Digital I/O Board
for PCI Express

DIO-6464T-PE

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

The < DIO-6464T-PE > features 64 unisolated TTL level inputs and 64 unisolated open-collector outputs. You can use 16 input signals as interrupt inputs. In addition, the digital filter function to prevent wrong recognition of input signals is provided.

Windows/Linux driver is bundled with this product.

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

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

Features

Unisolated TTL level input, unisolated open-collector output

The < DIO-6464T-PE > has the 64ch of unisolated TTL level input and 64ch of unisolated open-collector output whose response speed is 200nsec.
The output rating is max. 30VDC, 40mA per ch.

You can use 16 input signals as interrupt request signals.

You can use 16 input signals as interrupt request signals and also disable or enable the interrupt in bit units and select the edge of the input signals, at which to generate an interrupt.

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

This product has a digital filter to prevent wrong recognition of input signals from carrying noise or a chattering. 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 Window/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

Functions and connectors are compatible with PCI compatible board DIO-6464T2-PCI

The functions same with PCI compatible board DIO-6464T2-PCI 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.

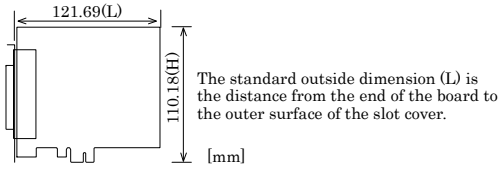
Using the dedicated library VI-DAQ makes it possible to make a LabVIEW application.

Specification

Item		Specification
Input		
	Input format	Unisolated TTL level input (Negative logic *1)
	Number of input signal channels	64ch (16ch available for interrupts) (1 common)
	Input resistance	Pull up 10kΩ (1TTL load)
	Interrupt	16 interrupt input signals are arranged into a single output of interrupt signal INTA. An interrupt is generated at the rising edge (HIGH-to-LOW transition) or falling edge (LOW-to-HIGH transition).
	Response time	Within 200nsec
Output		
	Output format	Unisolated open-collector output (Negative logic *1)
	Number of output signal channels	64ch (1 common)
	Output rating: Output voltage	30VDC (Max.)
	Output rating: Output current	40mA (par channel) (Max.)
	Response time	Within 200nsec (change by pull-up resistor value)
Common		
	External supply capable current (Max.)	5VDC 350mA
	Allowable distance of signal extension	Approx. 1.5m (depending on wiring environment)
	I/O address	Any 32-byte boundary
	Interruption level	1 level use
	Max. board count for connection	16 boards including the master board
	Power consumption (Max.)	3.3VDC 800mA
	Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
	Bus specification	PCI Express Base Specification Rev. 1.0a x1
	Dimension (mm)	121.69(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	120g

*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) / API-DIO(98/PC)
[Stored on the bundled CD-ROM driver library API-PAC(W32)]

The API-DIO(WDM) / API-DIO(98/PC) is the Windows version driver library software that provides products in the form of Win32 API functions (DLL). Various sample programs such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.

< Operating environment >

OS	Windows Vista, XP, Server 2003, 2000
Adaptation language	Visual Basic, Visual C++, Visual C#, Delphi, C++ Builder

You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/). 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)
[Stored on the bundled CD-ROM driver library API-PAC(W32)]

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.

< Operating environment >

OS	RedHatLinux, TurboLinux (For details on supported distributions, refer to Help available after installation.)
Adaptation language	gcc

You can download the updated version from the CONTEC's Web site (http://www.contec.com/apipac/). 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 (Available for downloading (free of charge) from the CONTEC web site.)

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.
See http://www.contec.com/vidaq/ for details and download of VI-DAQ.

Cable & Connector (Option)

Shielded Cable With Two 100pin Connector
: PCB100PS-0.5 (0.5m)
: PCB100PS-1.5 (1.5m)

Connection Conversion Shield Cable (100P→96P)
: PCB100/96PS-1.5(1.5m)

Flat Cable with One 100-Pin Connector
: PCA100P-1.5(1.5m)

Connection Conversion Shield Cable (100P→37P D-SUB x 2)
: PCB100WS-1.5(1.5m)

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

Accessories

Screw Terminal Unit (M3 x 100P)	: EPD-100A *1*4*6
Screw Terminal Unit (M3 x 96P)	: EPD-96A *2*4*6
Screw Terminal Unit (M3.5 x 96P)	: EPD-96 *2*4
Terminal Unit for Cables (M2.5 x 96P)	: DTP-64(PC) *2*4
Connection Conversion Board (96-Pin → 37-Pin x 2)	: CCB-96 *2*4
Signal Monitor / Output Accessory for Digital I/O (64P)	: CM-64(PC)E *2*4
Screw Terminal Unit (M3 x 37P)	: EPD-37A *3*5*6
Screw Terminal Unit (M3.5 x 37P)	: EPD-37 *3*5
General Purpose Terminal (M3 x 37P)	: DTP-3A *3*5
Screw Terminal (M2.6 x 37P)	: DTP-4A *3*5
Signal Monitor / Output Accessory for Digital I/O (32P)	: CM-32(PC)E *3*5

*1 PCB100PS-0.5, 1.5 optional cable is required separately.
*2 PCB100/96PS-1.5 optional cable is required separately.
*3 PCB100WS-1.5 optional cable is required separately.
*4 If using both the CNA and CNB connectors, two each of the terminal and cable sets are required.
*5 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.
*6 "Spring-up" type terminal is used to prevent terminal screws from falling off.

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

Packing List

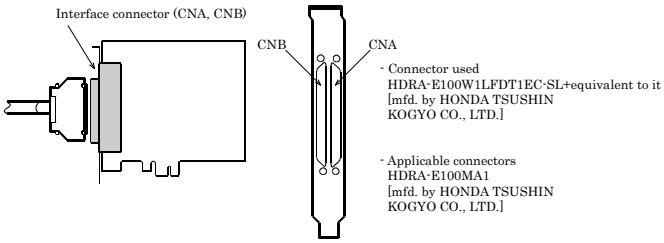
Board [DIO-6464T-PE] …1
First step guide … 1
CD-ROM *1 [API-PAC(W32)] …1

*1 The CD-ROM contains the driver software and User's Guide.

How to connect the connectors

Connector shape

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



* Please refer to chapter 1 for more information on the supported cable and accessories.

Pin Assignments of Interface Connector (CNA, CNB)

CNB

Port	Signal	Pin	Pin	Signal	Port
+5V	Vcc	100	50	Vcc	+5V
	Vcc	99	49	Vcc	
+F port (Output)	O-F7	98	48	O-B7	+B port (Output)
	O-F6	97	47	O-B6	
	O-F5	96	46	O-B5	
	O-F4	95	45	O-B4	
	O-F3	94	44	O-B3	
	O-F2	93	43	O-B2	
	O-F1	92	42	O-B1	
	O-F0	91	41	O-B0	
+E port (Output)	O-E7	90	40	O-A7	+A port (Output)
	O-E6	89	39	O-A6	
	O-E5	88	38	O-A5	
	O-E4	87	37	O-A4	
	O-E3	86	36	O-A3	
	O-E2	85	35	O-A2	
	O-E1	84	34	O-A1	
	O-E0	83	33	O-A0	
Signal Common	GND	82	32	GND	Signal Common
	GND	81	31	GND	
	GND	80	30	GND	
	GND	79	29	GND	
	GND	78	28	GND	
	GND	77	27	GND	
	N.C.	76	26	N.C.	
	N.C.	75	25	N.C.	
+5V	Vcc	74	24	Vcc	+5V
	Vcc	73	23	Vcc	
+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	
Signal Common	GND	56	6	GND	Signal Common
	GND	55	5	GND	
	GND	54	4	GND	
	GND	53	3	GND	
	GND	52	2	GND	
	GND	51	1	GND	

CNA

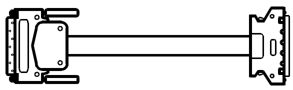
Port	Signal	Pin	Pin	Signal	Port
Signal Common	GND	1	51	GND	Signal Common
	GND	2	52	GND	
	GND	3	53	GND	
	GND	4	54	GND	
	GND	5	55	GND	
	GND	6	56	GND	
+0 port (Input)	*I-00	7	57	I-40	+4 port (Input)
	*I-01	8	58	I-41	
	*I-02	9	59	I-42	
	*I-03	10	60	I-43	
	*I-04	11	61	I-44	
	*I-05	12	62	I-45	
	*I-06	13	63	I-46	
	*I-07	14	64	I-47	
+1 port (Input)	*I-10	15	65	I-50	+5 port (Input)
	*I-11	16	66	I-51	
	*I-12	17	67	I-52	
	*I-13	18	68	I-53	
	*I-14	19	69	I-54	
	*I-15	20	70	I-55	
	*I-16	21	71	I-56	
	*I-17	22	72	I-57	
+5V	Vcc	23	73	Vcc	+5V
	Vcc	24	74	Vcc	
	N.C.	25	75	N.C.	
	N.C.	26	76	N.C.	
Signal Common	GND	27	77	GND	Signal Common
	GND	28	78	GND	
	GND	29	79	GND	
	GND	30	80	GND	
	GND	31	81	GND	
	GND	32	82	GND	
+2 port (Input)	I-20	33	83	I-60	+6 port (Input)
	I-21	34	84	I-61	
	I-22	35	85	I-62	
	I-23	36	86	I-63	
	I-24	37	87	I-64	
	I-25	38	88	I-65	
	I-26	39	89	I-66	
	I-27	40	90	I-67	
+3 port (Input)	I-30	41	91	I-70	+7 port (Input)
	I-31	42	92	I-71	
	I-32	43	93	I-72	
	I-33	44	94	I-73	
	I-34	45	95	I-74	
	I-35	46	96	I-75	
	I-36	47	97	I-76	
	I-37	48	98	I-77	
+5V	Vcc	49	99	Vcc	+5V
	Vcc	50	100	Vcc	

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

I-00 - I-77	64ch input signal. Connect output signals from the external device to these pins.
O-80 - O-F7	64ch output signal. Connect input signals from the external device to these pins.
Vcc	Output +5V. Max. electrical current is 350mA. The permitted current per connector pin is 0.3A. Connect the number of pins required to supply the total current.
GND	This pin is connected to GND in the slot. The permitted current per connector pin is 0.3A. Connect the number of pins required to supply the total current for the 64 outputs.
N.C.	This pin is left unconnected.

Pin Assignments of Optional Connector PCB100/96PS or PCB100WS

The figure below shows the correspondence between the option cable pins and signals.



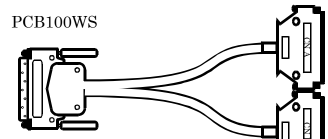
For connecting the board CNB

Port	Signal	Pin	Pin	Signal	Port
Signal common	GND	B01	A01	GND	Signal common
	GND	B02	A02	GND	
+C port (Output)	O-C0	B03	A03	O-80	+8 port (Output)
	O-C1	B04	A04	O-81	
	O-C2	B05	A05	O-82	
	O-C3	B06	A06	O-83	
	O-C4	B07	A07	O-84	
	O-C5	B08	A08	O-85	
	O-C6	B09	A09	O-86	
	O-C7	B10	A10	O-87	
+D port (Output)	O-D0	B11	A11	O-90	+9 port (Output)
	O-D1	B12	A12	O-91	
	O-D2	B13	A13	O-92	
	O-D3	B14	A14	O-93	
	O-D4	B15	A15	O-94	
	O-D5	B16	A16	O-95	
	O-D6	B17	A17	O-96	
	O-D7	B18	A18	O-97	
+5V	Vcc	B19	A19	Vcc	+5V
	Vcc	B20	A20	Vcc	
N.C.	N.C.	B21	A21	N.C.	N.C.
	N.C.	B22	A22	N.C.	
	N.C.	B23	A23	N.C.	
	N.C.	B24	A24	N.C.	
	N.C.	B25	A25	N.C.	
	N.C.	B26	A26	N.C.	
	N.C.	B27	A27	N.C.	
	N.C.	B28	A28	N.C.	
Signal common	GND	B29	A29	GND	Signal common
	GND	B30	A30	GND	
+E port (Output)	O-E0	B31	A31	O-A0	+A port (Output)
	O-E1	B32	A32	O-A1	
	O-E2	B33	A33	O-A2	
	O-E3	B34	A34	O-A3	
	O-E4	B35	A35	O-A4	
	O-E5	B36	A36	O-A5	
	O-E6	B37	A37	O-A6	
	O-E7	B38	A38	O-A7	
+F port (Output)	O-F0	B39	A39	O-B0	+B port (Output)
	O-F1	B40	A40	O-B1	
	O-F2	B41	A41	O-B2	
	O-F3	B42	A42	O-B3	
	O-F4	B43	A43	O-B4	
	O-F5	B44	A44	O-B5	
	O-F6	B45	A45	O-B6	
	O-F7	B46	A46	O-B7	
+5V	Vcc	B47	A47	Vcc	+5V
	Vcc	B48	A48	Vcc	

For connecting the board CNA

Port	Signal	Pin	Pin	Signal	Port
Signal common	GND	B01	A01	GND	Signal common
	GND	B02	A02	GND	
+4 port (Input)	I-40	B03	A03	I-00	+0 port (Input)
	I-41	B04	A04	I-01	
	I-42	B05	A05	I-02	
	I-43	B06	A06	I-03	
	I-44	B07	A07	I-04	
	I-45	B08	A08	I-05	
	I-46	B09	A09	I-06	
	I-47	B10	A10	I-07	
+5 port (Input)	I-50	B11	A11	I-10	+1 port (Input)
	I-51	B12	A12	I-11	
	I-52	B13	A13	I-12	
	I-53	B14	A14	I-13	
	I-54	B15	A15	I-14	
	I-55	B16	A16	I-15	
	I-56	B17	A17	I-16	
	I-57	B18	A18	I-17	
+5V	Vcc	B19	A19	Vcc	+5V
	Vcc	B20	A20	Vcc	
N.C.	N.C.	B21	A21	N.C.	N.C.
	N.C.	B22	A22	N.C.	
	N.C.	B23	A23	N.C.	
	N.C.	B24	A24	N.C.	
	N.C.	B25	A25	N.C.	
	N.C.	B26	A26	N.C.	
	N.C.	B27	A27	N.C.	
	N.C.	B28	A28	N.C.	
Signal common	GND	B29	A29	GND	Signal common
	GND	B30	A30	GND	
+6 port (Input)	I-60	B31	A31	I-20	+2 port (Input)
	I-61	B32	A32	I-21	
	I-62	B33	A33	I-22	
	I-63	B34	A34	I-23	
	I-64	B35	A35	I-24	
	I-65	B36	A36	I-25	
	I-66	B37	A37	I-26	
	I-67	B38	A38	I-27	
+7 port (Input)	I-70	B39	A39	I-30	+3 port (Input)
	I-71	B40	A40	I-31	
	I-72	B41	A41	I-32	
	I-73	B42	A42	I-33	
	I-74	B43	A43	I-34	
	I-75	B44	A44	I-35	
	I-76	B45	A45	I-36	
	I-77	B46	A46	I-37	
+5V	Vcc	B47	A47	Vcc	+5V
	Vcc	B48	A48	Vcc	

* The numbers in square brackets [ ] are pin numbers designated by HONDA TSUSHIN KOGYO CO., LTD.



CNA of PCB100WS connecting to the board CNB

Port	Signal	Pin	Pin	Signal	Port
	N.C.	19	37	Vcc	+5V
+5V	Vcc	18	36	O-B7	+B port (Output)
+9 port (Output)	O-97	17	35	O-B6	
	O-96	16	34	O-B5	
	O-95	15	33	O-B4	
	O-94	14	32	O-B3	
	O-93	13	31	O-B2	
	O-92	12	30	O-B1	
	O-91	11	29	O-B0	
	O-90	10	28	O-A7	+A port (Output)
+8 port (Output)	O-87	9	27	O-A6	
	O-86	8	26	O-A5	
	O-85	7	25	O-A4	
	O-84	6	24	O-A3	
	O-83	5	23	O-A2	
	O-82	4	22	O-A1	
	O-81	3	21	O-A0	
	O-80	2	20	GND	Signal common
Signal common	GND	1			

CNA of PCB100WS connecting to the board CNA

Port	Signal	Pin	Pin	Signal	Port
	N.C.	19	37	Vcc	+5V
+5V	Vcc	18	36	I-37	+3 port (Input)
+1 port (Input)	I-17	17	35	I-36	
	I-16	16	34	I-35	
	I-15	15	33	I-34	
	I-14	14	32	I-33	
	I-13	13	31	I-32	
	I-12	12	30	I-31	
	I-11	11	29	I-30	
	I-10	10	28	I-27	+2 port (Input)
+0 port (Input)	I-07	9	27	I-26	
	I-06	8	26	I-25	
	I-05	7	25	I-24	
	I-04	6	24	I-23	
	I-03	5	23	I-22	
	I-02	4	22	I-21	
	I-01	3	21	I-20	
	I-00	2	20	GND	Signal common
Signal common	GND	1			

CNB of PCB100WS connecting to the board CNB

Port	Signal	Pin	Pin	Signal	Port
	N.C.	19	37	Vcc	+5V
+5V	Vcc	18	36	O-F7	+F port (Output)
+D port (Output)	O-D7	17	35	O-F6	
	O-D6	16	34	O-F5	
	O-D5	15	33	O-F4	
	O-D4	14	32	O-F3	
	O-D3	13	31	O-F2	
	O-D2	12	30	O-F1	
	O-D1	11	29	O-F0	
	O-D0	10	28	O-E7	+E port (Output)
+C port (Output)	O-C7	9	27	O-E6	
	O-C6	8	26	O-E5	
	O-C5	7	25	O-E4	
	O-C4	6	24	O-E3	
	O-C3	5	23	O-E2	
	O-C2	4	22	O-E1	
	O-C1	3	21	O-E0	
	O-C0	2	20	GND	Signal common
Signal common	GND	1			

CNB of PCB100WS connecting to the board CNA

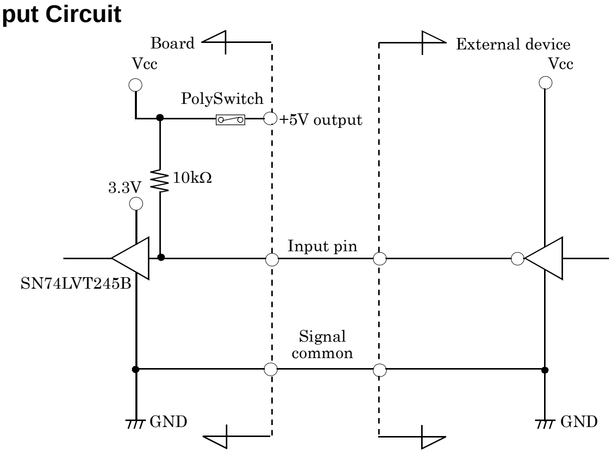
Port	Signal	Pin	Pin	Signal	Port
	N.C.	19	37	Vcc	+5V
+5V	Vcc	18	36	I-77	+7 port (Input)
+5 port (Input)	I-57	17	35	I-76	
	I-56	16	34	I-75	
	I-55	15	33	I-74	
	I-54	14	32	I-73	
	I-53	13	31	I-72	
	I-52	12	30	I-71	
	I-51	11	29	I-70	
	I-50	10	28	I-67	+6 port (Input)
+4 port (Input)	I-47	9	27	I-66	
	I-46	8	26	I-65	
	I-45	7	25	I-64	
	I-44	6	24	I-63	
	I-43	5	23	I-62	
	I-42	4	22	I-61	
	I-41	3	21	I-60	
	I-40	2	20	GND	Signal common
Signal common	GND	1			

Connecting Input Signals

The input circuits of interface blocks is illustrated in Figure 3.11.

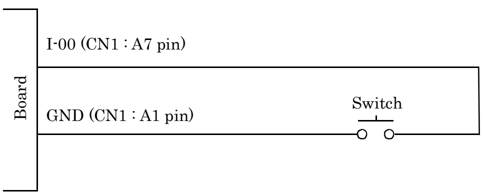
External digital signals given to signal inputs are TTL levels. The individual input signals are passed to the personal computer as negative logic signals. As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.

Input Circuit



* I-xx represents an input pin.
One polyswitch is connected for Vcc(+5V) terminal.

Connecting a Switch

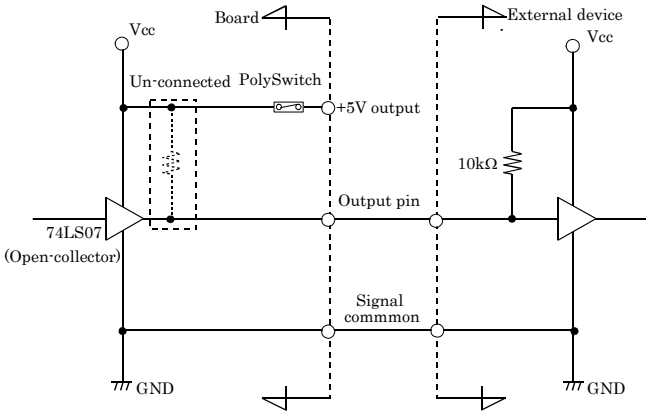


When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Connecting Output Signals

The output circuit of interface is illustrated in Figure 3.13. Signal outputs are open-collector outputs; individual output signals are sent to the external device as negative logic signals. Note that each signal output must be pulled up at the external device as it is not pulled up internally.

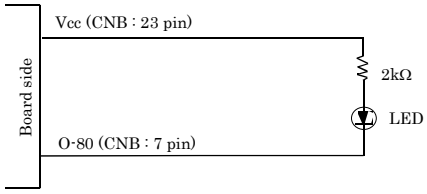
Output Circuit



* O-xx represents an output pin.
One polyswitch is connected for Vcc(+5V) terminal.

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

Connection 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.

A Protection Function of the +5V Outputs

A protection function, which prevents excessive current flow from the +5V outputs, is attached to this board. In case of accidental short of the +5V output and GND, for example, the function works, and the board operation may become impossible temporarily. In such a case, you should turn the PC off and wait for several minutes before you use the board again.

Block Diagram