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

SCXI 32-Channel Optically Isolated Digital Output and SSR Switch Modules

NI SCXI-1163, NI SCXI-1163R

- 32 digital outputs (SCXI-1163) or relays (SCXI-1163R)
- 8 banks of 4 lines
- 300 V_{rms} isolation per bank
- TTL and CMOS (SCXI-1163)
- Switch up to 240 VAC/VDC (SCXI-1163R)
- NI-DAQ driver software simplifies configuration and measurement
- NI-SWITCH simplifies system development for even the most complex switching applications

Operating Systems
- Windows 2000/NT/XP

Recommended Software
- LabVIEW
- LabWindows/CVI
- Measurement Studio
- VI Logger

Driver Software
- NI-DAQ 7
- NI-SWITCH*

*Included with SCXI-1163R



Overview

The National Instruments SCXI-1163 and SCXI-1163R are isolated digital output modules. The NI SCXI-1163 has 32 channels of optically-isolated digital outputs, arranged into eight isolated banks of four output lines each. The SCXI-1163 interfaces to field digital logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The SCXI-1163R includes 32 normally open, or Form A, solid-state relays, arranged into eight banks of four relays with one common pole for each bank. You can use the SCXI-1163R to switch high-voltage loads, up to 240 VAC/VDC and up to 200 mA.

The SCXI-1163 and SCXI-1163R are controlled over the SCXIbus. You can therefore easily integrate SCXI-1163 and 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.

Applications

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

Module	TTL/CMOS	240 VAC/VDC
SCXI-1163	✓	–
SCXI-1163R	✓	✓

Table 1. Module Compatibility

Description

Figure 1 is a block diagram of the SCXI-1163 and SCXI-1163R. The major functions and operation of the modules are described in the following paragraphs.

Optically Isolated Digital Channels/SSRs

The 32 channels of the SCXI-1163 and SCXI-1163R are organized into eight banks of four channels each. Each bank is optically isolated to 300 V_{rms} from each other and from the SCXI chassis earth ground. The SCXI-1163 digital outputs are open-collector outputs with 4.7 k pull-up resistors, as diagrammed in Figure 2. The digital outputs are compatible with most TTL and CMOS circuits. Each bank of four output lines share one +5 VDC supply voltage, V_{cc}, provided by the user.

Each channel of the SCXI-1163R is an independent, normally open, Form A, solid-state relay. Each bank of four relays shares one common, as shown in Figure 3. Each relay is capable of switching up to 200 mA at 240 VAC/VDC.

Update Rates

In multiplexed mode digital output lines or relays are controlled by digital lines on the DAQ device. With the SCXI-1163, a bit set to logic high generates a logic high at the corresponding output line. With the SCXI-1163R, a line set to logic high turns the corresponding solid-state relay off. A bit set to logic low turns on the solid-state relay, allowing current to flow. If the module is operating in multiplexed mode, updates are written to the SCXI-1163/R by the controlling DAQ device through the SCXIbus. In NI-DAQ 7, you can update all 32 lines at 600 updates/s. One update corresponds to all 32 digital lines. This transfer rate was determined using a 1 GHz Pentium IV computer

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SCXI 32-Channel Optically Isolated Digital Output and SSR Switch Modules

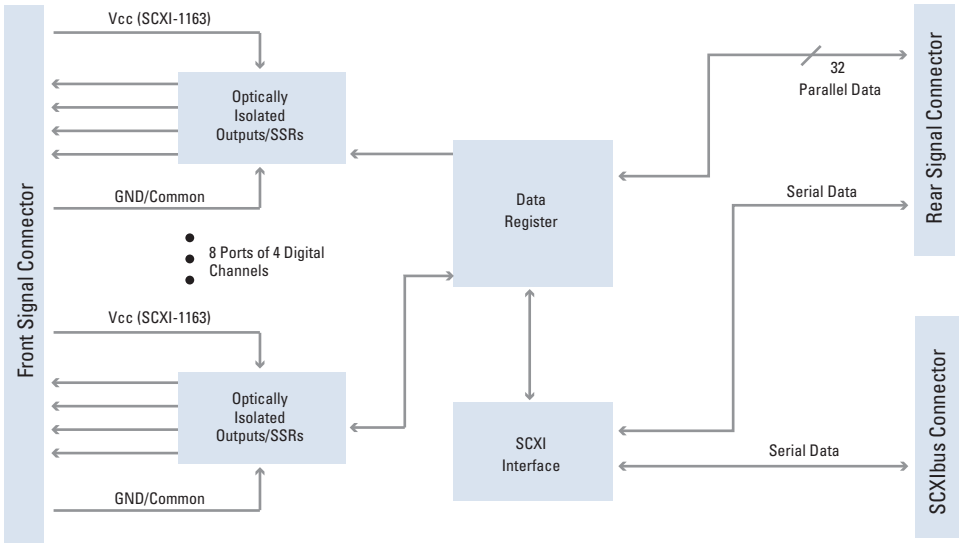


Figure 1. SCXI-1163 and SCXI-1163R Block Diagram

and is highly system and computer dependent. The SCXI-1163/R also has a parallel interface to the rear signal connector (for parallel mode operation with a plug-in DIO device). In parallel mode, update rates depend on propagation delays for SCXI-1163, on set/reset lines for 1163R, and on max update rate of controlling DIO device. If the DIO device has the capability, strobed updates are possible.

Modes of Operation

Multiplexed

In multiplexed mode, a single DAQ device controls one or more SCXI modules through the SCXIbus using a serial data protocol. This multiplexed-mode operation uses a maximum of five digital I/O lines of the DAQ device. With MUX-mode operation, you can control several SCXI-1163 and SCXI-1163R modules, along with other SCXI modules, in one or more chassis with a single DAQ device. Multiplexed mode is a cost-efficient solution for larger systems.

Parallel

For high update speeds, you can also operate the SCXI-1163 and SCXI-1163R in parallel mode, connecting each module directly to a DIO DAQ device – 6503 (DIO-24), 6533 (DIO-32HS), 6534, and 6508 (DIO-96). In this configuration, each channel of the SCXI-1163 or SCXI-1163R module connects to a corresponding digital output line of the DIO device.

Signal Connection

Digital signals connect to screw terminals located in the SCXI-1326 terminal block, which connects directly to the front of the SCXI module, or the TBX-1326, a DIN-rail mountable terminal block, which connects to the SCXI-1163 or SCXI-1163R using the SH48-48-B shielded cable. See Table 2 for more information.

Terminal Block	Part Number	Type	Cable	Page
SCXI-1326	777687-26	Screw terminals Front-mounting	–	329
TBX-1326	777207-26	Screw terminals DIN-rail mount	SH48-48-B	331

Table 2. Terminal Block Options for SCXI-1163 and SCXI-1163R

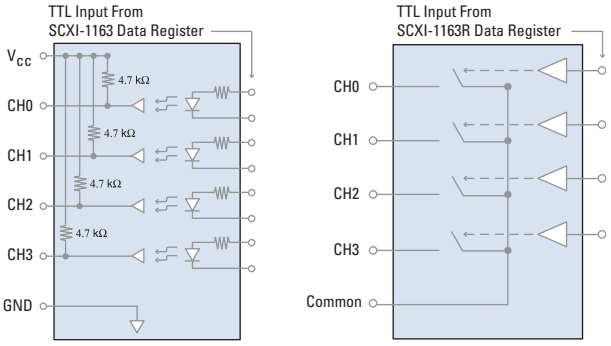


Figure 3. Digital Output Diagrams for SCXI-1163 and the SCXI-1163R

Ordering Information

NI SCXI-1163 776572-63
NI SCXI-1163R 776572-63R

For information on extended warranty and value-added services, see page 20

BUY ONLINE!

Visit ni.com/info and enter scxi1163 and/or scxi1163r.

See page 276 to configure your complete SCXI system.

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SCXI Digital I/O, and SSR Switch Specifications

Specifications

SCXI-1162, SCXI-1162HV

Typical for 25 °C unless otherwise noted.

Digital Input

Number of channels ..... 32 organized into 8 optically-isolated banks of 4 inputs each
Reference voltage Vcc (SCXI-1162) ..... +5 to +10 V
Digital Logic Levels for the SCXI-1162

Level	Minimum	Maximum
Input low voltage	Vcc - 10 V	Vcc - 4 V
Input high voltage	Vcc - 1.5 V	Vcc + 5 V
Input low current	-7 mA	-25 mA

Digital logic levels for the SCXI-1162HV

Level	Minimum	Maximum
Input low voltage (DC or peak AC)	–	± 1 V
Input high voltage (DC)	±2 VDC	±240 VDC
50-60 Hz AC	10 VAC[1]	±240 VAC[1]
1 kHz AC	2 VAC[1]	

Input impedance (SCXI-1162) 360
Input current limiting (SCXI-1162HV) ..... 1 mA
Common-mode isolation ..... 300 V_{rms} between banks and bank to earth
Common-mode transient rejection ..... 500 V/µs typical, 100 V/µs minimum
Transfer rate in MUX mode[2] ..... 750 words/s (1 word = 32 bits)
Propagation delay (in parallel mode)
  SCXI-1162 ..... 0.5 µs typical, 2.0 µs maximum
  SCXI-1162HV ..... 1.5 ms

SCXI-1163, SCXI-1163R

Typical for 25 °C unless otherwise noted.

Digital Output

Number of channels ..... 32 organized into 8 optically isolated banks of 4 outputs each
Compatibility ..... Most TTL and CMOS logic
Supply voltage (Vcc) ..... +5 V ±0.5 V, provided by user
Power requirement from Vcc ..... 60 mA/bank typical, 80 mA/bank max
Digital logic levels

Level	Minimum	Maximum
Output low voltage (Iout = 12 mA)	–	0.6 V
Output high voltage (Iout = -0.4 mA)	3.0 V	–
Output low current (per channel)	–	15 mA

Common-mode isolation ..... 250 V_{rms} between banks, and bank to earth
Common-mode transient rejection ..... 500 V/µs typical, 100 V/µs minimum
Transfer rate in MUX mode[2]
  (1 word = 32 bits) ..... 750 words/s
Propagation delay (parallel mode) ..... 100 ns
Power-on state ..... High

SCXI-1163R (only)

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[1]
  DC ..... 240 VDC
Maximum switching capacity ..... 200 mA
Common-mode isolation ..... 250 V_{rms} between banks, and bank to ground
On resistance 6
Output capacitance ..... 110 pF at 50 V, 1 MHz
Leakage current ..... 1 µA maximum
Transfer rate in serial mode[2]
  (1 word = 32 bits) ..... 750 words/s
Relay set time ..... 0.6 ms
Relay reset time ..... 0.1 ms
Power-on state ..... Relays open

Certification and Compliance

SCXI-1162/HV, SCXI-1163/R ..... 300 V, Cat II working voltage

European Compliance

EMC ..... EN 61326 Group I Class A, 10m, Table 1 Immunity
Safety ..... EN 61010-1

North American Compliance

EMC ..... FCC Part 15 Class A using CISPR
Safety ..... UL Listed to UL 3111-1
CAN/CSA C22.2 No. 1010.1

Australia & New Zealand Compliance

EMC ..... AS/NZS 2064.1/2 (CISPR-11)

[1]VAC assumes sinusoidal waveform.
[2]Transfer rate depends largely on the computer and software. These tests were made using an AT-MIO-16E-2 installed in a 500 MHz PIII computer running NI LabVIEW and Windows NT.

For a definition of specific terms, please visit *ni.com/glossary*

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