PXIe-6509 Specifications

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Contents

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These specifications apply to the PXIe-6509.

Revision History

Version	Date changed	Description
378203C-01	June 2025	Clarified pull-up/down resistor configuration.
378203B-01	April 2025	Added product pinout.
378203A-01	April 2020	Initial release.

Related information:

- PXIe-6509 User Manual
- Dimensional Drawings
- Product Certifications
- Letter of Volatility
- NI Learning Center

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the performance met by a majority of models.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

Conditions

Specifications are valid under the following conditions unless otherwise noted.

- 25 °C.
- All voltages are relative to COM.

PXIe-6509 Pinout

Use the pinout to connect to terminals on the PXIe-6509.

Figure 1. PXIe-6509 Connector Pinout

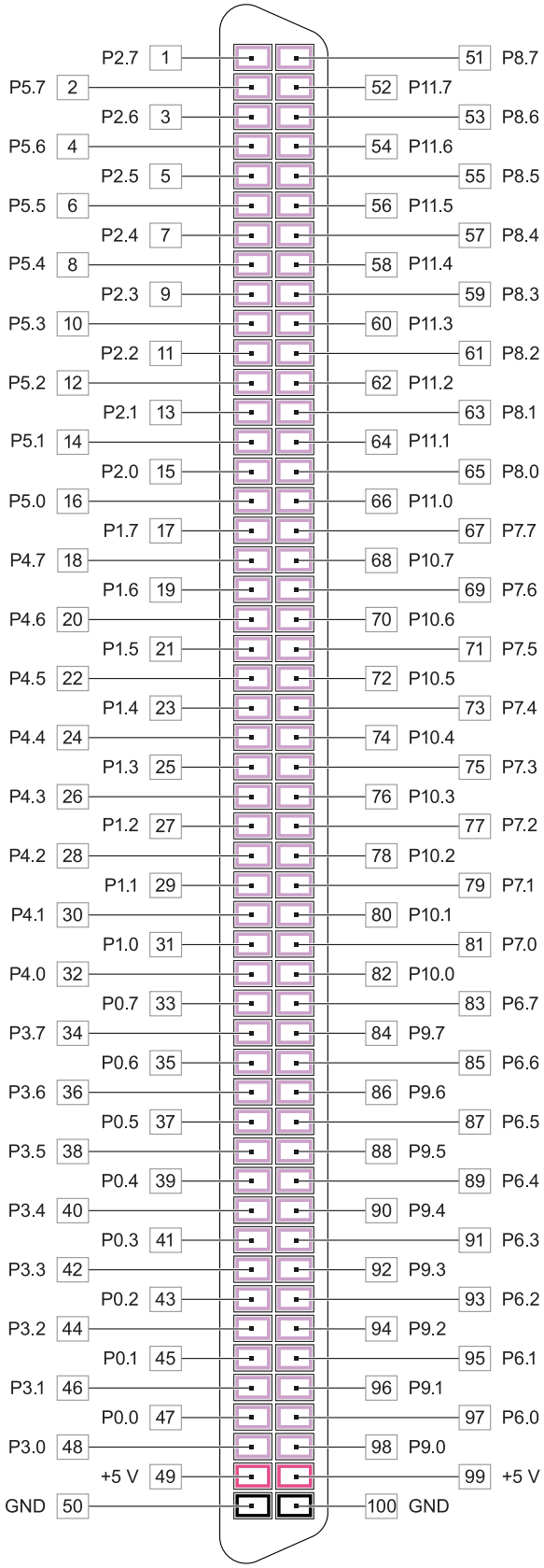

Table 1. Signal Descriptions

Signal Name	Pin	Description
P0.0	47	Bi-directional digital I/O lines for port 0
P0.1	45	Bi-directional digital I/O lines for port 0
P0.2	43	Bi-directional digital I/O lines for port 0
P0.3	41	Bi-directional digital I/O lines for port 0
P0.4	39	Bi-directional digital I/O lines for port 0
P0.5	37	Bi-directional digital I/O lines for port 0
P0.6	35	Bi-directional digital I/O lines for port 0
P0.7	33	Bi-directional digital I/O lines for port 0
P1.0	31	Bi-directional digital I/O lines for port 1
P1.1	29	Bi-directional digital I/O lines for port 1
P1.2	27	Bi-directional digital I/O lines for port 1
P1.3	25	Bi-directional digital I/O lines for port 1
P1.4	23	Bi-directional digital I/O lines for port 1
P1.5	21	Bi-directional digital I/O lines for port 1
P1.6	19	Bi-directional digital I/O lines for port 1
P1.7	17	Bi-directional digital I/O lines for port 1
P2.0	15	Bi-directional digital I/O lines for port 2
P2.1	13	Bi-directional digital I/O lines for port 2
P2.2	11	Bi-directional digital I/O lines for port 2
P2.3	9	Bi-directional digital I/O lines for port 2
P2.4	7	Bi-directional digital I/O lines for port 2
P2.5	5	Bi-directional digital I/O lines for port 2
P2.6	3	Bi-directional digital I/O lines for port 2
P2.7	1	Bi-directional digital I/O lines for port 2
P3.0	48	Bi-directional digital I/O lines for port 3
P3.1	46	Bi-directional digital I/O lines for port 3

Signal Name	Pin	Description
P3.2	44	Bi-directional digital I/O lines for port 3
P3.3	42	Bi-directional digital I/O lines for port 3
P3.4	40	Bi-directional digital I/O lines for port 3
P3.5	38	Bi-directional digital I/O lines for port 3
P3.6	36	Bi-directional digital I/O lines for port 3
P3.7	34	Bi-directional digital I/O lines for port 3
P4.0	32	Bi-directional digital I/O lines for port 4
P4.1	30	Bi-directional digital I/O lines for port 4
P4.2	28	Bi-directional digital I/O lines for port 4
P4.3	26	Bi-directional digital I/O lines for port 4
P4.4	24	Bi-directional digital I/O lines for port 4
P4.5	22	Bi-directional digital I/O lines for port 4
P4.6	20	Bi-directional digital I/O lines for port 4
P4.7	18	Bi-directional digital I/O lines for port 4
P5.0	16	Bi-directional digital I/O lines for port 5
P5.1	14	Bi-directional digital I/O lines for port 5
P5.2	12	Bi-directional digital I/O lines for port 5
P5.3	10	Bi-directional digital I/O lines for port 5
P5.4	8	Bi-directional digital I/O lines for port 5
P5.5	6	Bi-directional digital I/O lines for port 5
P5.6	4	Bi-directional digital I/O lines for port 5
P5.7	2	Bi-directional digital I/O lines for port 5
P6.0	97	Bi-directional digital I/O lines for port 6
P6.1	95	Bi-directional digital I/O lines for port 6
P6.2	93	Bi-directional digital I/O lines for port 6
P6.3	91	Bi-directional digital I/O lines for port 6
P6.4	89	Bi-directional digital I/O lines for port 6

Signal Name	Pin	Description
P6.5	87	Bi-directional digital I/O lines for port 6
P6.6	85	Bi-directional digital I/O lines for port 6
P6.7	83	Bi-directional digital I/O lines for port 6
P7.0	81	Bi-directional digital I/O lines for port 7
P7.1	79	Bi-directional digital I/O lines for port 7
P7.2	77	Bi-directional digital I/O lines for port 7
P7.3	75	Bi-directional digital I/O lines for port 7
P7.4	73	Bi-directional digital I/O lines for port 7
P7.5	71	Bi-directional digital I/O lines for port 7
P7.6	69	Bi-directional digital I/O lines for port 7
P7.7	67	Bi-directional digital I/O lines for port 7
P8.0	65	Bi-directional digital I/O lines for port 8
P8.1	63	Bi-directional digital I/O lines for port 8
P8.2	61	Bi-directional digital I/O lines for port 8
P8.3	59	Bi-directional digital I/O lines for port 8
P8.4	57	Bi-directional digital I/O lines for port 8
P8.5	55	Bi-directional digital I/O lines for port 8
P8.6	53	Bi-directional digital I/O lines for port 8
P8.7	51	Bi-directional digital I/O lines for port 8
P9.0	98	Bi-directional digital I/O lines for port 9
P9.1	96	Bi-directional digital I/O lines for port 9
P9.2	94	Bi-directional digital I/O lines for port 9
P9.3	92	Bi-directional digital I/O lines for port 9
P9.4	90	Bi-directional digital I/O lines for port 9
P9.5	88	Bi-directional digital I/O lines for port 9
P9.6	86	Bi-directional digital I/O lines for port 9
P9.7	84	Bi-directional digital I/O lines for port 9

Signal Name	Pin	Description
P10.0	82	Bi-directional digital I/O lines for port 10
P10.1	80	Bi-directional digital I/O lines for port 10
P10.2	78	Bi-directional digital I/O lines for port 10
P10.3	76	Bi-directional digital I/O lines for port 10
P10.4	74	Bi-directional digital I/O lines for port 10
P10.5	72	Bi-directional digital I/O lines for port 10
P10.6	70	Bi-directional digital I/O lines for port 10
P10.7	68	Bi-directional digital I/O lines for port 10
P11.0	66	Bi-directional digital I/O lines for port 11
P11.1	64	Bi-directional digital I/O lines for port 11
P11.2	62	Bi-directional digital I/O lines for port 11
P11.3	60	Bi-directional digital I/O lines for port 11
P11.4	58	Bi-directional digital I/O lines for port 11
P11.5	56	Bi-directional digital I/O lines for port 11
P11.6	54	Bi-directional digital I/O lines for port 11
P11.7	52	Bi-directional digital I/O lines for port 11
+5 V	49, 99	+5 V power source
GND	50, 100	Ground, connected to the computer ground.

Physical Characteristics

Table 2. Physical Characteristics

Printed circuit board dimensions	Standard 3U PXI
Dimensions (without connectors)	14.2 cm × 10.4 cm (5.6 in. × 4.1 in.)
Weight	140 g (4.8 oz)
I/O connector	100-pin SCSI

Digital I/O

Table 3. Digital Input/Output

Number of channels	96 input/output
Compatibility	TTL Schmitt Trigger/CMOS, single-ended GND reference
Power-on state	Input pulled up or down (software-selectable), output 1 or 0
Data transfers	Interrupts, programmed I/O
I/O connector	100-pin female 0.050 series SCSI

Table 4. Pull Resistors

Pull-up resistor	4.7 kΩ, typical
Pull-down resistor	47 kΩ, typical
Input voltage protection	±20 V on up to two pins, maximum

Note The pull-up resistors and pull-down resistors are configurable per port only.

Digital Logic Levels

Table 5. Input Signals

Level	Minimum	Maximum
Input voltage (V_{in})	0 V	5 V
Positive-going threshold (VT+)	—	2.2 V
Negative-going threshold (VT–)	0.8 V	—
Delta VT hysteresis (VT+ – VT–)	0.2 V	—
Input high current (I_{IH}) (V_{in} = 5 V, resistors set to pull-up)	—	260 µA
Input high current (I_{IH}) (V_{in} = 5 V, resistors set to pull-down)	—	260 µA

Level	Minimum	Maximum
Input low current (I_{IL}) (V_{in} = 0 V, resistors set to pull-up)	—	–1250 µA
Input low current (I_{IL}) (V_{in} = 0 V, resistors set to pull-down)	—	–20 µA

Table 6. Output Signals

Level	Minimum	Maximum
High-level output current (I_{OH})	—	–24 mA
Low-level output current (I_{OL})	—	24 mA
Output voltage (V_{out})	0 V	5.5 V
Output high voltage (V_{OH}), at –24 mA	3.4 V	—
Output low voltage (V_{OL}), at 24 mA	—	0.78 V

The total current sinking/sourcing from one port cannot exceed 100 mA.

Power Requirements

Table 7. Current Draw from Bus During No-Load Condition

Typical	575 mA on +3.3 VDC 20 mA on +12 VDC
Peak	700 mA on +3.3 VDC 90 mA on +12 VDC
+5 V power available at I/O connector (pins 49 and 99)	+4.0 V to 5.25 V 1 A, maximum

Note The voltage at the I/O connector depends on the amount of current drawn from the PXIe-6509.

Absolute Maximum Voltage Rating

Absolute maximum voltage rating refers to the peak voltage recommended during normal operation, including transient voltages. Refer to *Digital Logic Levels* for the maximum voltage input and output.

Table 8. Absolute Maximum Voltage Rating

Channel-to-earth	-0.5 V to 5.5 V, Measurement Category I

Caution Do not connect the PXIe-6509 to signals or use for measurements within Measurement Categories II, III, or IV.

Attention Ne connectez pas le PXIe-6509 à des signaux et ne l'utilisez pas pour effectuer des mesures dans les catégories de mesure II, III ou IV.

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.

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

Environmental Guidelines

Notice This product is intended for use in indoor applications only.

Environmental Characteristics

Table 9. Temperature

Operating	0 °C to 55 °C
Storage	–40 °C to 71 °C

Table 10. Humidity

Operating	10% to 90%, noncondensing
Storage	5% to 95%, noncondensing

Table 11. Pollution Degree

Pollution degree	2

Table 12. Maximum Altitude

Maximum altitude	2,000 m (at 25 °C ambient temperature)

Table 13. Shock and Vibration

Operating vibration	5 Hz to 500 Hz, 0.3 g RMS
Non-operating vibration	5 Hz to 500 Hz, 2.4 g RMS
Operating shock	30 g, half-sine, 11 ms pulse