421/5431 to generate a continuous sine wave, with a peak-to-peak amplitude of 1 V into a 50 Ω load, and no offset. Adjust the sine waveform settings in the FGEN SFP to match your needs. For more information about the FGEN SFP, launch the FGEN SFP, then press <Ctrl-H>.

Generate a Video Signal with the NI 5431

To programmatically generate video signals, use the NI Composite Video Generator in LabVIEW. For information about programmatically generating video signals, refer to the *NI 5431 Composite Video Generator Help*. Access this help file by selecting **Help»NI5431** from the LabVIEW VI menu bar.

To interactively generate a video signal using the NI Video Generator Wizard, complete the following steps:

1. Launch MAX.
2. Verify that the module you want to test appears under Devices and Interfaces.



Note If the module is not in the Devices and Interfaces list, press <F5> to refresh. If the module is still not in the list, repeat the instructions in the *Configure Your Module* section.

3. Launch the NI Video Generator Wizard, shown in Figure 12, by selecting **Start»Programs»National Instruments Composite Video Generator»Video Generator Wizard**.

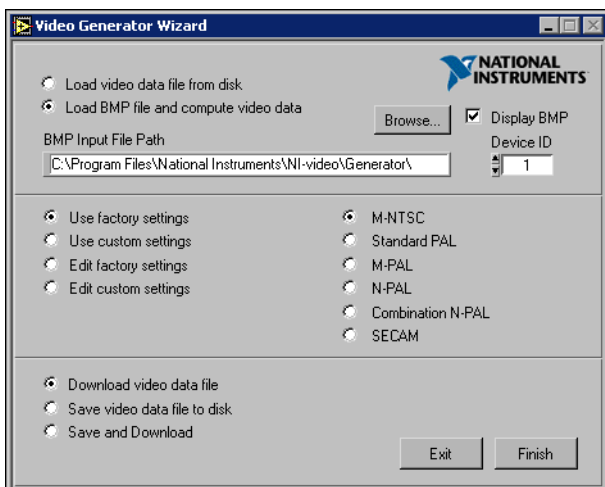


Figure 12. NI Video Generator Wizard Dialog Box

4. Generate a video signal based on a bitmap image using the factory settings by completing the following steps while referring to Figure 12.
 - a. Verify that the Device ID is set to the correct value—the device number previously configured in MAX.
 - b. Select **Load BMP file and compute video data**.
 - c. Click **Browse**.
 - d. Double-click the appropriate directory from the following choices:
 - For NTSC users, double-click the 640x480 or the 1044x480 directory.
 - For PAL and SECAM users, double-click the 768x576 or the 1040x576 directory.



Note For information about video data file formats, refer to the *NI Signal Generators Help*.

- e. Double-click any of the example .bmp files. The bitmap image file path appears in the BMP Input File Path control box.
- f. Select **Use factory settings**. This option applies the default video parameters to the video signal you want to generate.
- g. Select **M-NTSC**, **Standard-PAL**, or **SECAM**, depending on the video format you want to generate.
- h. Select **Download video data file**. This option downloads the binary video data from your computer to the NI 5431 module.



Note To display the .bmp file on your computer monitor, enable **Display BMP**.

- i. Click **Finish**. The Processing dialog box appears displaying the processing status.

Based on the .bmp file you selected, the NI Video Generator Wizard calculates either NTSC, PAL, or SECAM video data, downloads the calculated data to the NI 5431 module, and automatically starts generating the video signal on the VIDEO OUT connector.

FCC/Canada Radio Frequency Interference Compliance

Determining FCC Class

The Federal Communications Commission (FCC) has rules to protect wireless communications from interference. The FCC places digital electronics into two classes. These classes are known as Class A (for use in industrial-commercial locations only) or Class B (for use in residential or commercial locations). All NI products are FCC Class A products.

Depending on where it is operated, this Class A product could be subject to restrictions in the FCC rules. (In Canada, the Department of Communications (DOC), of Industry Canada, regulates wireless interference in much the same way.) Digital electronics emit weak signals during normal operation that can affect radio, television, or other wireless products.

All Class A products display a simple warning statement of one paragraph in length regarding interference and undesired operation. The FCC rules have restrictions regarding the locations where FCC Class A products can be operated.

Consult the FCC Web site at www.fcc.gov for more information.

FCC/DOC Warnings

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual and the CE marking Declaration of Conformity¹, may cause interference to radio and television reception. Classification requirements are the same for the FCC and the Canadian DOC.

Changes or modifications not expressly approved by NI could void the user's authority to operate the equipment under the FCC Rules.

Class A

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful

¹ The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Compliance to EU Directives

Readers in the European Union (EU) must refer to the manufacturer's Declaration of Conformity (DoC) for information¹ pertaining to the CE marking compliance scheme. The manufacturer includes a DoC for most hardware products except for those bought from OEMs. In addition, DoCs are usually not provided if compliance is not required, for example electrically benign apparatus or cables.

To obtain the DoC for this product, click **Declarations of Conformity Information** at ni.com/hardref.nsf/. This Web site lists the DoCs by product family. Select the appropriate product family, followed by your product, and a link to the DoC appears in Adobe Acrobat format. Click the Acrobat icon to download or read the DoC.

Safety Information

This section contains important safety information that you *must* follow when installing and using an NI signal generator.

Do *not* operate the module in a manner not specified in this document. Misuse of the module can result in a hazard. You can compromise the safety protection built into the module if the module is damaged in any way. If the module is damaged, return it to National Instruments (NI) for repair.

Do *not* substitute parts or modify the module except as described in this document. Use the module only with the chassis, modules, accessories, and cables specified in the installation instructions. You *must* have all covers and filler panels installed during operation of the module.

Do *not* operate the module in an explosive atmosphere or where there may be flammable gases or fumes. If you must operate the module in such an environment, it must be in a suitably rated enclosure.

¹ The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

If you need to clean the module, use a soft, nonmetallic brush. Make sure that the module is completely dry and free from contaminants before returning it to service.

Operate the module only at or below Pollution Degree 2. Pollution is foreign matter in a solid, liquid, or gaseous state that can reduce dielectric strength or surface resistivity. The following is a description of pollution degrees:

- Pollution Degree 1 means no pollution or only dry, nonconductive pollution occurs. The pollution has no influence.
- Pollution Degree 2 means that only nonconductive pollution occurs in most cases. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution Degree 3 means that conductive pollution occurs, or dry, nonconductive pollution occurs that becomes conductive due to condensation.

You *must* insulate signal connections for the maximum voltage for which the module is rated. Do *not* exceed the maximum ratings for the module. Do not install wiring while the module is live with electrical signals. Do not remove or add connector blocks when power is connected to the system. Avoid contact between your body and the connector block signal when hot swapping modules. Remove power from signal lines before connecting them to or disconnecting them from the module.

Operate the module at or below the *installation category*¹ marked on the hardware label. Measurement circuits are subjected to *working voltages*² and transient stresses (over voltage) from the circuit to which they are connected during measurement or test. Installation categories establish standard impulse withstand voltage levels that commonly occur in electrical distribution systems. The following is a description of installation categories:

- Installation Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS³ voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

¹ Installation categories, also referred to as *measurement categories*, are defined in electrical safety standard IEC 61010-1.

² Working voltage is the highest rms value of an AC or DC voltage that can occur across any particular insulation.

³ MAINS is defined as a hazardous live electrical supply system that powers equipment. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

- Installation Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 AC voltage for U.S. or 230 AC voltage for Europe). Examples of Installation Category II are measurements performed on household appliances, portable tools, and similar modules.
- Installation Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired equipment such as equipment in fixed installations, distribution boards, and circuit breakers. Other examples are wiring, including cables, bus bars, junction boxes, switches, socket outlets in the fixed installation, and stationary motors with permanent connections to fixed installations.
- Installation Category IV is for measurements performed at the primary electrical supply installation (<1,000 V). Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.

Technical Support Resources

NI Web Support

National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of ni.com.

A 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 electronic compatibility (EMC) and product safety. You can obtain the DoC for your product at ni.com/hardref.nsf. If your product supports calibration, you can obtain the calibration certificate at ni.com/calibration.

Worldwide Support

National Instruments has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of ni.com. Branch office Web sites provide up-to-date contact information, support phone numbers, email addresses, and current events.

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