

PRODUCT FLYER

# Digital Waveform Instruments

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# Digital Waveform Instruments

PXI-6541, PXI-6542, PXIe-6544, PXIe-6545, PXIe-6547, PXIe-6548, PCI-6541, and PCI-6542



- **Software:** Includes interactive soft front panel, API support for LabVIEW and text-based languages, shipping examples, and detailed help files
- Standard TTL/CMOS interface voltages and programmable voltage levels
- 24 to 36 bidirectional channels
- 50, 100, and 200 MHz product options
- Advanced waveform sequencing and streaming features
- Optional semiconductor test features available

## A Full Catalog of Digital Instruments for Interfacing and Functional Test

NI digital waveform instruments offer a flexible range of data rates, programmable voltage levels, onboard data compare, and light characterization/validation features like edge delays, programmable voltage thresholds, and DC parametric measurements. These instruments are ideal for interfacing with static or dynamic digital buses and doing stand-alone digital connectivity functional tests like bit error rate and integrated, mixed-signal testing that involves a number of instrument to test a single device.

For production and characterization test of semiconductor devices, consider [PXI Digital Pattern Instruments](#).

For basic digital signals and interfaces, consider PXI Digital I/O Modules or PXI Reconfigurable Digital I/O Modules.

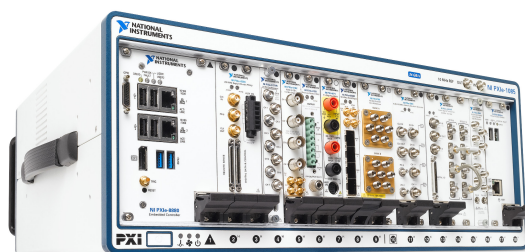
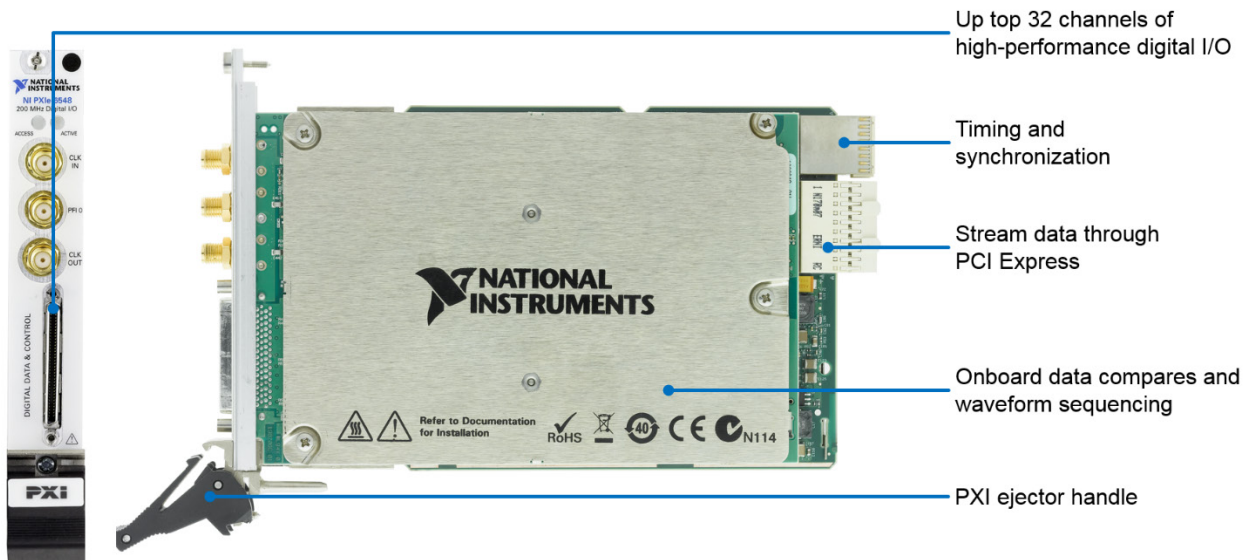


Table 1. NI offers digital waveform instruments ranging from standard interfacing modules to limited semiconductor production and characterization test instruments.

	PXI-6541 PCI-6541	PXI-6542 PCI-6542	PXle-6544	PXle-6545	PXle-6547	PXle-6548
Selectable Voltage Levels	1.8, 2.5, and 3.3 V	1.8, 2.5, and 3.3 V	1.2, 1.5, 1.8, 2.5, and 3.3 V	1.2, 1.5, 1.8, 2.5, and 3.3 V	1.2 to 3.3 V in 100 mV steps	1.2 to 3.3 V in 100 mV steps
Maximum Clock Rate	50 MHz	100 MHz	100 MHz	200 MHz	100 MHz	200 MHz
Maximum Data Rate	50 Mbits/s	100 Mbits/s	100 Mbits/s	100 Mbits/s	200 Mbits/s (DDR)	400 Mbits/s Generation/ 300 Mbits/s Acquisition (DDR)
Edge Delay			Per Instrument	Per Instrument	Per Bank	Per Bank
Waveform Sequencing	•		•	•	•	•
Waveform Scripting					•	•
Hardware Compare					•	•

## Detailed View of PXle-6548 Digital Waveform Instrument



# Key Features

## Synchronization Memory Core

NI digital instruments improve the speed and programming efficiency of testing of mixed signal devices through a device architecture that takes advantage of PXI. The most significant of these features are deep onboard memory and a sophisticated synchronization and data streaming design. National Instruments designed the Synchronization and Memory Core (SMC) as the common architecture for a suite of high-speed modular instruments that answer the challenge with flexible input and output data transfer cores, high-speed deep onboard memory scalable up to 512 MB per channel, precise timing and synchronization engine.

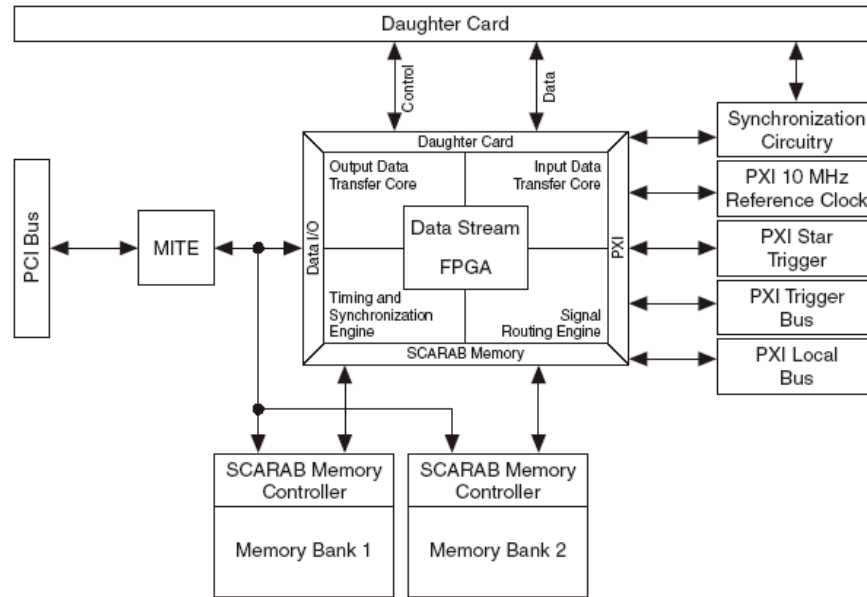
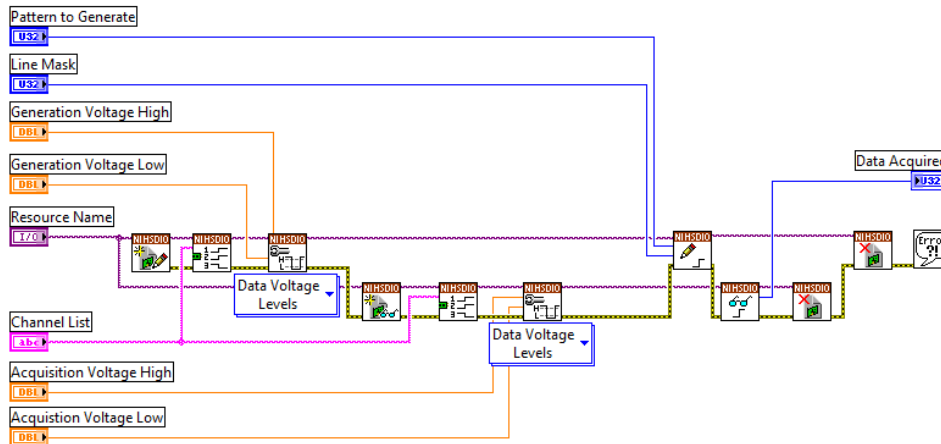


Figure 1. NI waveform generators are built around a common architecture called the Synchronization Memory Core that empowers the synchronization and data streaming features of the instrument.

## NI-HSDIO Application Programming Interface (API)

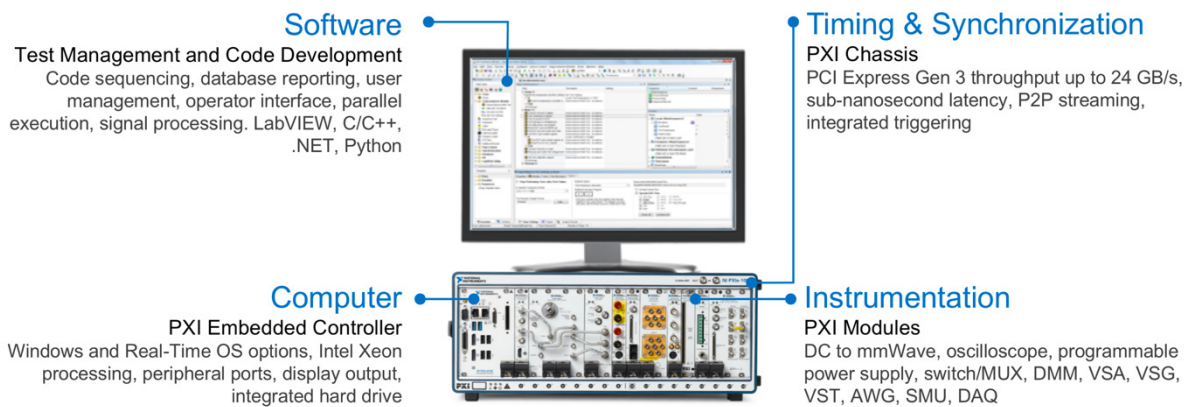
The [NI-HSDIO driver](#) includes a best-in-class API that works with a variety of development options such as LabVIEW, C, C#, and others. The driver also provides access to help files, documentation, and dozens of ready-to-run shipping examples you can use as a starting point for your application.



# 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



## GPIO, 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](https://ni.com/services/hardware).

	Standard	Premium	Description
Program Duration	3 or 5 years	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 <sup>1</sup>	•	•	NI technicians assemble, install software in, and test your system per your custom configuration prior to shipment.
Advanced Replacement <sup>2</sup>		•	NI stocks replacement hardware that can be shipped immediately if a repair is needed.
System Return Material Authorization (RMA) <sup>1</sup>		•	NI accepts the delivery of fully assembled systems when performing repair services.
Calibration Plan (Optional)	Standard	Expedited <sup>3</sup>	NI performs the requested level of calibration at the specified calibration interval for the duration of the service program.

<sup>1</sup>This option is only available for PXI, CompactRIO, and CompactDAQ systems.

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

<sup>3</sup>Expedited 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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