

Non-isolation type low price high precision analog input board for Low Profile PCI
AD16-16(LPCI)L



* Specifications, color and design of the products are subject to change without notice.

Features

Rich set of basic functions

Compact system providing high-precision analog inputs. This product is a control signal(3 points) of analog input(16bits, 16ch), analog input. Digital inputs (four channels), digital outputs (four channels), and a counter (32-bit one channel).

Substantial control functions

Capable of analog input in time-based mode or external-signal synchronous mode.

Filter function facilitating external signal connection

Digital filters provided for external control analog input signals, preventing chattering

Buffer memory

The analog inputs have own buffer memory.

You can also perform analog input in the background, independent of software and the current status of the PC.

Software-based adjustment function

Adjustment of analog input can be all performed by software. Apart from the adjustment information prepared before shipment, additional adjustment information can be stored according to the use environment.

Exchangeable low-profile and standard PCI slots

Support for both of low-profile and standard PCI slots (interchangeable with a bundled bracket).

Windows/Linux compatible device drivers

Using the device driver API-TOOL provided on the CONTEC Web site, it possible to create applications of Windows/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

This product is a PCI-compliant interface card that incorporates high-precision analog in-puts, high-precision analog outputs, digital inputs, digital outputs, and a counter function.

This product supports a Low Profile size slot and if replaced with the supplied bracket, sup-ports a standard size slot, too.

The card can make your space-saving PC into a cost-effective analog input system.

Windows/Linux device driver is supported with this product.

*The contents in this document are subject to change without notice.
 *Visit the CONTEC website to check the latest details in the document.
 *The information in the data sheets is as of October, 2025.

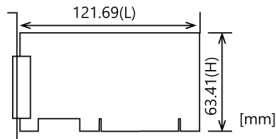
Specifications

Function Specifications

Item		Description
Analog input	Isolated specification	Non-isolated
	Input type	Single-Ended Input
	Number of input channels	16ch
	Input range	Bipolar ±10V
	Absolute max. input voltage	±20V
	Input impedance	1MΩ or more
	Resolution	16bit
	Non-Linearity error *1*2	±5LSB
	Conversion speed	10μsec/ch
	Buffer memory	1k Word
	Conversion start trigger	Software / external trigger.
	Conversion stop trigger	Number of sampling times / external trigger / software
	External start signal	TTL level (Rising or falling edge can be selected by software) Digital filter (1μsec can be selected by software)
	External stop signal	TTL level (Rising or falling edge can be selected by software) Digital filter (1μsec can be selected by software)
External clock signal	TTL level (Rising or falling edge can be selected by software) Digital filter (1μsec can be selected by software)	
Digital I/O section	Number of input channels	Non-isolated input 4ch (TTL level positive logic)
	Number of output channels	Non-isolated output 4ch (TTL level positive logic)
	Response time	200nsec (Max.)
Counter	Number of channels	1ch
	Counting system	Up count
	Max. count	FFFFFFFFh (Binary data, 32bit)
	Number of external inputs	2 TTL level (Gate/Up), Gate (High level), Up (Rising edge)
	Number of external outputs	TTL level, Count match output (positive logic, pulse output)
	Frequency response	10MHz (Max.)
Common section	I/O address	64 ports
	Interruption level	Errors and various factors, One interrupt request line as INTA
	Connector	10250-52A2JL[3M]
	Current consumption	5VDC 390mA (Max.)
	PCI bus specification	32bit, 33MHz, Universal key shapes supported *3
	Dimension (mm)	121.69(L) x 63.41(H)
	Weight	60g

- *1 The non-linearity error means an error of approximately 0.1% occurs over the maximum range at 0°C and 50°C ambient temperature.
- *2 At the time of the source use of a signal which built in the high-speed operational amplifier.
- *3 This board requires power supply at +5V from an expansion slot (it does not work on a machine with a +3.3V power supply alone).

Board Dimensions



The standard outside dimension (L) is the distance from the end of the card to the outer surface of the slot cover.

Support Software

For more details on the supported OS, applicable languages, or to download the latest version of software, visit the CONTEC Web site.

Name	Contents	How to get
Windows version High-efficiency Analog I/O Driver API-AIO(WDM)	The API-AIO(WDM) is the Windows version driver software that provides products in the form of Win32 API functions (DLL). Various sample programs such as Visual Basic and Visual C++, etc and diagnostic program useful for checking operation is provided.	Download from the CONTEC website *1
Analog I/O Driver for Linux API-AIO(LNX)	This is the Linux version driver software provided in API function formats. The software includes various sample programs such as gcc (C, C++) and Python programs.	Download from the CONTEC website *1
Development Support Tools and Support Software	In addition to device drivers, we offer a variety of software for convenient use of our devices.	Download from the CONTEC website *2

- *1 Download the files from the following URL <https://www.contec.com/download/>
- *2 For compatible software, search for this product on the Contec website and see the product page. <https://www.contec.com/>

Optional Products

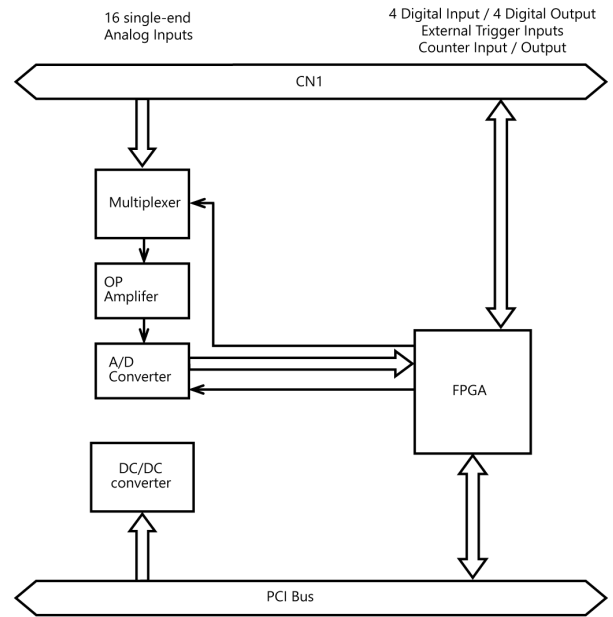
Product Name	Model type	Description
Buffer Amplifier Box for Analog Input Boards	ATBA-8L *1*3*4	8ch type
	ATBA-16L *1*3	16ch type
BNC Terminal Unit	ATP-8L *1*5	for analog input 8ch
Screw Terminal	EPD-50A *1*6	M3 * 50
Shield Cable with Two 50-pin Mini-Ribbon Connector	PCB50PS-0.5P	0.5m
	PCB50PS-1.5P	1.5m
Shield Cable with One 50-pin Mini-Ribbon Connector	PCA50PS-0.5P	0.5m
	PCA50PS-1.5P	1.5m

- *1 PCB50PS-0.5P or PCB50PS-1.5P optional cable is required separately.
 - *3 An external power supply is necessary (optional AC adaptor POA200-20 prepared).
 - *4 As for the AD16-16(LPCI)L, capable of using the analog input of up to 8ch.
 - *5 Capable of using the analog input of up to 8ch, and analog output of up to 2ch.
 - *6 "Spring-up" type terminal is used to prevent terminal screws from falling off.
- * Check the CONTEC's Web site for more information on these options.

Packing List

- Board [AD16-16(LPCI)L] ...1
- Standard size bracket ... 1
- Please read the following ...1

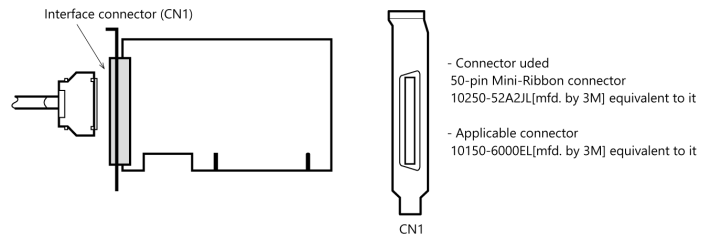
Block Diagram



How to connect the connectors

Connecting an Interface Connector

To connect an external device to this board, plug the cable from the device into the interface connector (CN1) shown below.



Connector Pin Assignment

Pin Assignments of Interface Connector (CN1)

Non Connect	N.C.	50	25	N.C.	Non Connect
Non Connect	N.C.	49	24	N.C.	Non Connect
Non Connect	N.C.	48	23	N.C.	Non Connect
Non Connect	N.C.	47	22	N.C.	Non Connect
Analog Input 04	AI 04	46	21	AI 00	Analog Input 00
Analog Input 12	AI 12	45	20	AI 08	Analog Input 08
Analog Input 05	AI 05	44	19	AI 01	Analog Input 01
Analog Input 13	AI 13	43	18	AI 09	Analog Input 09
Analog Ground (for AI)	AGND	42	17	AGND	Analog Ground (for AI)
Analog Ground (for AI)	AGND	41	16	AGND	Analog Ground (for AI)
Analog Input 06	AI 06	40	15	AI 02	Analog Input 02
Analog Input 14	AI 14	39	14	AI 10	Analog Input 10
Analog Input 07	AI 07	38	13	AI 03	Analog Input 03
Analog Input 15	AI 15	37	12	AI 11	Analog Input 11
Non Connect	N.C.	36	11	AI START	AI External Start Trigger Input
Non Connect	N.C.	35	10	AI STOP	AI External Stop Trigger Input
Non Connect	N.C.	34	9	AI EXCLK	AI External Sampling Clock Input
Digital Ground	DGND	33	8	DGND	Digital Ground
Digital Output 00	DO 00	32	7	DI 00	Digital Input 00
Digital Output 01	DO 01	31	6	DI 01	Digital Input 01
Digital Output 02	DO 02	30	5	DI 02	Digital Input 02
Digital Output 03	DO 03	29	4	DI 03	Digital Input 03
Digital Ground	DGND	28	3	DGND	Digital Ground
Counter UP Clock Input	CNT UPCLK	27	2	CNT GATE	Counter Gate Control Input
Reserved	Reserved	26	1	CNT OUT	Counter Output

Signal name	Description
Analog Input00 - Analog Input15	Analog input signal. The numbers correspond to channel numbers.
Analog Ground	Common analog ground for analog I/O signals.
AI External Start Trigger Input	External trigger input for starting analog input sampling.
AI External Stop Trigger Input	External trigger input for stopping analog input sampling.
AI External Sampling Clock Input	External sampling clock input for analog input.
Digital Input00 - Digital Input03	Digital input signal.
Digital Output00 - Digital Output03	Digital output signal.
Counter Gate Control Input	Gate control input signal for counter.
Counter Up Clock Input	External Up-Clock Input Signal for Counter.
Counter Output	Counter output signal.
Digital Ground	Common digital ground for digital I/O signals, external trigger inputs, external sampling clock inputs, and counter I/O signals.
Reserved	Reserved pin.
N.C.	No connection to this pin.

CAUTION

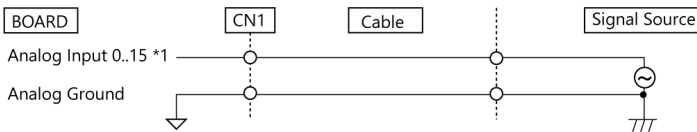
- Do not connect any of the outputs and power outputs to the analog or digital ground. Neither connect outputs to each other. Doing either can result in a fault.
- If analog and digital ground are shorted together, noise on the digital signals may affect the analog signals. Accordingly, analog and digital ground should be separated.
- Leave "Reserved" pins unconnected. Connecting these pins may cause a fault in the board.

Analog Input Signal Connection

◆ Single-ended Input

Single-ended Input Connection (Flat Cable)

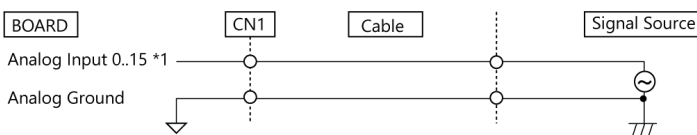
The following figure shows an example of flat cable connection. Each signal source is connected to one analog input channel and the signal common to analog ground pin of CN1.



Single-ended Input Connection (Shielded Cable)

The following figure shows an example of shielded cable connection. When the distance between the signal source and the product is long or you want to increase the noise tolerance, a shield cable is suggested.

Connect the signal by the core wire and common signal by the shield braids.



*1 The number of channels depends on each board. This product has 16 channels.

CAUTION

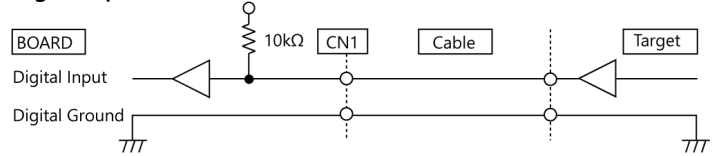
- When a frequency of 1MHz or higher is contained in the source signal, the cross talk between channels may occur.
- If the product and the signal source receive noise or the distance between the product and the signal source is too long, data may not be input properly.
- An input analog signal should not exceed the maximum input voltage (relate to the product analog ground). If it exceeds the maximum voltage, the product may be damaged.
- Connect all the unused analog input channels to analog ground.
- In the channel switching, the multiplexer does the electrical charge and discharge on the internal capacitor according to the signal voltage. Therefore, the voltage from the previous switching state may go into the next channel. It might cause the error of the signal source action. If this occurs, insert a high-speed amplifier as a buffer between the signal source and the analog input pin to reduce the fluctuation.
- An input pin may fail to obtain input data normally when the signal source connected to the pin has high impedance. If this is the case, change the signal source to one with lower output impedance or insert a high-speed amplifier buffer between the signal source and the analog input pin to reduce the effect.

Connecting Digital I/O Signals

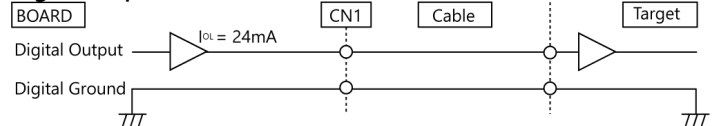
The following sections show examples of how to connect digital I/O signals.

All the I/O signals are TTL level, and input or output can be set in 8-bit units by software.

Digital Input



Digital Output

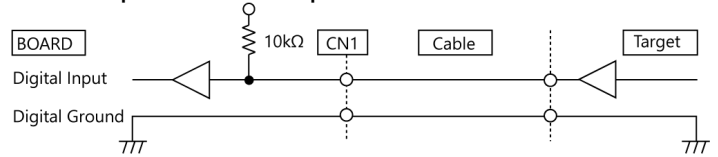


Counter signals and Control signals Connection

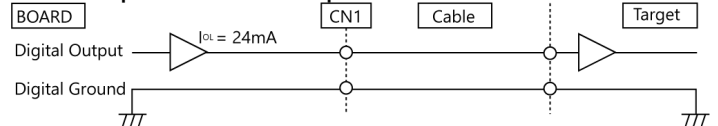
The following sections show examples of how to connect counter I/O signals, and other control I/O signals (external trigger input signals, sampling clock input signals, etc.).

All the counter signals and control signals are TTL.

Counter input and Control input



Counter input and Control output



About the counter input control signal

Counter Gate Control Input acts as an input that validate or invalidate the input of an external up-clock for counter. This function enables the control of an external up-clock for counter. The external up-clock for counter is valid when input is "High", and invalid when input is "Low". If unconnected, it is a pull-up in the product and remains "High". Therefore the external up-clock for counter is valid when the counter gate control input is not connected.

CAUTION

Do not short the output signals to analog ground, digital ground, and/or power line. Doing so may damage the product.