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400 and 200 Mb/s LVDS Digital Waveform Generator/Analyzers

NI PXI-6562, NI PXI-6561

- 400 Mb/s (PXI-6562) or 200 Mb/s (PXI-6561) maximum data rate in double data rate (DDR) mode
- 200 MHz (PXI-6562) or 100 MHz (PXI-6561) maximum clock rate
- LVDS signaling for fast clock rates and low power consumption
- 16 channels with per-channel direction control (single data rate mode)
- 2, 16, or 128 Mb/channel onboard memory
- Interactive waveform and script editor software
- Synchronization and Memory Core (SMC) for tight synchronization with other SMC-based devices

Operating Systems
- Windows 2000/NT/XP

Recommended Software
- LabVIEW
- LabWindows/CVI

Driver and Editing Software (included)
- NI-HSDIO driver
- Express VIs for LabVIEW 7.1 and later
- Script Editor
- Digital Waveform Editor (included with 16 and 128 Mb/channel models)



Description

The National Instruments PXI-6562 and PXI-6561 are 400 and 200 Mb/s digital waveform generator/analyzers, respectively, for interfacing to LVDS digital electronics. These modules feature 200 and 100 MHz clock rates, respectively, single and double data rate modes, 16 channels with per-channel direction control (in single data rate mode) and deep onboard memory with triggering and pattern sequencing. You can also use the modules with the NI Digital Waveform Editor, an interactive software tool for creating and editing digital waveforms. With the SMC, you can create mixed-signal test systems with digitizers, arbitrary waveform generators, and other digital waveform generator/analyzers, or you can synchronize multiple digital devices to build low-skew multichannel systems for interfacing to high-pin-count digital ICs and electronics.

Design High-Density Interfaces

- 400 Mb/s (NI 6562) or 200 Mb/s (NI 6561) maximum data rate in double data rate (DDR) mode
- 200 MHz (NI 6562) or 100 MHz (NI 6561) maximum clock rate
- Data delay for clock frequencies ≥ 25 MHz
- Data delay resolution as small as 60 ps (see specifications on following page for valid delay ranges)
- Internal or external clock sources
- Tight channel-channel skew of ±215 ps (generation) or ±330 ps (acquisition) (typical for clock frequencies at or above 25 MHz)
- 16 channels with per-channel direction control in single data rate (SDR) mode

Applications
Aerospace/Defense
Avionic subsystem communications
Surveillance systems
Satellite testing
Semiconductor
Analog-to-digital converters
Digital-to-analog converters

Create and Edit Patterns Interactively with the Digital Waveform Editor

- Import existing waveforms into LabVIEW from VHDL simulation and spreadsheet tools in Value Change Dump (.VCD) or ASCII formats
- Create new waveforms using built-in fill patterns
- Edit waveforms interactively in the user interface

Ordering Information

NI PXI-6561 .....778993-0M[1]
NI PXI-6562 .....778994-0M[1]

[1]Where M is: 1 (2 Mb/channel), 2 (16 Mb/channel), or 3 (128 Mb/channel)
Includes NI-HSDIO driver and Script Editor. The 16 and 128 Mb/channel models also include the Digital Waveform Editor.

Software
NI Digital Waveform Editor 778724-03

Cable
SHB12X-B12X LVDS cable 192344-01

Accessories
SMA-2164 prototyping board 779323-01
Mating connector for custom load boards 779157-01

BUY NOW!

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

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400 and 200 Mb/s LVDS Digital Waveform Generator/Analyzers

Specifications

For detailed specifications, please visit **ni.com/info** and enter pxi6561 or pxi6562.
These specifications are valid for PXI for the temperature range 0 to 55 °C.

Channel Characteristics

Data channels 16

Specification	Single Data Rate (SDR)		Double Data Rate (DDR)		Comments
Direction control of data channels	Data <0..15>	Per channel	Data <0:7>	Dedicated for data generation	Using SDR, data is clocked using the rising or falling edge of the Sample clock. Using DDR, data is clocked using both edges of the Sample clock.
			Data <8:15>	Dedicated for data acqusition	

Generation Signal Characteristics (data, and PFI <0:3> channels)

Generation Signal Type	Data<0:15>, PFI<1:2>	PFI 0	PFI 3
Generation voltage families	LVDS	LVCMOS	LVCMOS or LVDS (software selectable)

Generation Voltage Levels	Offset (V_{os})			Differential Voltage (V_{od})			Comments
	Typical	Min	Max	Min	Max	Typical	
Generation voltage levels	1.2 V	1.125 V	1.375 V	247 mV	454 mV	305 mV	Into 100 Ω differential load, TIA/EIA-644 compliant

Output impedance (LVDS channels)..... 100 Ω differential
Channel power-up state..... Drivers disabled, 100 Ω differential impedance

Acquisition Signal Characteristics (Data, Strobe, and PFI <0:3> Channels)

Acquisition Voltage Families (V)	Data<0:15>, PFI<1:2> and Strobe	PFI 0	PFI 3
Acquisition voltage families	LVDS	LVCMOS	LVCMOS or LVDS (software selectable)

Acquisition Voltage Levels	Voltage Threshold	Voltage Range		Comments
	Max	Min	Max	
Acquisition voltage levels (LVDS)	±50 mV	0 V	2.4 V	TIA/EIA-644 compliant

Input impedance..... 100 Ω differential

Timing Characteristics

Sample Clock

Sample clock sources..... 1. Onboard clock (internal VCXO with divider)
2. CLK IN (SMB)
3. PXI_STAR (PXI only)
4. STROBE (DDC connector) – acquisition only

On board clock frequency range ..... NI 6561: 48 Hz to 100 MHz.
(Settable to 200 MHz / N; 2 ≤ N ≤ 4,194,304)
NI 6562: 48 Hz to 200 MHz.
(Settable to 200 MHz / N; 1 ≤ N ≤ 4,194,304)

Exported Sample Clock Delay Range

Sample Clock Frequency (f)	Delay Range (Sample Clock Period)
50 MHz ≤ f ≤ maximum clock rate	0 to 1 sample clock period
25 MHz ≤ f < 50 MHz	0 to 1 sample clock period except [0.25 ± (0.25 - 5 ns x f)] and [0.75 ± (0.25 - 5 ns x f)]

Exported sample clock delay resolution..... 1/256 of sample clock period for clock frequencies ≥ 25 MHz or 60 ps, whichever is greater

Exported Sample Clock Jitter (Typical Using Onboard Clock)

Period jitter	Cycle-to-cycle jitter
19 ps (rms)	29 ps (rms)

Generation Signal Characteristics (Data, DDC Clk Out LVDS, DDC Clk Out PECL, and PFI <0:3> Channels)

Data channel-to-channel skew..... ±215 (typical across all data channels and PFI <1:2>)
Maximum data channel toggle rate ..... NI 6561: 100 MHz; NI 6562: 200 MHz
Data position modes ..... Rising edge, falling edge, delayed relative to sample clock
Generation data delay range ..... See Exported Sample Clock Delay Range table
Generation data delay resolution ..... 1/256 of sample clock period for clock frequencies ≥ 25 MHz or 60 ps, whichever is greater

Acquisition Signal Characteristics (Data, Strobe, and PFI <0:3> Channels)

Data channel-to-channel skew..... ±600 ps for sample clock rates < 25
±330 ps for sample clock rates ≥25 MHz
(typical across all data channels and PFI<1:2>)
Acquisition data delay range ..... See Exported Sample Clock Delay Range table
Acquisition data delay resolution ..... 1/256 of sample clock period for clock frequencies ≥ 25 MHz or 60 ps, whichever is greater

Waveform Characteristics

Triggers (Inputs to the NI 656x)

Trigger types..... Start trigger, pause trigger, script trigger <0:3> (generation sessions only), reference trigger (acquisition sessions only), advance trigger (acquisition sessions only)

Sources ..... 1. PFI <0> (SMB jack connectors)
2. PFI <1:3> (DDC connector)
3. PXI_TRIG<0:7> (PXI backplane, PXI only)
4. PXI STAR (PXI backplane, PXI only)
5. Pattern match (acquisition sessions only)
6. Software (user function call)
7. Disabled (do not wait for a trigger)

Trigger detection..... 1. Start trigger (edge detection: rising or falling)
2. Pause trigger (level detection: high or low)
3. Script trigger <0:3> (edge detection: rising or falling, Level detection: high or low)
4. Reference triggers (edge detection: rising or falling)
5. Advance trigger (edge detection: rising or falling)

Minimum required trigger pulse width..... 30 ns

Destinations ..... 1. PFI <0> (SMB jack connector)
2. PFI <1:3> (DDC connector)
3. PXI_TRIG <0:6> (PXI backplane)
Each of the triggers can be routed to any of the destinations with the exception of pause trigger. Pause trigger can not be exported.

Events (Outputs from the NI 656x)

Event types..... Marker <0..3>, data active event, ready for start event, ready for advance event, End of Record Event

Destinations ..... 1. PFI <0> (SMB jack connectors)
2. PFI <1:3> (DDC connector)
3. PXI_TRIG <0:6> (PXI backplane)
Each of the events can be routed to any of the destinations with the exception of data active event. Data active event can only be routed to the PFI channels.

Miscellaneous

Onboard Clock Characteristics (Only Valid When PLL Reference Source is Set to None)

Frequency accuracy..... ±100 ppm (typical)
Temperature stability ..... ±30 ppm (typical)
Aging ..... ±5 ppm first year (typical)

Power Requirements

Maximum..... 16.4 W

Physical

I/O Panel Connectors

Label	External Function(s)	Connector Type
CLK IN	External sample clock, External PLL reference input	SMB jack
PFI 0	Events, triggers	SMB jack
CLK OUT	Exported sample clock, exported reference clock	SMB jack
Digital data and control (DDC)	Digital data channels, exported sample clock, STROBE, events, triggers	12X InfiniBand

PXI ..... Single 3U CompactPCI slot. PXI Compatible

Environment

Operating temperature..... PXI: 0 to 55 °C in all NI PXI chassis except the following: 0 to 45 °C when installed in an NI PXI-1000/B and PXI-101x chassis. (Meets IEC-60068-2-1 and IEC-60068-2-2)
Storage temperature..... -20 to 70 °C
Relative humidity ..... 10 to 90%, noncondensing (meets IEC-60068-2-56)
Storage relative humidity..... 5 to 95%, noncondensing (meets IEC-60068-2-56)

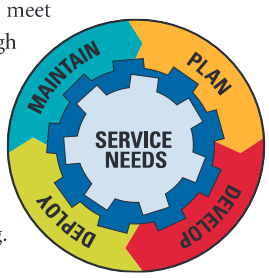
Compliance

Safety
NI 656x devices meet the requirements of the following standards for safety and electrical equipment for measurement, control, and laboratory use:
IEC 61010-1, EN 61010-1
UL 3111-1, UL 61010B-1
CAN/CSA C22.2 No. 1010.1
Note: For full EMC compliance, you must operate this device with shielded cabling. In addition, all covers and filler panels must be installed. See the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit **ni.com/hardref.nsf**.

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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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