PCI/PXI/USB-6255 Specifications

Contents

NI 6255 Specifications

Analog Input

Number of channels	40 differential or 80 single ended
ADC resolution	16 bits
DNL	No missing codes guaranteed
INL	Refer to the AI Absolute Accuracy section
Sample rate	
Single channel maximum	1.25 MS/s
Multichannel maximum (aggregate)	750 kS/s
Minimum	No minimum
Timing resolution	50 ns
Timing accuracy	50 ppm of sample rate
Input coupling	DC
Input range	±0.1 V, ±0.2 V, ±0.5 V, ±1 V, ±2 V, ±5 V, ±10 V
Maximum working voltage for analog inputs (signal + common mode)	±11 V of AI GND
CMRR (DC to 60 Hz)	100 dB
Input impedance	

Device on	
AI+ to AI GND	>10 GΩ in parallel with 100 pF
AI- to AI GND	>10 GΩ in parallel with 100 pF
Device off	
AI+ to AI GND	820 Ω
AI- to AI GND	820 Ω
Input bias current	±100 pA
Crosstalk (at 100 kHz)	
Adjacent channels	-75 dB
Non-adjacent channels	-95 dB [1]
Small signal bandwidth (-3 dB)	1.7 MHz
Input FIFO size	4,095 samples
Scan list memory	4,095 entries
Data transfers	
PCI/PXI	DMA (scatter-gather), interrupts, programmed I/O
USB	USB Signal Stream, programmed I/O
Overvoltage protection for all analog input and sense channels	
Device on	±25 V for up to four AI pins
Device off	±15 V for up to four AI pins

Input current during overvoltage condition	±20 mA maximum/AI pin

Settling Time for Multichannel Measurements

Table 1. Settling Time for Multichannel Measurements

Range	±60 ppm of Step (±4 LSB for Full-Scale Step)	±15 ppm of Step (±1 LSB for Full-Scale Step)
±1 V, ±2 V, ±5 V, ±10 V	1.3 µs	1.6 µs
±0.5 V	1.8 µs	2.5 µs
±0.1 V, ±0.2 V	3 µs	8 µs

Typical Performance Graphs

Figure 1. Settling Error versus Time for Different Source Impedances
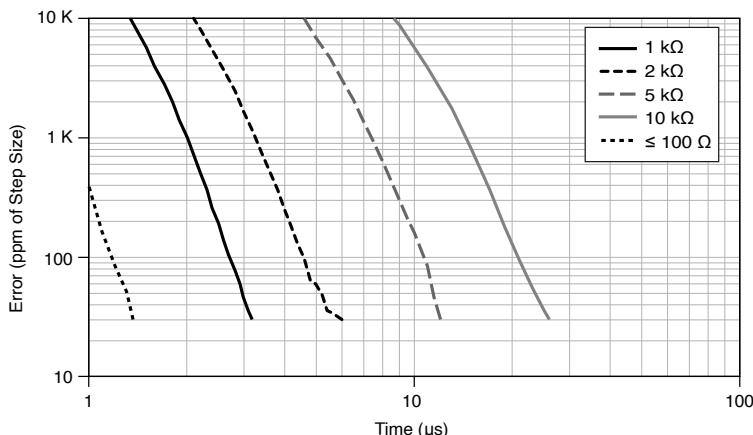

**Figure 2.** AI Small Signal Bandwidth
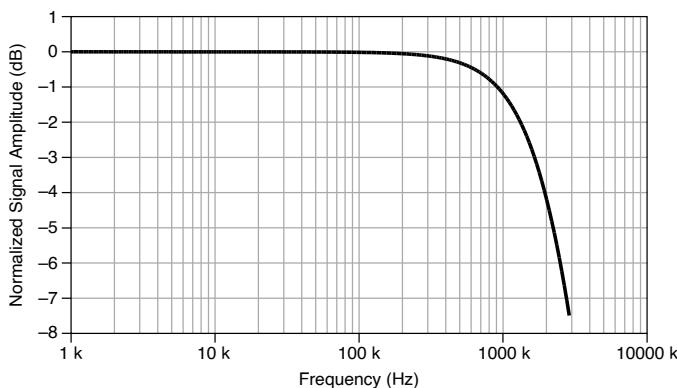
Figure 3. AI CMRR
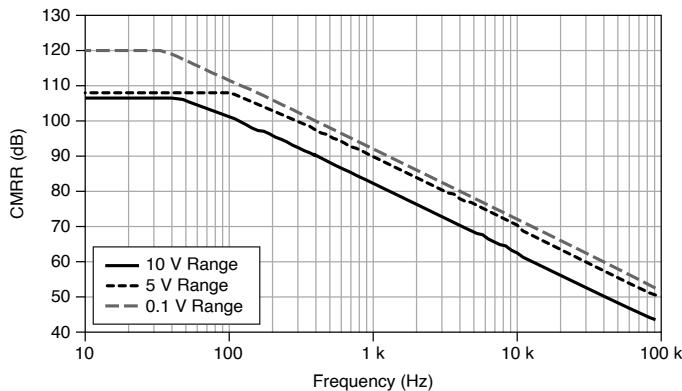
AI Absolute Accuracy

> **Note** Accuracies listed are valid for up to two years from the device external calibration.

Table 2. AI Absolute Accuracy

Nominal Range Positive Full Scale	Nominal Range Negative Full Scale	Residual Gain Error (ppm of Reading)	Residual Offset Error (ppm of Range)	Offset Tempco (ppm of Range/°C)	Random Noise, σ (µVrms)	Absolute Accuracy at Full Scale (µV)	Sensitivity (µV)
10	-10	60	20	21	280	1,920	112.0
5	-5	70	20	21	140	1,010	56.0
2	-2	70	20	24	57	410	22.8
1	-1	80	20	27	32	220	12.8
0.5	-0.5	90	40	34	21	130	8.4
0.2	-0.2	130	80	55	16	74	6.4
0.1	-0.1	150	150	90	15	52	6.0

> **Note** Sensitivity is the smallest voltage change that can be detected. It is a function of noise.

Gain tempco	13 ppm/°C

Reference tempco	1 ppm/°C
INL error	60 ppm of range

AI Absolute Accuracy Equation

AbsoluteAccuracy = **Reading** · **(GainError)** + **Range** · **(OffsetError)** + **NoiseUncertainty**

- **GainError** = **ResidualAIGainError** + **GainTempco** · **(TempChangeFromLastInternalCal)** + **ReferenceTempco** · **(TempChangeFromLastExternalCal)**

- **OffsetError** = **ResidualAIOffsetError** + **OffsetTempco** · **(TempChangeFromLastInternalCal)** + **INLError**

- **NoiseUncertainty** =

$$\frac{Random\ Noise \cdot 3}{\sqrt{100}}$$

for a coverage factor of 3 σ and averaging 100 points.

AI Absolute Accuracy Example

Absolute accuracy at full scale on the analog input channels is determined using the following assumptions:

- TempChangeFromLastExternalCal = 10 °C
- TempChangeFromLastInternalCal = 1 °C
- number_of_readings = 100
- CoverageFactor = 3 σ

For example, on the 10 V range, the absolute accuracy at full scale is as follows:

- GainError = 60 ppm + 13 ppm · 1 + 1 ppm · 10 = 83 ppm
- OffsetError = 20 ppm + 21 ppm · 1 + 60 ppm = 101 ppm
- NoiseUncertainty =

$$\frac{280\ \mu V \cdot 3}{\sqrt{100}}$$

= 84 µV

- AbsoluteAccuracy = 10 V · (GainError) + 10 V · (OffsetError) + NoiseUncertainty = 1,920 µV

Analog Triggers

Number of triggers	1
Source	AI <0..79>, API 0
Functions	Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Convert Clock, Sample Clock Timebase
Source level	
AI <0..79>	±Full scale
APFI 0	±10 V
Resolution	10 bits, 1 in 1,024
Modes	Analog edge triggering, analog edge triggering with hysteresis, and analog window triggering
Accuracy	±1%
Bandwidth (-3 dB)	
AI <0..79>	3.4 MHz
APFI 0	3.9 MHz
APFI 0 characteristics	
Input impedance	10 kΩ

Coupling	DC
Protection, power on	±30 V
Protection, power off	±15 V

Analog Output

Number of channels	2
DAC resolution	16 bits
DNL	±1 LSB
Monotonicity	16 bit guaranteed
Accuracy	Refer to the AO Absolute Accuracy section
Maximum update rate	
1 channel	2.86 MS/s
2 channels	2.00 MS/s per channel
Timing accuracy	50 ppm of sample rate
Timing resolution	50 ns
Output range	±5 V, ±10 V, ±external reference on APFI 0
Output coupling	DC
Output impedance	0.2 Ω

Output current drive	±5 mA
Overdrive protection	±25 V
Overdrive current	20 mA
Power-on state	±5 mV [2]
Power-on glitch	1.5 V peak for 1.5 s
Output FIFO size	8,191 samples shared among channels used
Data transfers	
Data transfers	DMA (scatter-gather), interrupts, programmed I/O
USB	USB Signal Stream, programmed I/O
AO waveform modes	Non-periodic waveform, periodic waveform regeneration mode from onboard FIFO, periodic waveform regeneration from host buffer including dynamic update
Settling time, full-scale step, 15 ppm (1 LSB)	2 µs
Slew rate	20 V/µs
Glitch energy at midscale transition, ±10 V range	
Magnitude	10 mV
Duration	1 µs

External Reference

APFI 0 characteristics	
Input impedance	10 kΩ
Coupling	DC
Protection, device on	±30 V
Protection, device off	±15 V
Range	±11 V
Slew rate	20 V/μs

Figure 4. AO External Reference Bandwidth
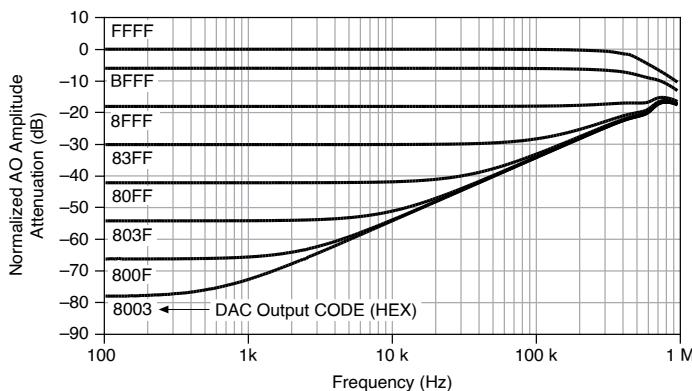
AO Absolute Accuracy

Absolute accuracy at full-scale numbers is valid immediately following internal calibration and assumes the device is operating within 10 °C of the last external calibration.

Note Accuracies listed are valid for up to two years from the device external calibration.

Table 3. AO Absolute Accuracy

Nominal Range Positive Full Scale	Nominal Range Negative Full Scale	Residual Gain Error (ppm of Reading)	Gain Tempco (ppm/°C)	Residual Offset Error (ppm of Range)	Offset Tempco (ppm of Range/°C)	Absolute Accuracy at Full Scale (µV)
10	-10	75	17	40	2	2,080
5	-5	85	8	40	2	1,045

Reference tempco	1 ppm/°C
INL error	64 ppm of range

AO Absolute Accuracy Equation

AbsoluteAccuracy = **OutputValue** · **(GainError)** + **Range** · **(OffsetError**)

- **GainError** = **ResidualGainError** + **GainTempco** · (**TempChangeFromLastInternalCal**) + **ReferenceTempco** · (**TempChangeFromLastExternalCal**)

- **OffsetError** = **ResidualOffsetError** + **AOOffsetTempco** · (**TempChangeFromLastInternalCal**) + **INLError**

Digital I/O/PFI

Static Characteristics

Number of channels	24 total, 8 (P0.<0..7>), 16 (PFI <0..7>/P1, PFI <8..15>/P2)
Ground reference	D GND
Direction control	Each terminal individually programmable as input or output

Pull-down resistor	50 kΩ typical, 20 kΩ minimum
Input voltage protection	±20 V on up to two pins[3]

Waveform Characteristics (Port 0 Only)

Terminals used	Port 0 (P0.<0..7>)
Port/sample size	Up to 8 bits
Waveform generation (DO) FIFO	2,047 samples
Waveform acquisition (DI) FIFO	2,047 samples
DI Sample Clock frequency	
PCI/PXI	0 MHz to 10 MHz, system and bus activity dependent
USB	0 MHz to 1 MHz, system and bus activity dependent
DO Sample Clock frequency	
PCI/PXI	
Regenerate from FIFO	0 MHz to 10 MHz
Streaming from memory	0 MHz to 10 MHz, system and bus activity dependent
USB	
Regenerate from FIFO	0 MHz to 10 MHz
Streaming from memory	0 MHz to 1 MHz, system and bus activity dependent

Data transfers	
PCI/PXI	DMA (scatter-gather), interrupts, programmed I/O
USB	USB Signal Stream, programmed I/O
DI or DO Sample Clock source[4]	Any PFI, RTSI, AI Sample or Convert Clock, AO Sample Clock, Ctr n Internal Output, and many other signals

PFI/Port 1/Port 2 Functionality

Functionality	Static digital input, static digital output, timing input, timing output
Timing output sources	Many AI, AO, counter, DI, DO timing signals
Debounce filter settings	125 ns, 6.425 µs, 2.56 ms, disable; high and low transitions; selectable per input

Recommended Operating Conditions

Level	Minimum	Maximum
Input high voltage (V_{IH})	2.2 V	5.25 V
Input low voltage (V_{IL})	0 V	0.8 V
Output high current (I_{OH}) P0.<0..7>	—	-24 mA
Output high current (I_{OH}) PFI <0..15>/P1/P2	—	-16 mA
Output low current (I_{OL}) P0.<0..7>	—	24 mA

Level	Minimum	Maximum
Output low current (I_{OL}) PFI <0..15>/P1/P2	—	16 mA

Electrical Characteristics

Level	Minimum	Maximum
Positive-going threshold (VT+)	—	2.2 V
Negative-going threshold (VT-)	0.8 V	—
Delta VT hystersis (VT+ - VT-)	0.2 V	—
I_{IL} input low current (V_{in} = 0 V)	—	-10 µA
I_{IH} input high current (V_{in} = 5 V)	—	250 µA

Digital I/O Characteristics

Figure 5. P0.<0..7>: I_{oh} versus V_{oh}
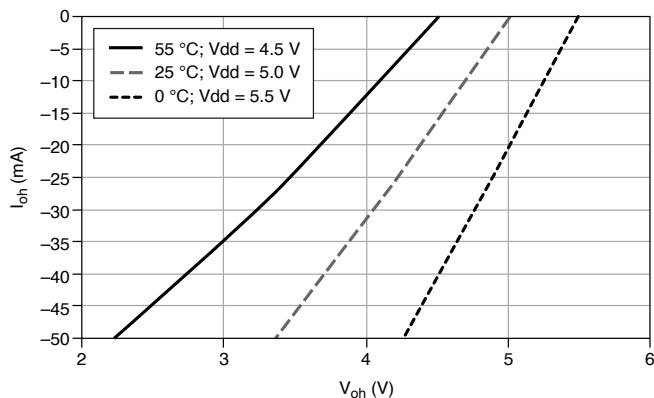
Figure 6. PFI <0..15>/P1/P2: I_{oh} versus V_{oh}
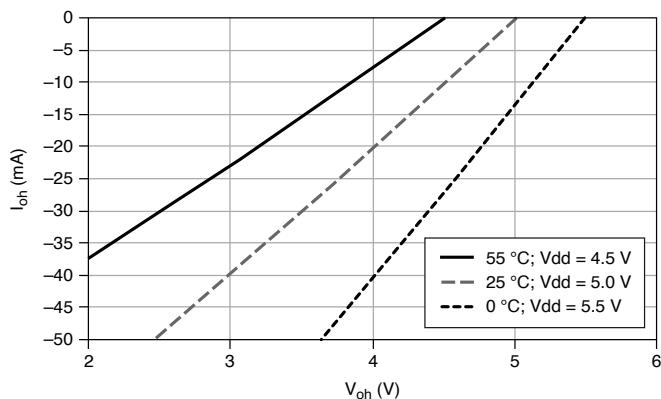
Figure 7. P0.<0..7>: I_{ol} versus V_{ol}
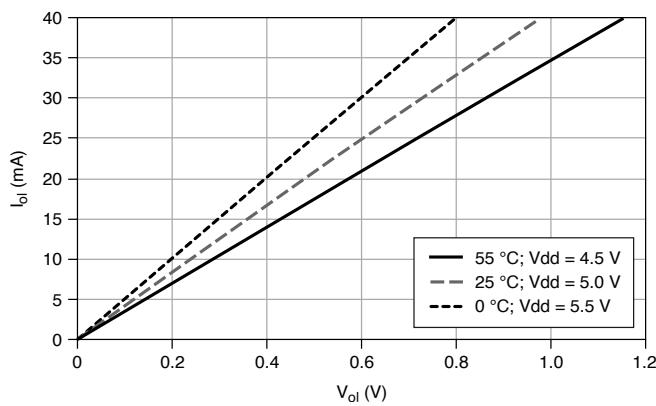
Figure 8. PFI <0..15>/P1/P2: I_{ol} versus V_{ol}
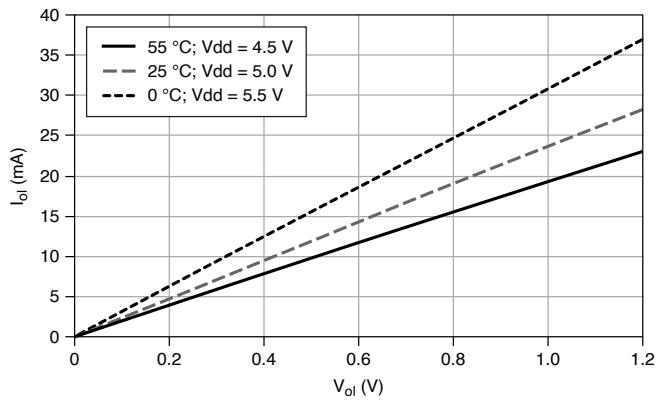
General-Purpose Counters/Timers

Number of counter/timers	2
Resolution	32 bits
Counter measurements	Edge counting, pulse, semi-period, period, two-edge separation
Position measurements	X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding
Output applications	Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling
Internal base clocks	80 MHz, 20 MHz, 0.1 MHz
External base clock frequency	0 MHz to 20 MHz
Base clock accuracy	50 ppm
Inputs	Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down
Routing options for inputs	Any PFI, RTSI, PXI_TRIG, PXI_STAR, analog trigger, many internal signals
FIFO	2 samples
Data transfers	
PCI/PXI	Dedicated scatter-gather DMA controller for each counter/timer; interrupts, programmed I/O
USB	USB Signal Stream, programmed I/O

Frequency Generator

Number of channels	1
Base clocks	10 MHz, 100 kHz
Divisors	1 to 16
Base clock accuracy	50 ppm

Output can be available on any output PFI or RTSI terminal.

Phase-Locked Loop (PLL)

Note PCI/PXI devices only.

Number of PLLs	1
Reference signal	PXI_STAR, PXI_CLK10, RTSI <0..7>
Output of PLL	80 MHz Timebase; other signals derived from 80 MHz Timebase including 20 MHz and 100 kHz Timebases

External Digital Triggers

Source	Any PFI, RTSI, PXI_TRIG, PXI_STAR
Polarity	Software-selectable for most signals

Analog input function	Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Convert Clock, Sample Clock Timebase
Analog output function	Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase
Counter/timer function	Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down
Digital waveform generation (DO) function	Sample Clock
Digital waveform acquisition (DI) function	Sample Clock

Device-to-Device Trigger Bus

PCI	RTSI <0..7>[5]
PXI	PXI_TRIG <0..7>, PXI_STAR
USB source	None
Output selections	10 MHz Clock, frequency generator output, many internal signals
Debounce filter settings	125 ns, 6.425 µs, 2.56 ms, disable; high and low transitions; selectable per input

Bus Interface

PCI/PXI	3.3 V or 5 V signal environment
USB	USB 2.0 Hi-Speed or full-speed[6], [7]

DMA channels (PCI/PXI)	6, can be used for analog input, analog output, digital input, digital output, counter/timer 0, counter/timer 1
USB Signal Stream	4, can be used for analog input, analog output, counter/timer 0, counter/timer 1

The PXI device can be installed in PXI Express hybrid slots. It cannot be used to control SCXI in PXI/SCXI combo chassis.

Power Requirements

Current draw from bus during no-load condition[8]	
PCI/PXI	
+5 V	0.03 A
+3.3 V	0.725 A
+12 V	0.35 A

Current draw from bus during AI and AO overvoltage condition[8]	
PCI/PXI	
+5 V	0.03 A
+3.3 V	1.2 A
+12 V	0.38 A

⚠️ **Caution** USB devices must be powered with an NI offered AC adapter or a National Electric Code (NEC) Class 2 DC source that meets the power requirements for the device and has appropriate safety certification marks for country of use.

USB power supply requirements	11 to 30 VDC, 20 W, locking or non-locking power jack with 0.080 in. diameter center pin, 5/16-32 thread for locking collars

Current Limits

> ⚠️ **Caution** Exceeding the current limits may cause unpredictable behavior by the device and/or PC/chassis.

PCI	
+5 V terminal (connector 0)	1 A maximum[9]
+5 V terminal (connector 1)	1 A maximum[9]
PXI	
+5 V terminal (connector 0)	1 A maximum[9]
+5 V terminal (connector 1)	1 A maximum[9]
P0/PFI/P1/P2 and +5 V terminals combined	2 A maximum
USB	
+5 V terminal	1 A max[9]
P0/PFI/P1/P2 and +5 V terminals combined	2 A maximum
Power supply fuse	2 A, 250 V

Physical Characteristics

Dimensions	

PCI printed circuit board	10.6 cm × 15.5 cm(4.2 in. × 6.1 in.)
PXI printed circuit board	Standard 3U PXI
Screw Terminal (includes connectors)	26.67 cm × 17.09 cm × 4.45 cm(10.5 in. × 6.73 in. × 1.75 in.)
Mass Termination enclosure (includes connectors)	18.8 cm × 17.09 cm × 4.45 cm (7.4 in. × 6.73 in. × 1.75 in.)
USB OEM	Refer to the **NI USB-622x/625x/628x OEM User Guide**
Weight	
PCI	164 g (5.8 oz)
PXI	236 g (8.3 oz)
USB Screw Terminal	1.24 kg (2 lb11 oz)
USB Mass Termination	816 g (1 lb12.8 oz)
USB OEM	172 g (6.1 oz)
I/O connectors	
PCI/PXI	2 68-pin VHDCI
Mass Termination	2 68-pin SCSI
Screw Terminal/BNC screw terminal wiring	16 AWG to 28 AWG

Calibration

Recommended warm-up time	
PCI/PXI/PCI Express/PXI Express	15 minutes
USB	30 minutes
Calibration interval	2 years

Maximum Working Voltage

Connect only voltages that are below these limits.

Channel-to-earth	11 V, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

> ⚠️ **Caution** Do not use for measurements within Categories II, III, or IV.

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

Environmental

Operating temperature	
PCI/PXI	0 °C to 55 °C
USB	0 °C to 45 °C
Storage temperature	-20 °C to 70 °C
Humidity	10% RH to 90% RH, noncondensing
Maximum altitude	2,000 m
Pollution Degree (indoor use only)	2

Indoor use only.

Shock and Vibration (PXI Only)

Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Random vibration	
Operating	5 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating	5 Hz to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Safety Compliance Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1

> **Note** For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Electromagnetic Compatibility

CE Compliance C E

- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

- ⊠ **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）

- ⊜⊝⊛ 中国 **RoHS**— NI 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 NI 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.)

Device Pinouts

Figure 9. NI PCI/PXI-6255 Pinout

AI 0 (AI 0+)	68	34	AI 8 (AI 0–)	
AI GND	67	33	AI 1 (AI 1+)	
AI 9 (AI 1–)	66	32	AI GND	
AI 2 (AI 2+)	65	31	AI 10 (AI 2–)	
AI GND	64	30	AI 3 (AI 3+)	
AI 11 (AI 3–)	63	29	AI GND	
AI SENSE	62	28	AI 4 (AI 4+)	
AI 12 (AI 4–)	61	27	AI GND	
AI 5 (AI 5+)	60	26	AI 13 (AI 5–)	
AI GND	59	25	AI 6 (AI 6+)	
AI 14 (AI 6–)	58	24	AI GND	
AI 7 (AI 7+)	57	23	AI 15 (AI 7–)	
AI GND	56	22	AO 0	
AO GND	55	21	AO 1	
AO GND	54	20	APFI 0	
D GND	53	19	P0.4	
P0.0	52	18	D GND	
P0.5	51	17	P0.1	
D GND	50	16	P0.6	
P0.2	49	15	D GND	
P0.7	48	14	+5 V	
P0.3	47	13	D GND	
PFI 11/P2.3	46	12	D GND	
PFI 10/P2.2	45	11	PFI 0/P1.0	
D GND	44	10	PFI 1/P1.1	
PFI 2/P1.2	43	9	D GND	
PFI 3/P1.3	42	8	+5 V	
PFI 4/P1.4	41	7	D GND	
PFI 13/P2.5	40	6	PFI 5/P1.5	
PFI 15/P2.7	39	5	PFI 6/P1.6	
PFI 7/P1.7	38	4	D GND	
PFI 8/P2.0	37	3	PFI 9/P2.1	
D GND	36	2	PFI 12/P2.4	
D GND	35	1	PFI 14/P2.6	

CONNECTOR 0 (AI 0-15)
CONNECTOR 1 (AI 16-79)

TERMINAL 68
TERMINAL 34
TERMINAL 35
TERMINAL 1
TERMINAL 1
TERMINAL 35
TERMINAL 34
TERMINAL 68

AI 71 (AI 71+)	1	35	AI 79 (AI 71–)	
AI 78 (AI 70–)	2	36	AI 70 (AI 70+)	
AI 69 (AI 69+)	3	37	AI 77 (AI 69–)	
AI 68 (AI 68+)	4	38	AI 76 (AI 68–)	
AI 75 (AI 67–)	5	39	AI 67 (AI 67+)	
AI 66 (AI 66+)	6	40	AI 74 (AI 66–)	
AI 65 (AI 65+)	7	41	AI 73 (AI 65–)	
AI 72 (AI 64–)	8	42	AI 64 (AI 64+)	
AI GND	9	43	AI GND	
AI 55 (AI 55+)	10	44	AI 63 (AI 55–)	
AI 54 (AI 54+)	11	45	AI 62 (AI 54–)	
AI 61 (AI 53–)	12	46	AI 53 (AI 53+)	
AI 52 (AI 52+)	13	47	AI 60 (AI 52–)	
AI 51 (AI 51+)	14	48	AI 59 (AI 51–)	
AI 58 (AI 50–)	15	49	AI 50 (AI 50+)	
AI 49 (AI 49+)	16	50	AI 57 (AI 49–)	
AI 48 (AI 48+)	17	51	AI 56 (AI 48–)	
AI 47 (AI 39–)	18	52	AI 39 (AI 39+)	
AI 38 (AI 38+)	19	53	AI 46 (AI 38–)	
AI 37 (AI 37+)	20	54	AI 45 (AI 37–)	
AI 44 (AI 36–)	21	55	AI 36 (AI 36+)	
AI GND	22	56	AI SENSE 2	
AI 35 (AI 35+)	23	57	AI 43 (AI 35–)	
AI 34 (AI 34+)	24	58	AI 42 (AI 34–)	
AI 41 (AI 33–)	25	59	AI 33 (AI 33+)	
AI 32 (AI 32+)	26	60	AI 40 (AI 32–)	
AI 23 (AI 23+)	27	61	AI 31 (AI 23–)	
AI 30 (AI 22–)	28	62	AI 22 (AI 22+)	
AI 21 (AI 21+)	29	63	AI 29 (AI 21–)	
AI 20 (AI 20+)	30	64	AI 28 (AI 20–)	
AI 27 (AI 19–)	31	65	AI 19 (AI 19+)	
AI 18 (AI 18+)	32	66	AI 26 (AI 18–)	
AI 17 (AI 17+)	33	67	AI 25 (AI 17–)	
AI 24 (AI 16–)	34	68	AI 16 (AI 16+)	

NC = No Connect

Figure 10. NI USB-6255 Screw Terminal Pinout

AI 0 (AI 0+)	1		17	AI 8 (AI 0–)
AI 1 (AI 1+)	2		18	AI 9 (AI 1–)
AI 2 (AI 2+)	3		19	AI 10 (AI 2–)
AI 3 (AI 3+)	4		20	AI 11 (AI 3–)
AI 4 (AI 4+)	5		21	AI 12 (AI 4–)
AI GND	6		22	AI GND
AI 5 (AI 5+)	7		23	AI 13 (AI 5–)
AI 6 (AI 6+)	8		24	AI 14 (AI 6–)
AI 7 (AI 7+)	9		25	AI 15 (AI 7–)
AI 16 (AI 16+)	10		26	AI 24 (AI 16–)
AI 17 (AI 17+)	11		27	AI 25 (AI 17–)
AI 18 (AI 18+)	12		28	AI 26 (AI 18–)
AI GND	13		29	AI GND
AI SENSE	14		30	APFI 0
AO GND	15		31	AO GND
AO 0	16		32	AO 1

AI 19 (AI 19+)	33		49	AI 27 (AI 19–)
AI 20 (AI 20+)	34		50	AI 28 (AI 20–)
AI 21 (AI 21+)	35		51	AI 29 (AI 21–)
AI 22 (AI 22+)	36		52	AI 30 (AI 22–)
AI GND	37		53	AI GND
AI 23 (AI 23+)	38		54	AI 31 (AI 23–)
AI 32 (AI 32+)	39		55	AI 40 (AI 32–)
AI 33 (AI 33+)	40		56	AI 41 (AI 33–)
AI 34 (AI 34+)	41		57	AI 42 (AI 34–)
AI 35 (AI 35+)	42		58	AI 43 (AI 35–)
AI 36 (AI 36+)	43		59	AI 44 (AI 36–)
AI GND	44		60	AI SENSE 2
AI 37 (AI 37+)	45		61	AI 45 (AI 37–)
AI 38 (AI 38+)	46		62	AI 46 (AI 38–)
AI 39 (AI 39+)	47		63	AI 47 (AI 39–)
AI 48 (AI 48+)	48		64	AI 56 (AI 48–)

AI 49 (AI 49+)	65		81	AI 57 (AI 49–)
AI 50 (AI 50+)	66		82	AI 58 (AI 50–)
AI 51 (AI 51+)	67		83	AI 59 (AI 51–)
AI 52 (AI 52+)	68		84	AI 60 (AI 52–)
AI 53 (AI 53+)	69		85	AI 61 (AI 53–)
AI 54 (AI 54+)	70		86	AI 62 (AI 54–)
AI 55 (AI 55+)	71		87	AI 63 (AI 55–)
AI GND	72		88	AI GND
AI 64 (AI 64+)	73		89	AI 72 (AI 64–)
AI 65 (AI 65+)	74		90	AI 73 (AI 65–)
AI 66 (AI 66+)	75		91	AI 74 (AI 66–)
AI 67 (AI 67+)	76		92	AI 75 (AI 67–)
AI 68 (AI 68+)	77		93	AI 76 (AI 68–)
AI 69 (AI 69+)	78		94	AI 77 (AI 69–)
AI 70 (AI 70+)	79		95	AI 78 (AI 70–)
AI 71 (AI 71+)	80		96	AI 79 (AI 71–)

P0.0	97		113	PFI 8/P2.0
P0.1	98		114	D GND
P0.2	99		115	PFI 9/P2.1
P0.3	100		116	D GND
P0.4	101		117	PFI 10/P2.2
P0.5	102		118	D GND
P0.6	103		119	PFI 11/P2.3
P0.7	104		120	D GND
PFI 0/P1.0	105		121	PFI 12/P2.4
PFI 1/P1.1	106		122	D GND
PFI 2/P1.2	107		123	PFI 13/P2.5
PFI 3/P1.3	108		124	D GND
PFI 4/P1.4	109		125	PFI 14/P2.6
PFI 5/P1.5	110		126	D GND
PFI 6/P1.6	111		127	PFI 15/P2.7
PFI 7/P1.7	112		128	+5 V

Figure 11. NI USB-6255 Mass Termination Pinout

CONNECTOR 0 (AI 0-15)   CONNECTOR 1 (AI 16-79)

AI 0 (AI 0+)	68	34	AI 8 (AI 0–)
AI GND	67	33	AI 1 (AI 1+)
AI 9 (AI 1–)	66	32	AI GND
AI 2 (AI 2+)	65	31	AI 10 (AI 2–)
AI GND	64	30	AI 3 (AI 3+)
AI 11 (AI 3–)	63	29	AI GND
AI SENSE	62	28	AI 4 (AI 4+)
AI 12 (AI 4–)	61	27	AI GND
AI 5 (AI 5+)	60	26	AI 13 (AI 5–)
AI GND	59	25	AI 6 (AI 6+)
AI 14 (AI 6–)	58	24	AI GND
AI 7 (AI 7+)	57	23	AI 15 (AI 7–)
AI GND	56	22	AO 0
AO GND	55	21	AO 1
AO GND	54	20	APFI 0
D GND	53	19	P0.4
P0.0	52	18	D GND
P0.5	51	17	P0.1
D GND	50	16	P0.6
P0.2	49	15	D GND
P0.7	48	14	+5 V
P0.3	47	13	D GND
PFI 11/P2.3	46	12	D GND
PFI 10/P2.2	45	11	PFI 0/P1.0
D GND	44	10	PFI 1/P1.1
PFI 2/P1.2	43	9	D GND
PFI 3/P1.3	42	8	+5 V
PFI 4/P1.4	41	7	D GND
PFI 13/P2.5	40	6	PFI 5/P1.5
PFI 15/P2.7	39	5	PFI 6/P1.6
PFI 7/P1.7	38	4	D GND
PFI 8/P2.0	37	3	PFI 9/P2.1
D GND	36	2	PFI 12/P2.4
D GND	35	1	PFI 14/P2.6

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AI 16 (AI 16+)	68	34	AI 24 (AI 16–)
AI 25 (AI 17–)	67	33	AI 17 (AI 17+)
AI 26 (AI 18–)	66	32	AI 18 (AI 18+)
AI 19 (AI 19+)	65	31	AI 27 (AI 19–)
AI 28 (AI 20–)	64	30	AI 20 (AI 20+)
AI 29 (AI 21–)	63	29	AI 21 (AI 21+)
AI 22 (AI 22+)	62	28	AI 30 (AI 22–)
AI 31 (AI 23–)	61	27	AI 23 (AI 23+)
AI 40 (AI 32–)	60	26	AI 32 (AI 32+)
AI 33 (AI 33+)	59	25	AI 41 (AI 33–)
AI 42 (AI 34–)	58	24	AI 34 (AI 34+)
AI 43 (AI 35–)	57	23	AI 35 (AI 35+)
AI SENSE 2	56	22	AI GND
AI 36 (AI 36+)	55	21	AI 44 (AI 36–)
AI 45 (AI 37–)	54	20	AI 37 (AI 37+)
AI 46 (AI 38–)	53	19	AI 38 (AI 38+)
AI 39 (AI 39+)	52	18	AI 47 (AI 39–)
AI 56 (AI 48–)	51	17	AI 48 (AI 48+)
AI 57 (AI 49–)	50	16	AI 49 (AI 49+)
AI 50 (AI 50+)	49	15	AI 58 (AI 50–)
AI 59 (AI 51–)	48	14	AI 51 (AI 51+)
AI 60 (AI 52–)	47	13	AI 52 (AI 52+)
AI 53 (AI 53+)	46	12	AI 61 (AI 53–)
AI 62 (AI 54–)	45	11	AI 54 (AI 54+)
AI 63 (AI 55–)	44	10	AI 55 (AI 55+)
AI GND	43	9	AI GND
AI 64 (AI 64+)	42	8	AI 72 (AI 64–)
AI 73 (AI 65–)	41	7	AI 65 (AI 65+)
AI 74 (AI 66–)	40	6	AI 66 (AI 66+)
AI 67 (AI 67+)	39	5	AI 75 (AI 67–)
AI 76 (AI 68–)	38	4	AI 68 (AI 68+)
AI 77 (AI 69–)	37	3	AI 69 (AI 69+)
AI 70 (AI 70+)	36	2	AI 78 (AI 70–)
AI 79 (AI 71–)	35	1	AI 71 (AI 71+)