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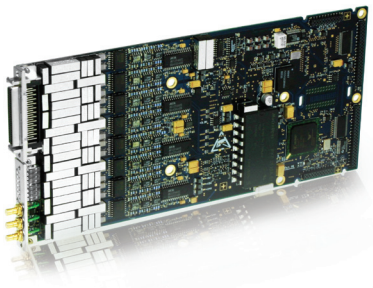
WHEN ACCURACY MATTERS

ProDAQ Data Acquisition Function Cards

ProDAQ 3424 8-Channel, 24-Bit, Sigma-Delta ADC Function Card



LXI VXI bus

OVERVIEW

The ProDAQ 3424 24-bit, sigma-delta ADC function card is a ProDAQ high-density card that fits into any of the ProDAQ VXIbus motherboards and LXI function card carriers.

The ProDAQ 3424 function card provides eight channels, each equipped with a 24-bit, sigma-delta ADC; differential input channels; and a maximum input range of ±10.24 V on a double-wide function card. This allows for a total of 32 fully-differential input channels per VXIbus slot by fitting four ProDAQ 3424 function cards on a ProDAQ motherboard.

The front-end of the ProDAQ 3424 card provides the user with a flexible solution for a wide range of applications. A very useful feature is the possibility of selecting between either differential or single-ended input. For the single ended input an offset voltage generated by an onboard DAC may be used to remove the DC portion of the input signal and thus adjust the input range to suit the application.

For calibration purposes, the input of every channel can be grounded or connected to the voltage output of a ProDAQ high-precision voltage reference fitted on the motherboard.

The gain of the ProDAQ 3424 is programmable from 1 to 1000, providing the user with voltage ranges from ±10.24 mV to ±10.24 V. The 4-pole fixed Butterworth anti-aliasing analog input filter allows for sample rates in the range of 20 kHz to 216 kHz. Output rates as low as 200 Hz can be achieved by using the onboard digital filters and decimation stages. The cut-off frequency of the Butterworth filter is set high enough to allow for a linear phase response within the passband.

The coefficients of the internal FIR decimation filter were also chosen to ensure a linear phase response within the passband. This makes the card useful in both the time and frequency domains.

The ProDAQ programmable voltage reference option can be switched directly to the programmable gain amplifier for on-the-fly calibration or for self-test purposes. The typical full-scale DC accuracy for a gain of 1 is 0.01%.

The ProDAQ 3424 function card provides source capabilities for IEPE/ICP sensors as well as an interface for accessing Transducer Electronic Data Sheets (TEDS). This makes the card especially useful in vibration measurement applications.

The ProDAQ 3424 function card consumes two adjacent function card slots within a motherboard. Up to four ProDAQ 3424s can be fitted onto a motherboard offering up to 32 channels per VXI slot. The vacant slots on a motherboard can be populated with other function cards from the ProDAQ range.

All **ProDAQ function cards** can be used in both ProDAQ VXIbus motherboards and LXI function card carriers, providing users with the highest channel density and functionality available today.

Features & Benefits

- **8 simultaneously sampling** analog inputs
- **Independent, per-channel**, 24-bit resolution ADCs
- **200 S/s to 216 kS/s** per channel
- **IEPE/ICP** sensor conditioning
- **Support for the 1451.4 IEEE** standard (smart transducer with TEDS formats)
- **Differential or single-ended** input
- **Programmable gain** from 1, 2, 5, 10, to 1000
- **FIR** decimation
- **Synchronization** of multiple ProDAQ 3424 function cards

For more information, visit **www.bustec.com**.

Learn more about the **ProDAQ 3424** on our website by scanning the code below.

SPECIFICATIONS

SAMPLING			
Analog-to-Digital Converter	24-bit Sigma-Delta		
Sample Rates	20 kHz to 108 kHz (3424-AA, 3424-AB) 20 kHz to 216 kHz (3424-BA, 3424-BB)		
Sampling Clock	internal (software selectable with 0.1 Hz resolution) or external		
Oversampling	32 $_{FS}$	for 80 kHz < $_{FS}$ < 216 kHz	
	64 $_{FS}$	for 40 kHz < $_{FS}$ < 108 kHz	
	128 $_{FS}$	for 20 kHz < $_{FS}$ < 54 kHz	
ADC Filter Characteristics	Passband:	0.4535 $_{FS}$	
	Stopband:	0.5465 $_{FS}$	
	Passband Ripple:	±0.001 dB @ 128-times oversampling	
		±0.003 dB @ 64-times oversampling	
		±0.007 dB @ 32-times oversampling	
	Stopband Attenuation:	120 dB	
	Group Delay:	63 1/$_{FS}$	
Decimation	0, 10, 100-times, software selectable		
Dec. Filter Characteristics	Passband:	0.4 $_{FS}$	
	Stopband:	0.5 $_{FS}$	
	Passband Ripple:	2.5 µdB	
	Stopband Attenuation:	126 dB	
	Group Delay:	40 1/$_{FS}$	
INPUT CHARACTERISTICS			
Number of Channels	8, Simultaneous Sampling		
Input Type	Differential or Single-ended, software selectable		
Coupling	DC or AC (10µF in series), software selectable		
Input Signal Ranges	3424-AA, 3424-BA: ±10.24 V 3424-AB, 3424-BB: ±10.24 V to ±10.24 mV (in steps of 1, 2, 5)		
ICP Current Drive	4.7 mA		
Gain Settings	1, 2, 5, 10, 20, 50, 100, 200, 500, 1000		
Analog Input Filter	Type 4-pole Butterworth		
Input Impedance	10 MΩ for both DC and AC coupling		
TEDS Support	Compliant to IEEE 1451.4		
Max. Input Voltage	±35 V DC		
DC Accuracy (calibrated)	± (54 + 1000/Gain) µV typical ± (90 + 1300/Gain) µV maximum		
Signal-to-Noise Ratio	103 dB typical, >100 dB minimum Input Signal: -1dB$_{FS}$, 1kHz Sine, 10 Hz – 20 kHz measurement bandwidth		
Signal, Noise And Distortion (SINAD)	93 dB typical, >90 dB minimum Input Signal: -1dB$_{FS}$, 1kHz Sine, 10 Hz – 20 kHz measurement bandwidth		
Total Harmonic Distortion (THD)	< 0.002% Input Signal: -1dB$_{FS}$, 1kHz Sine, 10 Hz – 20 kHz measurement bandwidth		
Spurious-free Dynamic Range (SFDR)	> 95 dB Input Signal: -1dB$_{FS}$, 1kHz Sine, 10 Hz – 20 kHz measurement bandwidth		
Cross Channel Phase Match	Function Card	Motherboard	Mainframe
50 Hz...2kHz:	< 0.01°	< 0.02°	< 0.03°
1kHz...20 kHz:	< 0.1°	< 0.2°	< 0.3°
20 kHz...108 kHz:	< 0.4°	< 0.8°	< 1.5°
PHYSICAL CHARACTERISTICS			
Dimensions	235 x 106 mm		
Weight	210 g		
POWER REQUIREMENTS			
Power Consumption	20 W maximum		
ENVIRONMENTAL			
Temperature	0°C to +50°C (operational) -40°C to +70°C (storage only)		
Humidity	10% - 90% (non-condensing)		
SOFTWARE SUPPORT			
Driver support for Microsoft Windows, VxWorks, and Linux (Contact Bustec Ltd. for more information)			
WARRANTY PERIOD			
12 months (extended periods available at additional cost)			

Ordering Information

- **3424-AA** 8-ch, 24-bit, sigma-delta ADC function card (108 kS, no gain)
- **3424-AB** 8-ch, 24-bit, sigma-delta ADC function card (108 kS, gain 1-1000)
- **3424-BA** 8-ch, 24-bit, sigma-delta ADC function card (216 kS, no gain)
- **3424-BB** 8-ch, 24-bit, sigma-delta ADC function card (216 kS, gain 1-1000)

Accessories

- **5716-xx** 16-ch bridge signal conditioning unit
- **5748-AA** Rack-mount break-out box
- **8020-CA** Cable, Lemo-Lemo, 2M
- **8020-BS** Lemo socket to 50 Ohm BNC (8020-CA to BNC lead)
- **8020-BP** Lemo plug to 50 Ohm BNC (8020-CA to scope input)

Related Products

- **6100-xx** LXI function card carrier
- **3180-AA** Ultra-performance motherboard module
- **3202-AA** Programmable voltage reference plug-in

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