



PIO-821LU/PIO-821HU

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

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)



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	Pin Assignment	Terminal No.	Pin Assignment
AI_0	01	20 AI_8	DI 0	01	02 DI 1
AI_1	02	21 AI_9	DI 2	03	04 DI 3
AI_2	03	22 AI_10	DI 4	05	06 DI 5
AI_3	04	23 AI_11	DI 6	07	08 DI 7
AI_4	05	24 AI_12	DI 8	09	10 DI 9
AI_5	06	25 AI_13	DI 10	11	12 DI 11
AI_6	07	26 AI_14	DI 12	13	14 DI 13
AI_7	08	27 AI_15	DI 14	15	16 DI 15
A.GND	09	28 A.GND	GND	17	18 GND
A.GND	10	29 A.GND	+5 V	19	20 +12 V
N.C.	11	30 DAOUT	CON1		
N.C.	12	31 N.C.	Pin Assignment	Terminal No.	Pin Assignment
+12V	13	32 GATE0	DO 0	01	02 DO 1
A.GND	14	33 N.C.	DO 2	03	04 DO 3
D.GND	15	34 GATE2	DO 4	05	06 DO 5
COUT0	16	35 COUT2	DO 6	07	08 DO 7
N.C.	17	36 EXT_INT	DO 8	09	10 DO 9
COUT1	18	37 EXT_CLK	DO 10	10	12 DO 11
VCC	19		DO 12	12	14 DO 13
			DO 14	14	16 DO 15
			GND	16	18 GND
			+5 V	18	20 +12 V
			CON2		

Software

Drivers

- 32/64-bit Windows 10/11
- Linux

Sample Programs

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

Applications

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

Ordering Information

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

Hardware Specifications

Model	PIO-821LU	PIO-821HU
Hardware		
Card ID	Yes (4-bit)	
Connector	Female DB37 x 1 , 20-pin box header x 2	
Analog Input		
Channels	16 single-ended/8 differential	
Range	Gain: 1, 2, 4, 8 Bipolar Range: ± 5 V, ± 2.5 V, ± 1.25 V, ± 0.625 V	Gain: 1, 10, 100, 1000 Bipolar Range: ± 5 V, ± 0.5 V, ± 0.05 V, ± 0.005 V
Resolution	12-bit	
Accuracy	0.01% of FSR ± 1 LSB @ 25 °C, ± 10 V	
Sampling Rate	45 kS/s. Max.	
Input Impedance	10 M Ω /6 Pf	
Overvoltage Protection	Continuous ± 35 Vp-p	
Zero Drift	± 4 ppm/°C of FSR	
Trigger Mode	Software, Internal programmable pacer	
Data Transfer	Polling, Interrupt	
Analog Output		
Channels	1	
Range	Unipolar: 0 ~ 5 V, 0 ~ 10 V, 0 ~ Ext Ref	
Resolution	12-bit	
Accuracy	0.01% of FSR $\pm 1/2$ LSB @ 25 °C, ± 10 V	
Response Time	500 kHz (Typical)	
Voltage Output Capability	± 5 mA	
Slew Rate	0.3 V/ μ s	
Operation Mode	Static Update	
Digital Input		
Channels	16	
Type	5 V/TTL	
ON Voltage Level	2.0 V Min.	
OFF Voltage Level	0.8 V Max.	
Response Speed	1.0 MHz (Typical)	
Trigger Mode	Static Update	
Digital Output		
Channels	16	
Type	5 V/TTL	
Operation Mode	Static Update	
Load Voltage	Logic 0: 0.4 V Max. , Logic 1: 2.4 V Min.	
Load Current	Sink: 2.4 mA , Source: 0.8 mA	
Response Speed	1.0 MHz (Typical)	
Timer/Counter/Frequency		
Channels	3 (Internal pacer x 1/Independent x 2)	
Type	5 V/TTL	
Resolution	16-bit	
Reference Clock	Internal: 2 MHz	
PC Bus		
Type	3.3 V/5 V Universal PCI, 32-bit, 33 MHz	
Data Bus	8-bit	
Power		
Consumption	960 mA @ +5 V	
Mechanical		
Dimensions (mm)	97 x 159 x 22 (W x L x D)	
Environment		
Operating Temperature	0 ~ +60°C	
Storage Temperature	-20 ~ +70°C	
Humidity	5 ~ 85% RH, Non-condensing	

Accessories

	CA-2010 CR	20-pin flat cable, 1 M (RoHS)
	CA-2020 CR	20-pin flat cable, 2 M (RoHS)
	CA-3710 CR	DB-37 Male-Male D-sub cable 1 M (Cable for Daughter Board (45°)) (RoHS)
	CA-3710D CR	DB-37 Male-Male D-sub cable 1 M (Cable for Daughter Board (180°)) (RoHS)
	CA-3715DM-H CR	DB-37 Male-Male Cable, 1.5 M, 180° (RoHS)
	CA-3730DM-H CR	DB-37 Male-Male Cable, 3.0 M, 180° (RoHS)
	CA-4002 CR	37-pin Male D-sub connector with plastic cover (RoHS)
	DB-8225 CR	Screw terminal board , filter circuitry can be added for 1800HU, 1800LU (RoHS)
	DB-889D CR	16-channel Analog Input Multiplexer Board (RoHS)
	DB-16P CR	16-channel Isolated Digital Input Daughter Board (RoHS)
	DB-16R CR	16-channel Relay Output Daughter Board (RoHS)
	DB-37 CR	Directly connect signal to D-sub 37-pin connector (RoHS)
	DN-37 CR	DIN Rail Mounting 37-pin Connector (RoHS)
	DB-24C CR	24-channel Open Collector Output Daughter Board (RoHS)
	DB-24OD CR	24-channel Open-Drain Output Board (RoHS)
	DB-24SSR CR	24-channel SSR Output Board (RoHS)
	DN-20/DN-20-381 CR	20-pin DIN-RAIL mounting I/O connector board (RoHS)
	2AB125R CR	Resistor DIP 125R 0.1% 1/4W MF 50PPM (1PCS) (RoHS)

