USB-6501 Specifications

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Contents

USB-6501 Specifications

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 at 25 °C unless otherwise noted. All voltages are relative to COM unless otherwise noted.

Digital I/O

Number of lines	
P0.<0..7>	8
P1.<0..7>	8
P2.<0..7>	8

Direction control	Input or output, software-selectable
Output driver type	Active drive (push-pull) or open collector (open-drain), software selectable
Pull-up resistor	4.7 kΩ Vbus (nominally 5 V)
Absolute voltage range	-0.5 V to 5.8 V with respect to GND
Power-on state	Input (high impedance)

Digital Logic Levels

Input low voltage	-0.3 V minimum, 0.8 V maximum
Input high voltage	2.0 V minimum, 5.8 V maximum
Input leakage current	50.0 µA maximum
Output low voltage, open collector or active drive	
I_{OL} = 2 mA	0.4 V maximum
I_{OL} = 8.5 mA	0.8 V maximum
Output high voltage, active drive[1]	
I_{OH} = -2 mA	2.8 V minimum, 3.6 V maximum

I_{OH} = -8.5 mA	2.0 V minimum, 3.5 V maximum
Output high voltage, open collector	
I_{OH} = -0.4 mA, nominal	2.0 V minimum, 5.0 V maximum
I_{OH} = -7.5 mA, with external pull-up resistor	2.0 V minimum

Counter

Number of counters	1 (P2.7 can be configured as a counter)
Resolution	32 bits
Counter measurements	Falling edge counting
Maximum input frequency	5 MHz
Minimum high pulse width	100 ns
Minimum low pulse width	100 ns

Bus Interface

USB specification	USB 2.0 Full Speed (12 Mb/s)

External Voltage

+5 V output	
Voltage	4.00 V minimum, 5.25 V maximum
Current	230 mA maximum

Power Requirements

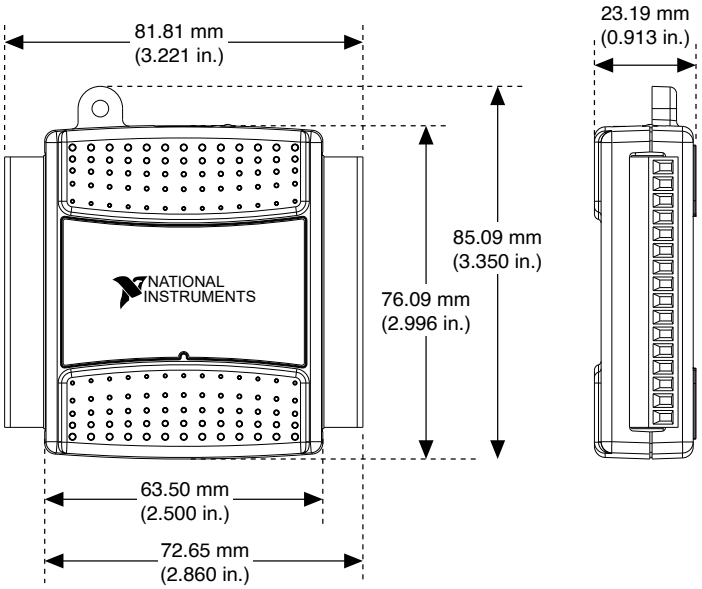
USB	
Input voltage	4.50 VDC to 5.25 VDC, in configured state
Active current	80 mA typical, 500 mA maximum
Suspend current	500 µA maximum, all DIO lines disconnected

Physical Characteristics

Dimensions	
Without connectors	6.35 cm × 8.51 cm × 2.31 cm (2.50 in. × 3.35 in. × 0.91 in.)
With connectors	8.18 cm × 8.51 cm × 2.31 cm (3.22 in. × 3.35 in. × 0.91 in.)
Weight	84 g (3 oz)

USB connector	USB series B receptacle (1)
I/O connectors	
Type	16-position (screw terminal) plug headers (2)
Screw terminal wiring	16 AWG to 28 AWG copper conductor wire with 10 mm (0.39 in.) of insulation stripped from the end
Torque for screw terminals	0.22 N · m to 0.25 N · m (2.0 lb · in. to 2.2 lb · in.)

Figure 1. USB-6501 Dimensions



If you need to clean the module, wipe it with a dry towel.

Safety Voltages

Connect only voltages that are within these limits.

Channel-to-COM (one channel)	±30 V max, Measurement Category I
Channels-to-COM (one port, all channels)	±8.9 V max, 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 this module for connection to signals or for measurements within Measurement 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

Temperature (IEC 60068-2-1 and IEC 60068-2-2)	
Operating	0 °C to 55 °C
Storage	-40 °C to 85 °C
Humidity (IEC 60068-2-56)	
Operating	5% to 90% RH, noncondensing

Storage	5% to 90% RH, noncondensing
Pollution Degree (IEC 60664)	2
Maximum altitude	2,000 m

Indoor use only.

Hazardous Locations

This device is not certified for use in hazardous locations.

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 CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

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`.)