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**PCI-6722**

# DEVICE SPECIFICATIONS

## NI 6722/6723

This document lists the specifications for the NI 6722/6723 analog output devices. The following specifications are typical at 25 °C unless otherwise noted.

### Analog Output

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#### Output Characteristics

Number of channels

NI 6722 ..... 8 voltage outputs

NI 6723 ..... 32 voltage outputs

Resolution ..... 13 bits, 1 in 8,192

Maximum update rate

Number of Channels	Maximum Update Rate	
	Using Local FIFO (kS/s)*	Using Host PC Memory (kS/s)†
1	800	800
2	714	714
8	476	182
16	333	90.9
24	253	60
32	204	45

\* These numbers apply to continuous waveform generation, which allows for the fastest waveform generation because it does not use the PCI bus. The maximum update rate in FIFO mode does not change regardless of the number of devices in the system. The NI 6722/6723 does not take any time to reset the FIFO to the beginning when cycling through it.

† These results were measured using a PCI-6722/6723 device with a 550 MHz Pentium III machine. These numbers may change when using more devices or when other CPU or bus activity occurs.

Type of DAC.....Double-buffered, voltage  
 FIFO buffer size.....2,047 samples  
 DMA channels .....3  
 Data transfers .....DMA, interrupts, programmed I/O  
 DMA modes.....Scatter-gather

## Accuracy Information

Nominal Range at Full Scale (V)	Absolute Accuracy					
	% of Reading			Offset (mV)	Temp Drift (%/°C)	Absolute Accuracy at Full Scale (mV)
	24 Hours	90 Days	1 Year			
±10	0.0335%	0.0355%	0.0377%	±7.010	0.0005%	10.78
Absolute accuracy = (% of Reading × Voltage) + Offset + (Temp Drift × Voltage) <b>Note:</b> Temp drift applies only if ambient is greater than ±10 °C of previous external calibration.						

## Transfer Characteristics

Relative accuracy (INL).....±2.0 LSB maximum  
 DNL .....±0.9 LSB maximum  
 Monotonicity.....13 bits

## Voltage Output

Range .....±10 V  
 Output coupling .....DC  
 Output impedance .....0.1 Ω maximum  
 Current drive .....±5 mA maximum  
 Output stability .....Any passive load  
 Protection .....Short-circuit to ground  
 Power-on state.....0 V (±200 mV)

## External Reference Input

Range .....	±11 V
Overvoltage protection .....	±27 V powered on, ±12 V powered off
Input impedance .....	10 kΩ

## Dynamic Characteristics

Slew rate .....	0.7 V/μs
Noise .....	1.0 mVrms, DC to 1 MHz
Channel crosstalk.....	-65 dB with SH68-C68-S cable (generating a 10 V, 100 point sinusoidal at 100 kHz on the reference channel)
Settling time.....	45 μs typical, 55 μs maximum to ±0.5 LSB
Glitch energy (at mid-scale transition)	
Magnitude .....	400 mV
Duration .....	2 μs
Channel-to-channel update glitch	
Magnitude .....	100 mV
Duration .....	1.2 μs



**Note** Channel-to-channel update glitch is the energy glitch that occurs on all channels as the result of a channel update. For example, if you update the value of Channel 7, all other channels will experience this glitch regardless of whether their output voltages change.

## Stability

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### Calibration

Recommended warm-up time.....	15 minimum
Calibration interval .....	1 year

### Onboard calibration reference

Level .....	5.000 V (±2.5 mV) (actual value stored in EEPROM)
Temperature coefficient .....	±5.0 ppm/°C maximum
Long-term stability .....	±15 ppm/ $\sqrt{1,000}$ h

# Digital I/O

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Number of channels ..... 8 input/output

Compatibility ..... TTL/CMOS

Digital logic levels

Level	Minimum	Maximum
Input low voltage	0 V	0.8 V
Input high voltage	2.0 V	5.0 V
Input low current ( $V_{in} = 0$ V)	—	-320 $\mu$ A
Input high current ( $V_{in} = 5$ V)	—	10 $\mu$ A
Output low voltage ( $I_{OL} = 24$ mA)	—	0.4 V
Output high voltage ( $I_{OH} = -13$ mA)	4.35 V	—

Power-on state ..... Input (high-impedance)

Data transfers ..... Programmed I/O

# Timing I/O

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Number of channels ..... 2 up/down counter/timers, 1 frequency scaler

Resolution

Counter/timers ..... 24 bits

Frequency scaler ..... 4 bits

Compatibility ..... 5 V TTL/CMOS

Base clocks available

Counter/timers ..... 20 MHz, 100 kHz

Frequency scaler ..... 10 MHz, 100 kHz

Base clock accuracy .....  $\pm 0.01\%$

Maximum external source frequency

Frequency scaler ..... 20 MHz

External source selections ..... PFI <0..9>, RTSI <0..6>

External gate selections ..... PFI <0..9>, RTSI <0..6>

Minimum source pulse duration ..... 10 ns, edge-detect mode

Minimum gate pulse duration ..... 10 ns, edge-detect mode

## Data transfers

Up/down counter/timers .....	DMA (scatter-gather), interrupts, programmed I/O
Frequency scaler .....	Programmed I/O

## DMA

Channels .....	1 (scatter-gather)
Data source/destination.....	Analog output, counter/timer 0, counter/timer 1

# Triggers

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## Digital Trigger

### Purpose

Analog output .....	Start trigger, gate, clock
Counter/timers .....	Source, gate

Source .....

.....	PFI <0..9>
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Compatibility .....

.....	5 V TTL
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Response.....

.....	Rising or falling edge
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Pulse width .....

.....	10 ns minimum
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## RTSI Bus (PCI Only)

Trigger lines <0..6> .....

.....	7
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RTSI clock .....

.....	1
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## PXI Trigger Bus (PXI Only)

Trigger lines <0..5> .....

.....	6
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Star trigger .....

.....	1
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Clock.....

.....	1
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## Bus Interface

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NI PCI-6722/6723 .....

.....	3.3 V or 5 V PCI master, slave
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NI PXI-6722/6723 .....

.....	PXI/CompactPCI master, slave
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# Power Requirement

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+3.3 VDC ( $\pm 5\%$ ).....	300 mA
+5 VDC ( $\pm 5\%$ ).....	1.5 A typical, 3 A maximum (not including power sourced from +5 V pin on I/O connector)
Power available at I/O connector.....	+4.65 to +5.25 VDC at 1 A

# Physical

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## Dimensions (not including connectors)

NI PCI-6722/6723..... 17.4 cm  $\times$  9.8 cm (6.85 in.  $\times$  3.85 in.)

NI PXI-6722/6723 ..... 16 cm  $\times$  10 cm (6.3 in.  $\times$  3.9 in.)

## I/O connector

NI 6722 ..... 1 68-pin VHDCI

NI 6723 ..... 2 68-pin VHDCI

# Maximum Working Voltage

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Maximum working voltage refers to the signal voltage plus the common-mode voltage.

Channel-to-earth .....  $\pm 11$  V, Measurement Category I

Channel-to-channel.....  $\pm 22$  V, Measurement Category I



**Caution** Do not use this module for connection to signals or for measurements within Measurement Categories II, III, or IV.



**Note** Measurement Categories CAT I and CAT O (Other) are equivalent. The input circuits are not intended for direct connection to the MAINS building installations of Categories CAT II, CAT III, or CAT IV.

# Environmental

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The NI 6722/6723 is intended for indoor use only.

Operating temperature ..... 0 °C to 50 °C

Storage temperature ..... -20 °C to 70 °C

Humidity ..... 5% to 90% RH, noncondensing

Maximum altitude..... 2,000 meters

Pollution Degree ..... 2



**Note** Clean the device with a soft, non-metallic brush. Make sure that the device is completely dry and free from contaminants before returning it to service.

# Safety

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This product meets 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 C22.2 NO. 61010-1



**Note** For UL and other safety certifications, refer to the product label or the [Online Product Certification](#) section.

# Electromagnetic Compatibility

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

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.



**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



**Note** For EMC declarations and certifications refer to the [Online Product Certification](#) section.



# CE Compliance

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This product meets the essential requirements of applicable European Directives as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

## Online Product Certification

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To obtain product certifications and the Declaration of Conformity (DoC) for this product, visit [ni.com/certification](http://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)



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