PCL-734

32-channel Isolated
Digital Output Card

Acknowledgments
PC-LabCard is a trademark of Advantech Co., Ltd. IBM and PC are trademarks of International Business Machines Corporation. MS-DOS, Microsoft C and Quick BASIC are trademarks of Microsoft Corporation. BASIC is a trademark of Dartmouth College. Intel is a trademark of Intel Corporation. TURBO C is a trademark of Borland International.

Part No. 2003734000 1st Edition
Printed in Taiwan April 1996

Contents

CHAPTER 1

General information

Introduction

The PCL-734 offers 32 isolated digital output channels on a PC add-on card. Its isolated output channels provide 1,000 V of protection.

Each I/O channel corresponds to a bit in a PC I/O port. This makes the PCL-734 very easy to program.

Features

- 32 isolated digital output channels
- High output driving capacity
- High-voltage isolation on isolated output channels (1,000 V_{DC})
- Open collector outputs (up to 40 V_{DC})
- D-type connectors for isolated output channels
- High sink current on isolated output channels (200 mA/channel)
- Suppression diode for inductive loads

Applications

- Industrial ON/OFF control
- Contact closure monitoring
- Switch status sensing
- BCD interfacing
- Digital I/O control
- Industrial and lab automation

Specifications

Digital output

32 optically-isolated outputs

- **Output voltage**: Open collector 5 to 40 V_{DC}
- **Sink current**: 200 mA max.
- **Isolation voltage**: 1,000 V_{DC}

Register format

BASE+0	Isolated DO0~DO7
BASE+1	Isolated DO8~DO15
BASE+2	Isolated DO16~DO23
BASE+3	Isolated DO24~DO31

Dimensions

185 mm x 100 mm

Connectors

DB-37 connector for isolated Digital Output

Power consumption

+5 V: 330 mA typical, 500 mA maximum

Daughterboards

PCLD-880

The PCLD-880 is a universal screw terminal board for industrial wiring. It can be used with the analog or digital ports of various PC-LabCards via 20-pin flat cables or shielded round cables with DB-37 connectors.

CHAPTER 2

Installation

Initial inspection

We carefully inspected the PCL-734 both mechanically and electrically before shipment. It should be free of marks and in perfect order on receipt.

As you unpack the PCL-734, check it for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or fails to meet specifications, notify our service department or your local sales representative immediately. Also, call the carrier immediately and retain the shipping carton and packing material for inspection by the carrier. We will then make arrangements to repair or replace the unit.

Discharge any static electricity on your body before you touch the board by touching the back of the system unit (grounded metal).

Remove the PCL-734 card from its protective packaging by grasping the rear metal panel. Handle the card only by its edges to avoid static electric discharge which could damage its integrated circuits. Keep the antistatic package. Whenever you remove the card from the PC, please store the card in this package for protection.

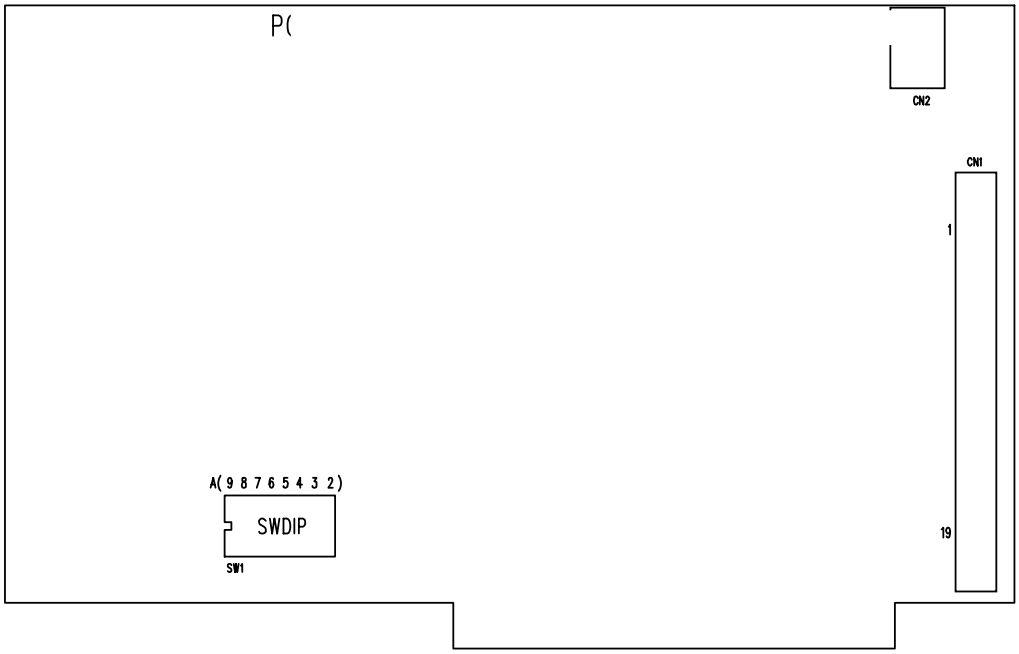
You should also avoid contact with materials that hold static electricity such as plastic, vinyl and styrofoam.

Switch and jumper settings

The PCL-734 card has one function switch and three jumper settings. The following sections tell how to configure the card. You may want to refer to the opposite page for help identifying card components.

Base address selection (SW1)

You control the PCL-734's operation by writing data to the PC's I/O (input/output) port addresses. The PCL-734 requires four consecutive address locations. Switch SW1 sets the card's base (beginning) address. Valid base addresses range from Hex 200 to Hex 3F0. However, other devices in your system may be using some of these addresses.



Card connector, jumper and switch locations

Label	Function
CN1	Isolated output
CN2	E.GND (external ground)
SW1	Card base address

We set the PCL-734 for a base address of Hex 300 at the factory. If you need to adjust it to some other address range, set switch SW1 as shown in the following table:

Card I/O addresses (SW1)

Range (hex)	**Switch position**							
	1	2	3	4	5	6	7	8
200 - 203	○	●	●	●	●	●	●	●
204 - 207	○	●	●	●	●	●	●	○
˙								
*300 - 303	○	○	●	●	●	●	●	●
˙								
3F0 - 3F3	○	○	○	○	○	○	●	●

○ = Off ● = On * = default

Note: Switches 1-8 control the PC bus address lines as shown below:

Switch	1	2	3	4	5	6	7	8
Line	A9	A8	A7	A6	A5	A4	A3	A2

Appendix A provides a PC I/O port address map to help you avoid the I/O addresses for standard PC devices.

Hardware installation

Warning! *TURN OFF your PC power supply whenever you install or remove the PCL-734 or connect and disconnect cables.*

Installing the card in your computer

1. Turn the computer off. Turn the power off to any peripheral devices such as printers and monitors.
2. Disconnect the power cord and any other cables from the back of the computer.
3. Remove the system unit cover (refer to your user's guide chassis user's guide if necessary).
4. Locate the expansion slots at the rear of the unit and choose any unused slot.
5. Remove the screw that secures the expansion slot cover to the system unit. Save the screw to secure the interface card retaining bracket.
6. Carefully grasp the upper edge of the PCL-734 card. Align the hole in the retaining bracket with the hole on top of the expansion slot and align the gold striped edge connector with the expansion slot socket. Press the board firmly into the socket.
7. Secure the PCL-734 using the screw you removed in step 5.
8. Attach any accessories (i.e. a DB-37 cable, etc.) to the PCL-734.
9. Replace the system unit cover. Connect the cables you removed in step 2. Turn the computer power on.

CHAPTER 3

Signal connections

Good signal connections can avoid a lot of unnecessary damage to your valuable PC and other hardware. This chapter gives pin assignments for each of the card's connectors and signal connections for different applications.

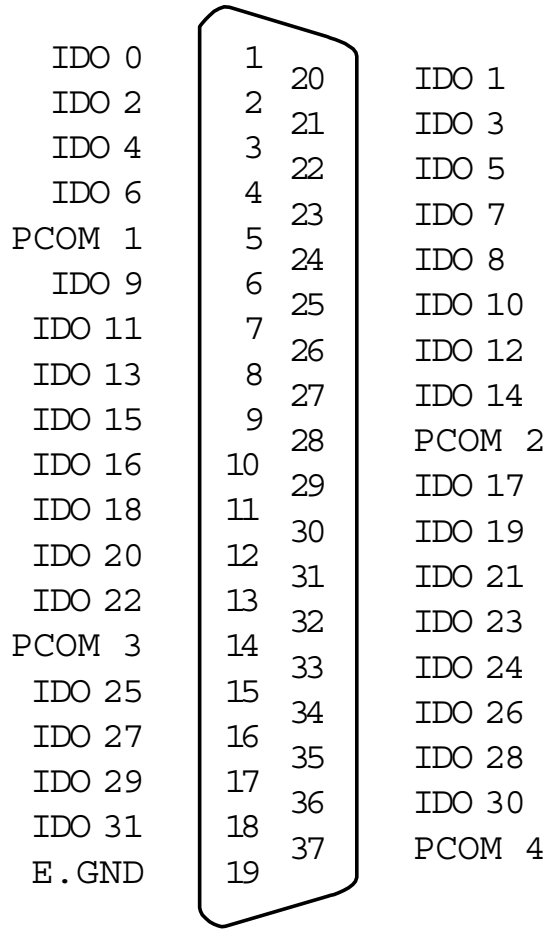
Connector pin assignments

The PCL-734 has a DB-37 connector accessible from the card bracket. See the figure on page 9 for the location of each connector.

Pin assignments for each connector appear in the following sections.

Abbreviations	
IDO	Isolated digital output
E.GND	External ground for isolated output
PCOM	Free wheeling diode common

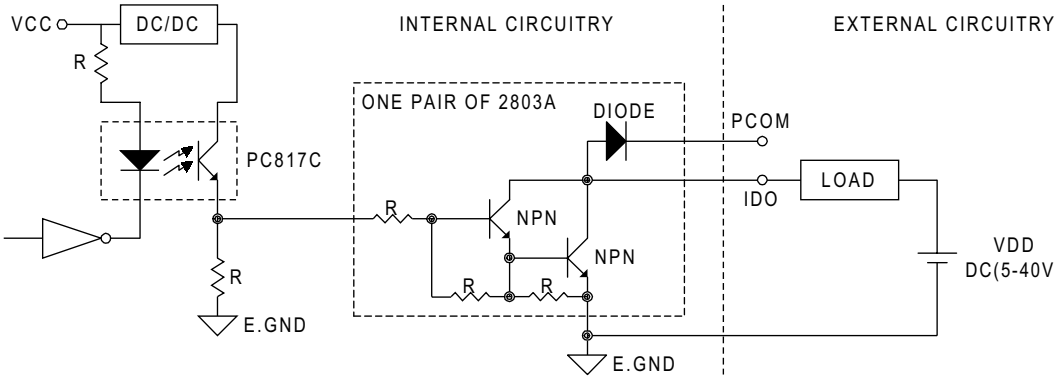
Connector CN1 – Isolated input and output



Isolated Output

Each of the eight isolated digital output channels come equipped with eight darlington transistors featuring common emitters and integral suppression diodes for inductive loads.

If the external voltage (5 to 40 V) is connected to each isolated output channel (IDO) and its isolated digital output turns on (max. of 200 mA per channel), the card's current will sink from the external voltage. The current through each E.GND should not exceed 50 mA. If the current for all channels combined exceed 150 mA, return the current to the external voltage through CN2. The following figure shows how to connect an external output load to the card's isolated outputs.



CHAPTER 4

Register format

Programming the PCL-734 is extremely simple. Each output channel corresponds to a bit in the card's registers. To turn on an output channel you write a "1" to the corresponding bit.

The card requires four I/O register addresses. The address of each register is specified as an offset from the card's base address. For example, BASE+0 is the card's base address and BASE+2 is the base address + two bytes. If the card's base address is 300h, the register's address is 302h. See Chapter 2 for information on setting the card's base address.

Register assignments are as follows:

	Write	**Read**
BASE+0	IDO bits 0-7	N/A
BASE+1	IDO bits 8-15	N/A
BASE+2	IDO bits 16-23	N/A
BASE+3	IDO bits 24-31	N/A

APPENDIX A

PC I/O port address map

PC I/O port address map

Range (hex)	Function
000 - 1FF	Base system
200	Reserved
201	Game control
202 - 277	Reserved
278 - 27F	LPT2: (2nd printer port)
280 - 2F7	Reserved
2F8 - 2FF	COM2:
300 - 377	Reserved
378 - 37F	LPT1: (1st printer port)
380 - 3AF	Reserved
3B0 - 3BF	Mono Display/Print adapter
3C0 - 3CF	Reserved
3D0 - 3DF	Color/Graphics
3E0 - 3EF	Reserved
3F0 - 3F7	Floppy disk drive
3F8 - 3FF	COM1: