

PO-64L(CPCI)
For CompactPCI Bus System
User's Guide

 **CONTEC**

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Product Configuration

PO-64L(CPCI) Board ... 1

PIO(CPCI) SERIES SETUP Diskette (3.5" / 1.44MB) ... 1

User's Guide (this booklet) ... 1

Unpacking:

This board is specially packed in an anti-static bag to prevent damage in shipping.

Note!

Do not remove the board from its protective packaging until the computer case is open and ready for installation. Electrical static can cause damage to electronic components.

Note!

Check the contents to make sure that you have everything listed above. If you do not have all the items, please contact CONTEC.

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Introduction

About the PO-64L(CPCI) Board

PO-64L(CPCI) is a PCI bus-compatible add-on interface board designed for isolated digital output. Plugged in a CompactPCI bus expansion slot on the motherboard of a system, the board can output up to 64 channels.

Note!

This User's Guide assumes your PC uses the MS-DOS operation system; all explanations are based on this assumption.

Features

CompactPCI Bus Ver.2.0 compliant target/slave Interface board. It works in any peripheral slot of CompactPCI system.

- Opto-isolated output providing improved noise resistance
- Up to 64 (8 signals x 8 groups) current sink type output signals
- Up to 35 VDC, 100mA per signal, max. (2A per common, max.) output
- In addition to its general-purpose output function, this board also supports:
 - Output data monitor
 - The STB/ACK signals can be used to handshake the data transmission.
 - Bit output function

Limited Three-Year Warranty

CONTEC Interface boards are warranted by CONTEC to be free from defects in material and workmanship for up to three years from the date of purchase by the original purchaser.

Replacement or repair will be free of charge only when this device is returned to CONTEC freight prepaid with the original invoice.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original boards. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy. If replacement with a new device is needed, regular factory prices will be charged, the product will be returned to you COD, and no other written warranty will apply.

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization Number (RMA) from our Sales Administration Department before returning any product. No product will be accepted without an RMA number.

About the Manual

This manual consists of the following chapters:

Chapter 1 Setup

This chapter describes the procedures for setting up the PO-64L(CPCI) board and setting its switches.

Chapter 2 External Connection

This chapter explains how to connect external devices to the board.

Chapter 3 I/O Ports and Registers

This chapter provides the assignment and definition of each I/O port bit used for the board.

Chapter 4 System Reference

This chapter summarizes hardware specifications of the board and provides circuit block diagrams.

Chapter 5 Troubleshooting

This chapter asks the set of questions you need to answer to trouble the board.

Chapter 1. Setup

Component Locations

Figure 1. shows the names of major parts on the PO-64L(CPCI) board.

Note that the switch setting shown below is the factory default.

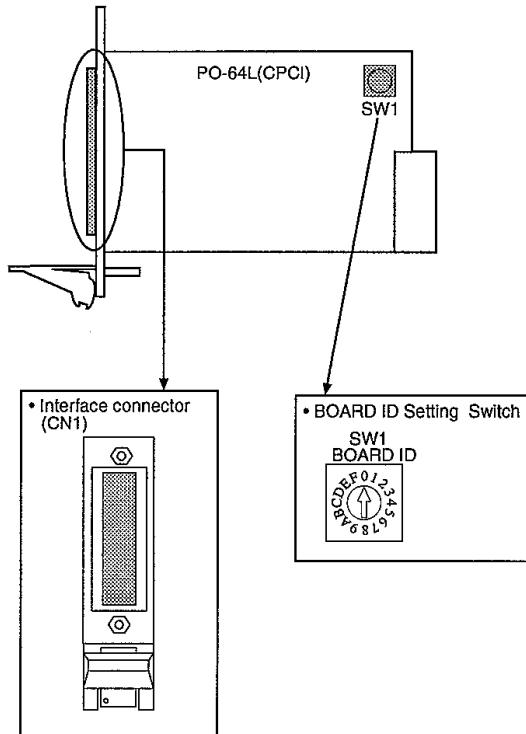


Figure 1. Component Locations

Setting the Board ID

If you install two or more PO-64L(CPCI) boards on one system, assign a different ID value to each of the boards to distinguish them.

The board IDs from 0 to F can be set to identify up to sixteen boards.

If only one board is used, the original factory setting (Board ID = 0) should be used.

Setting Procedure

To set the board ID, use the rotary switch on the board. Turn the SW1 knob to set the board ID as shown below.

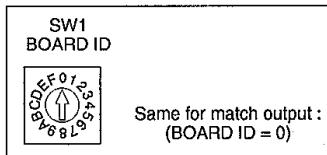


Figure 2. Board ID Settings (SW1)

Setting up the Board

The board setup method for the PO-64L(CPCI) board depends on the operating system being used. Set up the board using the method appropriate for the OS that you are using.

Installing for Windows98

Installing the PO-64L(CPCI) board hardware

Before the PO-64L(CPCI) board can be used under Windows98, the OS must recognize the I/O addresses and interrupt level (IRQ) to be used for the PO-64L(CPCI) board. Use the appropriate procedure to install the PO-64L(CPCI) board.

- (1) Set the board ID.
- (2) Be sure to check that the system is off; then plug the board into an expansion bus slot in the system.
- (3) Turn the system ON to start up Windows98.
- (4) Windows98 will come up with the [New Hardware] detection dialog box. In the [Add New Hardware Wizard] that appears next, check that "Multimedia Device" has been listed, then select [Next>].
- (5) In the next dialog box, select a radio button of [Search for the best driver for your device. (Recommended).], then select [Next>].
- (6) In the next dialog box, select both of the [Floppy disk drives(F)] and [Specify Location(L)] check boxes, then enter the drive name and the directory name, WIN95, into the [Location] field.
(In the next dialog box, select two check box both of [Floppy disk drives] and [Specify Location:], then enter the drive name in the [Location] field.)
Insert PO-64L(CPCI) Driver Install Disk 1 into the disk drive, then select [Next>].
- (7) In the [Windows driver file search for the device] dialog box, check that "CONTEC Co., Ltd. - PO-64L(CPCI)" and "DIO_CPIO.INF" in the [Location of driver] has been listed, then select [Next>].
- (8) In the next dialog box, check the "Windows has finished installing the software that your new hardware device requires." message, then select [Finish]. After completed the board installation, be sure to check the assigned resources. The "Checking resources" part of this section explains you how to check the OS assigned resources of this board. (When board setup has been completed, be sure to check the assigned resources.)

Method of installing two or more PO-64L(CPCI) boards :

Follow the procedure below to install two PO-64L(CPCI) boards for use under Windows98.

- (1) Check the board ID of the first PO-64L(CPCI) board, plug it into an expansion bus slot, then start up Windows98 to install the first board correctly.
- (2) Check that the first PO-64L(CPCI) board has been set up correctly, as described in "Checking resources". Be sure to complete installation of the first board before attempting to install the second one.
- (3) Exit Windows98 and turn the system off.
- (4) Check the board ID of the second PO-64L(CPCI) board, then plug it into an expansion bus slot. Assign ID to the second board a board ID that is different from the ID assigned to the first board.
- (5) Turn the system on again to start up Windows98.
- (6) Windows98 will come up with the [New Hardware] detection dialog box. In the [Add New Hardware Wizard] that appears next, check that "CONTEC Co., Ltd.- PO-64L(CPCI)" has been listed, then select [Next>].
- (7) In the next dialog box, select a radio button of [Display a list of all the drivers in a specific location, so you can select the driver you want.], then select [Next>].
- (8) In the next dialog box, select "CONTEC Co., Ltd. PO-64L(CPCI)" from [Models], then select [Next>].
- (9) In the [Windows driver file search for the device] dialog box, check that "CONTEC Co., Ltd. - PO-64L(CPCI)" and "CONTEC-*.INF" in the [Location of driver] has been listed, then select [Next>]. (* is a number which the OS assigned.)
- (10) In the next dialog box, check the "Windows has finished installing the software that your new hardware device requires." message, then select [Finish]. This completes installation of the PO-64L(CPCI) board. After finishing installing the board, be sure to check the assigned resources again.

For installing the third board and any additional boards, follow the same steps as those for installing a second board. Before you can install a third board or additional boards, all PO-64L(CPCI) boards that are already installed must be in an expansion bus slots.

Chapter 1. Setup

Notes!

- *The second PO-64L(CPCI) board cannot be properly installed unless the resources (I/O addresses and interrupt level) for the board can be allocated. Before attempting to install the second board, first determine what PC resources are free.*
- *The resources used for each PO-64L(CPCI) board do not depend on the location of an expansion bus slot or the board itself. The resources used for each PO-64L(CPCI) board do not depend on the location of the PCI bus slot or the board itself. If you remove two or more PO-64L(CPCI) boards that have already been installed and then remount one of them on the computer, it is unknown which one of the sets of resources previously assigned to the two boards is assigned to the remounted board. In this case, re-check the resource settings.*

Checking resources

Follow the steps below to check the assigned resources managed by the OS.

- (1) Double-click on the [System] option in [Control Panel] to open the [System Properties] property sheet. Select the [Device Manager] tab.
- (2) Click on the [Multi-function adapters] folder.
- (3) Click on the [CONTEC Co., Ltd. - PO-64L(CPCI)] folder to display its properties.
- (4) Select the [Resources] tab to check the device type, resource settings, and the conflicting device list.
- (5) If you want to change a resource setting, uncheck the [Use automatic settings] option in advance. To change the I/O address range (Input/Output Range), change the configuration name in the [Setting based on:] field. Since the interrupt level (Interrupt Request) cannot be changed, use the assigned IRQ.

Support software

CONTEC provides the following driver software for Windows98.

API-PAC(W32) Ver. Jun. 1998 or later

This driver software supports up to four PO-64L(CPCI) boards.

Not e that when API-PAC(W32) is used, only 32-bit versions of development languages can be used. Neither driver can be supported by any language dedicated to 16-bit applications.

Installing for Windows95

Installing the PO-64L(CPCI) board hardware

Before the PO-64L(CPCI) board can be used under the Windows95 operation system (OS), the OS must recognize the assigned I/O address range and the interrupt level (IRQ) of this board and register these information into OS itself. Refer the following procedure to register the board information for Windows95.

Checking the OS version

Note that the procedure for installing the PO-64L(CPCI) board depends on which version of Windows95 you are using. Check the version of Windows95 on your system as follows before installing the PO-64L(CPCI) board.

- (1) Open [Control Panel] from [My Computer].
- (2) Double-click on the [System] option to open the [System Properties] property sheet.
- (3) Check the "System:" number displayed on the [General] page.
System : Microsoft Windows 95
4.00.950

The version numbers of Windows95 include 4.00.950, 4.00.950a, 4.00.950B and 4.00.950C. The PO-64L(CPCI) board setup depends on the version number of Windows95 that is being used.

Procedure for use under Windows95 version 4.00.950 or 4.00.950a :

- (1) Set the board ID.
- (2) Be sure to check that the system is off; then plug the board into an expansion bus slot in the system.
- (3) Turn the system ON to start up Windows95.
- (4) Windows95 will come up with the [New Hardware] detection dialog box. Select [Multimedia Device: Select which driver you want to install for your new hardware.] and then [Driver from disk provided by hardware manufacturer].
- (5) In the [Install From Disk] dialog box, insert PO-64L(CPCI) Driver Install Disk 1 into the disk drive, enter the drive name and directory name in the [Copy Distributed File From] field, then click on [OK].
This completes installation of the PO-64L(CPCI) board.
- (6) Follow the instructions on the screen to complete installation of the PO-64L(CPCI) board.
After completed the board installation, be sure to check the assigned resources. The "Checking resources" part of this section explains you how to check the OS assigned resources of this board.

Chapter 1. Setup

Procedure for use under Windows95 version 4.00.950B or 4.00.950C :

- (1) Set the board ID.
- (2) Be sure to check that the system is off; then plug the board into an expansion bus slot in the system.
- (3) Turn the system on to start up Windows95.
- (4) Windows95 will come up with the [New Hardware] detection dialog box. In the [Device Driver Wizard] that appears next, check that "CONTEC Co., Ltd. - Multimedia Device" has been listed, then select [Next>].
- (5) In the next dialog box, select [Specify Location...]. Insert the supplied FD in a drive, enter the drive name and directory name (WIN95) in the [Location] field, then click on [OK].

In the next dialog box, check the "Updated driver found for this device" message, then select [End]. This completes installation of the PO-64L(CPCI) board. After completed the board installation, be sure to check the assigned resources. The "Checking resources" part of this section explains you how to check the OS assigned resources of this board.

Method of installing two or more PO-64L(CPCI) boards (For use under Windows95 version 4.00.950 or 4.00.950a) :

Follow the procedure below to install two PO-64L(CPCI) boards for use under Windows95 version 4.00.950 or 4.00.950a.

- (1) Check the board ID of the first PO-64L(CPCI) board, plug it into an expansion bus slot, then start up Windows95 to install the first board correctly.
- (2) Check that the first PO-64L(CPCI) board has been set up correctly, as described in "Checking resources". Be sure to complete installation of the first board before attempting to install the second one.
- (3) Exit Windows95 and turn the system off.
- (4) Check the board ID of the second PO-64L(CPCI) board, then plug it into an expansion bus slot. Assign ID to the second board a board ID that is different from the ID assigned to the first board.
- (5) Turn the system on again to start up Windows95.
- (6) Windows95 will come up with the [New Hardware] detection dialog box. In [Multimedia Device: Select which driver you want to install for your new hardware.], select [Select from List].
- (7) The [Select Hardware Type] dialog box will then appear. In [Select Hardware Type to Install], select [Other Devices].

- (8) In the [Select Device] dialog box that appears, select [CONTEC] from [Manufacturers] and select [CONTEC Co., Ltd. - PO-64L(CPCI)] from [Models].
- (9) The [Change System Settings] dialog box appears. Follow the messages to restart the computer.
- (10) When Windows95 is restarted, installation of the second PO-64L(CPCI) board is completed. Check the assigned resources again.

For installing the third board and any additional boards, follow the same steps as those for installing a second board. Before you can install a third board or additional boards, all PO-64L(CPCI) boards that are already installed must be in an expansion bus slots.

Notes!

- *The second PO-64L(CPCI) board cannot be properly installed unless the resources (I/O addresses and interrupt level) for the board can be allocated. Before attempting to install the second board, first determine what PC resources are free.*
- *The resources used for each PO-64L(CPCI) board do not depend on the location of an expansion bus slot or the board itself. The resources used for each PO-64L(CPCI) board do not depend on the location of the PCI bus slot or the board itself. If you remove two or more PO-64L(CPCI) boards that have already been installed and then re-mount one of them on the computer, it is unknown which one of the sets of resources previously assigned to the two boards is assigned to the re-mounted board. In this case, re-check the resource settings.*

**Method of installing two or more PO-64L(CPCI) Boards
(For use under Windows95 version 4.00.950B or
4.00.950C) :**

Follow the procedure below to install two PO-64L(CPCI) boards for use under Windows95 version 4.00.950B or 4.00.950C.

- (1) Check the board ID of the first PO-64L(CPCI) board. Then plug it into an expansion bus slot. Finally, start up Windows95 to install the first board correctly.
- (2) Check that the first PO-64L(CPCI) board has been set up correctly, as described in "Checking resources". Be sure to complete installation of the first board before attempting to install the second one.
- (3) Exit Windows95 and turn the system OFF.
- (4) Check the board ID of the second PO-64L(CPCI) board. Then plug it into a Compact PCI bus slot. Assign to the second board a board ID different from that assigned to the first board.
- (5) Turn the system ON again to start up Windows95.
- (6) The OS will then automatically install the second board. When the installation has been completed, re-check the assigned resources.

For installing the third board and any additional boards, follow the same steps as those for installing a second board. Before you can install a third board or additional boards, all PO-64L(CPCI) boards that are already installed must be in an expansion bus slots.

Notes!

- A second PO-64L(CPCI) board cannot be properly installed unless the resources (I/O addresses and interrupt level) to be used for the board can be allocated. Before attempting to install a second board, first determine which PC resources are free.
- The resources used for each PO-64L(CPCI) board do not depend on the location of an expansion bus slot or the board itself. The resources used for each PO-64L(CPCI) board do not depend on the location of the PCI bus slot or the board itself. If you remove two or more PO-64L(CPCI) boards that have already been installed and then re-mount one of them on the computer, it is unknown which one of the sets of resources previously assigned to the two boards is assigned to the re-mounted board. In this case, check the resource settings again.

Checking resources

Follow the steps below to check the assigned resources managed by the OS.

- (1) Double-click on the [System] option in [Control Panel] to open the [System Properties] property sheet. Select the [Device Manager] tab.
- (2) Click on the [Multi-function adapters] folder.
- (3) Click on the [CONTEC Co., Ltd. - PO-64L(CPCI)] folder to display its properties.
- (4) Select the [Resources] tab to check the device type, resource settings, and the conflicting device list.
- (5) If you want to change a resource setting, uncheck the [Use automatic settings] option in advance. To change the I/O address range (Input/Output Range), change the configuration name in the [Setting based on:] field. Since the interrupt level (Interrupt Request) cannot be changed, use the assigned IRQ.

Support software

CONTEC provides the following driver software for Windows95:

API-PAC(W32) Ver. Jun. 1998 or later

This driver software supports up to four PO-64L(CPCI) boards.

Note that when API-PAC(W32) is used, only 32-bit versions of development languages can be used. Neither driver can be supported by any language dedicated to 16-bit applications.

Installing for WindowsNT

Installing the PO-64L(CPCI) board requires separately priced CONTEC driver software. Follow the procedure below to install the board.

Verifying PC settings

Be sure that [PnP OS] is either [disabled] or set to [not to use] in the PC's BIOS setup. If this is set to [Windows95], for example, the PO-64L(CPCI) might not be recognized properly.

Installing the PO-64L(CPCI) driver software

To use the PO-64L(CPCI) board under WindowsNT operation system, you need an optional CONTEC installation driver program. Refer the following procedure to install this board to the WindowsNT OS.

- (1) Set the board ID.
- (2) Be sure that the system power is off. Then plug the board into an expansion bus slot in the system.
- (3) Start WindowsNT with Administrator.
- (4) Execute the optional driver program to install the board. Refer the driver program's manual or the driver program's help file for details.

After completed the board installation, be sure to check the assigned resources. The "Checking resources" part of this section explains you how to check the OS assigned resources of this board.

Checking resources

Follow the steps below to check the assigned resources managed by the OS.

- (1) Open [WindowsNT Diagnostic Program] from [Management Tools].
- (2) Select [Resources] (IRQ/port settings). Check the types and settings of resources assigned to the relevant driver and the corresponding device list.

Support software

CONTEC provides the following driver software for WindowsNT.

API-PAC(W32) Ver. Jun. 1998 or later

This driver software supports up to four PO-64L(CPCI) boards.

Note that when API-PAC(W32) is used, only 32-bit versions of development languages can be used.

Installing for other OS System

For all the other operation systems, in addition of the Windows OS, we use MS-DOS as an example to show how to use the PO-64L(CPCI) board under the OS.

For all the other operation systems, refer the MS-DOS programs of the attached floppy as an example.

For a CompactPCI bus board, the system will automatically assign a usable resource / usable resources to the board. Refer the following procedure to copy the attached programs and to confirm the assigned resource/resources.

Procedure

- (1) Set the board ID.
- (2) Be sure that the system power is off; then plug the board into a CompactPCI bus slot in the system.
- (3) Turn the system ON to start up MS-DOS.
- (4) Copy the programs that are under the DOS directory of the attached floppy to a directory of your HDD.
- (5) Execute the PIOPCI.EXE resource confirmation program.
- (6) Check the I/O addresses and interrupt level (IRQ) displayed on the screen.

Sample programs for MS-DOS

The sample programs for using the PO-64L(CPCI) board under MS-DOS are written in Microsoft C.

The attached floppy contains following sample programs.

DOS --- Samples ---	(1) PIOPCI.C PIOPCI.EXE	Resource check program
	(2) PIO3232.C PIO3232.EXE	Input/Output data (PIO-32/32(CPCI) series)
	(3) PI64.C PI64.EXE	Input data (PI-64(CPCI) series)
	(4) PO64.C PO64.EXE	Output data (PO-64(CPCI) series)
	(5) INTPC.C INTPC.EXE	Input data by Interrupt for PC (PIO-32/32(CPCI) series)

Figure 3. Sample Programs on FD

For details on I/O addresses, see Chapter 3 "I/O Ports and Registers."

Chapter 2. External Connection

Interface Connector

Connecting the Interface Connector

To connect an external device to this board, plug the cable from the device into the interface connector (CN1).

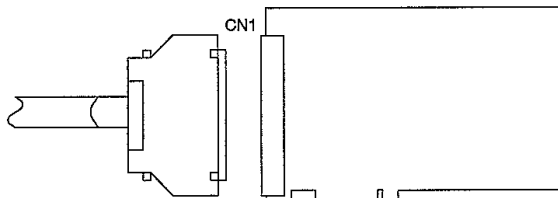
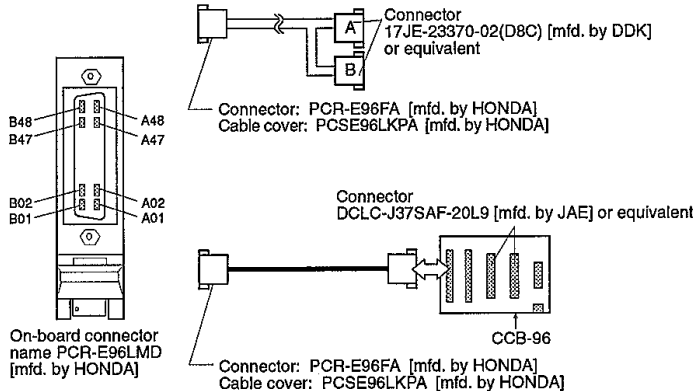


Figure 4. Connecting the Interface Connector

- Connector used
PCR-E96LMD [mfd. by HONDA]
- Applicable connector
PCR-E96FA [mfd. by HONDA]

* Optional cable PCB96WS-**



** represents the cable length (1.5, 3, or 5 m).

Figure 5. Connector Used

Interface Connector Pin Assignment

To connect an external device to this interface board, plug the device into the on-board 96-pin connector shown below in Figure 6.

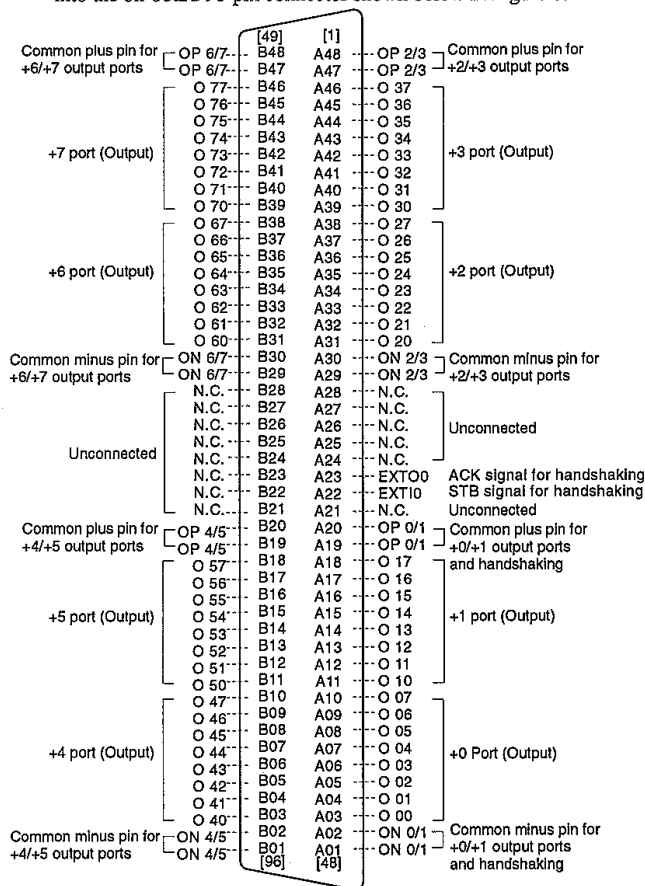


Figure 6. Interface Connector Pin Assignment

Note!

The numbers in brackets are pin numbers defined by the connector manufacturer.

PCB96WS and CCB-96 Signal Assignments

Optional cable connectors and their corresponding signals are shown in Figure 7 below.

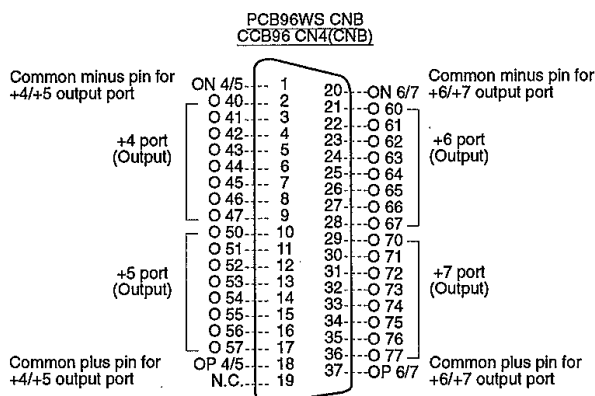
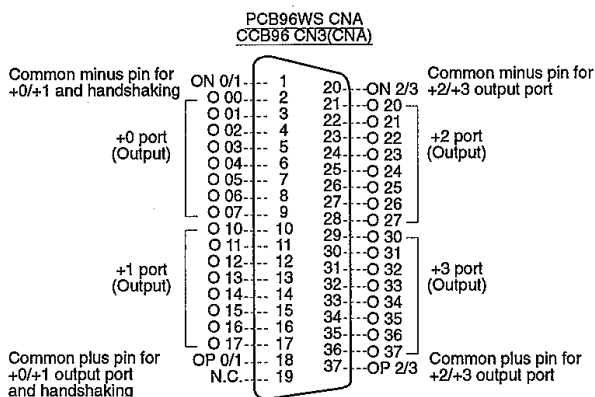


Figure 7. PCB96WS and CCB-96 Signal Assignments

Note!

Not support signals for handshaking.

Input Circuit and Output Circuit

Output circuit

The output circuit of this illustrated in Figure 8. The output channel is a photocoupler-isolated open-collector type (sink type). Driving these opto-isolated circuits require an additional power supply isolated from the PC system. The maximum output current rating is 100 mA per channel or 2 A per common ; (16 output channels share a common power supply).

Note!

The board has no voltage surge protection circuits for protecting output transistors. To drive inductive loads such as relays and lamps by this board, consequently a measure against voltage surge must be taken on the load side.

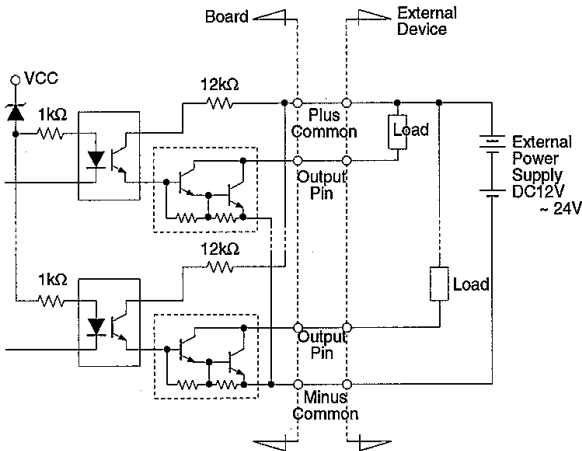


Figure 8. Output Circuit

STB and ACK input and output circuits

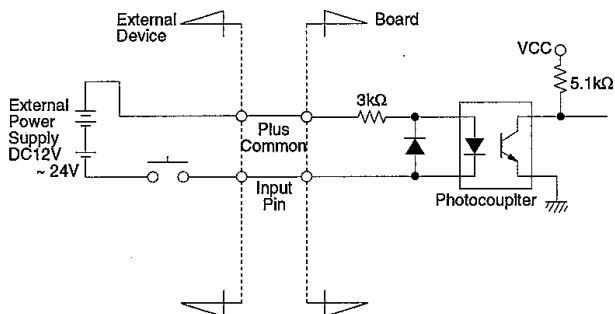


Figure 9. STB Input Circuit

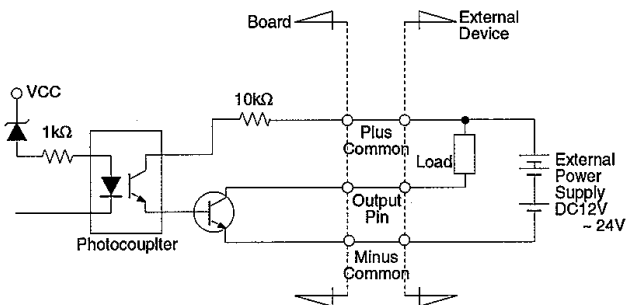
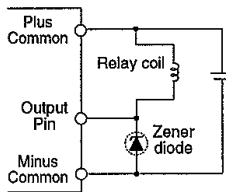
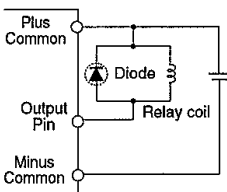


Figure 10. ACK Output Circuit

Surge Protection

When connecting to digital outputs a load that may generate a voltage surge or current, for example an inductive load such as a relay coil or incandescent lamp, suitable protection measures are required to prevent damage to the output stage or malfunction owing to noise. The instantaneous interruption of current flowing through a coil, including a relay, results in the sudden generation of a high-voltage pulse. If the voltage exceeds the withstand voltage of the transistor, the transistor performance may be degraded or the transistor may be damaged. To prevent this, be sure to connect a surge absorption element when driving an inductive load including a relay coil. Example of measures against voltage surge are shown in Figure 11 below.

■ Examples of use of relay coil



External power voltage < Zener diode voltage

■ Examples of use of lamp

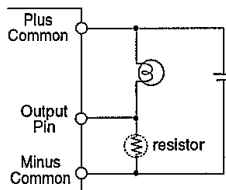
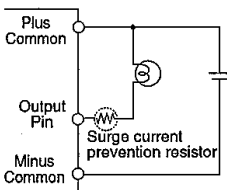


Figure 11. Samples of Voltage Surge Protection

Note!

The protection circuit must be installed less than 50 cm from the load and contact to provide effective protection.

Chapter 3. I/O Ports and Registers

I/O Address Map

Board I/O Address	D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
+0H	Input Group 0							
	O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H	Input Group 1							
	O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H	Input Group 2							
	O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H	Input Group 3							
	O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H	Input Group 4							
	O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H	Input Group 5							
	O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H	Input Group 6							
	O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H	Input Group 7							
	O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
+8H	Handshake Status Input							
	X	X	X	X	INT	IRF	STR	ACK
+9H	Not Allowed							
+AH	Bit Data Input							
	0	0	0	0	0	0	0	BDT
+BH	Not Allowed							
+CH	Group Data Input							
	PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0
+DH	Not Allowed							
+EH	Interrupt Setting							
	X	X	0	0	X	0	IS1	IS0
+FH	Not Allowed							
+10H	Interrupt Status							
	0	0	0	0	0	0	0	INTS0
+12H +	Not Allowed							
+1FH								

Oxx represents an output signal that will be read back here; Numbers in brackets [] represent input bit numbers.

- Note
- All access except to input group 0 to 7 (port +0 to +7) should be byte access.
 - Input by word access to input group 0 to 7 should be to I/O addresses that are multiples of 2 (+0, +2, +4, +6).
 - Input by double word access to input group 0 to 7 should be to I/O addresses that are multiples of 4 (+0, +4).

Figure 12. Input Port Assignments

Chapter 3. I/O Ports and Registers

Board I/O Address	D7	D6	D5	D4	D3	D2	D1	D0
+0H	Output Group 0							
	O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H	Output Group 1							
	O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H	Output Group 2							
	O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H	Output Group 3							
	O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H	Output Group 4							
	O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H	Output Group 5							
	O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H	Output Group 6							
	O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H	Output Group 7							
	O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
+8H	ACK Signal Setting							
	0	0	0	0	0	0	0	ACK
+9H	Not Allowed							
+AH	Bit Data							
	0	0	0	0	0	0	0	BDT
+BH	Bit Select							
	0	0	BS5	BS4	BS3	BS2	BS1	BS0
+CH	Group Data							
	PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0
+DH	Group Select							
	0	0	0	0	0	PS2	PS1	PS0
+EH	Interrupt Setting							
	0	0	0	0	0	0	IS1	IS0
+FH	Not Allowed							
+10H	Interrupt Mask Register							
	0	0	0	0	0	0	0	INTM0
+11H	Interrupt Clear Register							
	0	0	0	0	0	0	0	INTC0
+12H +1FH	Not Allowed							

Oxx represents an output signal;
Numbers in brackets [] represent
output bit numbers.

- Note
- All access except to output group 0 to 7 (port +0 to +7) should be byte access.
 - Output by word access from output group 0 to 7 should be from I/O addresses that are multiples of 2 (+0, +2, +4, +6).
 - Output by double word access from output group 0 to 7 should be from I/O addresses that are multiples of 4 (+0, +4).

Figure 13. Output Port Assignments

Input / Output Data by Direct Access to I/O Ports

Data Input

I/O address + 0H to + 7H input ports are used to read output channel data. The following table shows output channels and their corresponding input ports. For example, if channel O07 is ON, bit D7 of the I/O address + 0 port is read "1."

		D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Input Ports I/O Address	+0H	Input Group 0							
		O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H		Input Group 1							
		O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H		Input Group 2							
		O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H		Input Group 3							
		O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H		Input Group 4							
		O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H		Input Group 5							
		O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H		Input Group 6							
		O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H		Input Group 7							
		O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]

Oxx represents an output signal that will be read back here.

Figure 14. Input Port " I/O Address +0H ~ 7H "

Programming examples

The following programming examples check the input channel 007. If this channel is "ON" then program will continue. The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
DAT% = INPUT(PORT%)
IF (DAT% AND &H80) = &H80 THEN
  :
```

Microsoft C or C++ (MS-DOS version)

```
data_in = inp(port);
while(data_in & 0x80)
  :
```


Data Output

I/O address + 0H to + 7H output ports are used to output data. The following table shows the relationship of output channels and output ports. Setting an output bit of output ports to "1" will switch the corresponding output transistor to "ON". Resetting an output bit of output ports to "0" will switch the corresponding output transistor to "OFF".

	D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Output Ports I/O Address	Output Group 0							
	O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H	Output Group 1							
	O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H	Output Group 2							
	O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H	Output Group 3							
	O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H	Output Group 4							
	O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H	Output Group 5							
	O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H	Output Group 6							
	O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H	Output Group 7							
	O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]

Oxx represents an output signal of CN1 connector.

Figure 15. Output Port " I/O Address +0H ~ 7H "

Programming examples

The following programming examples turn the O47 output transistor to "ON". The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H04, &H80
```

Microsoft C or C++ (MS-DOS version)

```
outp(port + 0x04, 0x80) ;
```

Note!

When the PC is turned ON, all output ports are reset to "0."

Input / Output Data by Bit Number

PO-64L(CPCI) supports bit input / output function. Under this function, you can specify a bit number and output to this bit. The following figure shows the relations of bit numbers and their corresponding output ports.

		D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Input Ports I/O Address	+0H	Input Group 0							
		O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H		Input Group 1							
		O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H		Input Group 2							
		O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H		Input Group 3							
		O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H		Input Group 4							
		O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H		Input Group 5							
		O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H		Input Group 6							
		O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H		Input Group 7							
		O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
		Bit Data							
+AH		0	0	0	0	0	0	0	BDT

Oxx represents an output signal that will be read back here;
Numbers in brackets [] represent input bit numbers; BDT is input data.

Figure 16. Input Port " I/O Address +0H ~ 7H "
and " I/O Address +AH "

Chapter 3. I/O Ports and Registers

The following figure shows bit numbers and their corresponding output ports.

	D7	D6	D5	D4	D3	D2	D1	D0
Output Ports I/O Address	Output Group 0							
	O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H	Output Group 1							
	O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H	Output Group 2							
	O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H	Output Group 3							
	O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H	Output Group 4							
	O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H	Output Group 5							
	O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H	Output Group 6							
	O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H	Output Group 7							
	O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
Bit Data								
+AH	0	0	0	0	0	0	0	BDT
Bit Select								
+BH	0	0	BS5	BS4	BS3	BS2	BS1	BS0

Oxx represents an output signal; Numbers in brackets [] represent output bit numbers; BDT is output data.

Figure 17. Output Port " I/O Address +0H ~ 7H "
and " I/O Address +AH ~ BH "

Input a Bit Data

- (1) Select the bit number that you are going to input by outputting this bit number to an I/O address + BH output port, the Bit Select port. The bit numbers are from 0 to 63 (3FH).
- (2) Input this bit data from I/O address + AH input port, the Bit Data port. The BDT indicates the status of the specified bit signal.

Programming examples

The following programming examples input the bit [31] (1FH). The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H0B, &H1F
BDT% = INP(PORT% + &H0A)
```

Microsoft C or C++ (MS-DOS version)

```
outp(port + 0x0b, 0x1f) ;
bit_data = inp(port + 0x0a) ;
```

Output a Bit Data

- (1) Select the bit number that you are going to output by outputting this bit number to an I/O address + BH output port, the Bit Select port. The bit numbers are from 32 (20H) to 63 (3FH).
- (2) Output this bit data to an I/O address + AH output port, the Bit Data port. The BDT is the output data of the specified bit signal.

Programming examples

The following programming examples output "1" to bit [63] (3FH). The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H0B, &H3F
OUT PORT% + &H0A, &H01
```

Microsoft C or C++ (MS-DOS version)

```
outp(port + 0x0b, 0x3f) ;
outp(port + 0x0a, 0x01) ;
```

Note!

After the PC is turned ON, all output bits are reset to "0."

Input / Output Data by Group Number

PO-64L(CPCI) supports group input / output function. Under this function, you can specify a group number instead of the I/O port and then input from this port and then output to this port. The following figure shows group numbers and their corresponding output ports.

		D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Input Ports I/O Address	+0H	Input Group 0							
		O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H		Input Group 1							
		O17 [15]	O16 [14]	O51 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H		Input Group 2							
		O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H		Input Group 3							
		O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H		Input Group 4							
		O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H		Input Group 5							
		O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H		Input Group 6							
		O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H		Input Group 7							
		O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
+CH		Group Data							
		PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0

Oxx represents an output signal that will be read back here.
Numbers in brackets [] represent output bit numbers.

Figure 18. Input Port " I/O Address +0H ~ 7H "
and " I/O Address + CH "

Chapter 3. I/O Ports and Registers

The following figure shows group numbers and their corresponding output ports.

	D7	D6	D5	D4	D3	D2	D1	D0
Output Ports I/O Address	Output Group 0							
	O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
+1H	Output Group 1							
	O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
+2H	Output Group 2							
	O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
+3H	Output Group 3							
	O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
+4H	Output Group 4							
	O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
+5H	Output Group 5							
	O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
+6H	Output Group 6							
	O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
+7H	Output Group 7							
	O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]
+CH	Group Data							
	PD7	PD6	PD5	PD4	PD3	PD2	PD1	PD0
	Group Select							
+DH	0	0	0	0	0	PS2	PS1	PS0

Oxx represents an output signal; PS0 to PS2 specify an input or output group number.

Figure 19. Output Port " I/O Address +0H ~ 7H "
and " I/O Address +CH ~ DH "

Input a Group Data

- (1) Select the group number that you are going to input by outputting this group number to an I/O address + DH output port, the Group Select port. The group numbers are from 0 to 7.
- (2) Input this group data from an I/O address + CH input port, the Group Data port. The PD0 to PD7 represent the status of the specified group signals.

Programming examples

The following programming examples input data from input group 0. The "PORT%" and "port" are variables of I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H0D, &H00
GDT% = INP(PORT% + &H0C)
```

Microsoft C or C++ (MS-DOS version)

```
outp(port + 0x0d, 0x00) ;
group_data = inp(port + 0x0c) ;
```

Output a Group Data

- (1) Select the group number that you are going to output by outputting this group number to an I/O address + DH output port, the Group Select port. The group numbers are from 4 to 7.
- (2) Output this group data to an I/O address + CH output port, the Group Data port. The PD0 to PD7 are output data of the specified group, which represent the related output channels.

Programming examples

The following programming examples output "OFFH" to group 4. The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H0D, &H04
OUT PORT% + &H0C, &HFF
```

Microsoft C or C++ (MS-DOS version)

```
outp(port + 0x0d, 0x04) ;
outp(port + 0x0c, 0xff) ;
```

Note!

After the PC is turned ON, all output bits are reset to "0."

Output Monitor Data

This function allows you to read the last output data without affecting that data.

		D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Input Ports I/O Address	+0H	Input Group 0							
		O07 [7]	O06 [6]	O05 [5]	O04 [4]	O03 [3]	O02 [2]	O01 [1]	O00 [0]
	+1H	Input Group 1							
		O17 [15]	O16 [14]	O15 [13]	O14 [12]	O13 [11]	O12 [10]	O11 [9]	O10 [8]
	+2H	Input Group 2							
		O27 [23]	O26 [22]	O25 [21]	O24 [20]	O23 [19]	O22 [18]	O21 [17]	O20 [16]
	+3H	Input Group 3							
		O37 [31]	O36 [30]	O35 [29]	O34 [28]	O33 [27]	O32 [26]	O31 [25]	O30 [24]
	+4H	Input Group 4							
		O47 [39]	O46 [38]	O45 [37]	O44 [36]	O43 [35]	O42 [34]	O41 [33]	O40 [32]
	+5H	Input Group 5							
		O57 [47]	O56 [46]	O55 [45]	O54 [44]	O53 [43]	O52 [42]	O51 [41]	O50 [40]
	+6H	Input Group 6							
		O67 [55]	O66 [54]	O65 [53]	O64 [52]	O63 [51]	O62 [50]	O61 [49]	O60 [48]
	+7H	Input Group 7							
		O77 [63]	O76 [62]	O75 [61]	O74 [60]	O73 [59]	O72 [58]	O71 [57]	O70 [56]

Figure 20. Input Port " I/O Address + 0H ~ 7H "

Input from an I/O Port

To monitor output data, you can read it as it is being output from the output port.

Programming examples

The following programming examples output data AAH to I/O address + 4H output port and then read it from I/O address + 4H input port to confirm the output data. The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT%+&H04, &HAA
MDT% = INP(PORT% + &H04)
```

Microsoft C or C++ (MS-DOS version)

```
outp(port+0x04, 0xaa);
m_data = inp(port + 0x04);
```


Confirm an Output Bit

Refer to the section "Input / Output Data by Bit Number."

Monitor Output Data by Port Number

Refer to the section "Input / Output Data by Group Number."

Handshake of Input Channel 0 to 15

Under this function, to issue an external STB signal will write output data to external device registers through channel 0 to 15. If you set the interrupt event for handshake function, rising edge of ACK signal can generate an interrupt signal. An STB signal can be issued through software commands. By using these STB and ACK signals, you can then handshake with external circuits.

Note!

Outputting a hexadecimal data 0F0H to I/O address + 8H port will reset (initial) the handshake function.

	D7	D6	D5	D4	D3	D2	D1	D0
Input ports	Handshake Status Input							
I/O Address +8H	x	x	x	x	INT	IBF	STB	ACK

	D7	D6	D5	D4	D3	D2	D1	D0
Output ports	ACK Signal Setting							
I/O Address +8H	0	0	0	0	0	0	0	ACK

Figure 21. I/O Port Assignment of Handshake Function

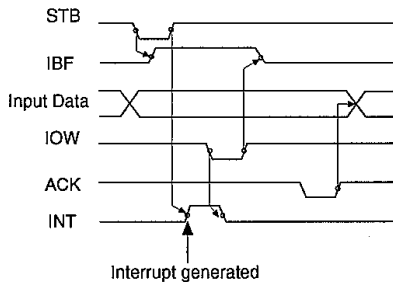


Figure 22. Write Timing for Handshake Function

Programming examples

The following programming examples input a latched data by checking the INT status of the handshake status register. The "PORT%" and "port" are sample I/O addresses.

BASIC (MS-DOS version)

```
OUT PORT% + &H08, &HF0
                                'INITIALIZE HANDSHAKE FUNCTION
OUT PORT% + &H04, DAT%         'OUTPUT DATA
OUT PORT% + &H08, 0             'OUTPUT STB SIGNAL
OUT PORT% + &H08, 1
WHILE((INP(PORT% + &H08) AND &H08) = 0)
                                'INPUT STATUS REGISTER
WEND                             'CHECK INT STATUS
```

Microsoft C or C++ (MS-DOS version)

```
#include<stdio.h >
void main(void)
{
    int dat;

    outp(port + 0x08, 0xf0) ;
                                /* initialize handshake function */
    outp (port + 0x04, dat) ;    /* output data */
    outp (port + 0x08, 0) ;     /* output STB signal */
    outp (port + 0x08, 1) ;
    while(!(inp(port + 0x08) & 0x08)) ;
                                /* Checking INT status */
}
```

Interrupt Control Function

If the No.1-2 pins of JP1 is jumped as "Using Interrupt", the hand-shake signal (STB signal), can generate an interrupt request signal.

	D7	D6	D5	D4	D3	D2	D1	D0
Input ports	Interrupt Setting							
I/O Address +EH	x	x	0	0	x	0	IS1	IS0

	D7	D6	D5	D4	D3	D2	D1	D0
I/O Address +11H	Interrupt Status							
	0	0	0	0	0	0	0	INTS0

Figure 23. Input Port Assignment of Interrupt Function

	D7	D6	D5	D4	D3	D2	D1	D0
Output ports	Interrupt Setting							
I/O Address +EH	0	0	0	0	0	0	IS1	IS0

	D7	D6	D5	D4	D3	D2	D1	D0
I/O Address +10H	Interrupt Mask Register							
	0	0	0	0	0	0	0	INTM0

	D7	D6	D5	D4	D3	D2	D1	D0
I/O Address +11H	Interrupt Clear Register							
	0	0	0	0	0	0	0	INTC0

Figure 24. Output Port Assignment of Interrupt Function

Set Interrupt Events

You use the Interrupt Setting output port to set handshake events. The handshake event can be connected to any of the internal signal INTa.

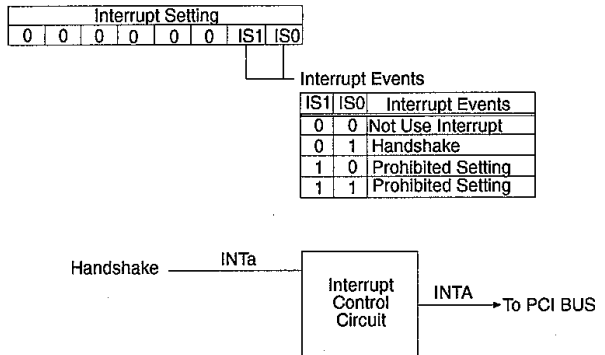


Figure 25. Explanation of Interrupt Setting Register

Interrupt Event Masking

PO-64L(CPCI) uses I/O address + 10H output port for masking. Setting a bit to "1" will mask the related event from generating an unwanted interrupt request.

For example, if you set the handshake signal as an interrupt event and you set INTM0 to "1" from I/O address + 11H, then handshake signal will not generate an interrupt request but set the INTS0 of interrupt status register. The relationship of interrupt events "INTa" and interrupt masking bits is as following:

INTa : INTM0

Note!

After power on, these two ports are reset as all "1".

Interrupt Status Register

PO-64L(CPCI) connects only one interrupt request signal to the CompactPCI bus, the INTA bus signal.

Interrupt events and their corresponding interrupt status are shown below:

INTa : INTS0

Check Interrupt Setting

You can check what you have set for the interrupt setting register by reading the I/O address + 0EH input port.

Clear Interrupt Request Signal

The interrupt of the CompactPCI bus uses a level trigger instead an edge trigger, which is used by the ISA bus. Therefore, the arrival of an interrupt request means that the INTA has been assigned to low. If you do not clear this request signal, the CPU will respond to this interrupt request repeatedly. To avoid this kind of malfunctioning in your interrupt handler program, you must clear the interrupt request signal before you enable the interrupt. For PO-64L(CPCI), you can use the Interrupt Clear output port for this purpose. For example, if the INTS0 is "1" in the Interrupt Status register of your interrupt handler program, INTa will generate an interrupt request. Setting the INTC0 to "1" by output to the Interrupt Clear port will clear this INTS0 interrupt request to enable the next interrupt.

INTa : INTC0

Programming example

The following sample program is part of a sample interrupt handler program. The "port" is sample I/O address.

Microsoft C or C++ (MS-DOS version)

```
_disable() ;
n = inp(port + 0x11) & 0x0f ;
/*Find out which event(s) has/have requested interrupt.*/
out(port + 0x11, n) ;
/*Clear interrupt request signal.*/
.
.
/* Service the interrupt request.*/
.
_enable() ;
```

Chapter 4. System Reference

Block Diagram

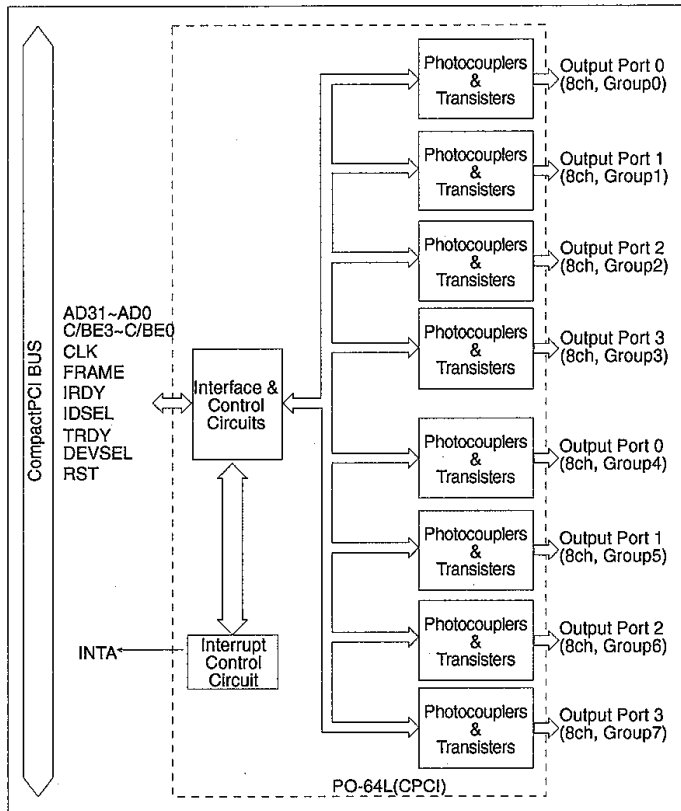


Figure 26. Block Diagram

Specifications

Table 1. lists the chief specifications of this board.

Table 1. Specifications

Item		Specification
Output	Type	Opto - Isolated open collector current - sink (Negative logic) 16 channels share a positive common and a negative common
	Voltage	35VDC (Max.)
	Current	100mA max. per a channel 2A max. per a common
	Number of channels	64 channels
	Throughput	1 ms (Max.)
I/O address		Any 32-byte boundary
Isolated voltage		1000Vrms
Boards in one system		Maximum of 16 boards can be install in a same system.
External power supply		12 to 24 VDC (+/- 15%) Note: 4mA/12V to 8mA/24V per input channel
Power consumption		5 VDC 300mA (Max.)
Operating condition		0 to 50°C, 20% to 90% (not condensing)
Connecting distance		50m (Typical) (depending on wiring environment)
Dimension		3U4HP
Weight		160g

Chapter 5. Troubleshooting

If you are having trouble with your board or program, first answer the following questions to see if you can find the problem.

QUESTIONS:

STEPS TO TAKE:

Is the pilot light on?

The system must be turned on and the power supply must be working. Check the main power switch and the power supply.

Did the system boot up?

If the board is installed and the system did not boot up, check the following:

- Make sure that the board is plugged in firmly.
- Can you boot up if you chose not to use the interrupt?

Does your program work?

If the system booted and your program does not work, check the following:

- Try one of the programs provided on disk and see if it works.
- Check the board address of your program.
- Check your interrupt handler program.

Does the sample program work?

Check the following:

- Try it with only the PO-64L(PCI) board installed.
- Make sure that input signals are connected to the right pins.
- Make sure that output signals are recalled back correctly.
- Pin connections on the I/O cables are secure.

Note!

Before you call, please make a list of the following information. Our technical representatives will need the following information to help you.

1. Your name, company, and phone number.
2. The brand and type of computer you are using
3. OS and Version (e.g. DOS Ver.6.2)
4. Name of the CONTEC board that you are using.
5. Names of other boards in the computer.
6. The programming language that you are using (and the version number).
7. Are you using your own program or a CONTEC sample program?
8. List AUTOEXEC.BAT.
9. List CONFIG.SYS.

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CONTEC Group

- JAPAN : Headquarters
CONTEC Co., LTD.
3-9-31, Himesato, Nishiyodogawa-ku, Osaka 555-0025, Japan
Tel : +81 (6) 6477-5219 Fax : +81 (6) 6477-1692
E-mail : intsales@osaka.contec.co.jp
- U.S.A. : CONTEC MICROELECTRONICS U.S.A. INC.
744 South Hillview Drive, Milpitas, CA 95035 U.S.A.
Tel : +1 (408) 719-8200 Fax : +1 (408) 719-6750
E-mail : tech_support@contecusa.com
- EUROPE : CONTEC MICROELECTRONICS EUROPE B.V.
Binnenweg 4, 2132 CT, Hoofddorp, The Netherlands
Tel : +31 (23) 567-3030 Fax : +31 (23) 567-3035
E-mail : tech_support@conteceu.nl
- KOREA : HYOJIN CONTEC Co., LTD.
Ki-im Bldg. #399, Shindolim-Dong, Kuro-ku, Seoul, Korea
Tel : +82 (2) 2636-4277/8 Fax : +82 (2) 2636-4279
E-mail : product@conteck.com
- CHINA : INTERNATIONAL CONTEC TECHNOLOGY CO., LTD.
B-8F, Hua Tong Building, No. B19, Che Gong Zhuang West Road,
Hai Dian District, Beijing 100044, China
Tel : +86(10)8801-8228 Fax : +86 (10)8801-8209
E-mail : ict@ict.com.cn
- SHANGHAI CONTEC MICROELECTRONICS CORP.
No. 481 Gui Ping Road, Cao He Jing Hi-Tech Park Shanghai, 200233, China
Tel : +86 (21) 6485-1907 Fax : +86 (21) 6485-0330
E-mail : contec@contec.com.cn
- SHENYANG CONTEC MICROELECTRONICS Co., LTD.
No. 169, Qingnian Street, Shenhe District, Shenyang 110015, China
Tel : +86 (24) 2392-9771 Fax : +86 (24) 2392-9773
- TAIWAN : MACROMATE CORP.
8F, Universal Center, No.179, Ta-Tung Rd., Sec.1 Hsi-Chih, Taipei Hsien, Taiwan,
R.O.C
Tel : +886 (2) 2647-9353 Fax : +886 (2) 2647-9373
E-mail : intl@macromate.com.tw