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

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.

NATIONAL INSTRUMENTS

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)
Note: 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

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/√1,000 h

Digital I/O

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 µA
Input high current (V_{in} = 5 V)	—	10 µA
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

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 ..... ±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

Digital Trigger

Purpose

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

Source ..... PFI <0..9>

Compatibility ..... 5 V TTL

Response ..... Rising or falling edge

Pulse width ..... 10 ns minimum

RTSI Bus (PCI Only)

Trigger lines <0..6> 7

RTSI clock 1

PXI Trigger Bus (PXI Only)

Trigger lines <0..5> 6

Star trigger 1

Clock 1

Bus Interface

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

NI PXI-6722/6723 ..... PXI/CompactPCI master, slave

Power Requirement

+3.3 VDC (±5%)..... 300 mA

+5 VDC (±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

Dimensions (not including connectors)

- NI PCI-6722/6723..... 17.4 cm × 9.8 cm (6.85 in. × 3.85 in.)
- NI PXI-6722/6723 ..... 16 cm × 10 cm (6.3 in. × 3.9 in.)

I/O connector

- NI 6722 ..... 1 68-pin VHDCI
- NI 6723 ..... 2 68-pin VHDCI

Maximum Working Voltage

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

Channel-to-earth ..... ±11 V, Measurement Category I

Channel-to-channel..... ±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

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

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

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 CE

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

To obtain product certifications and the Declaration of Conformity (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 the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit `ni.com/environment/weee`.

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`.)