48-Bit Isolated Digital I/O

NI 6527

- 24 optically isolated inputs (0-28 VDC)
- 24 isolated, solid-state relay outputs (0-60 VDC, 0-30 V_{rms})
- Switch up to 120 mA
- Digital filtering on inputs
- Messaging (change notification)
- NI-DAQ driver simplifies configuration and measurements

Models

- NI 6527
  - PCI-6527
  - PXI-6527

Real-Time

See page 142

NI Application Software

- LabVIEW
- Measurement Studio

Operating Systems

- Windows 2000/NT/Me/9x*

Applications

- Isolation of computer from field devices
- Breaking ground loops
- High current digital outputs
- Sensing non-TTL DC signals
- Switching non-TTL AC or DC signals
- Detecting changes on digital lines
- Driving current-sensitive devices
- Driving mechanical relays

Accessories

See page 338

* Visit *ni.com/info* and enter winxp for the latest operating system information.

Family	Bus	Digital I/O Lines	Maximum Rate	Onboard Memory	Logic Level	Isolation	Handshaking I/O	Pattern I/O	Messaging	Triggering
NI 6527	PCI, PXI/CompactPCI	24 inputs and 24 outputs	Unstrobed I/O	–	0 to 28 VDC input and 0 to 60 VDC (30 V_{rms}) output	60 VDC	–	–	✓	–

Table 1. NI 6527 Specifications Overview (see page 344 for detailed specifications)

INFO CODES

For more information or to order products online, visit *ni.com/info* and enter:

pci6527
pxi6527

BUY ONLINE!

Overview

The NI 6527 devices are 48-bit, parallel, isolated digital I/O interfaces for PCI and PXI/CompactPCI. They have 24 optically isolated digital inputs and 24 solid-state relay outputs. The NI 6527 can sense digital levels up to 28 VDC and switch currents up to 120 mA. The isolated inputs and outputs protect your system from noise and spikes on I/O signals and break ground loops.

Hardware

Digital Inputs

You can use the 24 optically isolated inputs of the NI 6527 devices to read the status of external logic at TTL and non-TTL levels. Each input channel has two isolated terminals – one for the signal and one for its reference. A potential difference of 2 to 28 VDC between the two terminals registers as a logic high. Logic low is between 0 and 1 V. The inputs feature 60 VDC isolation from the computer and between channels.

Messaging – Change Notification

NI 6527 devices can generate a message when one or more user-selected input lines changes, either from low to high, high to low, or both. Once notified of a change, NI-DAQ can read the status of other input lines, set outputs, or perform some other programmed operation. Using this feature, you can monitor lines without polling, thus using your CPU more efficiently.

Debouncing and Glitch Removal

Each input line can be digitally filtered to prevent a momentary glitch or spike from affecting the line state. When you use messaging, filtering blocks spurious change events caused by noise on the input line.

Digital Switch Outputs

The 24 solid-state relay outputs on the NI 6527 devices can switch external devices, including those requiring high input currents, and control digital logic levels at both TTL and non-TTL levels. Each relay output has two terminals. Writing a logic low to an output closes the connection between the terminals; writing a logic high opens the connection. Depending on how your load connects to the terminals, an output can either source or sink currents. By adding pull-up resistors externally and, if needed, an isolated power supply, you can output digital signals that drive source or sink currents. The solid-state relay outputs have a maximum switching capacity of 60 VDC, 30 V_{rms}, or 120 mA, and are isolated up to 60 VDC or 30 V_{rms} from the computer and between channels.

48-Bit Isolated Digital I/O

The NI 6527 device outputs include circuitry to protect against transient currents above their rated values. When excessive current flows through the relay, the relay limits the current to approximately 260 mA (typical).

By default, the solid-state relays power up open (digital lines high). You can configure the power-up state of each output line independently with a software utility located in the Developer Zone. For more information, go to *ni.com/info* and enter ex95u3

I/O Connector

The I/O connector for the NI 6527 is a 100-pin female connector, the pinout of which is shown in Figure 1. For a shielded cable/accessory combination, use the SH100-100-F cable with the SCB-100 accessory. The NI 6527 devices are also compatible with the CB-100 kit, which includes two 50-pin connector blocks and ribbon cable.

For 5 V, non-isolated applications, +5 V and GND lines from the computer, available on the I/O connector, eliminate the need for an external power supply.

DIG+2.7	1	51	DIG+5.7
DIG–2.7	2	52	DIG–5.7
DIG+2.6	3	53	DIG+5.6
DIG–2.6	4	54	DIG–5.6
DIG+2.5	5	55	DIG+5.5
DIG–2.5	6	56	DIG–5.5
DIG+2.4	7	57	DIG+5.4
DIG–2.4	8	58	DIG–5.4
DIG+2.3	9	59	DIG+5.3
DIG–2.3	10	60	DIG–5.3
DIG+2.2	11	61	DIG+5.2
DIG–2.2	12	62	DIG–5.2
DIG+2.1	13	63	DIG+5.1
DIG–2.1	14	64	DIG–5.1
DIG+2.0	15	65	DIG+5.0
DIG–2.0	16	66	DIG–5.0
DIG+1.7	17	67	DIG+4.7
DIG–1.7	18	68	DIG–4.7
DIG+1.6	19	69	DIG+4.6
DIG–1.6	20	70	DIG–4.6
DIG+1.5	21	71	DIG+4.5
DIG–1.5	22	72	DIG–4.5
DIG+1.4	23	73	DIG+4.4
DIG–1.4	24	74	DIG–4.4
DIG+1.3	25	75	DIG+4.3
DIG–1.3	26	76	DIG–4.3
DIG+1.2	27	77	DIG+4.2
DIG–1.2	28	78	DIG–4.2
DIG+1.1	29	79	DIG+4.1
DIG–1.1	30	80	DIG–4.1
DIG+1.0	31	81	DIG+4.0
DIG–1.0	32	82	DIG–4.0
DIG+0.7	33	83	DIG+3.7
DIG–0.7	34	84	DIG–3.7
DIG+0.6	35	85	DIG+3.6
DIG–0.6	36	86	DIG–3.6
DIG+0.5	37	87	DIG+3.5
DIG–0.5	38	88	DIG–3.5
DIG+0.4	39	89	DIG+3.4
DIG–0.4	40	90	DIG–3.4
DIG+0.3	41	91	DIG+3.3
DIG–0.3	42	92	DIG–3.3
DIG+0.2	43	93	DIG+3.2
DIG–0.2	44	94	DIG–3.2
DIG+0.1	45	95	DIG+3.1
DIG–0.1	46	96	DIG–3.1
DIG+0.0	47	97	DIG+3.0
DIG–0.0	48	98	DIG–3.0
+5 V	49	99	+5 V
GND	50	100	GND

Figure 1. NI 6527 I/O Connector

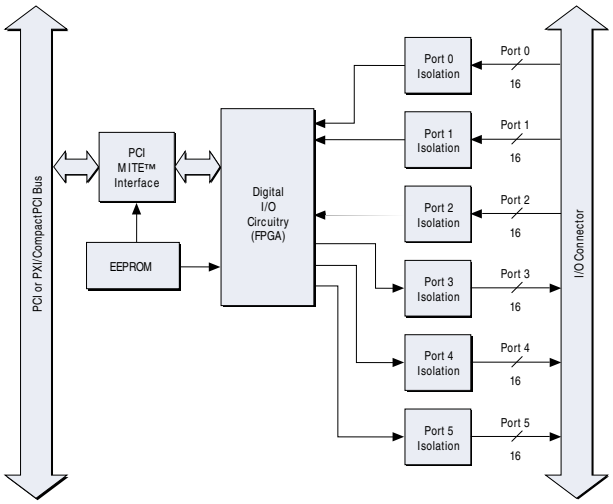

Figure 2. NI 6527 Block Diagram

Ordering Information

NI 6527

PCI-6527..... 777810-01

PXI-6527..... 777802-01

Includes NI-DAQ driver software.

For information on extended warranty and value added services, see page 22.

Recommended Configurations

DAQ Device	Accessory	Cable
PCI-6527	CB-100 kit (777812-01)	Kit includes R1005050 ribbon cable
PXI-6527	SCB-100 (776990-01)	SH100-100-F (185095-02)

See page 338 for accessory and cable information.

Digital I/O Specifications

Specifications

NI 653x (Continued)

Environment

Operating temperature ..... 0 to 55 °C, DAQCard should not exceed 55 °C while in PCMCIA slot
Storage temperature..... -20 to 70 °C
Relative humidity ..... 10% to 90% noncondensing

Certifications and Compliances

CE Mark Compliance

NI 6527

These specifications are typical for 25 °C unless otherwise noted.

Digital Input

Optically isolated input channels ..... 24, each with its own isolated ground reference
Maximum input voltage ..... 28 VDC
Digital Logic Levels

Level	Minimum	Maximum
Input low voltage	0 VDC	1 V
Input high voltage	2 VDC	28 VDC

Input current
  5 V input ..... 1.5 mA/channel max
  24 V input ..... 8 mA/channel max
Isolation ..... 60 VDC channel-to-channel, and from computer

Digital Switch Output

Solid-state relay output channels..... 24, each with two terminals isolated from other channels
Relay type ..... Normally open form A solid-state relays
Maximum switching voltage
  AC..... 30 V_{rms} (42 V peak)
  DC..... 60 VDC
Maximum switching capacity, 25 °C ..... 120 mA
Common-mode isolation..... 60 VDC or 30 V_{rms} (42 V peak) channel-to-channel and channel-to-computer
On resistance..... 35 Ω maximum
Off leakage current (maximum)..... 200 nA
Relay set time (maximum)..... 3.0 ms
Relay reset time (maximum) ..... 3.0 ms
Power-on state..... Relays open by default, can be user-defined through software utility
Overcurrent protection on outputs ..... 260 mA, typical

Power Requirement

+5 VDC (±5%)..... 500 mA, maximum
Power available at I/O connector..... +4.5 to +5.25 VDC, fused at 1 A

Physical

Dimensions (not including connectors)
  PCI-6527 ..... 17.5 by 10.7 cm (6.9 by 4.2 in.)
  PXI-6527 ..... 16 by 10 cm (6.3 by 3.9 in.)
I/O connector ..... 100-pin keyed female

Environment

Operating temperature ..... 0 to 50 °C
Storage temperature..... -20 to 70 °C
Relative humidity ..... 10% to 90%, noncondensing

Certifications and Compliances

CE Mark Compliance

NI 650x

These specifications are typical for 25 °C unless otherwise noted.

Digital I/O

Number of channels
  NI 6503 24
  NI 6507, NI 6508 96
Compatibility ..... 5 V TTL/CMOS
Power-on state..... Input
Digital logic levels

Level	Minimum	Maximum
Input low voltage	-0.3 V	0.8 V
Input high voltage	2.2 V	5.3 V
Output low voltage (Iout = 2.5 mA)	–	0.4 V
Output high voltage (Iout = 2.5 mA)	3.7 V	–

Transfer rate

Bus	Maximum with NI-DAQ Software	Typical Sustainable Rate
PCI, PXI, DAQCard, ISA	50 kbytes/s	1-10 kbytes/s
DAQPad	250 bytes/s	175 bytes/s

Note: Transfer rate depends on the computer and software. The rates may vary due to programming language and code efficiency, CPU utilization, transfer methods, and so on. Please consult the user manual for specifics. The DAQPad-650x transfer rate is dependent upon available USB bandwidth.

Handshaking 2-wire
Data transfers ..... Interrupts, programmed I/O

Bus interface

PCI, PXI, DAQCard, DAQPad, AT ..... Slave

Power Requirements

Device	+5 VDC (±5%)	Power Available at I/O Connector
6507/8 and PCI-6503	400 mA	+4.65 to +5.25 VDC, 1 A fused
DAQCard-DIO-24	15 mA	+4.65 to +5.25 VDC, 500 mA
PC-DIO-24	160 mA	+4.65 to +5.25 VDC, 1 A fused

Device	+9 to + 30 VDC	Power Available at I/O Connector
DAQPad-6507/8	150 mA at 12 VDC typical; 1 A max	+4.65 to +5.25 VDC, 1 A fused

Physical

Dimensions
  PCI-6503 ..... 12.2 by 9.5 cm (4.8 by 3.7 in.)
  DAQCard-DIO-24 ..... Type II PC Card
  PC-DIO-24..... 11.7 by 10.6 cm (4.6 by 4.2 in.)
  PCI-DIO-96..... 13.7 by 10.7 cm (5.4 by 4.2 in.)
  PXI-6508 ..... 10 by 16 cm (3.9 by 6.3 in.)
  PC-DIO-96..... 16.5 by 9.9 cm (6.3 by 3.9 in.)
  DAQPad-6507/8..... 14.6 by 21.3 by 3.8 cm (5.8 by 8.4 by 1.5 in.)
I/O Connector
  NI 6503, except DAQCard..... 50-pin male
  DAQCard-DIO-24 ..... 25-pin female PCMCIA
  NI 6508, except PC-DIO-96 ..... 100-pin female 0.050 series D-type
  PC-DIO-96..... 100-pin male ribbon cable

Environment

Operating temperature ..... 0 to 55 °C, DAQCard should not exceed 55 °C while in PCMCIA slot
Storage temperature..... -20 to 70 °C
Relative humidity ..... 10% to 90% noncondensing

For information on static digital I/O in the VXI form factor, refer to the VXI Solutions Product Guide.

Certifications and Compliances

CE Mark Compliance CE