



## PIO-821LU/PIO-821HU

Universal PCI, 45 kS/s, 16-ch, 12-bit Analog Input Multifunction Board

### Introduction

The PIO-821LU/HU card is designed as an easy replacement for the PIO-821L/H without requiring any modification to the software or the driver.

The PIO-821LU/HU is a multifunction board for PC/AT compatible computers. The PIO-821LU provides for low gain (1, 2, 4, 8), and the PIO-821HU supports high gain (1, 10, 100, 1000). The PIO-821L/H contains a 12-bit ADC with up to 16 single-ended or 8 differential Analog Input channels. The cards also have a 12-bit DAC voltage output and 16 TTL-compatible Digital Input and Digital Output channels, respectively. The maximum sampling rate for the AD converter is around 45 kS/s.

The PIO-821LU/HU also includes an onboard Card ID switch and pull-high/low DI resistors. The Card ID enables the board to be recognized via software if two or more PIO-821LU/HU cards are installed in the same computer. The pull-high/pull-low resistors allow the DI status to be predefined instead of remaining floating if the DI channels are disconnected or interrupted.

### Pin Assignments

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	AI_8	20	DI 0
AI_1	02	AI_9	21	DI 2
AI_2	03	AI_10	22	DI 4
AI_3	04	AI_11	23	DI 6
AI_4	05	AI_12	24	DI 8
AI_5	06	AI_13	25	DI 10
AI_6	07	AI_14	26	DI 12
AI_7	08	AI_15	27	DI 14
A.GND	09	A.GND	28	DI 16
A.GND	10	A.GND	29	GND
N.C.	11	DAOUT	30	+5 V
N.C.	12	N.C.	31	
+12V	13	GATE0	32	
A.GND	14	N.C.	33	
D.GND	15	GATE2	34	
COU0	16	COU2	35	
N.C.	17	EXT_INT	36	
COU1	18	EXT_CLK	37	
VCC	19			

Pin Assignment	Terminal No.	Pin Assignment	Terminal No.
DO 0	01	DO 1	02
DO 2	03	DO 3	04
DO 4	05	DO 5	06
DO 6	07	DO 7	08
DO 8	09	DO 9	10
DO 10	10	DO 11	12
DO 12	12	DO 13	14
DO 14	14	DO 15	16
GND	16	GND	18
+5 V	18	+12 V	20

### Ordering Information

PIO-821LU CR	Universal PCI, 45 kS/s, 16-ch, 12-bit Analog Input Multifunction Board (RoHS) Includes one CA-4002 D-Sub connector
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### Features

- Universal PCI (3.3 V/5 V) Interface
- 16 Single-ended/8 Differential Analog Input Channels
  - 12-bit, 45 kS/s AD Converter
  - AD Trigger: Software-trigger, Pacer-trigger, External-trigger
  - Interrupt Handling
- 16-channel 5 V/TTL Digital Output
- 16-channel 5 V/TTL Digital Input
  - Pull-high and Pull-low Resistors for DI Channels
- 1-channel, 12-bit Analog Output
- Supports Card ID (SMD Switch)



### Software

#### Drivers

- 32/64-bit Windows XP/2003/2008/7/8/10
- Linux

#### Sample Programs


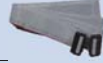







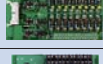








- DOS Lib and TC Demo
- LabVIEW Toolkit
- VB/VC/Delphi/BCB/VB.NET/C#.NET/VC.NET/MATLAB Demo

### Hardware Specifications

Model	PIO-821LU	PIO-821HU
<b>Analog Input</b>		
Channels	16 Single-ended/8 Differential	
AD Conversion	12-bit, 8 $\mu$ s Conversion Time	
Accuracy	0.01% of FSR $\pm$ 1 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
Sampling Rate	45 kS/s	
<b>Analog Output</b>		
Channels	2	
Resolution	12-bit	
Accuracy	0.01% of FSR $\pm$ 1/2 LSB @ 25 $^{\circ}$ C, $\pm$ 10 V	
Output Driving	$\pm$ 5 mA	
Output Range	Unipolar: 0 ~ +5 V, 0 ~ +10 V, 0 ~ Ext Ref	
<b>Digital I/O</b>		
Channels	DI	16, 5 V/TTL
	DO	16, 5 V/TTL
Input Voltage	Logic 0: 0.8 V Max.; Logic 1: 2.0 V Min.	
Output Voltage	Logic 0: 0.4 V Max.; Logic 1: 2.4 V Min.	
Output Capability	Sink: 2.4 mA @ 0.8 V; Source: 0.8 mA @ 2.0 V	
Response Speed	1.2 MHz (Typical)	
<b>Timer/Counter</b>		
Channels	3	
Resolution	16-bit	
Input Frequency	10 MHz Max.	
Reference Clock	Internal: 2 MHz	
<b>General</b>		
Bus Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Card ID	Yes (4-bit)	
Connectors	Female DB37 x 1, 20-pin Box Header x 2	
Power Consumption	960 mA @ +5 V	
Operating Temperature	0 $^{\circ}$ C to +60 $^{\circ}$ C	
Humidity	5 to 85% RH, Non-condensing	

PIO-821HU CR	Universal PCI, 45 kS/s, 16-ch, 12-bit Analog Input Multifunction Board (RoHS) Includes one CA-4002 D-Sub connector
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## Accessories

	CA-2010	20-pin flat cable, 1 M
	CA-2020	20-pin flat cable, 2 M.
	CA-3710	DB-37 Male-Male D-sub cable 1 M (Cable for Daughter Board (45°))
	CA-3710D	DB-37 Male-Male D-sub cable 1 M (Cable for Daughter Board (180°))
	CA-3715DM-H	DB-37 Male-Male Cable, 1.5 M, 180°. (RoHS)
	CA-3730DM-H	DB-37 Male-Male Cable, 3.0 M, 180°. (RoHS)
	CA-4002	37-pin Male D-sub connector with plastic cover.
	DB-8225	Screw terminal board , filter circuitry can be added for 1800HU, 1800LU
	DB-889D	16-channel Analog Input Multiplexer Board
	DB-16P	16-channel Isolated Digital Input Daughter Board
	DB-16R	16-channel Relay Output Daughter Board
	DB-37	Directly connect signal to D-sub 37-pin connector
	DN-37	DIN Rail Mounting 37-pin Connector
	DB-24C	24-channel Open Collector Output Daughter Board
	DB-24OD	24-channel Open-Drain Output Board
	DB-24SSR	24-channel SSR Output Board
	DN-20/DN-20-381	20-pin DIN-RAIL mounting I/O connector board
	125Ω, 0.1% DIP Resistors	125 Ω External Resistor for use with Current Input

