KEITHLEY

KPCI-PIO32IOA & KPCI-PDISO8A

PCI Bus Isolated I/O Board

User's Manual

A GREATER MEASURE OF CONFIDENCE

Specifications

General specifications are listed in "Specifications," Appendix A. I/O connections are identified in Section 3, and I/O addresses (needed by advanced programmers, only) are defined in "I/O Address Mapping," Appendix B.

System requirements

The system capabilities required to run the KPCI-PIO32IOA and KPCI-PDISO8A board, and to use the DriverLINX software supplied with the board, are listed in Table 2-1.

Table 2-1
System requirements

CPU Type	Pentium or higher processor on motherboard with PCI bus version 2.1.
Operating System	Windows® 95, 98, or Me.
	Windows® NT (version 4.0 or higher), 2000, or XP.
Memory	16 MB or greater RAM when running Windows® 95, 98, or Me.
	32 MB or greater RAM when running Windows® NT, 2000, or XP.
Hard Disk Space	4 MB for minimum installation.
	50 MB for maximum installation.
Other	A CD-ROM drive*.
	A free PCI bus expansion slot.
	Enough reserve computer power supply capacity to power the board, which draws 500mA from the 5V supply (maximum).

* Any CD-ROM drive that came installed with the required computer should be satisfactory. However, if you have post-installed an older CD-ROM drive or arrived at your present system by updating the microprocessor or replacing the motherboard, be aware that some early CD-ROM drives do not support the long file names often used in 32-bit Windows files.

Functional description

The KPCI-PIO32IOA and KPCI-PDISO8A each contain isolated control inputs and isolated solid-state relay switching outputs on a PCI interface board. Both cards work in a Windows environment and take advantage of the 32-bit bus width.

Solid-state relay switching

The KPCI-PIO32IOA's 32 isolated I/O lines and KPCI-PDISO8A's 16 isolated I/O lines include:

- Control inputs are solid-state, opto-isolated (16 for the KPCI-PIO32IOA; 8 for the KPCI-PDISO8A). Maximum control input voltages are: ±60V DC (logic high); ±1V DC (logic low).
- Relay outputs are solid-state, opto-isolated, N.O. form A (16 for the KPCI-PIO32IOA; 8 for the KPCI-PDISO8A). Outputs can switch both DC voltages (±60V DC maximum) and AC voltages (30V RMS maximum) with a maximum load current of 350mA. A relay output will close when a logic high is applied to the corresponding control input.

Under Windows 98/Me, most existing port I/O application programs and data acquisition packages designed for ISA boards work with the KPCI-PIO32IOA and KPCI-PDISO8A board. The PCI-BIOS-assigned base address is entered in place of a user-assigned base address. (Use of such programs under Windows NT/2000/XP, not recommended, is much more involved.)

Other I/O characteristics

Additional I/O port characteristics are summarized below:

- Two of the KPCI-PIO32IOA and KPCI-PDISO8A general-purpose I/O lines can be alternatively configured via software to be external interrupt enable input, $\overline{\text{INT_ENN}}$, and external interrupt request input, INT_REQ.
- The KPCI-PIO32IOA and KPCI-PDISO8A can switch currents up to 350mA. Output current capabilities allow the boards to control some motors, solenoids, and relays.
- +5V power from the computer power supply is made available at the I/O connector, for use in external circuits.

NOTE *The maximum current on each +5V and digital ground pin is 1A. The +5V supply is not isolated and is available for use only when isolation is not required by the application.*

- Control inputs and relay outputs interface via standard 36-pin connector(s). The KPCI-PIO32IOA has two 36-pin connectors, and the KPCI-PDISO8A has one 36-pin connector.
- Output ports can always be read-accessed without switching the output states, allowing the output states to be read at any time by the controlling program.

Software

The user can select a fully integrated data acquisition software package (e.g., TestPoint or LabVIEW) or write a custom program supported by DriverLINX. DriverLINX software is included with the hardware.

DriverLINX supports programmers who wish to create custom applications using Visual C/C++, Visual Basic, or Delphi. DriverLINX accomplishes foreground and background tasks to perform data acquisition. TestPoint is a fully featured, integrated application package with a graphical drag-and-drop interface, which can be used to create data acquisition applications without programming. LabVIEW is a fully featured graphical programming language used to create virtual instrumentation.

Refer to Section 3, "Installation," for more information about software.

Connecting the KPCI-PIO32IOA and KPCI-PDISO8A boards

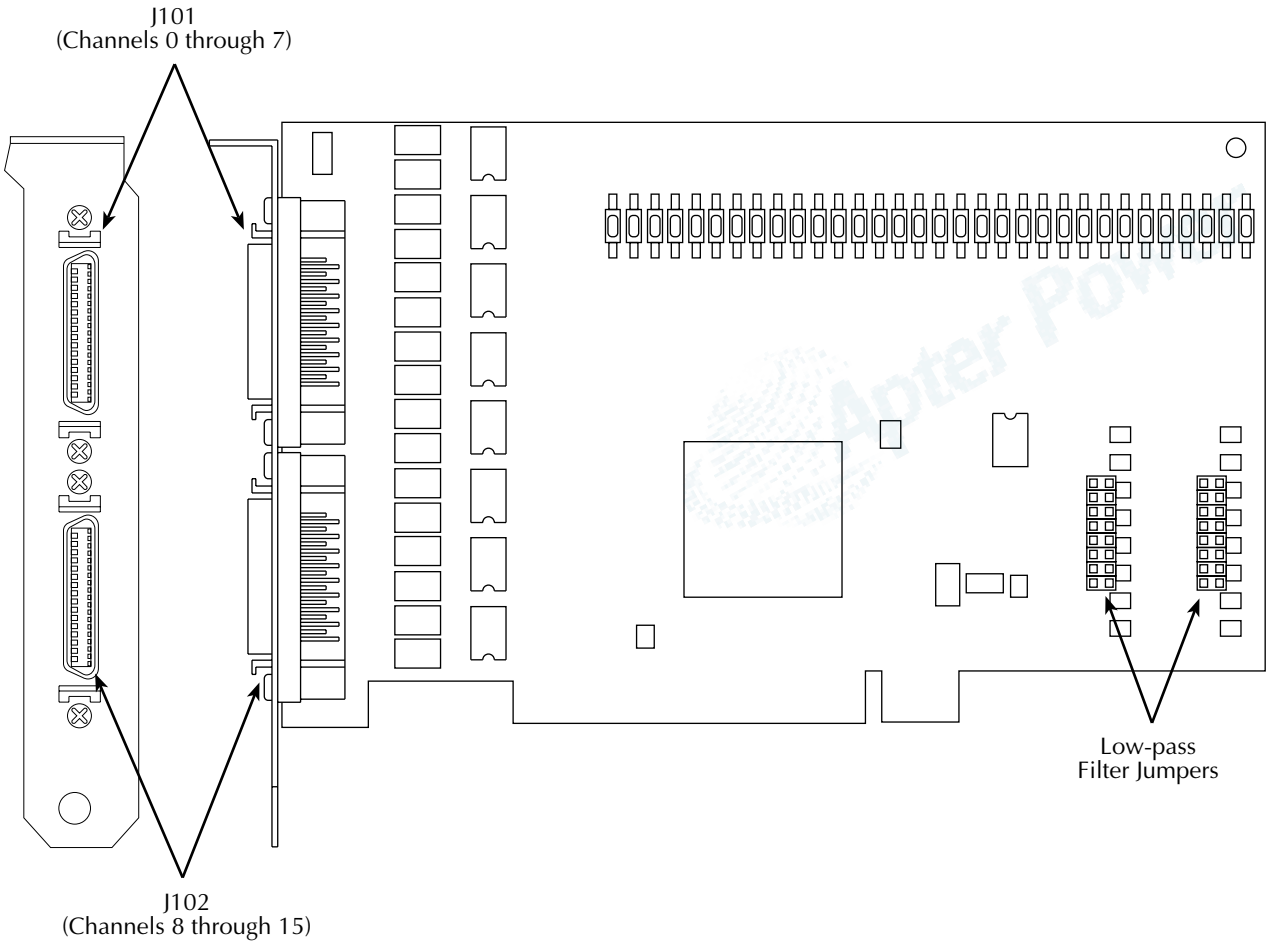
This subsection helps you to do the following:

- Identify pin assignments on the board.
- Connect interface accessories.
- Wire the KPCI-PIO32IOA or KPCI-PDISO8A I/O to your external circuits.

Identifying I/O connector pin assignments

The KPCI-PIO32IOA board has two 36-pin mini-D type I/O connectors for I/O, while the KPCI-PDISO8A board has one 36-pin mini-D type I/O connector for I/O. Figure 3-1 shows the configuration of the KPCI-PIO32IOA board, and Figure 3-2 shows the KPCI-PDISO8A board. Table 3-1 defines connector pin assignments for both boards. Note that those terminals labeled "IP" are control inputs, while "OP" terminals are switching outputs.

Figure 3-1
KPCI-PIO32IOA board configuration



Input and output connections

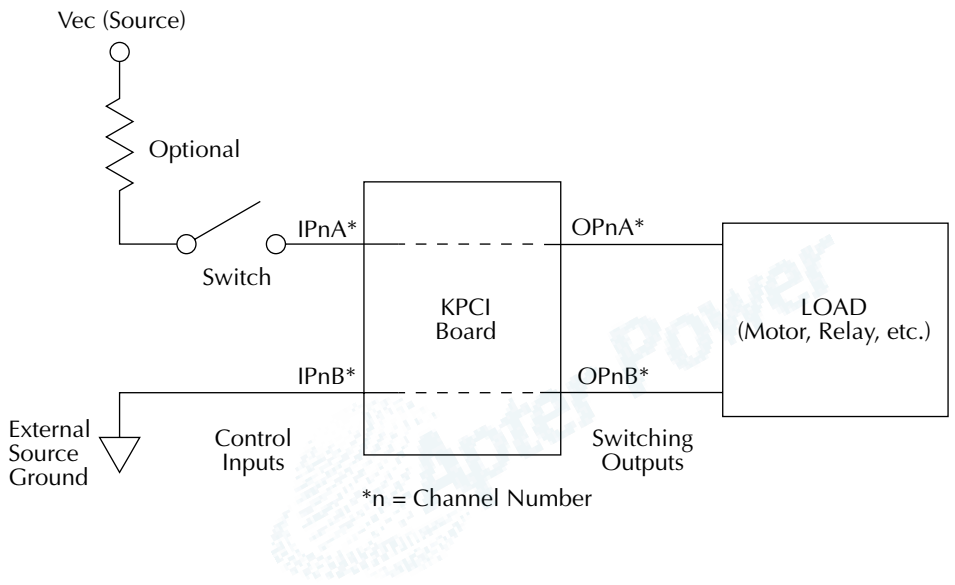
Figure 3-4 shows typical input and output connections for one channel. IPnA and IPnB are the control inputs, while OPnA and OPnB are the switching outputs (n is the channel number). See Table 3-2 for terminal designations).

Signal voltages are as follows:

- Maximum control input voltages are: ±60V DC (logic high); ±1V DC (logic low).
- Outputs can switch both DC voltages (±60V DC maximum) and AC voltages (30V RMS maximum) with a maximum load current of 350mA. An output relay is turned on (closed) when the corresponding control input is placed at a logic high.

NOTE *DC control inputs require approximately 80µA at 2.5V input and approximately 3.5mA at 60V input.*

Figure 3-4
Typical KPCI-PIO32IOA and KPCI-PDISO8A input/output connections



PURCHASED ITEM

KPCI-PDISO8A and KPCI-PIO32IOA Specifications

These two products are to achieve a PCI version of the PDISO-8 and PIO32-IO ISA cards.

Control Inputs[1]

Quantity: 8 KPCI-PDISO8A
16 KPCI-PIO32IOA
Type: Solid-State, Opto-isolated

DC Inputs without optional filter

PARAMETER	MIN.	TYP.	MAX.	UNIT
Voltage Input Logic High	+/- 2.5		+/- 60	V_{DC}
Voltage Input Logic Low			+/- 1.0	V_{DC}
Response Time		0.6	1.0	ms
Isolation[2]	60			V pk

AC Inputs with optional filtering[3]

PARAMETER	MIN.	TYP.	MAX.	UNIT
Low Pass Filter Time Constant		175		ms
AC Sense Voltage Logic High	10		42	V pp
AC Sense Voltage Logic Low			< 10	V pp
AC Line Frequency Sensing		50 and 60		Hz

Interrupt Line Assignment

PARAMETER	Signal	Location	Pin #
External Interrupt Enable	INT_ENN	IP7	3,21
External Interrupt Request	INT_REQ	IP6	4,22

Outputs

Quantity: 8 KPCI-PDISO8A
16 KPCI-PIO32IOA
Type: Solid-State, Opto-isolated N.O. Relay (Form A)

AC/DC Load Switching

PARAMETER		MIN.	TYP.	MAX.	UNIT
Load Voltage					
	DC			+/-60	V_{DC}
	AC			30	V_{RMS}
Load Current[4]					
	DC			350	mA $_{DC}$
	AC			247	mA $_{RMS}$
Off State Leakage Current[5]			316	2000	nA
On State Channel Resistance [7]			3.5	4.0	Ω
Relay Turn ON Time			1.0	3.5	ms

HW 2/27/02
Rev B

LTR	REVISIONS	APP.	DATE
A	26816 Rel	SZ	1-15-02
B	26946 Rev	SZ	2-22-02

DRN. HW DATE 1-15-02
CKD. DATE
APP. SK DATE 1-15-02

KEITHLEY Keithley Instruments, Inc.
Cleveland, Ohio 44139

SPECIFICATIONS

PART NUMBER
SPEC-KPCIPIO32IOA

BRUNING 40-21 62198-SBG

FORM 28777A-SBG

PURCHASED ITEM

PARAMETER	MIN.	TYP.	MAX.	UNIT
Relay Turn OFF Time		80	200	µs
Power Dissipation				
Per Channel			430	mW
Isolation (2)	60			V pk

NON-Isolated external power(6)

PARAMETER	Maxiumum Capacity	Location	Pin #
+5 V_{DC} PC Bus Sourced	1.0 Amperes	+5V	1 Top & Bot Connector
Digital Ground Return	1.0 Amperes	GND	19 Top & Bot Connector

GENERAL SPECIFICATIONS

POWER REQUIREMENTS: +5V: 500 mA Maximum

EMC: Conforms to European Union Directive 89/336/EEC, EN61326-1

SAFETY: Conforms to European Union Directive 73/23/EEC, EN61010-1

ENVIRONMENTAL:

Operating Temperature: 0 to 50°C

Storage Temperature: -20 to 70°C

Humidity (non condensing): 0 to 80% at 35°C

DIMENSION: 18.1cm x 10.8cm x 1.9cm (7.1in x 4.25in x 0.75in)

WEIGHT: KPCI-PIO32IOA – 0.13kg (0.30lbs) KPCI-PDISO8A – 0.12kg (0.26lbs)

ACCESSORIES:

Cables: CAB-1284CC-0.5, CAB-1284CC-2

STP-36: 36-pin Screw Terminal Panel

Notes:

1. Inputs are not guaranteed to be compatible with all TTL/CMOS logic families.
2. Minimum guaranteed isolation, which includes channel to channel, channel to PC and channel to chassis ground.
3. Selectable, jumper switched LPF. Recommended for AC or slow DC inputs.
4. De-rate 3.6 mA/°C if ambient temperature is over 25°C.
5. Output channel in off-state, T_A = 50°C, 60 V_{DC} applied with 30% RH (non-condensing) for maximum and typical values.
6. For convenience only. These are not isolated from the rest of the system. Do not use directly in external circuit if isolation is required.
7. Typical measurement was achieved with an STP-36 and 2 meter cable, CAB-1284CC-2 at 25°C.

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