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Find the *Measurement Computing PCI-PDISO8* at our website: ***Click HERE***

PCI-PDISO8

Isolated Input and Relay Output

User's Guide

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MEASUREMENT COMPUTING™

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About this User's Guide

What you will learn from this user's guide

This user's guide describes the Measurement Computing PCI-PDISO8 data acquisition device and lists device specifications.

Conventions in this user's guide

For more information

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

bold text — **Bold** text is used for the names of objects on a screen, such as buttons, text boxes, and check boxes.

italic text — *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase.

Where to find more information

Additional information about the PCI-PDISO8 is available on our website at www.mccdaq.com. You can also contact Measurement Computing Corporation by phone, fax, or email with specific questions.

- Phone: 508-946-5100 and follow the instructions for reaching Tech Support
- Fax: 508-946-9500 to the attention of Tech Support
- Email: techsupport@mccdaq.com

Register-level programming

You should use the Universal Library to control your board. Only experienced programmers should attempt register-level programming. If you need to program at the register level in your application, refer to the Register Map for the PCI-PDISO8. This document is available on our web site at www.mccdaq.com/registermaps/RegMapPCI-PDISO8.pdf.

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Introducing the PCI-PDISO8

Overview: PCI-PDISO8 features

The PCI-PDISO8 is an eight channel-isolated high voltage digital input and eight relay output interface board. You can use the PCI-PDISO8 for control and sensing applications where high voltages need to be sensed or controlled.

Caution! High voltages are present on the PCI-PDISO8 board when you connect high voltage inputs or outputs to the PCI-PDISO8 connector. Use extreme caution! Never handle the PCI-PDISO8 when signals are connected to the board through the connector.
Never remove the protective plates from the PCI-PDISO8.

The eight inputs are individual, optically-isolated (500 V) inputs that can be read back as a single byte. The inputs are not polarity sensitive and may be driven by either AC (50 - 1000 Hz) or DC. Each input channel has a programmable low-pass filter with a time constant of 5 ms (200 Hz).

The eight outputs are electromechanical relays. Five relays provide Form C connections, and three relays provide normally-open Form A connections. The relays are controlled by writing to an eight-bit port. The relay control register can be read back from the same port.

Signal conditioning installed

The PCI-PDISO8 is a combination digital I/O board with signal conditioning installed. Most accessory boards provide signal conditioning or easy-to-access signal termination. The PCI-PDISO8 does not require additional signal conditioning.

PCI-PDISO8 functions are illustrated in the block diagram shown here.

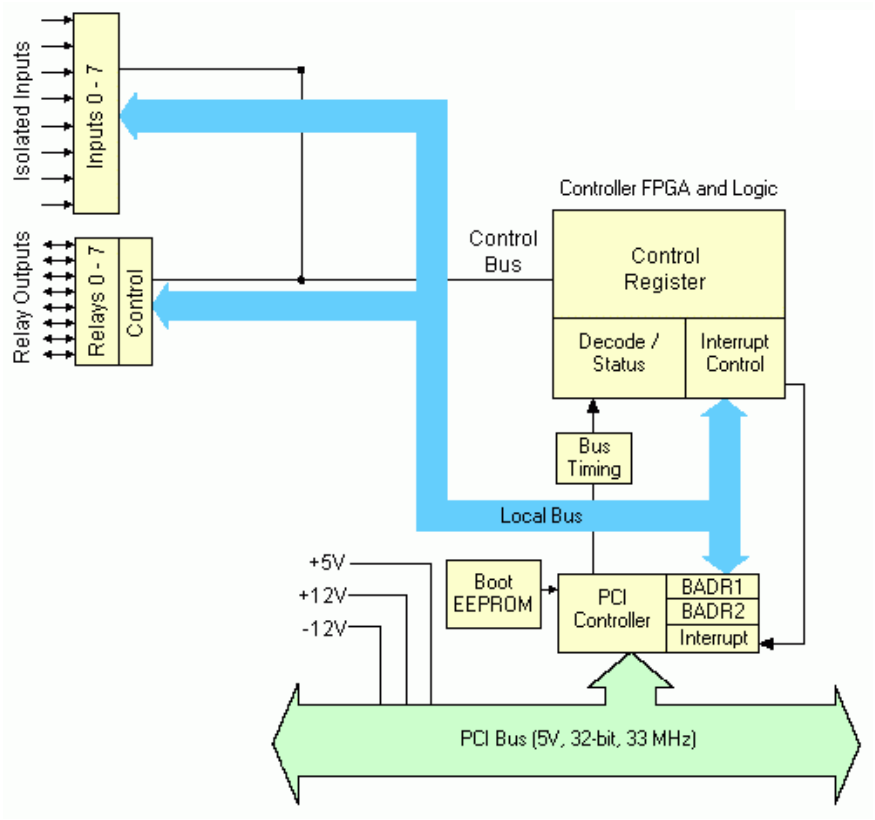


Figure 1. PCI-PDISO8 block diagram

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Installing the PCI-PDISO8

What comes with your PCI-PDISO8 shipment?

The following items are shipped with the PCI-PDISO8.

Hardware

- PCI-PDISO8

Software

- MCC DAQ CD

Documentation

In addition to this hardware user's guide, you should also receive the *Quick Start Guide*. This booklet provides an overview of the MCC DAQ software you received with the device, and includes information about installing the software. Please read this booklet completely before installing any software or hardware.

Optional components

- Cables
  - C37FF-x and C37FFS-x
- Signal termination boards

  Measurement Computing provides signal termination boards for use with the PCI-PDISO8. Refer to Signal termination on page 9 for more information.

Unpacking

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the PCI-PDISO8 from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

If any components are missing or damaged, notify Measurement Computing Corporation immediately by phone, fax, or e-mail:

- Phone: 508-946-5100 and follow the instructions for reaching Tech Support
- Fax: 508-946-9500 to the attention of Tech Support
- Email: techsupport@mccdaq.com

For international customers, contact your local distributor. Refer to the International Distributors section on our web site at www.mccdaq.com/International.

Installing the software

Refer to the *Quick Start Guide* for instructions on installing the software on the MCC DAQ CD. This booklet is available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

Installing the hardware

The PCI-PDISO8 is completely plug-and-play. There are no switches or jumpers to set. Configuration is controlled by the system BIOS.

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Install the MCC DAQ software before you install your board

The driver needed to run your board is installed with the MCC DAQ software. Therefore, you need to install the MCC DAQ software before you install your board. Refer to the *Quick Start Guide* for instructions on installing the software.

Complete the following steps to install the board:

1. Turn your computer off, open it up, and insert your board into an available PCI slot.
2. Close your computer and turn it on.

   When you connect the device for the first time to a computer running Windows, a **Found New Hardware** dialog opens when the operating system detects the device. If the information file for this board is not already loaded onto your PC, you will be prompted for the disk containing this file. The MCC DAQ software contains this file. If required, insert the *Measurement Computing Data Acquisition Software* CD and click **OK**.
3. To test your installation and configure your board, run the InstaCal utility installed in the previous section. Refer to the *Quick Start Guide* that came with your board for information on how to initially set up and load InstaCal.

Signal connections

The table below lists the board connectors, applicable cables and compatible accessory boards.

Board connectors, cables, accessory equipment

I/O connector type	P2: 37-pin D connector
Compatible cable	C37FF-x, where x = length in feet C37FFS-x, where x =5 or 10 feet
Compatible accessory products (with the C37FFS-x and C37FF-x cables)	CIO-MINI37 SCB-37

Figure 2 shows the location of the I/O connector P2 and board relays.

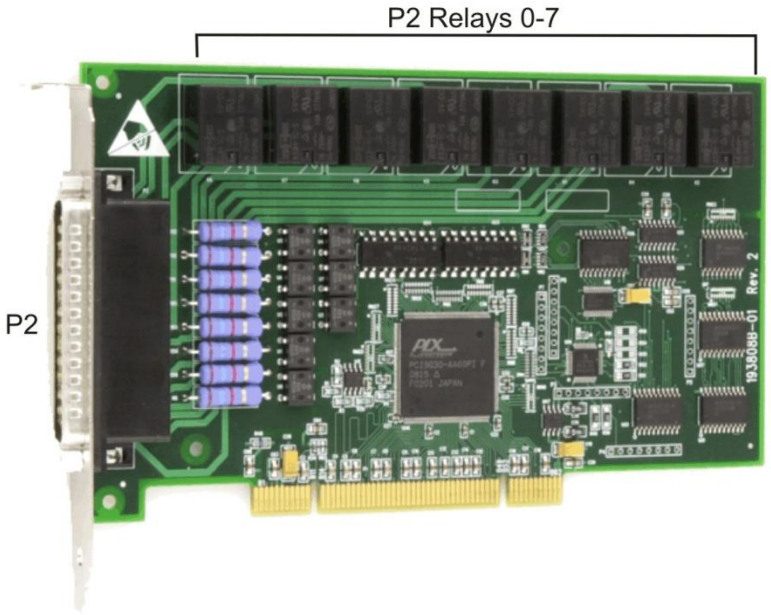


Figure 2. P2 connector and relays (shown with protective cover removed)

The board is shipped with a protective plate covering some components. The board in Figure 2 is shown with the protective cover removed – we recommend that the cover always be left in place during use.

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Caution! **Do not remove the protective plate on the PCI-PDISO8**. High voltages are present on the board when you connect high voltage inputs or outputs to the board connector. Use extreme caution! Never handle the PCI-PDISO8 when signals are connected to the board through the connector.

P2 pinout

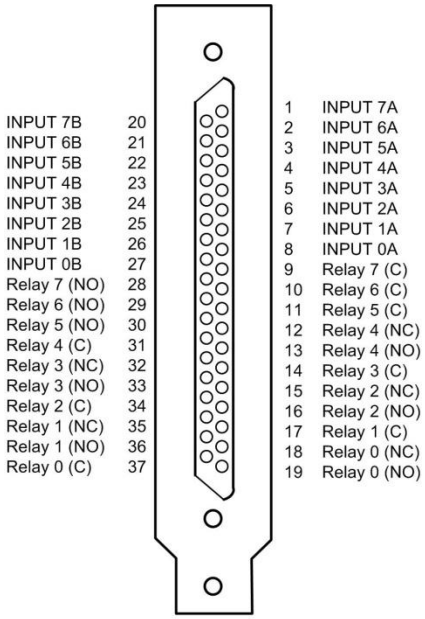


Figure 3. P2 connector pinout

Cabling

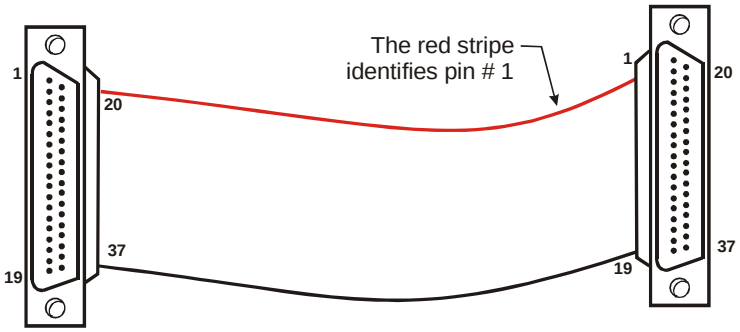


Figure 4. C37FF-x cable

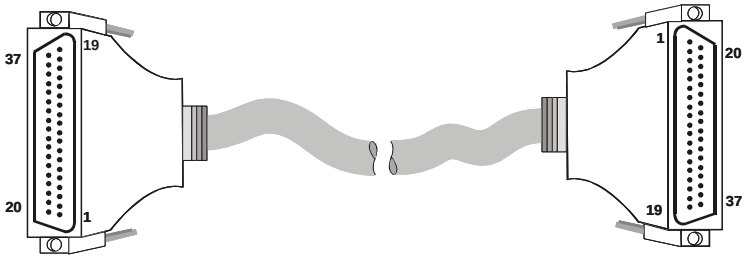


Figure 5. C37FFS-x cable

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Information on signal connections

General information regarding signal connection and configuration is available in the *Guide to Signal Connections*. This document is available on our web site at www.mccdaq.com/signals/signals.pdf.

Signal termination

You can use the following screw terminal board with the C37FF-x cable:

- CIO-MINI37 – 37-pin screw terminal board.
- SCB-37 – 37-conductor, shielded signal connection/screw terminal box.

Details on these products are available on our web site at www.mccdaq.com/products/screw_terminal_bnc.aspx.

Caution! Do not use exposed-screw terminal boards if your field voltage is more than 24 volts. Using a screw terminal board with high voltage inputs or outputs exposes you and others to those high voltage signals. Construct a safe cable to carry your signals directly from your equipment to the PCI-PDISO8 connector.

Additional information about digital interfacing

Detailed information about digital interfacing is contained in the *Guide to Signal Connections*. This document is available on our web site at www.mccdaq.com/signals/signals.pdf.

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Functional Details

Relay outputs

Form C relay

The Form C relay has a common, normally open (NO) and normally closed (NC) contact. Figure 6 shows the schematic for a Form C relay, like those connected at relay 0 through relay 4.

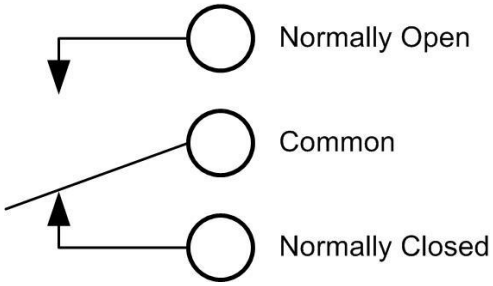


Figure 6. Form C Relay (0) contacts

- When 0 is written to the output, the common and NC are in contact.
- When 1 is written to the output, the common and NO are in contact.

Form A relay

The Form A relay has a common and a normally open (NO) contact. Figure 7 shows the schematic for a Form A relay, like those connected at relay 5 through relay 7.

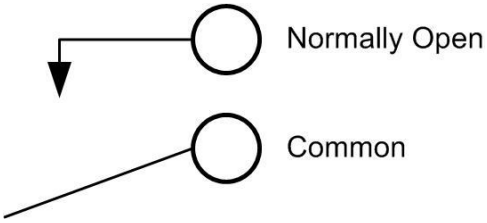


Figure 7. Form A Relay (5) contacts

- When 0 is written to the output, the common and NO are NOT in contact.
- When 1 is written to the output, the common and NO are in contact.

The Form A and Form C relays on the PCI-PDISO8 board are the same type. Only the connections to the relay poles differ.

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Isolated inputs

The PCI-PDISO8 has eight isolated input channels. A schematic of a single channel is shown in Figure 8. The signals are routed through a bridge rectifier so that the inputs are not polarity sensitive.

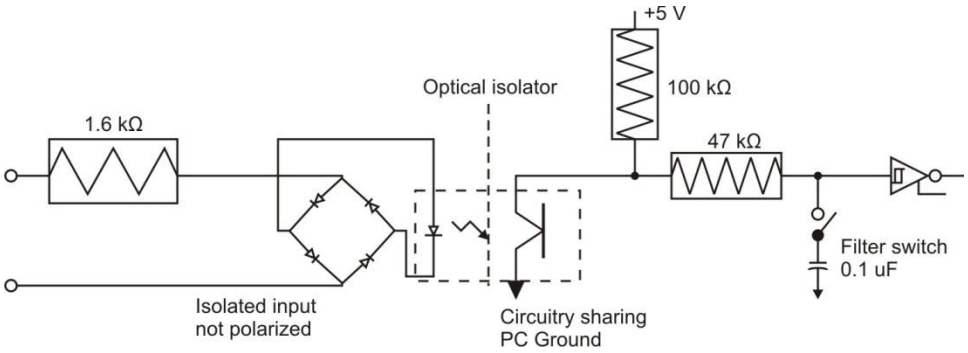


Figure 8. Isolated input schematic - simplified

Extending the input range

To extend the input range beyond the 5 V to 28 V specified, add an external resistor. Figure 9 shows the resistor and the equations used to calculate resistor values for a given V_{in}.

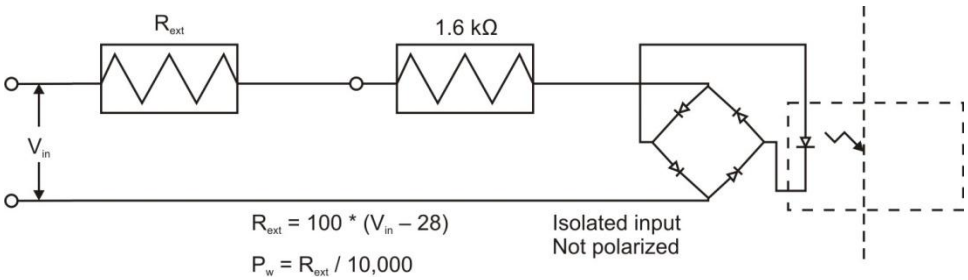


Figure 9. Input range-extending resistor

For more information on digital signal connections

For more information on digital signal connections and digital I/O techniques, refer to the *Guide to Signal Connections*. This document is available on our web site at available on our web site at www.mccdaq.com/signals/signals.pdf).

AC input filter

The inputs are eight individual, optically isolated (500 V) inputs that can be read back as a single byte. The inputs are not polarity sensitive and may be driven by either AC (50 Hz to 1000 Hz) or DC.

Each input has a software enabled/disabled low-pass filter with a time constant of 5 ms (200 Hz). You enable or disable each input with InstaCal. The filter is required for AC inputs, and should be used for almost all DC inputs. Unless you have reason to turn off a filter, you should enable it.

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Mechanical drawing

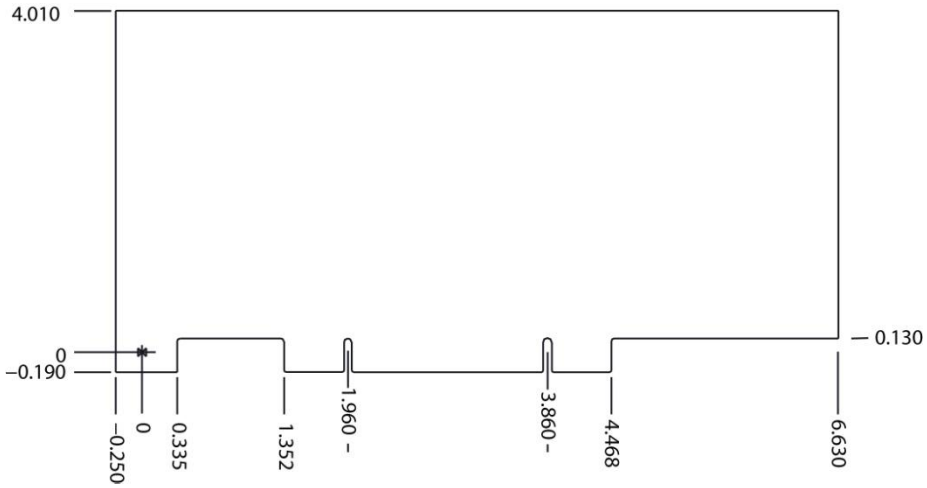


Figure 10. PCI-PDISO8 board dimensions

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Specifications

Typical for 25°C unless otherwise specified.
Specifications in italic text are guaranteed by design.

Relay specifications

Table 1. Relay specifications

Number	8
Contact configuration	5 FORM C (SPDT) RELAY 0 through RELAY 4
	3 FORM A (SPST) RELAY 5 through RELAY 7
Contact rating	*6 A @ 120 VAC or 28 VDC resistive (see connector rating below)*
Contact resistance	100 milliohms max
Operate time	*20 milliseconds max*
Release time	*10 milliseconds max*
Vibration	*10 to 55 Hz (Dual amplitude 1.5 mm)*
Shock	*10 G (11 milliseconds)*
Dielectric isolation	*500 V (1 minute)*
Life expectancy	*10 million mechanical operations, min*
Power on RESET state	Not energized. NC in contact to Common.

Isolated inputs

Table 2. Isolated input specifications

Number	8	
Isolation	*500 V*	
Resistance	1.6 k Ohms min.	
Voltage range	DC:	5 to 28 V (Not TTL compatible)
	AC:	5 to 28 V (50 to 1000 Hz)
Input 'High' level	>5V min (positive or negative input voltage - not TTL compatible)	
Input 'Low' level	<2.5V max (positive or negative input voltage)	
Response	w/o filter:	20 µS
	w/filter:	5 mS
Filters	Time constant:	5 mS (200 Hz)
	Filter control:	Software programmable at each input
	Power-up /reset:	Filters off

Power consumption

Table 3. Power consumption specifications

+5 V Power	All relays off:	0.4 A typical
	All relays on:	1 A typical

Environmental

Table 4. Environmental specifications

Operating temperature range	0 to 70 °C
Storage temperature range	-40 to 100 °C
Humidity	0 to 90% non-condensing

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Main connector and pin out

Table 5. Main connector specifications

I/O connector type	37-pin D connector
Compatible cable	C37FF-x, where x = length in feet C37FFS-x, where x =5 or 10 feet
Compatible accessory products (with the C37FFS-x and C37FF-x cables)	CIO-MINI37 SCB-37
Max current	5 A

Table 6. Connector pin out

Pin	Signal Name	Pin	Signal Name
1	Input 7A	20	Input 7B
2	Input 6A	21	Input 6B
3	Input 5A	22	Input 5B
4	Input 4A	23	Input 4B
5	Input 3A	24	Input 3B
6	Input 2A	25	Input 2B
7	Input 1A	26	Input 1B
8	Input 0A	27	Input 0B
9	Relay 7 (C)	28	Relay 7 (NO)
10	Relay 6 (C)	29	Relay 6 (NO)
11	Relay 5 (C)	30	Relay 5 (NO)
12	Relay 4 (NC)	31	Relay 4 (C)
13	Relay 4 (NO)	32	Relay 3 (NC)
14	Relay 3 (C)	33	Relay 3 (NO)
15	Relay 2 (NC)	34	Relay 2 (C)
16	Relay 2 (NO)	35	Relay 1 (NC)
17	Relay 1 (C)	36	Relay 1 (NO)
18	Relay 0 (NC)	37	Relay 0 (C)
19	Relay 0 (NO)		

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CE Declaration of Conformity

Manufacturer:	Measurement Computing Corporation
Address:	10 Commerce Way Suite 1008 Norton, MA 02766 USA
Category:	Information technology equipment.

Measurement Computing Corporation declares under sole responsibility that the product

PCI-PDISO8

to which this declaration relates is in conformity with the relevant provisions of the following standards or other documents:

EC EMC Directive 2004/108/EC: Electromagnetic Compatibility, EN 61326-1:2006 (IEC 61326-1:2005)

Emissions: Group 1, Class B

- EN55022 (1995)/CISPR 22: Radiated and Conducted emissions.

Immunity: EN61326-1:2006, (IEC 61326-1:2005)

- EN61000-4-2 (2001): Electrostatic Discharge immunity.
- EN61000-4-3 (2002): Radiated Electromagnetic Field immunity.
- EN61000-4-4 (2004): Electric Fast Transient Burst immunity.
- EN61000-4-5 (2001): Surge immunity.
- EN61000-4-6 (2003): Radio Frequency Common Mode immunity.
- EN61000-4-11 (2004): Voltage Dip and Interrupt immunity.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in September, 2001. Test records are outlined in Chomerics Test Report #EMI3053.01. Further testing was conducted by Chomerics Test Services, Woburn, MA. 01801, USA in December, 2008. Test records are outlined in Chomerics Test report #EMI5241.08.

We hereby declare that the equipment specified conforms to the above Directives and Standards.



Carl Haapaoja, Director of Quality Assurance

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