

**DNx-AO-319-420****8-Channel Isolated 4-20 mA current sinking D/A Board**

- DNA- /DNR- /DNF-AO-319-420 for use in Cube/RACKtangle / FLATRACK I/O chassis
- 8 independent fully isolated 16-bit DACs
- Built-in-test monitors output voltage and current
- 10 kHz per channel max update rate
- Simulates open circuit/broken wire
- Simultaneous update across all channels



DNx-AO-319-420,  
RACKtangle version shown

**General Description:**

The DNA-AO-319-420, DNR-AO-319-420 and DNF-AO-319-420 are fully isolated, high-precision, 8-channel analog current output boards compatible with UEI's popular Cube, RACKtangle and FLATRACK I/O chassis respectively. The boards offer full 16-bit resolution and guarantee monotonicity over the entire operating temperature range. Each DNx-AO-319-420 channel provides an output range of 4-20 mA (sinking).

For applications requiring a sourcing output, please refer to the [DNx-AO-318-020](#) and [DNx-AO-318-024](#). For applications requiring voltage outputs please refer to the [DNx-AO-308](#) or [DNx-AO-318](#) series boards.

The DNx-AO-319-420 provides extensive built-in-test diagnostics. An on-board A/D converter on each channel allows the user to monitor both output voltage and current. A solid state relay on each output allows the D/A channel to be disconnected from the field I/O so that a complete board self-test can be

**BENEFITS OF UEI'S GUARDIAN SERIES**

✓	CIRCUIT BREAKER
✓	VOLTAGE MONITORING
✓	CURRENT MONITORING
✓	FIELD DISCONNECT
✓	TEMPERATURE

UEI's Guardian series boards include a sophisticated, reliable on-board monitoring system, allowing quick and easy system testing, sensor diagnostics monitoring and fault detection for rapid resolution in field or lab.

[Learn more about UEI's Guardian series](#)

completed without driving the circuitry connected to the outputs. This relay automatically disconnects the D/A output in the event of an external fault condition such as a short to ground or a DC power supply. The output relay may also be opened to simulate an open circuit/broken cable failure.

All 8 channels may be configured to update simultaneously, or they may be updated one at a time as data is written. A 1024 sample FIFO allows each D/A to be updated at 10 kHz without data loss. Note that the output circuit

only sinks current. Settling time for current increases will be low, but settling time for current decreases is largely set by the reactance of the sensor/cable combination (essentially a pull-up configuration).

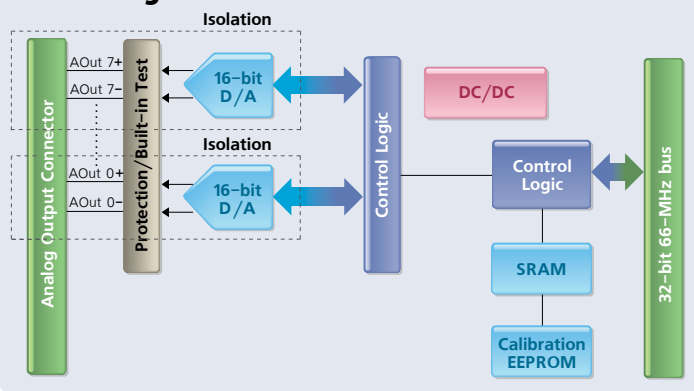
Software included with the DNx-AO-319-420 provides a comprehensive, yet easy-to-use API that supports all popular Windows programming languages as well as supporting programmers using Linux and most real-time operating systems including QNX, RTX, VXworks and more. Finally, the UEIDAQ Framework supplies complete support for those creating applications in data acquisition software packages such as LabVIEW, MATLAB/Simulink or any application which supports ActiveX or OPC servers.

**Technical Specifications:**

Number of Channels	8
Resolution	16-bits
Maximum Update Rate	*10 kHz/channel (80 kHz max aggregate)
Buffer Size	1K samples (each channel)
INL (no load)	±6 LSB (0.018%), typical
DNL (no load)	±2 LSB (0.006%), typical
Monotonicity Over Temperature	16-bits guaranteed
Gain Linearity Error	0.002%
Gain Calibration Error	±2.5 µA, typical
Offset Calibration Error	±2.5 µA, typical
Offset Drift	10 ppm/ °C, typical
Gain Drift	10 ppm/ °C, typical
Output Range	4–20mA
Settling Time	*500 µs to 16 bits
Excitation Voltage	9–36 VDC
Isolation	350 Vrms
Simulated open circuit	Leakage current < 50 µA
Series resistance**	Limited by channels power dissipation and excitation voltage
Built-in Test	
Voltage accuracy	+/- 25 mV
Current accuracy	25 µA
Sample rate	Up to ~2 Hz per channel total
Power Consumption	4.0 W not including output load
Operating Temperature (tested)	-40°C to +85°C
Operating Humidity	0 - 95%, non-condensing
Vibration IEC 60068-2-6IEC 60068-2-64	5 g, 10-500 Hz, sinusoidal 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
MTBF	200,000 hours

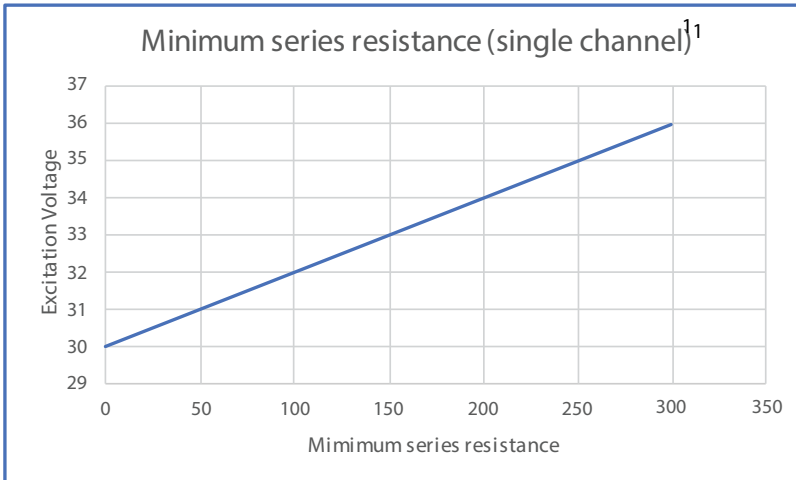
\* The outputs are actively pulled low so output fall times (low to high current) will likely be shorter than rise times. Rise times will largely be determined by the reactance of the sensor and cable system.

\*\*Please see the charts on the following page

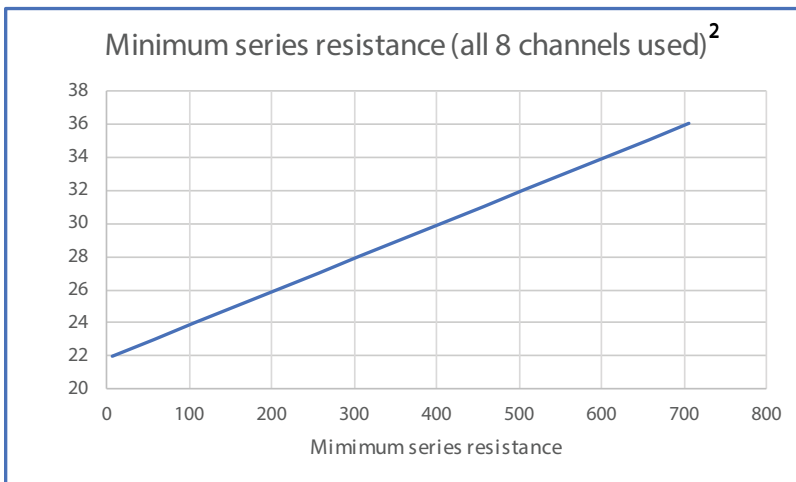
**Block Diagram:**

## Series resistance requirements:

## Pinout Diagram:



1. A single channel can dissipate a maximum of 0.6 W per channel.



2. When all 8 channels are used, the maximum power per channel is 0.44 W.

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

## Ordering Guide:

Part #	Description
<a href="#">DNx-AO-319-420</a>	32-channel, 16-bit analog output board with analog voltage readback

## Connection options:

Cable	Screw Terminal Panel	Description
<a href="#">DNA-CBL-37 series</a>	<a href="#">DNA-STP-37</a>	37 conductor screw terminal panel connects to board via DNA-CBL-37 or 37S series cables.

<a href="#">Extended Warranty</a>	Option to purchase UEI's extended 5 year warranty is available
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