

# PXI/DAQ/DAQe-2200 Series

## 64-CH 12/16-Bit Up to 3 MS/s Multi-Function DAQ Cards



### Introduction

ADLINK's PXI/DAQ/DAQe-2200 series are high-density and high-performance multi-function DAQ cards. These devices can sample up to 64 AI channels with different gain settings and scan sequences, making them ideal for dealing with high-density analog signals with various input ranges and sampling speeds. These devices also offer differential mode for 32 AI channels in order to achieve maximum noise elimination.

The PXI/DAQ/DAQe-2200 series also feature analog and digital triggering, 2-CH 12-bit analog outputs with waveform generation capability, 24-CH programmable digital I/O lines, and 2-CH 16-bit general-purpose timer/counter. Like all the other members in the PXI/DAQ/DAQe-2200 family, the PXI/DAQ/DAQe-2200 is able to perform the analog input and output functions at full speed simultaneously and multiple cards can be synchronized through the SSI (System Synchronization Interface) bus. The auto-calibration functions adjust the gain and offset to within specified accuracies such that you do not have to adjust trimpots to calibrate the cards.

### Features

- Supports a 32-bit 3.3 V or 5 V PCI bus (DAQ-2200 series)
- x1 lane PCI Express® Interface (DAQe-2200 series)
- PXI specification Rev 2.2 compliant (PXI-2200 series)
- 64-CH single-ended or 32-CH differential analog inputs
- Onboard 1 k-sample A/D FIFO
- Bipolar or unipolar analog input ranges
- Programmable gains:
  - x1, x2, x4, x5, x8, x10, x20, x40, x50, x200 (DAQ/DAQe-2204)
  - x1, x2, x4, x8 (DAQ/DAQe-2205 & DAQ/DAQe-2206)
- 512-configuration channel gain queue
- Scatter-gather DMA for both analog inputs and outputs
- 2-CH 12-bit multiplying analog outputs with waveform generation
- Onboard 1 k-sample D/A FIFO
- 24-CH TTL digital input/output
- 2-CH 16-bit general-purpose timer/counter
- Analog and digital triggering
- Fully auto calibration
- Multiple cards synchronization through SSI (System Synchronization Interface) bus or PXI trigger bus
- Operating Systems
  - Windows 7/Vista/XP/2000/2003 Server
  - Linux

### Recommended Software

- AD-Logger
- VB.NET/VC.NET/VB/VC++/BCB/Delphi
- DAQBench

### Driver Support

- DAQPilot for LabVIEW™
- DAQ-MTLB for MATLAB®
- D2K-DASK for Windows
- D2K-DASK/X for Linux

### Terminal Boards & Cables

#### DIN-685-01

Terminal Board with One 68-pin SCSI-II Connector and DIN-Rail Mounting (Cables are not included.)

#### ACL-10568-I

68-pin SCSI-VHDCI cable (mating with AMP-787082-7), 1 M

\* For more information on mating cables, please refer to P2-61/62.

### SSI Bus Cables (for multiple cards synchronization)

- ACL-SSI-2  
SSI Bus cable for 2 devices
- ACL-SSI-3  
SSI Bus cable for 3 devices
- ACL-SSI-4  
SSI Bus cable for 4 devices



SSI bus cable for multiple card synchronization for DAQ/DAQe-2000 series



Terminal board DIN-685-01 & 68-Pin SCSI-VHDCI cable  
ACL-10568-I

### Pin Assignment Connector CN1 Pin Assignment

|              |    |    |              |
|--------------|----|----|--------------|
| AI0 (AIH0)   | 1  | 35 | (AIL0) AI32  |
| AI1 (AIH1)   | 2  | 36 | (AIL1) AI33  |
| AI2 (AIH2)   | 3  | 37 | (AIL2) AI34  |
| AI3 (AIH3)   | 4  | 38 | (AIL3) AI35  |
| AI4 (AIH4)   | 5  | 39 | (AIL4) AI36  |
| AI5 (AIH5)   | 6  | 40 | (AIL5) AI37  |
| AI6 (AIH6)   | 7  | 41 | (AIL6) AI38  |
| AI7 (AIH7)   | 8  | 42 | (AIL7) AI39  |
| AI8 (AIH8)   | 9  | 43 | (AIL8) AI40  |
| AI9 (AIH9)   | 10 | 44 | (AIL9) AI41  |
| AI10 (AIH10) | 11 | 45 | (AIL10) AI42 |
| AI11 (AIH11) | 12 | 46 | (AIL11) AI43 |
| AI12 (AIH12) | 13 | 47 | (AIL12) AI44 |
| AI13 (AIH13) | 14 | 48 | (AIL13) AI45 |
| AI14 (AIH14) | 15 | 49 | (AIL14) AI46 |
| AI15 (AIH15) | 16 | 50 | (AIL15) AI47 |
| AISENSE      | 17 | 51 | AI GND       |
| AI16 (AIH16) | 18 | 52 | (AIL16) AI48 |
| AI17 (AIH17) | 19 | 53 | (AIL17) AI49 |
| AI18 (AIH18) | 20 | 54 | (AIL18) AI50 |
| AI19 (AIH19) | 21 | 55 | (AIL19) AI51 |
| AI20 (AIH20) | 22 | 56 | (AIL20) AI52 |
| AI21 (AIH21) | 23 | 57 | (AIL21) AI53 |
| AI22 (AIH22) | 24 | 58 | (AIL22) AI54 |
| AI23 (AIH23) | 25 | 59 | (AIL23) AI55 |
| AI24 (AIH24) | 26 | 60 | (AIL24) AI56 |
| AI25 (AIH25) | 27 | 61 | (AIL25) AI57 |
| AI26 (AIH26) | 28 | 62 | (AIL26) AI58 |
| AI27 (AIH27) | 29 | 63 | (AIL27) AI59 |
| AI28 (AIH28) | 30 | 64 | (AIL28) AI60 |
| AI29 (AIH29) | 31 | 65 | (AIL29) AI61 |
| AI30 (AIH30) | 32 | 66 | (AIL30) AI62 |
| AI31 (AIH31) | 33 | 67 | (AIL31) AI63 |
| EXTATRIG     | 34 | 68 | AI GND       |

### Pin Assignment Connector CN2 Pin Assignment

|              |    |    |              |
|--------------|----|----|--------------|
| DA0OUT       | 1  | 35 | AOGND        |
| DA1OUT       | 2  | 36 | AOGND        |
| AOEXTREF     | 3  | 37 | AOGND        |
| N/C          | 4  | 38 | N/C          |
| DGND         | 5  | 39 | DGND         |
| EXTWFTRIG    | 6  | 40 | DGND         |
| EXTDTRIG     | 7  | 41 | DGND         |
| SSHOUT       | 8  | 42 | SDI0 / DGND* |
| RESERVED     | 9  | 43 | SDI1 / DGND* |
| RESERVED     | 10 | 44 | SDI2 / DGND* |
| AF11         | 11 | 45 | SDI3 / DGND* |
| AF10         | 12 | 46 | DGND         |
| GPTC0_SRC    | 13 | 47 | DGND         |
| GPTC0_GATE   | 14 | 48 | DGND         |
| GPTC0_UPDOWN | 15 | 49 | DGND         |
| GPTC0_OUT    | 16 | 50 | DGND         |
| GPTC1_SRC    | 17 | 51 | DGND         |
| GPTC1_GATE   | 18 | 52 | DGND         |
| GPTC1_UPDOWN | 19 | 53 | DGND         |
| GPTC1_OUT    | 20 | 54 | DGND         |
| EXTTIMEBASE  | 21 | 55 | DGND         |
| PB7          | 22 | 56 | PB6          |
| PB5          | 23 | 57 | PB4          |
| PB3          | 24 | 58 | PB2          |
| PB1          | 25 | 59 | PB0          |
| PC7          | 26 | 60 | PC6          |
| PC5          | 27 | 61 | PC4          |
| DGND         | 28 | 62 | DGND         |
| PC3          | 29 | 63 | PC2          |
| PC1          | 30 | 64 | PC0          |
| PA7          | 31 | 65 | PA6          |
| PA5          | 32 | 66 | PA4          |
| PA3          | 33 | 67 | PA2          |
| PA1          | 34 | 68 | PA0          |

\*Pin 42-45 are SDI<0..3> for 2204; DGND for 2205 and 2206

## Ordering Information / Quick Selection Guide

| Model Name        | Analog Input    |            |               |                            | Analog Output   |            |             | DIO             | Timer/Counter   |
|-------------------|-----------------|------------|---------------|----------------------------|-----------------|------------|-------------|-----------------|-----------------|
|                   | No. of channels | Resolution | Sampling rate | Input range                | No. of channels | Resolution | Update rate | No. of channels | No. of channels |
| PXI/DAQ/DAQe-2204 | 32 DI/64 SE     | 12 bits    | 3 MS/s        | $\pm 0.05$ V to $\pm 10$ V | 2               | 12 bits    | 1 MS/s      | 24-CH 8255 PIO  | 2-CH, 16-bit    |
| PXI/DAQ/DAQe-2205 | 32 DI/64 SE     | 16 bits    | 500 kS/s      | $\pm 1.25$ V to $\pm 10$ V | 2               | 12 bits    | 1 MS/s      | 24-CH 8255 PIO  | 2-CH, 16-bit    |
| PXI/DAQ/DAQe-2206 | 32 DI/64 SE     | 16 bits    | 250 kS/s      | $\pm 1.25$ V to $\pm 10$ V | 2               | 12 bits    | 1 MS/s      | 24-CH 8255 PIO  | 2-CH, 16-bit    |

## Specifications

| Model Name                                               | PXI/DAQ/DAQe-2204                                                                                                                                                                             |                                                                                             | PXI/DAQ/DAQe-2205                                                                            | PXI/DAQ/DAQe-2206         |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------|
| Analog Input                                             |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Resolution                                               | 12 bits, no missing codes                                                                                                                                                                     |                                                                                             | 16 bits, no missing codes                                                                    | 16 bits, no missing codes |
| Number of channels                                       | 64 single-ended or 32 differential (software selectable per channel)                                                                                                                          |                                                                                             |                                                                                              |                           |
| Channel gain queue size                                  | 512                                                                                                                                                                                           |                                                                                             |                                                                                              |                           |
| Maximum sampling rate                                    | 3 MS/s                                                                                                                                                                                        | 500 kS/s                                                                                    | 250 kS/s                                                                                     |                           |
| Programmable gain                                        | 1, 2, 4, 5, 8, 10, 20, 40, 50, 200                                                                                                                                                            | 1, 2, 4, 8                                                                                  | 1, 2, 4, 8                                                                                   |                           |
| Bipolar input ranges                                     | Max. : $\pm 10$ V, Min. : $\pm 0.05$ V $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V, $\pm 1.25$ V $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V, $\pm 1.25$ V                                                      |                                                                                             |                                                                                              |                           |
| Unipolar input ranges                                    | Max. : 0-10 V, Min. : 0-0.1 V0-10 V, 0-5 V, 0-2.5 V, 0-1.25 V0-10 V, 0-5 V, 0-2.5 V, 0-1.25 V                                                                                                 |                                                                                             |                                                                                              |                           |
| Offset error                                             | $\pm 2$ mV                                                                                                                                                                                    | $\pm 1$ mV                                                                                  | $\pm 2$ mV                                                                                   |                           |
| Gain error                                               | $\pm 0.06\%$ of FSR                                                                                                                                                                           | $\pm 0.08\%$ of FSR                                                                         | $\pm 0.06\%$ of FSR                                                                          |                           |
| Input coupling                                           | DC                                                                                                                                                                                            |                                                                                             |                                                                                              |                           |
| Overvoltage protection                                   | Power on: Continuous $\pm 30$ V, Power off: Continuous $\pm 15$ V                                                                                                                             |                                                                                             |                                                                                              |                           |
| Input impedance                                          | 1 G $\Omega$ /100 pF                                                                                                                                                                          |                                                                                             |                                                                                              |                           |
| CMRR (gain = 1)                                          | 90 dB                                                                                                                                                                                         | 83 dB                                                                                       | 83 dB                                                                                        |                           |
| Settling time                                            | 1 $\mu$ s to 0.1% error *                                                                                                                                                                     | 2 $\mu$ s to 0.1% error                                                                     | 4 $\mu$ s to 0.01% error                                                                     |                           |
| -3 dB small signal bandwidth<br>(@Bipolar +/-10V Gain=1) | 2 MHz                                                                                                                                                                                         | 850kHz                                                                                      | 600 kHz                                                                                      |                           |
| Trigger sources                                          | Software, external digital/analog trigger, SSI bus                                                                                                                                            |                                                                                             |                                                                                              |                           |
| Trigger modes                                            | Pre-trigger, post-trigger, middle-trigger, delay-trigger, and repeated trigger                                                                                                                |                                                                                             |                                                                                              |                           |
| FIFO buffer size                                         | 1 k samples                                                                                                                                                                                   |                                                                                             |                                                                                              |                           |
| Data transfers                                           | Polling, scatter-gather DMA                                                                                                                                                                   |                                                                                             |                                                                                              |                           |
| Analog Output                                            |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Number of channels                                       | 2 voltage outputs                                                                                                                                                                             |                                                                                             |                                                                                              |                           |
| Resolution                                               | 12 bits                                                                                                                                                                                       |                                                                                             |                                                                                              |                           |
| Output ranges                                            | 0-10 V, $\pm 10$ V, 0-AOEXTREF, $\pm$ AOEXTREF                                                                                                                                                |                                                                                             |                                                                                              |                           |
| Maximum update rate                                      | 1 $\mu$ s                                                                                                                                                                                     |                                                                                             |                                                                                              |                           |
| Slew rate                                                | 20 V/ $\mu$ s                                                                                                                                                                                 |                                                                                             |                                                                                              |                           |
| Settling time                                            | 3 $\mu$ s to $\pm 0.5$ LSB accuracy                                                                                                                                                           |                                                                                             |                                                                                              |                           |
| Offset error                                             | $\pm 1$ mV                                                                                                                                                                                    | $\pm 2$ mV                                                                                  | $\pm 1$ mV                                                                                   |                           |
| Gain error                                               | $\pm 0.02\%$ of max. output                                                                                                                                                                   | $\pm 0.04\%$ of max. output                                                                 | $\pm 0.02\%$ of max. output                                                                  |                           |
| Driving capacity                                         | $\pm 5$ mA                                                                                                                                                                                    |                                                                                             |                                                                                              |                           |
| Stability                                                | Any passive load, up to 1500 pF                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Trigger sources                                          | Software, external digital/analog trigger, SSI bus                                                                                                                                            |                                                                                             |                                                                                              |                           |
| Trigger modes                                            | Post-trigger, delay-trigger, and repeated trigger                                                                                                                                             |                                                                                             |                                                                                              |                           |
| FIFO buffer size                                         | 1 k samples                                                                                                                                                                                   |                                                                                             |                                                                                              |                           |
| Data transfers                                           | Programmed I/O, scatter-gather DMA                                                                                                                                                            |                                                                                             |                                                                                              |                           |
| Digital I/O                                              |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Number of channels                                       | 24-CH 8255 programmable input/output                                                                                                                                                          |                                                                                             |                                                                                              |                           |
| Compatibility                                            | 5 V/TTL                                                                                                                                                                                       |                                                                                             |                                                                                              |                           |
| Data transfers                                           | Programmed I/O                                                                                                                                                                                |                                                                                             |                                                                                              |                           |
| General-Purpose Timer/Counter                            |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Number of channels                                       | 2                                                                                                                                                                                             |                                                                                             |                                                                                              |                           |
| Resolution                                               | 16-bit                                                                                                                                                                                        |                                                                                             |                                                                                              |                           |
| Base clock available                                     | 40 MHz, external clock up to 10 MHz                                                                                                                                                           |                                                                                             |                                                                                              |                           |
| Auto Calibration                                         |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Onboard reference                                        | $+5$ V                                                                                                                                                                                        |                                                                                             |                                                                                              |                           |
| Temperature drift                                        | $\pm 2$ ppm/ $^{\circ}$ C                                                                                                                                                                     |                                                                                             |                                                                                              |                           |
| Stability                                                | $\pm 6$ ppm/1000 Hrs                                                                                                                                                                          |                                                                                             |                                                                                              |                           |
| General Specifications                                   |                                                                                                                                                                                               |                                                                                             |                                                                                              |                           |
| Dimensions                                               | 160 mm x 100 mm (not including connectors) (PXI-2200 series)<br>175 mm x 107 mm (not including connectors) (DAQ-2200 series)<br>168 mm x 107 mm (not including connectors) (DAQe-2200 series) |                                                                                             |                                                                                              |                           |
| Connector                                                | 68-pin VHDCI female x 2                                                                                                                                                                       |                                                                                             |                                                                                              |                           |
| Operating temperature                                    | 0 to $55^{\circ}$ C                                                                                                                                                                           |                                                                                             |                                                                                              |                           |
| Storage temperature                                      | $-20$ to $70^{\circ}$ C                                                                                                                                                                       |                                                                                             |                                                                                              |                           |
| Humidity                                                 | 5 to 95%, non-condensing                                                                                                                                                                      |                                                                                             |                                                                                              |                           |
| Power requirements                                       | $+5$ V 1.3 A typical (PXI/DAQ-2204)<br>$+3.3$ V 0.9 A, $+12$ V 0.564 A typical (DAQe-2204)                                                                                                    | $+5$ V 1.2 A typical (PXI/DAQ-2205)<br>$+3.3$ V 0.81 A, $+12$ V 0.568 A typical (DAQe-2205) | $+5$ V 1.2 A typical (PXI/DAQ-2206)<br>$+3.3$ V 0.756 A, $+12$ V 0.584 A typical (DAQe-2206) |                           |

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