

## PCIE-1750U PCI Express Card with 32-Ch Isolated Digital I/O PCIE-1750UH PCI Express Card with 32-Ch Isolated Digital I/O and Digital Filter Startup Manual

### Packing List

Before installation, please ensure that the following items are included with the product:

- 1 x PCIE-1750U/UH card
- 1 x PCIE-1750U/UH startup manual

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

### User Manual

For more detailed information about this product, refer to the PCIE-1750U/UH user manual on the Advantech Support Portal.

### 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 and other Advantech products, please visit our website at

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

For technical support and customer service, please visit our support website at

<http://support.advantech.com>

This manual is for PCIE-1750U/UH.

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### Overview

PCIE-1750U/UH is a PCI Express card equipped with 32 digital input/output channels and (for PCIE-1750UH only) digital filters.

The key advantage provided by these cards is that the NPN/PNP direction can be configured on every digital output channel. Users can select the direction according to their usage needs as set by the APIs.

For PCIE-1750UH, the inclusion of a digital filter on every channel makes the card ideal for signal acquisition in noisy environments. Moreover, the addition of channel interrupt support provides not only an alternative method for monitoring DI status (which saves computing resources compared to software polling), but also superior real-time performance.

### Specifications

#### Isolated Digital Input

- Input Channels: 16
- Input Voltage:
  - Logic 0: 3 V max. (0 V<sub>DC</sub> min.)
  - Logic 1: 10 V min. (30 V<sub>DC</sub> max.)
- Input Current:
  - 3.4 mA @ 12 V<sub>DC</sub>
  - 7.13 mA @ 24 V<sub>DC</sub>
- Digital Filter Channel: 16 (PCIE-1750UH only)
- Interrupt-Capable Channel:
  - PCIE-1750U: 2 (Channel 0 and 8)
  - PCIE-1750UH: 16
- Isolation Protection: 2,500 V<sub>DC</sub>
- Overvoltage Protection: 70 V<sub>DC</sub>
- Opto-Isolator Response: 100 µs
- Input Resistance: 3.37 kΩ

#### Isolated Digital Output

- Output Channels: 16
- Output Type: Sink (NPN)/Source (PNP), configurable via software
- Isolation Protection: 2,500 V<sub>DC</sub>
- Output Voltage: 5 ~ 40 V<sub>DC</sub>
- Load Current: 350 mA/channel (max.)
- Opto-Isolator Response: 100 µs

## Specifications (Cont.)

### Digital Filter

- Digital Filter Time [sec.] =  $2^n / (8 \times 10^6)$ , n = setting data (7-20)

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

### Hardware Installation

- Turn off the computer and unplug the power cord and cables before installing or removing any components.
- Remove the cover of the computer.
- Remove the slot cover on the rear panel of the computer.
- Touch a metal part of the computer case with your hand to neutralize any static electricity that may be in your body.
- Insert the PCIE-1750U/UH card into a PCI Express slot. Holding the card by the edges, carefully align the card with the slot. Insert the card firmly into place. Do not use excessive force to avoid damaging the card.
- Fasten the bracket of the PCIE-1750U/UH card onto the back panel rail of the computer using screws.
- Connect any additional accessories (37-pin cable, wiring terminals, etc.) to the PCIE-1750U/UH card.
- Replace the cover of the computer chassis. Reconnect the cables removed in Step 2.
- Plug in the power cord and turn on the computer.

## Pin Assignments

IDI 0	1	20	IDI 1
IDI 2	2	21	IDI 3
IDI 4	3	22	IDI 5
IDI 6	4	23	IDI 7
IDI 8	5	24	IDI 9
IDI 10	6	25	IDI 11
IDI 12	7	26	IDI 13
IDI 14	8	27	IDI 15
ECOM	9	28	GND
PCOM0	10	29	GND
IDO 0	11	30	IDO 1
IDO 2	12	31	IDO 3
IDO 4	13	32	IDO 5
IDO 6	14	33	IDO 7
IDO 8	15	34	IDO 9
IDO 10	16	35	IDO 11
IDO 12	17	36	IDO 13
IDO 14	18	37	IDO 15
PCOM1	19		

Pin Name	Direction	Description
Isolated Digital Input		
IDI n	Input	Isolated digital input n (n = 0 ~ 15)
ECOM	Input	Common pin for external source or ground of IDI0~IDI15
Isolated Digital Output		
IDO n	Output	Isolated digital output n (n = 0 ~ 15)
PCOM0	Input	NPN: Common pin for connecting inductive loads of IDO0 ~ IDO7 PNP: Common pin for external voltage of IDO0 ~ IDO7
PCOM1	Input	NPN: Common pin for connecting inductive loads of IDO8 ~ IDO15 PNP: Common pin for external voltage of IDO8 ~ IDO15
GND		Isolated ground

## Switch and Jumper Settings

Refer to Figure 1 regarding the location of the connectors, jumpers, and switches on the PCIe-1750U/UH card.

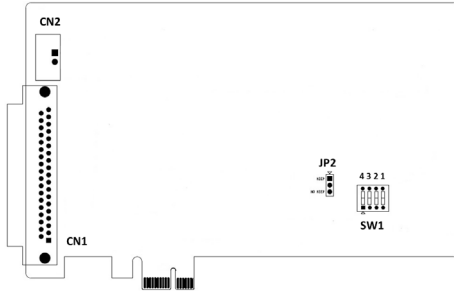


Figure 1. PCIe-1750U/UH Card Layout

### Board ID (SW1)

The PCIe-1750U/UH card features a built-in DIP switch (SW1) that is used to define each card's board ID. When multiple cards are installed on the same chassis, the board ID switch is useful for identifying each card's device number. After setting the ID for all PCIe-1750U/UH cards, users can identify each card using their various device numbers. The default board ID value is 0. To change the board ID (SW1) value, refer to the table below.

Board ID (dec)	Switch Position			
	1 (ID3)	2 (ID2)	3 (ID1)	4 (ID0)
* = 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 is that all isolated output channels are set as open (the load current cannot be sinking current) to protect external devices from damage during system starts or resets.

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

JP2	Power On Configuration After Hot Resets
	Keep last status after hot reset
	Default configuration (default setting)

## Signal Connections

### Isolated Digital Input

Each of the isolated digital input channels accepts bi-directional  $10 \sim 30 V_{DC}$  voltage inputs. This means that both positive and negative voltage can be applied to an isolated input pin (VIN). Figure 2 shows how to connect an external input source to one of the card's isolated input channels.

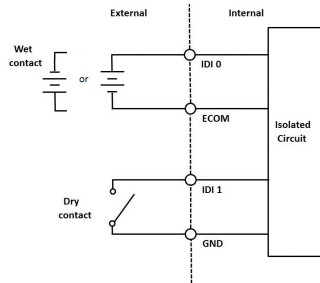


Figure 2. IDI Connection

### Isolated Digital Output

The PCIe-1750U/UH card allows the digital output direction to be configured via software as NPN or PNP. When the direction is set as NPN and the wiring is connected as shown in Figure 3, the current will sink into the IDO channel as the IDO channel is switched to HIGH. When IDO is switched ON in PNP mode and the wiring is connected as shown in Figure 4, the current will be coming from the IDO channel.

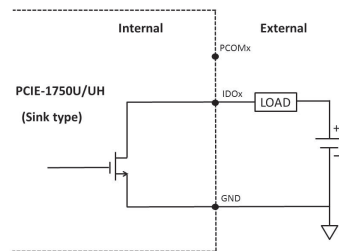


Figure 3. Sink Type (NPN) Connection

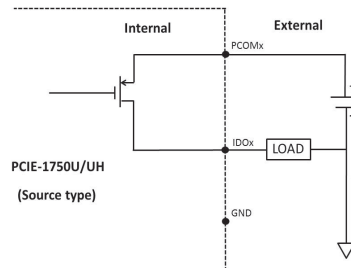


Figure 4. Source Type (PNP) Connection

## Signal Connections (Cont.)

### Extra Grounding

CN2 provides two extra connections that are equivalent to the GND/PCOM pin on CN1 and also increases the current tolerance of the PCIe-1750U/UH card. The CN2 pins should be connected whenever the total current of IDO is higher than 3.2A.

The pin assignments are as follows:

- Pin 1: PCOM, used in source type (PNP) connections
- Pin 2: GND, used in sink type (NPN) connections

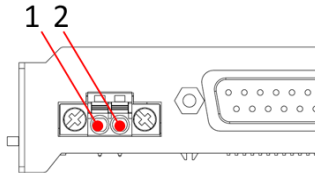


Figure 5. CN2 Pin Definition