

# PCI-M512/PCI-M4M



PCI-M512



PCI-M4M

### Functional Description

The PCI-M512 provides 512K bytes memory and the PCI-M4M provides 4M bytes memory. They consist of one 12-bit input port and one 16-bit output port. The user can use the DB-16P to connect the input ports (CN2) for isolation purpose, or use DB-16R to interface to the output ports (CN1) for relay control.

### Specifications

#### Digital Input

- Number of channels: 12
- All inputs are TTL compatible
- Logic high voltage: 2.4V min
- Logic low voltage: 0.8V max

#### Digital Output

- Number of channels: 16
- All outputs are TTL compatible
- Sink current: 24 mA max
- Source current: 15 mA max

#### Comparison Table of PCI-M512/PCI-M4M

Device	PCI-M512	PCI-M4M
SRAM Size	512K bytes	4M bytes
Memory Access	32-bit	16-bit
Sub-device ID for auto detection	0x0512	0x4096
I/O Access	16-bit	
Li-Battery	BT1&BT2	
Battery Status bits	BT1 Low, BT1 Bad, BT2 Low, BT2 Bad (low voltage=2.3V,bad voltage=2.1V)	
LED indicators	BT1 Low(Green),BT1 Bad(Red) BT2 Low(Green),BT2 Bad(Red)	
D/I	12-channel, TTL compatible	
D/O	16-channel, TTL compatible	

### Features

- On-board 512K bytes SRAM for PCI-M512
- On-board 4M bytes SRAM for PCI-M4M
- Two Li-batteries, BT1 & BT2, for battery-backup the data of SRAM
- Two indicators, low-battery & bad-battery, for battery BT1
- Another two indicators, low-battery & bad-battery, for battery BT2
- 16-bit general purpose TTL-compatible D/O or relay (with daughter board DB-16R or DB-24PR)
- 12-bit general propose TTL-compatible D/I or isolated input (with daughter board DB-16P)

### General Specifications

- PCI-M512 power requirements: +5V @ 420 mA
- PCI-M4M power requirements: +5V @ 500 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90 % non-condensing
- Storage temperature: -40 ~ 85°C
- Dimensions: 140 mm x 90 mm

### Pin Assignment

CN1										CN2									
DO 0	1	○	○	2	DO 1	NC	1	○	○	2	NC								
DO 2	3	○	○	4	DO 3	NC	3	○	○	4	NC								
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								

### Ordering Information

#### Standard

- PCI-M512:** PCI bus 512K bytes memory board  
**PCI-M4M:** PCI bus 4M bytes memory board

#### Optional

- DB-16P:** 16-channel isolated D/I board  
**DB-16R:** 16-channel relay board  
**DB-24PR:** 24-channel power relay board  
**DB-24POR:** 24-channel Photo Mos relay output board  
**DB-24C:** 24-channel open-collector output board  
**DB-24OD:** 24-channel open-drain output board  
**DB-8025:** General screw terminal board  
**DN-20:** DIN-rail mounting terminal board

# Selection Guide

## PCI bus data acquisition board

PCI-Bus AD/DA Board			PCI-1802		PCI-1800		PCI-1602		PCI-1202		PCI-1002		PIO-821		PISO-813	
Optional			L	H	L	H	F		L	H	L	H	L	H		
Analog Input	Channel (*note1)	S.E.	32		16		32		32		32		16		32	
		Diff.	16		8		16		16		16		8		-	
	Resolution		12-bit		12-bit		16-bit		12-bit		12-bit		12-bit		12-bit	
	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	40K	110K	44K	45K	45K	10K	
	Input Range *Refer Table 1		Bipolar /Unipolar				Bipolar		Bipolar/ Unipolar		Bipolar		Bipolar		Bipolar/ Unipolar	
	Trigger Mode	Internal	Software Trigger, Pacer Ttigger												Software	
		External	Post-trigger, Pre-trigger, Middle-trigger										-			
	Change Scan Method		Magic Scan								Software					
	On-Board FIFOs		8K sample		2K sample (8K Option)		8K sample		2K sample (8K Option)		-					
	Bus Isolation		-												3000VDC	
Analog Output	Channel		2								-		1		-	
	Resolution		12-bit												-	
	Output Range (Voltage)		-5 ~ +5V -10 ~ +10V								-		0 ~ +10V 0 ~ +5V		- -	
	Driving Current		± 5 mA								-		± 5 mA		-	
Digital Input Channel			16												-	
Digital Output Channel			16												-	
Counter/Timer			16-bit								-		16-bit x 3		-	
Dimensions(mm)			200 x 105				205 x 105		205 x 105		175 x 105		165 x 105		180 x 105	
Page			2-3								2-7		2-9		2-10	

Note :

1. S.E : Single-ended Input Mode      Diff. : Differential Input Mode.(jumper selection)

**Table1 : 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-180X/1602/1202

12/16-bit high performance multi-function DAQ boards



PCI-1800H

## Functional Description

The PCI-180X series is a family of high performance data acquisition board for PC with PCI bus. It features a continuous, 330KHz, gap-free data acquisition under DOS and Windows. This family has the same architecture: one 12-bit 330KHz A/D converter, two 12-bit independent D/A converters, 16-channel digital input and 16-channel digital output. The PCI-1800H/L provides 16-channel single-ended or 8-channel differential analog input. The PCI-1802H/L provides 32 channel single-ended or 16-channel differential analog input. The -H means high gain mode and the -L means low gain mode. Two DACs of the multifunction card are independent bipolar voltage output with jumper selectable voltage output range.

The scan function of PCI-180X is so amazing. We call it "MAGIC SCAN". It scans with two modes: "Fix channel scan" and "Variable channel scan". 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, both modes can be up to 330K samples per second.

The PCI-180X series also has other outstanding features. For example:

1. The data transfer rate of digital I/O is up to 2.1 M words/second (non-burst mode).
2. The throughput of D/A is up to 2.1MHz throughput max.
3. Provides three flexible external trigger modes, such as post-trigger, pre-trigger, middle trigger.
4. Provides M-function and Continue Capture function.

The PCI-1202H/L is very similar to PCI-1802H/L. The different items between the PCI-1802 and PCI-1202 are given as follows:

- A/D sampling rate is 110K samples/second for PCI-1202.
- FIFOs size is 2K words for PCI-1202.

The PCI-1602 is very similar to PCI-1802L. The

## Features

- 32-bit +5V PCI Bus, Plug & Play
- 12/16-bit resolution
- Up to 330KS/s sampling rate
- Single-ended or differential analog input
- On-board FIFOs
- Software programmable gain
- Two 12-bit independent programmable DAC
- 16 digital input / 16 digital output channels

different items between the PCI-1802 and PCI-1602 are given as follows:

- 16-bit A/D converter
- A/D sampling rate is 200K sample/second for PCI-1602F.
- A/D sampling rate is 100K sample/second for PCI-1602.

## Applications

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

## "MAGIC SCAN " Function

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

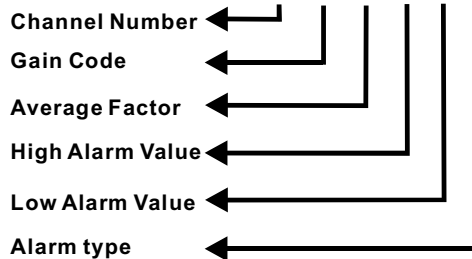
1. Different gain for each scan channel
2. Non-sequential order for channel scan
3. Different sampling rate for each scan channel
4. Programmable different digital filter for each scan channel
5. Programmable high/ low alarm function, provide four different alarm monitor mode for each scan channel
6.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

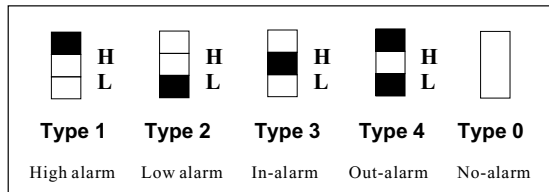
# PCI-180X/1602/1202

12/16-bit high performance multi-function DAQ boards

## The Format of Function Call P180X\_Add To Scan (N, G, AF, H, L, A)



## Alarm type



## 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 and Linux. Some programming language (VC/C++, BC++, VB, Delphi), Java and package (LabVIEW) can call the M\_Function.

## Continue Capture Function

The PCI-180X/1602/1202 provide different continuously 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. The user should have to calculate the memory size according to the sampling rate and the capture period.

The Continue Capture function can be executed under DOS, Windows and Linux. Continuous Capture function can support multiple boards.

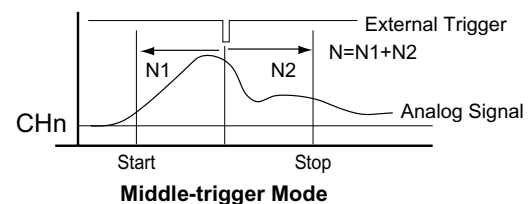
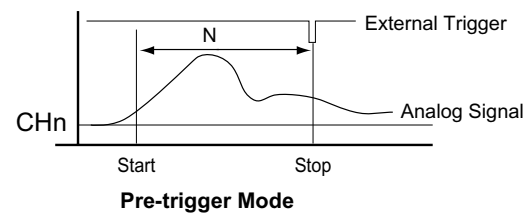
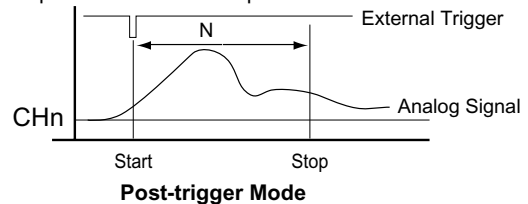
## FIFO Size

How many FIFOs is large enough for your application? It depends on your application. You can calculate the time buffer using the following formula. For example, the FIFO size of PCI-1800 is 2 K words. The maximum. Sampling rate of the board is 330KS/s. The time buffer you can get is  $1\text{sec} / 330\text{K} \times 2\text{K (FIFO SIZE)} / 2 = 3.1\text{ ms}$ . It is enough for regular application under the DOS. For some complicated multi-tasking applications, the user have to know the FIFO size he needs; otherwise the data might be lost. The PCI-1800 series provide the possibility to upgrade the FIFO size.

## Diverse Trigger Mode

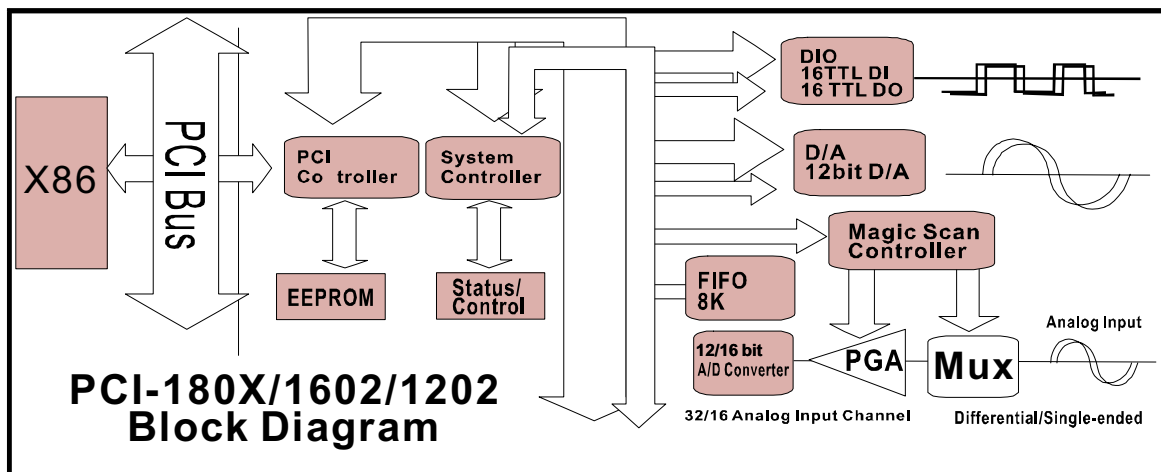
PCI-180X series provide diverse internal and external trigger modes. The internal trigger includes software trigger and pacer timer trigger. The external trigger includes the following trigger modes.

- **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.



# PCI-180X/1602/1202

## 12/16-bit high performance multi-function DAQ boards



### Specifications

#### Analog Input

- Number of channels:
  - PCI-1802/1602/1202: 32 single-ended or 16 differential
  - PCI-1800: 16 single-ended or 8 differential
- Resolution: PCI-1802/1800/1202: 12-bit  
PCI-1602: 16-bit
- Conversion rate: PCI-1802/1800: 330 KS/s  
PCI-1602F: 200 KS/s  
PCI-1602: 100 KS/s  
PCI-1202: 110 KS/s
- Input impedance: 10,000 M $\Omega$
- Over voltage protection:  $\pm 35V$
- Accuracy: 0.01 % of reading ,  $\pm 1$  bit
- Linearity:  $\pm 1$  bit
- On chip sample & hold
- FIFO size: PCI-1202/1800: 2K word (option 8K)  
PCI-1802/1602: 8K word

#### PCI-1602 Input Range

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

#### PCI-1800H/1802H/1202H Input Range

Gain	Bipolar	Unipolar	Max.Switching Frequency
0.5	$\pm 10$	X	44K/s
1	$\pm 5$	0~10	44K/s
5	$\pm 1$	X	36K/s
10	$\pm 0.5$	0~1	36K/s
50	$\pm 0.1$	X	7K/s
100	$\pm 0.05$	0~0.1	7K/s
500	$\pm 0.01$	X	0.8K/s
1000	$\pm 0.005$	0~0.01	0.8K/s

#### PCI-1800L/1802L/1202L Input Range

Gain	Bipolar	Unipolar	Max.Switching Frequency	
			180X	1202
0.5	$\pm 10$	X	330K/s	110K/s
1	$\pm 5$	0~10	330K/s	110K/s
2	$\pm 2.5$	0~5	330K/s	110K/s
4	$\pm 1.25$	0~2.5	330K/s	110K/s
8	$\pm 0.625$	0~1.25	330K/s	110K/s

#### Analog Output

- Number of channels: 2 independent
- Type: 12-bit double buffered
- Linearity: 0.006% FS
- Settling time: 0.4  $\mu$  S
- Output range: -5V~5V or -10V~10V
- Output Driving:  $\pm 5$  mA

#### Timer

- Three 16-bit independent timer, 8MHz input clock
- Timer 0: Internal pacer trigger timer
- Timer 1: External pacer trigger
- Timer 2: Machine independent timer for settling time delay

#### Digital I/O

- 16 TTL-level input
- Input low  $V_{IL} = 0.8V$  max;  $I_{IL} = -0.4mA$  max
- Input high  $V_{IH} = 2.0V$  min;  $I_{IH} = 20 \mu A$  max
- 16 TTL-level output
- Output low  $V_{OL} = 0.5V$  max;  $@I_{OL} = 8$  mA max
- Output high  $V_{OH} = 2.7V$  min;  $@I_{OH} = 0.4$  mA max

#### General Specifications

- I/O connector: one 37-pin D-Sub female  
two 20-pin ribbon male

- Power requirements:

Device	PCI-180X	PCI-1602	PCI-1202
+5V	1600 mA	1200 mA	1400 mA

- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 200 mm x 105 mm (PCI-180X)  
205 mm x 105 mm (PCI-1202 / 1602)

# PCI-180X/1602/1202

## 12/16-bit high performance multi-function DAQ boards



# PCI-1602



## PCI-1202H

## Ordering Information

### Standard

**PCI-1800H:** 16-channel 12-bit 330KS/s high gain multi-function board

**PCI-1800H/S:** PCI-1800H with DB-8225

**PCI-1800H/NDA:** PCI-1800H without DB-8225

**PCI-1800L:** 16-channel 12-bit 330KS/s low gain multi-function board

**PCI-1800L/S:** PCI-1800L with DB-8225

**PCI-1800L/NDA:** PCI-1800L without DB-8225

**PCI-1802H:** 32-channel 12-bit 330KS/s high gain multi-function board

**PCI-1802H/S:** PCI-1802H with DB-1825

**PCI-1802L:** 32-channel 12-bit 330KS/s low gain multi-function board

**PCI-1802L/S:** PCI-1802L with DB-1825

**PCI-1602F:** 32-channel 16-bit 200 KS/s multi-function board

**PCI-1602F/S :** PCI-1602F with DB-1825

**PCI-1602:** 32-channel 16-bit 100 KS/s multi-function board

**PCI-1602/S:** PCI-1602 with DB-1825

**PCI-1202H:** 32-channel 12-bit 44 KS/s high gain multi-function board

**PCI-1202H/S:** PCI-1202H with DB-1825

**PCI-1202L:** 32-channel 12-bit 110 KS/s low gain multi-function board

**PCI-1202L/S:** PCI-1202L with DB-1825

### Optional

**DB-1825:** Screw terminal board with break area for filter circuitry added for PCI-1802/1602/1202

**DB-8225:** Screw terminal board with CJC for PCI-1800

**DB-889D:** 16-channel multiplexer and signal conditioning board for PCI-1800

**DN-37** DIN-rail mounting terminal board

**DB-37** Directly connection terminal board





















**DN-20:** DIN-rail mounting terminal board

**DB-16P:** 16-channel isolated digital input board

**DB-16R:** 16-channel SPDT relay board

**ADP-20/PCI:** 20-pin extender

## Pin Assignment

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

## PCI-1802/1602/1202 CN3

D.GND	37	19	Ext Trg
DA2 OUT	36	18	DA1 OUT
AI 31	35	17	A.GND
AI 30	34	16	AI 15
AI 29	33	15	AI 14
AI 28	32	14	AI 13
AI 27	31	13	AI 12
AI 26	30	12	AI 11
AI 25	29	11	AI 10
AI 24	28	10	AI 9
AI 23	27	9	AI 8
AI 22	26	8	AI 7
AI 21	25	7	AI 6
AI 20	24	6	AI 5
AI 19	23	5	AI 4
AI 18	22	4	AI 3
AI 17	21	3	AI 2
AI 16	20	2	AI 1
		1	AI 0

## PCI-1800 CN3

N.C.	37	○	○	19	+5V OUT
N.C.	36	○	○	18	N.C.
N.C.	35	○	○	17	Ext Trig
N.C.	34	○	○	16	N.C.
N.C.	33	○	○	15	D.GND
D/A OUT1	32	○	○	14	A.GND
N.C.	31	○	○	13	+12V OUT
D/A OUT0	30	○	○	12	N.C.
A.GND	29	○	○	11	N.C.
A.GND	28	○	○	10	A.GND
AI15	27	○	○	9	A.GND
AI14	26	○	○	8	AI 7
AI13	25	○	○	7	AI 6
AI12	24	○	○	6	AI 5
AI11	23	○	○	5	AI 4
AI10	22	○	○	4	AI 3
AI 9	21	○	○	3	AI 2
AI 8	20	○	○	2	AI 1
		○	○	1	AI 0



# PCI-1002

32-channel 12-bit 110KS/s Low cost multi-function board



## Functional Description

The PCI-1002 series is a family of A/D board for PC with PCI bus. It features a 110KHz data acquisition under DOS and Windows. The PCI-1002H/L provides 32-channel single-ended or 16-channel differential analog input, 16-channel digital input and 16-channel digital output. The -H means high gain mode and the -L means low gain mode. The PCI-1002 series provides three flexible external trigger mode: post-trigger, pre-trigger, middle-trigger.

## Applications

- Laboratory Automation
- Production Test
- Sensor Interface

## Specifications

### Analog Input Specifications

- Number of channels: 32 single-ended or 16 differential
- Resolution: 12-bit
- Conversion rate: 110 KS/s max
- Input impedance: 10,000 M $\Omega$
- Over voltage protection:  $\pm 35V$
- Accuracy: 0.01 % of reading ,  $\pm 1$  bit
- Linearity:  $\pm 1$  bit
- On chip sample & hold

Gain	Bipolar	Max.Switching Frequency
1	$\pm 10V$	110K/s
2	$\pm 5V$	110K/s
4	$\pm 2.5V$	110K/s
8	$\pm 1.25V$	110K/s

## Features

- 32-bit +5V PCI bus, Plug & Play
- 12-bit resolution
- 32 single-ended or 16 differential analog inputs
- The sampling rate of single channel or multiple channels is 110 K samples/s
- Programmable gain: 1, 2, 4, 8 (PCI-1002L)  
1, 10, 100, 1000 (PCI-1002H)
- Internal / external trigger
- Three different external trigger: post-trigger, pre-trigger, middle-trigger
- 16 digital input / 16 digital output channels

## PCI-1002H Input Range

Gain	Bipolar	Max.Switching Frequency
1	$\pm 10V$	44K/S
10	$\pm 1V$	36K/S
100	$\pm 0.10V$	7K/S
1000	$\pm 0.01V$	0.8K/S

## Timer

- Three of 16-bit independent timer, 8MHz input clock
- Timer 0: Internal pacer trigger timer
- Timer 1: External pacer trigger
- Timer 2: Machine independent timer for settling time delay

## Digital I/O

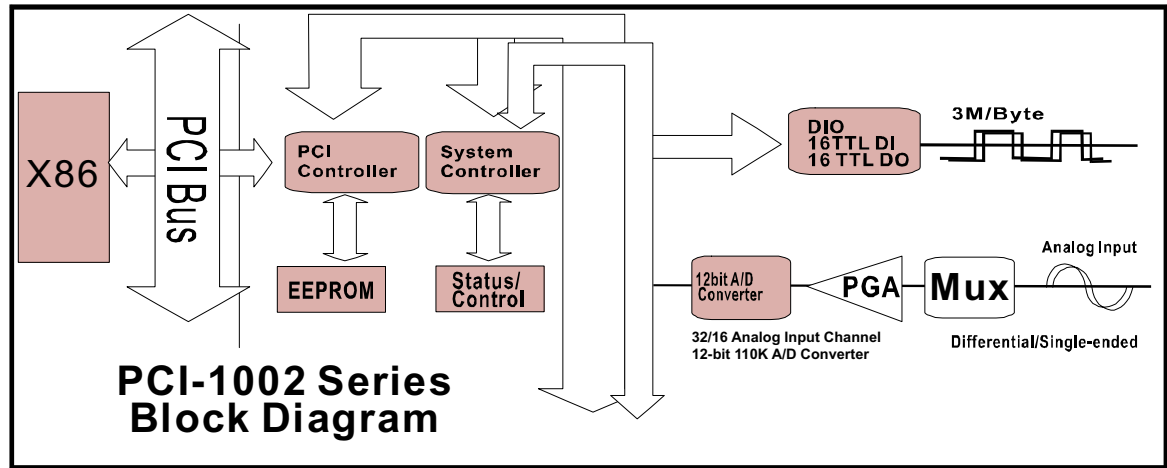
- 16 TTL-level input
- Input low  $V_{IL} = 0.8V$  max;  $I_{IL} = -0.4$  mA max
- Input high  $V_{IH} = 2.0V$  min;  $I_{IH} = 20 \mu A$  max
- 16 TTL-level output
- Output low  $V_{OL} = 0.5V$  max;  $@I_{OL} = 8$  mA max
- Output high  $V_{OH} = 2.7V$  min;  $@I_{OH} = 0.4$  mA max

## General Specifications

- I/O connector: one 37-pin D-sub female  
two 20-pin ribbon male
- Power requirements : +5V @ 350 mA Max
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 175 mm x 105 mm

# PCI-1002

110KS/s 12-bit low cost multi-function board



2 PCI Bus I/O Boards

## Pin Assignment

### CN1

DI 0	1	DI 1
DI 2	3	DI 3
DI 4	5	DI 5
DI 6	7	DI 7
DI 8	9	DI 9
DI 10	11	DI 11
DI 12	13	DI 13
DI 14	15	DI 15
D.GND	17	D.GND
+5V	19	+12V

### CN3

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

### CN2

DO 0	1	DO 1
DO 2	3	DO 3
DO 4	5	DO 5
DO 6	7	DO 7
DO 8	9	DO 9
DO 10	11	DO 11
DO 12	13	DO 13
DO 14	15	DO 15
D.GND	17	D.GND
+5V	19	+12V

## Ordering Information

### Standard

**PCI-1002H:** 32-channel 12-bit 110KS/s high gain multi-function board

**PCI-1002H/S:** PCI-1002H with DB-1825

**PCI-1002L:** 32-channel 12-bit 110KS/s low gain multi-function board

**PCI-1002L/S:** PCI-1002L with DB-1825

### Optional

**DB-1825** Screw terminal board with break area for filter circuitry added

**DN-37:** DIN-rail mounting terminal board

**DB-37:** Directly connection terminal board

**DN-20:** DIN-rail mounting terminal board

**DB-16P:** 16-channel isolated digital input board

**DB-16R:** 16-channel SPDT relay board

**ADP-20/PCI:** 20-pin extender



# PIO-821

16-channel 12-bit 45KS/s low cost multi-function board



## Functional Description

The PIO-821 is a low cost multi-function card for PC with PCI bus. The PIO-821 contains 16-channel single-ended or 8-channel differential analog input, 1-channel 12-bit DAC voltage output, 16-channel digital input and 16-channel digital output. The maximum sampling rate of A/D converter is about 45K samples/second.

## Applications

- Process monitor and control
- Vibration Analysis
- Digital pattern generator from digital I/O port

## Specifications

### Analog Input

- Number of channels: 16 signal-ended or 8 differential
- Resolution: 12-bit
- Conversion time: 8 microseconds
- Input current: 250 nA max (125 nA typical) at 25°C
- On chip sample & hold
- Overvoltage protection:  $\pm 35V$
- Input impedance:  $10^{10} \Omega$
- Accuracy: 0.01% of reading  $\pm 1$  bit
- Linearity:  $\pm 1$  bit

Gain	Bipolar	Max.Switching Frequency
1	$\pm 5V$	45K/s
2	$\pm 2.5V$	45K/s
4	$\pm 1.25V$	45K/s
8	$\pm 0.625V$	45K/s

Gain	Bipolar	Max.Switching Frequency
1	$\pm 5V$	45K/s
10	$\pm 0.5V$	45K/s
100	$\pm 0.05V$	10K/s
1000	$\pm 0.005V$	1K/s

## Features

- 32-bit +5V PCI Bus, Plug & Play
- 12-bit resolution
- The maximum sample rate is 45K samples/second
- 16 single-ended or 8 differential analog inputs
- A/D trigger mode: software trigger, pacer trigger
- Programmable high gain: 1, 10, 100, 1000 (PIO-821PGH)
- Programmable low gain: 1, 2, 4, 8 (PIO-821PGL)
- 1-channel 12-bit D/A voltage output
- 16 digital input / 16 digital output channels
- Software calibrated

## Analog Output

- Number of channels: 1 independent
- Type: 12-bit double-buffered
- Linearity: 0.006% FS
- Output range: 0~5V, 0~10V or 0~Ext Ref
- External reference: +10V or -10V max
- Output driving:  $\pm 5$  mA
- Settling time: 0.6  $\mu$ s to 0.01% for full scale step

## Digital I/O

- Inputs: 16-channel; TTL Levels
- Outputs: 16-channel; TTL levels

## Timer

- Three 16-bit independent timer, 8MHz input clock
- Timer 0: Internal pacer trigger timer
- Timer 1: External pacer trigger
- Timer 2: Machine independent timer for settling time delay

## General Specifications

- I/O connector: one 37-pin D-Sub female  
two 20-pin ribbon male
- Power requirements: +5V @ 960 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 165 mm x 105 mm

## Ordering Information

### Standard

**PIO-821L:** 16-channel 12-bit 45KS/s low gain multi-function board

**PIO-821H:** 16-channel 12-bit 45KS/s high gain multi-function board

**PIO-821H/S:** PIO-821H with DB-8225

**PIO-821H/NDA:** PIO-821H without D/A

**PIO-821L/NDA:** PIO-821L without D/A

# PISO-813

## 32-channel isolated analog input board



### Features

- 32-bit +5V PCI Bus, Plug & Play
- 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, 0~0.625V
- Programmable gain control: 1, 2, 4, 8, 16
- 3000V isolated voltage for built-in DC/DC converter
- A/D trigger mode: software trigger
- A/D data transfer mode: polling

### Functional Description

The PISO-813 is a bus-type isolated 12-bit A/D board with the PCI bus for IBM or compatible PC. It features a 10KHz data acquisition under DOS and Windows. The PISO-813 provides 32-channel single-ended analog input. The isolation range of PISO-813 can reach to 3000VDC. It is the most cost-effective isolated A/D board for the PCI Bus in the world.

### Applications

- Data Acquisition
- Harsh Environment Operation
- Signal Isolation

### Specifications

#### Analog Input

- Number of channels: 32 single-ended
- Resolution: 12-bit
- Conversion rate: 10KS/s max
- Input impedance: 10M $\Omega$
- Over voltage protection:  $\pm 35V$
- Accuracy: 0.01% of reading  $\pm 1$ -bit
- Linearity:  $\pm 1$  bit
- On chip sample & hold
- Zero drift:  $\pm 25$ ppm/  $^{\circ}C$  of FS max

#### General Specifications

- I/O connector: one 37-pin D-sub female
- Power requirements: +5V @ 860 mA
- Operating temperature: 0 ~ 60 $^{\circ}C$
- Operating humidity: 0 ~ 90 % non-condensing
- Storage temperature: -20 ~ 70 $^{\circ}C$
- Dimensions: 180 mm x 105 mm

### Pin Assignment

AI_31	37	19	A.GND
AI_29	36	18	AI_30
AI_27	35	17	AI_28
AI_25	34	16	AI_26
AI_23	33	15	AI_24
AI_21	32	14	AI_22
AI_19	31	13	AI_20
AI_17	30	12	AI_18
A.GND	29	11	AI_16
A.GND	28	10	A.GND
AI_15	27	9	A.GND
AI_13	26	8	AI_14
AI_11	25	7	AI_12
AI_9	24	6	AI_10
AI_7	23	5	AI_8
AI_5	22	4	AI_6
AI_3	21	3	AI_4
AI_1	20	2	AI_2
		1	AI_0

### Ordering Information

#### Standard

**PISO-813:** 32-channel isolated analog input board

**PISO-813/S:** PISO-813 with DB-8325

#### Optional

**DB-8325:** Daughter board with signal conditioning circuitry

**DB-37:** Directly connection terminal board

**DN-37:** DIN-rail mounting terminal board

# Selection Guide

## PCI bus analog output board

PCI Bus DA Board		PISO-DA2	PIO-DA4	PIO-DA8	PIO-DA16
Analog Output	Output Channel	2	4	8	16
	Resolution	12-bit	14-bit	14-bit	14-bit
	Output Range	Voltage	-10~10V, -5~+5V 0~+5V, 0~+10V		
		Current	0~20 mA, 4~20 mA		
	Power on value can be pre-set	N	N	N	N
	Voltage output and Current output can be switched without re-calibration	Y	Y	Y	Y
	Need trim pot for calibration	N	N	N	N
	Channel to Channel Isolation	Y	N	N	N
Digital Output Channel (TTL Level)		N	16	16	16
Digital Input Channel (TTL Level)		N	16	16	16
Dimensions (mm)		170 x 122	179 x 122	179 x 122	179 x 122
Page		2-12	2-13	2-13	2-13

# PISO-DA2

## 2-channel 12-bit isolated analog output board



### Features

- 32-bit +5V PCI Bus, Plug & Play
- Two independent 12-bit channels of analog output
- 3750 VDC isolation protection
- 3000 VDC isolation DC/DC converter build-in
- Software calibration
- The calibration data is fully stored in EEPROM
- Two pacer timers interrupt source
- The voltage or current output can be set to arbitrary values or reset to zero when the power is on

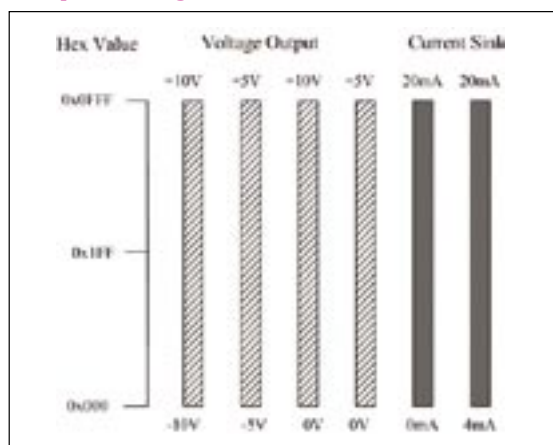
### Functional Description

The PISO-DA2 is a PCI bus analog output board with two isolated 12-bit output channels for IBM personal computer and compatibility. The output range can be configured as voltage output by one of the different ranges:  $\pm 10V$ ,  $\pm 5V$ ,  $0\sim 10V$ ,  $0\sim 5V$ , or current output using loop sink by the range:  $0\sim 20\text{ mA}$  or  $4\sim 20\text{ mA}$ . Besides, output channel is isolated from each other and the isolation range can reach the voltage more than 3000 VDC. The maximum conversion rate of the analog output is 10KS/s. It is the most cost-effective isolated D/A board for the PCI bus interface.

### Applications

- Factory Automation
- Product Test
- Laboratory Automation
- Security Control

### Output Range Resolution



### Specifications

- D/A converter with resolution: 12-bit
- Conversion rate: 10KS/s max
- Voltage output range: Bipolar:  $\pm 10V$ ,  $\pm 5V$   
Unipolar:  $0\sim 10V$ ,  $0\sim 5V$
- External load register:  $1K\Omega$  min
- Reference voltage: Internal:  $-5V$  and  $-10V$   
External: DC  $\pm 10V$  max
- Current output:  $0\sim 20\text{ mA}$ ,  $4\sim 20\text{ mA}$
- Current loop excitation voltage:  $+8V\sim +36V$
- External load register:  $400\Omega$  max
- Converter: AD7541 or equivalent
- Accuracy: 0.015% of reading FSR (Full Scale Range)
- Linearity:  $\pm 1/2$  LSB

### General Specifications

- I/O connector: two 9-pin D-Sub female
- Power requirement:  $5V @ 2.5A$
- Operating temperature:  $0\sim 60^{\circ}C$
- Operating humidity:  $0\sim 90\%$  non-condensing
- Storage temperature:  $-20\sim 70^{\circ}C$
- Dimensions: 170 mm x 122 mm

### Ordering Information

#### Standard

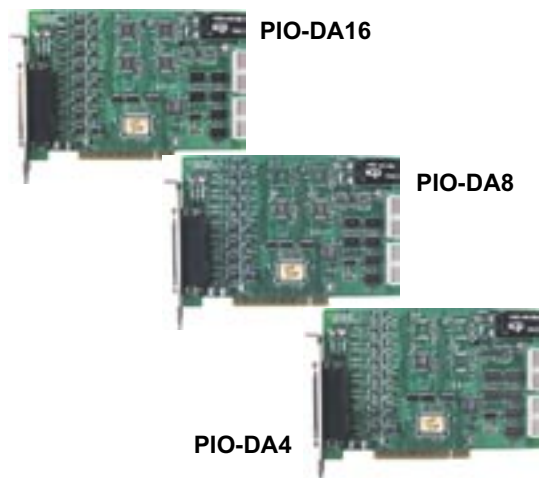
**PISO-DA2:** Isolated 12-bit analog output board  
**PISO-DA2/S:** PISO-DA2 with DB-8425

#### Optional

**DB-8425:** Screw terminal board for PISO-DA2  
**DN-09-02:** DIN-rail mounting terminal board for PISO-DA2

# PIO-DA16/DA8/DA4 Series

16/8/4-channel 14-bit analog output board



## Features

- 32-bit +5V PCI bus, Plug & Play
- 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 and output range can be software programmable
- 4~20 mA or 0~20 mA current sink to ground for each converter
- Two pacer timers interrupt source
- Double-buffered D/A latches
- Software calibration
- 16-channel DI, 16-channel DO

## Functional Description

The PIO-DA16/DA8/DA4 are multi-channel D/A boards with the PCI bus for IBM or compatible PC. The PIO-DA16/DA8/DA4 offers 16/8/4-channels 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  $4\sim 20$  mA,  $0\sim 20$  mA sink current loop.

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 and 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.

## Applications

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

## Specifications

### Analog Output

- D/A converter: Quad 14-bit MDAC
- Number of channels: 4/8/16 independent
- Resolution: 14-bit
- 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:  $\pm 5$  mA (PIO-DA16/DA8/DA4)  
 $\pm 40$  mA (PIO-DA4H)
- Absolute accuracy: 0.01% FSR (typical)

### Current Output Range

- $0\sim 20$  mA or  $4\sim 20$  mA
- Absolute accuracy: 0.1% FSR (typical)
- Excitation voltage range:  $+7$  V to  $+40$  V

### Stability

- Offset temperature coefficient:  $\pm 50$   $\mu V/^{\circ}C$
- Gain temperature coefficient:  $\pm 10$  ppm/ $^{\circ}C$

### Digital I/O

- 16 TTL-level input
- Input low  $V_{IL} = 0.8V$  max;  $I_{IL} = -0.4$  mA max
- Input high  $V_{IH} = 2.0V$  min;  $I_{IH} = 20$   $\mu A$  max
- 16 TTL-level output
- Output low  $V_{OL} = 0.5V$  max;  $@I_{OL} = 8$  mA max
- Output high  $V_{OH} = 2.7V$  min;  $@I_{OH} = 0.4$  mA max

### General Specifications

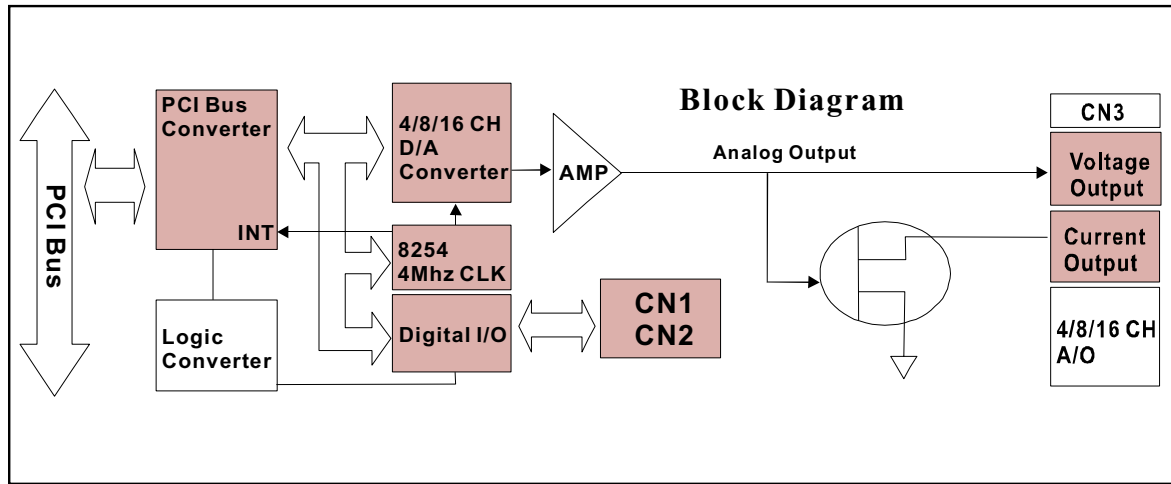
- I/O connector: one 37-pin D-sub female  
two 20-pin ribbon male
- Power requirements:

Device	+5V	+12V	-12V
PIO-DA16	1400 mA	16 mA	16 mA
PIO-DA8	800 mA	8 mA	8 mA
PIO-DA4	600 mA	4 mA	6 mA

- Operating temperature:  $0\sim 60^{\circ}C$
- Operating humidity:  $0\sim 90$  % non-condensing
- Storage temperature:  $-20\sim 70^{\circ}C$
- Dimensions: 179 mm x 122 mm

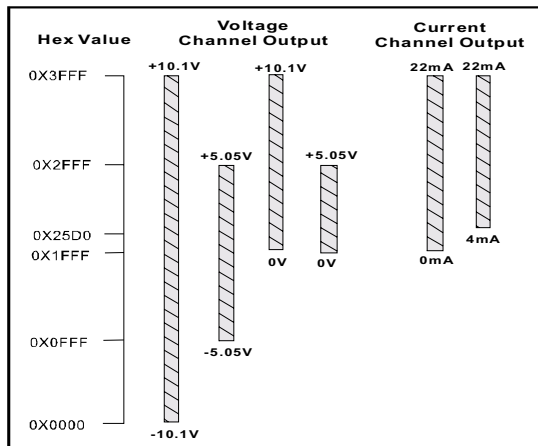
# PIO-DA16/DA8/DA4 Series

16/8/4-channel 14-bit analog output boards



2 PCI Bus I/O Boards

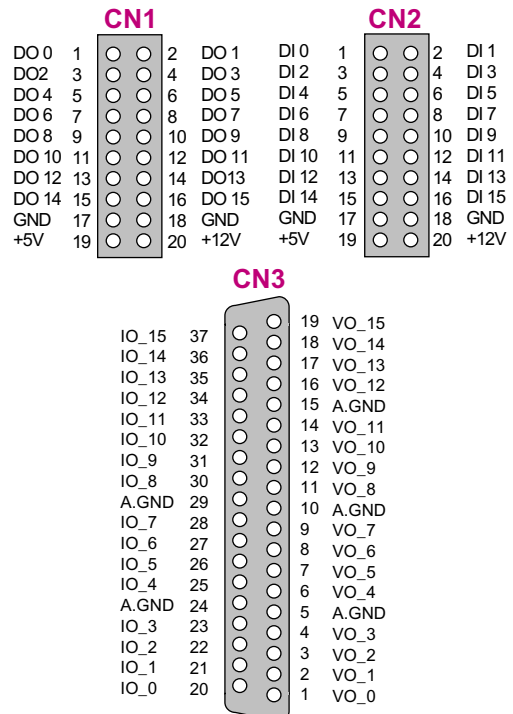
## Output Range & Resolution



The resolution of each is given as follows

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

## Pin Assignment



## Ordering Information

### Standard

- PIO-DA4:** 4-channel 14-bit analog output board
- PIO-DA4/S:** PIO-DA4 with DN-37
- PIO-DA8:** 8-channel 14-bit analog output board
- PIO-DA8/S:** PIO-DA8 with DN-37
- PIO-DA16:** 16-channel 14-bit analog output board
- PIO-DA16/S:** PIO-DA16 with DN-37

### Optional

- DN-37:** DIN-rail mounting terminal board
- DB-37:** Directly connection terminal board
- DB-16P:** 16-channel opto-isolated digital input board
- DB-16R:** 16-channel relay output board
- DN-20:** DIN-rail mounting terminal board
- ADP-20/PCI:** 20-pin extender



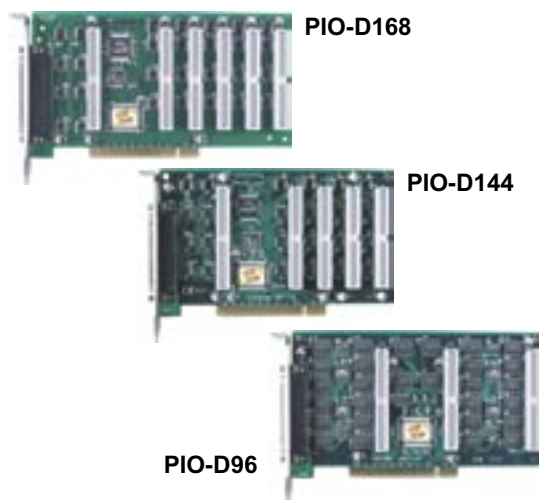
# Selection Guide

## PCI bus digital I/O board

Digital I/O Board		PIO-D168	PIO-D144	PIO-D96	PIO-D64	PIO-D56	PIO-D48	PIO-D24	PCI-TMC12A
	Type	TTL Level							
Digital I/O Channel	Bi-direction Digital I/O	168	144	96	–	24	48	24	–
	D/I	–	–	–	32	16	–	–	16
	D/O	–	–	–	32	16	–	–	16
Driving Capacity	Sink	64 mA	64 mA	64 mA	24 mA	64 mA	64 mA	64 mA	24 mA
	Source	32 mA	32 mA	32 mA	15 mA	32 mA	32 mA	32 mA	15 mA
Timer/Counter	Channel	–	–	–	4x16-bit 1x32-bit	–	1x16-bit 1x32-bit	–	2x16-bit
	Clock Source	–	–	–	4MHz	–	4MHz 32.768KHz	–	8M/1.6MHz 0.8M/80KHz
Connector	37-pin D-sub	1	1	1	–	1	1	1	1
	50-pin Header	6	5	3	–	–	1	–	–
	20-pin Header	–	–	–	5	2	–	–	2
Dimensions (mm)		200x105	180x105	180x105	156x110	143x105	156x105	143x105	150x105
Page		2-16			2-19	2-20	2-17	2-20	2-21

# PIO-D168/D144/D96

PCI bus 168/144/96-bit OPTO-22 compatible DIO board



## Functional Description

PIO-D168/D144/D96 are high density parallel digital I/O board equipped with 168/144/96-channel bi-direction I/O. The header connectors are fully compatible with industry OPTO-22 standard. The PIO-D168/D144/D96 emulate mode 0 of the industry standard 8255 programmable peripheral interface (PPI) chips. Each PPI offers three 8-bit ports, Port A, Port B and Port C. All groups are configured as inputs upon power-up or reset.

The flat cable can be connected to ADP-37/PCI or ADP-50/PCI adapter. The adapter can be fixed on the chassis. Refer to the above figure. It can be installed in a 5 V PCI bus and can support truly "Plug & Play."

## Applications

- Factory Automation
- Laboratory Automation
- Communication Switching
- Industrial Automation

## Features

- 32-bit +5V PCI Bus, Plug & Play
- 168/144/96-channel digital TTL/DTL I/O
- All I/O lines buffered on the board
- Emulate 7/6/4 industry standard 8255 PPI mode 0
- Direct interface with OPTO-22 compatible I/O modules
- High output driving capability
- Programmable direct-trigger interrupt source

## Specifications

- All inputs & outputs are TTL compatible
- Input Logic high voltage: 2.4V min
- Input Logic low voltage: 0.8V max
- Output sink current: 64 mA max
- Output source current: 32 mA max
- Programmable Interrupt source:  
P2C0, P2C1, P2C2, P2C3 (PIO-D168, PIO-D144)  
P2C0, P5C0, P8C0, P11C0 (PIO-D96)

## General Specifications

- I/O connector: one 37-pin D-Sub female  
six 50-pin ribbon male (PIO-D168)  
five 50-pin ribbon male (PIO-D144)  
three 50-pin ribbon male (PIO-D96)
- Power requirements:

Device	PIO-D168	PIO-D144	PIO-D96
+5V	1300 mA	1100 mA	600 mA

- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 200 mm x 105 mm (PIO-D168)  
180 mm x 105 mm (PIO-D144/D96)

# PIO-D48

PCI bus 48-bit OPTO-22 compatible DIO board



## Features

- 32-bit +5V PCI Bus, Plug & Play
- 48-channel digital TTL/DTL I/O
- All I/O lines buffered on the board
- Emulate 2 industry standard 8255 PPI mode 0
- Direct interface with OPTO-22 compatible I/O modules
- High output driving capability
- Programmable direct-trigger interrupt source
- On-board 8254 timer/counter chip
- Interrupt source: timer, event, direct trigger
- Pull-up or pull-down resistors on I/O lines

## Functional Description

The PIO-D48 provides 48 TTL digital I/O lines. The PIO-D48 consists of two 24-bit bi-direction ports. Each 24-bit port supports three of 8-bit groups (A, B, C). Each 8-bit group can be configured to function as either inputs or latched outputs. All groups are configured as inputs upon power-up or reset. Outputs of the I/O buffers are pulled up through 10K resistors to +5VDC. Outputs can be changed to pull-down by jumper selection on the board. This pull-up / pull-down mechanism assures that there are no erroneous outputs at power-up until the board is initialized by application software.

The PIO-D48 has one D-sub connector and one 50-pin flat-cable header. The header can be connected to a 50-pin flat-cable. The flat-cable can be connected to ADP-37 / PCI or ADP-50 / PCI adapters. The adapter can be fixed on the chassis. It can be installed in a 5 V PCI bus and can support truly "Plug & Play".

## Applications

- Factory Automation
- Laboratory Automation
- Communication Switching
- Industrial Automation

## Specifications

- All inputs & outputs are TTL compatible
- Input logic high voltage: 2.4V min
- Input logic low voltage: 0.8V max
- Output sink current: 64 mA max
- Output source current: 32 mA max
- Programmable interrupt source:  
P2C3, P2C7, P5C3, P5C7 (PIO-D48)

## General Specifications

- I/O connector: one 37-pin D-Sub female  
one 50-pin ribbon male
- Power requirements: +5V / 500 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 156 mm x 105 mm

# PIO-D168/D144/D96/D48

PCI bus 168/144/96/48-bit OPTO-22 compatible DIO board

## Pin Assignment

### CN1

PA_0	37	○	○	○	19	GND
PA_1	36	○	○	○	18	V <sub>cc</sub>
PA_2	35	○	○	○	17	GND
PA_3	34	○	○	○	16	N.C.
PA_4	33	○	○	○	15	GND
PA_5	32	○	○	○	14	N.C.
PA_6	31	○	○	○	13	GND
PA_7	30	○	○	○	12	N.C.
PC_0	29	○	○	○	11	GND
PC_1	28	○	○	○	10	PB_0
PC_2	27	○	○	○	9	PB_1
PC_3	26	○	○	○	8	PB_2
PC_4	25	○	○	○	7	PB_3
PC_5	24	○	○	○	6	PB_4
PC_6	23	○	○	○	5	PB_5
PC_7	22	○	○	○	4	PB_6
GND	21	○	○	○	3	PB_7
V <sub>cc</sub>	20	○	○	○	2	N.C.
		○	○	○	1	N.C.

### CN2, CN3, CN4, CN5, CN6 & CN7

GND	50	○	○	○	49	V <sub>cc</sub>
GND	48	○	○	○	47	PA_0
GND	46	○	○	○	45	PA_1
GND	44	○	○	○	43	PA_2
GND	42	○	○	○	41	PA_3
GND	40	○	○	○	39	PA_4
GND	38	○	○	○	37	PA_5
GND	36	○	○	○	35	PA_6
GND	34	○	○	○	33	PA_7
GND	32	○	○	○	31	PB_0
GND	30	○	○	○	29	PB_1
GND	28	○	○	○	27	PB_2
GND	26	○	○	○	25	PB_3
GND	24	○	○	○	23	PB_4
GND	22	○	○	○	21	PB_5
GND	20	○	○	○	19	PB_6
GND	18	○	○	○	17	PB_7
GND	16	○	○	○	15	PC_0
GND	14	○	○	○	13	PC_1
GND	12	○	○	○	11	PC_2
GND	10	○	○	○	9	PC_3
GND	8	○	○	○	7	PC_4
GND	6	○	○	○	5	PC_5
GND	4	○	○	○	3	PC_6
GND	2	○	○	○	1	PC_7

## Ordering Information

### Standard

<b>PIO-D168:</b>	PCI bus 168-bit OPTO-22 DIO board
<b>PIO-D144:</b>	PCI bus 144-bit OPTO-22 DIO board
<b>PIO-D96:</b>	PCI bus 96-bit OPTO-22 DIO board
<b>PIO-D48:</b>	PCI bus 48-bit OPTO-22 DIO board

### Optional

<b>DB-24PD:</b>	24-channel isolated D/I board
<b>DB-24RD:</b>	24-channel relay board
<b>DB-24PRD:</b>	24-channel power relay board
<b>DB-16P8R:</b>	16-channel isolated D/I and 8-channel relay output board
<b>DB-24POR:</b>	24-channel PhotoMos relay output board
<b>DB-24SSR:</b>	24-channel solid state relay output board
<b>DB-24C:</b>	24-channel open-collector output board
<b>DB-24OD:</b>	24-channel open-drain output board
<b>DN-37:</b>	DIN-rail mounting terminal board
<b>DN-50:</b>	DIN-rail mounting terminal board
<b>ADP-37/PCI:</b>	50-pin OPTO-22 ports to DB-37 adapter
<b>ADP-50/PCI:</b>	50-pin extender

# PIO-D64

PCI bus 64-bit DIO board with timer/counter



## Features

- 32-bit +5V PCI bus, Plug & Play
- 32-channel digital input
- 32-channel digital output
- 3 independent programmable 16-bit down counters
- Four clock sources: 2M, 1M, 500K, 250KHz
- Three frequency divider: 100,10,1
- One 16-bit counter, one 32-bit timer with a 4 MHz for interface function
- Interrupt source: timer, event and direct trigger
- One breadboard area for add-on circuitry

## Functional Description

The PIO-D64 provides 32-channel digital input, 32-channel output and 6-channel counter/timer. The user can use the DB-16P to connect the input ports (CN2, CN4) for isolation purpose, or use DB-16R to interface to the output ports (CN1, CN3) for relay control. The first 8254 chip is used as general purpose timer/counter, such as frequency measurement, event counting and pulse generation. The second 8254 chip is used to generate interrupt trigger signal. The Counter 3 accept event signal and it will generate trigger signal of interrupt. The Counter 4 and Counter 5 are cascaded together. The clock source is 4MHz. It is used to generate pacer timer trigger for interrupt.

## Applications

- Factory automation
- Laboratory automation
- Communication switching
- Industrial automation

## Specifications

### Digital I/O

- All outputs and inputs are TTL Compatible
- Input logic high voltage: 2.4V min
- Input logic low voltage: 0.8V max
- Input load current: -0.45 mA min/ +70  $\mu$  A
- Output sink current: +24 mA max
- Output source current: -15 mA max

### General Specifications

- I/O connector: five 20-pin ribbon male
- Power consumption: +5V/580 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 156 mm x 110 mm

## Pin Assignment

### CN1/CN3

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

### CN2/CN4

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

### CN5

CLK2	1	2	CLK1
OUT2	3	4	OUT1
GATE2	5	6	GATE1
CLK3	7	8	CLK0
OUT3	9	10	OUT0
GATE3	11	12	GATE0
GATE4	13	14	CLK4
X	15	16	OUT4
GND	17	18	GND
+5V	19	20	X

## Ordering Information

### Standard

**PIO-D64:** PCI bus 64-bit DIO board with timer/counter

### Optional

**DB-16P:** 16-channel OPTO-isolated input board  
**DB-26R:** 16-channel relay terminal board  
**DB-24PR:** 24-channel power relay board  
**DB-24POR:** 24-channel PhotoMOS relay board  
**DB-24C:** 24-channel open-collector output board  
**DB-24OD:** 24-channel open-drain output board  
**DB-8025:** General screw terminal board  
**DN-20:** DIN-rail mounting terminal board  
**ADP-20/PCI:** 20-pin extender

# PIO-D56/D24

PCI bus 56/24-bit DIO board



PIO-D56



PIO-D24

## Functional Description

The PIO-D56/D24 consists of one 24-bit port, one 16-bit input port and one 16-bit output port (only for PIO-D56). The 24-bit port emulate mode 0 of the industry standard 8255 programmable peripheral interface (PPI) chip. Each PPI offers three 8-bit ports, Port A, Port B and Port C. The Port C is divided into 2 nibble-wide (4-bit) ports. The 24-bit bi-directional ports are configured as inputs upon power-up or reset.

## Applications

- Factory automation
- Laboratory automation
- Communication switching
- Industrial automation

## Specifications

### Digital Input

- All inputs are TTL compatible
- Logic high voltage: 2.4V min
- Logic low voltage: 0.8V max

### Digital Output

- All outputs are TTL compatible
- OPTO-22 output (CN3)
  - Sink current: 64 mA max
  - Source current: 32 mA max
- 16-channel output (CN1)
  - Sink current: 8 mA max
  - Source current: 0.4 mA max

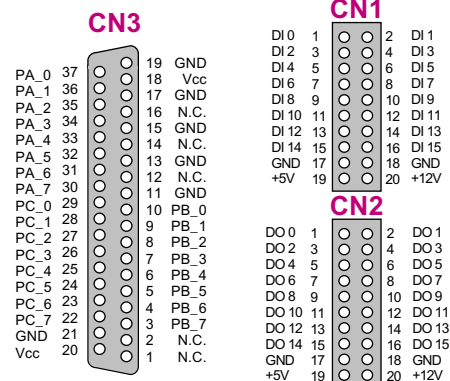
### General Specifications

- I/O connector: one D-sub 37-pin female  
two 20-pin ribbon male (PIO-D56)
- Power requirements: +5V@580 mA (PIO-D56)  
+5V@420 mA (PIO-D24)
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 143 mm x 105 mm

## Features

- 32-bit +5V PCI bus, Plug & Play
- 56-bit digital I/O (PIO-D56)  
24-bit digital I/O (PIO-D24)
- High driving capability
- Four interrupt sources: PC0, PC1, PC2, PC3

## Pin Assignment



## Ordering Information

### Standard

- PIO-D56:** PCI bus 56-bit DIO board  
**PIO-D24:** PCI bus 24-bit DIO board

### Optional

- DB-24PD:** 24-channel isolated D/I board  
**DB-24RD:** 24-channel relay board  
**DB-24PRD:** 24-channel power relay board  
**DB-16P8R:** 16-channel isolated D/I and 8-channel relay output board  
**DB-24POR:** 24-channel PhotoMOS relay output board  
**DB-24SSR:** 24-channel solid state relay output board  
**DB-24C:** 24-channel open-collector output board  
**DB-24OD:** 24-channel open-drain output board  
**DB-16P:** 16-channel OPTO-isolated digital input board  
**DB-16R:** 16-channel relay output board  
**DN-20:** 2x20 pin header DIN-rail mounting terminal board  
**DN-37:** 2x37 pin header DIN-rail mounting terminal board  
**ADP-20/PCI:** 20-pin extender



# PCI-TMC12A

PCI bus 12-channel timer/counter board



## Features

- On-board four 8254 timer/counter chips
- 12 independent 16-bit timer/counter
- 12 external clock input
- 12 external gate control input
- 12 timer/counter output
- All Signal are TTL compatible
- 16-bit timer/counter can be cascaded to 32/48-bit
- Gate input can be from external or previous timer/counter output
- 4 internal interrupt source: COUT3, COUT6, COUT9, COUT12
- 2 internal clock source: 8M/1.6M, 0.8M/80K
- 16-channel D/I; 16-channel D/O

## Functional Description

The PCI-TMC12A is a PCI bus general purpose timer/counter and digital I/O board. It provides twelve channels of 16-bit Timer/Counter. Two internal clock sources (8M/1.6M and 0.8M/80K) are selected by jumper.

## Applications

- Event Counting
- Wave Generator
- Frequency Measurement
- Pulse Width Measurement
- Time-delay generation

## Comparison

	TMC-10	PCI-TMC12A
8254	4	same
16-DI	No	Yes
16-DO	No	Yes
16-bit Time/Counter	8	12
32-bit Time/Counter	2	0 (can be cascaded)
Internal clock source	2	Same
External clock source	8	12
flexible	flexible	More flexible

## Specifications

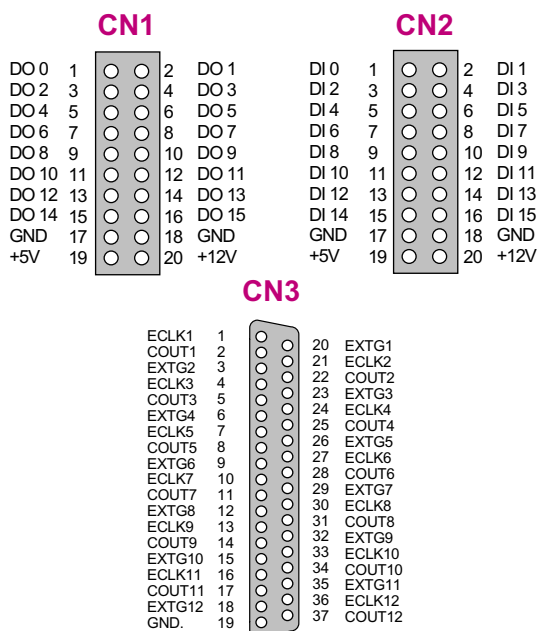
### Digital I/O

- All input & output are TTL compatible
- Input logic high voltage: 2.0V min / 5.0V max
- Input logic low voltage: -0.5V min / 0.8V max
- Output sink current: +24 mA max
- Output source current: -15 mA max

### General Specifications

- I/O connector: one 37-pin D-Sub female  
two 20-pin ribbon male
- Power requirements: +5V@500 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 150 mm x 105 mm

## Pin Assignment



## Ordering Information

### Standard

**PCI-TMC12A:** 12-channel timer/counter board

### Optional

- DN-37:** 2x37-pin connector DIN-rail mounting terminal board
- DB-37:** 37-pin D-sub directly connector terminal board
- DN-20:** 2x20-pin header DIN-rail terminal board
- DB-16P:** 16-channel isolated D/I board
- DB-16R:** 16-channel relay board
- ADP-20/PCI:** 20-pin extender

# Selection Guide

## PCI bus isolated digital I/O board

Isolated Digital I/O Board			PCI-P16R16	PCI-P8R8	PCI-P16C16	PCI-P16POR16	PISO-P8R8	PISO-P8SSR8DC/AC	PISO-725
Digital Output	Type		Relay	Relay	Open-Collector	PhotoMos Relay	Relay	DC/AC-Type Solid-state Relay	Relay
	Channel	Total	16	8	16	16	8	8	8
		Contact Type	8xFormC 8xFormA	4xFormC 4xFormA	16xNPN	16xFormA	8xFormA	8xFormA	8xFormC
	Output Rating	DC	1A/24V		400mA/30V	130mA/250V	5A/30V	1A/30V	1A/30V
		AC	0.5A/120V		-	130mA/350V (Peak AC)	5A/250V	24~265Vrms /1.0Arms	0.3A/120V
Digital Input	Type		Optical-isolated						
	Channel		16	8	16	16	8	8	8
	Input Impedance		1.2KΩ						
	Input Voltage	DC	5~24V						
		AC	3.5~30V(50~1KHz)						
Connector	37-pin D-sub		2	1	2	2	1	1	1
Dimensions (mm)			180 x1 05	180 x1 05	180 x1 05	180 x1 05	146 x1 05	146 x1 05	146 x1 05
Page			2-23	2-23	2-24	2-25	2-26	2-26	2-30

Isolated Digital I/O Board			PISO-P32A32	PISO-P32C32	PISO-P64	PISO-A64	PISO-C64	PISO-730	PISO-730A
Digital Output	Type		Open-Collector (PNP)	Open-Collector (NPN)	-	Open-Collector (PNP)	Open-Collector (NPN)	Open-Collector (NPN)	Open-Collector (PNP)
	Channel		32	32	-	64	64	16	16
	Output Rating	DC	100mA/30V	100mA/30V	-	100mA/30V	100mA/30V	100mA/30V	100mA/30V
		AC	-	-	-	-	-	-	-
	Non-Isolated D/O (TTL Level)		-	-	-	-	-	16	16
Digital Input	Type		Optical-isolated						
	Channel		32	32	64	-	-	16	16
	Input Impedance		3K $\Omega$	3K $\Omega$	3K $\Omega$	-	-	3K $\Omega$	3K $\Omega$
	Input Voltage (DC)		5~30V	5~30V	5~30V			5~30V	5~30V
	Building DC/DC Converter		2x150mA/5VDC	2x150mA/5VDC	2x150mA/5VDC	-	-	150mA/5VDC	150mA/5VDC
	Non-Isolated D/I (TTL Level)		-	-	-	-	-	16	16
Connector	37-pin D-Sub		2	2	2	2	2	1	1
	20-pin header		-	-	-	-	-	2	2
Dimensions (mm)			180x105	180x105	180x105	180x105	180x105	170x105	170x105
Page			2-28	2-28	2-28	2-28	2-28	2-31	2-31

\*Note : Contact arrangement : "Form A" Common and Normal Open; "Form C" Common, Normal open and Normal Close

# PCI-P8R8/P16R16

8/16-channel isolated input & 8/16-channel relay output board



PCI-P8R8



PCI-P16R16

## Functional Description

The PCI-P8R8 provides 8-channel electromechanical relay output and 8-channel optically isolated input. The PCI-P8R8 can be used in various applications including load switching, external switching, contact closure and others. The PCI-P16R16 has one of 37-pin D-Sub & one of 40-pin header connectors and the function is equal to two PCI-P8R8.

## Applications

- Factory Automation
- Laboratory Automation
- Communication Switching

## Specifications

### Isolated Digital Input

- Number of channels: 8 (PCI-P8R8); 16 (PCI-P16R16)
- Type: non-polarized OPTO-Isolated
- Isolated voltage: 5000V
- Photo-coupler: PC-814
- Input current: 20 mA max (24V)
- Input voltage: AC/DC 5-24V (AC 50~1KHz)
- Input impedance:  $1.2K\Omega$  / 1W
- Withstanding voltage: 1KV
- Response time: 20  $\mu$ S (without filter)  
2.2mS (with filter)

### Relay Output

- Number of channels: 8 (PCI-P8R8); 16 (PCI-P16R16)
- Contact rating: 120VAC@0.5A; 24VDC@1.0A
- Breakdown voltage: 1KV
- Operate time: 5mS
- Release time: 2mS
- Insulation resistance: 1,000 M $\Omega$
- Life: mechanical (5 millions) ; electrical (1 millions)
- Switching power: 60VA, 24W

## Features

- 32-bit +5V PCI Bus, Plug & Play
- 8/16-channel electromechanical relay output
- 8/16-channel optically isolated digital input
- AC/DC signal input
- AC signal input with filter
- On-board LED indication for relay status

## General Specifications

- I/O connector:  
one 37-pin D-Sub female (PCI-P8R8)  
one 37-pin D-Sub & one 40-pin header (PCI-P16R16)
- Power requirements:

Device	PCI-P8R8	PCI-P16R16
+5V	500 mA	800 mA

- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 180 mm x 105 mm

## Pin Assignment

NO_0	1		20	NO_3
COM_0	2		21	COM_3
NC_0	3		22	NC_3
NO_1	4		23	NO_4
COM_1	5		24	COM_4
NC_1	6		25	NO_5
NO_2	7		26	COM_5
COM_2	8		27	NO_6
NC_2	9		28	COM_6
NO_3	10		29	GND
COM_3	11		30	DIL_0
DIH_0	12		31	DIL_1
DIH_1	13		32	DIL_2
DIH_2	14		33	DIL_3
DIH_3	15		34	DIL_4
DIH_4	16		35	DIL_5
DIH_5	17		36	DIL_6
DIH_6	18		37	DIL_7
DIH_7	19			

## Ordering Information

### Standard

**PCI-P8R8:** 8-channel isolated digital Input & 8-channel relay output board

**PCI-P16R16:** 16-channel isolated digital Input & 16-channel relay output board

### Optional

**DN-37:** DIN-rail mounting terminal board

**DB-37:** Directly connection terminal board

# PCI-P16C16

16-channel isolated digital input & 16-channel open-collector output board



## Features

- 32-bit +5V PCI Bus, Plug & Play
- 16-channel open-collector output
- 16-channel optical isolated digital input
- AC/DC signal input
- AC signal input with filter
- On-board LED indication for external power status

## Functional Description

The PCI-P16C16 provides 16-channel optically isolated input and 16-channel open-collector output. The PCI-P16C16 has one 37-pin D-sub connector and one 40-pin header. The 40-pin to DB-37 flat-cable can be fixed on the case wall.

## Applications

- Factory Automation
- Laboratory Automation
- Communication Switching
- Industrial Automation

## Specifications

### Isolated Digital Input

- Number of channels: 16
- Type: non-polarized OPTO-Isolated
- Isolated voltage: 5000V
- Photo-coupler: PC-814
- Input current: 20 mA max (24V)
- Input voltage: AC/DC 5-24V (AC 50~1KHz)
- Input impedance: 1.2K $\Omega$  / 1W
- Withstanding voltage: 1KV
- Response time: 20  $\mu$  S (without filter)  
2.2mS (with filter)

### Isolated Digital Output

- Number of channels: 16
- Type: open collector Darlington transistor
- Sink current: 400 mA/channel
- External power: 30V max
- Response time: 30KHz max

## General Specifications

- I/O connector:  
one 37-pin D-Sub & one 40-pin header
- Power requirements: +5V @ 320 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 180 mm x 105 mm

## Pin Assignment

NO_0	1		20	COM_0
NO_1	2		21	COM_1
NO_2	3		22	COM_2
NO_3	4		23	COM_3
NO_4	5		24	COM_4
NO_5	6		25	COM_5
NO_6	7		26	COM_6
NO_7	8		27	COM_7
	9		28	GND
	10		29	
	11		30	DIL_0
DIH_0	12		31	DIL_1
DIH_1	13		32	DIL_2
DIH_2	14		33	DIL_3
DIH_3	15		34	DIL_4
DIH_4	16		35	DIL_5
DIH_5	17		36	DIL_6
DIH_6	18		37	DIL_7
DIH_7	19			

## Ordering Information

### Standard

**PCI-P16C16:** 16-channel isolated digital input & 16-channel open-collector output board

### Optional

**DN-37:** 2x37-pin connector DIN-rail mounting terminal board

**DB-37:** 37-pin D-sub directly connector terminal board

# PCI-P16POR16

16-channel isolated digital input & 16-channel PhotoMOS relay output board



## Features

- 32-bit +5V PCI Bus , Plug & Play
- 16-channel PhotoMOS relay output
- 16-channel optical isolated digital input
- AC/DC signal input
- AC signal input with filter
- On-board LED indication for output status

## Functional Description

The PCI-P16POR16 provides 16-channel optically isolated input and 16-channel PhotoMOS relay output. The PCI-P16POR16 has one 37-pin D-Sub connector and one 40-pin header. The 40-pin to DB-37 flat-cable can be fixed on the case wall.

## Applications

- Factory automation
- Laboratory automation
- Communication switching
- Industrial automation

## Specifications

### 16 Isolated Digital Input

- Type: non-polarized OPTO-Isolated
- Isolated voltage: 5000V
- Photo-coupler: PC-814
- Input current: 20 mA max (24V)
- Input voltage: AC/DC 5-24V (AC 50~1KHz)
- Input impedance:  $1.2K\Omega / 1W$
- Withstanding voltage: 1KV
- Response time:  $20\mu S$  (without filter)  
 $2.2mS$  (with filter)

### 16 Isolated Digital Output

- Type: PhotoMOS relay
- Turn on time:  $T_{on}=0.7ms$  (typical)
- Turn off time:  $T_{off}=0.05ms$  (typical)
- Output: on resistance  $\approx 23\Omega$  (typical)
- Load voltage: 350V (Peak AC)
- Continuous load current: 0.13A
- Peak load current: 0.3A
- Maximum switching power: 300mW
- Output off-state leakage current:  $1\mu A$  max
- Input/Output isolation: 5000 V (AC Switching)

## General Specifications

- I/O connector: one 37-pin D-sub and one 40-pin header
- Power requirements: +5V@320 mA
- Operating temperature:  $0 \sim 60^{\circ}C$
- Operating humidity:  $0 \sim 90\%$  non-condensing
- Storage temperature:  $-20 \sim 80^{\circ}C$
- Dimensions: 180 mm x 105 mm

## Pin Assignment

NO_0	1	○	20	COM_0
NO_1	2	○	21	COM_1
NO_2	3	○	22	COM_2
NO_3	4	○	23	COM_3
NO_4	5	○	24	COM_4
NO_5	6	○	25	COM_5
NO_6	7	○	26	COM_6
NO_7	8	○	27	COM_7
	9	○	28	
	10	○	29	GND
	11	○	30	DIL_0
DIH_0	12	○	31	DIL_1
DIH_1	13	○	32	DIL_2
DIH_2	14	○	33	DIL_3
DIH_3	15	○	34	DIL_4
DIH_4	16	○	35	DIL_5
DIH_5	17	○	36	DIL_6
DIH_6	18	○	37	DIL_7
DIH_7	19	○		

## Ordering Information

### Standard

**PCI-P16POR16:** 16-channel isolated digital input & 16-channel PhotoMOS output board

### Optional

**DN-37:** DIN-rail mounting terminal board  
**DB-37:** Direct connection terminal board

# PISO-P8R8/P8SSR8AC/P8SSR8DC

8-channel isolated digital input & 8-channel relay output board



PISO-P8R8

## Features

- 32-bit +5V PCI Bus, Plug & Play
- 8-channel electromechanical relay output (PISO-P8R8)
- 8-channel AC type solid state relay output (PISO-P8SSR8AC)
- 8-channel DC type solid state relay output (PISO-P8SSRDC)
- 8-channel optical isolated digital input
- AC/DC signal input
- AC signal input with filter
- On-board LED indicate relay output status

## Functional Description

The PISO-P8R8/P8SSR8AC/P8SSR8DC are isolated input/output interface boards for the PCI-Bus computers. The PISO-P8R8 provides 8-channel electromechanical relay output and 8-channel optically isolated input, while PISO-P8SSR8AC and PISO-P8SSR8DC provide 8-channel solid state relay output and 8-channel optically isolated input. The PISO-P8R8, PISO-P8SSR8AC and PISO-P8SSR8DC can be used in various applications including contact closure, external-voltage sensing, external-switch sensing and loading switching and designed for control and sensing applications.

## Applications

- Factory automation
- Laboratory automation
- Communication switching
- Industrial automation

## Specifications

### Isolated Digital Input

- Number of channels: 8
- Type: non-polarized OPTO-Isolated
- Isolated voltage: 5000V
- Photo-coupler: PC-814
- Input current: 20 mA max (24V)
- Input voltage: AC/DC 5~24V (AC 50~1KHz)
- Input impedance: 1.2K $\Omega$ /1W
- Withstanding voltage: 1KV
- Response time: 20  $\mu$  S (without filter); 2.2mS (with filter)

### Relay Output (PISO-P8R8)

- Number of channels: 8
- Output type: SPST (Form A)
- Contact rating:
  - 250VAC @ 1.6A, 120 VAC @ 1A
  - 30VDC @ 1A
- Surge Strength : 4000 VAC
- Relay on time: max 6 ms
- Relay off time: max 3 ms
- Insulation resistance: 1,000 M $\Omega$  @ 500VDC min
- Life: Mechanical: 20 x 10<sup>6</sup> ops.  
Electrical: 100 x 10<sup>3</sup> ops.

### AC-Type SSR Output (PISO-P8SSR8AC)

- Number of channels: 8
- Relay type: SPST (Form A)
- Contact rating: AC: 24 ~ 265 Vrms @ 1.0Arms
- Max. load current: 1.0Arms
- Min. load current: 10mArms
- Max. off-state leakage current:
  - 0.75mA (at 100Vrms 60Hz )
  - 1.5mA ( at 200Vrms 60 Hz )
- 1 cycle surge current: 50A@60Hz
- Max. off-state voltage drop: 1.2Vrms
- Max. operate time: 1 ms
- Max. release time: 1/2 cycle + 1 ms
- Insulation resistance: 1,000 M $\Omega$  @500VDC min
- Life: long life, maintenance free



# PISO-P8R8/P8SSR8AC/P8SSR8DC

8-channel isolated digital input & 8-channel relay output board



PISO-P8SSR8AC



PISO-P8SSR8DC

## DC-Type SSR Output (PISO-P8SSR8DC)

- Number of channels: 8
- Relay type: SPST (Form A)
- Contact rating: 3~30VDC@1A
- Max. load current: 1.0 A
- Min. load current: 1 mA
- Max. off-state leakage current: 0.1 mA ( at 30 VDC )
- 1 cycle surge current: 3A (10ms )
- Max. off-state voltage drop: 1.2V
- Max. operate time: 1 ms
- Max. release time: 1 ms
- Insulation resistance: 1,000 MΩ @500VDC min
- Life: long life, maintenance free

## General Specifications

- I/O connector: one 37-pin D-sub female
- Power requirements: +5V@300 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 180 mm x 105 mm

## Pin Assignment

NO_0	1									20	NO_3
COM_0	2	○	○	○	○	○	○	○	○	21	COM_3
	3									22	
NO_1	4	○	○	○	○	○	○	○	○	23	NO_4
COM_1	5									24	COM_4
	6									25	NO_5
NO_2	7	○	○	○	○	○	○	○	○	26	COM_5
COM_2	8									27	NO_6
	9									28	COM_6
NO_7	10	○	○	○	○	○	○	○	○	29	
COM_7	11									30	DIB_0
DIA_0	12	○	○	○	○	○	○	○	○	31	DIB_1
DIA_1	13									32	DIB_2
DIA_2	14	○	○	○	○	○	○	○	○	33	DIB_3
DIA_3	15									34	DIB_4
DIA_4	16	○	○	○	○	○	○	○	○	35	DIB_5
DIA_5	17									36	DIB_6
DIA_6	18	○	○	○	○	○	○	○	○	37	DIB_7
DIA_7	19										

## Ordering Information

### Standard

**PISO-P8R8:** 8-channel isolated digital input & 8-channel relay output board

**PISO-P8SSR8AC:** 8-channel isolated digital input & 8-channel AC-type solid state relay output board

**PISO-P8SSR8DC:** 8-channel isolated digital input & 8-channel DC-type solid state relay output board

### Optional

**DN-37:** 2x37-pin connector DIN-rail mounting terminal board

**DB-37:** 37-pin D-sub directly connector terminal board

# PISO-P32A32/P32C32/P64/A64/C64

64-channel isolated digital I/O board



PISO-P32A32

## Functional Description

The PISO-P32A32/P32C32/P64/A64/C64 provide 64 optically isolated digital input and/or output channel, arranged into four isolated banks. Each input channel use a photo-coupler input which allows either internal isolated power supply or external power selected by jumper. Each digital output offers a PNP transistor (PISO-P32A32/A64) or Darlington transistor (PISO-P32C32/C64) and integral suppression diode for inductive load. The power supply of the input port may use the external power or the power from the PC side using DC/DC converter. The power supply of the output port should use the external power. This interface board is easily installed in any PC. The board interface to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The PISO-P32A32, PISO-P32C32, PISO-P64, PISO-A64 and PISO-C64 has one 37-pin D-Sub connector and one 40-pin male header. The 40-pin to DB-37 flat-cable is used to fix with the case.

The user can use the DB-16P16R to connect the input ports (CON1) of the PISO-P32C32 for relay output.

Also use the DB-32R to connect the input ports (CON1) of the PISO-C64 for relay output.

## Applications

- Factory Automation
- Product Test
- Laboratory Automation

## Specifications

### Isolated Digital Input

- Number of channels:  
32 (PISO-P32A32, PISO-P32C32)  
64 (PISO-P64)
- Type: Isolated current input
- Isolation voltage:  
3750V (Using external power)  
3000V (Using internal power)
- Input voltage: 5V to 30V
- Input impedance:  $3K\Omega$  /1/4W
- Response time: 4KHz max

## Features

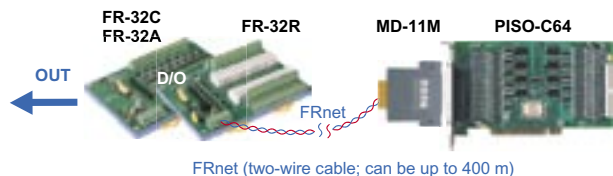
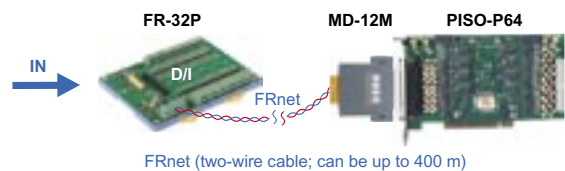
- 32-bit +5V PCI Bus, Plug & Play
- 32-channel isolated digital input & 32-channel isolated digital output (PISO-P32A32, PISO-P32C32)
- 64-channel isolated digital input (PISO-P64)
- 64-channel isolated digital output (PISO-A64, PSIO-C64)
- Sink current output (PSIO-P32C32, PSIO-C64)
- Source current output (PISO-P32A32, PISO-A64)
- 3000VDC isolated voltage

## Isolated Digital Output

- Number of channels:  
32 (PISO-P32A32, PISO-P32C32)  
64 (PISO-P64, PISO-A64, PSIO-C64)
- Type: isolated open collector
- Sink current:  
100 mA/channel (PISO-P32C32, PSIO-C64)
- Source current:  
100 mA/channel (PISO-P32A32, PISO-A64)
- External voltage: 30V max
- Response time: 30KHz max

## General Specifications

- I/O connector: one 37-pin D-sub female  
one 40-pin ribbon male
- Power requirements (typical):  
+5V@ 600 mA (PISO-P32A32, PISO-P32C32)  
+5V@ 400 mA (PISO-P64)  
+5V@ 800 mA (PISO-A64, PSIO-C64)
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 80°C
- Dimensions: 180 mm x 105 mm



Please refer to page 8-7 MagicWire and FR I/O for detail information

# PISO-P32A32/P32C32/P64/A64/C64

64-channel isolated digital I/O board



PISO-P32C32



PISO-A64



PISO-P64



PISO-C64

## Pin Assignment

### PISO-P32A32/PISO-P32C32

GND_DO(-)	1		20	GND_DO(-)
DI_0	2		21	DO_0
DI_1	3		22	DO_1
DI_2	4		23	DO_2
DI_3	5		24	DO_3
DI_4	6		25	DO_4
DI_5	7		26	DO_5
DI_6	8		27	DO_6
DI_7	9		28	DO_7
DI_8	10		29	DO_8
DI_9	11		30	DO_9
DI_10	12		31	DO_10
DI_11	13		32	DO_11
DI_12	14		33	DO_12
DI_13	15		34	DO_13
DI_14	16		35	DO_14
DI_15	17		36	DO_15
CON1 D/I COM1A	18		37	Power_DO(+)
CON1 D/I COM1B	19			

### PISO-P64

GND1	1		20	GND1
DI_0	2		21	DI_16
DI_1	3		22	DI_17
DI_2	4		23	DI_18
DI_3	5		24	DI_19
DI_4	6		25	DI_20
DI_5	7		26	DI_21
DI_6	8		27	DI_22
DI_7	9		28	DI_23
DI_8	10		29	DI_24
DI_9	11		30	DI_25
DI_10	12		31	DI_26
DI_11	13		32	DI_27
DI_12	14		33	DI_28
DI_13	15		34	DI_29
DI_14	16		35	DI_30
DI_15	17		36	DI_31
PWR1	18		37	PWR2
NC	19			

### PISO-A64/PISO-C64

GND_A(-)	1		20	GND_B(-)
DO_0	2		21	DO_16
DO_1	3		22	DO_17
DO_2	4		23	DO_18
DO_3	5		24	DO_19
DO_4	6		25	DO_20
DO_5	7		26	DO_21
DO_6	8		27	DO_22
DO_7	9		28	DO_23
DO_8	10		29	DO_24
DO_9	11		30	DO_25
DO_10	12		31	DO_26
DO_11	13		32	DO_27
DO_12	14		33	DO_28
DO_13	15		34	DO_29
DO_14	16		35	DO_30
DO_15	17		36	DO_31
Power_A(+)	18		37	Power_B(+)
N.C.	19			

## Ordering Information

### Standard

**PISO-P32A32:** 32-channel isolated digital input & 32-channel isolated open-collector output board. (current sourcing)

**PISO-P32C32:** 32-channel isolated digital input & 32-channel isolated open-collector output board. (current sinking)

**PISO-P64:** 64-channel isolated digital input board

**PISO-A64:** 64-channel isolated open-collector output board. (current sourcing)

**PISO-C64:** 64-channel isolated open-collector output board. (current sinking)

### Optional

**DN-37:** 2x37-pin connector DIN-rail mounting terminal board

**DB-37:** 37-pin D-sub connector direct connection terminal board

**DB-16P16R:** 16-channel input terminal and 16-channel relay output board (For PISO-P32C32)

**DB-32R:** 32-channel relay output board (For PISO-C64)

# PISO-725

## 8-channel Relay Output 8-channel Isolated Digital Input Board



### Features

- 32-bit +5V PCI Bus, Plug & Play
- 8-channel isolated digital input
- State-changed interrupt for all digital inputs
- Digital input can be isolated or non-isolated selected by hardware jumper
- 8-channel electromechanical relay output
- One Form C for user's external device
- Another Form C for relay status read back
- On-board LEDs indicate output state

### Functional Description

The PISO-725 provides 8-channel electric mechanical relay output and 8-channel digital input. The digital input channels can be isolated or non-isolated that is selected by hardware jumpers. All digital inputs can generate an interrupt if any state change occurs at any one or more of the inputs. This is very useful when monitoring contact closures/ openings since continuously polling the input is not necessary. All relays are de-energized at power-on. On/Off status of the relays can be read back. The PISO-725 can be used in various applications including contact closure checking, external voltage sensing, and loading sensing and control and sensing applications.

### Applications

- Industrial Automation
- Laboratory Automation
- Communication Switching

### Specifications

#### 8 Isolated Digital Input

- Isolated/non-isolated input selected by jumper JA&JB
- Photo-coupler used for isolated input: PC-357
- Input\_high voltage for isolated input: 3.5 ~ 30V
- Input\_low voltage for isolated input: 0 ~ 1V
- Input impedance for isolated input: 1.2K $\Omega$  / 1W
- Isolation voltage for isolated input: 3750V
- Response time for isolated input: 20uS
- Non-isolated input: TTL compatible

#### 8 Relay Output

- Relay type: DPDT(Form C)
- Output type:
  - Channel 0 ~ channel 3: NC and No output
  - Channel 4 ~ channel 7: No output
- Contact rating: 120VAC@0.3A, 30VDC@1A

- Operating time: 5ms
- Release time: 10ms
- Life: 100,000 times (at 30V/1A)

#### General Specifications

- I/O connector: one 37-Pin D-sub female
- Power requirements: 300 mA@5V (typical)
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 150 mm x 110 mm

### Pin Assignment

NO_0	1	○	20	NO_3
COM_0	2	○	21	COM_3
NC_0	3	○	22	NC_3
NO_1	4	○	23	NO_4
COM_1	5	○	24	COM_4
NC_1	6	○	25	NO_5
NO_2	7	○	26	COM_5
COM_2	8	○	27	NO_6
NC_2	9	○	28	COM_6
NO_7	10	○	29	GND
COM_7	11	○	30	DIL_0
DIH_0	12	○	31	DIL_1
DIH_1	13	○	32	DIL_2
DIH_2	14	○	33	DIL_3
DIH_3	15	○	34	DIL_4
DIH_4	16	○	35	DIL_5
DIH_5	17	○	36	DIL_6
DIH_6	18	○	37	DIL_7
DIH_7	19	○		

### Ordering Information

#### Standard

**PISO-725:** 8-channel isolated digital input & 8-channel relay output board

#### Optional

**DN-37:** Two 37-pin connector DIN-rail mounting terminal board

**DB-37:** 37-pin D-sub directly connector terminal board

# PISO-730/730A

32-channel isolated DI/O & 32-channel TTL DI/O board



PISO-730



PISO-730A

## Functional Description

The PISO-730/730A provides 32-channel isolated digital I/O and 32-channel TTL-level digital I/O. Each of the 16 isolated digital output channel equipped a Darlington transistor (PISO-730) or PNP transistor (PISO-730A). The board can interface to field digital logic signals to eliminate ground-loop problems and isolate the host PC from damaging voltages.

## Applications

- Factory Automation
- Product Test
- Laboratory Automation

## Specifications

### 16 Optical-Isolated Inputs

- Type: isolated current input
- Input voltage: 5V to 24VDC
- Input impedance:  $1.2K\Omega$ , 0.5W
- Response time: 4KHz max

### 16 TTL-level Inputs

- Input high voltage: 2.0V min
- Input low voltage: 0.8V max
- Response time: 30KHz typical

### 16 Isolated Digital Outputs

- Output voltage:
  - open-collector 5~30VDC (PISO-730)
  - open-collector 10~30VDC (PISO-730A)
- Sink current: 100 mA/channel, 200 mA max
- Source current: 100 mA/channel
- Response time: 30KHz max

### 16 TTL-level Outputs

- High: Source 0.4 mA at 2.4V min
- Low: Sink 8 mA at 0.5V max

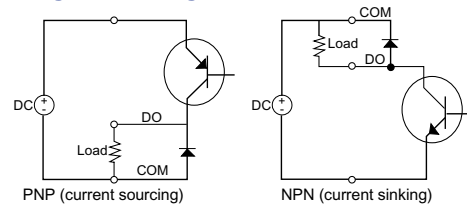
## Features

- 16-channel isolated digital input and 16-channel isolated open-collector output
- 16-channel TTL input and 16-channel TTL output
- Built-in DC/DC converter built-in
- 2500VDC isolated voltage (PISO-730)
- 3750VDC isolated voltage (PISO-730A)
- Sink current output (PISO-730)
- Source current output (PISO-730A)

## General Specifications

- I/O connector: one 37-pin D-sub female two 20-pin ribbon male
- Power requirements: +5V @ 640 mA
- Operating temperature: 0 ~ 60°C
- Operating humidity: 0 ~ 90% non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 180 mm x 105 mm

## Sinking and Sourcing circuit



## Pin Assignment

CN1																		
NO_0	1																	
COM_0	2																	
NO_1	3																	
COM_1	4																	
NO_2	5																	
COM_2	6																	
NO_3	7																	
COM_3	8																	
NO_4	9																	
COM_4	10																	
NO_5	11																	
COM_5	12																	
NO_6	13																	
COM_6	14																	
NO_7	15																	
COM_7	16																	
DIH_0	17																	
DIH_1	18																	
DIH_2	19																	
DIH_3	20																	
DIH_4	21																	
DIH_5	22																	
DIH_6	23																	
DIH_7	24																	
	25																	
	26																	
	27																	
	28																	
	29																	
	30																	
	31																	
	32																	
	33																	
	34																	
	35																	
	36																	
	37																	

CN2																		
DI0	1																	
DI2	2																	
DI4	3																	
DI6	4																	
DI8	5																	
DI10	6																	
DI12	7																	
DI14	8																	
D.GND	9																	
+5V	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	

CN3																		
DO0	1																	
DO2	2																	
DO4	3																	
DO6	4																	
DO8	5																	
DO10	6																	
DO12	7																	
DO14	8																	
D.GND	9																	
+5V	10																	
	11																	
	12																	
	13																	
	14																	
	15																	
	16																	
	17																	
	18																	
	19																	

## Ordering Information

### Standard

- PISO-730:** 32-channel isolated digital I/O & 32-channel TTL digital I/O board. (current sinking)
- PISO-730A:** 32-channel isolated digital I/O & 32-channel TTL digital I/O board. (current sourcing)

### Optional

- DN-37:** Two 37-pin connector DIN-rail mounting terminal board
- DB-37:** 37-pin D-sub directly connector terminal board
- DN-20:** Two 20-pin header DIN-rail terminal board
- DB-16P:** 16-channel isolated D/I board
- DB-16R:** 16-channel relay board
- ADP-20/PCI:** 20-pin extender