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RMX-4104

PRODUCT FLYER

Rack-Mount Programmable Power Supplies and Loads

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Programmable Power Supply Devices

RMX-4101, RMX-4102, RMX-4104, RMX-4120, RMX-4121, RMX-4122, RMX-4123, RMX-4124, RMX-4125, RMX-4126, and RMX-4127



- **Software:** API support for LabVIEW with shipping examples; SCPI-compliant for use with NI-VISA and text-based languages
- Up to 1,500 W options
- Output up to 650 V or 150 A, depending on model
- Combine multiple devices for higher voltage/current
- Calibration software utility included

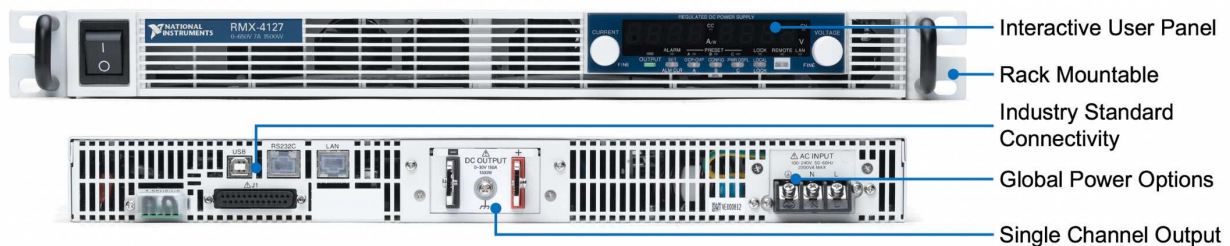
Built for Automated Test and Measurement

Rack-mount power supplies provide programmable DC power in either full or 1/6 rack-width, rack-mount form factors. The RMX-412x models offer up to 1,500 W of power in a 1U, full-rack form factor with flexible voltage and current limits ranging up to 650 VDC or 150 A, making them ideal for test systems that require large amounts of power with a broad range of voltage and current values. For applications requiring more than the specified voltage or current limits, you can combine up to two devices in series for higher voltage and up to four devices in parallel for higher current. The RMX-410x models can source hundreds of watts in a compact 2U, 1/6 rack-width design that makes them ideal for test systems that need multiple power rails. Additionally, both series offer buttons and knobs for interactive use, as well as USB, LAN, RS232 and analog control options for remote or automated use.

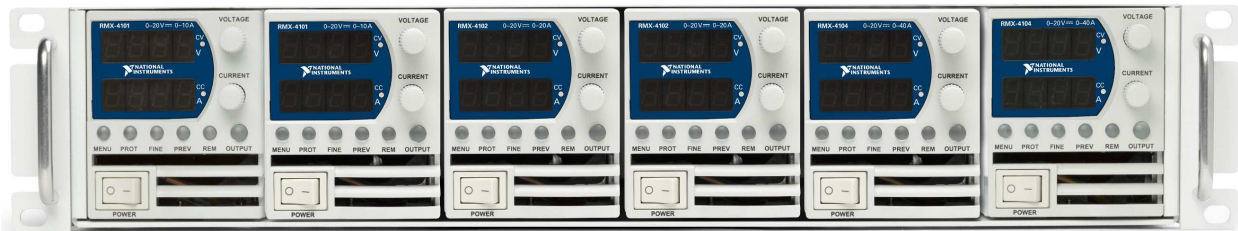
Table 1. NI offers rack power supplies up to 1,500 W. Note that RMX-410x models offer several part number variants per model number with varying I-V capabilities

Model	Max Power	Max Voltage	Max Current	Rack Width	Rack Height
RMX-4101	200 W	100 V	2 A	1/6	2U
RMX-4101	200 W	20 V	10 A	1/6	2U
RMX-4101	210 W	60 V	3.5 A	1/6	2U
RMX-4101	216 W	36 V	6 A	1/6	2U
RMX-4102	400 W	100 V	4 A	1/6	2U
RMX-4102	400 W	20 V	20 A	1/6	2U
RMX-4102	420 W	60 V	7 A	1/6	2U
RMX-4102	432 W	36 V	12 A	1/6	2U
RMX-4104	800 W	100 V	8 A	1/6	2U
RMX-4104	800 W	20 V	40 A	1/6	2U
RMX-4104	840 W	60 V	14 A	1/6	2U
RMX-4104	864 W	36 V	24 A	1/6	2U
RMX-4120	750 W	30 V	75 A	Full	1U
RMX-4121	750 W	80 V	28 A	Full	1U
RMX-4122	750 W	230 V	10 A	Full	1U
RMX-4123	750 W	650 V	3.5 A	Full	1U
RMX-4124	1500 W	30 V	150 A	Full	1U
RMX-4125	1500 W	80 V	56 A	Full	1U
RMX-4126	1500 W	230 V	20 A	Full	1U
RMX-4127	1500 W	650 V	7 A	Full	1U

Detailed View of RMX-4124 Programmable Power Supply



Full Rack of RMX-410x Power Supplies



Key Features

Wide Voltage and Current Ranges

Power supplies are limited by the overall maximum power output, maximum voltage output, and maximum current output. Sometimes, the maximum power is the product of the maximum voltage and maximum current output, following Ohm's law. This results in a uniform, rectangular I-V plot, such as Figure 1.

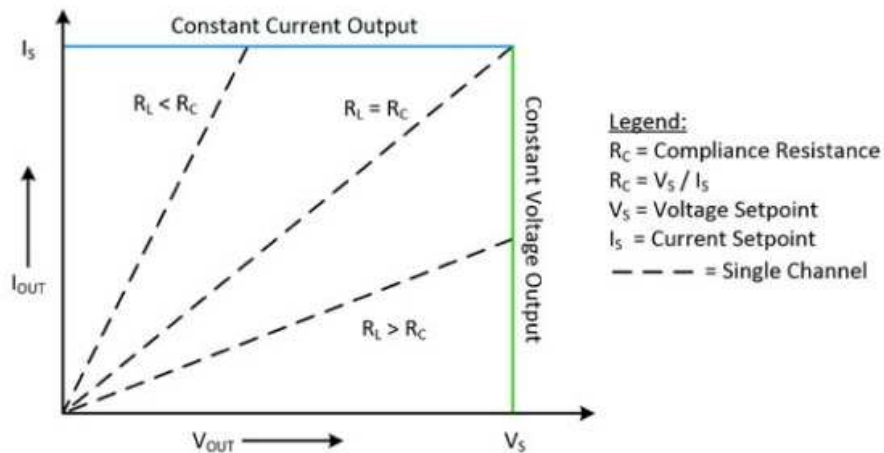


Figure 1. When outputting a constant voltage, you can set a current limit to protect the device under test (DUT). Alternatively, when outputting a constant current, you can set a voltage limit to protect the DUT.

However, many power supplies offer wider voltage and current ranges, which are still limited by the maximum power output of the device, but will provide maximum flexibility when selecting voltage or current output. The RMX-412x power supplies offer comparably wide I-V ranges, allowing more flexibility when selecting voltage or current output levels. In many cases, a single RMX-412x power supply can achieve the maximum voltage and current outputs of multiple competitor devices, allowing you to purchase fewer power supplies for the same I-V range. For example, the RMX-4124 can output up to 30 V or 150 A, but is still limited to 1,500 W (not 4,500 W).

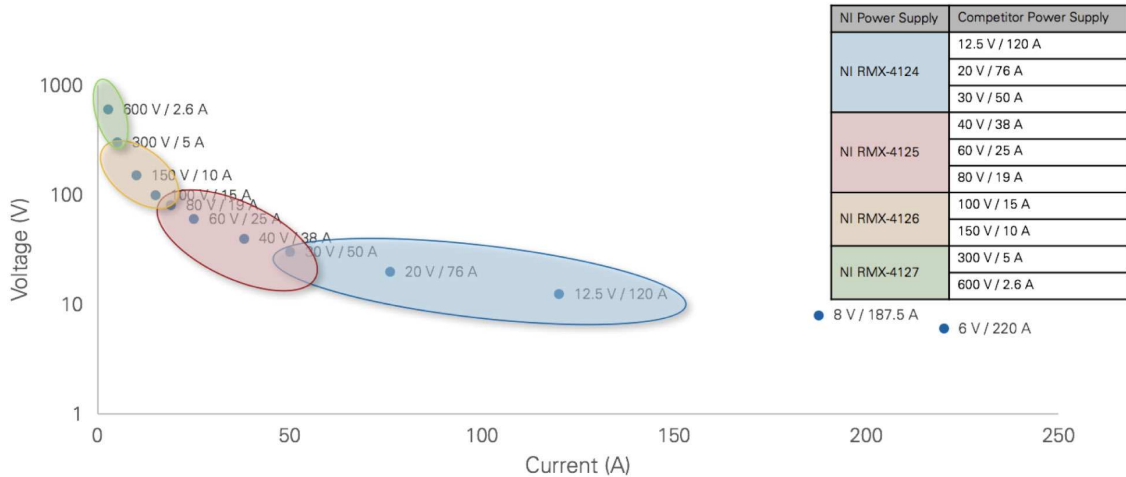


Figure 2. RMX-412x power supplies offer wide I-V ranges, allowing maximum flexibility when selecting voltage or current output levels.

Calibration

The RMX-412x power supplies have a one-year suggested calibration interval and offer multiple calibration options ranging from manual calibration to paid, automated calibration services. To calibrate an RMX-412x power supply yourself, you can use the free RMX-412x calibration software utility and a digital multimeter. Learn about [NI Digital Multimeters](#).

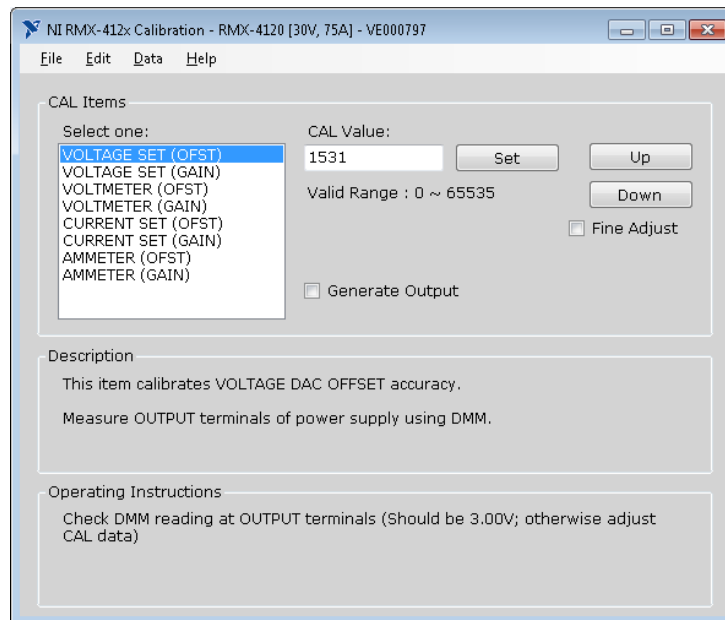
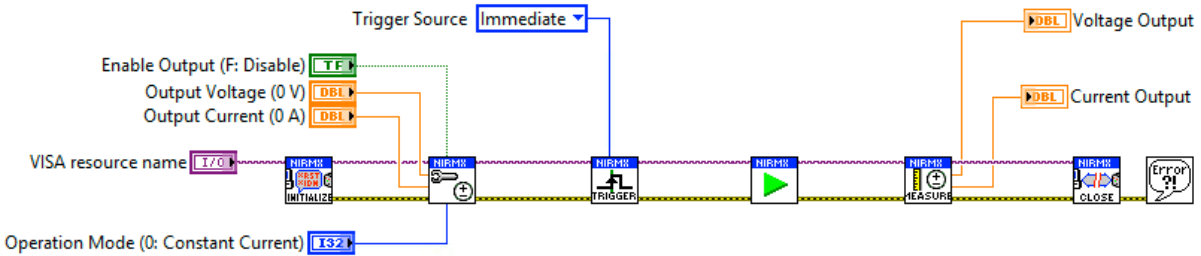


Figure 3. RMX-412x Power Supplies can be calibrated manually using the free RMX-412x Calibration Software Utility and a digital multimeter.

Alternatively, NI offers standard calibration services for traceable, compliant, and accredited calibration options. Visit [ni.com](#) to learn more about [NI's calibration services](#).

NI RMX Power Supply API

The NI RMX-412x and RMX-410x Power Supply instrument drivers includes a best-in-class LabVIEW API, based on SCPI commands, that is complete with help files, documentation, and various ready-to-run shipping examples you can use as a starting point for your application.



For text-based programming options, you can use the NI-VISA driver to send SCPI commands from C or .NET languages. Visit ni.com to learn more about [NI drivers](#).

Electronic Load Devices

RMX-4003, RMX-4004, RMX-4005, and RMX-4006



- **Software:** API support for LabVIEW with shipping examples; SCPI-compliant for use with NI-VISA and text-based languages
- One- and two-channel options
- Sink up to 350 W
- Up to 500 V
- Up to 70 A
- Stack multiple channels and link multiple mainframes for higher power and parallel operation

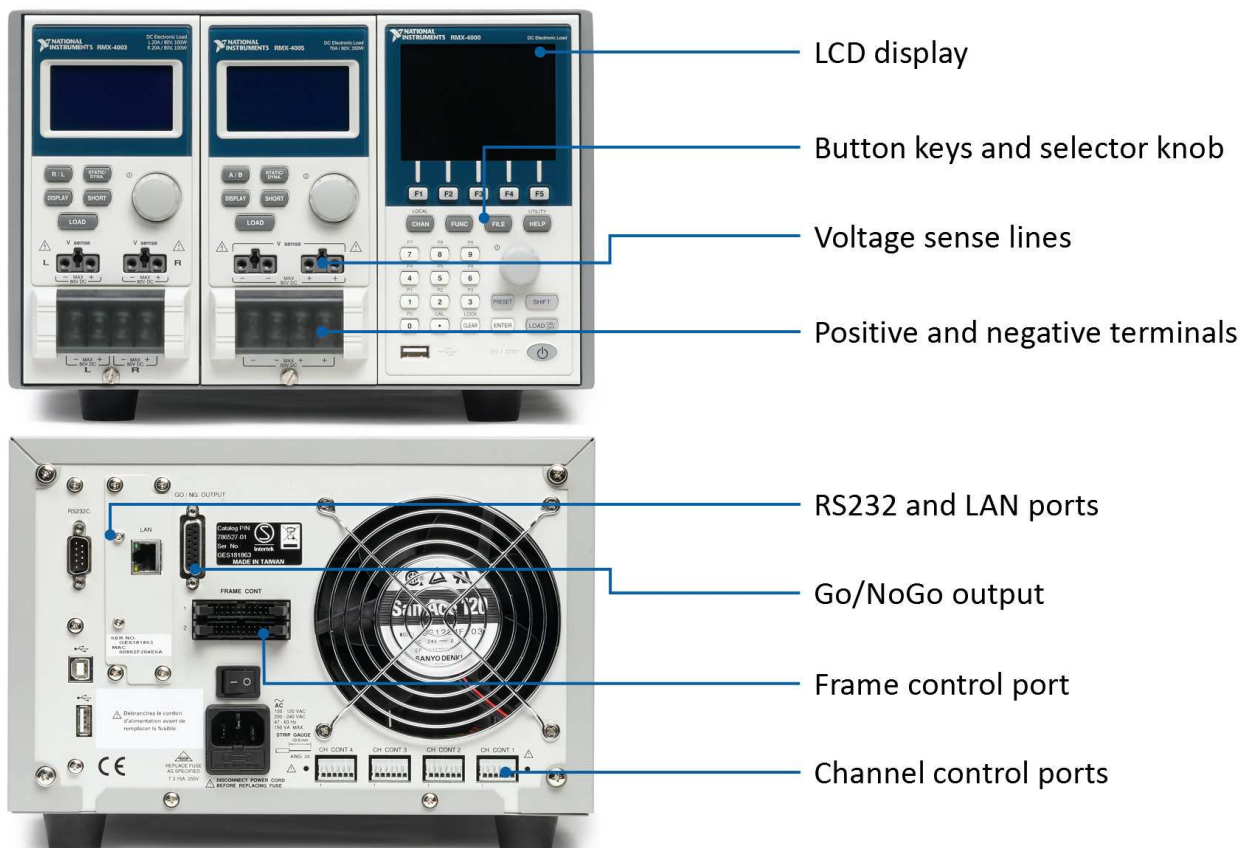
Built for Automated Test and Measurement

Electronic Load Devices can sink power at various current and voltage levels for power supply design, quality inspection, and functional tests. Their modular design and several operating modes allow them to simulate the real load that a power source sees in its actual application. They also feature buttons and knobs for interactive use as well as USB or RS232 interface options for automated use. You can connect multiple loads in parallel to increase your system's overall power capacity.

Table 2. NI offers DC electronic loads up to 350 W. Each load requires either the RMX-4000 (two-slot) or RMX-4002 (four-slot) mainframe for operation.

Model	Channels	Max Power	Max Voltage	Max Current
RMX-4003	2	100 W, 100 W	80 V, 80 V	20 A, 20 A
RMX-4004	2	30 W, 250 W	80 V, 80 V	5 A, 40 A
RMX-4005	1	350 W	80 V	70 A
RMX-4006	1	350 W	500 V	10 A

Detailed View of RMX Load Family



Key Features

Multiple Operating Modes

Electronic loads can operate in constant current, constant voltage, constant resistance, or constant power modes to serve a wide variety of DUT needs. All modes support configurable range limits, slew rates, and protection limits.

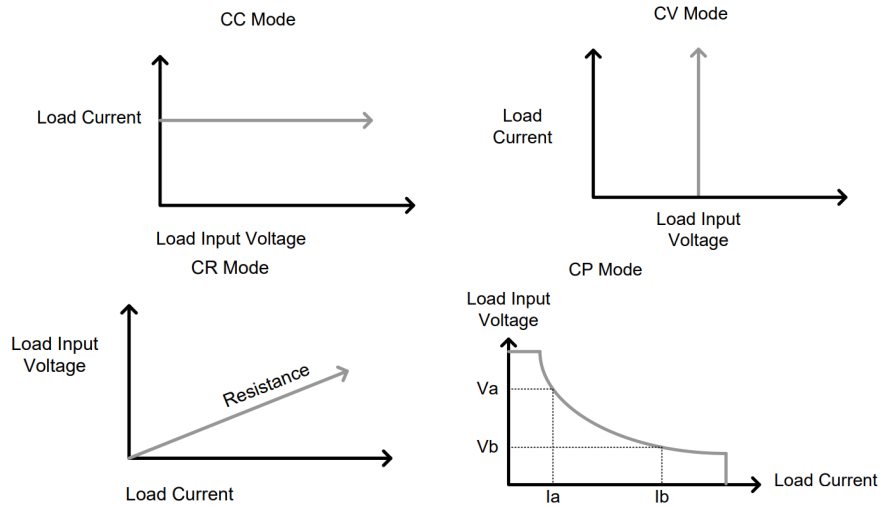
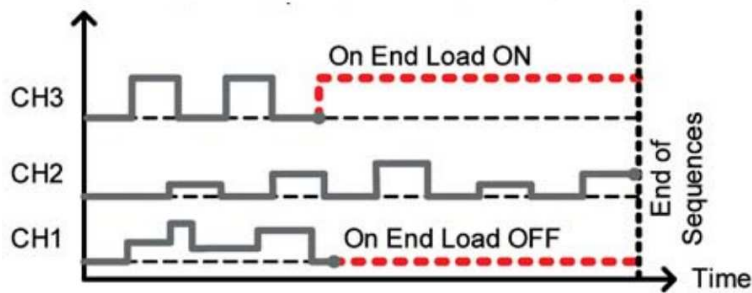


Figure 4. Operating modes of Electronic Load Devices

Dynamic Mode and Sequencing

Electronic loads are more dynamic than manual resistor banks for simulating various power states quickly. Using dynamic mode in constant current or constant resistance mode, you can test transient load conditions like in charge and discharge cycle testing.

Sequences can realistically simulate a multi-output power supply load by changing each channel's sink according to a predefined sequence. Each channel can change its load sink at 25 μ s – 60,000 s per point independently, and each point can have a different duration, slew rate, and value.



Sequence - On End Load

Figure 5: Sequence mode of Electronic Load Devices

Channel Stacking

For a maximum total 7 kW load capacity for high-current and high-power applications, you can link up to five mainframes together using frame link cables and stack channels. Modules must be of the same type for parallel operation. This configuration enables you to use a single communication interface for all the channels in the system.

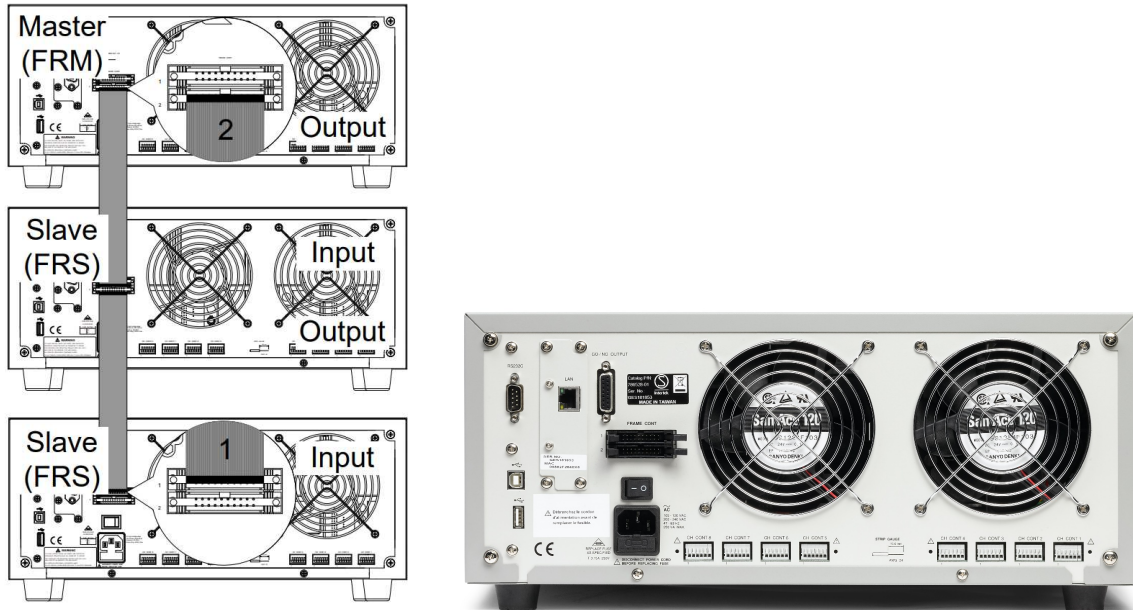
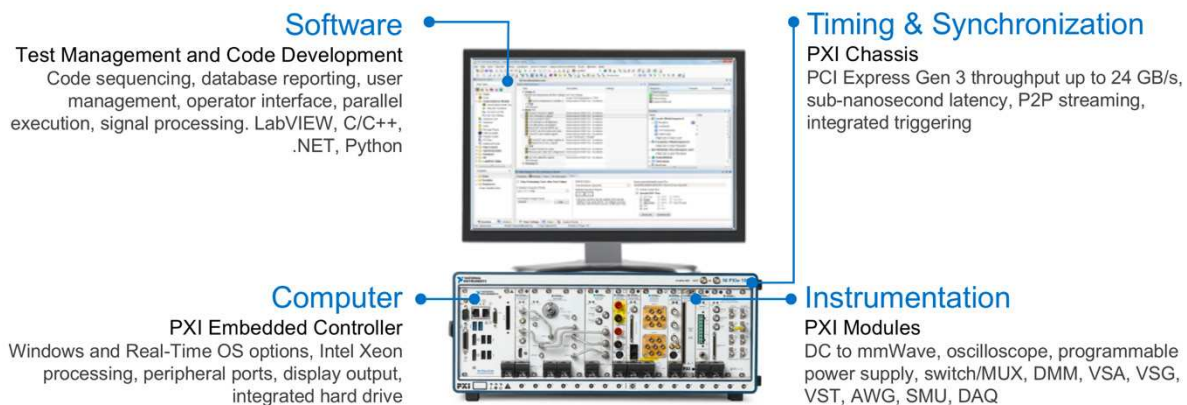


Figure 6: Up to four slave mainframes can be connected to a master mainframe for channel stacking.

Platform-Based Approach to Test and Measurement





What Is PXI?

Powered by software, PXI is a rugged PC-based platform for measurement and automation systems. PXI combines PCI electrical-bus features with the modular, Eurocard packaging of CompactPCI and then adds specialized synchronization buses and key software features. PXI is both a high-performance and low-cost deployment platform for applications such as manufacturing test, military and aerospace, machine monitoring, automotive, and industrial test. Developed in 1997 and launched in 1998, PXI is an open industry standard governed by the PXI Systems Alliance (PXISA), a group of more than 70 companies chartered to promote the PXI standard, ensure interoperability, and maintain the PXI specification.



Integrating the Latest Commercial Technology

By leveraging the latest commercial technology for our products, we can continually deliver high-performance and high-quality products to our users at a competitive price. The latest PCI Express Gen 3 switches deliver higher data throughput, the latest Intel multicore processors facilitate faster and more efficient parallel (multisite) testing, the latest FPGAs from Xilinx help to push signal processing algorithms to the edge to accelerate measurements, and the latest data converters from TI and ADI continually increase the measurement range and performance of our instrumentation.

<p>HIGHER DATA THROUGHPUT</p>  <p>PCI Express Gen 3</p>	<p>PARALLEL TEST EXECUTION</p>  <p>Multicore Processors</p>	<p>MEASUREMENT ACCELERATION</p>  <p>FPGAs</p>	<p>INCREASED MEASUREMENT RANGE</p>  <p>Data Converters</p>
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PXI Instrumentation

NI offers more than 600 different PXI modules ranging from DC to mmWave. Because PXI is an open industry standard, nearly 1,500 products are available from more than 70 different instrument vendors. With standard processing and control functions designated to a controller, PXI instruments need to contain only the actual instrumentation circuitry, which provides effective performance in a small footprint. Combined with a chassis and controller, PXI systems feature high-throughput data movement using PCI Express bus interfaces and sub-nanosecond synchronization with integrated timing and triggering.



Oscilloscopes

Sample at speeds up to 12.5 GS/s with 5 GHz of analog bandwidth, featuring numerous triggering modes and deep onboard memory



Digital Multimeters

Perform voltage (up to 1000 V), current (up to 3A), resistance, inductance, capacitance, and frequency/period measurements, as well as diode tests



Digital Instruments

Perform characterization and production test of semiconductor devices with timing sets and per channel pin parametric measurement unit (PPMU)



Waveform Generators

Generate standard functions including sine, square, triangle, and ramp as well as user-defined, arbitrary waveforms



Frequency Counters

Perform counter timer tasks such as event counting and encoder position, period, pulse, and frequency measurements



Source Measure Units

Combine high-precision source and measure capability with high channel density, deterministic hardware sequencing, and SourceAdapt transient optimization



Power Supplies & Loads

Supply programmable DC power, with some modules including isolated channels, output disconnect functionality, and remote sense



FlexRIO Custom Instruments & Processing

Provide high-performance I/O and powerful FPGAs for applications that require more than standard instruments can offer



Switches (Matrix & MUX)

Feature a variety of relay types and row/column configurations to simplify wiring in automated test systems



Vector Signal Transceivers

Combine a vector signal generator and vector signal analyzer with FPGA-based, real-time signal processing and control



GPIB, Serial, & Ethernet

Integrate non-PXI instruments into a PXI system through various instrument control interfaces



Data Acquisition Modules

Provide a mix of analog I/O, digital I/O, counter/timer, and trigger functionality for measuring electrical or physical phenomena

Hardware Services

All NI hardware includes a one-year warranty for basic repair coverage, and calibration in adherence to NI specifications prior to shipment. PXI systems also include basic assembly and a functional test. NI offers additional entitlements to improve uptime and lower maintenance costs with service programs for hardware. Learn more at ni.com/services/hardware.

	Standard	Premium	Description
Program Duration	1, 3, or 5 years	1, 3, or 5 years	Length of service program
Extended Repair Coverage	•	•	NI restores your device's functionality and includes firmware updates and factory calibration.
System Configuration, Assembly, and Test ¹	•	•	NI technicians assemble, install software in, and test your system per your custom configuration prior to shipment.
Advanced Replacement ²		•	NI stocks replacement hardware that can be shipped immediately if a repair is needed.
System Return Material Authorization (RMA) ¹		•	NI accepts the delivery of fully assembled systems when performing repair services.
Calibration Plan (Optional)	Standard	Expedited ³	NI performs the requested level of calibration at the specified calibration interval for the duration of the service program.

¹This option is only available for PXI, CompactRIO, and CompactDAQ systems.

²This option is not available for all products in all countries. Contact your local NI sales engineer to confirm availability.

³Expedited calibration only includes traceable levels.

PremiumPlus Service Program

NI can customize the offerings listed above, or offer additional entitlements such as on-site calibration, custom sparring, and life-cycle services through a PremiumPlus Service Program. Contact your NI sales representative to learn more.

Technical Support

Every NI system includes a 30-day trial for phone and e-mail support from NI engineers, which can be extended through a [Software Service Program \(SSP\)](#) membership. NI has more than 400 support engineers available around the globe to provide local support in more than 30 languages. Additionally, take advantage of NI's award winning [online resources](#) and [communities](#).

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