

WISAN 2

Universal Sensor Platform



Universal Sensor Platform enriches capabilities of WISAN 2 sensor nodes by providing built-in acceleration sensors and interfaces to a variety of off-the-shelf sensors and actuators.

Universal Sensor Platform (USP) provides a diverse selection of configuration options supporting built-in and external sensors and actuators.

Optional features allow for over a hundred different configurations that can be marketed as a line of products.

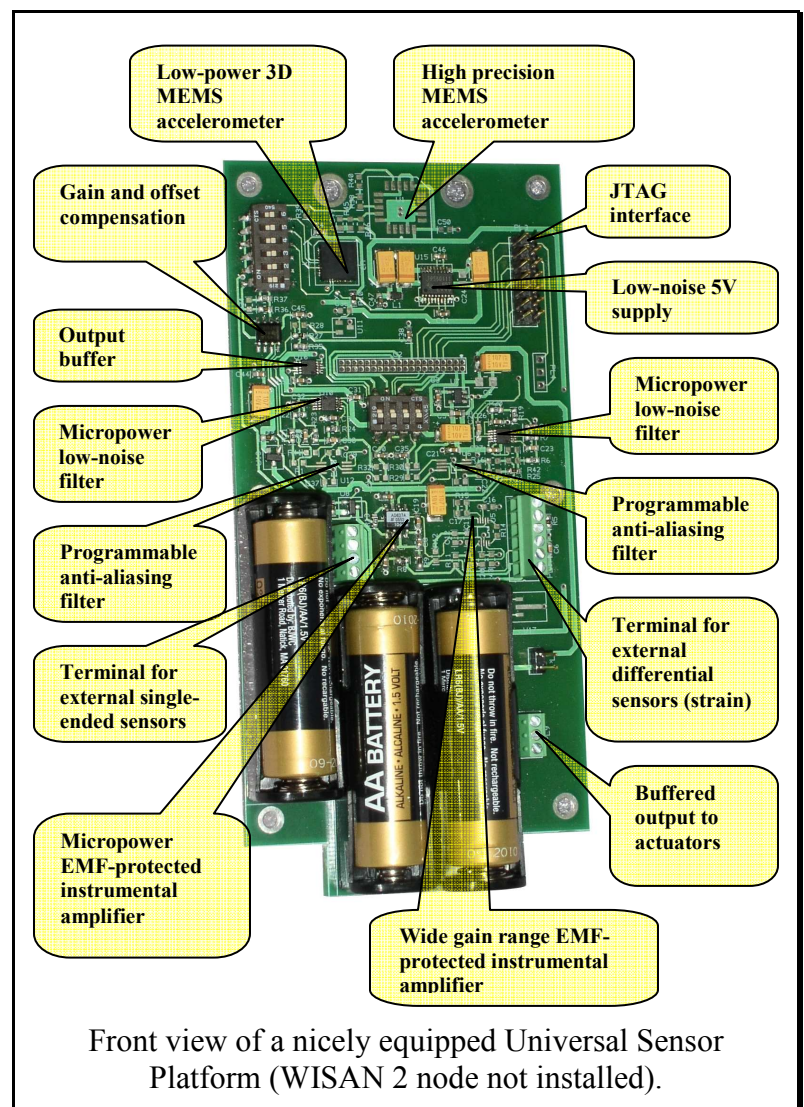
- Two options are provided for internal accelerometer sensors – either a low power 3D MEMS accelerometer (noise $50\mu\text{V}/\sqrt{\text{Hz}}$) or a high-precision MEMS accelerometer ($5\mu\text{V}/\sqrt{\text{Hz}}$). Accuracy of the sensors was validated in laboratory experiments against a scanning Laser Doppler Vibrometer.

- Two options are provide for optional anti-aliasing filters (24-bit ADC has a 3rd order filter) – micropower with fixed cutoff frequency and programmable filter with software-configurable cutoff frequency

- Optional gain and offset compensation stage improves resolution

- External single-ended sensors can be connected to an optional power-controlled terminal (3.3V, 5V)

- Two options are provided for external differential sensors – a micropower instrumental amplifier (gain range 5-1000) or a wide range instrumental amplifier (gain 0.1-10000)



- Optional buffered output terminal allows sourcing of control and excitation signals

- USP can be used with WISAN 2 sensor nodes with or without 24-bit ADC. Provisions to use 12-bit ADC are kept for less expensive and less precise configurations. Optionally populated on WISAN 2 sensor nodes, a 24-bit ADC can be used for applications requiring high precision.

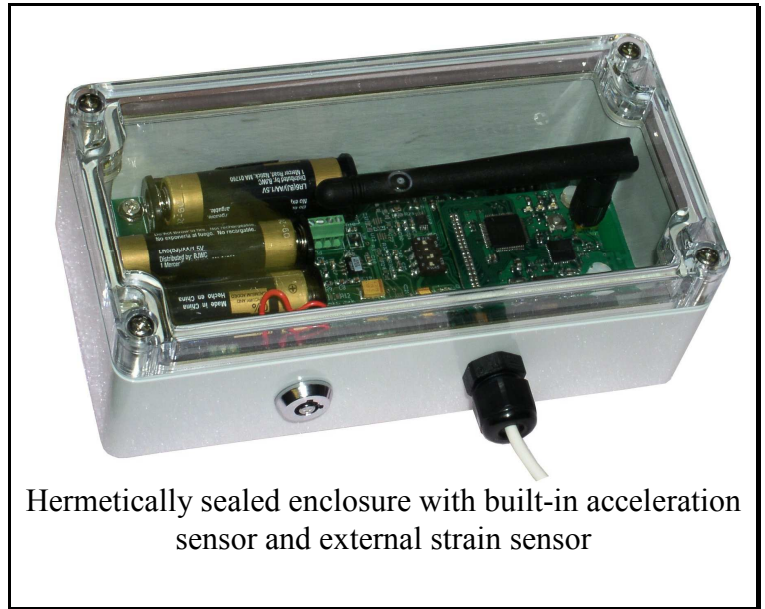
- Form-factor of the board allows use of commercially available NEMA4 enclosures.

- A quarter- or half- wavelength whip antenna fits inside of the enclosure, not requiring an outside connection

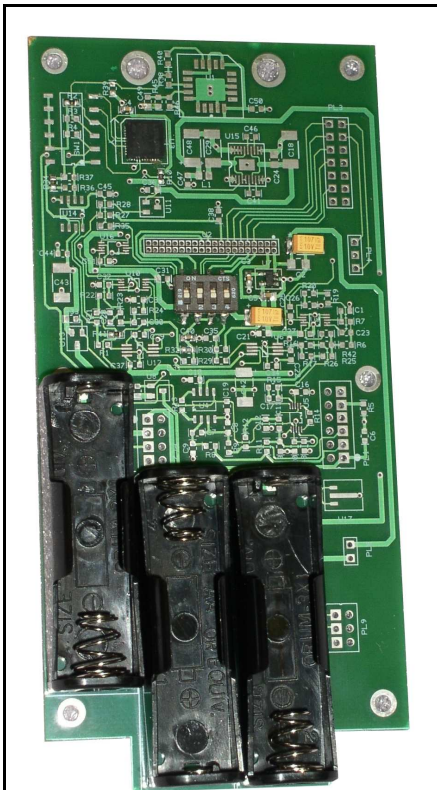
- Status LEDs can be observed through transparent lid

- Voltage reference for instrumental amplifiers can either be sourced from 24-bit ADC or a stand-alone precision reference

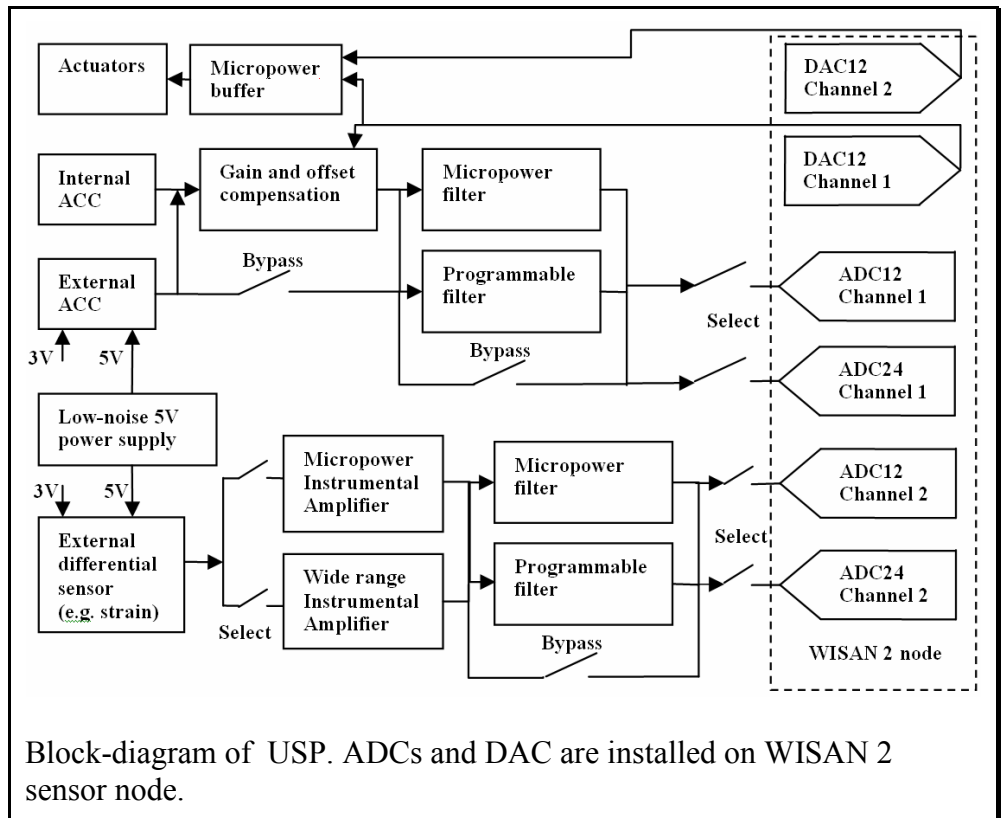
- All circuits feature shutdown inputs, so a part or the whole USP can be put into low-power sleep mode.



Hermetically sealed enclosure with built-in acceleration sensor and external strain sensor



Minimally populated USP (WISAN 2 node is not installed) in configuration with a vibration sensor



Block-diagram of USP. ADCs and DAC are installed on WISAN 2 sensor node.