# DEVICE SPECIFICATIONS

#### 66-Channel SPDT Relay Module

This document lists specifications for the NI PXI-2571 (PXI-2571) general-purpose relay module. All specifications are subject to change without notice. Visit *ni.com/manuals* for the most current specifications.

# Contents

About These Specifications	1
Input Characteristics	2
Dynamic Characteristics	3
Trigger Characteristics	
Physical Characteristics	
Environment	.4
Shock and Vibration	.5
Compliance and Certifications	5
Diagrams	
Accessories	

# About These Specifications

*Specifications* characterize the warranted performance of the instrument under the stated operating conditions. Data in this document are *Specifications* unless otherwise noted.

*Typical Specifications* are specifications met by the majority of the instrument under the stated operating conditions and are tested at 23 °C ambient temperature. Typical specifications are not warranted.

All voltages are specified in DC, ACpk, or a combination unless otherwise specified.

Topology

66-channel SPDT, latching

Refer to the NI Switches Help at ni.com/manuals for detailed topology information.



**Caution** The protection provided by the PXI-2571 can be impaired if it is used in a manner not described in this document.



# Input Characteristics

Maximum switching voltage

8	
Channel-to-channel	100 V
Channel-to-ground	100 V, CAT I



**Caution** This module is rated for Measurement Category I and intended to carry signal voltages no greater than 100 V. This module can withstand up to 500 V impulse voltage. Do not use this module for connection to signals or for measurements within Categories II, III, or IV. Do not connect to MAINs supply circuits (for example, wall outlets) of 115 or 230 VAC.<sup>1</sup>



**Caution** When hazardous voltages (>42.4 Vpk/60 V DC) are present on any channel, safety low-voltage ( $\leq$ 42.4 Vpk/60 V DC) cannot be connected to any other channel.



**Caution** The switching power is limited by the maximum switching current and maximum voltage, and must not exceed 60 W, 62.5 VA.

Maximum switching power (per channel)	60 W, 62.5 VA (DC to 60 Hz)
Maximum current (switching or carry, per channel)	1 A
Simultaneous channels at maximum current (≤55 °C)	66
Minimum switch load	20 mV/1 mA

**Caution** Switching inductive loads (for example, motors and solenoids) can produce high voltage transients in excess of the module's rated voltage. Without additional protection, these transients can interfere with module operation and impact relay life. For more information about transient suppression, visit *ni.com/info* and enter the Info Code relayflyback.

DC path resistance		
Initial	<0.5 Ω	
End-of-life	$\geq 1.0 \ \Omega$	

<sup>&</sup>lt;sup>1</sup> Measurement Categories CAT I and CAT O 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.

DC path resistance typically remains low for the life of the relay. At the end of relay life, the path resistance rises rapidly above 1  $\Omega$ . Load ratings apply to relays used within the specification before the end of relay life.

Thermal EMF	12 μV, typical	
Bandwidth (-3 dB, 50 $\Omega$ termination)	≥35 MHz, typical	
Crosstalk, channel-to-channel (50 $\Omega$ termination)		
10 kHz	≤-80 dB, typical	
100 kHz	≤-60 dB, typical	
1 MHz	≤-40 dB, typical	
10 MHz	≤-30 dB, typical	
Isolation, open channel (50 $\Omega$ termination)		
10 kHz	≥80 dB, typical	
100 kHz	≥60 dB, typical	
1 MHz	$\geq$ 40 dB, typical	
10 MHz	≥20 dB, typical	

### **Dynamic Characteristics**

Relay operate time	1 ms, typical
	3.4 ms maximum

**Note** Certain applications may require additional time for proper settling. Refer to the *NI Switches Help* at *ni.com/manuals* for more information about including additional settling time.

Expected relay life	
Mechanical	$1 \times 10^8$ cycles
Electrical	
10 VDC, 100 mADC resistive	$2.5 \times 10^6$ cycles
10 VDC, 1 ADC resistive	$1 \times 10^6$ cycles
30 VDC, 1 ADC resistive	$5 \times 10^5$ cycles
60 VDC, 1 ADC resistive	$1 \times 10^5$ cycles



**Note** Relays are field replaceable. Refer to the *NI Switches Help* at *ni.com/manuals* for more information about replacing a failed relay.

# **Trigger Characteristics**

So	urces	PXI trigger lines <07>
Mi	nimum pulse width	150 ns
		ecognize trigger pulse widths less than 150 ns if you fer to the <i>NI Switches Help</i> at <i>ni.com/manuals</i> for g digital filtering.

o uip ut ui BBei	
Destinations	PXI trigger lines <07>
Pulse width	Programmable (1 $\mu$ s to 62 $\mu$ s)

#### **Physical Characteristics**



**Caution** Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Relay type	Electromechanical, latching
Relay contact material	Palladium-ruthenium, gold covered
I/O connector	200 POS LFH Matrix 50, receptacle
PXI power requirement	6 W at 5 V 2.5 W at 3.3 V
Dimensions (L $\times$ W $\times$ H)	3U, one slot, PXI/cPCI module, 21.6 cm × 2.0 cm × 13.0 cm (8.5 in. × 0.8 in. × 5.1 in.)
Weight	174 g (6.1 oz)

## Environment

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

Indoor use only.

#### **Operating Environment**

Ambient temperature range	0 °C to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)
Storage Environment	
Ambient temperature range	-20 °C to 70 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)
Relative humidity range	5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.)
Shock and Vibration	
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, 0.31 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64.)
Nonoperating	5 Hz to 500 Hz, 2.46 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64. Test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

### **Compliance and Certifications**

#### Safety

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 61010-1



**Note** For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

#### Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.



**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



**Note** For EMC declarations and certifications, refer to the *Online Product Certification* section.

# CE Compliance $C \in$

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

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

#### **Online Product Certification**

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit *ni.com/ certification*, search by model number or product line, and click the appropriate link in the Certification column.

#### **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 *Minimize Our Environmental Impact* 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.

#### Waste Electrical and Electronic Equipment (WEEE)

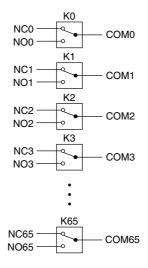
**EU Customers** At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

#### 电子信息产品污染控制管理办法(中国 RoHS)

中国客户 National Instruments 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 National Instruments 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.)

# Diagrams

The following figure shows the PXI-2571 default power-on state with all relays open.



#### Figure 1. PXI-2571 Power-on State

The following figure shows the PXI-2571 connector pinout.

NC0 -		150		_, _		51		- COM0
NC1 -	NC50-	150 151 149	•	٦Ľ	<u>~</u>	51 50 52 49	— NO0	-COM1
NC2 -	COM50-	152 148 153	•	76	<u>~</u>	49 53 48	— NO1	-COM2
NC3 -	NO50-	153 147 154	-0	٦Ľ	0-	48 54 47	— NO2	- COM3
NC4 -	NC51 —	154	~	36	<u>~</u>	55	— NO3	- COM4
NC5 -	COM51-	155 145	-0	٦Ľ	<u>~</u>	46 56	— NO4	- COM5
NC5	NO51 —	156 144	-0	٦Ľ	<u>~</u>	56 45 57 44	— NO5	- COM6
	NC52-	157 143	Ŷ	96	<u> </u>	58	— NO6	- COM7
NC7 -	COM52-	158 142 159	Ŷ	96	<u> </u>	43 59	— NO7	
NC8 -	NO52-	141	Ŷ	٦Ľ	<u> </u>	42 60	— NO8	- COM8
NC9 -	NC53-	160 140	Ŷ	<u>ا</u> ،	<u> </u>	41 61	— NO9	- COM9
NC10 -	COM53-	161 139	-0	٦٢	<u>~</u>	40 62	- NO10	- COM10
NC11 -	NO53-	162 138	•	٦٢	<u> </u>	39 63	- NO11	-COM11
NC12 -	NC54-	163 137	-0	٦Ľ	<u> </u>	38 64	- NO12	-COM12
NC13 -	COM54-	164 136	•	٦Ľ	<u> </u>	37	- NO13	- COM13
NC14 -	NO54-	165 135	-	٦Ľ	•	36 66	- NO14	-COM14
NC15 -	NC55-	166	-0	٦Ľ	~	35	- NO15	-COM15
NC16 -	COM55-	134	-	٦Ľ	~	67 34 68	- NO16	-COM16
NC17 -	NO55-	168	-	٦Ľ	~	33 69	- NO17	-COM17
NC18 -	NC56-	132 169 131	-	٦Ľ	~	69 32	- NO18	- COM18
NC19 -	COM56-	170	-	ĴĹ	-	32 70 31	- NO19	- COM19
NC20 -	NO56-	130 171 129 172 128		٦Ľ	~	71 30 72	- NO20	- COM20
NC21 -	NC57-	129 172		ĴĹ	~	72 29	- NO20 - NO21	- COM21
NC22 -	COM57-	170		ĴĹ	0 0	73 28	- NO21 - NO22	- COM22
NC23 -	NO57-	1/3 127 174	° °	Ĵ	- -	74 27 75	- NO22 - NO23	-COM23
NC24 -	NC58-	126	-	Ĵ	-	75		-COM24
NC25 -		125 176	-0	Ĵ	<u>~</u>	26 76 25	- NO24	- COM25
NC26 -	COM58-	124	•	Ĵ	<u> </u>	77	- NO25	- COM26
NC27 -	NO58-	123 178	•	ۍد ۲۲	<u> </u>	77 24 78 23	- NO26	- COM27
NC28 -	NC59-	122 179	•	Ĵ	<u> </u>	79	- NO27	- COM28
NC29 -	COM59-	121 180	-0		<u> </u>	22 80	- NO28	- COM29
NC30 -	NO59-	120 181	•	٦, ٦,	<u> </u>	21 81 20 82	- NO29	- COM30
NC31 -	NC60-	110	•	٦Ľ	<u> </u>	82	— NO30	- COM31
NC32 -	COM60-	182 118 118	•	זר	<u>~</u>	19 83 18	— NO31	- COM32
NC33 -	NO60-	117	-0	36	<u> </u>	84 17	— NO32	- COM33
NC34 -	NC61-	184	•	٦Ľ	<u>~</u>	85 16	— NO33	-COM34
NC35 -	COM61-	185 115	•	7	<u>~</u>	86	— NO34	-COM35
NC36 -	NO61 —	186 114 187	•	٦Ľ	<u> </u>	87	— NO35	-COM36
NC37 -	NC62-	187 113 188	-0	7	<u> </u>	14 88	— NO36	-COM37
NC38 -	COM62-	112	-0	99	<u>~</u>	13 89	— NO37	-COM38
	NO62-	<u>189</u> 111	-0	٦Ľ	<u> </u>	12 90	— NO38	- COM39
NC39 -	NC63-	190 110	-0	Ϋ́	<u> </u>	11 91	— NO39	- COM39
NC40 -	COM63-	191	Ŷ	٦٢	<u> </u>	10 92	- NO40	
NC41 -	NO63-	192 108	Ŷ	٦Ľ	•	9 93	- NO41	- COM41 - COM42
NC42 -	NC64-	193 107	Ŷ	٦٢	•	8 94	- NO42	
NC43 -	COM64-	194	Ŷ	٦Ľ	<u> </u>	7 95	- NO43	- COM43
NC44 -	NO64-	195 105 196	Ŷ	٦٢	•	6 96	- NO44	-COM44
NC45 -	NC65-	196	•	٦Ľ	<u>~</u>	5 97	- NO45	-COM45
NC46 -	COM65-	197	•	٦Ľ	<u>~</u>	97 4 98	- NO46	-COM46
NC47 -	NO65-	103 198	-	٦Ľ	~	98 3 99	- NO47	-COM47
NC48 -	O CONNECT-	102 199	-	٦Ľ	~	99 2 100	- NO48	-COM48
NC49 -	O CONNECT-	101 200	-	٦Ľ	<u> </u>	1	- NO49	- COM49
				_	$\sim$			

# Accessories

Visit *ni.com* for more information about the following accessories.

Accessory	Part Number
LFH200 to 4 × 50-pin D-SUB (CH-COM twisted) cable	779038-02
LFH to bare-wire switch cable	779038-01
IM42PNS relay replacement kit (through-hole)	781678-01

Table 1. NI Accessories for the PXI-2571



**Caution** You must install mating connectors according to local safety codes and standards and according to the specifications provided by the manufacturer. You are responsible for verifying the safety compliance of third-party connectors and their usage according to the relevant standard(s), including UL and CSA in North America and IEC and VDE in Europe.

Accessory	Manufacturer	Part Number
Row header <sup>2</sup> (four required per module)	Molex	71715-4002
Plug connector subassembly <sup>2</sup>	Molex	71719-3000
Backshell only <sup>2</sup>	Jevons	JDC200B-832
Mass interconnect cable assembly, 20 in.	Virginia Panel	540105010105
Mass interconnect cable assembly, 36 in.	Virginia Panel	540105010205
Mating ITA module (one required per module)	Virginia Panel	510108131
Mating ITA PC (198 required per module)	Virginia Panel	720101101
DAK assembly NI PCB, 200 Pin LFH, male	MAC Panel	561036

Table 2. Third-Party Accessories for the PXI-2571

<sup>&</sup>lt;sup>2</sup> Additional cover or enclosure required.

Accessory	Manufacturer	Part Number
VARIOFACE terminal block, with screw connections and 50 position O-Subminiature (four required per module)	Phoenix Contact	FLK-D50 SUB/S
VARIOFACE terminal block, with screw connections and 50 position O-Subminiature (four required per module)	Phoenix Contact	FLKM-D50 SUB/S
VARIOFACE terminal block, with screw connections and 50 position O-Subminiature (four required per module)	Phoenix Contact	FLKMS-D50 SUB/S
VARIOFACE terminal block, with screw connection and 50 position O-Subminiature, with LED indicators	Phoenix Contact	FLKM-D50 SUB/S/LA

Table 3. Third-Party Accessories for the LFH200 to 4 × 50-pin D-SUB Cable

Refer to the *NI Trademarks and Logo Guidelines* at ni.com/trademarks for information on NI trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering NI products/technology, refer to the appropriate location: **Help**»**Patents** in your software, the patents.txt file on your media, or the *National Instruments Patent Notice* at ni.com/patents. You can find information about end-user license agreements (EULAs) and third-party legal notices in the readme file for your NI product. Refer to the *Export Compliance Information* at ni.com/ legal/export-compliance for the NI global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7015.

© 2011-2016 National Instruments. All rights reserved.