2.7 GHz RF Vector Signal Generator

NI PXIe-5672 *NEW!*

- 250 kHz to 2.7 GHz
- 16-bit resolution, 100 MS/s arbitrary waveform generation (400 MS/s interpolated)
- 32, 256, or 512 MB memory
- 20 MHz real-time bandwidth
- Full bandwidth stream-from-disk capability
- High-stability timebase (10 MHz OCXO)
- ±20 ppb frequency stability
- ±50 ppb frequency accuracy
- -145 dBm to +10 dBm output power

Operating Systems

- Windows Vista (32- and 64-bit)/XP/2000

Recommended Software

- LabVIEW
- LabWindows™/CVI

Application Software (included)

- Modulation Toolkit for LabVIEW

Driver Software (included)

- NI-RFSG



Overview

The National Instruments PXIe-5672 is a 2.7 GHz RF vector signal generator with quadrature digital upconversion. Digital upconversion provides an efficient mechanism of waveform generation resulting in significant waveform download times. The NI PXIe-5672 provides 16-bit resolution arbitrary waveform generation at 100 MS/s (400 MS/s interpolated), up to 512 MB of memory, and up to 20 MHz of instantaneous signal bandwidth. The NI PXIe-5672 is a general-purpose vector signal generator that can generate standard modulation formats such as AM, FM, PM, ASK, FSK, MSK, GMSK, PSK, QPSK, PAM, and QAM. One accompanying tool is the NI Modulation Toolkit for LabVIEW, which provides functions for signal generation, analysis, visualization, and processing of custom and standard digital and analog modulation formats. The combined functionality of the NI PXIe-5672 and the Modulation Toolkit delivers a highly flexible and powerful solution for scientific research, consumer electronics, communications, aerospace/defense, and semiconductor test applications as well as for emerging areas including software-defined radio, radio-frequency identification (RFID), and wireless sensor networks. For specific communications standards, you can use various software add-ons to generate modulated signals according to standards such as WCDMA, DVB-H, and ZigBee.

High-Speed Data Streaming

Combined with high-speed RAID arrays, the high-speed PXI Express data bus and digital upconversion enable continuous RF generation from hard disk or memory. PXI Express instruments can stream data from the host controller at rates greater than 600 MB/s. With the NI PXIe-5672, you can perform continuous streaming from disk at the maximum output rate of the instrument, 25 MS/s (100 MB/s). For extended waveform generation, the NI PXIe-5672 is capable of streaming continuous waveforms from disk for more than five hours. Applications that benefit from this capability include broadcast video test, record and playback, and extended bit error rate (BER) testing.

Quadrature Digital Upconversion

The NI PXIe-5672 uses a superheterodyne upconversion approach to minimize quadrature error. Digital upconversion of baseband I/Q waveforms to an intermediate frequency (IF) is performed digitally in hardware on a field-programmable gate array (FPGA). With digital upconversion, you can apply interpolating pulse-shaping filters (raised cosine, root-raised cosine, and flat) to improve the efficiency of memory usage. Because this functionality can operate on baseband waveforms sampled as high as 25 MS/s, you can use it for up to the full 20 MHz real-time bandwidth of the instrument.

Hardware Performance

The NI PXIe-5672 provides vector signal generation from 250 kHz to 2.7 GHz over a wide range of signal levels from -145 dBm to +10 dBm in a compact, three-slot, 3U module. It follows industry-standard plug-and-play specifications for the PXI Express bus, and you can seamlessly integrate the NI PXIe-5672 with compliant PXI and PXI Express systems. The NI PXIe-5672 features an onboard ultrahigh-stability oven-controlled crystal oscillator (OCXO), which provides frequency stability of ±20 ppb and frequency accuracy of ±50 ppb. These specifications make it useful

NATIONAL INSTRUMENTS™

for a range of automation applications. A sophisticated calibration scheme is implemented in the NI PXIe-5672 to ensure power-level accuracy over varying temperatures from 0 to 55 °C. This feature is important to many applications, especially in manufacturing environments where the stable operation over varying temperature ranges is critical.

Software

The NI PXIe-5672 is shipped with the NI-RFSG instrument driver and the Modulation Toolkit for LabVIEW. NI-RFSG is a fully functional instrument driver that is compatible with a variety of application software environments including NI LabVIEW, LabWindows/CVI, and C. NI-RFSG features easy-to-use functions for configuring the timing and synchronization, continuous-wave (CW) tone, and arbitrary waveform generation capabilities of the NI PXIe-5672. It also contains Express VIs for both CW and arbitrary waveform generation. In addition, the software includes interactive examples and instructional online help to jump-start your application test development.

NI Modulation Toolkit for LabVIEW

The Modulation Toolkit for LabVIEW provides functions for signal generation, analysis, and visualization of custom and standard analog and digital modulation. With the Modulation Toolkit, you can develop and analyze custom modulation formats and generate these with the NI PXIe-5672. Some of the standard measurement functions include EVM (error vector magnitude), MER (modulation error ratio), and ρ (rho). Functions are also available for injecting impairments including IQ gain imbalance, quadrature skew, and AWGN (additive white Gaussian noise). Visualization functions include trellis, constellation, and 2D and 3D eye diagrams. With this hardware and software, you have access to customizable functionality not available in traditional instrumentation.

NI Modulation Toolkit Functions[1]

Modulation/Demodulation

- AM, FM, PM
- ASK, FSK, PSK
- MSK, GMSK
- PAM, QAM
- BPSK, QPSK, OQPSK, DQPSK, π/4DQPSK

Modulation Analysis Functions

- ρ (rho)
- DC offset
- Phase error
- Quadrature skew
- IQ gain imbalance
- Bit error rate (BER)
- Frequency deviation
- Burst timing measurements
- Modulation error ratio (MER)
- Error vector magnitude (EVM)

Visualization and Analysis

- Trellis diagrams
- Constellation plot
- 2D and 3D eye diagrams

Modulation Impairments

- Frequency offset
- Quadrature skew
- DC offset
- IQ gain imbalance
- Phase noise
- Multipath fading profiles
- Multitone interference
- Additive white Gaussian noise (AWGN)

[1]The NI Modulation Toolkit for LabVIEW data sheet is available separately.

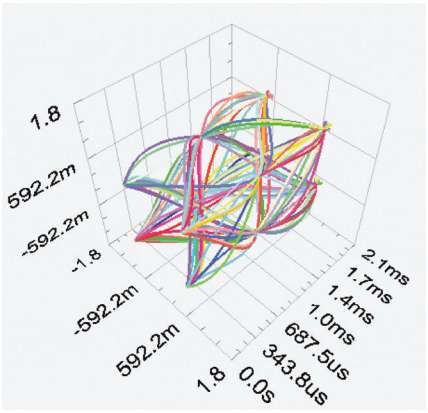


Figure 1. A 3D IQ plot created with the NI Modulation Toolkit for LabVIEW visually separates the I and Q components for this phase-shift keying (PSK) modulated signal.

Superior Flexibility

Today's complex, rapidly evolving systems require flexible platforms with software-defined instruments, and PXI and PXI Express meet that need. Thus you can use a single test set consisting of an NI PXIe-5672 vector signal generator and a PXI-5661 vector signal analyzer for a variety of communication standards. With the appropriate software, you can use this single set of instruments to test each of the following

standards: DVB (digital video broadcast), WiFi (IEEE 802.11a/g), ZigBee, WiMAX (IEEE 802.16), HD Radio, DAB, GPS, and many others.

Calibration

The NI PXIe-5671 consists of two modules, the NI PXI-5610 and the NI PXIe-5442. Each of these is calibrated separately by National Instruments with NIST-traceable and ISO-9002-certified calibration certificates. Temperature variations are calibrated and corrected during normal operation resulting in very high stability and repeatability.

Ordering Information

NI PXIe-5672

32 MB memory 779900-01

256 MB memory 779900-02

512 MB memory 779900-03

Includes Modulation Toolkit for LabVIEW application software and NI-RFSG instrument driver software.

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/rf**.

NI Services and Support



NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit **ni.com/services**.

Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit **ni.com/training**.

Professional Services

Our NI Professional Services team is composed of NI applications and systems engineers and a worldwide National Instruments Alliance Partner program of more than 600 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit **ni.com/alliance**.

NATIONAL INSTRUMENTS™
Certified Alliance Partner

OEM Support

We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit **ni.com/oem**.

Local Sales and Technical Support

In offices worldwide, our staff is local to the country, giving you access to engineers who speak your language. NI delivers industry-leading technical support through online knowledge bases, our applications engineers, and access to 14,000 measurement and automation professionals within NI Developer Exchange forums. Find immediate answers to your questions at **ni.com/support**.

We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit **ni.com/calibration**.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit **ni.com/services**.

NATIONAL INSTRUMENTS™

ni.com • 800 813 3693
National Instruments • info@ni.com

351513A-01 2007-9072-101-D

© 2007 National Instruments Corporation. All rights reserved. CVI, LabVIEW, National Instruments, National Instruments Alliance Partner, NI, ni.com, and SCXI are trademarks of National Instruments. The mark LabWindows is used under a license from Microsoft Corporation. Other product and company names listed are trademarks or trade names of their respective companies. A National Instruments Alliance Partner is a business entity independent from National Instruments and has no agency, partnership, or joint-venture relationship with National Instruments.