TASnano

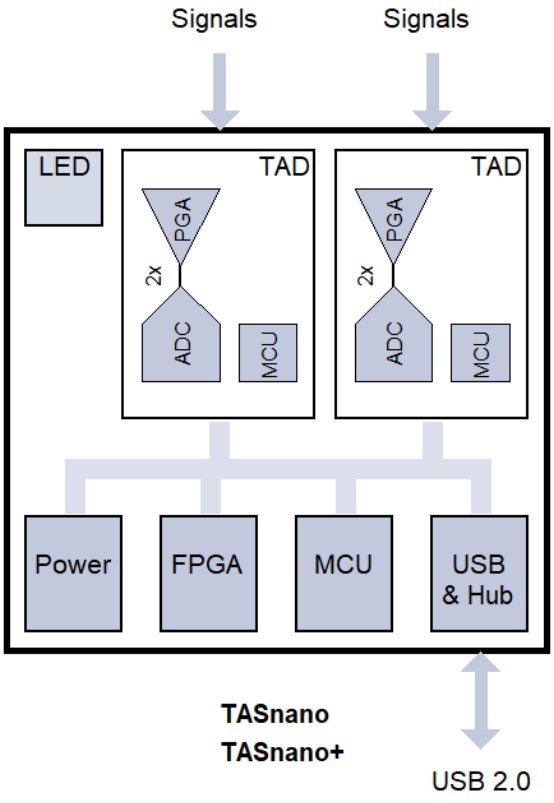
Data Acquisition Front-End

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

TASnano

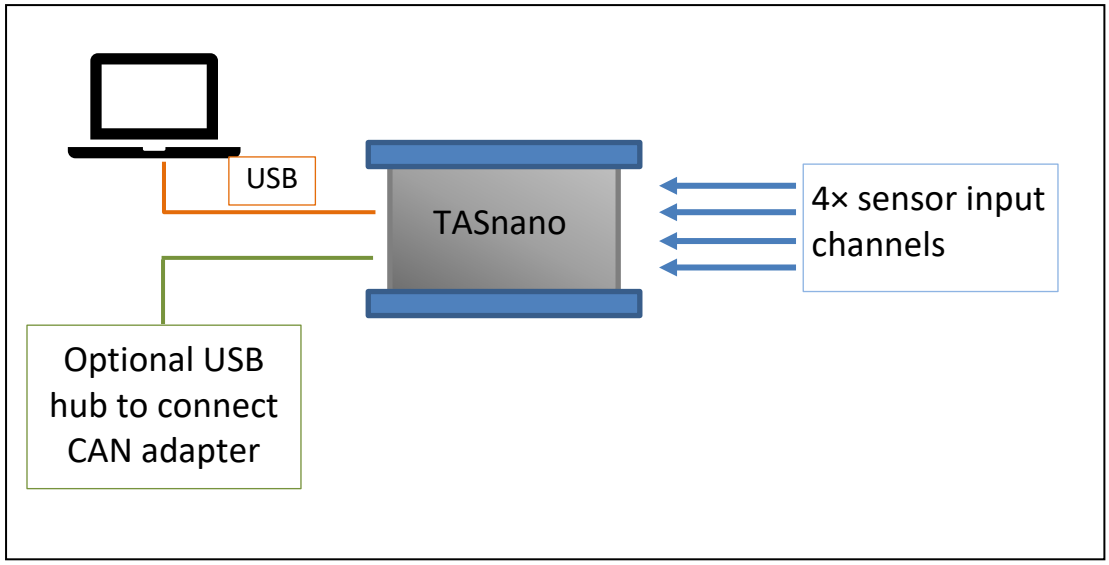
TASnano is a miniature 4-channel data acquisition front-end with the following features:

- ADC: 4 analog voltage / IEPE channels with 24bit / 100kHz A/D converters
- Sampling: 2 main system clocks are available, providing either 24/48/96kHz or 25/50/100kHz 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

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 × 60mm × 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 = 50kHz)
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	±2.0°C from −25°C to +85°C (max)	internal monitoring only
IEPE Supply Voltage (ICP®, CCLD®)	21V ±5% / 10mA	
Clocks	2 crystal oscillators on board: 25.6MHz 24.576MHz	for sampling rates of 25kHz, 50kHz, 100kHz or 24kHz, 48kHz, 96kHz
Clock Accuracy	±50ppm	affects frequency measurements
Calibration	-	-
Power Consumption	0.6W	f_S = 100kHz
PCB Dimensions	92mm x 54mm	

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3 TAD28 – Analog Input

TAD28 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	33.7kΩ ±2% || 150pF max 26.8kΩ ±2% || 150pF max (±30V)	
AC Coupling	f_C = 4.7Hz ±20% * f_C = 5.9Hz ±20% * (±30V)	f_C : -3dB corner frequency * when both channels are AC coupled, the ADC's internal high pass is used to cancel DC offsets. The ADC's HPF scales with the sampling rate, that's the reason for the ±20%
IEPE Supply Current	2.2mA ±5%	
IEPE Supply Voltage	depends on base card, see above	
IEPE Coupling	AC / SE DC / SE with ±30V input range	
Input Range Max.	±30V peak	
Without Damage	$60V_{PP}$ DC/AC	
Gain Accuracy @ 1kHz	± 0.5dB at 25°C ±10°C	without calibration
Offset ±10V	≤ 50mV (0.5% FS) with DC coupling ≤ 1mV (0.01% FS) with 2 ch AC	when both channels are AC coupled, the ADC's digital high pass is used to cancel DC offsets
Offset ±1V	≤ 10mV (1% FS) with DC coupling ≤ 0.1mV (0.01% FS) with 2 ch AC	
Offset ±100mV	≤ 3mV (3% FS) with DC coupling ≤ 0.1mV (0.1% FS) with 2 ch AC	
Noise (BW 20kHz)	≤ 15µVrms RTI @ max gain	
SNR (BW 20kHz)	≥ 96dB (±30V) ≥ 100dB (±10V) ≥ 90dB (±1V)	
THD (1kHz)	≥ 90dB (±10V) ≥ 80dB (±1V)	
CMRR	≥ 60dB @ 50Hz ≥ 50dB @ 1kHz	DC/DIF coupling
Crosstalk	≥ 110dB @ 1kHz ≥ 100dB @ 10kHz	attenuation adjacent channels
Anti-Aliasing Filter	3-pole, f_C = 200kHz	f_C : -3dB corner frequency
Passband (-0.06dB)	0.46 * f_S	f_S = sampling rate

PB Ripple (BW 20kHz)	± 0.2dB	
Stopband	0.55 * f_S	f_S = sampling rate
Stopband Attenuation	≥ 80dB	
Phase Match	1 sample	adjacent channels
ADC Resolution	24 bits	
Sampling Rate	100kHz max	
Overall Dynamic Range	> 120dB (BW 20kHz)	incl. gain
SFDR	> 110dB (BW 20kHz)	
ADC Group Delay	27.6 samples	compensated by TasAlyser
Calibration	ext. manual / SW calib.	recom. calibration interval: 1/year
Power Consumption	≤ 0.4W without IEPE	f_S = 100kHz IEPE: + 60mW / channel
PCB Dimensions	70mm x 48mm per 2 channels	

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