



# PCI Bus Data Acquisition Board Selection Guide

PCI-Bus AD/DA Board			PCI-1802		PCI-1800		PCI-1602		PCI-1202		PIO-1002		PIO-821		PISO-813	
Optional			L	H	L	H	F		L	H	L	H	L	H	(*note 1)	
Analog Input	Channel (*note 2)	S.E.	32		16		32		32		32		16		32	
		DIF.	16		8		16		16		16		8		-	
	Resolution		12bits		12bits		12bits		12bits		12bits		12bits		12bits	
	Input Impedance		10,000MΩ												10MΩ	
	Gain *Refer Table 1		Low Gain	High Gain	Low Gain	High Gain	Low Gain		Low Gain	High Gain	Low Gain	High Gain	Low Gain	High Gain	Low Gain	
	Sampling Rate Max. (S/sec)		330K	44K	330K	44K	200K	100K	110K	44K	110K	44K	80K	30K	10K	
	Input Range *Refer Table 1		Bipolar mode/Unipolar				Bipolar		Bipolar/Unipolar		Bipolar		Bipolar		Bipolar/Unipolar	
	Trigger Mode	Internal	Software Trigger, Pacer Trigger												Software Trigger	
		External	Post-trigger, Pre-trigger, Middle-trigger													
	Channel Scan Method		Magic Scan						Software		Software		Software		Software	
On-Board FIFO		2K sample (8K Option)		1K sample		2K sample (8K Option)		1K sample		-		-		-		
Bus Isolation		-		-		-		-		-		-		Y		
Analog Output	Channel		2						-		1		-			
	Resolution		12bits						-		12 bits		-			
	Output Range (Voltage)		-5~+5V -10~+10V						-		0~+10V 0~+5V		-			
	Driving Current		5mA						-		5mA		-			
Digital Input Channel			16						-		-		-			
Digital Output Channel			16						-		-		-			
Counter/Timer			16 bits						-		16 bits x 3		-			
Dimensions (mm)			200 x 105		200 x 105		190 x 105		200 x 105		175 x 105		160 x 105		180 x105	
Page			14 - 17		14 - 17		20 - 21		14 - 17		18 - 19		*		22	

Note:

1. PISO-813 provides bus isolation up to 3,000Vdc
2. S.E. : Single-ended Input MOde Diff. : Differential Input Mode. (jumper selection)
3. \*: A available soon

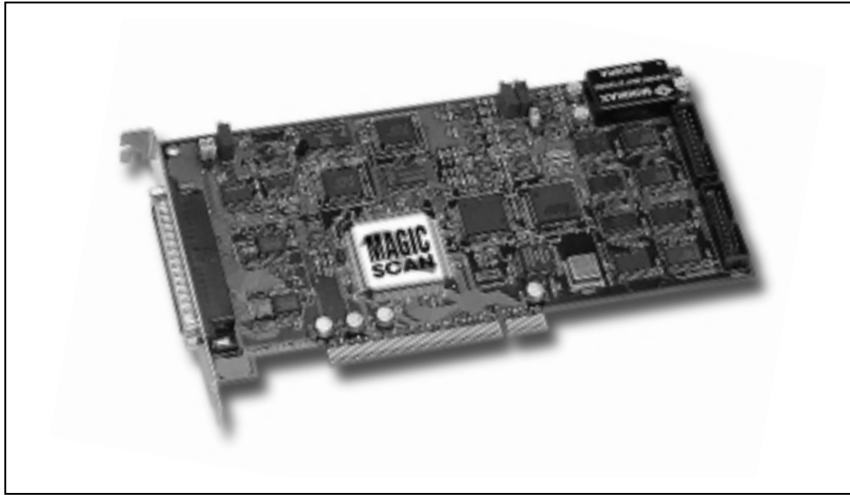
**Table 1: Analog Input Range and Gain Table**

			Analog Input Range and Gain Table							
High Gain	Gain Value		0.5	1	5	10	50	100	500	1000
	Input Range(V)	Bipolar	-10~10	-5~5	-1~1	-0.5~0.5	-0.1~0.1	-0.05~0.05	-0.01~0.01	-0.005~0.005
		Unipolar		0~10		0~1		0~0.1		0~0.01
Low Gain	Gain Value		0.5	1	2	4	8			
	Input Range(V)	Bipolar	-10~10	-5~5V	-2.5~2.5	-1.25~1.25	-0.625~0.625			



## PCI-1800 Series/PCI-1202 Series

**330KS/s 12-bit High Performance Analog and Digital I/O Board**  
**110KS/s 12-bit High Performance Analog and Digital I/O Board**



### Functional Description

The PCI-1800/-1202 series is a family of high performance data acquisition board for PC with PCI bus. It features a continuous, 330KHz/110KHz, gap-free data acquisition under DOS and Windows. The PCI-1800/-1202 family has the same architecture and has, two 12-bit D/A output channel, 16 digital input channels, 16 digital output channels. The PCI-1800H, PCI-1800L provide 16 single-ended or 8 differential inputs. The PCI-1802H, PCI-1802L, PCI-1202H, PCI-1202L provide 32 single-ended or 16 differential inputs. The -H means high gain model and the -L means low gain model. The scan function of PCI-1800/PCI-1202 is so amazing. We call it "MAGIC SCAN". The "variable channel scan" function is found in some famous data acquisition boards. Compare to "Variable channel scan", the "MAGIC SCAN" improves a lot functions and meet the demand of high end user. The "Magic Scan" mechanism not only scan the different input channels at vastly different rates, but also at different gain. Even in multi-channel scan, the sampling rates can maintains at 330KS/s. The PCI-1800 series also has other outstanding features,

For example, 1. The data transfer rate of digital I/O is up to 2.7 M bytes 2.The throughput of D/A is up to 2MHz throughput max. 3. Provides three flexible external trigger mode, such as post-trigger, pre-trigger, middle trigger. 4. Support true "Plug & Play" function 5. Provides M-function, X\_function and Continue Capture function. Please refer to PCI-1602 for more details of M-function and Continuous capture function.

### Features

- Family of three data acquisition boards:
  - PCI-1800: 330K sampling rate
  - PCI-1802: 330K sampling rate
  - PCI-1202:110K sampling rate
- PCI bus
- PCI-1800H,PCI-1800L ,16 single-ended/ 8 differential inputs, 1 K word FIFO buffer
- PCI-1802H,PCI-1802L, 32 single-ended/ 16 differential inputs, 2K word FIFO buffer can be upgrade to 8K word.
- PCI-1202H,PCI-1202L, 32 single-ended/ 16 differential inputs, 1K word FIFO buffer.
- Three different external trigger : post-trigger, pre-trigger, middle trigger
- 16 digital input / 16 digital output channels

- 1800L, 1802L, 1202L : programmable low gain: 0. 5, 1, 2, 4, 8.
- 1800H, 1802H, 1202H : programmable high gain: 0.5, 1,5, 10, 50, 100, 500, 1000.
- Internal / external trigger.
- Two 12-bit independent programmable DAC.; 2 MHz throughput per channel max.
- 2.7 M word /high speed data transfer rate.
- Half size board

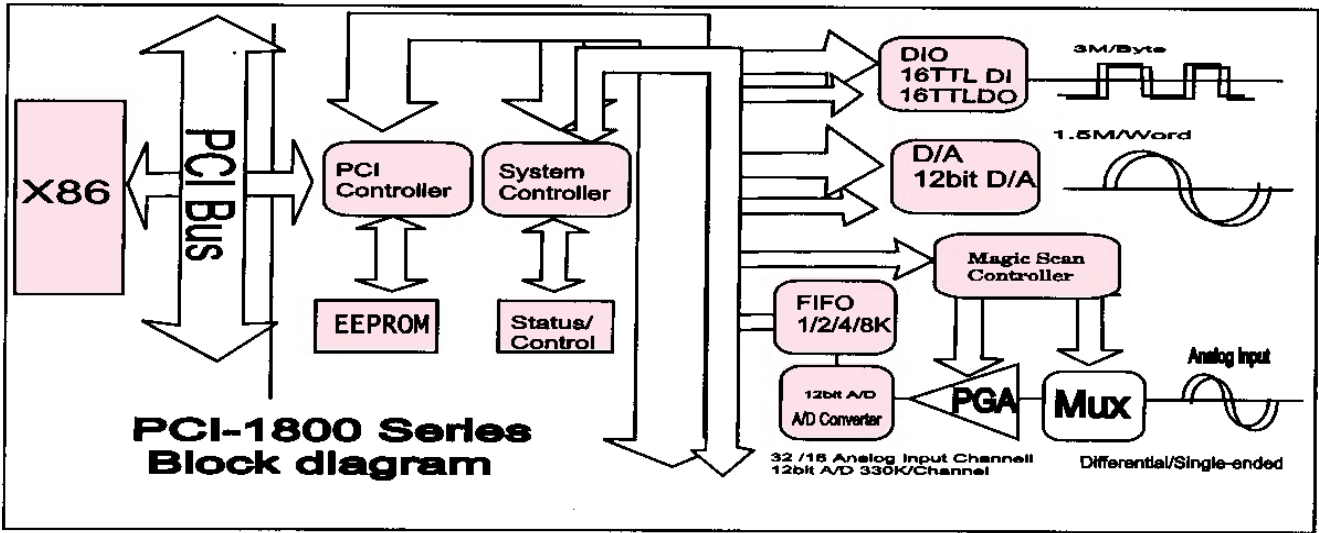
### Applications

- High speed data acquisition system
- Process monitor and control
- Vibration analysis
- Digital pattern generator from digital I/O port
- Continue data capture

### Specifications

#### ■ Analog Inputs

Channels :  
 PCI-1802H , -1802L, -1202L:  
 32 single-ended/ 16 differential  
 PCI-1800H, -1800L :  
 16 single-ended /8 differential  
 Resolution : 12 bits  
 Conversion rate:  
 PCI-1800L, PCI-1802L: 330 KS/s  
 PCI-1202L, : 110KS/s max.  
 Input Impedance : 10,000 MΩ 6pF  
 Over Voltage Protection : +/-35V  
 Accuracy : 0.01 % of reading , +/- 1 bit  
 Linearity : +/- 1 bit  
 On chip sample & hold  
 PCI-1800L, -1802L, -1202L Input Range  
 Bipolar : +/-10V, +/-5V, +/-2.5V, +/-1.25V, +/-0.625V  
 Unipolar :  
 0~10V, 0~5V, 0~2.5V, 0~1.25V



Gain	Bipolar	Unipolar(V)	Max. Switching Frequency	
			180X	1202
0.5	±10	X	330K/S	110K/S
1	±5	0~10	330K/S	110K/S
2	±2.5	0~5	330K/S	110K/S
4	±1.25	0~2.5	330K/S	110K/S
8	±0.625	0~1.25	330K/S	110K/S

- **PCI-1800H , -1802H, -1202H Input Range**  
 Bipolar : +/-10V, +/-5V, +/-1V, +/-0.5V, +/-0.1V, +/-0.05V, +/-0.01V, +/-0.005V  
 Unipolar : 0~10V, 0~1V, 0~0.1V, 0~0.01V

Gain	Bipolar(V)	Unipolar(V)	Max. Switching Frequency
1/0.5	±5/±10	0~10	44K/S
10/5	±0.5/±1	0~1	36K/S
100/50	±0.05/±0.1	0~0.1	7K/S
1000/500	±0.005/±0.01	0~0.01	0.8K/S

- **D/A Outputs**  
 Channels : 2 independent  
 Type : 12-bit double buffered  
 Linearity : 0.006% FS  
 Settling time : 0.4 μS  
 Output range :  
 -5V~5V or -10V~10V  
 Output Driving : +/- 5mA

- **Digital I/O**  
 Inputs : 16 channels ;TTL levels  
 Outputs : 16 channels ;TTL levels ;

- **Timer**  
 Internal pacer timer : 16-bit , 8MHz input  
 Pacer timer for external trigger : 16-bit , 8MHz input  
 Machine independent timer : 16-bit , 8MHz input  
 Power Requirements : +5V, 350mA(max)

- **General Environmental**  
 Storage temp. : -20°C to 70°C  
 Humidity: 0 to 90% non-condensing  
 Dimensions: 200 mm x 105 mm

## "MAGIC SCAN " Function

The "MAGIC SCAN "controller is a innovative design. It has the following features,

1. Different gain for each scan channel
2. Non-sequential order for channel scan
3. Different sampling rate for each scan channel
4. Programmable different digital filter for each scan channel
5. Programmable high/ low alarm function, provide four different alarm monitor mode for each scan channel
6. The scan sampling rate can maintain at max. sampling rates without sacrifice the speed
7. Provide three external trigger: Pre-trigger, Post-trigger, Middle-trigger
8. Easy programming

The PCI-1800 can measure the high frequency signal and low frequency signal with different sampling rate. In other words, the user doesn't have to waste valuable data memory for low speed channel. It can measure small signal and large signal at the same time. The digital filter can filter out some noisy signal. The programmable high/low alarm function will be very helpful for some monitor application system.

### FIFO Size

How many FIFO is big enough for your application? It depend on your application. You can calculate the time buffer you can get using the following formula.

For example, the FIFO size of PCI-1800 is 1 K word. The maxi. Sampling rates of the board is 330KS/s . The time buffer you can get is  
 $1 \text{ Sec}/330\text{K} \times 1\text{K} (\text{FIFO SIZE}) / 2 = 1.55 \text{ ms}$

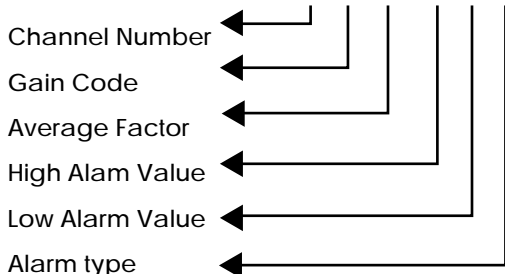
It is enough for regular application under the DOS and Windows. For some complicate multi-tasking applications, the user have to know the FIFO size he need , otherwise the data might be lost. The PCI-1800 series provide the possibility to upgrade the FIFO size.



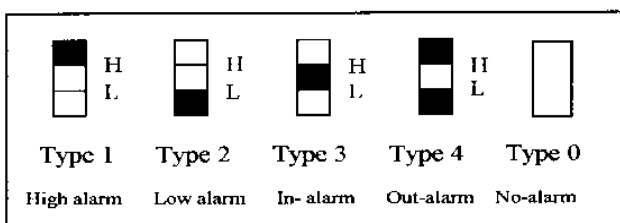
# Powerful Function Call & Easy Programming

## The format of Function Call

P180X\_AddToScan (N, G, AF, H, L, A)



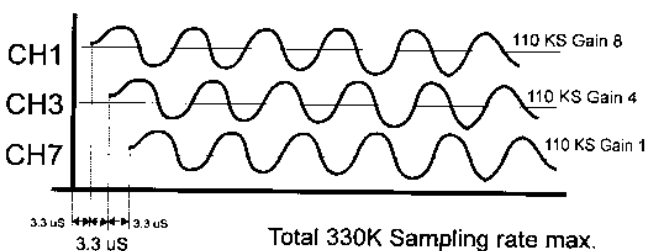
### Alarm Type



### Scan Sequence

#### Programming example 1

```
//Reset MagicScan controller
P180X_ClearScan();
//scan CH:1, Gain code:3, Average factor:1
//set High Alarm: 0.5V, set low alarm: -0.5V, Alarm Type:4
P180X_AddToScan(1,3,1,0.5,-0.5,4);
//scan ordinal number 0, the second data be stored in
//wBuf1
P180X_SaveScan(0,wBuf1);
//scan CH:3, Gain code:2, Average factor:1,
//set High Alarm: 0.0V,set Low Alarm: -1.5V, Alarm Type:2
P180X_AddToScan(3,2,1,0.0,-1.5,2);
//scan ordinal number 1, the scanned data be stored in
//wBuf3
P180X_SaveScan(1,wBuf3);
//scan CH:7, Gain code:0, Averaging factor:1,
//set High Alarm: 4.0V, set Low Alarm: 0.0V, Alarm Type:1
P180X_AddToScan(7,0,1,4.0,0.0,1);
//scan ordinal number 2, the scanned data be stored in
//wBuf7
P180X_SaveScan(2,wBuf7);
//set sampling rate of MagicScan as 8M/24=330K, each
//channel scan 100 points
//the priority of MagicScan thread is THREAD-PRIORITY-
//NORMAL
P180X_startScan(24,100,0);
```

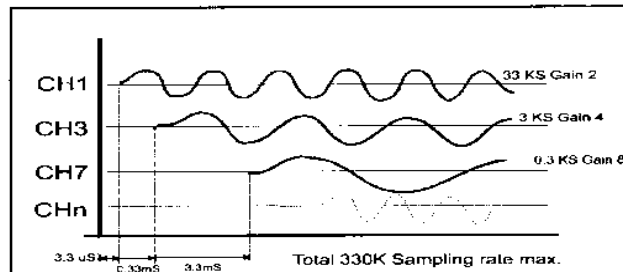


Note:

- High speed ,low channel count scan
- Max. Speed = 330K /3 = 110 K
- Sampling rate of channel 1, 3, 7 is 110K
- Channel 7 > 4V ( high alarm)
- Channel 3 <-1.5V (low alarm)
- Channel 1 > 0.5V ( out of range alarm)
- Channel 1 <-0.5V (out of range alarm)

### Program example 2

```
// Reset MagicScan controller
P180X_ClearScan();
//scan CH:1, Gain code:1, Average factor:1, NO
//Alarm
P180X_AddToScan(1,1,1,0,0,0);
//scan ordinal number 0, the scanned data be
//stored in wBuf1
P180X_SaveScan(0,wBuf1);
//scan CH:3, Gain code:2, Average factor:10, No
//Alarm
P180X_AddToScan(3,2,10,0,0,0);
//SCAN ORDINAL NUMBER 1, THE SCANNED DATA BO
//STORED IN wBuf3
P180X_SaveScan(1,wBuf3);
//scan CH:7, gain code:3, Average factor:100,No
//Alarm
P180X_AddToScan(7,3,100,0,0,0);
//scan ordinal number 2, the scanned data be
//stored in wBuf7
P180X_SaveScan(2,wBuf7);
//set sampling rate of MagicScan as 8M/24=330K,
//each channel scan 100 points.
//the priority of MagicScan thread is THREAD-
//PRIORITY-NORMAL
P180X_StartScan(24,100,0);
```



NOTE:

- High channel count scan at vastly different rates

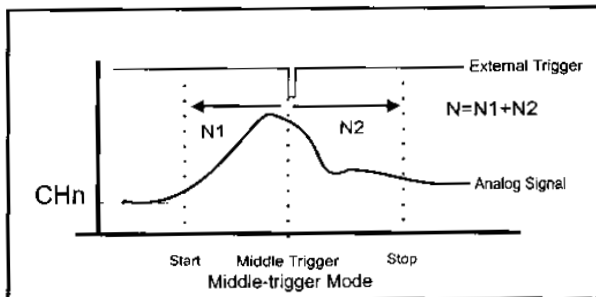
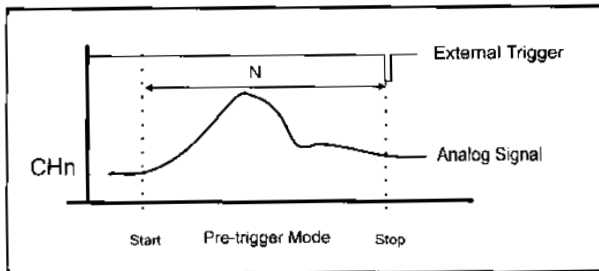
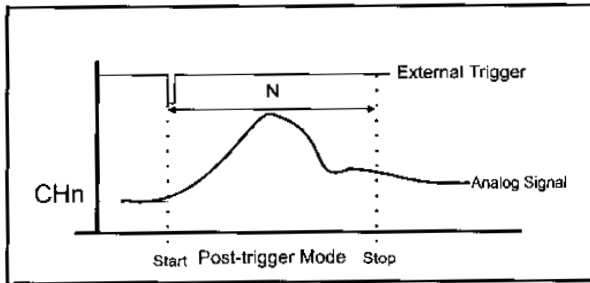


# Powerful Function Call & Easy Programming

## Diverse Trigger Mode

PCI-1800 series provide diverse internal and external trigger modes. The internal trigger includes software trigger and pacer timer trigger. The external trigger includes the following trigger modes:

- Post-trigger mode : Acquisition begins after an external trigger and continues until the specified number of samples are collected
- Pre-trigger mode : Acquisition occurs before an external trigger occurs
- Middle trigger mode : Acquisition occurs before and after an external trigger occurs. The samples number can be pre-defined.



## Software

- PCI-180X Development Toolkit for DOS
- PCI-180X Development Toolkit for Win95
- PCI-180X Development Toolkit for WinNT
- PCI-1202 Development Toolkit for DOS
- PCI-1202 Development Toolkit for Win95
- PCI-1202 Development Toolkit for WinNT

## Order Description

- PCI-1800H : 330KS/s High Gain 12-bit Analog and Digital I/O Board (1K word FIFO)
- PCI-1800H/NDA : PCI-1800H Without D/A
- PCI-1800L : 330KS/s Low Gain 12-bit Analog and Digital I/O Board ( 1K word FIFO)
- PCI-1800L/NDA : PCI-1800L Without D/A
- PCI-1802H : High Channel ,330KS/s High Gain 12-bit Analog and Digital I/O Board (2K word FIFO)
- PCI-1802L : High Channel , 330KS/s Low Gain 12-bit Analog and Digital I/O Board ( 2K word FIFO)
- PCI-1802L /8K : High Channel , 330KS/s Low Gain 12-bit Analog and Digital I/O Board ( 8K word FIFO)
- PCI-1202L: High Channel , 110KS/s Low Gain 12-bit Analog and Digital I/O Board ( 1K word FIFO)
- PCI-1202H: High Channel , 110KS/s High Gain 12-bit Analog and Digital I/O Board ( 1K word FIFO)

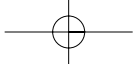
## Options

- DB-1825 : Screw terminal board with bread area for filter circuitry added for the PCI-1802H, -1802L, -1202H, -1202L
- DB-8225 : Screw terminal board , filter circuitry can be added for PCI-1800H,1800L
- DB-16P : 16 Channel isolated digital input Board
- DB-16R : 16 Channel SPDT relay board
- ADP-20/PCI: 20-pin Extender
- PCI-1800 LabVIEW Development Toolkit for Win95
- PCI-1800 LabVIEW Development Toolkit for WinNT
- PCI-1202 LabVIEW Development Toolkit for Win95
- PCI-1202 LabVIEW Development Toolkit for WinNT

Pin Assignment of PCI-1800H,PCI-1800L is the same as A-822PGH.

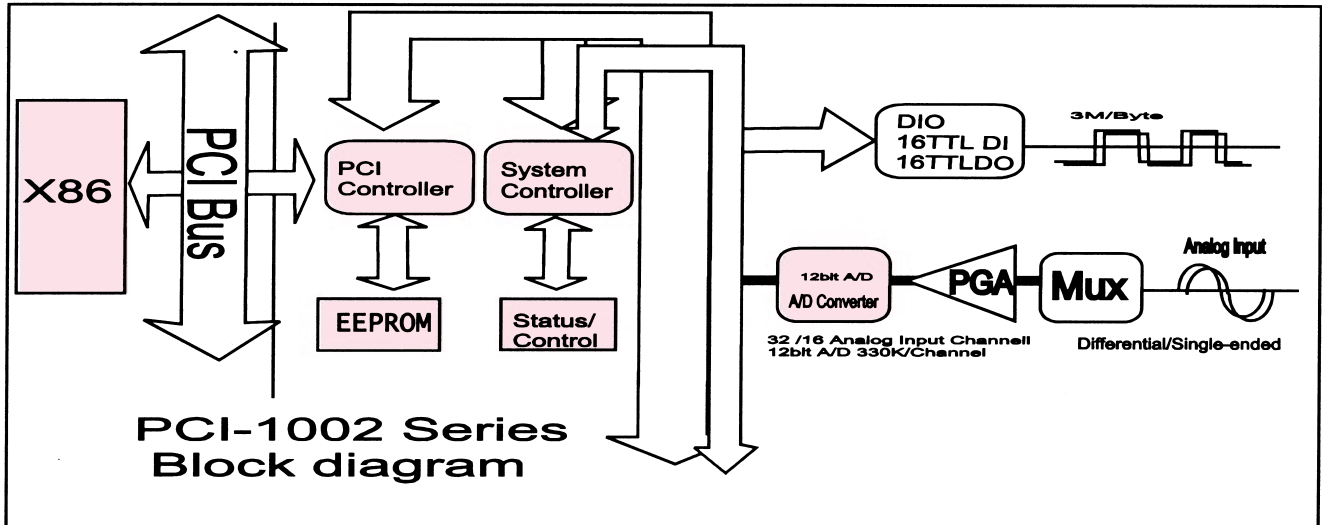
Pin Assignments of PCI-1802H,PCI-1802L

AI 0	1	●	20	AI16
AI 1	2	●	21	AI17
AI 2	3	●	22	AI18
AI 3	4	●	23	AI19
AI 4	5	●	24	AI20
AI 5	6	●	25	AI21
AI 6	7	●	26	AI22
AI 7	8	●	27	AI23
AI 8	9	●	28	AI24
AI 9	10	●	29	AI25
AI10	11	●	30	AI26
AI11	12	●	31	AI27
AI12	13	●	32	AI28
AI13	14	●	33	AI29
AI14	15	●	34	AI30
AI15	16	●	35	AI31
A.GND	17	●	36	DA2 out
DA1 out	18	●	37	D.GND
Ext Trg	19	●		



# PCI-1002 Series

## 110KS/s 12 bit Low Cost A/D Board



PCI-Bus

### Pin Assignments of CON3

#### Pin Assignment

AI 0	1	•	20	AI 16
AI 1	2	•	21	AI 17
AI 2	3	•	22	AI 18
AI 3	4	•	23	AI 19
AI 4	5	•	24	AI 20
AI 5	6	•	25	AI 21
AI 6	7	•	26	AI 22
AI 7	8	•	27	AI 23
AI 8	9	•	28	AI 24
AI 9	10	•	29	AI 25
AI 10	11	•	30	AI 26
AI 11	12	•	31	AI 27
AI 12	13	•	32	AI 28
AI 13	14	•	33	AI 29
AI 14	15	•	34	AI 30
AI 15	16	•	35	AI 31
A. GND	17	•	36	N.C.
N.C.	18	•	37	D. GND
Ext Trg	19	•		

### Pin Assignment of CON1

DI0	1	2	DI1
DI2	3	4	DI3
DI4	5	6	DI5
DI6	7	8	DI7
DI8	9	10	DI9
DI10	11	12	DI11
DI12	13	14	DI13
DI14	15	16	DI15
D.GND	17	18	D.GND
+5V	19	20	+12V

### Software

- PCI-1002 Development Toolkit for DOS
- PCI-1002 Development Toolkit for Win95
- PCI-1002 Development Toolkit for WinNT

### Order Description

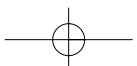
- PCI-1002H : High Channel ,110KS/s High Gain,12-bit Analog and Digital I/O Board
- PCI-1002L : High Channel , 110KS/s Low Gain 12-bit Analog and Digital I/O Board

### Options

- DB-1825 : Screw terminal board with bread area
- DB-16P : 16 Channel isolated digital input Board
- DB-16R : 16 Channel SPDT relay board
- ADP-20/PCI: 20-pin Extender
- PCI-1002 LabVIEW Development Toolkit for Win95
- PCI-1002 LabVIEW Development Toolkit for WinNT

### Pin Assignment of CON2

DO0	1	2	DO1
DO2	3	4	DO3
DO4	5	6	DO5
DO6	7	8	DO7
DO8	9	10	DO9
DO10	11	12	DO11
DO12	13	14	DO13
DO14	15	16	DO15
D.GND	17	18	D.GND
+5V	19	20	+12V





## PCI-1602F/1602 Series

**200KS/s 16 bit High Performance Analog and Digital I/O Board**  
**100KS/s 16 bit High Performance Analog and Digital I.O Board**



### Functional Description

The PCI-1602F/1602 series is a family of high performance data acquisition boards for the PCI bus. It features a continuous, 200KHz / 110KHz, gap-free data acquisition under DOS and Windows. The PCI-1602 family has the same hardware architecture as PCI-1802L. The PCI-1602F/1602 series provide 32 single-ended or 16 differential inputs. Like the PCI-1802 family, the PCI-1602F/1602 series features " Magic Scan " function, M-function, X-function, and Continuous Capture function. Please refer to PCI-1802 for more details of "Magic Scan" .

### Features

- PCI bus
- PCI-1602F :16-bit 200KHz A/D converter
- PCI-1602 :16 bit 100KHz A/D converter
- PCI-1602F,PCI-1602
  - 32 single-ended/ 16 differential inputs, 2K word FIFO buffer, PCI-1602F can be upgrade to 8K word
- The sampling rates of single channel or multiple channels is 200 K /100K samples/s
- Three different external trigger : post-trigger, pre-trigger, middle trigger
- 16 digital input / 16 digital output channels
- programmable low gain: 1, 2, 4, 8.
- Internal / external trigger
- Two 12-bit independent programmable DAC.; 2 MHz throughput per channel max.
- 2.7 M word / high speed data transfer rate.
- Half size board

### Applications

- High speed data acquisition system
- Process monitor and control
- Vibration analysis
- Digital pattern generator from digital I/O port
- System Identification

- Continuous data acquisition

### Specifications

#### ■ Analog Input Specifications

Channels: 32 single-ended/ 16 differential  
 Resolution : 16 bits

PCI-1602F :Conversion rate : 200 KS/s max.

PCI-1602 :Conversion rate : 100 KS/s max.

Input Impedance : 10,000 MΩ||6pF

Over Voltage Protection : +/-35V

A/D converter: +/-1.5LSB ( Max. INL)

On chip sample & hold

#### ■ PCI-1602F,PCI-1602 Input Range

Bipolar : +/-10V,+/-5V,+/-2.5V,+/-1.25V

Gain	Bipolar(V)	PCI-1602F Max. Switching Frequency	PCI-1602 Max. Switching Frequency
1	±10	200K/s	100K/s
2	±5	200K/s	100K/s
4	±2.5	200K/s	100K/s
8	±1.25	200K/s	100K/s

#### ■ D/A Outputs

Channels : 2 independent

Type : 12-bit double buffered

Linearity : 0.006% FS

Settling time : 0.4 μs

Output range :

Internal reference -5V~5V or -10V~10V(bipolar)

Output Driving : +/- 5mA

#### ■ Digital I/O

Inputs : 16-channels ;TTL levels

Outputs : 16-channels ;TTL levels ;

#### ■ Timer

Internal pacer timer : 16 bit , 8MHz input

Pacer timer for external trigger : 16 bit , 8MHz input

Machine independent timer : 16 bit ,

8MHz input

#### ■ Power Requirements : +5V, 350mA(max)

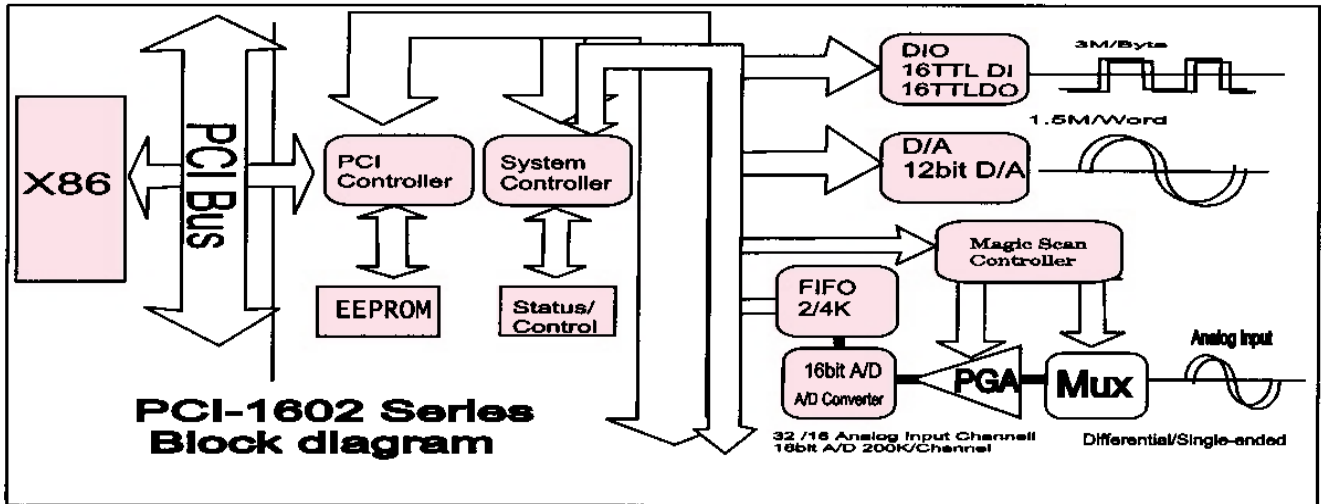
#### ■ General Environmental

Operating temp.: 0-50°C

Storage temp.: -20°C to 70°C

Humidity : 0 to 90% non-condensing

Dimensions: 190 mm x 105 mm



### M\_function

M\_Function is used to support simultaneous gap-free A/D, D/A at full rated throughput. The user can use the D/A channel to send out the pre-defined signal pattern to the external device and measure the output signal simultaneously. The M\_function can be executed under DOS, Windows 3.1, Windows 95, Windows NT. Some programming language (VC/C++, BC++, VB, Delphi) and package (LabVIEW) can call the M\_function. It is a cost-effective tool for system identification. The user doesn't have to use expensive signal analyzer. Refer to EP001 application note for detail.

### Continue Capture Function

The PCI-180X/1602/1202 provides different continuous capture functions.

- 1. Continuous Capture at Low speed. The acquired data can be display at the monitor simultaneously. No storage is required. Therefore the user can monitor the data continually.
- 2. Continuous Capture at high speed. The acquired data should be saved into the DRAM of PC. The capture period should be limited to the Memory size
- 3. Continuous Capture at high speed. The acquired data should be saved into the SRAM card of PC. The capture period should be limited to the Memory size.

- 3. Continuous Capture at high speed. The acquired data should be saved into the SRAM card of PC. The capture period should be limited to the Memory size. The user should have to calculate the memory size according to the sampling rates and the capture period. The Continue Capture function can be executed under DOS, Windows 3.1, Windows 95, Windows NT. Continuous Capture function can support multiple boards.

- **FIFO Size & Trigger mode**  
Refer to PCI-1800 for more details.

### Software

- PCI-1602 Development Toolkit for DOS
- PCI-1602 Development Toolkit for Win95
- PCI-1602 Development Toolkit for WinNT

### Order Description

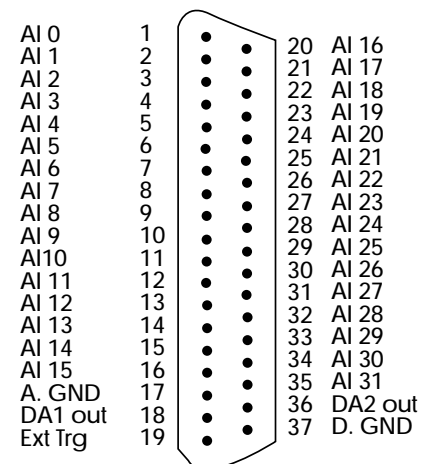
- PCI-1602F/2K: 200KS/s 16-bit Analog and Digital I/O Board (2K word FIFO)
- PCI-1602F/8K: 200KS/s; 16-bit Analog and Digital I/O Board (8K word FIFO)
- PCI-1602: 100KS/s; 16-bit Analog and Digital I/O Board (2K word FIFO)

### Options

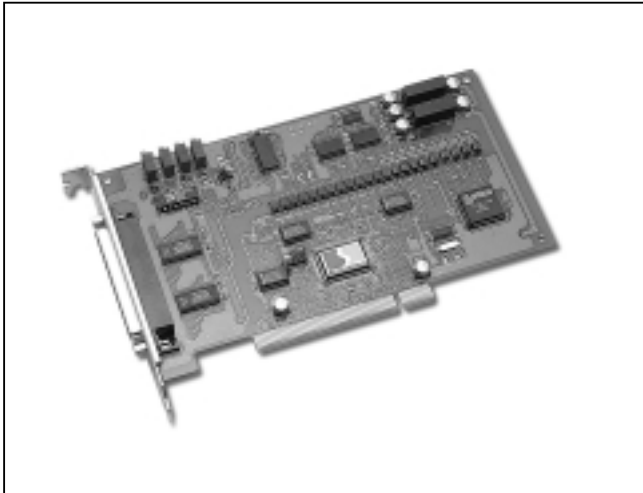
- DB-1825 : Screw terminal board with bread area for filter circuitry added for the PCI-1602F/1602

- DN-37 : I/O connector block with DIN-Rail Mounting
- DB-37: Direct connect 37-pin termination board
- DB-16P: 16 Channel isolated digital input Board
- DB-16R: 16 Channel SPDT relay board
- ADP-20/PCI: 20-pin Extender
- PCI-1602 LabVIEW Development Toolkit for Win95
- PCI-1602 LabVIEW Development Toolkit for WinNT

### PCI-1602F/1602 Pin Assignments







### Functional Description

The PISO-813 is a bus-type isolated 12-bit A/D board for the PCI bus for IBM or compatible PC. It features a 10KHz data acquisition under DOS and Windows. The PISO-813 provides 32 single-ended analog input. The isolation range of PISO-813 is increased to 3000 V. It is the most cost-effective isolated A/D board for the PCI Bus in the world. The PISO-813 has one 37-pin D-sub connector. It can be installed in a 5V PCI slot and can support truly " Plug & Play "

### Features

- PCI Bus
- 32 single-ended analog input channels
- 12-bit A/D converter
- 3,000Vdc photo-isolation protection
- Analog input range
  - Bipolar: +/-10V, +/-5V, +/-2.5V, +/-1.25V, +/-0.625V
  - Unipolar: 0-10V, 0-5V, 0-2.5V, 0-1.25V
- Programmable gain control: 1, 2, 4, 8, 16
- 3000V DC/DC converter built-in
- A/D trigger mode: software trigger
- A/D data transfer mode: polling

### Applications

- Data acquisition
- Harsh environment operation
- Signal isolation

### Specifications

- Channels: 32 single-ended
- Resolution: 12 bits
- Conversion rate: 10KS/s (max.)
- Input impedance: 10MΩ
- Overvoltage protection: +/-35V
- Accuracy: 0.01% of reading +/- 1 bit
- Linearity: +/- 1 bit
- On chip sample & hold

- Zero drift: +/-25ppm/°C of FS max.
- Power consumption: +5V / 860mA

### Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temp.: -20 °C to 70 °C
- Humidity: 0 to 90 % non-condensing
- Dimension: 180 mm x 105 mm

### Software

- PISO-813 Development Toolkit for DOS
- PISO-813 Development Toolkit for Win95
- PISO-813 Development Toolkit for WinNT

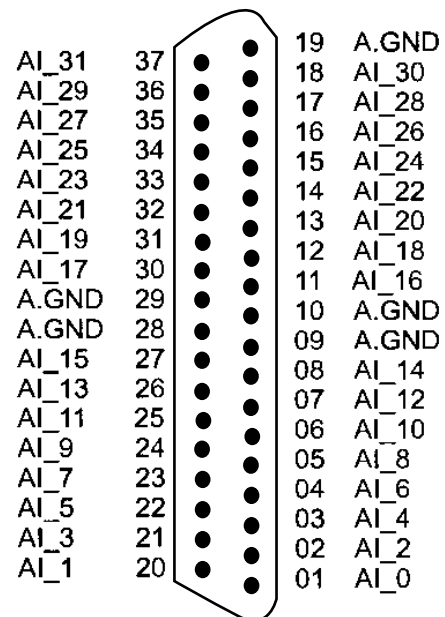
### Order Description

- PISO-813: 32 channel isolated analog input board
- PISO-813/S: PISO-813 with DB-8325

### Options

- DB-8325: Daughter board with signal conditioning circuitry
- DB-37: Directly connect signals to the back of PISO-813
- DN-37: I/O connector block with DIN-rail mounting and 37-pin D-Sub connector on it
- PISO-813 LabVIEW Development Toolkit for Win95
- PISO-813 LabVIEW Development Toolkit for WinNT

### Pin Assignment



Note: AI-n: Analog Input Channel  
A.GND: Analog Ground



# PCI Bus Analog Output Board Selection Guide

PCI-Bus DA Board		PISO-DA2	PISO-DA4	PISO-DA8	PISO-DA16	PIO-DA4	PIO-DA8	PIO-DA16
Analog Output	Output Channel	2	4	8	16	4	8	16
	Resolution	12bits	14 bits					
	Output Range	Voltage	-10~+10V, -5~+5V 0~+5V, 0~+10V					
		Current	0~20mA, 4~20mA					
	Power on value can be pre-set	N	Y	Y	Y	N		
	Voltage output and Current output can be switched without re-calibration	-	Y	Y	Y	Y		
	Need trimpot for calibration	N	Y	Y	Y	N		
	Channel to Channel Isolation	Y	N	N	N	N		
Digital Input Channel (TTL Level)		16						
Digital Output Channel (TTL Level)		16						
Counter/Time	Channel	16bits x 1/ 32 bits x 1						
	Clock Source	4MHz						
Bus Isolation	Bus Isolated	Y	Y	Y	Y	N		
	Channel to Channel Isolated	Y	N	N	N	N		
Dimensions (mm)		170 x 122	unknown	unknown	unknown	179 x 122		
Page		*	*	*	*	24 - 25		

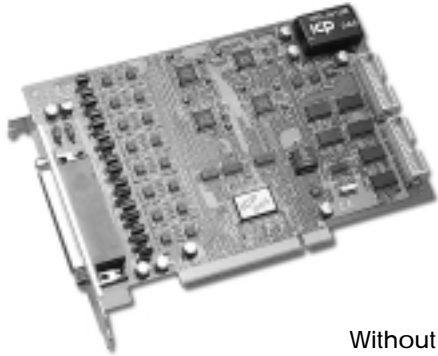
NOTE:

1. \*: (Available Soon)



# PIO-DA16/PIO-DA8/PIO-DA4

## 14-Bit 16/8/4 Channel Analog Output Boards



Without trim-pot  
With Voltage and  
current output

### Functional Description

The PIO-DA16, PIO-DA8, and PIO-DA4 are multi-channel D/A boards for the PCI bus for IBM or compatible PC.

The PIO-DA16/8/4 offer 16/8/4 channel double-buffered analog output. The output range may be configured in different ranges:  $\pm 10V$ ,  $\pm 5V$ ,  $0\sim 10V$ ,  $0\sim 5V$  voltage output or  $4\sim 20mA$  or  $0\sim 20mA$  current loop sink.

The innovative design improves several drawbacks of the conventional D/A boards. For example: 1. Jumperless and without Trim-pot. 2. The calibration is performed under software control eliminating manual trim-pot adjustments. The calibration data is stored in EEPROM. 3. Each channel can be selected as voltage or current output. 4. High channel count output can be implemented in half size.

### Features

- PCI bus
- 16/8/4 channel, 14-bit analog output
- Unipolar or bipolar outputs available from each converter
- Voltage/ current outputs for individual D/A converter
- Output type (Unipolar or bipolar) and output range ( $0\sim 5V$ ,  $\pm 5V$ ,  $0\sim 10V$ ,  $\pm 10V$ ) can be software programmable
- $4\sim 20mA$  or  $0\sim 20mA$  current sink to ground for each converter
- Double-buffered D/A latches
- Software calibration
- 16-channel DI, 16-channel DO

### Applications

- Programmable voltage source
- Programmable current sink
- Harsh environment operation
- Process control

### Specifications

- Analog Outputs
- D/A converter: Quad 14-Bit MDAC
- Channels: 4/8/16 independent
- Resolution: 14 bits
- Type: double-buffered, multiplying
- Integral linearity: 0.006% FSR ; typical
- Differential linearity: 0.006 % FSR ; typical

#### Voltage Output Range:

- Unipolar:  $0\sim 5V$  or  $0\sim 10V$
- Bipolar:  $\pm 10V$  or  $\pm 5V$
- Current drive:  $\pm 5mA$
- Absolute accuracy: 0.01% FSR typical

#### Current Output Range:

- $20mA$  or  $4\sim 20mA$
- Absolute accuracy: 0.1% FSR typical
- Excitation voltage range:  $+ 7V$  to  $+40V$  Stability
- Offset temperature coefficient:  $\pm 50V\mu/^\circ C$
- Gain temperature coefficient:  $\pm 10ppm/^\circ C$

#### Power consumption:

- PIO-DA4:  $+5VDC/600mA$  (max.)
- PIO-DA8:  $+5VDC/800mA$  (max.)
- PIO-DA16.  $+5VDC/1400mA$  (max.)

### Environmental

- Operating Temperature:  $0$  to  $50^\circ C$
- Storage Temp.:  $-20^\circ C$  to  $70^\circ C$
- Humidity:  $0$  to  $90\%$  non-condensing
- Dimensions:  $179\text{ mm} \times 122\text{ mm}$

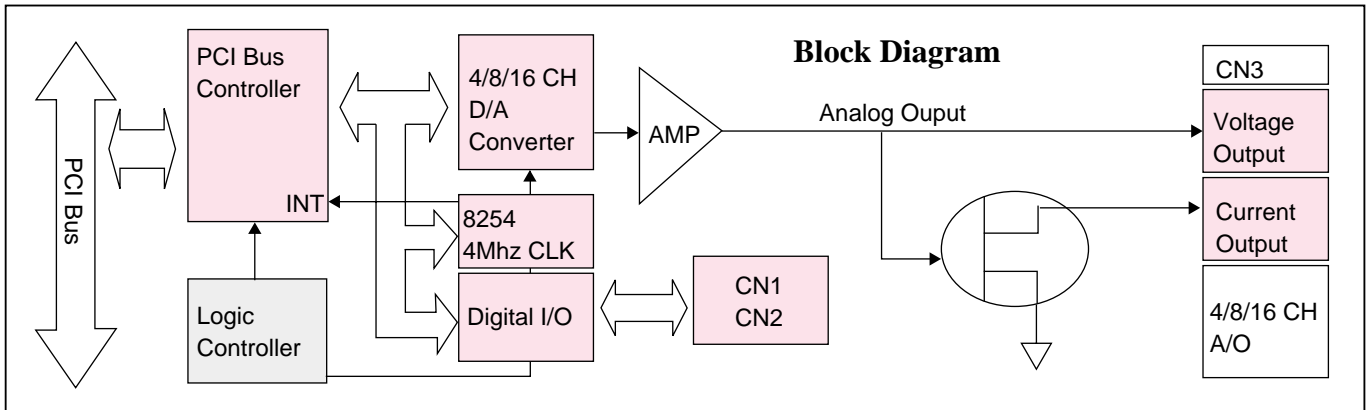
### Software

- PIO-DA Development Toolkit for DOS
- PIO-DA Development Toolkit for Win95
- PIO-DA Development Toolkit for WinNT

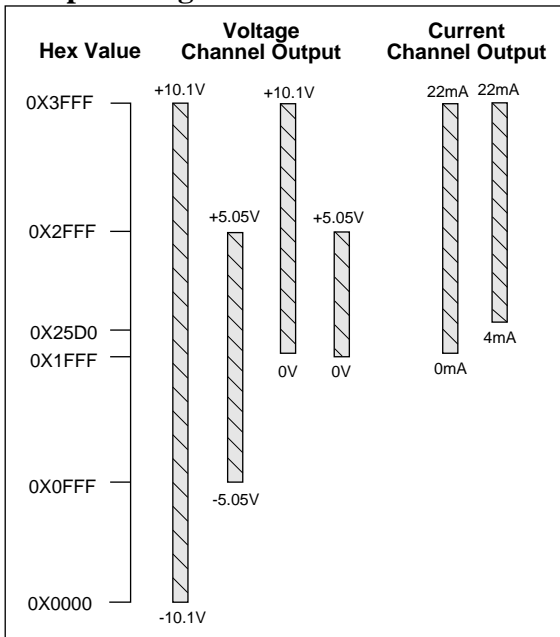


# PIO-DA16/PIO-DA8/PIO-DA4

## 14-Bit 16/8/4 Channel Analog Output Boards



### Output Range & Resolution



The resolution of each range is given as follows

Configuration	Equivalent bit	Resolution
-10 ~ +10V	14bit	1.22mV
0V ~ +10V	13bit	1.22mV
-5V ~ +5V	13bit	1.22mV
0V ~ +5V	12bit	1.22mV
0mA ~ 20mA	13bit	2.70μA
4mA ~ 20mA	13bit	2.70μA

### Pin Assignment

CN1				CN2					
DO 0	1	●	2	DO 1	DI 0	1	●	2	DI 1
DO 2	3	●	4	DO 3	DI 2	3	●	4	DI 3
DO 4	5	●	6	DO 5	DI 4	5	●	6	DI 5
DO 6	7	●	8	DO 7	DI 6	7	●	8	DI 7
DO 8	9	●	10	DO 9	DI 8	9	●	10	DI 9
DO 10	11	●	12	DO 11	DI 10	11	●	12	DI 11
DO 12	13	●	14	DO 13	DI 12	13	●	14	DI 13
DO 14	15	●	16	DO 15	DI 14	15	●	16	DI 15
GND	17	●	18	GND	GND	17	●	18	GND
+5V	19	●	20	+12V	+5V	19	●	20	+12V

### Order Description

- PIO-DA4: 4 channel 14-BIT Analog Output Board
- PIO-DA8: 8 channel 14-BIT Analog Output Board
- PIO-DA16: 16 channel 14-BIT Analog Output Board

### Options

- DN-37: I/O connector block with DIN-rail mounting and 37-pin D-Sub connector
- DN-37: 37-pin directly connecting board
- DB-16P: opto-isolated digital input board
- DB-16R: Relay output board
- DB-24PR: Power relay output board
- DB-24C: Open-collector output board
- DB-24POR: photo-mos relay output board
- ADP-20/PCI: 20-pin extender
- PCI-DA LabVIEW Development Toolkit for Win95
- PCI-DA LabVIEW Development Toolkit for WinNT

