

PCI-1712/1712L

1 MS/s, 12-bit, 16-ch High-Speed Multifunction card

Packing List

Before installation, please make sure that you have received the following:

- PCI-1712, PCI-1712L card
- Driver CD
- Quick Start User Manual

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

User Manual

For more detailed information on this product, please refer to the PCI-1712 User Manual on the CD-ROM (PDF format).

CD:\Documents\Hardware Manuals\PCI\PCI-1712

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 which case the user is required to correct interference at his 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 kind of cable is available from Advantech. Please contact your local supplier for ordering information.

Overview

The PCI-1712/1712L is a powerful high-speed multifunction DAS card for PCI bus. It features a 1MHz 12-bit A/D converter, an on-board FIFO buffer (storing up to 1K samples for A/D, and up to 32K samples for D/A conversion). The PCI-1712/1712L provides a total of up to 16 single-ended or 8 differential A/D input channels or a mixed combination, 2 12-bit D/A output channels, 16 digital input/output channels, and 3 10MHz 16-bit multifunction counter channels. PCI-1712/1712L provides specific functions for different user requirements.

Notes

For more information on this and other Advantech products, please visit our websites at:

<http://www.advantech.com/eAutomation>

For technical support and service:

<http://www.advantech.com/support/>

This startup manual is for PCI-1712/1712L.

Part No.2003171210

1st Edition

June 2007

Specifications

Digital Input/Output

Input Channels	16 bi-directional	
Number of Ports	2	
Input Voltage	Low	0.8 V max.
	High	2.0V min.
Output Voltage	Low	0.5 V max. @ +24 mA (sink)
	High	2.4V min. @ -15 mA (source)

Analog Input

Channels	16 single-ended or 8 differential or combination					
Resolution	12-bit					
FIFO Size	1K samples					
Max. Sampling Rate	Multi-channel, single gain: MS/s					
	Multi-channel, multi gain: 600kS/s					
Conversion Time	Multi-channel, multi gain, unipolar/bipolar: 400kS/s					
	500 ns					
Input range and Gain List	Gain	0.5	1	2	4	8
	Unipolar	N/A	0~10	0~5	0~2.5	0~1.25
Drift	Bipolar	±10	±5	±2.5	±1.25	±0.625
	Gain	0.5	1	2	4	8
Small Signal Bandwidth for PGA	Zero(μV/°C)	±80	±30	±30	±30	±30
	Gain(ppm/°C)	±30	±30	±30	±30	±30
Common Mode Voltage	Gain	0.5	1	2	4	8
	Band-width	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz
Max. Input Voltage	±11 V max. (operational)					
Input Protect	±20 V					
Input Impedance	30 V _{p-p}					
Trigger Mode	100 M Ω /10pF(Off); 100 M Ω /100pF(On)					
Accuracy	Software, on-board programmable pacer or external, pre-trigger, post-trigger, delay-trigger, about-trigger					
	DNLE: ±1LSB INLE: ±3LSB Offset error: < 1LSB					
DC Gain error (% FSR)	Gain	0.5	1	2	4	8
	error	0.15	0.03	0.03	0.05	0.1
AC SNR: 68 dB	ENOB: 11 bits					
	THD: -75 dB typical					
External TTL Trigger Input	Low 0.8 V max. High 2.0 V min.					
External Analog Trigger Input	Range -10V to +10 V Resolution 8-bit Impedence 100 M Ω /10 pF typical					
Clock Output	Low	0.5 V max. @ +24 mA				
	High	2.4 V min. @ -15 mA				
Trigger Output	Low	0.5 V max. @ +24 mA				
	High	2.4 V min. @ -15 mA				

Specifications

Analog Output (PCI-1712 only)

Channels	2	
Resolution	12-bit	
FIFO Size	32K samples	
Operation Mode	Single output, continuous output, waveform output	
Output Range (Internal & External Reference)	Using Internal Reference	0~+5V, 0~+10 V -5~+5V, -10~+10V
	Using External Reference	0 ~ + x V @ + x V (- 10 ≤ x ≤ 10) -x ~ + x V @ + x V (- 10 ≤ x ≤ 10)
Accuracy	Relative	±1 LSB
	Differential Non-linearity	±1 LSB (monotonic)
Offset	< 1 LSB	
Slew Rate	20 V / μs	
Drift	10 ppm / °C	
Driving Capability	±10 mA	
Max. Transfer Rate	Single channel: 1 MS/s max. for FSR Dual channel: 500 kS/s max. for FSR	
Output Impedance	0.1 Ω max.	
Digital Rate	5 MHz	
Settling Time	2 μs (to ±1/2 LSB of FSR)	
External Clock Input	Low	0.8 V max.
	High	2.0 V min.
External TTL Trigger Input	Low	0.8 V max.
	High	2.0 V min.

Counter/Timer

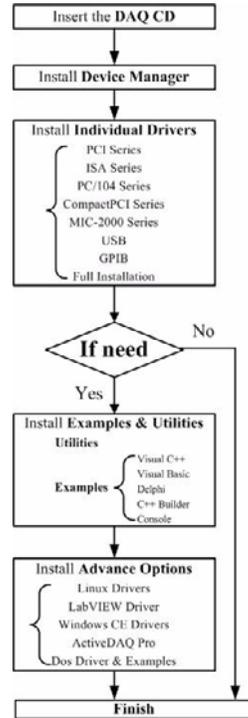
Channels	3	
Resolution	16-bit	
Compatibility	TTL level	
Base Clock	10 MHz, 1 MHz, 100 MHz, 10 kHz	
Max. Input Frequency	10 MHz	
Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.5 V max. @ +24mA
	High	2.4 V min. @ -15mA

General

I/O Connector Type	68-pin SCSI-II female	
Dimensions	175 mm x 100 mm (6.9" x 3.9")	
Power Consumption	Typical	+5 V @ 850mA +12 V @ 960mA
	Max.	+5 V @ 1A +12 V @ 700mA
Temperature	Operation	0 ~ +60°C (32~ 140°F) (refer to IEC 68 -2 -1 .2)
	Storage	-20 ~ +85°C (-4 ~185°F)
Relative Humidity	5 ~ 95% RH non-condensing (refer to IEC 68-2-3)	
Certification	CE certified	

Installation

Software Installation



Hardware Installation

1. Turn off your computer and unplug the power cord and cables. TURN OFF your computer before installing or removing any components on the computer.
2. Remove the cover of your computer.
3. Remove the slot cover on the back panel of your computer.
4. Touch the metal part on the surface of your computer to neutralize the static electricity that might be on your body.
5. Insert the PCI-1712, 1712L card into a PCI slot. Hold the card only by its edges and carefully align it with the slot. Insert the card firmly into place. Use of excessive force must be avoided; otherwise, the card might be damaged.
6. Fasten the bracket of the PCI card on the back panel rail of the computer with screws.
7. Connect appropriate accessories (68-pin cable, wiring terminals, etc. if necessary) to the PCI card.
8. Replace the cover of your computer chassis. Re-connect the cables you removed in step 2.
9. Plug in the power cord and turn on the computer.

PIN Assignment

AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	ANA_TRG
AO0_REF	59	25	AO1_REF
AO0_OUT	58	24	AO1_OUT
AOGND	57	23	AOGND
AL_CLK	56	22	AI_TRG
DGND	55	21	DGND
AO_CLK	54	20	AO_TRG
CNT0_CLK	53	19	CNT0_GATE
CNT0_OUT	52	18	DGND
CNT1_CLK	51	17	CNT1_GATE
CNT1_OUT	50	16	DGND
CNT2_CLK	49	15	CNT2_GATE
CNT2_OUT	48	14	DGND
DIO0	47	13	DIO1
DIO2	46	12	DIO3
DIO4	45	11	DIO5
DIO6	44	10	DIO7
DGND	43	9	DGND
DIO8	42	8	DIO9
DIO10	41	7	DIO11
DIO12	40	6	DIO13
DIO14	39	5	DIO15
DGND	38	4	DGND
AI_TRG_OUT	37	3	AL_CLK_OUT
NC	36	2	NC
+12V	35	1	+5V

*: Pins 20, 22~25, 54, 56~59 are not defined on PCI-1712L.

Signal Name	Reference	Direction	Description
AI<0..15>	AIGND	Input	Analog Input Channels 0 through 15. Each channel pair, AI<i, i+8> (i = 0...7), can be configured as either one differential input or two single-ended inputs.
AIGND	-	-	Analog Input Ground. These pins are the reference points for single-ended measurements and the bias current return point for differential measurements. All three ground references - AIGND, AOGND, and DGND - are connected together on the PCI-1712 card.

AO0_REF AO1_REF	AOGND	Input	Analog Channel 0 Output External Reference. This is the external reference input for the analog output channel 0/1 circuitry.
ANA_TRG	AIGND	Input	Analog Threshold Trigger. This pin is the analog input threshold trigger input.
AO0_OUT AO1_OUT	AOGND	Output	Analog Channels 0 Output. This pin supplies the voltage output of the analog output channel 0/1.
AI_CLK	DGND	Input	Analog Input external clock input. This is the external clock input for the analog input.
AI_TRG	DGND	Input	Analog Input TTL Trigger. This is the TTL trigger for analog trigger.
AOGND	-	-	Analog Output Ground. The analog output voltages are referenced to these nodes. All three ground references - AIGND, AOGND, and DGND - are connected together on your PCI -1712 card.
CNT0_CLK	DGND	Input	Counter 0 Clock Input. This pin is the counter 0 external clock input (up to 10 MHz), counter 0 clock can be wither internal set by software.
CNT0_GATE	DGND	Input	Counter 0 Gate Input. This pin is for counter 0 gate control, see 82C54 data sheer for detailed information.
CNT0_OUT	DGND	Output	Counter 0 Output. This pin is counter 0 output, see 82C54 data sheer for detailed information.
CNT1_CLK	DGND	Input	Counter 1 Clock Input. This pin is the counter 1 external clock input (up to 10 MHz), counter 1 clock can be wither internal set by software.
CNT1_GATE	DGND	Input	Counter 1 Gate Input. This pin is for counter 1 gate control, see 82C54 data sheer for detailed information.
CNT1_OUT	DGND	Output	Counter 1 Output. This pin is counter 1 output, see 82C54 data sheer for detailed information
CNT2_CLK	DGND	Input	Counter 2 Clock Input. This pin is the counter 2 external clock input (up to 10 MHz), counter 2 clock can be wither internal set by software.
CNT2_GATE	DGND	Input	Counter 2 Gate Input. This pin is for counter 2 gate control, see 82C54 data sheer for detailed information.
CNT2_OUT	DGND	Output	Counter 2 Output. This pin is counter 2 output, see 82C54 data sheer for detailed information.
+12V	DGND	Output	+12 VDC Source. This pin is +12 V power supply.
+5V	DGND	Output	+5 VDC Source. This pin is +5 V power supply.
NC	-	-	No Connection. These pins serve no connection.

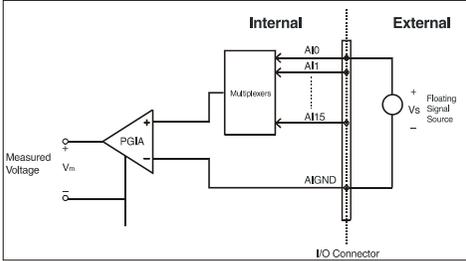
Connections

Analog Input Connections

The PCI-1712/1712L supports either 16 single-ended or 8 differential analog inputs. Each individual input channel is software-selected.

Single-ended Channel Connections

The single-ended input configuration has only one signal wire for each channel, and the measured voltage (V_m) is the voltage of the wire as referenced against the common ground.



Differential Channel Connections

The differential input channels operate with two signal wires for each channel, and the voltage difference between both signal wires is measured. On the PCI-1712/1712L, when all channels are configured to differential input, up to 8 analog channels are available.

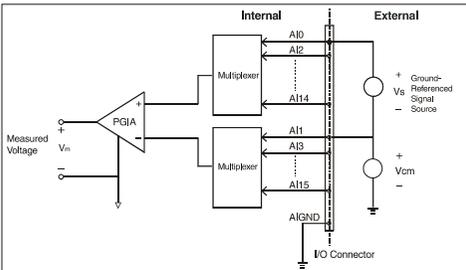


Figure 1: Differential input channel connection - ground reference signal source

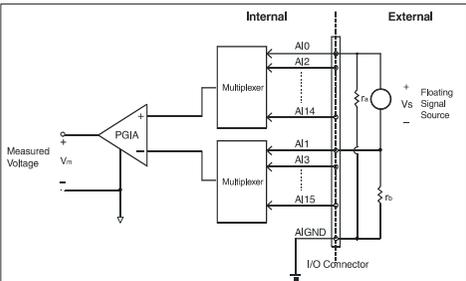


Figure 2: Differential input channel connection - floating signal source

Analog Output Connections

The PCI-1712/1712L provides two D/A output channels, **AO0_OUT** and **AO1_OUT**. Users may use the PCI-1712 internally-provided precision +5V (+10V) reference to generate 0 ~ +5 V and 0 ~ +10 V unipolar D/A output range; or to generate -5 ~ +5 V and -10 ~ +10 V for bipolar output range.

Users also may create D/A output range through external references, **AO0_REF** and **AO1_REF**. The external reference input range is 0 ~10 V. For example, connecting with an external reference of +7 V will generate 0 ~ +7 V D/A output for unipolar; and -7 ~ +7 V for bipolar.

