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Find the *National Instruments SCXI-1163R* at our website: *Click HERE*

32-Channel Solid-State Relays

NI SCXI-1163R

- 32 optically isolated solid-state relays
- Relays arranged in 8 banks of 4x1 multiplexers
- 750 operations/s
- 200 mA at 240 VDC/V_{rms} capacity
- Fully software programmable

Operating Systems
- Windows 2000/NT/XP

Recommended Software
- LabVIEW
- LabVIEW Real-Time Module
- LabWindows/CVI
- Measurement Studio
- NI Switch Executive

Other Compatible Software
- Visual Basic
- C/C++

Driver Software (included)
- NI-SWITCH

Certifications and Compliance
- UL
- CE



Overview

The National Instruments SCXI-1163R includes 32 normally open, or Form A, optically isolated solid-state relays, arranged in eight banks of four relays with one common pole for each bank. You can use the NI SCXI-1163R to switch high-voltage loads, up to 240 VAC/VDC and up to 200 mA.

The SCXI-1163R is programmed serially over the SCXIbus. You can therefore easily integrate SCXI-1163R modules into existing SCXI systems without additional DAQ devices or cabling. The modules can also operate in parallel mode when cabled directly to a plug-in DIO device.

You can use an SCXI system equipped with the SCXI-1163R in a variety of industrial and laboratory applications. The SCXI-1163R safely isolates the computer from large common-mode voltages, ground loops, and voltage spikes that often occur in industrial and research environments. You can use the solid-state relay channels to switch a wide range of AC and DC voltage and power signals to control field devices.

Extended Features and Specifications

National Instruments switch modules are built with a number of core features that are covered in detail in the Switch Overview section.

For additional information about the SCXI-1163R, including software support, certifications and compliance, relay control, etc., please see page 20. For detailed specifications, please see page 505.

Ordering Information

NI SCXI-1163R 776572-63R
Includes switch module and NI-SWITCH driver software.
Accessories
SCXI-1326 terminal block 777687-26
PXI-4021 switch controller 778278-01
PCI-4021 switch controller 778277-01

For information on extended warranty and value added services, see page 20.
See page 499 for accessory and cable information.

BUY ONLINE!
Visit ni.com/products and enter scxi1163r.

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Specifications (continued)

SCXI-1191, PXI-2591

Input Characteristics

Number of channels per bank 4
Number of banks 4
  SCXI-1191 4
  PXI-2591 1
Input voltage
  Channel-to-ground ..... 30 V_{rms}/VDC
Maximum switching voltage
  AC ..... 30 V_{rms}
  DC ..... 30 VDC
Maximum switching capacity per channel
  AC. ..... 0.33 A at 30 V_{rms}
  DC ..... 0.33 A at 30 VDC
Maximum switching power per channel ..... 10 W
Contact on resistance (initial) ..... 200 mΩ maximum
Contact material ..... Gold

RF Performance Characteristics

Characteristic impedance (Z0) ..... 50 Ω
Insertion loss
  2.5 GHz ..... <0.6 dB
  4 GHz ..... <0.9 dB
VSWR
  2.5 GHz ..... <1.3
  4 GHz ..... <1.5
Isolation
  2.5 GHz ..... >60 dB
  4 GHz ..... >55 dB
Maximum RF carry power at 900 MHz ..... 10 W

Dynamic Characteristics

Relay operate time (at 20 °C)
  Typical ..... 15 ms
Relay release time (at 20 °C)
  Typical ..... 15 ms
Expected life
  Mechanical (no load) ..... $5x10^6$ operations
  Electrical (maximum switching capacity).. 10^5 operations
Caution: Exceeding the maximum switching capability decreases expected life.

Power Requirement

+5 VDC ..... 950 mW maximum (all relays closed)

Physical

Dimensions
  SCXI-1191 ..... 17.3 by 19.6 by 3.0 cm (6.81 by 7.70 by 1.19 in.)
  PXI-2591 ..... 10 by 16 by 4 cm (3.9 by 6.3 by 1.6 in.)
I/O connector ..... 5 SMA female per bank

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 85% noncondensing

SCXI-1192

Input Characteristics

Number of relays ..... 8 SPDT (latching)
Input voltage
  Channel-to-ground ..... 30 V_{rms}/VDC
Maximum switching voltage ..... 30 VDC
Maximum carry current per channel ..... 2 ADC
Maximum continuous carry power per channel
  1 to 3 GHz ..... 120 W
  3 to 8 GHz ..... 80 W
  8 to 12.4 GHz ..... 60 W
  12.4 to 18 GHz ..... 50 W

The total input power for all relays combined should not exceed the preceding specifications. When using multiple relays, refer to table below for adjusted maximum input power

Active Relays	1 to 3 GHz	3 to 8 GHz	8 to 12.4 GHz	12.4 to 18 GHz
1	120 W	80 W	60 W	50 W
2	60 W	40 W	30 W	25 W
4	30 W	20 W	15 W	12.5 W
8	15 W	10 W	7.5 W	6.25 W

Contact resistance (initial) ..... 100 mΩ maximum
Contact material ..... Gold plate

RF Performance Characteristics

Characteristic impedance (Z0) ..... 50 Ω
Insertion loss at:
  ≤4 GHz ..... ≤0.2 dB
  4 to 8 GHz ..... ≤0.3 dB
  8 to 12.4 GHz ..... ≤0.4 dB
  12.4 GHz to 18 GHz ..... ≤0.5 dB
VSWR at:
  ≤1 GHz ..... ≤1.1
  1 to 4 GHz ..... ≤1.15
  4 to 8 GHz ..... ≤1.25
  8 to 12.4 GHz ..... ≤1.35
  12.4 to 18 GHz ..... ≤1.5
Isolation:
  ≤1 GHz ..... ≥85 dB
  1 to 4 GHz ..... ≥80 dB
  4 to 8 GHz ..... ≥70 dB
  8 to 12.4 GHz ..... ≥65 dB
  12.4 to 18 GHz ..... ≥60 dB

Dynamic Characteristics

Relay operate time (at 20 °C)
  Typical ..... 15 ms
Relay release time (at 20 °C)
  Typical ..... 15 ms
Expected life
  Mechanical (no load) ..... $5x10^6$ operations
  Electrical at 5 W ..... $5x10^6$ operations (to 3 GHz, 50 Ω, VSWR maximum 1.2)
Caution: Exceeding these electrical parameters decreases expected life.

Power Requirement

+5 VDC ..... 800 mA, maximum

Physical

Dimensions ..... 17.3 by 19.6 by 3.0 cm (6.81 by 7.70 by 1.19 in.)
I/O connector ..... 24 SMA female

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 85% noncondensing

SCXI-1163R

Input Characteristics

Number of relays ..... 32 organized as 8 optically isolated banks of 4 relays each
Relay type ..... Normally open (Form A). solid-state relays
Maximum switching voltage
  AC ..... 240 VAC
  DC ..... 240 VDC
Maximum switching capacity ..... 200 mA
Commonmode isolation ..... 250 V_{rms} between banks, and bank to ground
On-resistance ..... 8 Ω
Output capacitance ..... 110 pF at 50 V, 1 MHz
Leakage current ..... 1 µA maximum
Transfer rate in serial mode[1]
  (1 word = 32 bits) ..... 750 words/s
Relay set time ..... 0.6 ms
Relay reset time ..... 0.1 ms
Power-on state ..... Relays open

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Switch Specifications

Specifications (continued)

Physical

Dimensions ..... 17.2 by 20.3 by 3.0 cm (6.8 by 8.0 by 1.2 in.)

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 90% noncondensing

[1]Transfer rate depends largely on the computer and software. These tests were made using an AT-MIO-16E-2 installed in a 450 MHz Pentium III computer running LabVIEW and Windows NT.

PXI-2566, SCXI-1166

Input Characteristics

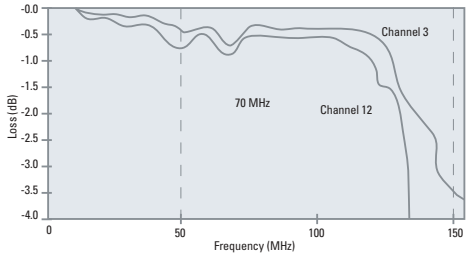
Maximum switching voltage
- Channel-to-channel ..... 150 VDC, 125 VAC, CAT I
- Channel-to-ground ..... 150 VDC, 125 VAC, CAT I

Simultaneous channels at maximum switching current (≤25 °C)
- PXI-2566 16
- SCXI-1166 32

Maximum carry current ..... 5 ADC, 5 AAC (per channel)
Simultaneous channels at maximum carry current (≤25 °C)
- PXI-2566 9
- SCXI-1166 8

Maximum switching power ..... 60 W, 62.5 VA (DC to 60 Hz) (per channel)
DC path resistance
- Initial ..... <1.0 Ω
- End of life ..... ≥1.0 Ω

Thermal EMF ..... <9 µV (typical at 23 °C)
Minimum switching capacity ..... 10 µA at 10 mVDC
Bandwidth (-3 dB) ..... ≥70 MHz



Crosstalk (Typical at 23 °C)

Channel-to-channel
- 10 kHz ..... ≤-75 dB
- 100 kHz ..... ≤-65 dB
- 1 MHz ..... ≤-45 dB
- 10 MHz ..... ≤-25 dB

Isolation (Typical at 23 °C)

Open channel
- 100 kHz ..... ≥65 dB
- 1 MHz ..... ≥45 dB
- 10 MHz ..... ≥25 dB

Dynamic Characteristics

Maximum speed ..... 115 operations/s
Relay operate time
- Typical ..... 2 ms
- Maximum ..... 4.4 ms

Expected relay life
- Mechanical ..... 10^8 operations
- Electrical
  - 30 VDC, 1 A resistive ..... $5x10^5$ operations
  - 30 VDC, 2 A resistive ..... 10^5 operations
  - 125 VAC, 0.2 A resistive ..... $3x10^5$ operations
  - 125 VAC, 0.5 A resistive ..... 10^5 operations

Physical Characteristics

Relay type ..... Electromechanical, nonlatching
Relay contact material ..... Gold clad silver alloy
I/O connectors ..... Two 62-pin D-Sub
Dimensions
- PXI-2566 ..... 10 by 16 cm (3.9 by 6.3 in.)
- SCXI-1166 ..... 3.0 by 17.3 by 19.6 cm (1.2 by 6.7 by 7.6 in.)

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature ..... -20 to 70 °C
Relative humidity ..... 5 to 85% noncondensing
Pollution degree 2
Approved at altitudes up to 2,000 m

Safety

This product is designed to meet the requirements of the following standards of safety for electricalequipment for measurement, control and laboratory use:
- IEC 61010-1, EN 61010-1
- UL 3111-1, UL 61010B-1
- CAN/CSA C22.2 No. 1010.1

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE Marking, as follows:
- Low-Voltage Directive (safety) 73/23/EEC

Electromagnetic Compatibility
- Directive (EMC) 89/336/EEC

SCXI-1160, SCXI-1161

Input Characteristics

Number of relays
- SCXI-1160 16
- SCXI-1161 8

Relay type
- SCXI-1160 ..... SPDT (Form C), latching
- SCXI-1161 ..... SPDT (Form C), nonlatching

Maximum input voltage
- Channel-to-channel ..... 250 VDC, 250 V_{rms}
- Channel-to-ground ..... 250 VDC, 250 V_{rms}

Maximum switching voltage
- SCXI-1160 ..... 250 VDC, 250 V_{rms}
- SCXI-1161 ..... 250 VDC, 250 V_{rms}

Maximum switching capacity
- SCXI-1160 ..... 2 A at 250 V_{rms}, 0.6 A at 48 VDC, 2 A at 30 VDC
- SCXI-1161 ..... 8 A at 125 V_{rms}, 6 A at 250 V_{rms}, 5 A at 30 VDC

Minimum current load
- SCXI-1160 ..... 100 µA
- SCXI-1161 ..... 100 mA

Channel on resistance
- SCXI-1160 (includes terminal block) ..... 75 mΩ (initially)
- SCXI-1161 ..... 175 mΩ (initially)

Contact material
- SCXI-1160 ..... Gold-clad silver alloy
- SCXI-1161 ..... Silver alloy

Thermal offset
- SCXI-1160 ..... 3 µV

Dynamic Characteristics

Relay operate time
- SCXI-1160 ..... 10 ms
- SCXI-1161 ..... 15 ms

Relay release time
- SCXI-1160 ..... 10 ms
- SCXI-1161 ..... 15 ms

Maximum switching rate
- SCXI-1160 ..... 50 operations/s
- SCXI-1161 ..... 3 operations/s

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