

# DNA/DNR/DNF-AI-228-300

## 8-Channel, medium voltage, fully isolated A/D boards

- DNR/DNF-AI-228 for RACKtangle® / FLATRACK I/O chassis
- DNA-AI-228 for use in all CUBE chassis
- 8 differential analog input channels
- $\pm 300$  VDC inputs
- 350 Vrms isolation (channel to channel and channel to chassis)
- Simultaneous sampling (one A/D converter per channel)
- Built-in anti-aliasing filters (@ 48% of sample rate)
- 120 kHz per channel sample rate (480 kHz board max)
- 24-bit resolution
- Extensive **Built-In-Test** functionality



[DNR-AI-228-300 Shown]

## General Description:

The DNA/DNR/DNF-AI-228 are 8-channel fully isolated, high voltage, simultaneously sampling A/D boards compatible with UEI's popular Cube/RACKtangle/FLATRACK chassis. The DNA/DNR/DNF versions are electronically identical. The DNx-AI-228 features a  $\pm 300$  VDC input range and 24-bit resolution.

An A/D per channel configuration allows channels to be sampled simultaneously at rates up to 120 kS/s each (480 kS/s max aggregate entire board). The A/D per channel configuration virtually eliminates input cross talk and channel settling time issues even when connected to high impedance signal sources.

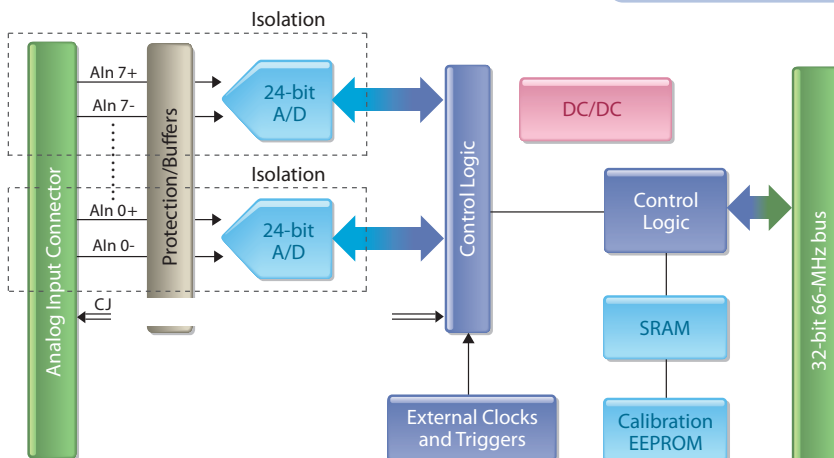
The DNx-AI-228 offers extensive built-in-test and diagnostics. An on-board reference can be connected to each input to ensure proper operation even while connected to the field wiring. The inputs also provide over-voltage notification.

Each channel is electrically isolated from all other channels as well as from the Cube or RACKtangle chassis. In addition to the isolation, each input is over-voltage protected up to  $\pm 350$  V (power on or off). All connections are made through a female DB37 series connector.

Each channel also provides an isolated digital I/O line. DOuts are 3.3 V logic while DIins are both 3.3 V and 5 V logic compatible

Software is included, providing a comprehensive, yet easy-to-use API that supports all popular operating systems, including Windows, Linux, and most real-time operating systems—such as QNX, Intime, VXworks, and more. Additionally, the UEIDAQ Framework—an even higher level Windows driver—supplies complete support for those creating applications in many popular Windows programming languages, as well as data acquisition software packages such as LabVIEW and MATLAB/Simulink.

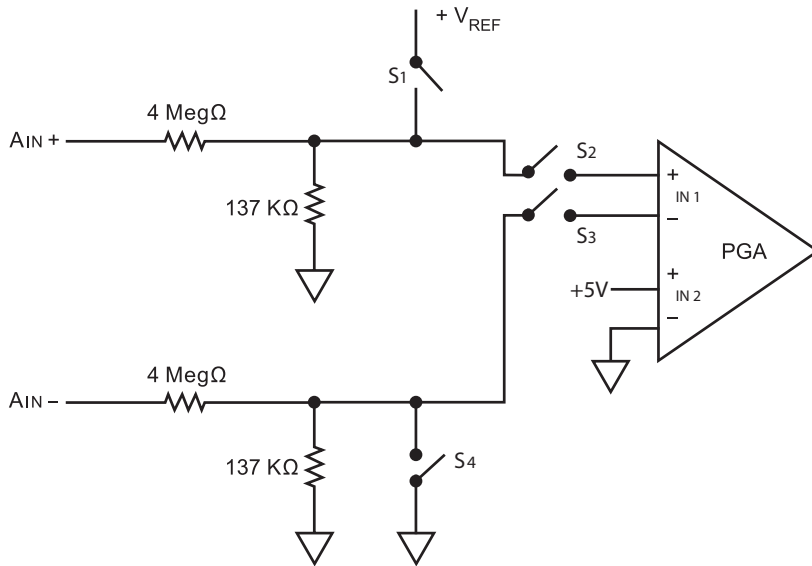
## Block Diagram:



## Technical Specifications:

Number of channels:	8 fully differential and isolated
ADC resolution / type	24 bits / SAR. (AD7766)
Sampling rate	120 kS/s per channel (max); 480 kS/s max aggregate for entire board
Input bias current	< 2 nA typical
Input offset	<120 $\mu$ V @ 25°C <300 $\mu$ V from -40°C to +85°C
Input INL error	< 0.0020% (20 ppm) max
Gain error	< 0.0025% (25 ppm) max (18°C to 28°C) <5 ppm/°C (<18°C or >28°C)
Input impedance	4 M $\Omega$ (min)
Input range	$\pm 300$ Volt (gain = 1)
Input resolution	35.8 $\mu$ V (gain = 1)
Gains	1, 2, 4, 8, 16, 32, 64
Common mode rejection	110 dB typical (@ DB-37 connector)
Chan to Chan crosstalk	< 120 $\mu$ Vrms (not including cable coupling)
Digital I/O	1 bit per A/D channel. 3.3 V output, 5/3.3 V input
Isolation	350 Vrms (channel to channel and channel to chassis)
Overvoltage protection	-350 V to +350 V (power on or off)
Power off leakage current	< 150 $\mu$ A (-300 V to + 300 V)
Power consumption	4.5 W max
Operating temp. (tested)	-40°C to +85°C
Operating humidity	95%, non-condensing
Vibration IEC 60068-2-6	5 g, 10-500 Hz, sinusoidal
IEC 60068-2-64	5 g (rms), 10-500Hz, broadband random
Shock IEC 60068-2-27	100 g, 3 ms half sine, 18 shocks @ 6 orientations 30 g, 11 ms half sine, 18 shocks @ 6 orientations
Altitude	120,000 ft
MTBF	290,000 hours

## Simplified input configuration:



## Pinout Diagram:

DB-37 (female)

Aln 7-	1	20	Aln 7+
Gnd 7	2	21	DIO 7
Rsvd	3	22	Rsvd
Aln 6-	4	23	Aln 6+
Gnd 6	5	24	DIO 6
Aln 5-	6	25	Aln 5+
Gnd 5	7	26	DIO 5
Aln 4-	8	27	Aln 4+
Gnd 4	9	28	DIO 4
Aln 3-	10	29	Aln 3+
Gnd 3	11	30	DIO 3
Aln 2-	12	31	Aln 2+
Gnd 2	13	32	DIO 2
Aln 1-	14	33	Aln 1+
Gnd 1	15	34	DIO 1
Aln 0-	16	35	Aln 0+
Gnd 0	17	36	DIO 0
Rsvd	18	37	Rsvd
Rsvd	19		

### Self-test theory of operation

Switches built into the front end of the DNX-AI-228 series allow a comprehensive self-test of the input stages, even while still connected to the field wiring. Switches between the input resistor voltage divider and input PGA (see S1 and S4 above) allow a fixed reference voltage to be connected to the PGA inputs. As the resistance between the reference and the field wiring is high, the reference easily overdrives any input signal generated by an external source allowing a direct and accurate reading of the reference.

In addition, the PGA utilized on the AI-228 series has two input channels. A secondary check of the input system may be conducted by setting the PGA input to read from the second input channel, which is connected to a 5 Volt reference.

### Connection Options:

Part #	Description
DNA-CBL-37s	Shielded 37 conductor cable (3 foot standard, 1, 5, 10 and 20 foot lengths available)
DNA-CBL-37	Ribbon 37 conductor cable (3 foot standard, other lengths available)
DNA-STP-37	37 pin screw terminal panel