Waveform Voltage Output – Up to 800 kS/s/Channel, 13-Bit, 8 or 32 Analog Outputs

NI 6723, NI 6722

- 32 or 8 channels
- +/- 10V, 13-bit analog output resolution
- 45 kS/s to 800 kS/s per channel update rate
- Maximum 10 kHz full-scale sine wave
- Simultaneous update
- Digital triggering and external clocking
- NI-DAQ driver simplifies configuration and measurements

Models
- NI PCI 6723
- NI PCI 6722

Operating Systems
- Windows 2000/NT/XP/Me

Recommended Software
- LabVIEW
- LabWindows/CVI
- Measurement Studio for Visual Studio

Other Compatible Software
- Visual Basic
- C/C++

Driver Software (included)
- NI-DAQ

Calibration Certificate Included

NEW

Product	Bus	Voltage Outputs	Resolution	Output Rate kS/s (1, 8, 32 channels simultaneously)	Output Range	Digital I/O	Counter/timers	Triggers
NI 6723	PCI	32	13 bits	800, 182, 45	±10V	8	2, 24-bit	Digital
NI 6722	PCI	8	13 bits	800, 182, –	±10V	8	2, 24-bit	Digital

Table 1. Channel, Speed, and Resolution Specifications

Overview and Applications

NI 6723 and NI 6722 devices use the latest analog converter technology to deliver high-density, high-performance analog output at a great price per channel ratio. These devices enable a broad variety of applications including:

- Waveform generation up to an 11 kHz full-scale sine wave, slew-rate limited
- Signal simulation
- Mechanical system or process control

Features

NI 6723 and NI 6722 devices feature hands-free self-calibration capability to ensure output accuracy. Additional features include waveform and single-point update capability, simultaneous updates, and internal or external clocking capability. Since most applications require more than analog output, these devices are able to integrate with other I/O such as analog input, vision, motion, or CAN through the RTSI bus.

Driver Software

NI-DAQ is the robust driver software that makes it easy to access the functionality of your data acquisition hardware, whether you are a beginning or advanced user. Helpful features include:

Automatic Code Generation – The DAQ Assistant is an interactive guide that steps you through configuring, testing, and programming measurement tasks and generates the necessary code automatically for LabVIEW, LabWindows/CVI, or Measurement Studio.

Cleaner Code Development – Basic and advanced software functions have been combined into one easy-to-use yet powerful set to help you build cleaner code and move from basic to advanced applications without replacing functions.

High-Performance Driver Engine – NI-DAQ delivers maximum I/O system throughput with a multithreaded driver.

Test Panels – With NI-DAQ, you can test all of your device functionality before you begin development.

Visit ni.com/oem for quantity discount information.

Ordering Information

NI PCI-6723 778701-01
NI PCI-6722 778705-01

Recommended Accessories

Family	Bus	Accessory	Cable
NI 6723	PCI	Two CB-68LPs (777145-01)	Two SH68-C68-S (186381-02)
NI 6722	PCI	CB-68LP (777145-01)	RC68-68 (187252-01)

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	Absolute Accuracy					
Nominal Range (V)	Percent of Reading					
	24 Hours	90 Days	1 Year	Offset (mV)	Absolute Accuracy at Full-Scale (mV)	Temp Drift (%/°C)
±10V	0.0335%	0.0355%	0.0337%	±7.01	10.78	0.0005%

Note: Temp Drift applies only if ambient is greater than ±10 °C of previous external calibration.

Table 2. NI 672x Analog Output Accuracy Specifications

Worldwide Support and Services

NI provides you with a wealth of resources to help you get your application up and running more quickly, including:

Calibration – Includes NIST-traceable basic calibration certificates, services for ANSI/NCSL-Z540 and periodic calibration – ***ni.com/calibration***

Extended Warranty – Meet project life-cycle requirements and maintain optimal performance in a cost-effective way – ***ni.com/services***

Data Acquisition Training – Instructor-led courses – ***ni.com/training***

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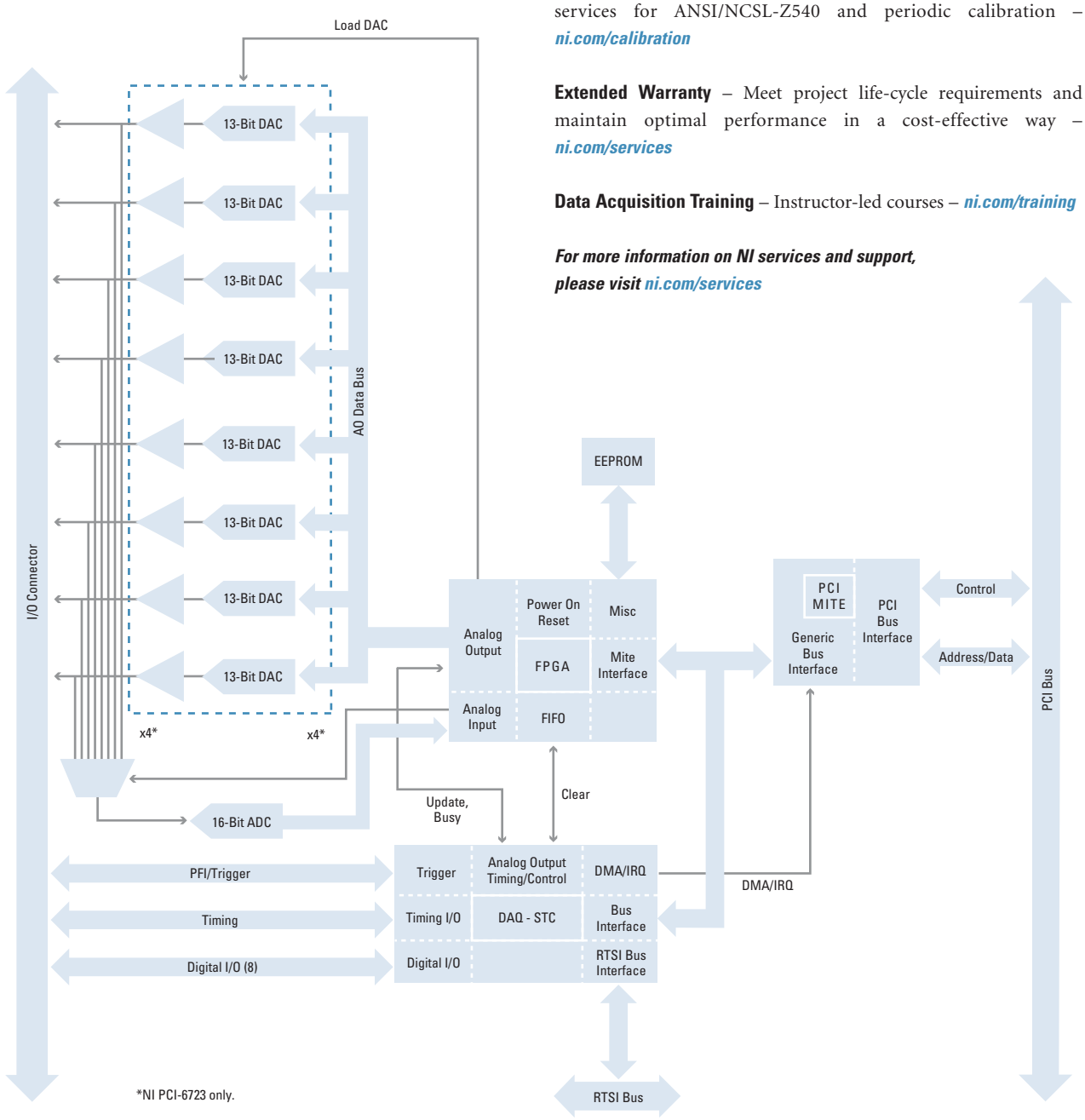

Figure 1. NI 672x Hardware Block Diagram

Waveform Voltage Output – Up to 800 kS/s/Channel, 13-Bit, 8 or 32 Analog Outputs

Specifications

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

Max update rate

	Max Update Rate (NI 6722/6723)	
Number of Channels	**Using Local FIFO[1]**	**Using Host PC Memory[2]**
1	800 kS/s	800 kS/s
2	714 kS/s	714 kS/s
8	476 kS/s	182 kS/s
16	333 kS/s	90.9 kS/s
24	253 kS/s	60 kS/s
32	204 kS/s	45 kS/s

[1] These numbers apply to continuous waveform generation, which allows for the time it takes to reset the FIFO to the beginning when cycling through it. This additional time is not incurred when using host PC memory for waveform generation. Max update rate in FIFO mode does not change regardless of the number of devices in the system.
[2] 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.

FIFO buffer size ..... 2,048 samples
Data transfers ..... DMA, interrupts, programmed I/O
DMA modes ..... Scatter gather

Transfer Characteristics

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

Voltage Output

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

Dynamic Characteristics

Slew rate ..... 0.7 V/µs
Noise ..... 1.0 mV_{rms}, DC to 1 MHz
Channel crosstalk ..... -70 dB (generating a 10 V, 100 point sinusoidal at 10 kHz on the reference channel)
Settling time ..... 30 ms typ, 40 µs max to ±0.5 LSB
Glitch energy (at mid-scale transition)
- Magnitude ..... 300 mV
- Duration ..... 2 µs

Channel-to-channel update glitch
- Magnitude ..... 70 mV
- Duration ..... 1.2 µs

Stability

Calibration
- Recommended warm-up time ..... 15 min
- Calibration interval ..... 1 yr

Onboard calibration reference
- Level ..... 5.000 V (±2.5 mV) (actual value stored in EEPROM)
- Temperature coefficient ..... ±5 ppm/°C max
- Long-term stability ..... ±15 ppm/$\sqrt{1{,}000\ h}$

Digital I/O

Number of channels ..... 8 input/output
Compatibility ..... TTL/CMOS
Digital logic levels

Level	Min	Max
Input low voltage	0.0 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} = ñ13 mA)	4.35 V	–

Power-on state ..... Input (high-impedance)
Data transfers ..... Programmed I/O

Timing I/O

Number of channels
- Up/down counter/timers 2
- Frequency scaler 1

Resolution
- Up/down counter/timers ..... 24 bits
- Frequency scaler ..... 4 bits

Compatibility ..... 5 V TTL/CMOS
Digital logic levels

Level	Min	Max
Input low voltage	0.0 V	0.8 V
Input high voltage	2.0 V	5.0 V
Output low voltage (I_{out} = 5 mA)	–	0.4 V
Output high voltage (I_{out} = -3.5 mA)	4.35 V	–

Base clocks available
- Up/down counter/timers ..... 20 MHz, 100 kHz
- Frequency scaler ..... 10 MHz, 100 kHz

Base clock accuracy ..... ±0.01%
Max external source frequency
- Up/down counter/timers ..... 20 MHz

External source selections ..... PFI <0..9>, RTSI <0..6>
External gate selections ..... PFI <0..9>, RTSI <0..6>
Min source pulse duration ..... 10 ns in edge-detect mode
Min gate pulse duration ..... 10 ns in edge-detect mode
Data transfers
- Up/down counter/timers ..... DMA (scatter-gather), interrupts, programmed I/O
- Frequency scaler ..... programmed I/O

Digital Trigger

Purpose
- Analog Input ..... Start and stop trigger, gate, clock
- 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 min
External input for digital trigger
- Protection ..... -0.5 V to V_{CC} + 0.5 V

RTSI Trigger Lines
Trigger lines <0..6> 7
RTSI clock 1
DMA
- Channels ..... 1 (scatter-gather)
- Data source/destination ..... Analog output, counter/timer 0, counter/timer 1

Bus Interface

Type ..... 3.3 V or 5 V PCI master, slave

Power Requirement

+3.3 VDC (±5%) ..... 100 mA
+5 VDC (±5%) ..... 1 A typ, 3 A max (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 6722/6723 for PCI ..... 17.4 by 9.8 cm (6.85 by 3.85 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, Installation Category I
Channel-to-channel ..... ±22 V, Installation Category I

Environmental

Operating temperature ..... 0 to 55 °C
Storage temperature ..... -20 to 70 °C
Humidity ..... 5 to 90% RH, noncondensing
Maximum altitude ..... 2,000 m
Pollution Degree (indoor use only) 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.

Certification and Compliances

CE Compliance CE

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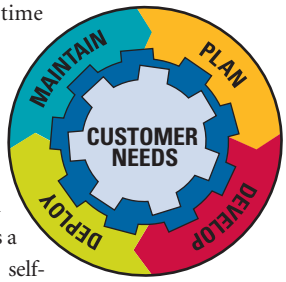

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