

S Series Simultaneous Sampling Multifunction DAQ – 16-Bit, 4 MS/s per Channel, 4 Analog Inputs

NI PXIe-6124 **NEW!**

- 4 differential 16-bit analog inputs at 4 MS/s per channel
- Simultaneous sampling
- Two 16-bit analog outputs at 4 MS/s single channel, 2.5 MS/s both channels
- 24 digital I/O (DIO) lines (5 V/TTL/CMOS)
- 16 static DIO lines, 8 correlated (timed) DIO lines from 0 to 10 MHz
- Two 32-bit counter/timers
- PXI Express interface for fast, dedicated bandwidth

Operating Systems

- Windows Vista/XP/2000

Recommended Software

- LabVIEW
- LabWindows™/CVI
- Measurement Studio

Other Compatible Software

- Visual Studio .NET
- Visual Basic 6.0
- ANSI C/C++, C#
- LabVIEW SignalExpress

Measurement Services Software (included)

- NI-DAQmx driver software
- Measurement & Automation Explorer configuration utility
- LabVIEW SignalExpress LE data-logging software



Product	Analog Inputs	Input Resolution	Sampling Rate	Input Ranges (V)	Analog Outputs	Update Rate	Digital I/O	Triggering
NI PXIe-6124	4	16 bits	4 MS/s	±1, ±2, ±5, ±10	2	Up to 4 MS/s	24	Analog, digital

Table 1. NI PXIe-6124 Specifications Overview

Overview and Applications

The NI PXIe-6124 S Series multifunction data acquisition (DAQ) module offers simultaneous sampling at 4 MS/s per channel, 16 bits of resolution, and a PXI Express interface for dedicated bandwidth from module to controller. The module features high speed and resolution that suit a variety of applications such as:

- Highly transient signal acquisition
- Ballistics and impact testing
- High-energy physics
- Ultrasonic and sonar testing

Features

Simultaneous Sampling – The NI PXIe-6124 samples its four analog inputs simultaneously with a dedicated 16-bit analog-to-digital converter (ADC) per channel. Simultaneous sampling has several benefits:

- High sampling rate on all analog input channels
- High aggregate data throughput
- No interchannel delay

Multiplexed devices share one ADC among multiple channels, keeping the aggregate data throughput constant regardless of the number of active channels. For simultaneously sampling devices, the aggregate data throughput increases linearly with the number of active channels

and selected sampling rate, up to 16 million samples per second for this device.

Simultaneous sampling devices also preserve the phase relationship between input signals and do not have an interchannel delay introduced by a multiplexer.

PXI Express Interface – The NI PXIe-6124 features a x1 PXI Express interface and is compatible with x1 and x4 PXI Express slots or PXI Express hybrid slots.

Where PCI and PXI share bandwidth among the modules, PCI Express and PXI Express provide dedicated bandwidth to each module, which means you can have several modules streaming data to and from the controller without resource contention. The NI PXIe-6124 also features six DMA channels, so you can use the analog, digital, and counter functionality with minimal CPU interaction.

The PXI Express bus delivers the industry's best synchronization and latency specifications. For more information on PXI and PXI Express, visit ni.com/pxi.

High-Speed Stream to Disk – With the high bandwidth provided by PXI Express, it is possible to stream hundreds of megabytes of data per second to disk. For more information on the best hardware and software to use for streaming, visit ni.com/streaming.

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Better Dynamic Specifications – The analog input path on S Series devices is tuned for both accurate DC and dynamic measurements, while multiplexed data acquisition devices suffer from settling time and distortion error created by switching the input channel.

Many Input Ranges – You can configure each analog input channel to use one of four voltage ranges, from ± 1 to ± 10 V. By selecting the input range most appropriate for your signal, you maximize the available 16 bits of resolution.

Signal Conditioning – With the release of NI-DAQmx 7.4, all S Series devices are compatible with parallel mode SCXI modules.

Model	Description	Channels
SCXI-1520	Universal strain gage input	8
SCXI-1125	Isolation amplifier	8
SCXI-1141/2/3	8-pole lowpass filters	8

Table 2. Most Commonly Used Parallel-Mode SCXI Modules

Although you can sample signals through an SCXI module at up to 4 MS/s, the SCXI module reduces the available analog bandwidth.

For more information, visit ni.com/signalconditioning.

Recommended Software

National Instruments measurement services software, built around NI-DAQmx driver software, includes intuitive application programming interfaces, configuration tools, I/O assistants, and other tools designed to reduce system setup, configuration, and development time. National Instruments recommends using the latest version of NI-DAQmx driver software for application development in NI LabVIEW, LabWindows/CVI, and Measurement Studio. To obtain the latest version of NI-DAQmx, visit ni.com/support/daq/versions. NI measurement services software speeds up your development with features including:

- A guide to create fast and accurate measurements with no programming using the DAQ Assistant
- Free LabVIEW SignalExpress LE data-logging software
- Automatic code generation to create your application in LabVIEW; LabWindows/CVI; LabVIEW SignalExpress; and Visual Studio .NET, ANSI C/C++, C#, or Visual Basic 6.0
- Multithreaded technology for 1,000 times performance improvements over basic data acquisition driver software
- More than 3,000 free software downloads to jump-start your project available at ni.com/zone

Easy Multidevice Programming – NI-DAQmx driver software now supports multidevice tasks for S Series. Synchronizing channels on multiple devices using the RTSI, PXI, or PXI Express bus is now as simple as configuring a single data acquisition board. This greatly reduces the time and complexity involved with multidevice application programming, and is now available for any combination of S Series devices.

The NI PXIe-6124 is compatible with NI-DAQmx Version 8.8 or later. It also is compatible with the following versions (or later) of NI application software: LabVIEW 7.1, LabWindows/CVI 7.1, Measurement Studio 7.1, or LabVIEW SignalExpress 3.0.

Cables and Accessories

The NI PXIe-6124 uses a 68-pin VHDCI connector and is compatible with the following cables and accessories.



SHC68-68-EPM (Recommended) – Shielded 68-conductor cable with individually shielded analog twisted pairs for reduced crosstalk.

Connects device to 68-pin accessories.

0.5 m cable	192061-0R5
1 m cable	192061-01
2 m cable	192061-02
10 m cable	192061-10



SCB-68 (Recommended) – Rugged, low-noise shielded I/O connector block with screw terminals and a general breadboard area for 68-pin devices.

SCB-68	776844-01
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TB-2706 – Direct connector block on the front panel of the NI PXIe-6124, eliminating the need for a cable. Provides 70 screw terminals and a metal enclosure with strain relief.

TB-2706	779183-01
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BNC-2110 – Shielded connector block that provides screw terminals for digital and timing I/O connections and BNC connectors for analog I/O.
 BNC-2110777643-01



BNC-2120 – Shielded connector block that provides screw terminals, BNC connectors, a function generator, and a quadrature encoder.
 BNC-2120777960-01



BNC-2090A – Shielded, 1U, 19 in. rack-mountable connector block with 22 signal-labeled BNC connectors.
 BNC-2090A779556-01



RC68-68 – Unshielded ribbon cable that connects to 68-pin accessories.
 0.25 m cable187252-0R25
 0.5 m cable187252-0R5
 1 m cable187252-01



CB-68LP – Low-cost, unshielded termination accessory with 68 screw terminals for easy connection of field I/O signals.
 CB-68LP777145-01



CB-68LPR – Right-angle mounted, unshielded termination board with 68 screw terminals.
 CB-68LPR777145-02



TBX-68 – Unshielded, 68-pin connector block with DIN-rail mounting.
 TBX-68777141-01



PCB Mounting Connectors – PCB connectors for use in building custom accessories that connect to 68-conductor shielded and ribbon cables.
 68-pin, male, right-angle mounting777600-01
 68-pin, male, vertical mounting777601-01

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Custom cable connector/backshell kit – 68-pin female mating connector and backshell kit for use in making custom cables. Solder-cup contacts are available for soldering of cable wires to the connector.
68-Pin Connector/Backshell Kit776832-01

Ordering Information

NI PXIe-6124 780536-01

BUY NOW!

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

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Specifications

>> For complete specifications, see the *NI PXIe-6124 Specifications* manual at ni.com/manuals.

The following specifications are typical at 25 °C unless otherwise noted.

Analog Input

Number of channels.....	4 differential
Type of ADC	
Resolution	16 bits, 1 in 65,536
Pipeline	0
Sampling rate	
Maximum	4 MS/s per channel
Minimum.....	No minimum
Input coupling	DC
Input ranges	±10, ±5, ±2, ±1 V
Input FIFO size.....	16,382 samples shared among channels used
Data transfers	DMA (scatter-gather), interrupts, programmed I/O

Analog Output

Number of channels.....	2 voltage
DAC characteristics	
Resolution	16 bits
Pipeline	0
Sampling rate	
Maximum	
One channel	4 MS/s
Two channels.....	2.5 MS/s
Minimum.....	No minimum
Output coupling.....	DC
Output range	±10 V
Output current drive.....	±5 mA
AO waveform modes:	
• Nonperiodic waveform	
• Periodic waveform regeneration mode from onboard FIFO	
• Periodic waveform regeneration from host buffer including dynamic update	
Output FIFO size	8,191 samples shared among channels used
Data transfers	DMA (scatter-gather), interrupts, programmed I/O

Digital I/O/PFI

Static Characteristics

Number of channels.....	24 total, 8 (P0.<0..7>), 16 (PFI <0..7>/P1, PFI <8..15>/P2)
Compatibility	TTL/CMOS
Direction control	Each terminal individually programmable as input or output
Data transfers	DMA (scatter-gather), interrupts, programmed I/O

General-Purpose Counter/Timers

Number of counter/timers	2
Resolution	32 bits
Counter measurements.....	Edge counting, pulse, semi-period, period, two-edge separation
Position measurements	X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding
Output applications.....	Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling
Internal base clocks	80 MHz, 20 MHz, 0.1 MHz
Data transfers	Dedicated scatter-gather DMA controller for each counter/timer, interrupts, programmed I/O

External Digital Triggers

Source	Any PFI, RTSI, PXI_TRIG, PXI_STAR
Polarity	Software-selectable for most signals
Analog input function	Start Trigger, Reference Trigger, Sample Clock, Convert Clock, Sample Clock Timebase
Analog output function	Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase

Bus Interface

Slot compatibility.....	x1 and x4 PXI Express or PXI Express hybrid slots
DMA channels	6, analog input, analog output, digital input, digital output, counter/timer 0, counter/timer 1

Physical

Dimensions (not including connectors).....	Standard 3U PXI, 16 by 10 cm (6.3 by 3.9 in.)
I/O connector	68-pin VHDCI

Safety and Compliance

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note: For UL and other safety certifications, refer to the product label or visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

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Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note: For the standards applied to assess the EMC of this product, refer to the Online Product Certification section.

Note: For EMC compliance, operate this product according to the documentation.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit ni.com/environment/weee.htm.

电子信息产品污染控制管理办法（中国 RoHS）



中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息, 请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

AI 0 +	68	34	AI 0 -
AI 0 GND	67	33	AI 1 +
AI 1 -	66	32	AI 1 GND
AI 2 +	65	31	AI 2 -
AI 2 GND	64	30	AI 3 +
AI 3 -	63	29	AI 3 GND
NC	62	28	NC
NC	61	27	NC
NC	60	26	NC
NC	59	25	NC
NC	58	24	NC
NC	57	23	NC
NC	56	22	AO 0
AO GND	55	21	AO 1
AO GND	54	20	NC
D GND	53	19	P0.4
P0.0	52	18	D GND
P0.5	51	17	P0.1
D GND	50	16	P0.6
P0.2	49	15	D GND
P0.7	48	14	+5 V
P0.3	47	13	D GND
PFI 11/P2.3	46	12	D GND
PFI 10/P2.2	45	11	PFI 0/P1.0
D GND	44	10	PFI 1/P1.1
PFI 2/P1.2	43	9	D GND
PFI 3/P1.3	42	8	+5 V
PFI 4/P1.4	41	7	D GND
PFI 13/P2.5	40	6	PFI 5/P1.5
PFI 15/P2.7	39	5	PFI 6/P1.6
PFI 7/P1.7	38	4	D GND
PFI 8/P2.0	37	3	PFI 9/P2.1
D GND	36	2	PFI 12/P2.4
D GND	35	1	PFI 14/P2.6

NC = No Connect

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

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integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.



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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

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