

PCIE-1758DIO 128-Ch Isolated Digital I/O Card, PCIE-1758DI 128-Ch Isolated Digital Input Card, PCIE-1758DO 128-Ch Isolated Digital Output Card Startup Manual

Packing List

Before installation, please ensure that the following items are included in your shipment:

- 1 x PCIE-1758 series card
- 1 x PCIE-1758 startup manual

If any item is missing or damaged, contact your distributor or sales representative immediately.

User Manual

For more detailed product information, please refer to the PCIE-1758 series user manual provided on the Advantech Support Portal at http://support.advantech.com/support/new_default.aspx.

Declaration of Conformity

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. In such cases, users are required to correct the interference at their own expense.

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

For more information about this or other Advantech products, please visit our website at

<http://www.advantech.com/products/ProView/>

For technical support and service, visit our support website at

<http://support.advantech.com>

This manual is for the PCIE-1758 series.

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Overview

Advantech's PCIE-1758 series comprises multiple cards with various I/O configurations that can be selected according to application scenario.

Each PCIE-1758 digital I/O card provides 128 isolated DI/O channels with 2500 V_{DC} protection. Equipped with high sink current capabilities, these cards can support diverse industrial automation applications. Moreover, the added inclusion of Advantech's DAQNav driver software ensures easy configuration and efficient programming.

Specifications

Isolated Digital Input

- Input Channels:
 - PCIE-1758DIO: 64
 - PCIE-1758DI: 128
- Input Voltage:
 - Logic 0: 3 V max. (0 V_{DC} min.)
 - Logic 1: 10 V min. (30 V_{DC} max.)
- Input Current:
 - 3.8mA @ 12 V_{DC}
 - 7.2mA @ 24 V_{DC}
- Interrupt-Capable Channel:
 - PCIE-1758DIO: 64
 - PCIE-1758DI: 128
- Digital Filter Channel:
 - PCIE-1758DIO: 64
 - PCIE-1758DI: 128
- Isolation Protection: 2,500 V_{DC}
- Overvoltage Protection: 70 V_{DC}
- Opto-Isolator Response: 100 μs
- Input Resistance: 3.6 KΩ @ 1W

Isolated Digital Output

- Output Channels:
 - PCIE-1758DIO: 64
 - PCIE-1758DO: 128
- Output Type: Sink (NPN)
- Isolation Protection: 2,500 V_{DC}
- Output Voltage: 5 ~ 40 V_{DC}
- Sink Current:
 - 350mA/ch (sink) @25 °C
 - 250mA/ch (sink) @60 °C
- Opto-Isolator Response: 100 μs

Specifications (Cont.)

Digital Filter

- Digital Filter Time [sec] = $2^n / (8 \times 10^6)$
n = setting data (0 ~ 20)

Setting Data (n)	Digital Filter Time	Setting Data (n)	Digital Filter Time
7 (07h)	16 μsec	14 (0Eh)	2.048 msec
8 (08h)	32 μsec	15 (0Fh)	4.096 msec
9 (09h)	64 μsec	16 (10h)	8.192 msec
10 (0Ah)	128 μsec	17 (11h)	16.384 msec
11 (0Bh)	256 μsec	18 (12h)	32.768 msec
12 (0Ch)	512 μsec	19 (13h)	65.536 msec
13 (0Dh)	1.024 msec	20 (14h)	131.072 msec

Card Layout

The connector, switch, and jumper locations on the PCIe-1758 series digital I/O cards are shown in Figures 1 ~ 3.

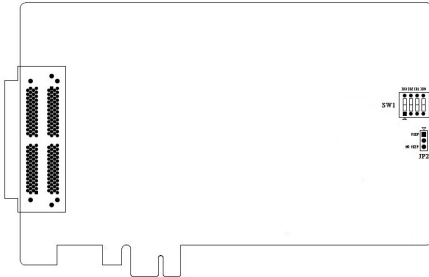


Figure 1. PCIe-1758 DIO Card Layout

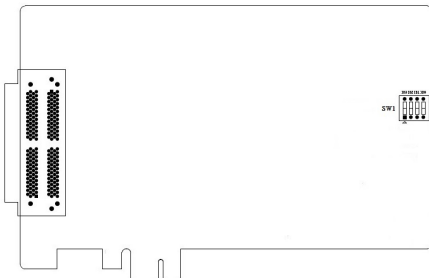


Figure 2. PCIe-1758 DI Card Layout

Card Layout (Cont.)

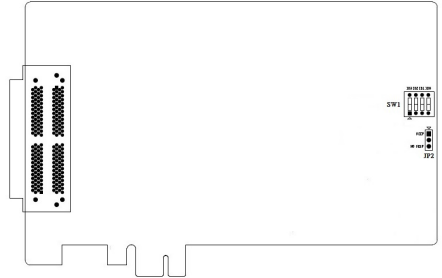


Figure 3. PCIe-1758 DO Card Layout

Board ID (SW1)

The PCIe-1758 series have a built-in DIP switch (SW1), which is used to define each card's board ID. When there are multiple cards on the same chassis, this board ID switch is useful for identifying each card's device number. After setting for each PCIe-1758 series, you can identify each card in system with different device numbers. The default value of board ID is 0 and if you need to adjust it to other value, please set the SW1 by referring to the below table.

Board ID (dec)	Switch Position			
* = default	1 (ID3)	2 (ID2)	3 (ID1)	4 (ID0)
*0	On	On	On	On
1	On	On	On	Off
:	:	:	:	:
14	Off	Off	Off	On
15	Off	Off	Off	Off

Power-On Configuration (JP2)

The default configuration after a system power on or hardware reset for all isolated output channels is set to open (the current of the load cannot be in sink mode). This is to prevent system starts or resets from damaging external devices.

When the system is hot reset, the status of the isolated digital output channels is selected by jumper JP2. The configuration of jumper JP2 is shown below.

JP2	Power-On Configuration After Hot Resets
	Retain last status after hot resets
	Default configuration (default settings)

Pin Assignments

CNB			CNA				
P67_PCOM	100	50	P23_PCOM	GND	1	51	GND
P67_PCOM	99	49	P23_PCOM	GND	2	52	GND
P7_IDO07	98	48	P3_IDO07	GND	3	53	GND
P7_IDO06	97	47	P3_IDO06	GND	4	54	GND
P7_IDO05	96	46	P3_IDO05	GND	5	55	GND
P7_IDO04	95	45	P3_IDO04	GND	6	56	GND
P7_IDO03	94	44	P3_IDO03	P0_IDI00	7	57	P4_IDI00
P7_IDO02	93	43	P3_IDO02	P0_IDI01	8	58	P4_IDI01
P7_IDO01	92	42	P3_IDO01	P0_IDI02	9	59	P4_IDI02
P7_IDO00	91	41	P3_IDO00	P0_IDI03	10	60	P4_IDI03
P6_IDO07	90	40	P2_IDO07	P0_IDI04	11	61	P4_IDI04
P6_IDO06	89	39	P2_IDO06	P0_IDI05	12	62	P4_IDI05
P6_IDO05	88	38	P2_IDO05	P0_IDI06	13	63	P4_IDI06
P6_IDO04	87	37	P2_IDO04	P0_IDI07	14	64	P4_IDI07
P6_IDO03	86	36	P2_IDO03	P1_IDI00	15	65	P5_IDI00
P6_IDO02	85	35	P2_IDO02	P1_IDI01	16	66	P5_IDI01
P6_IDO01	84	34	P2_IDO01	P1_IDI02	17	67	P5_IDI02
P6_IDO00	83	33	P2_IDO00	P1_IDI03	18	68	P5_IDI03
GND	82	32	GND	P1_IDI04	19	69	P5_IDI04
GND	81	31	GND	P1_IDI05	20	70	P5_IDI05
GND	80	30	GND	P1_IDI06	21	71	P5_IDI06
GND	79	29	GND	P1_IDI07	22	72	P5_IDI07
GND	78	28	GND	P01_ECOM	23	73	P45_ECOM
GND	77	27	GND	P01_ECOM	24	74	P45_ECOM
NC	76	26	NC	NC	25	75	NC
NC	75	25	NC	NC	26	76	NC
P45_PCOM	74	24	P01_PCOM	GND	27	77	GND
P45_PCOM	73	23	P01_PCOM	GND	28	78	GND
P5_IDO07	72	22	P1_IDO07	GND	29	79	GND
P5_IDO06	71	21	P1_IDO06	GND	30	80	GND
P5_IDO05	70	20	P1_IDO05	GND	31	81	GND
P5_IDO04	69	19	P1_IDO04	GND	32	82	GND
P5_IDO03	68	18	P1_IDO03	P2_IDI00	33	83	P6_IDI00
P5_IDO02	67	17	P1_IDO02	P2_IDI01	34	84	P6_IDI01
P5_IDO01	66	16	P1_IDO01	P2_IDI02	35	85	P6_IDI02
P5_IDO00	65	15	P1_IDO00	P2_IDI03	36	86	P6_IDI03
P4_IDO07	64	14	P0_IDO07	P2_IDI04	37	87	P6_IDI04
P4_IDO06	63	13	P0_IDO06	P2_IDI05	38	88	P6_IDI05
P4_IDO05	62	12	P0_IDO05	P2_IDI06	39	89	P6_IDI06
P4_IDO04	61	11	P0_IDO04	P2_IDI07	40	90	P6_IDI07
P4_IDO03	60	10	P0_IDO03	P3_IDI00	41	91	P7_IDI00
P4_IDO02	59	9	P0_IDO02	P3_IDI01	42	92	P7_IDI01
P4_IDO01	58	8	P0_IDO01	P3_IDI02	43	93	P7_IDI02
P4_IDO00	57	7	P0_IDO00	P3_IDI03	44	94	P7_IDI03
GND	56	6	GND	P3_IDI04	45	95	P7_IDI04
GND	55	5	GND	P3_IDI05	46	96	P7_IDI05
GND	54	4	GND	P3_IDI06	47	97	P7_IDI06
GND	53	3	GND	P3_IDI07	48	98	P7_IDI07
GND	52	2	GND	P23_ECOM	49	99	P67_ECOM
GND	51	1	GND	P23_ECOM	50	100	P67_ECOM

Figure 4. PCIe-1758 DIO Card Connector Pin Assignments

Pin Assignments (Cont.)

CNB			CNA				
PEF_ECOM	100	50	PAB_ECOM	GND	1	51	GND
PEF_ECOM	99	49	PAB_ECOM	GND	2	52	GND
PF_IDI07	98	48	PB_IDI07	GND	3	53	GND
PF_IDI06	97	47	PB_IDI06	GND	4	54	GND
PF_IDI05	96	46	PB_IDI05	GND	5	55	GND
PF_IDI04	95	45	PB_IDI04	GND	6	56	GND
PF_IDI03	94	44	PB_IDI03	P0_IDI00	7	57	P4_IDI00
PF_IDI02	93	43	PB_IDI02	P0_IDI01	8	58	P4_IDI01
PF_IDI01	92	42	PB_IDI01	P0_IDI02	9	59	P4_IDI02
PF_IDI00	91	41	PB_IDI00	P0_IDI03	10	60	P4_IDI03
PE_IDI07	90	40	PA_IDI07	P0_IDI04	11	61	P4_IDI04
PE_IDI06	89	39	PA_IDI06	P0_IDI05	12	62	P4_IDI05
PE_IDI05	88	38	PA_IDI05	P0_IDI06	13	63	P4_IDI06
PE_IDI04	87	37	PA_IDI04	P0_IDI07	14	64	P4_IDI07
PE_IDI03	86	36	PA_IDI03	P1_IDI00	15	65	P5_IDI00
PE_IDI02	85	35	PA_IDI02	P1_IDI01	16	66	P5_IDI01
PE_IDI01	84	34	PA_IDI01	P1_IDI02	17	67	P5_IDI02
PE_IDI00	83	33	PA_IDI00	P1_IDI03	18	68	P5_IDI03
GND	82	32	GND	P1_IDI04	19	69	P5_IDI04
GND	81	31	GND	P1_IDI05	20	70	P5_IDI05
GND	80	30	GND	P1_IDI06	21	71	P5_IDI06
GND	79	29	GND	P1_IDI07	22	72	P5_IDI07
GND	78	28	GND	P01_ECOM	23	73	P45_ECOM
GND	77	27	GND	P01_ECOM	24	74	P45_ECOM
NC	76	26	NC	NC	25	75	NC
NC	75	25	NC	NC	26	76	NC
PCD_ECOM	74	24	P89_ECOM	GND	27	77	GND
PCD_ECOM	73	23	P89_ECOM	GND	28	78	GND
PD_IDI07	72	22	P9_IDI07	GND	29	79	GND
PD_IDI06	71	21	P9_IDI06	GND	30	80	GND
PD_IDI05	70	20	P9_IDI05	GND	31	81	GND
PD_IDI04	69	19	P9_IDI04	GND	32	82	GND
PD_IDI03	68	18	P9_IDI03	P2_IDI00	33	83	P6_IDI00
PD_IDI02	67	17	P9_IDI02	P2_IDI01	34	84	P6_IDI01
PD_IDI01	66	16	P9_IDI01	P2_IDI02	35	85	P6_IDI02
PD_IDI00	65	15	P9_IDI00	P2_IDI03	36	86	P6_IDI03
PC_IDI07	64	14	P8_IDI07	P2_IDI04	37	87	P6_IDI04
PC_IDI06	63	13	P8_IDI06	P2_IDI05	38	88	P6_IDI05
PC_IDI05	62	12	P8_IDI05	P2_IDI06	39	89	P6_IDI06
PC_IDI04	61	11	P8_IDI04	P2_IDI07	40	90	P6_IDI07
PC_IDI03	60	10	P8_IDI03	P3_IDI00	41	91	P7_IDI00
PC_IDI02	59	9	P8_IDI02	P3_IDI01	42	92	P7_IDI01
PC_IDI01	58	8	P8_IDI01	P3_IDI02	43	93	P7_IDI02
PC_IDI00	57	7	P8_IDI00	P3_IDI03	44	94	P7_IDI03
GND	56	6	GND	P3_IDI04	45	95	P7_IDI04
GND	55	5	GND	P3_IDI05	46	96	P7_IDI05
GND	54	4	GND	P3_IDI06	47	97	P7_IDI06
GND	53	3	GND	P3_IDI07	48	98	P7_IDI07
GND	52	2	GND	P23_ECOM	49	99	P67_ECOM
GND	51	1	GND	P23_ECOM	50	100	P67_ECOM

Figure 5. PCIe-1758 DI Card Connector Pin Assignments

Pin Assignments (Cont.)

CNB			CNA				
PEF_PCOM	100	50	PAB_PCOM	GND	1	51	GND
PEF_PCOM	99	49	PAB_PCOM	GND	2	52	GND
PF_ID007	98	48	PB_ID007	GND	3	53	GND
PF_ID006	97	47	PB_ID006	GND	4	54	GND
PF_ID005	96	46	PB_ID005	GND	5	55	GND
PF_ID004	95	45	PB_ID004	GND	6	56	GND
PF_ID003	94	44	PB_ID003	PO_ID000	7	57	P4_ID000
PF_ID002	93	43	PB_ID002	PO_ID001	8	58	P4_ID001
PF_ID001	92	42	PB_ID001	PO_ID002	9	59	P4_ID002
PF_ID000	91	41	PB_ID000	PO_ID003	10	60	P4_ID003
PE_ID007	90	40	PA_ID007	PO_ID004	11	61	P4_ID004
PE_ID006	89	39	PA_ID006	PO_ID005	12	62	P4_ID005
PE_ID005	88	38	PA_ID005	PO_ID006	13	63	P4_ID006
PE_ID004	87	37	PA_ID004	PO_ID007	14	64	P4_ID007
PE_ID003	86	36	PA_ID003	P1_ID000	15	65	P5_ID000
PE_ID002	85	35	PA_ID002	P1_ID001	16	66	P5_ID001
PE_ID001	84	34	PA_ID001	P1_ID002	17	67	P5_ID002
PE_ID000	83	33	PA_ID000	P1_ID003	18	68	P5_ID003
GND	82	32	GND	P1_ID004	19	69	P5_ID004
GND	81	31	GND	P1_ID005	20	70	P5_ID005
GND	80	30	GND	P1_ID006	21	71	P5_ID006
GND	79	29	GND	P1_ID007	22	72	P5_ID007
GND	78	28	GND	PO1_PCOM	23	73	P45_PCOM
GND	77	27	GND	PO1_PCOM	24	74	P45_PCOM
NC	76	26	NC	NC	25	75	NC
NC	75	25	NC	NC	26	76	NC
PCD_PCOM	74	24	P89_PCOM	GND	27	77	GND
PCD_PCOM	73	23	P89_PCOM	GND	28	78	GND
PD_ID007	72	22	P9_ID007	GND	29	79	GND
PD_ID006	71	21	P9_ID006	GND	30	80	GND
PD_ID005	70	20	P9_ID005	GND	31	81	GND
PD_ID004	69	19	P9_ID004	GND	32	82	GND
PD_ID003	68	18	P9_ID003	P2_ID000	33	83	P6_ID000
PD_ID002	67	17	P9_ID002	P2_ID001	34	84	P6_ID001
PD_ID001	66	16	P9_ID001	P2_ID002	35	85	P6_ID002
PD_ID000	65	15	P9_ID000	P2_ID003	36	86	P6_ID003
PC_ID007	64	14	P8_ID007	P2_ID004	37	87	P6_ID004
PC_ID006	63	13	P8_ID006	P2_ID005	38	88	P6_ID005
PC_ID005	62	12	P8_ID005	P2_ID006	39	89	P6_ID006
PC_ID004	61	11	P8_ID004	P2_ID007	40	90	P6_ID007
PC_ID003	60	10	P8_ID003	P3_ID000	41	91	P7_ID000
PC_ID002	59	9	P8_ID002	P3_ID001	42	92	P7_ID001
PC_ID001	58	8	P8_ID001	P3_ID002	43	93	P7_ID002
PC_ID000	57	7	P8_ID000	P3_ID003	44	94	P7_ID003
GND	56	6	GND	P3_ID004	45	95	P7_ID004
GND	55	5	GND	P3_ID005	46	96	P7_ID005
GND	54	4	GND	P3_ID006	47	97	P7_ID006
GND	53	3	GND	P3_ID007	48	98	P7_ID007
GND	52	2	GND	P23_PCOM	49	99	P78_PCOM
GND	51	1	GND	P23_PCOM	50	100	P78_PCOM

Figure 6. PCIe-1758 DO Card Connector Pin Assignments

Pin Assignments (Cont.)

Pin Name	Description
Isolated Digital Input	
Pn_IDI00~07	Isolated digital input of port n (n = 0~7 for PCIe-1758DIO, 0~F for PCIe-1758DI, hex)
P01_ECOM	Common port of isolated digital input ports 0 and 1
P23_ECOM	Common port of isolated digital input ports 2 and 3
P45_ECOM	Common port of isolated digital input ports 4 and 5
P67_ECOM	Common port of isolated digital input ports 6 and 7
P89_ECOM	Common port of digital input ports 8 and 9
PAB_ECOM	Common port of digital input ports A and B
PCD_ECOM	Common port of digital input ports C and D
PEF_ECOM	Common port of digital input ports E and F
Isolated Digital Output	
Pn_IDO00~07	Isolated digital output of port n (n = 0~7 for PCIe-1758DIO, 0~F for PCIe-1758DO, hex)
P01_PCOM	Free wheeling common diode for isolated digital output ports 0 1
P23_PCOM	Free wheeling common diode for isolated digital output ports 2 and 3
P45_PCOM	Free wheeling common diode for isolated digital output ports 4 and 5
P67_PCOM	Free wheeling common diode for Isolated digital output of port 6 & port 7
P89_PCOM	Free wheeling common diode for isolated digital output ports 8 and 9
PAB_PCOM	Free wheeling common diode for isolated digital output ports A and B
PCD_PCOM	Free wheeling common diode for isolated digital output ports C and D
PEF_PCOM	Free wheeling common diode for isolated digital output ports E and F
GND	Isolation grounding

Signal Connections

Isolated Digital Input

All of the isolated digital input channels accept bi-directional 10 ~ 30 V_{DC} voltage inputs. This means positive or negative voltage can be applied to an isolated input pin (IDIn) The figure below shows how to connect an external input source to one of the card's isolated input channels.

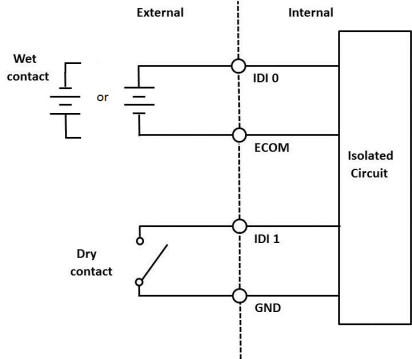


Figure 7. Isolated Digital Input Connection

Isolated Digital Output

All of the isolated output channels are equipped with a MOSFET, polyswitch (for current protection), and flywheel diode that can be activated by connecting PCOM to V_{DC} for use with inductive loads. If external voltage (5 ~ 40 V_{DC}) is applied to an isolated output channel, the current will flow from the external voltage source to the card. Please note that the current passed through each IDO channel should not exceed 350 mA.

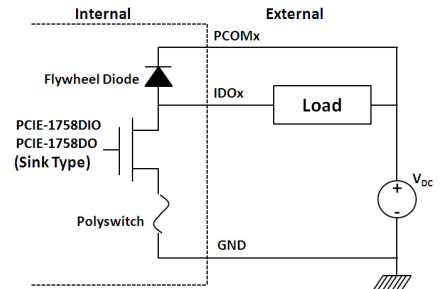


Figure 8. Isolated Digital Output Connection

Hardware Installation

1. Power off the computer and unplug the power cord and cables before installing or removing any components.
2. Remove the computer cover.
3. Remove the slot cover on the back panel of the computer.
4. Touch the metal surface of the computer to neutralize any static electricity that might be in your body.
5. Insert the PCIe-1758 series card into a PCI Express slot. Holding the card by its edges, carefully push it into the PCIe card slot. Be careful not to use excessive force in order to avoid damaging the card.
6. Fasten the PCIe-1758 card bracket to the back panel rail of the computer using screws.
7. Connect any accessories (100-pin cable, wiring terminals, etc.) to the PCIe-1758 card.
8. Replace the cover of the computer chassis. Reconnect any cables that were disconnected in Step 2.
9. Plug in the power cord and turn on the computer.