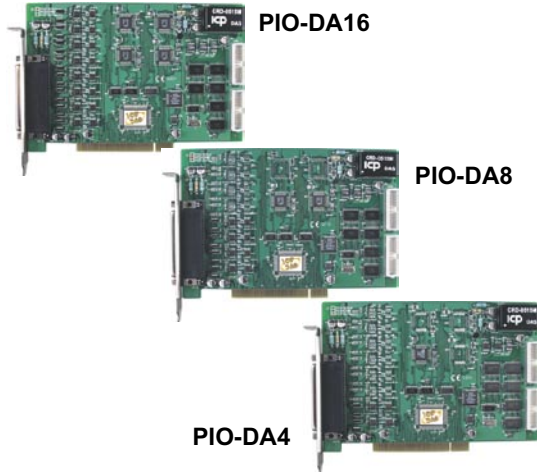


PCI Analog Output Board

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: $\pm 10V$, $\pm 5V$, 0~10V, 0~5V voltage output, or 4~20 mA, 0~20 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: 0~5V or 0~10V
- Bipolar: $\pm 10V$ or $\pm 5V$
- Current drive: ± 5 mA (PIO-DA16/DA8/DA4)
 ± 40 mA (PIO-DA4H)
- Absolute accuracy: 0.01% FSR (typical)

Current Output Range

- 0~20 mA or 4~20 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: ± 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

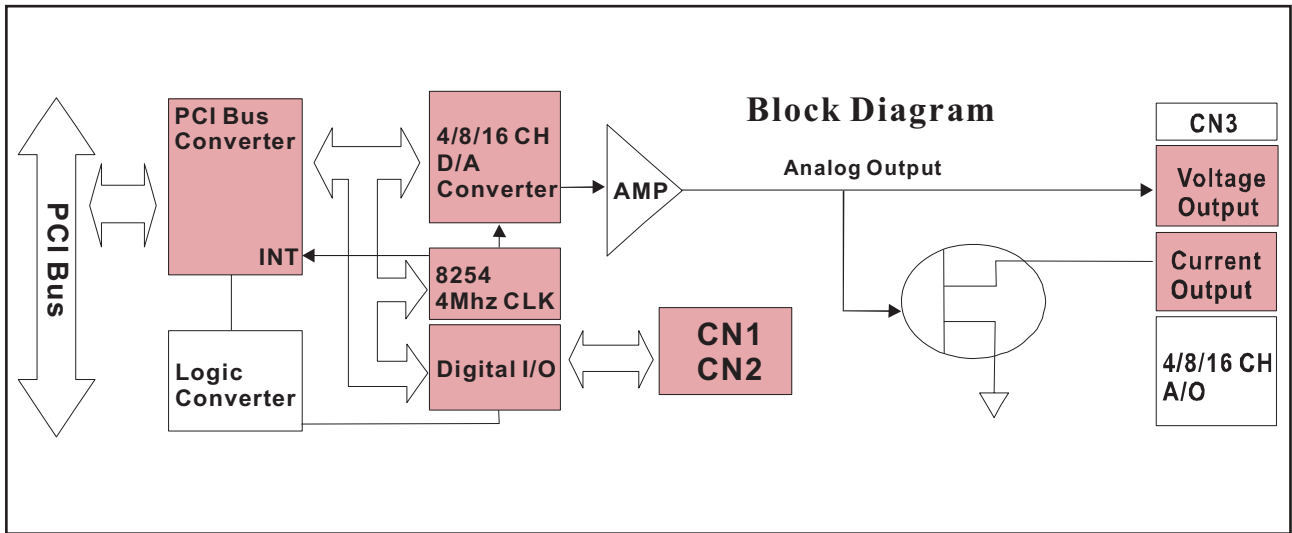
- I/O connector: one 37-pin D-sub female
two 20-pin ribbon male
- Power requirements:

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 ~ 60°C
- Operating humidity: 0 ~ 90 % non-condensing
- Storage temperature: -20 ~ 70°C
- Dimensions: 179 mm x 122 mm

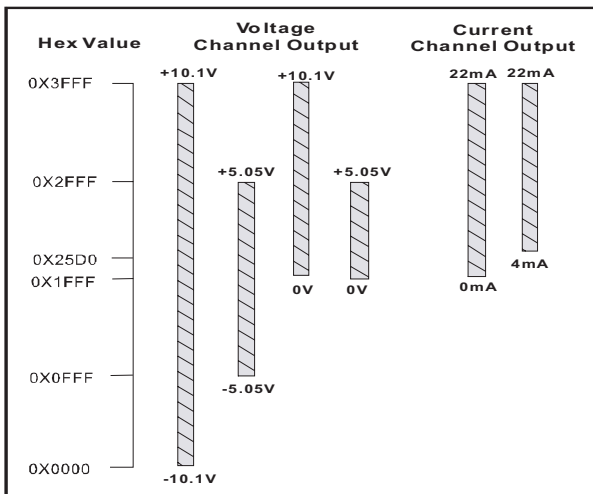
PIO-DA16/DA8/DA4 Series

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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 μ A
4mA~20mA	13-bit	2.70 μ A

Pin Assignment

CON1				CON2			
DO 0	1	DO 1	DI 0	1	DO 2	DI 1	DI 1
DO 2	3	DO 3	DI 2	3	DO 4	DI 3	DI 3
DO 4	5	DO 5	DI 4	5	DO 6	DI 5	DI 5
DO 6	7	DO 7	DI 6	7	DO 8	DI 7	DI 7
DO 8	9	DO 9	DI 8	9	DO 10	DI 9	DI 9
DO 10	11	DO 11	DI 10	11	DO 12	DI 11	DI 11
DO 12	13	DO 13	DI 12	13	DO 14	DI 13	DI 13
DO 14	15	DO 15	DI 14	15	DO 16	DI 15	DI 15
GND	17	GND	GND	17	GND	GND	GND
+5V	19	+12V	+5V	19	+12V	+5V	+12V

CON3

IO_15	37	19	VO_15
IO_14	36	18	VO_14
IO_13	35	17	VO_13
IO_12	34	16	VO_12
IO_11	33	15	A.GND
IO_10	32	14	VO_11
IO_9	31	13	VO_10
IO_8	30	12	VO_9
A.GND	29	11	VO_8
IO_7	28	10	A.GND
IO_6	27	9	VO_7
IO_5	26	8	VO_6
IO_4	25	7	VO_5
A.GND	24	6	VO_4
IO_3	23	5	A.GND
IO_2	22	4	VO_3
IO_1	21	3	VO_2
IO_0	20	2	VO_1
		1	VO_0

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