

Low Profile PCI -compliant
High-precision Analog Output (16Ch Type)

DA16-16(LPCI)L



Low Profile PCI -compliant
High-precision Analog Output (8Ch Type)

DA16-8(LPCI)L

Driver Library [API-PAC]: Included

*Specification, color and design of the products may be changed without notice.

Optional Cable & Connector

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)

Optional Cable & Connector

Screw Terminal Unit (M3 terminal block, 50 points)
:EPD-50A *1

*1 PCB50PS-0.5P or PCB50PS-1.5P optional cable is required separately.

DA16-16(LPCI)L and DA16-8(LPCI)L are PCI-compliant interface board include high-precision 16-bit analog outputs, digital I/O(TTL, 4 channels each), and a counter (32bit, 1ch) function.

DA16-16(LPCI)L and DA16-8(LPCI)L support Low-profile PCI slot and PCI slot (using the included bracket), making it ideal for configuring cost-efficient analog output systems with slim-type PCs.

With the included driver library "API-PAC(W32)", users can configure the application software for Windows using the programming languages that support Win32API functions.

Features

- 16 analog output channels [DA16-16(LPCI)L], 8 analog output channels [DA16-8(LPCI)L]
- 3 control signals, 4 TTL digital inputs, 4 TTL digital outputs, 32-bit TTL 1 channel counter
- Onboard control mechanism provides timed output that can be synchronized with external signals.
- Adjustment can be done via software, requires no trimmer setting, capable of recognizing any adjustment information that is different from that set at the factory. This allows for optimum settings for individual applications.
- Compatible with Low Profile size slot and Standard-size slot (Bracket included)
- Provides ML-DAQ library for The MathWork's MATLAB and VI-DAQ for National Instrument's LabVIEW that can be downloaded at CONTEC website for free.

Packing List

- Board (One of the following) ...1
[DA16-16(LPCI)L, DA16-8(LPCI)L]
- First step guide ... 1
- CD-ROM *1 [API-PAC(W32)] ...1
- Bracket for PCI ...1

*1 The CD-ROM contains the driver software and User's Guide.

Specifications

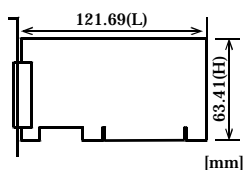
DA16-16(LPCI)L

Item	Specification
Analog output	
Isolated specification	Un-Isolated
Number of output channels	16ch
Output range	Bipolar $\pm 10V$
Absolute max. output current	$\pm 3mA$
Output impedance	1Ω or less
Resolution	16bit
Non-Linearity error *1	$\pm 5LSB$
Conversion speed	10μ sec
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 (1μ sec can be selected by software)
External stop signal	TTL level (Rising or falling edge can be selected by software) Digital filter (1μ sec can be selected by software)
External clock signal	TTL level (Rising or falling edge can be selected by software)
Digital I/O	
Number of input channels	4 TTL levels (positive logic)
Number of output channels	4 TTL levels (positive logic)
Counter	
Number of channels	1ch
Counting system	Up count
Max. count	FFFFFFFFh (Binary data,32bit)
Number of external inputs	2 TTL levels (Gate/Up)/ch Gate (High level), Up (Rising edge)
Number of external outputs	TTL Count match output (positive logic, pulse output)
Response frequency	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]
Power consumption (Max.)	5VDC 1100mA
Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
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 temperatures.

*2: 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).

Physical Dimension



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

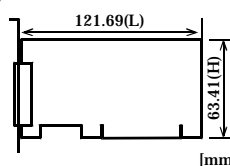
DA16-8(LPCI)L

Item	Specification
Analog output	
Isolated specification	Un-Isolated
Number of output channels	8ch
Output range	Bipolar $\pm 10V$
Absolute max. output current	$\pm 3mA$
Output impedance	1Ω or less
Resolution	16bit
Non-Linearity error *1	$\pm 5LSB$
Conversion speed	10μ sec
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 (1μ sec can be selected by software)
External stop signal	TTL level (Rising or falling edge can be selected by software) Digital filter (1μ sec can be selected by software)
External clock signal	TTL level (Rising or falling edge can be selected by software)
Digital I/O	
Number of input channels	4 TTL levels (positive logic)
Number of output channels	4 TTL levels (positive logic)
Counter	
Number of channels	1ch
Counting system	Up count
Max. count	FFFFFFFFh (Binary data,32bit)
Number of external inputs	2 TTL levels (Gate/Up)/ch Gate (High level), Up (Rising edge)
Number of external outputs	TTL Count match output (positive logic, pulse output)
Response frequency	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]
Power consumption (Max.)	5VDC 850mA
Operating condition	0 - 50°C, 10 - 90%RH (No condensation)
PCI bus specification	32bit, 33MHz, Universal key shapes supported *2
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 temperatures.

*2: 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).

Physical Dimension



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

Supported Software

Driver Software Package API-PAC(W32) (Included)

API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL). It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C++.

It can also be used by the installed diagnosis program to check hardware operations. CONTEC provides download services (at <http://www.contec.com/apipac/>) to supply the updated drivers and differential files.

For details, read Help on the included CD-ROM or visit the CONTEC Web site.

< Operating environment >

OS: Windows XP, Server 2003, 2000, Me, 98, etc..

Language: Visual C++ .NET, Visual C# .NET, Visual Basic .NET, Visual Basic, Delphi, C++Builder etc.

Linux version of analog I/O driver API-AIO (LNX)

(Supplied: Stored on the API-PAC(W32) CD-ROM)

This driver is used to control CONTEC analog I/O boards (cards) from within Linux. Users can control CONTEC I/O boards easily using the shared library called from the user application, the device driver (module) for kernel version, and the board (card) configuration program(config). CONTEC provides download services (at <http://www.contec.com/apipac/>) to supply the updated drivers and differential files.

For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

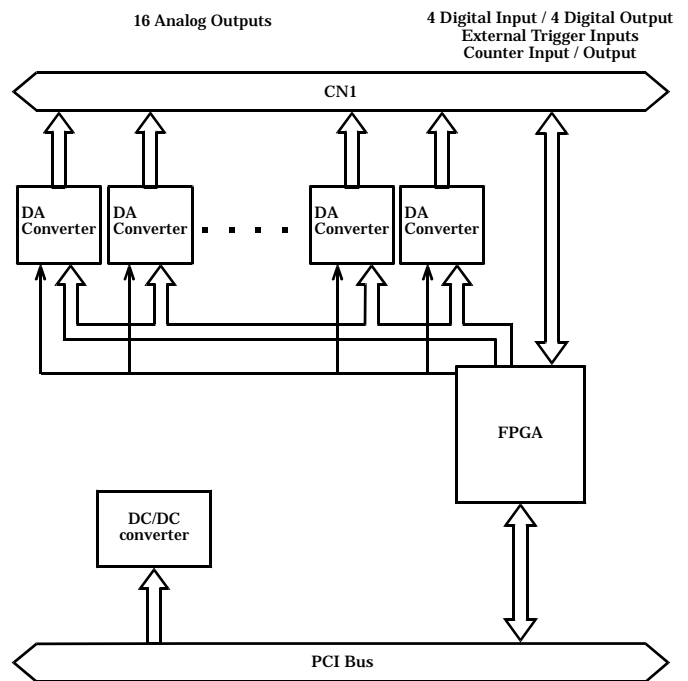
OS: RedHatLinux, TurboLinux, etc..

(For details on supported distributions, refer to Help available after installation.)

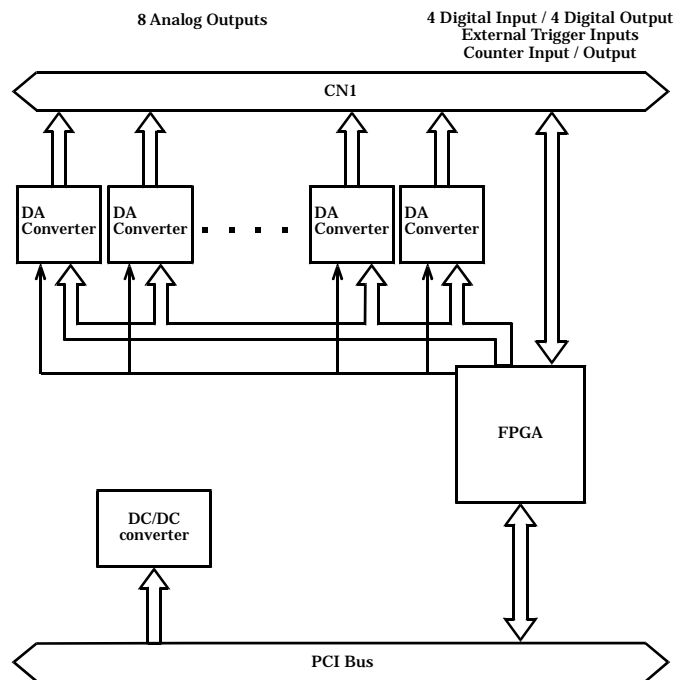
Adaptation language: gcc, etc..

Block Diagram

DA16-16 (LPCI) L



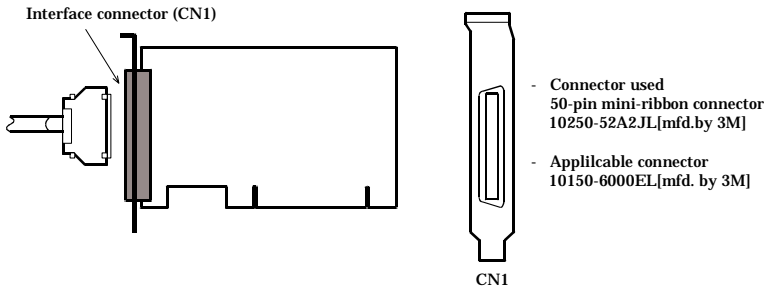
DA16-8 (LPCI) L



Connector Wiring

Connector shape

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) [DA16-16(LPCI)L]

Analog Output 02	AO 02	50	25	--AO 00	Analog Output 00
Analog Ground (for AO)	AGND	49	24	--AGND	Analog Ground (for AO)
Analog Output 03	AO 03	48	23	--AO 01	Analog Output 01
Analog Ground (for AO)	AGND	47	22	--AGND	Analog Ground (for AO)
Analog Output 06	AO 06	46	21	--AO 04	Analog Output 04
Analog Ground (for AO)	AGND	45	20	--AGND	Analog Ground (for AO)
Analog Output 07	AO 07	44	19	--AO 05	Analog Output 05
Analog Ground (for AO)	AGND	43	18	--AGND	Analog Ground (for AO)
Analog Output 10	AO 10	42	17	--AO 08	Analog Output 08
Analog Ground (for AO)	AGND	41	16	--AGND	Analog Ground (for AO)
Analog Output 11	AO 11	40	15	--AO 09	Analog Output 09
Analog Ground (for AO)	AGND	39	14	--AGND	Analog Ground (for AO)
Analog Output 14	AO 14	38	13	--AO 12	Analog Output 12
Analog Ground (for AO)	AGND	37	12	--AGND	Analog Ground (for AO)
Analog Output 15	AO 15	36	11	--AO 13	Analog Output 13
Analog Ground (for AO)	AGND	35	10	--AGND	Analog Ground (for AO)
Output Control External Sampling Stop Trigger Input	OCESSPI	34	9	--OCESSTI	Output Control External Sampling Start Trigger Input
Output Control External Sampling Clock Input	OCESSCKI	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 Clock Input	CNT CKI	27	2	--CNT CCI	Counter Gate Control Input
Reserved (Counter Input)	Reserved	26	1	--CNT CPO	Counter Count-up Pulse Output

Analog Output00 - Analog Output15	Analog output signal. The numbers correspond to channel numbers.
Analog Ground *1	Common analog ground for analog I/O signals.
AO External Start Trigger Input *1	External trigger input for starting analog output sampling.
AO External Stop Trigger Input *1	External trigger input for stopping analog output sampling.
AO External Sampling Clock Input *1	External sampling clock input for analog output.
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	Count-up clock input signal for counter.
Counter Output	Counter output signal.
Digital Ground *1	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.

*1 :Pin Assignments is different from High-Resolution Analog Output Board for Low Profile PCI DA16-4 (LPCI)L.

⚠ CAUTION

- Do not connect any of the outputs and power outputs to the analog or digital ground. Do not connect outputs to each other. Doing either can result in a fault.
- If analog and digital grounds 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.

Connector Pin Assignment Pin Assignments of Interface Connector (CN1) [DA16-8(LPCI)L]

Analog Output 02	AO 02	50	25	-	AO 00	Analog Output 00
Analog Ground (for AO)	AGND	49	24	-	AGND	Analog Ground (for AO)
Analog Output 03	AO 03	48	23	-	AO 01	Analog Output 01
Analog Ground (for AO)	AGND	47	22	-	AGND	Analog Ground (for AO)
Analog Output 06	AO 06	46	21	-	AO 04	Analog Output 04
Analog Ground (for AO)	AGND	45	20	-	AGND	Analog Ground (for AO)
Analog Output 07	AO 07	44	19	-	AO 05	Analog Output 05
Analog Ground (for AO)	AGND	43	18	-	AGND	Analog Ground (for AO)
	N.C.	42	17	-	N.C.	
Analog Ground (for AO)	AGND	41	16	-	AGND	Analog Ground (for AO)
	N.C.	40	15	-	N.C.	
Analog Ground (for AO)	AGND	39	14	-	AGND	Analog Ground (for AO)
	N.C.	38	13	-	N.C.	
Analog Ground (for AO)	AGND	37	12	-	AGND	Analog Ground (for AO)
	N.C.	36	11	-	N.C.	
Analog Ground (for AO)	AGND	35	10	-	AGND	Analog Ground (for AO)
Output Control External Sampling Stop Trigger Input	OCESSPI	34	9	-	OCESSSTI	Output Control External Sampling Start Trigger Input
Output Control External Sampling Clock Input	OCESSCKI	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 Clock Input	CNT CKI	27	2	-	CNT GCI	Counter Gate Control Input
Reserved (Counter Input)	Reserved	26	1	-	CNT CPO	Counter Count-up Pulse Output

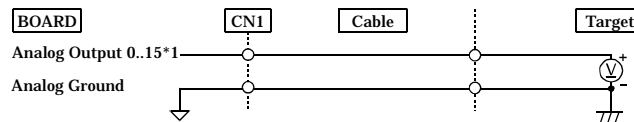
Analog Output00 - Analog Output07	Analog output signal. The numbers correspond to channel numbers.
Analog Ground *1	Common analog ground for analog I/O signals.
AO External Start Trigger Input *1	External trigger input for starting analog output sampling.
AO External Stop Trigger Input *1	External trigger input for stopping analog output sampling.
AO External Sampling Clock Input *1	External sampling clock input for analog output.
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	Count-up clock input signal for counter.
Counter Output	Counter output signal.
Digital Ground *1	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

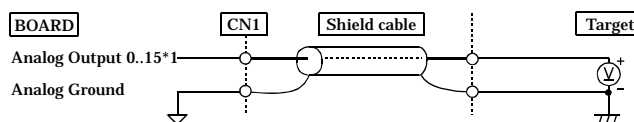
- Do not connect any of the outputs and power outputs to the analog or digital ground. Do not connect outputs to each other. Doing either can result in a fault.
- If analog and digital grounds are shorted together, noise on the digital signals may affect the analog signals. Accordingly, analog and digital ground should be separated.
- Leave "Reserved" pins unconnected. Connecting these pins may cause a fault in the board.

How to Connect Analog Output Signals

This section shows how to connect the analog output signal by using a flat cable or a shielded cable. The following figure shows an example of flat cable connection. Connect the signal source and ground to the CN1 analog output.



The following figure shows an example of shield cable connection. Use shielded cable if the distance between the signal source and board is long or if you want to provide better protection from noise. For each analog input channel on CN1, connect the core wire to the signal line and connect the shielding to ground.



*1 The number of channels depends on each board. The DA16-16(LPCI)L has 16 channels; the DA16-8(LPCI)L has 8 channels.

⚠ CAUTION

- If the board or the connected wire receives noise, or the distance between the board and the target is long, data may not be outputted properly.
- For analog output signal, the current capacity is $\pm 3\text{mA}$ (Max.). Check the specification of the connected device before connecting the board.
- Do not short the analog output signal to analog ground, digital ground, and/or power line. Doing so may damage the board.
- Do not connect an analog output signal to any other analog output, either on the board or on an external device, as this may cause a fault on the board.