PCL-735

12-channel Relay
Actuator Card

Contents

CHAPTER

1

General Information

Introduction

Ideal for applications such as device On/Off control or signal switching, the PCL-735 12-channel relay actuator provides 12 electromechanical SPDT relays on a half-size card.

To prevent relay fault, the On/Off status of each relay is easy to monitor. A red LED next to each relay shows its On/Off status, and the software can read each relay's status. Plus, an on-board DB-37 connector provides access to all output channels.

Features

• 12 relay outputs

• LED relay status indicators

• Male DB-37 matching connector included

• Relay status readback function

Applications

• Industrial On/Off control

• Signal switching

• External relay driving

Specifications

Relay   Output

- **Relay type:** Single-pole double-throw (SPDT, Form C)

- **Output type:** Ch0 to Ch11, normally open/normally closed

- **Contact rating:** 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}

- **Breakdown voltage:** 1000 V AC/DC min.

- **Relay on time:** 5 msec. typical

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- **Total switching time:** 10 msec. typical

- **Insulation resistance:** 1000 MΩ @ 500 V_{DC} min.

- **Life expectancy:**
  $> 5 \times 10^5$ operations @ 30 V_{DC} and 2 A
  $> 2 \times 10^6$ operations @ 30 V_{DC} and 1 A

General

- **Dimensions:** 6.07" x 3.89" (155 mm x 99 mm)

- **I/O port address:** Two consecutive bytes from hex 200 to 3F8

- **Power consumption:** +5 V @ 200 mA, +12 V @ 200 mA max.

Installation

Initial   Inspection

We carefully inspected the PCL-735 both mechanically and electrically before shipment. It should be free of marks and in perfect order on receipt.

As you unpack the PCL-735, 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-735 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-735 card has one function switch (SW1). The following sections tell how to configure the card. Refer to the figure below for help identifying card components.
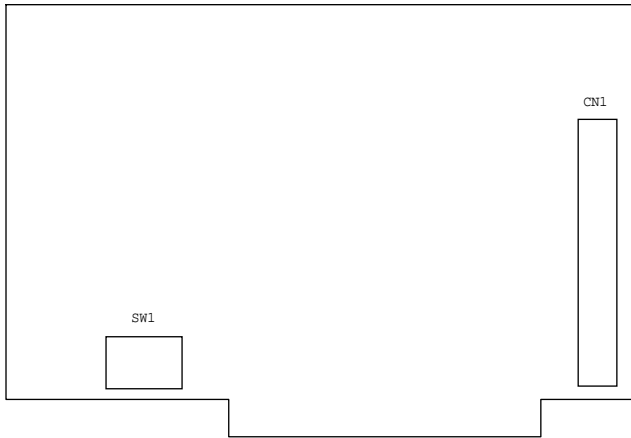
Switch and Connector Locations

Switches and Connectors	
Label	**Function**
CN1	Relay output
SW1	Card base address

Base address selection (SW1)

You control the PCL-735's operation by reading or writing data to the PC's I/O (input/output) port addresses. The PCL-735 requires two consecutive address locations. Switch SW1 sets the card's base (beginning) address. Valid base addresses range from Hex 200 to Hex 3F0. Other devices in your system may, however, be using some of these addresses.

We set the PCL-735 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	○	●	●	●	●	●	●	○
⑨								
* 300 - 303	○	○	●	●	●	●	●	●
⑨								
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-735 or connect and disconnect cables.*

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 (see the user's guide for your chassis 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-735 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-735 using the screw you removed in step 5.

8. Attach any accessories (using 20 pin flat cables, a DB-37 cable, etc.) to the PCL-735.

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-735 has a DB-37 connector accessible from the card bracket.

Abbreviations	
NO	Normally open
NC	Normally closed
COM	Common relay pin

CN1 Pin Assignments

NO0	1		
COM0	2	20	NO6
NC0	3	21	COM6
NO1	4	22	NC6
COM1	5	23	NO7
NC1	6	24	COM7
NO2	7	25	NC7
COM2	8	26	NO8
NC2	9	27	COM8
NO3	10	28	NC8
COM3	11	29	NO9
NC3	12	30	COM9
NO4	13	31	NC9
COM4	14	32	NO10
NC4	15	33	COM10
NO5	16	34	NC10
COM5	17	35	NO11
NC5	18	36	COM11
N/A	19	37	NC11

Relay   Output

The PCL-735 has 12 channels of Single Pole Double Throw (SPDT) Form C relay output. Each relay has two Form C contacts, which are controlled by the same coil. One of the contacts is connected directly to CN1 for relay output, while the other contact controls the LED that displays the relay status, which can also be read back by a read command to the I/O port.
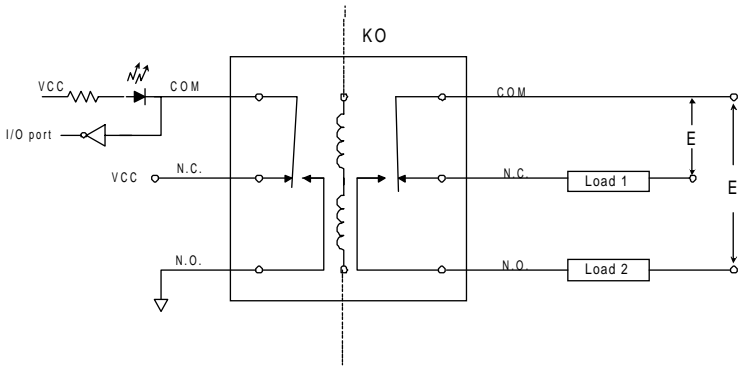
A write operation to I/O address BASE+0 will change the output status of each relay. For example, if Bit 0 of BASE+0 is set to "1" (logic high), K0 (Relay 0) will switch from position NC0 (Normal Close) to position NO0 (Normal Open). This means that Load 2 is energized, while Load 1 is de-energized.

In summary, when the bit has a value of "0" (power-on default), the corresponding COM line is in the "Normal Close" position. When the bit has a value of "1", the corresponding COM line is in the "Normal Open" position.

Warning: *External circuits connected to the PCL-735's relay ouput port must be fused at 1A or less and be rated at 120 VA or less. Voltage must not exceed the ±120V peak.*

Register   Format

Programming the PCL-735 is extremely simple. Each I/O 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

Address	Write	Read
BASE+0	DO bits 0-7	DI bits 0-7 status
BASE+1	DO bits 8-11	DI bits 8-11 status
BASE+2	–	–
BASE+3	–	–

Register   format
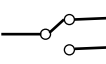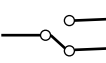
B A S E + 0

D7	D6	D5	D4	D3	D2	D1	D0

B A S E + 1

N/A	N/A	N/A	N/A	D11	D10	D9	D8

Relay status for D*n*

Setting	Status
0	com —o o— N.C. / N.O.
1	com —o o— N.C. / N.O.