

Introduction

The PCI-1712 is a powerful high-speed multifunction DAS card for PCI bus. It features a 1 MHz 12-bit A/D converter, an on-board FIFO buffer (storing up to 1 K samples for A/D, and up to 4 K samples for D/A conversion). The PCI-1712 provides a total of up to 16 single-ended or 8 differential A/D input channels or a mixed combination, two 12-bit D/A output channels, 16 digital input/output channels, and three 10MHz 16-bit multifunction counter channels.

PCI-Bus Mastering Data Transfer

The PCI-1712 supports PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, the PCI-1712 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Plug-and-Play Function

The PCI-1712 is a Plug-and-Play device, which fully complies with the PCI Specification Rev 2.2. During card installation, you have no need to set any jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug-and-Play function.

On-board FIFO Memory

The PCI-1712 provides an on-board FIFO (First In First Out) memory buffer, storing up to 1K samples for A/D and 4K for D/A conversion.

Automatic Channel/Gain/SD* Scanning

PCI-1712 features an automatic channel/Gain/SD scanning circuit. This circuit controls multiplexer switching during sampling in a way that is much more efficient than software implementation. On-board SRAM stores different gain and SD values for each channel. This combination lets user perform multi-channel high-speed sampling

Features

- PCI-bus mastering for data transfer
- 16 single-ended or 8 differential or combination analog inputs
- 12-bit A/D converter, with up to 1 MHz sampling rate
- Pre-, post-, about- and delay-trigger data acquisition modes for analog input channels
- Programmable gain for each analog input channel
- Automatic channel/gain/SD* scanning
- On-board FIFO buffer storing up to 1 K samples for A/D and 4 K samples for D/A
- Two 12-bit analog output channels with continuous waveform output function
- Software calibration of analog input and output channels
- 16 digital input and output channels
- Three 16-bit programmable multifunction counter/timers on 10 MHz

(up to 500 kHz) with different gain and SD values for each channel.

SD: Single-Ended/Differential Analog Input

Flexible Triggering and Clocking Capabilities

The PCI-1712 provides flexibility in triggering action, both in the available trigger modes and trigger events for analog input. You can acquire data using post-trigger, pre-trigger, delay-trigger and about-trigger modes. The trigger source could be either analog or digital signal. The analog trigger could originate from a dedicated input pin. In fact, you can designate any of the analog input channels as the analog trigger input. You can set the analog trigger level within a voltage range from zero to A/D FSR. When trigger signal is digital, you can pace A/D and D/A conversion using software interrupt, internal or external clock. You can set the internal clock as trigger source to activate data acquisition up to 2.5 MS/s using only one analog input channel.

Continuous Analog Output

The PCI-1712 provides two analog output channels. Both of them can perform continuous waveform output. The analog output can be up to 500 kS/s for each analog output channel. Or you can load a cyclic waveform into an on-board FIFO, which will continuously output the cyclic waveform. The on-board FIFO of the PCI-1712 can store 2 ~ 4096 samples of the waveform.

On-board Programmable Multifunction Counter/Timer

The PCI-1712 is equipped with three programmable multifunction counter/timers, which can serve as a pacer trigger for A/D conversion. The counter chip is an 82C54 or equivalent, which incorporates three 16-bit channels on a 10 MHz clock. And then, we enhance the gate and clock input function for more applications, such as event counting, pulse generation, duty cycle frequency generation, one shot, frequency measurement and pulse width measurement.

Specifications

Analog Input:

Channels	16 Single-Ended or 8 Differential or Combination				
Resolution	12-bit				
FIFO Size	1 K samples				
Max. Sampling Rate	Single channel: 1 MHz; Multiple channels: 500 KHz				
Conversion Time	500 ns				
Input range and Gain List	Gain	1	2	4	8
	Unipolar	-	0-10V	0-5V	0-2.5V
Small Signal Bandwidth for PGA	Bipolar	±10V	±5V	±2.5V	±1.25V
	Gain	1	2	4	8
Max. Input Overvoltage	Bandwidth	4.0 MHz	2.0 MHz	1.5 MHz	0.65MHz
	Input Protect	±20V			
Input Impedance	70 Vp-p				
Trigger Mode	100 MΩ/10pF (Off); 100 MΩ/100pF (On)				
Accuracy	DC	Software, On-board Programmable Pacer or External, Pre-trigger, Post-trigger, Delay-trigger, About-trigger			
		DNLE: ±1LSB			
		INLE: ±1LSB			
	Offset Error: Adjustable to zero				
	Gain Error: 0.03% FSR (Gain=1)				
	AC	SNR: 68 dB			
ENOB: 11 bits					
THD: -75 dB typical					

Analog Output

Channels	2	
Resolution	12-bit	
FIFO Size	4 K samples	
Operation mode	Single output, Continuous Output, Waveform Output	
Output Range (Internal & External Reference)	Internal Reference	0-+5 V, 0-+10 V, -5-+5 V, -10-+10 V
	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)
Gain Error	Adjustable to zero	
Slew Rate	20V/μs	
Driving Capability	±10mA	
Throughput	500 kHz (max.)	
Output Impedance	0.1 Ω (max.)	
Settling Time	2μs (to ±1/2 LSB of FSR)	

Digital Input/Output:

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

Counter/Timer:

Channels	3	
Resolution	16-bit	
Compatibility	TTL level	
Base Clock	10 MHz	
Max. Input Frequency	10 MHz	

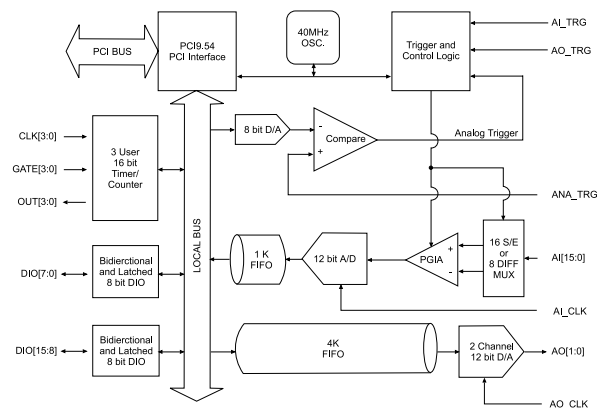
General:

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 @ 850 mA +12 V @ 600 mA
	Max.	+5 V @ 1 A +12 V @ 700mA
Temperature	Operation	0-+70° C (32-158° 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)	

PCI-1712 Pin Assignment

A10	68	34	A11
A12	67	33	A13
A14	66	32	A15
A16	65	31	A17
A18	64	30	A19
A110	63	29	A111
A112	62	28	A113
A114	61	27	A115
A1GND	60	26	ANA_TRG
AO0_REF	59	25	AO1_REF
AO0_OUT	58	24	AO1_OUT
AOGND	57	23	AOGND
AI_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	AI_CLK_OUT
AL_TRG_OUT	37	3	NC
NC	36	2	NC
+12V	35	1	+5V

Block Diagram



Ordering Information

- ❑ **PCI-1712:** 1 MS/s, 12-bit High-Speed Multifunction DAS Card
- ❑ **PCLD-8712:** Wiring Terminal Board for DIN-Rail Mounting
- ❑ **PCL-10168:** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1m
- ❑ **ADAM-3968:** 68-pin SCSI-II Wiring Terminal Board for DIN-Rail Mounting