Bi-Directional Digital I/O
Board for PCI Express Low Profile

DIO-96D-LPE

This product is a PCI Express bus-compliant interface board that extends the input/output function of bi-directional digital signal. This board has up to 96 unisolated LVTTL-level input/output channels that is powered by the equivalence to the mode 0 of i8255 chips, and you can use up to 96 channels of the input signals as interrupt inputs. You can select the input/output by the application software in eight signals units (in four signals unit for some inputs/outputs). Additionally, the digital filter function is equipped with this product.
Windows/Linux driver is bundled with this product.
Using the dedicated library VI-DAQ makes it possible to create each application for LabVIEW.

* Specifications, color and design of the products are subject to change without notice.

Features

This board can be used to input/output 96 points bi-directional digital corresponding to to the equivalence to the i8255 mode 0.

This board has up to 96 unisolated LVTTL-level input/output channels whose response speed is 200□sec that is powered by to the equivalence to the mode 0 of i8255 device for general-purpose. You can select the input/output by the application software in eight signals units (in four signals unit for some inputs/outputs).

You can use up to 96channels of the input signals as interrupt events.

You can use up to 96channels of the input signals as interrupt events and also disable or enable the interrupt in bit units and select the edge of signals, at which to generate an interrupt.

- This product has a digital filter function to prevent wrong recognition of input signals from carrying noise or a chattering.

This product has a digital filter function to prevent wrong recognition of input signals by noise or chattering is provided. All input terminals can be added a digital filter, and the setting can be performed by software.

Windows/Linux compatible driver libraries are attached.

Using the attached driver library API-PAC(W32) makes it possible to create applications of Windows/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

Support for both of Low Profile and standard size slots

Support for both of Low Profile and standard size slots (interchangeable with a bundled bracket).

Functions and connectors are compatible with PCI compatible board DIO-96D2-LPCI.

The functions same with PCI compatible board DIO-96D2-LPCI are provided. In addition, as there is compatibility in terms of connector shape and pin assignments, it is easy to migrate from the existing system.

LabVIEW is supported by a plug-in of dedicated library VI-DAQ.

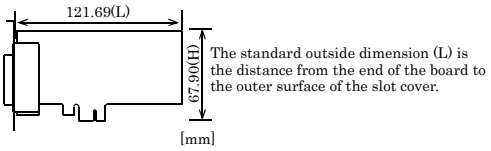
Using the dedicated library VI-DAQ makes it possible to create each application for LabVIEW.

Specification

Item		Specification
I/O		
	I/O format	Unisolated LVTTL-level I/O (Positive logic)
	Number of I/O channels	96 channels (all available for interrupts)
	Interrupt	96 interrupt input signals are arranged into a single output of interrupt signal INT. An interrupt is generated at the falling edge (HIGH-to-LOW transition) or rising edge (LOW-to-HIGH transition).
	Response time	200nsec within
	Rated output current	I_{OL}=8mA(Max.) I_{OH}=-8mA(Max.)
Common		
	I/O address	Any 32-byte boundary (Common to I/O part)
	Power consumption (Max.)	3.3VDC 300mA
	Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
	Allowable distance of signal extension	Approx. 1.5m (depending on wiring environment)
	Bus specification	PCI Express Base Specification Rev. 1.0a x1
	Dimension (mm)	121.69(L) x 67.90(H)
	Connector	68 pin 0.8mm pitch connector x 2 HDRA-E68W1LFDT+ [mfd. by HONDA TSUSHIN KOGYO CO., LTD.] or equivalent to it
	Weight	60g
Certification		VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*1 Data "0" and "1" correspond to the High and Low levels, respectively.

Board Dimensions



Support Software

Windows version of digital I/O driver API-DIO(WDM)

The API-DIO(98/PC) is the Windows version driver library software that provides products in the form of Win32 API functions (DLL). Various sample programms such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.
You can download the updated version from the CONTEC's Web site. For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Linux version of digital I/O driver API-DIO(LNX)

The API-DIO(LNX) is the Linux version driver software which provides device drivers (modules) by shared library and kernel version. Various sample programs of gcc are provided.
You can download the updated version from the CONTEC's Web site. For more details on the supported OS, applicable language and new information, please visit the CONTEC's Web site.

Data acquisition VI library for LabVIEW VI-DAQ

This is a VI library to use in National Instruments LabVIEW. VI-DAQ is created with a function form similar to that of LabVIEW's Data Acquisition VI, allowing you to use various devices without complicated settings.

Cable & Connector

Cable(Option)

Cable with 68-Pin D-sub Connector at either Ends (Mold Type)
: PCB68PS-0.5P (0.5m)
: PCB68PS-1.5P (1.5m)

Shield Cable with One 68-Pin Connector
: PCA68PS-0.5P (0.5m)
: PCA68PS-1.5P (1.5m)

Shielded Cable for CardBusDigital I/O Card
: DIO-68M/96F (0.5m)

* If using both the CNA and CNB connectors, two cable sets are required.

Accessories

Accessories (Option)

Screw Terminal Unit (M3 x 68P) : EPD-68A *1*3
Screw Terminal Unit (M3 x 96P) : EPD-96A *2*3
Screw Terminal Unit (M3.5 x 96P) : EPD-96 *2
Terminal Unit for Cables (M2.5 x 96P) : DTP-64A *2

*1 PCB68PS-0.5P or PCB68PS-1.5P optional cable is required separately.
*2 DIO-68M/96F optional cable is required separately.
*3 "Spring-up" type terminal is used to prevent terminal screws from falling off.
*4 If using both the CNA and CNB connectors, two each of the accessories and cable sets are required.

* Check the CONTEC's Web site for more information on these options.

Packing List

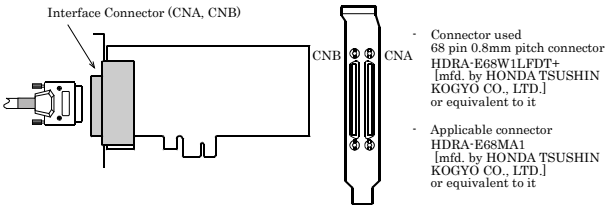
Board [DIO-96D-LPE] …1
First step guide … 1
Disk *1 [API-PAC(W32)] …1
Standard-sized bracket …1
Serial number label…1
Product Registration Card & Warranty Certificate…1

*1 The Disk contains the driver software and User's Guide.

How to connect the connectors

Connecting a Device to a Connector

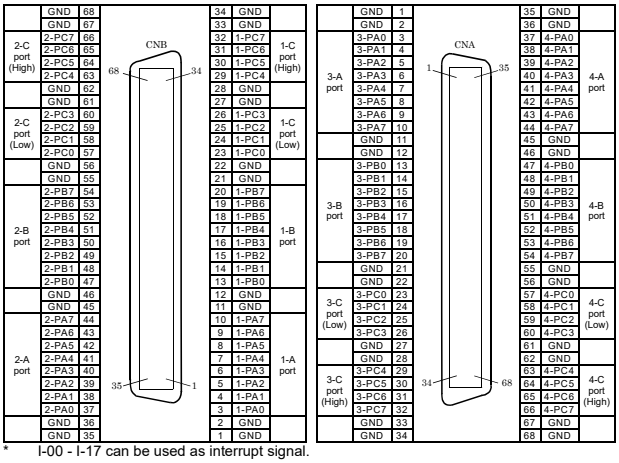
The on-board interface connector (CNA, CNB) is used when connecting this product and the external devices.



* Please refer to page 2 for more information on the supported cable and accessories.

Connector Pin Assignment

Pin Assignments of Interface Connector (CNA, CNB)



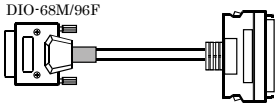
	GND	68	34	GND			
	GND	67	33	GND			
2-C port (High)	2-PC7	66	32	1-PC7	1-C port (High)		
	2-PC6	65	31	1-PC6			
	2-PC5	64	30	1-PC5			
	2-PC4	63	29	1-PC4			
	GND	62	28	GND			
	GND	61	27	GND			
2-C port (Low)	2-PC3	60	26	1-PC3	1-C port (Low)		
	2-PC2	59	25	1-PC2			
	2-PC1	58	24	1-PC1			
	2-PC0	57	23	1-PC0			
	GND	56	22	GND			
	GND	55	21	GND			
2-B port	2-PB7	54	20	1-PB7	1-B port		
	2-PB6	53	19	1-PB6			
	2-PB5	52	18	1-PB5			
	2-PB4	51	17	1-PB4			
	2-PB3	50	16	1-PB3			
	2-PB2	49	15	1-PB2			
	2-PB1	48	14	1-PB1			
	2-PB0	47	13	1-PB0			
	GND	46	12	GND			
	GND	45	11	GND			
2-A port	2-PA7	44	10	1-PA7	1-A port		
	2-PA6	43	9	1-PA6			
	2-PA5	42	8	1-PA5			
	2-PA4	41	7	1-PA4			
	2-PA3	40	6	1-PA3			
	2-PA2	39	5	1-PA2			
	2-PA1	38	4	1-PA1			
	2-PA0	37	3	1-PA0			
	GND	36	2	GND			
	GND	35	1	GND			

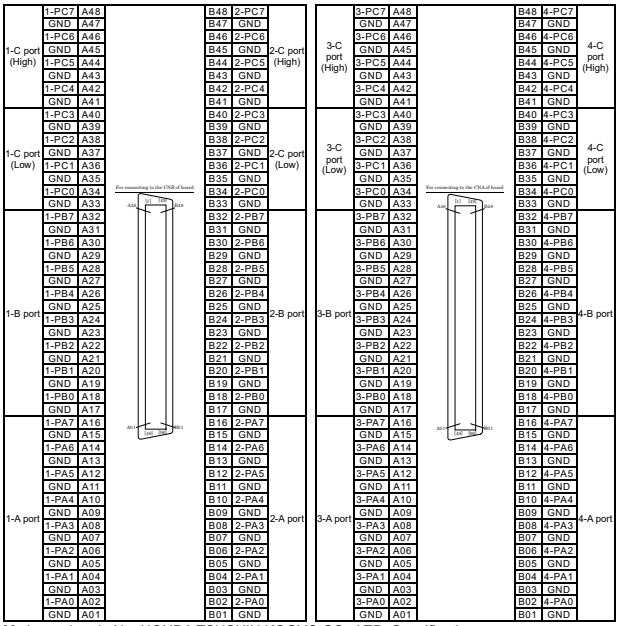
	GND	1	35	GND			
	GND	2	36	GND			
3-A port	3-PA0	3	37	4-PA0	4-A port		
	3-PA1	4	38	4-PA1			
	3-PA2	5	39	4-PA2			
	3-PA3	6	40	4-PA3			
	3-PA4	7	41	4-PA4			
	3-PA5	8	42	4-PA5			
	3-PA6	9	43	4-PA6			
	3-PA7	10	44	4-PA7			
	GND	11	45	GND			
	GND	12	46	GND			
3-B port	3-PB0	13	47	4-PB0	4-B port		
	3-PB1	14	48	4-PB1			
	3-PB2	15	49	4-PB2			
	3-PB3	16	50	4-PB3			
	3-PB4	17	51	4-PB4			
	3-PB5	18	52	4-PB5			
	3-PB6	19	53	4-PB6			
	3-PB7	20	54	4-PB7			
	GND	21	55	GND			
	GND	22	56	GND			
3-C port (Low)	3-PC0	23	57	4-PC0	4-C port (Low)		
	3-PC1	24	58	4-PC1			
	3-PC2	25	59	4-PC2			
	3-PC3	26	60	4-PC3			
	GND	27	61	GND			
	GND	28	62	GND			
3-C port (High)	3-PC4	29	63	4-PC4	4-C port (High)		
	3-PC5	30	64	4-PC5			
	3-PC6	31	65	4-PC6			
	3-PC7	32	66	4-PC7			
	GND	33	67	GND			
	GND	34	68	GND			

* I-00 - I-17 can be used as interrupt signal.

1-PA0 - 4-PC7	96 I/O signal pins. Connect signals from the external device to these pins.
GND	Connected to slot GND

Pin assignments for connecting to the DIO-68M/96F used





1-C port (High)	1-PC7	A48	B48	2-PC7	2-C port (High)		
	GND	A47	B47	GND			
	1-PC6	A46	B46	2-PC6			
	GND	A45	B45	GND			
	1-PC5	A44	B44	2-PC5			
	GND	A43	B43	GND			
	1-PC4	A42	B42	2-PC4			
	GND	A41	B41	GND			
1-C port (Low)	1-PC3	A40	B40	2-PC3	2-C port (Low)		
	GND	A39	B39	GND			
	1-PC2	A38	B38	2-PC2			
	GND	A37	B37	GND			
	1-PC1	A36	B36	2-PC1			
	GND	A35	B35	GND			
	1-PC0	A34	B34	2-PC0			
	GND	A33	B33	GND			
1-B port	1-PB7	A32	B32	2-PB7	2-B port		
	GND	A31	B31	GND			
	1-PB6	A30	B30	2-PB6			
	GND	A29	B29	GND			
	1-PB5	A28	B28	2-PB5			
	GND	A27	B27	GND			
	1-PB4	A26	B26	2-PB4			
	GND	A25	B25	GND			
	1-PB3	A24	B24	2-PB3			
	GND	A23	B23	GND			
	1-PB2	A22	B22	2-PB2			
	GND	A21	B21	GND			
	1-PB1	A20	B20	2-PB1			
	GND	A19	B19	GND			
	1-PB0	A18	B18	2-PB0			
	GND	A17	B17	GND			
1-A port	1-PA7	A16	B16	2-PA7	2-A port		
	GND	A15	B15	GND			
	1-PA6	A14	B14	2-PA6			
	GND	A13	B13	GND			
	1-PA5	A12	B12	2-PA5			
	GND	A11	B11	GND			
	1-PA4	A10	B10	2-PA4			
	GND	A09	B09	GND			
	1-PA3	A08	B08	2-PA3			
	GND	A07	B07	GND			
	1-PA2	A06	B06	2-PA2			
	GND	A05	B05	GND			
	1-PA1	A04	B04	2-PA1			
	GND	A03	B03	GND			
	1-PA0	A02	B02	2-PA0			
	GND	A01	B01	GND			

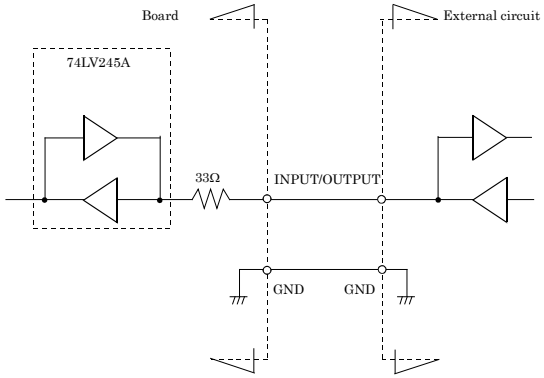
3-C port (High)	3-PC7	A48	B48	4-PC7	4-C port (High)		
	GND	A47	B47	GND			
	3-PC6	A46	B46	4-PC6			
	GND	A45	B45	GND			
	3-PC5	A44	B44	4-PC5			
	GND	A43	B43	GND			
	3-PC4	A42	B42	4-PC4			
	GND	A41	B41	GND			
3-C port (Low)	3-PC3	A40	B40	4-PC3	4-C port (Low)		
	GND	A39	B39	GND			
	3-PC2	A38	B38	4-PC2			
	GND	A37	B37	GND			
	3-PC1	A36	B36	4-PC1			
	GND	A35	B35	GND			
	3-PC0	A34	B34	4-PC0			
	GND	A33	B33	GND			
3-B port	3-PB7	A32	B32	4-PB7	4-B port		
	GND	A31	B31	GND			
	3-PB6	A30	B30	4-PB6			
	GND	A29	B29	GND			
	3-PB5	A28	B28	4-PB5			
	GND	A27	B27	GND			
	3-PB4	A26	B26	4-PB4			
	GND	A25	B25	GND			
	3-PB3	A24	B24	4-PB3			
	GND	A23	B23	GND			
	3-PB2	A22	B22	4-PB2			
	GND	A21	B21	GND			
	3-PB1	A20	B20	4-PB1			
	GND	A19	B19	GND			
	3-PB0	A18	B18	4-PB0			
	GND	A17	B17	GND			
3-A port	3-PA7	A16	B16	4-PA7	4-A port		
	GND	A15	B15	GND			
	3-PA6	A14	B14	4-PA6			
	GND	A13	B13	GND			
	3-PA5	A12	B12	4-PA5			
	GND	A11	B11	GND			
	3-PA4	A10	B10	4-PA4			
	GND	A09	B09	GND			
	3-PA3	A08	B08	4-PA3			
	GND	A07	B07	GND			
	3-PA2	A06	B06	4-PA2			
	GND	A05	B05	GND			
	3-PA1	A04	B04	4-PA1			
	GND	A03	B03	GND			
	3-PA0	A02	B02	4-PA0			
	GND	A01	B01	GND			

[ ] shows the pin No. HONDA TSUSHIN KOGYO CO., LTD. Specification.

Connecting I/O Signals

The I/O circuits of interface blocks of the DIO-96D-LPE are illustrated in the below Figure. Signals are LVTTL-levels and positive logic. Each of the signal is pulled up.

I/O Circuit

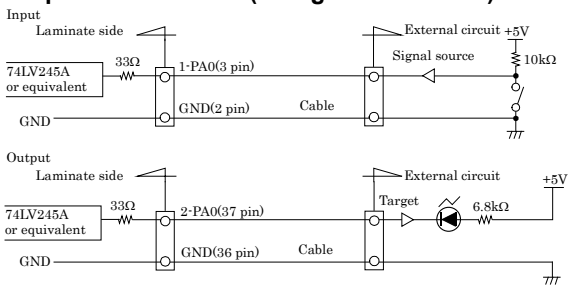


⚠ CAUTION

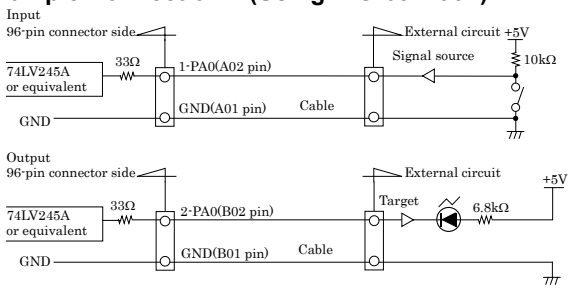
Take care not to short the outputs to digital ground as this may cause a fault.

If connecting pull-up resistors to the outputs, use a resistor of approximately 10kΩ and pull-up to the 5V power supply.

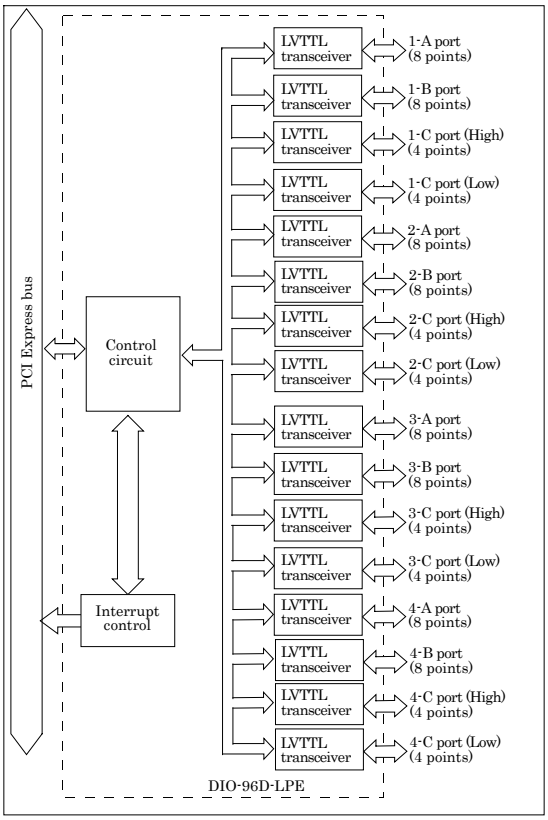
Example Connection 1 (Using PCA68PS-**P)



Example Connection 2 (Using DIO-68M/96F)



Block Diagram



Difference from DIO-96D2-LPCI

The functions same with conventional product of DIO-96D2-LPCI are provided with the DIO-96D-LPE. In addition, as there is compatibility in terms of connector shape and pin assignments, it is easy to migrate from the existing system. So you can use the same operating procedures as DIO-96D2-LPCI.

There are some differences in specifications as shown below.

	DIO-96D2-LPCI	DIO-96D-LPE
I/O	Unisolated TTL-level I/O (Positive logic)	Unisolated LVTTL-level I/O (Positive logic)
Rated output current	I_{OL}=24mA(Max.) I_{OH}=-15mA(Max.)	I_{OL}=8mA(Max.) I_{OH}=-8mA(Max.)
Power consumption	5VDC 950mA(Max.)	3.3VDC 300mA(Max.)
Bus specification	32-bit, 33MHz, Universal key shapes supported (The 5V pin on the bus must supply 5V.)	PCI Express Base Specification Rev. 1.0a x1
Dimension (mm)	121.69(L) x 63.41(H)	121.69(L) x 67.90(H)