

PCM-3810I

PCI-104 12-bit Multifunction Module

Packing List

Before installation, please make sure that you have:

- PCM-3810I Module
- Driver CD
- Startup 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 PCM-3810I User Manual on the CD-ROM (PDF format).

Documents\Hardware Manuals\PCM\PCM-3810I

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

PCM-3810I is a multifunction module for PCI-104 bus. Their advanced circuit design provides higher quality and more functions, including 12-bit A/D conversion, D/A conversion, digital input, digital output, and counter/timer.

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 PCM-3810I.

Part No. 2003381010

1st Edition

March 2010

Specifications

Analog Input

Channels	16 S/E or 8 DIFF or combination			
Resolution	12 bits			
FIFO Size	4k samples			
Max. Sampling Rate	250 kS/s			
Input Range and Gain List	Gain	0.5	1	2
	Unipolar	-	0~10	0~5
	Bipolar	±10	±5	±2.5
	Gain	4	8	
Drift	Unipolar	0~2.5	0~1.25	
	Bipolar	±1.25	±0.625	
	Gain	All Gain		
Input Impedance	Zero	15 ppm/°C		
	Span	25 ppm/°C		
	300 M / 5pF			
Accuracy	INLE: ±1 LSB			
	DNLE: ±1 LSB			
	Gain	0.5	1	2
	Gain Error (% FSR)	0.1	0.1	0.2
	Gain	4	8	
	Gain Error (% FSR)	0.2	0.4	

Analog Output

Channels	2		
Resolution	12 bits		
Output Range	Using Internal Reference	0~5, 0~10, ±5, ±10 V	
	Using External Reference	0~+x V @ +x V (-10 ≤ x ≤ 10)	
		-x~+x V @ +x V (-10 ≤ x ≤ 10)	
Accuracy	Relative	±1 LSB	
	Differential	±1 LSB (monotonic)	
	Non-linearity		
Driving Capability	10 mA		
Update Rate	Static update		
Output Impedance	0.1 ohm max.		

Non-Isolated Digital Input/Output

Input Channels	16 (shared)	
Input Voltage	Low	0.8 V max.
	High	2.4 V min.
Output Channels	16 (shared)	
Output Voltage	Low	0.8 V max.
	High	2.4 V min.

Specifications

Counter

Channels	3		
Resolution	24 bits		
Input Frequency	10 MHz max.		
Input Voltage	Low	0.8 V max.	
	High	2.0 V min.	

General

I/O Connector Type	50-pin and 26-pin box header		
Dimensions	96 x 90 mm (3.8" x 3.5")		
Power Consumption	4.2 W typical; 5 W max.		
Temperature	Operating	0 ~ 60° C (32 ~ 158° F)	
	Storage	-20 ~ 70° C (-4 ~ 185° F)	
Humidity	Operating	5 ~ 85% RH non-condensing	
	Storage	5 ~ 95% RH non-condensing	
Certifications	CE certified		

Board ID Switch

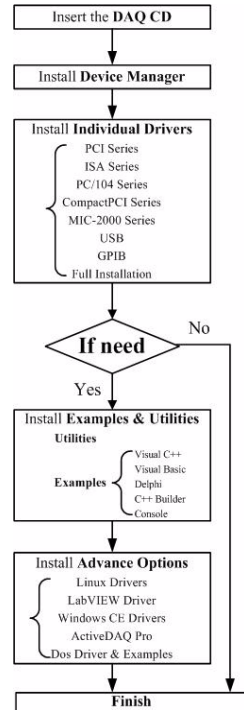
The PCM-3810I has a built-in DIP switch (SW1), which is used to define each module's board ID. When there are multiple cards on the same chassis, this board ID setting function is useful for identifying each module's device number through board ID.

SW1	Position1	Position2	Position3	Position4
Board ID	ID3	ID2	ID1	ID0
15	OFF	OFF	OFF	OFF
14	OFF	OFF	OFF	ON
13	OFF	OFF	ON	OFF
:	:	:	:	:
1	ON	ON	ON	OFF
0*	ON	ON	ON	ON

* Default setting is 0

Installation

Software Installation



Hardware Installation

After the device driver installation is completed, you can now go on to install the PCM-3810I module on your computer.

Please follow the steps below to install the module on your system:

1. Touch the metal part on the surface of your computer to neutralize the static electricity that might be in your body.
2. Plug your card into a PCI-104 slot. Use of excessive force must be avoided; otherwise the card might get damaged.

Pin Assignments

AI DIG TRIG	1	2	DGND
AI PAUSE GATE	3	4	DGND
AI SCAN CLK	5	6	DGND
AI CONV CLK	7	8	DGND
AO START TRIG	9	10	DGND
AO CONV CLK	11	12	DGND
NC	13	14	DGND
CNT0 CLK	15	16	CNT0 GATE
CNT0 OUT	17	18	DGND
CNT1 CLK	19	20	CNT1 GATE
CNT1 OUT	21	22	DGND
CNT2 CLK	23	24	CNT2 GATE
CNT2 OUT	25	26	DGND
DGND	27	28	DGND
DIO0	29	30	DIO1
DIO2	31	32	DIO3
DIO4	33	34	DIO5
DIO6	35	36	DIO7
DGND	37	38	DGND
DIO8	39	40	DIO9
DIO10	41	42	DIO11
DIO12	43	44	DIO13
DIO14	45	46	DIO15
DGND	47	48	DGND
+5V	49	50	+12V

Figure 1: 50-pin I/O Connector Pin Assignments

AI0	1	14	AI1
AI2	2	15	AI3
AI4	3	16	AI5
AI6	4	17	AI7
AI8	5	18	AI9
AI10	6	19	AI11
AI12	7	20	AI13
AI14	8	21	AI15
AGND	9	22	AGND
AO0 REF	10	23	AO1 REF
AO0 OUT	11	24	AO1 OUT
AGND	12	25	AGND
ANA TRIG	13	26	AGND

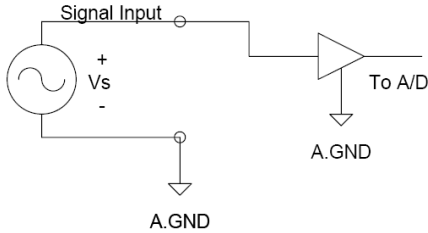
Figure 2: 26-pin I/O Connector Pin Assignments

Signal Name	Reference	Direction	Description
AI<0...15>	AGND	Input	Analog Input Channels 0 to 15.
AGND	-	-	Analog Ground.
ANA TRIG	AGND	Input	Analog threshold Trigger.
AI DIG TRIG	DGND	Input	Analog Input Digital Trigger.
AI PAUSE GATE	DGND	Input	Analog Input Pause GATE.
AI SCAN CLK	DGND	Input	Analog Input Scan Clock.
AI CONV CLK	DGND	Input	Analog Input Conversion Clock.
AO0_REF	AGND	Input	Analog Output Channel 0/1 External Reference.
AO1_REF	AGND	Input	Analog Output Channel 0/1 External Reference.
AO0_OUT	AGND	Output	Analog Output Channels 0/1.
AO1_OUT	AGND	Output	Analog Output Channels 0/1.
AO START TRIG	DGND	Input	Analog Output Start Trigger.
AO CONV CLK	DGND	Input	Analog Output Convert Clock.
DIO<0..15>	DGND	Input	Digital Input/ Output Channel 0 to 15.
DGND	-	-	Digital Ground. This pin supplies the reference for the digital channels at the I/O connector as well as the +5 V and +12 V DC supply.
CNT0 CLK	DGND	Input	Counter 0/1/2 External Clock Input.
CNT1 CLK	DGND	Input	Counter 0/1/2 External Clock Input.
CNT2 CLK	DGND	Input	Counter 0/1/2 External Clock Input.
CNT0 OUT	DGND	Output	Counter 0/1/2 Output.
CNT1 OUT	DGND	Output	Counter 0/1/2 Output.
CNT2 OUT	DGND	Output	Counter 0/1/2 Output.
CNT0 GATE	DGND	Input	Counter 0/1/2 Gate Control.
CNT1 GATE	DGND	Input	Counter 0/1/2 Gate Control.
CNT2 GATE	DGND	Input	Counter 0/1/2 Gate Control.
+12V	DGND	Output	+12 VDC Source.
+5V	DGND	Output	+5 VDC Source.
NC	-	-	Not Connected.

Input Connections

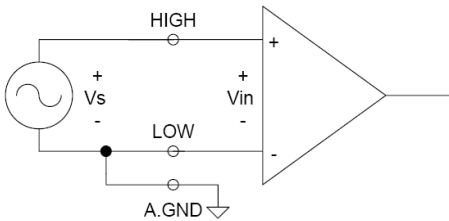
Analog Input - Single-ended Channel Connections

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



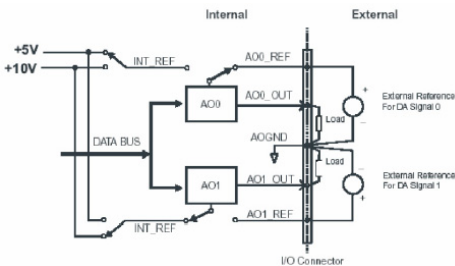
Analog Input - Differential Channel Connections

The differential input channels operate with two signal wires for each channel, and the voltage difference between both signal wires is measured. On PCM-3810I, when all channels are configured to differential input, up to 8 analog channels are available.



Analog Output Connections

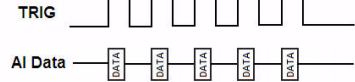
PCM-3810I provides two analog output channels, AO0 and AO1. The figure below shows how to make analog output connections on PCM-3810I.



External Trigger Source Connection

In addition to pacer triggering, PCM-3810I also allows external triggering for A/D conversions. A low-to-high edge coming from TRIG will trigger an A/D conversion on the PCM-3810I board.

External Trigger Mode:



Note!: Don't connect any signal to the TRIG pin when the external trigger function is not being used.

Note!: If you use external triggering for A/D conversions, we recommend you choose differential mode for all analog input signals, so as to reduce the cross-talk noise caused by the external trigger source.