

TASnano+



Data Acquisition Front-End

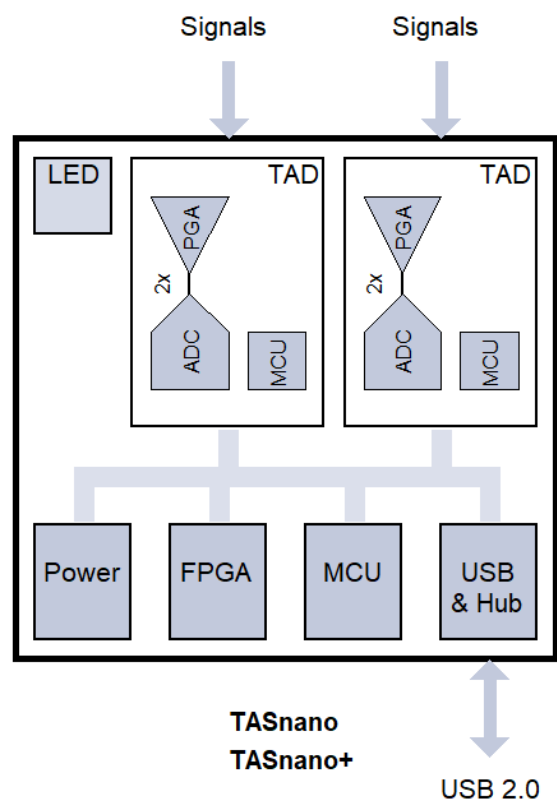


- ✓ Industrial, universal, miniature front-end for mobile acoustical and vibration measurements
- ✓ 4 universal channels for analog voltage or IEPE with high resolution A/D converters
- ✓ USB-powered
- ✓ Small and lightweight

TASnano+

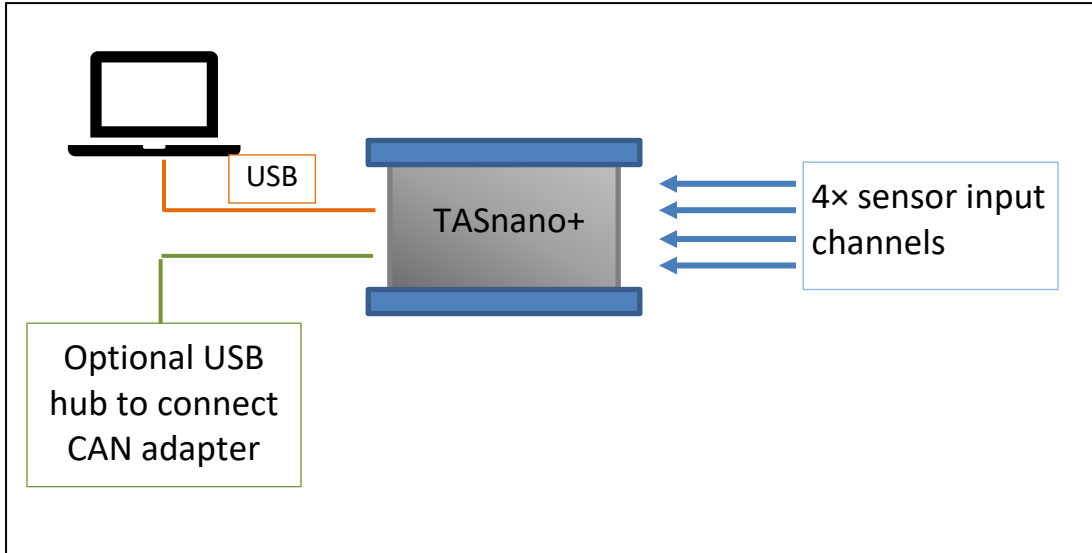
TASnano is an ultra-mobile miniature 4-channel data acquisition front-end with the following features:

- ADC: 4 analog voltage / IEPE channels with 24bit / 200kHz A/D converters
- Sampling: 2 main system clocks are available, providing either 24/48/96/192kHz or 25/50/100/200kHz sampling rates
- RPM acquisition via AD channels
- USB 2.0 high speed interface to the host PC
- Bus powered: TASnano+ is USB-powered
- Dimensions: 140mm × 60mm × 30mm, 212g



Specifications

The following pages contain the specifications of the base system and the AD modules.



- 1 [TASnano+ Environmental & Dimensions](#)
- 2 [TASnano+ USB Interface](#)
- 3 [TAD48 Analog Input](#)

1 TASnano+ Environmental & Dimensions

TASnano+ System Specifications		
Environment		
Temperature	0°C .. 45°C - Operation -20°C .. 70°C - Storage	
Humidity	85% rel. humidity - Operation 95% rel. humidity - Storage	non-condensing at 20°C non-condensing at 50°C
Mechanical		
Dimensions	140mm x 60mm x 30mm	
Weight	212g	
Electrical		
Power Supply	USB only	

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2 TASnano+ USB Interface

TASnano+ Specifications		
Interface	USB 2.0	
Datarate	Max. 480Mbit/sec	theoretical USB2.0 maximum
Internal Interface	Dual I2S decoder for ADC data to 8-bit parallel bus to USB	FPGA, SW-reconfigurable
Data Buffers	64kB FPGA SRAM for AD data 1kB FPGA SRAM for control data	for host latency compensation (100ms for 4 AD channels at $f_s = 50\text{kHz}$)
Power Input	USB powered via USB-mini connector	
Power Monitoring	10-bit ADC	all internal voltages are monitored by the MCU's 10-bit ADC
Temperature Sensor	$\pm 2.0^\circ\text{C}$ from -25°C to $+85^\circ\text{C}$ (max)	internal monitoring only
IEPE Supply Voltage (ICP [®] , CCLD [®])	21V $\pm 5\%$ / 10mA	
Clocks	2 crystal oscillators on board: 25.6MHz 24.576MHz	for sampling rates of 25kHz, 50kHz, 100kHz, 200kHz or 24kHz, 48kHz, 96kHz, 192kHz
Clock Accuracy	$\pm 50\text{ppm}$	affects frequency measurements
Calibration	-	-
Power Consumption	0.6W	$f_s = 100\text{kHz}$
PCB Dimensions	92mm x 54mm	

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3 TAD48 Analog Input

TAD48 Specifications		
Analog Inputs	2 BNC	
Input Coupling	AC / DC / IEPE Single-Ended (SE) / Differential (DIF)	IEPE: ICP [®] , CCLD [®] DIF: not for IEPE
Input Impedance, SE	33.7k Ω \pm 2% 150pF max 26.8k Ω \pm 2% 150pF max (\pm 30V)	
AC Coupling	$f_c = 4.7\text{Hz} \pm 10\%$ $f_c = 5.9\text{Hz} \pm 10\%$ ($\pm 30\text{V}$)	f_c : -3dB corner frequency
IEPE Supply Current	2.2mA \pm 5%	
IEPE Supply Voltage	21V \pm 5%	supplied by TASnano+
IEPE Coupling	AC / SE DC / SE with $\pm 30\text{V}$ input range	
Input Range Max.	$\pm 30\text{V}$ peak	
Without Damage	60V _{pp} DC/AC	
Gain Accuracy @ 1kHz	$\pm 0.5\text{dB}$ at 25°C $\pm 10^\circ\text{C}$	without calibration
Offset $\pm 10\text{V}$	$\leq 10\text{mV}$ (0.1% FS) / $\leq 12\text{mV}$ IEPE	
Offset $\pm 1\text{V}$	$\leq 2\text{mV}$ (0.2% FS) / $\leq 5\text{mV}$ IEPE	
Offset $\pm 100\text{mV}$	$\leq 1.5\text{mV}$ (1.5% FS) / $\leq 5\text{mV}$ IEPE	
Noise (BW 20kHz)	$\leq 15\mu\text{V}_{\text{rms}}$ RTI @ max gain	input shorted / 50 Ω
SNR (BW 20kHz)	$\geq 106\text{dB}$ ($\pm 10\text{V}$) $\geq 90\text{dB}$ ($\pm 1\text{V}$) $\geq 105\text{dB}$ ($\pm 30\text{V}$)	shorted / 50 Ω
THD (1kHz)	$\geq 90\text{dB}$ (-6dBFS) $\geq 80\text{dB}$ (-6dBFS, $\pm 1\text{V}$)	
CMRR	$\geq 60\text{dB}$ @ 1kHz $\geq 50\text{dB}$ @ 50Hz	DC/DIF coupling
Crosstalk	$> 120\text{dB}$ @ 1kHz $> 110\text{dB}$ @ 10kHz	adjacent channels
Anti-Aliasing Filter	3-pole, $f_c = 160\text{kHz}$ -0.2dB @ 40kHz	f_c : -3dB corner frequency
Passband	DC .. 0.40 * f_s	f_s = sampling rate
PB Ripple (BW 20kHz)	$\pm 0.1\text{dB}$	
Stopband	0.50 * f_s	
Stopband Attenuation	$\geq 116\text{dB}$	
Phase Match	1 sample	adjacent channels
ADC Resolution	24 bits	
Sampling Rate	200kHz max	

Dynamic Range	$\geq 120\text{dB}$ (BW 20kHz)	input shorted / 50Ω , incl. gain
SFDR	$\geq 110\text{dB}$ (BW 20kHz)	input shorted / 50Ω
ADC Group Delay	42 samples	compensated by TasAlyser
Calibration	ext. manual / SW calib.	recom. calibration interval: 1/year
Power Consumption	$\leq 0.4\text{W}$ without IEPE	at $f_s = 100\text{kHz}$ IEPE: + 60mW / channel
PCB Dimensions	70mm x 48mm	

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