

40 and 20 MHz Arbitrary Function Generators

NI 5406, NI 5402

- Phase-continuous frequency hopping and frequency sweeps
- 400 MS/s effective sample rate with interpolation
- .355 μ Hz frequency resolution
- $<\pm 0.4$ dB passband flatness across bandwidth for sine waveforms
- NI-TCik technology for timing and synchronization
- Built-in sine, square, triangle, noise ramp up, ramp down, and DC offset functions
- 32 kB memory for arbitrary waveform generation
- 10 V_{pp} into 50 Ω
- Low-jitter square wave and SYNC (TTL) output

NI 5406

- 40 MHz sine and square wave generation
- 5 MHz ramp and triangle wave generation
- 16-bit resolution

NI 5402

- 20 MHz sine and square wave generation
- 1 MHz ramp and triangle wave generation
- 14-bit resolution

Operating Systems

- Windows XP/2000
- LabVIEW Real-Time

Recommended Software

- LabVIEW
- LabWindows™/CVI
- Measurement Studio
- LabVIEW SignalExpress

Other Compatible Software

- Visual Basic
- ANSI C/C++

Driver Software (included)

- NI-FGEN
- FGEN Soft Front Panel

[Calibration Certificate Available](#)



Overview

NI 5406 and NI 5402 devices are 100 MS/s, 40 and 20 MHz arbitrary function generators (AFGs) that feature up to 16 bits of resolution and 32 kB of onboard memory for arbitrary function generation in a compact, 1-slot 3U PXI module or PCI board. Using these devices, you can combine the power of a stand-alone function generator with the flexibility and benefits of your computer to create highly capable virtual instrumentation solutions. Direct digital synthesis (DDS) is used to precisely generate waveforms that are repetitive in nature, including sine, square, triangle, ramp, noise, and DC waveforms.

Analog Output Performance

These devices feature unparalleled analog output performance in PXI and PCI. The analog output path features a 7-pole elliptical analog filter to suppress high-frequency signal images. Depending on your signal and application needs, you can select up to a 4X digital interpolation for an effective sampling rate up to 400 MS/s. Additionally, the analog output has a passband flatness of ± 0.4 dB across the bandwidth for sine generation.

Frequency Hops and Sweeps

The function generator uses DDS, which is a technique for deriving, under digital control, an analog frequency source from a single reference clock frequency. This technique is used to achieve high-frequency accuracy and resolution; temperature stability; and rapid, phase-continuous frequency switching. All frequency sweeping and hopping is phase-continuous, and you can generate a burst of several tones. Frequency sweeping and hopping is implemented through a frequency list of steps, each of which defines frequency and duration. Complex frequency lists can be instructed with 32 MS/s of available instruction memory.

Timing and Synchronization

Using NI-TCik synchronization technology, you can synchronize multiple NI signal generators for applications requiring a greater number of channels. Because it is built into the Synchronization and Memory Core (SMC), NI-TCik can synchronize NI signal generators with SMC-based high-speed digitizers and digital waveform generator/analyzers for tight correlation of analog and digital stimulus and response. Using onboard calibration measurements and compensation, NI-TCik can

40 and 20 MHz Arbitrary Function Generators

automatically synchronize any combination of SMC-based modules with less than 500 ps_{rms} module-to-module skew. Greatly improved from traditional synchronization methods, the skew between modules does not increase as the number of modules increases. To achieve even better performance, you can use a high-bandwidth oscilloscope to precisely measure the module-to-module skew. Using the oscilloscope measurement for calibration information, NI-TCIk can achieve <20 ps_{rms} module-to-module skew.

Calibration

Every NI 5406 and NI 5402 device is factory calibrated using NIST-traceable standards. NI 5406 and NI 5402 devices have onboard calibration references that correct for environmental effects on DC gain, offset, and timing errors. If you want to calibrate your device externally, return your NI 5406 or NI 5402 devices to National Instruments or ship them to a qualified metrology lab for recalibration.

Software

Every National Instruments signal generator comes with the IVI-compliant NI-FGEN driver, which is fully compatible with NI LabVIEW, LabWindows/CVI, LabVIEW SignalExpress, and Measurement Studio, as well as Microsoft Visual C++ and Visual Basic. NI-FGEN also includes the interactive FGEN Soft Front Panel, with which you can quickly generate standard signals such as sine, square, and ramp, as well as user-defined waveforms. You can generate waveforms with control of frequency, amplitude, and DC offset as well as phase-continuous frequency hopping and sweeping. Simulation mode is available in both the FGEN Soft Front Panel and the NI-FGEN instrument driver, so you can develop your application without having the hardware in your system. In this mode, several developers can write applications for the same hardware and share resources.

Ordering Information

NI PCI-5406.....	779658-01
NI PCI-5402.....	779656-01
NI PXI-5406.....	779657-01
NI PXI-5402.....	779655-01

Includes the NI 540x hardware, NI-FGEN, and FGEN Soft Front Panel. Calibration certificate available.

Recommended PXI Switch

NI PXI-2593.....	778793-01
------------------	-----------

BUY NOW!

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

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.

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

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

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.



ni.com • 800 813 3693

National Instruments • info@ni.com



351333B-01

2008-10591-101-D