

24-Bit, 8-Channel Dynamic Signal Acquisition

Specifications

Typical for 25 °C unless otherwise noted.

Analog Input

Channel Characteristics

Number of channels	
NI 4472 Series	8, simultaneously sampled
NI 4474 Series	4, simultaneously sampled
Input configuration	Unbalanced differential
Resolution	24 bits, nominal
Type of ADC	Delta-sigma
Oversampling, for sample rate (f_s):	
1.0 kS/s $\leq f_s \leq 51.2$ kS/s	128 f_s
51.2 kS/s $< f_s \leq 102.4$ kS/s	64 f_s
Sample rates (f_s)	1.0 to 102.4 kS/s in 190.7 μ S/s increments for $f_s > 51.2$ kS/s or 95.36 μ S/s increments for $f_s \leq 51.2$ kS/s
Frequency accuracy	± 25 ppm
Input signal range	± 10 V peak
FIFO buffer size	1,024 samples
Data transfers	DMA

Transfer Characteristics

Offset (residual DC)	± 3 mV, max
Gain (amplitude accuracy)	± 0.1 dB, max, $f_{in} = 1$ kHz

Amplifier Characteristics

Input impedance (ground referenced)	
Positive input	1 M Ω in parallel with 60 pF
Negative input (shield)	50 Ω in parallel with 0.02 μ F
Flatness (relative to 1 kHz)	± 0.1 dB, DC to 0.4535 f_s , max, DC-coupled
-3 dB bandwidth	0.4863 f_s
Input coupling	AC or DC, software-selectable
AC -3 dB cutoff frequency	
NI 4472, NI 4474	3.4 Hz
NI 4472B	0.5 Hz
Overvoltage protection	
Positive input	± 42.4 V
Positive inputs protected	CH-0..7>
Negative input (shield)	Not protected, rated at ± 2.5 V
Common mode rejection ratio (CMRR)	
$f_{in} < 1$ kHz	> 60 dB, minimum

Dynamic Characteristics

Alias-free bandwidth (passband)	DC (0 Hz) to 0.4535 f_s
Stop band	0.5465 f_s
Alias rejection	110 dB
Spurious-free dynamic range	130 dB, 1.0 kS/s $\leq f_s \leq 51.2$ kS/s,
118 dB, 51.2 kS/s $< f_s \leq 102.4$ kS/s THD, $f_{in} = 1$ kHz	
0 dBFS input	< -90 dB
20 dBFS input	< -100 dB
60 dBFS input	< -60 dB
IMD	< -100 dB (CCIF 14 kHz + 15 kHz)
Crosstalk ¹ (channel separation), $f_{in} = 0$ to 51.2 kHz	
Between channels 0 and 1, 2 and 3, 4 and 5, or 6 and 7	
Shorted input	< -90 dB
1 k Ω load	< -80 dB
Other channel combinations	
Shorted input	< -100 dB
1 k Ω load	< -90 dB
Phase linearity	$\leq \pm 0.5$ deg
Interchannel phase mismatch	$< f_{in}$ (in kHz) \times 0.018 deg + 0.082 deg
Interchannel gain mismatch	± 0.1 dB
Filter delay through ADC	38.8 sample periods

Onboard Calibration Reference

DC level	5.000 V ± 2.5 mV
Temperature coefficient	± 5 ppm/ $^{\circ}$ C maximum
Long-term stability	± 20 ppm/ $\sqrt{1,000}$ h

Signal Conditioning

Constant current source (software-controlled)	
Current	4 mA, $\pm 5\%$
Compliance	24 V
Output impedance	> 250 k Ω at 1 kHz
Current noise	< 500 pA/ $\sqrt{\text{Hz}}$

Triggers

Analog Trigger

Source	CH-0..7>
Level	-10 to +10 V, full scale, programmable
Slope	Positive or negative (software selectable)
Resolution	24 bits, nominal
Hysteresis	Programmable

Digital Trigger

Compatibility	5 V TTL/CMOS
Response	Rising or falling edge
Pulse width	10 ns, minimum

Bus Interface

Type	Master, slave
------	---------------

Power Requirements

+3.3 VDC	
PXI	400 mA, maximum
+5 VDC	
PCI	2.6 A, maximum
PXI	2.2 A, maximum
+12 VDC	120 mA, maximum
-12 VDC	120 mA, maximum

Physical

Dimensions (not including connectors)	
PCI	17.5 by 10.7 cm (6.9 by 4.2 in.)
PXI	16.0 by 9.9 cm (6.3 by 3.9 in.) (1 slot)
Analog I/O connectors	SMB male
Digital trigger connector	SMB male

Maximum Working Voltage

Maximum working voltage refers to the signal voltage plus the common-mode voltage.	
Channel-to-earth	10 V, installation category I
Channel-to-channel	10 V, installation category I

Environmental

Operating temperature	0 to 50 $^{\circ}$ C
Storage temperature	-20 to 70 $^{\circ}$ C
Relative humidity	10 to 90%, noncondensing
Maximum altitude	2,000 m
Pollution degree (indoor use only)	2

Calibration

Internal – On software command; computes gain and offset corrections	
Interval	Whenever temperature is different from temperature at last internal calibration by more than ± 5 $^{\circ}$ C
External – Internal voltage reference read and stored in nonvolatile memory	
Interval	1 year
Warm-up time	15 minutes

Certifications and Compliances

CE Mark Compliance **CE**

¹Measured with full-scale (± 10 V) input.