



## SPECIFICATIONS FOR *Nano*DAS SERIES

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### SYSTEM SPECIFICATIONS

#### PHYSICAL

Size	169 X 97 X 79,5 mm for 64 Channels +/- 10 mm for each group of 16 channels added or removed
Housing	Machined 6061-T6
Weight	1,6 kg

#### ENVIRONMENTAL

Operational Temperature	0 to 70 degrees Celsius
Operational Humidity	98%
Durability	+/- 110 g, 120m sec. ½ Sine Wave Pulse +/- 70 g, 500m sec. ½ Sine Wave Pulse +/- 35 g, 2 sec. ½ Sine Wave Pulse
Vibration	10-200Hz Sine Wave Sweep Amplitude 60 g's

**POWER REQUIREMENTS** 10 - 14.5 VDC

**CURRENT DRAW** 1.5 amps @ 12 VDC (FULL ANALOG MODE 64 Channels)  
+/- .250 amps for each group of 16 channels added or removed  
+ Excitation current draw for sensors used (>82% efficient)

#### INPUT CONNECTORS

Trigger/Clock	9 Pin Sub-miniature D-sub (MIL-C-83513)
RS232/RS422/LAN	15 Pin Sub-miniature D-sub (MIL-C-83513)
12V Main/Remote	15 Pin Sub-miniature D-sub High Profile (MIL-C-83513)
Digital Input/Output	37 Pin Sub-miniature D-sub (MIL-C-83513)
Analog Input	37 Pin Sub-miniature D-sub (MIL-C-83513)

**POWER INPUT** Battery override input, reverse polarity protection

**SYSTEM LEDS** Power On, ARM condition, Ethernet Link, Ethernet Activity

#### COMMUNICATIONS

RS232	115 KBaud /s
RS422	1 Mbaud /s
ETHERNET 10baseT TCP/IP	3 Mbaud /s

#### ONBOARD MEMORY

System	Non-volatile 32 MB Standard, 64 MB Optional
Pre-trigger	512 KB

**TRIGGER INPUT** Hardwire (high or low), Backup Analog Channel

**TRIGGER OUTPUT** .1 ohm FET capable of sinking 100ma

**LOW BATTERY OUTPUT** GND when battery is < 10.5 Volts

**VOLTAGE MONITOR** Real-time view in DAS Software



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<b>DIGITAL EVENT INPUTS</b>	16 Total with pull-up resistors
<b>DIGITAL OUTPUTS</b>	8 Total opto-isolated 80V load / 75 ma sink, timed from trigger
<b>TACHOMETER INPUTS</b>	2 Total (OPTIONAL)
Pulse Rate	1 Hz to 1KHz
<b>MULTI STAGE SAMPLING</b>	3 Stages, Sample Rate change triggered by event inputs and/or delays.
<b>START/STOP ACQUISTION</b>	Trigger using hardwire trigger or analog channel
<b>MULTIPLE DAS CONTROL</b>	Synchronized control of multiple systems through one communications port using the same system clock and trigger input

### ANALOG SPECIFICATIONS

<b>A/D CONVERTER</b>	Individual for each analog channel
Resolution	12 or 16 bits
<b>SENSOR IDENTIFICATION</b>	DALLAS Single wire ID/MEMORY (i.e. DS2401) (OPTIONAL)

<b>EXCITATION</b>	Individual for each channel, fold back current limited, isolated
Ranges	2.5 / 5.0 / 10.0 volt
Current Limit	50 / 70 / 100 ma (1 AMP total for each voltage)
Uncalibrated Accuracy	.1 / .05 / .05 %
Calibrated Accuracy	.02%
Drift	40 ppm/C

<b>Input Range</b>	5 or 10 v @ gain=1	( *1 )
<b>Gain Range</b>	1-10,000	
<b>Common Mode Range</b>	12 v	
<b>Linearity</b>	.03 %	

	<b>Gain &lt; 10</b>	<b>10 Gain &lt; 100</b>	<b>Gain 100</b>	<b>Units</b>
<b>Gain Resolution</b>	4096 / N	10 * 4096 / N	100 * 4096 / N	
<b>Gain Accuracy Uncal</b>	.1	.1	.15	%
<b>Calibrated</b>	.02	.02	.03	%
<b>Gain Stability</b>	20	20	30	ppm/C
<b>Noise RTI</b>	530	53	6.3	uv
<b>SND @ fc=2500</b>	73	73	72	dB
<b>CMRR @ DC</b>	90	108	108	dB
<b>@ 2.5 khz</b>	70	72	72	dB
<b>Offset Range RTI (*2)</b>	15	1.5	.15	volt
<b>Stability</b>	20	20	20	ppm/C

<b>Input Offset Range</b>	10 v switched to S-	( *2 )
Stability	20 ppm/C	



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Accuracy Calibrated	2 mv	
<b>Offset Resolution</b>	range / 4096	( normal or input offset configuration )
<b>Shunt Cal Mode 1,2</b>	200k and 20k .1% switched from S- to Input Offset DAC.	( *3 )
Calibrated Accuracy mode 3	.02%	( *4 )
Calibrated Accuracy mode 4	.03%	
Effective Stability	40 ppm/C	
<b>Shunt Cal Mode 3</b>	20k .1% switched from S+ to ground	
Calibrated Accuracy	.02%	
Stability	25 ppm/C	
<b>Input Overvoltage protection</b>	50 v indefinite	
	200v .5 second	
<b>Crosstalk DC</b>	< -120 dB	
@ 1 khz input	< - 100 dB	
<b>Sample Rate</b>	1 - 20,000 hz	
<b>Variable Analog Filter</b>	6 pole Butterworth switched capacitor with bypass switch	
Cutoff Accuracy	.5 %	
Cutoff Resolution	160,000 / N Hz	( where N is an integer between 2 and 65536 )
<b>Variable Digital Filter</b>	6 pole Butterworth	( other types optional )
Max Filter Rate	10 khz	with 32 channels, 5 khz with 64 channels
Max Cutoff Frequency	2.5 khz	( 10 khz sample rate )
Cutoff Accuracy	.05 %	
Cutoff Resolution	.1 %	
<b>Fixed Analog Filter</b>	5 pole Butterworth	
Cutoff	10khz 5%	( any other frequency optional ) (*5)

\*1 - Without offset. Usable range must include offset and common mode range.

\*2 - This offset range is standard. A higher or lower fixed range can be optional to tradeoff range and resolution. Single ended inputs frequently use the Input Offset to handle high offsets where high gain is required.

\*3 - The two software selected shunt cal resistors can optionally be replaced with any other shunt resistor values.

\*4 - Mode 1 shunt cal resistor switches between S- and a virtual ground or virtual Ex+. Mode 2 adjusts the input offset step size to effect any value shunt resistor.

\*5 - The fixed filter could be reduced for minimum noise and zero anti-aliasing at lower sample rates.



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### Host Resident Software

<b>Platform</b>	Windows 95/98/NT™
<b>Test Name</b>	Can be set using up to 130 ASCII characters
<b>I/O Setup</b>	Communication Port selection for RS232/RS422, ETHERNET TCP/IP setup
<b>Calibration</b>	Automatic
Channel Definition	User friendly interface, Sensor ID read, Compatible with various DataBase Programs, any number of channels can be allocated to full system memory
Calibration Mode	Shunt CAL Mode, Joint Sensor Mode, NoCal using input or output offsetting
<b>Transfer</b>	Any length of time for channel data can be transferred from the DAS
<b>Diagnostics</b>	
Memory Check	Functionality Test for all memory
Comm. Check	Loop-back Test
All Channel Read A/D	Displays the values for all channels updating them continuously
Channel Monitor	Graphically displays a single analog channel or a group of 4 channels, real-time streaming to hard disk, Power Spectrum Density display
<b>Arming Parameters</b>	
TestName	Displays current TestName
DATE	Taken from the computer
Battery	Real-time display during set-up and acquisition
10240 pt Pre Arm Zero	This data is stored in the DAS and is used to provide a zero offset for data taken
Trigger Holdoff	The time the DAS will wait before detecting a trigger
Start On	Trigger High/Trigger Low/Trigger Immediate
Backup Trigger	Sets an analog channel as a trigger input, a trigger threshold is set, and a 2 pole digital filter can be enabled
Pre Trigger Length	Displays how many seconds of pre trigger data is available for the acquisition
Post Samples	The number of samples to acquire for each channel during the acquisition
Post Seconds	Displays the time length for the acquisition
Excitations	Can be switched on before arming
Stage Sampling	3 Stages can be defined, time lengths can be set for each stage, or stages can be changed during the acquisition using Event 1 and Event 2
Armed Screen	After arming, a screen is displayed on the computer containing a real-time monitor of all analog channels, a real-time voltage monitor, and a remote trigger button. The communications connection can be removed at this point and the acquisition can be performed when a trigger is detected, or the acquisition can be performed with the communications connection present.
<b>Graphing</b>	
Up to 5 channel graphs can be overlaid	
Data can be offset using the average of the 10240pt Pre Arm data	
Time length and amplitude can be changed for zooming	
Zooming is accomplished by marking a window with the Right Mouse Button	

### **Converting**

ASCII or Binary, Variable Frequency Digital 6 Pole Butterworth, Decimation, Zero Offsetting