Digital Output Board with Opto-Isolation for PCI Express
DO-128L-PE

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

This product is a PCI Express bus-compliant interface board used to provide a digital signal Output function on a PC.

This product can output digital signals at 12 - 24VDC.

This product features 128 Optocoupler isolated open-collector outputs. In addition, output transistor protection circuit (surge voltage protection and overcurrent protection).

Windows/Linux drivers are available.

Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

*The contents in this document are subject to change without notice.
*Visit the CONTEC website to check the latest details in the document.
*The information in the data sheets is as of December, 2022.

Features

Optocoupler isolated open-collector outputs (current sink type)
This product has the 128 channels of Optocoupler isolated open-collector output (current sink type) whose response speed is 200µsec. Common terminal provided per 16channels, capable of supporting a different external power supply. Supporting driver voltages of 12 - 24 VDC for I/O.

Optocoupler bus isolation
As the PC is isolated from the input and output interfaces by Optocoupler, this product has excellent noise performance.

Windows/Linux drivers are available.
By using the digital I/O driver, each Windows/Linux application can be created. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

Output circuits include zener diodes for surge voltage protection and poly-switches for overcurrent protection.
Zener diodes are connected to the output circuits to protect against surge voltages. Similarly, polyswitches are fitted to each group of 8 channels outputs for over-current protection. Output rating : max 35VDC, 100mA per pin.

Functions and connectors are compatible with PCI compatible board PO-128L(PCI)H.
The functions same with PCI compatible board PO-128L(PCI)H 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 make a LabVIEW application.

Included Items

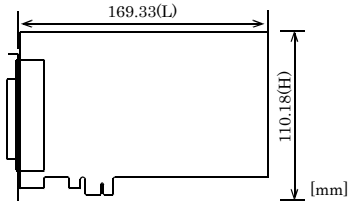
Board (DO-128L-PE) ...1
Setup Guide ... 1
Warranty Certificate ...1
Serial Number Label ...1

Specification

Item		Specification
Output		
Output format		Optocoupler isolated open-collector output (current sink type)(Negative logic *1)
Number of output signal channels		128 channels (1 common per 16 channels unit)
Output rating	Output voltage	35VDC (Max.)
	Output current	100mA (par 1 channel) (Max.)
Residual voltage with output on		0.5V or less (Output current≤50mA), 1.0V or less (Output current≤100mA)
Surge protector		Zener diode RD47FM(NEC) or equivalent to it
Response time		Within 200µsec
Common		
Allowable distance of signal extension		Approx. 50m (depending on wiring environment)
I/O address		Any 32-byte boundary
Interruption level		Not used
Max. board count for connection		16 boards including the master board
Isolated Power		250Vrms
External circuit power supply		12 - 24VDC(±10%)
Power consumption (Max.)		3.3VDC 600mA
Operating condition		0 - 50°C, 10 - 90%RH (No condensation)
Bus specification		PCI Express Base Specification Rev. 1.0a x1
Dimension (mm)		169.33(L) x 110.18(H)
Connector		100 pin 0.8mm pitch connector [F (female) type] x 2 HDRA-E100W1LFDT1EC-SL+[HONDA TSUSHIN KOGYO CO., LTD.] or equivalent to it
Weight		215g
Standard		VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*1 Data "0" corresponds at the High level and data "1" correspond at the Low level.

Board Dimensions



The standard outside dimension (L) is the distance from the end of the board to the outer surface of the slot cover.

Support Software

The name of the documents	Contents	How to get
Digital I/O Driver software API-DIO(WDM)	Driver software of digital input and output for Windows.	Download (ZIP)
Digital I/O Driver software API-DIO(LNX)	Driver software of digital input and output for Linux.	Download (tgz)
LabVIEW-support data acquisition library DAQfast for LabVIEW	This is a data collection library to use in the LabVIEW by National Instruments. With Polymorphic VI, our design enables a LabVIEW user to operate seamlessly. Our aim is that the customers to perform easily, promptly what they wish to do.	Download (ZIP)

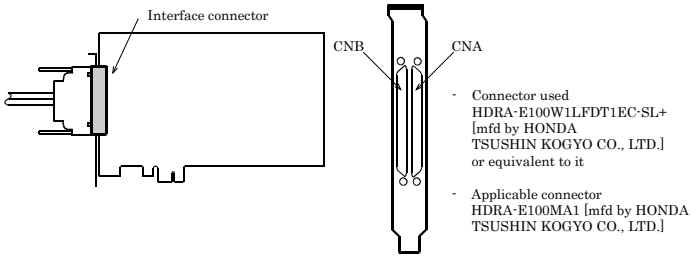
Optional Products

Item	Model	Description
Cable *1	PCB100PS-0.5 (0.5m) PCB100PS-1.5 (1.5m) PCB100PS-3 (3m) PCB100PS-5 (5m)	Shielded Cable With Two 100pin Connector
	PCB100/96PS-1.5 (1.5m) PCB100/96PS-3 (3m) PCB100/96PS-5 (5m)	Connection Conversion Shield Cable (100P→96P)
	PCA100P-1.5 (1.5m) PCA100P-3 (3m)	Flat Cable with One 100-Pin Connector
	PCB100WS-1.5 (1.5m) PCB100WS-3 (3m) PCB100WS-5 (5m)	Connection Conversion Shield Cable (100P→37P D-SUB x 2)
Accessories	EPD-100A *2*4*7	Screw Terminal Unit (M3 x 100P)
	EPD-96A *2*5*7	Screw Terminal Unit (M3 x 96P)
	EPD-96 *2*5	Screw Terminal Unit (M3.5 x 96P)
	DTP-64A *2*5	Terminal Unit for Cables (M3 x 96P)
	CCB-96 *2*5	Connector Conversion card (96-Pin→37-Pin x 2)
	EPD-37A *3*6*7	Screw Terminal Unit (M3 x 37P)
	EPD-37 *3*6	Screw Terminal Unit (M3.5 x 37P)
	DTP-3C *3*6	General Purpose Terminal (M3 x 37P)
	DTP-4C *3*6	Screw Terminal (M2.6 x 37P)
	CM-64L *2*5	Signal Monitor / Output Accessory for Digital I/O (64P)
	CM-32L *3*6	Signal Monitor for Digital I/O

*1 If using both the CNA and CNB connectors, two cable sets are required.
*2 If using both the CNA and CNB connectors, two each of the terminal block and cable sets are required.
*3 If using both the CNA and CNB connectors, two cable sets are required. You will also require sufficient terminal blocks for the number of I/O points you are using.
*4 PCB100PS optional cable is required separately.
*5 PCB100/96PS optional cable is required separately.
*6 PCB100WS optional cable is required separately.
*7 "Spring-up" type terminal is used to prevent terminal screws from falling off.

Using the On-board Connectors

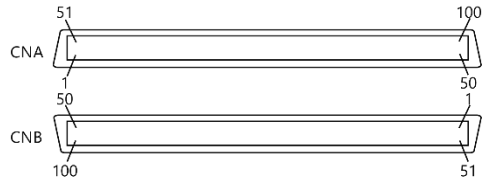
Connecting a Device to a Connector



- Connector used
HDRA-E100W1LFDT1EC-SL+
[mfd by HONDA
TSUSHIN KOGYO CO., LTD.]
or equivalent to it

- Applicable connector
HDRA-E100MA1 [mfd by HONDA
TSUSHIN KOGYO CO., LTD.]

Connector Pin Assignment



CNB						CNA					
Function	Signal Name	Pin No.	Pin No.	Signal Name	Function	Function	Signal Name	Pin No.	Pin No.	Signal Name	Function
Common plus pin for +E/+F output ports	P-E/F	100	50	P-A/B	Common plus pin for +A/+B output ports	Common minus pin for +0/+1 output ports	N-0/1	1	51	N-4/5	Common minus pin for +4/+5 output ports
	P-E/F	99	49	P-A/B			N-0/1	2	52	N-4/5	
+F port (Output)	O-F7	98	48	O-B7	+B port (Output)		N-0/1	3	53	N-4/5	
	O-F6	97	47	O-B6			N-0/1	4	54	N-4/5	
	O-F5	96	46	O-B5			N-0/1	5	55	N-4/5	
	O-F4	95	45	O-B4			N-0/1	6	56	N-4/5	
	O-F3	94	44	O-B3		+0 port (Output)	O-00	7	57	O-40	+4 port (Output)
	O-F2	93	43	O-B2			O-01	8	58	O-41	
	O-F1	92	42	O-B1			O-02	9	59	O-42	
	O-F0	91	41	O-B0			O-03	10	60	O-43	
+E port (Output)	O-E7	90	40	O-A7	+A port (Output)		O-04	11	61	O-44	
	O-E6	89	39	O-A6			O-05	12	62	O-45	
	O-E5	88	38	O-A5			O-06	13	63	O-46	
	O-E4	87	37	O-A4			O-07	14	64	O-47	
	O-E3	86	36	O-A3		+1 port (Output)	O-10	15	65	O-50	+5 port (Output)
	O-E2	85	35	O-A2			O-11	16	66	O-51	
	O-E1	84	34	O-A1			O-12	17	67	O-52	
	O-E0	83	33	O-A0			O-13	18	68	O-53	
Common minus pin for +E/+F output ports	N-E/F	82	32	N-A/B	Common minus pin for +A/+B output ports		O-14	19	69	O-54	
	N-E/F	81	31	N-A/B			O-15	20	70	O-55	
	N-E/F	80	30	N-A/B			O-16	21	71	O-56	
	N-E/F	79	29	N-A/B			O-17	22	72	O-57	
	N-E/F	78	28	N-A/B		Common plus pin for +0/+1 output ports	P-0/1	23	73	P-4/5	Common plus pin for +4/+5 output ports
	N-E/F	77	27	N-A/B			P-0/1	24	74	P-4/5	
	N.C.	76	26	N.C.			N.C.	25	75	N.C.	
	N.C.	75	25	N.C.			N.C.	26	76	N.C.	

Common plus pin for +C/+D output ports	P-C/D	74	24	P-8/9	Common plus pin for +8/+9 output ports
	P-C/D	73	23	P-8/9	
+D port (Output)	O-D7	72	22	O-97	+9 port (Output)
	O-D6	71	21	O-96	
	O-D5	70	20	O-95	
	O-D4	69	19	O-94	
	O-D3	68	18	O-93	
	O-D2	67	17	O-92	
	O-D1	66	16	O-91	
	O-D0	65	15	O-90	
+C port (Output)	O-C7	64	14	O-87	+8 port (Output)
	O-C6	63	13	O-86	
	O-C5	62	12	O-85	
	O-C4	61	11	O-84	
	O-C3	60	10	O-83	
	O-C2	59	9	O-82	
	O-C1	58	8	O-81	
	O-C0	57	7	O-80	
Common minus pin for +C/+D output ports	N-C/D	56	6	N-8/9	Common minus pin for +8/+9 output ports
	N-C/D	55	5	N-8/9	
	N-C/D	54	4	N-8/9	
	N-C/D	53	3	N-8/9	
	N-C/D	52	2	N-8/9	
	N-C/D	51	1	N-8/9	

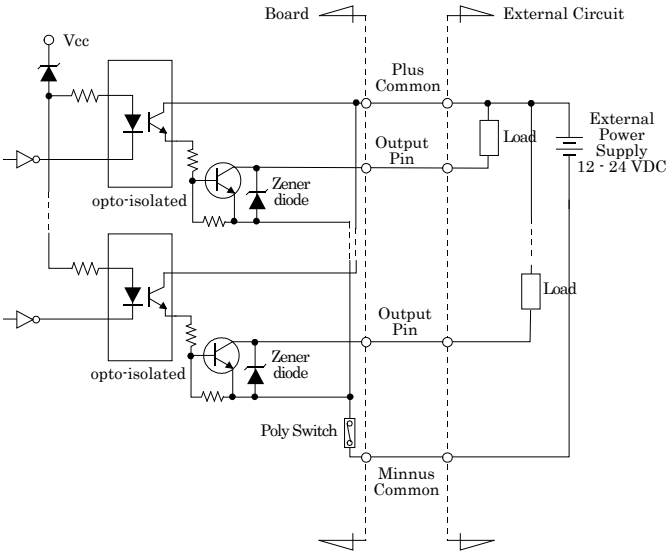
Common minus pin for+2/+3 output ports	N-2/3	27	77	N-6/7	Common minus pin for+6/+7 output ports
	N-2/3	28	78	N-6/7	
	N-2/3	29	79	N-6/7	
	N-2/3	30	80	N-6/7	
	N-2/3	31	81	N-6/7	
	N-2/3	32	82	N-6/7	
+2 Port (Output)	O-20	33	83	O-60	+6 port (Output)
	O-21	34	84	O-61	
	O-22	35	85	O-62	
	O-23	36	86	O-63	
	O-24	37	87	O-64	
	O-25	38	88	O-65	
	O-26	39	89	O-66	
	O-27	40	90	O-67	
+3 Port (Output)	O-30	41	91	O-70	+7 Port (Output)
	O-31	42	92	O-71	
	O-32	43	93	O-72	
	O-33	44	94	O-73	
	O-34	45	95	O-74	
	O-35	46	96	O-75	
	O-36	47	97	O-76	
	O-37	48	98	O-77	
Common plus pin for+2/+3 output ports	P-2/3	49	99	P-6/7	Common plus pin for+6/+7 output ports
	P-2/3	50	100	P-6/7	

Signal name	Description
O-00 - O-F7	128 channels output signal. Connect input signals from the external device to these pins.
P-0/1 - P-E/F	Connect the positive side of the external power supply. These pins are common to 16 channels output signal.
N-0/1 - N-E/F	Connect the negative side of the external power supply. These pins are common to 16 channels output signal. One pin permissible current of the connector is 0.3A. Please connect necessary number of pins for the corresponding total current of the output 16 channels. When 16 channels are used by the output full ratings (100mA per 1 channel), it is necessary to connect six all.
N.C.	This pin is left unconnected.

Connecting Output Signals

Connect the output signals to a current-driven controlled device such as a relay or LED. The connection requires an external power supply to feed currents. The board controls turning on/off the current-driven controlled device using a digital value.

Output Circuit



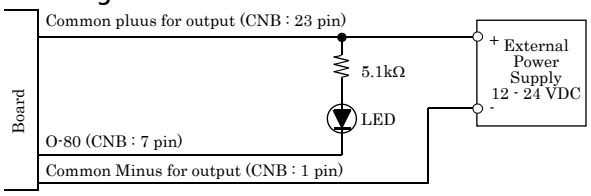
* O-xx shows output pins.

The signal output section is an Optocoupler isolated, open-collector output (current sink type). Driving the output section requires an external power supply.
The rated output current per channel is 100mA at maximum.
The output section can also be connected to a TTL level input as it uses a low-saturated transistor for output. The residual voltage (low-level voltage) between the collector and emitter with the output on is 0.5V or less at an output current within 50mA or at most 1.0V at an output current within 100mA.
A zener diode is connected to the output transistor for protection from surge voltages. A PolySwitch-based overcurrent protector is provided for every eight output transistors. When the overcurrent protector works, the output section of the board is temporarily disabled. If this is the case, turn of the power to the PC and the external power supply and wait for a few minutes, then turn them on back.

CAUTION

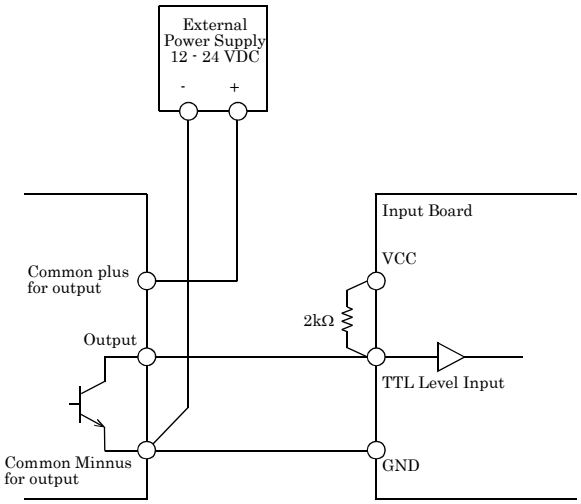
When the PC is turned on, all output are reset to OFF.

Connecting to the LED



When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.

Example of Connection to TTL Level Input



Connecting the Sink Type Output and Sink Output Support Input

The following example shows a connection between a sink type output (output board) and a sink output support input (input board). Refer to this connection example when you connect such boards to each other.