Counter/Timer Specifications

Specifications

These specifications are typical for 25 °C unless otherwise noted.

Timing I/O

General-Purpose Up/Down Counter/Timers

Number of channels
- NI 6601 ..... 4 up/down counters
- NI 6602/6608 ..... 8 up/down counters

Counter size/number of bits ..... 32 bits
Prescalers (per counter) ..... 3 bits (divided by 8)
1 bit (divided by 2)

Disabled (by default)
Power-on state ..... Input (high-Z), pulled low
Pull down current: 10 µA (min) to 200 µA (max)
Hysteresis ..... 300 mV Schmitt triggers
Compatibility ..... 5 V TTL/CMOS

Digital logic levels

Level	Minimum	Maximum
Input low voltage	-0.3 V	0.8 V
Input high voltage	2.0 V	5.25 V
Output low voltage (I_{out} = 4 mA)	–	0.4 V
Output high voltage (I_{out} = 4 mA)	2.4 V	–

Base clocks available
- NI 6601 ..... 100 kHz and 20 MHz
- NI 6602/6608 ..... 100 kHz, 20 MHz, and 80 MHz

Base clock accuracy (NI 6601 and NI 6602) ..... ±0.005% (50 ppm)[1]
Base clock (OCXO) accuracy (NI 6608) ..... ±0.0000075% (75 ppb)
Maximum source frequency
External source selections ..... I/O connector, RTSI/PXI Trigger lines, software selectable
External gate selections ..... I/O connector, RTSI/PXI Trigger lines, software selectable

[1] If a PXI-6608 is installed in slot 2 of a PXI chassis, then the PXI-6608 and any PXI-6602 installed in that chassis inherit a base clock accuracy of ±0.0000075% (75 ppb).

Family	Without Prescaling	With Prescaling
NI 6601	20 MHz	60 MHz
NI 6602	80 MHz	125 MHz
NI 6608	80 MHz	125 MHz

Minimum source pulse duration
- With prescalers ..... 3.5 ns; edge-detect mode
- Without prescalers ..... 5 ns; edge-detect mode

Minimum gate pulse duration ..... 5 ns; edge-detect mode
Frequency ranges to measure or generate

Data Transfers

Family	Frequency to Measure	Min/Max Frequency to Generate
NI 6601	20 MHz	10 MHz
NI 6602	80 MHz	40 MHz
NI 6608	80 MHz	40 MHz

For more information, please visit ***ni.com/info*** and enter exatzz.

Transfer modes ..... DMA, interrupts, programmed I/O

Transfer rates

DMA[1,2]		Interrupt[1,3]	
Finite Operation Buffer Size (S)	Rate (MS/s)	Finite Operation Buffer Size (S)	Rate (kS/s)
100	5.0	100	55
1,000	4.2	1,000	49
10,000	2.0	10,000	49
100,000	1.8	100,000	48

[1]Values may vary depending on your computer hardware, operating system and system activity. Benchmark data was determined on a Pentium II 400 MHz computer with 64 MB RAM running Windows 98 and LabVIEW using one counter of a PCI-6602. [2]The number of simultaneous DMA transfers you can perform is equivalent to the DMA channels available on your device. [3]The rate is based on one counter using the interrupts. If multiple counters share interrupts, the transfer rate per counter is lower.

Continuous Operation		Continuous Operation	
Buffer Size (MS)	Rate (kS/s)	Buffer Size (kS)	Rate (kS/s)
50	28	50	15

DMA channels
- NI 6601 1
- NI 6602/6608 3

Oven-Controlled Crystal Oscillator (OCXO) (NI 6608 Only)

Frequency ..... 10 MHz
OCXO accuracy ..... ±0.0000075% (75 ppb)
Warm-up time (to within 0.02 ppm of operating frequency) ..... 5 minutes
Frequency stability versus
- supply voltage change (±5%) ..... ≤ 0.005 ppm

Temperature stability (0 to 50 °C) ..... ≤ 0.005 ppm
Drift in frequency ..... ≤ 0.00045 ppm/day
≤ 0.045 ppm/year
Allowed frequency adjustment ..... 0.5 ppm, typical

Note: You can use the OCXO to replace the PXI 10 MHz backplane clock when the PXI-6608 is installed in the PXI star trigger slot (Slot 2). You can also use it as the counter source or gate in any slot.

Digital I/O

Number of channels ..... Up to 32 input/output
Compatibility ..... 5 V TTL/CMOS
Power-on state ..... Input (high-Z), pulled low
Pulldown current ..... 10 µA (min) to 200 µA (max)
Hysteresis ..... 300 mV Schmitt triggers
Data transfers ..... Unstrobed I/O

Digital logic levels

Level	Minimum	Maximum
Input low voltage	-0.3 V	0.8 V
Input high voltage	2.0 V	5.25 V
Output low voltage (I_{out} = 4 mA)	–	0.4 V
Output high voltage (I_{out} = 4 mA)	2.4 V	–

RTSI Bus (PCI Only)

Trigger lines 7
Minimum pulse width
- for trigger and clock ..... 25 ns

PXI Trigger Bus (PXI Only)

Trigger lines 6
Star trigger 1

Bus Interface

PCI, PXI ..... Master, slave

Power Requirements

Device	+5 VDC (±5%)*	Power Available at I/O Connector
NI 6601	0.4 to 0.75 A	+4.65 to +5.25 VDC, 1 A
NI 6602	0.5 to 1.5 A	+4.65 to +5.25 VDC, 1 A
NI 6608	1 to 2.5 A	+4.65 to +5.25 VDC, 1 A

*Excludes power consumed through I/O connector

Physical

Dimensions (not including connectors)
- PCI ..... 17.5 by 9.9 cm (6.9 by 3.9 in.)
- PXI ..... 16.0 by 10.0 cm (6.3 by 3.9 in.)

I/O connector ..... 68-pin male SCSI-II type

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 10 to 90%, noncondensing

Certifications and Compliances

CE Mark Compliance CE