

## xWave MAX Standalone Digital Accelerometer



### Overview

**xWave MAX** is a fully digital standalone solution revolutionizing field/remote acquisition and structural data analysis. This versatile device offers an affordable and flexible approach, thriving in harsh environments and compact spaces. With extreme performance and small size, xWave MAX delivers unprecedented control and acquisition capabilities in a rugged package, boasting industrial certifications for operation in the harshest environments. Temperature ranges from  $-40^{\circ}\text{C}$  to  $55^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $131^{\circ}\text{F}$ ) and various international safety, EMC, and environmental certifications make xWave-SA the go-to solution. Whether used as a standalone accelerograph or in a daisy chain SHM system, xWave MAX communicates effortlessly via Ethernet, Wi-Fi, Mesh, or GSM, embedding different accelerometers and accommodating various sensors for SHM instrumentation.

### Key Features

#### Configurable ADC Options

Choose from 16, 20, 24, or 32-bit ADC configurations to tailor the device to your specific requirements.

#### Flexible Sensor Integration

The Sentry System supports a variety of sensors, including accelerometers, strain gauges, geophones, weather stations, inclinometers, displacement sensors, and more. Customize your setup with ease.

#### Advanced Filtering

Benefit from both hardware and software filters for precise data analysis, ensuring accuracy in every reading.

#### User-Configurable Sampling Rates

Tailor the device to your specific needs with a wide range of Sampling Rates (SPS) from 1 to 1000.

#### Alarm Functionality

Receive real-time alerts through digital outputs, relays, SMS, or email, ensuring you're always informed.

#### Diverse Communication Channels

Communicate effortlessly via Ethernet, Wi-Fi, DigiMesh, or GSM, ensuring connectivity in any environment.

#### Integrated Battery Option

Keep your monitoring uninterrupted with the option for embedded battery power.

#### Intuitive Display Options

Stay informed with real-time data through LED diodes, a 2.8-inch display, or a user-friendly web interface – the choice is yours.

#### Robust Construction

Housed in an IP67-rated aluminum enclosure, the Sentry System is rugged, durable, and ready for challenging conditions.

#### Low Power Consumption

Enjoy efficient operation with the Sentry System's low power consumption, extending device life and reducing energy costs.

#### Easy Installation

With a leveling plate and compact design, installation is a breeze, ensuring minimal downtime.

#### Network Integration

Connect seamlessly with other Sentry System devices and integrate into the Digitex ecosystem for a comprehensive monitoring solution.

#### Cloud Compatibility

Link your Sentry System to the xPlover or Voyager cloud for centralized data management and easy access.

# xWave MAX

## General

- ADC Type:** 16, 20, 24, 32-bit acquisition options
- Sampling Rate:** 50, 100, 200, 250, 500, 1000 SPS - User Selectable
- Advanced Filtering:** Anti-aliasing, Option with HW-SINC filters and software filters
- Communication:** Ethernet, Wi-Fi, DigiMESH, GSM
- Storage:** SD Card or Flash Memory (32/16GB)
- Number of Channels:** Dependent on the selected acquisition and alarming options
- Leveling:** Option for mounting plate for precise leveling and easy installation
- User Interface:** Informational LED, Display, Web Interface
- Packaging:** Rugged aluminum
- Protection:** IP66/IP67 Weight: 800g (w/o batteries)
- Dimensions:** 130x120x90 (160x16x100 with leveling plate)

## Acquisition Options

- Accelerometer Input:** Three-channel modules with 20, 24 or 32 bit resolution for the connection of embedded or external accelerometers.
- Geophone Input:** Three-channel modules with 20, 24 or 32 bit resolution for the connection of embedded or external geophones.
- Micro-Voltage Input:** 4SDIFF/8DIFF/16SE 24-bit channel modules for the external connection of strain gauges, pressure sensors, and other appropriate transducers. The device provides 5V excitation. User-configurable gain (1 to 128) and measuring range ( $\pm 39.06\text{mV}$  to  $\pm 5\text{V}$ )
- Voltage Input:** 8DIFF/16SE 16-bit channel modules for the external connection of displacement, temperature, humidity, corrosion, inclination sensors, and other appropriate transducers. Sensor powering can be done from the device. User-configurable measuring range (0-5V, 0-10V,  $\pm 5\text{V}$ ,  $\pm 10\text{V}$ ).
- Weather Station Input:** RS485 MODBUS input for the connection of weather stations that support this protocol. User-configurable reading channels (dependent on the weather station model—wind speed and direction, temperature, humidity, barometric pressure, solar radiation, precipitation, and more)



## Embedded Accelerometer Options

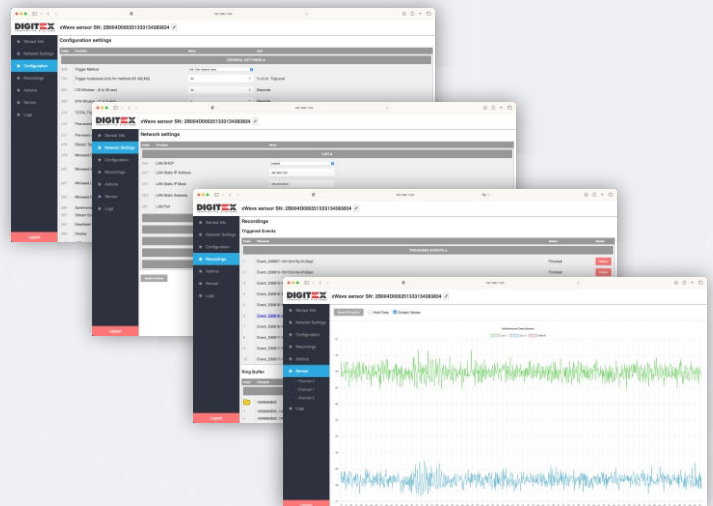
- D230-T:** Ultra-sensitive accelerometer with  $0.7 \mu\text{g}/\sqrt{\text{Hz}}$  noise in band. The sensor can measure up to  $\pm 3\text{g}$  with a dynamic range of 108.5 dB in the range of 0.1Hz to 100Hz. The noise, integrated over 0.1Hz to 100Hz, is  $8 \mu\text{g}$ . The bandwidth ( $\pm 3\text{dB}$ ) is 550Hz.
- D225-T:** High-sensitive accelerometer with  $1 \mu\text{g}/\sqrt{\text{Hz}}$  noise in band. The sensor can measure up to  $\pm 3\text{g}$  in the frequency range of 0 to 200Hz. The zero-bias stability of the sensor is 0.03mg. It has a very low bias temperature coefficient of  $\pm 0.2\text{mg}/^\circ\text{C}$ .
- D220-T:** Very-sensitive accelerometer with  $7 \mu\text{g}/\sqrt{\text{Hz}}$  noise in band. The sensor can measure up to  $\pm 2\text{g}$  in the frequency range of 0 to 700Hz. Non-linearity, in the full range, is 0.1%. It has a very low bias temperature coefficient of  $\pm 0.2\text{mg}/^\circ\text{C}$ .
- D211-T/D212-T:** Sensitive accelerometer with  $22.5 \mu\text{g}/\sqrt{\text{Hz}}$  noise in band. User-configurable measuring range of  $\pm 2$  or  $\pm 4$ . Non-linearity, in the full range, is 0.1%. It has a  $\pm 0.01\%/^\circ\text{C}$  sensitivity due to temperature.

## Additional Embedded Sensor Options

- Inclinometer:** The device can be equipped with the embedded I230-B or I225-B inclinometer with an accuracy of  $\pm 0.001^\circ$  in the preferred range ( $\pm 5, \pm 10, \pm 30^\circ$ ).
- Geophone:** With natural frequency of 4.5Hz, coil resistance of  $375\Omega$  and moving mass of 11.5g.

## Power

- Input Voltage:** 12 - 24 VDC or POE
- Power Consumption:**  $\geq 1\text{W}$  (Dependent on the chosen option)
- Sensor Powering:** Supplied from the device
- Battery:** Option with integrated rechargeable batteries (3 x 18650)
- Solar Power:** Option with solar panel (10W - 30W)



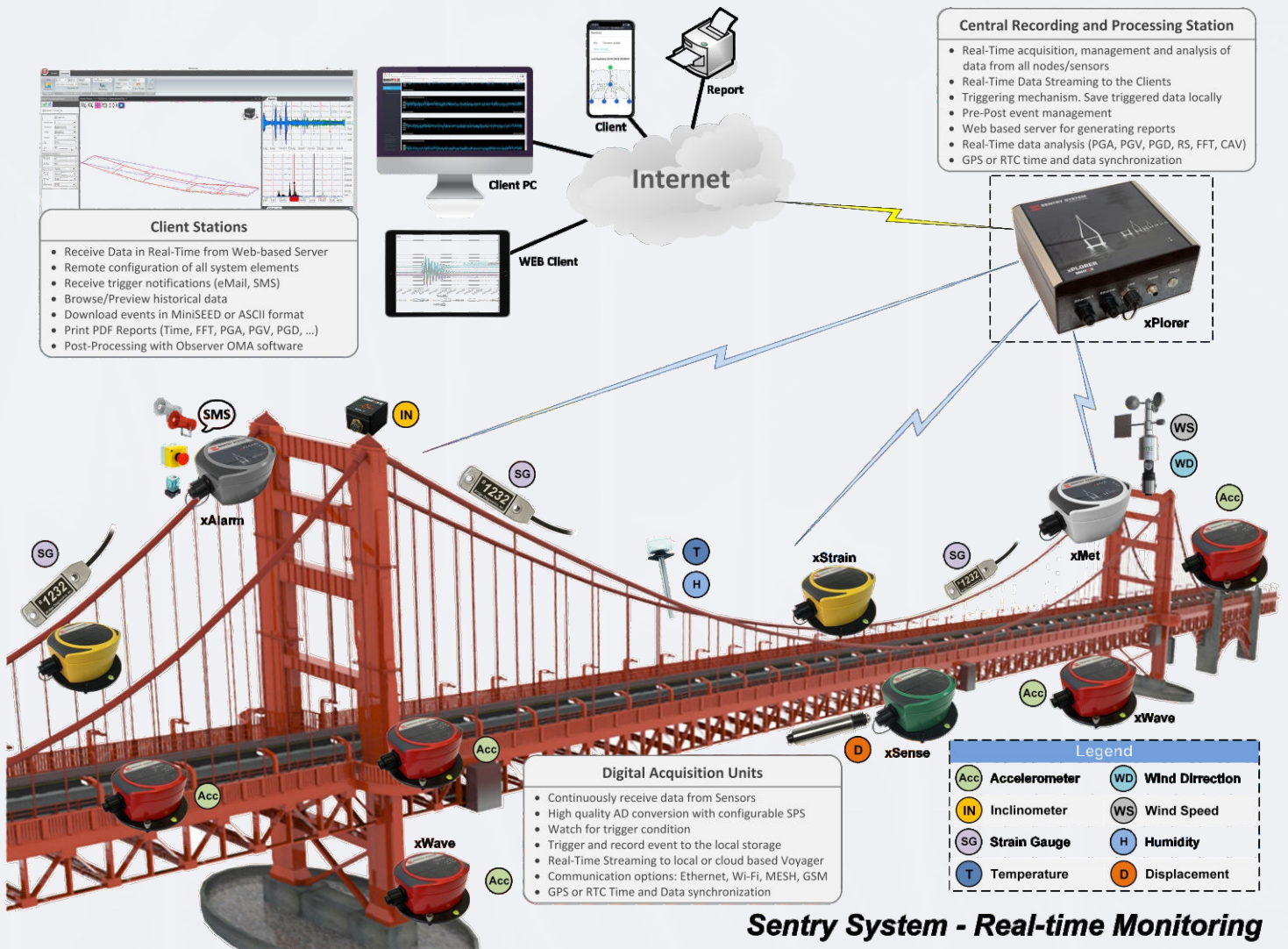


# Real Time Monitoring System Architecture

The Digitex monitoring system is founded on a highly efficient, multithreaded software design. This design facilitates the acquisition of data from numerous xDAS units, the real-time monitoring and conditioning of this data, and its seamless distribution over the Internet to multiple remote locations.

Sensors embedded in the structure consistently transmit data to the system. In the event of occurrences such as earthquakes, predefined thresholds of drift are surpassed in one or multiple locations, prompting the recording and analysis of data, inclusive of pre-event memory. Following the recording of an event, the system promptly notifies a specified list of users via email and uploads the event via FTP to an alternate site.

Leveraging the "quick analysis" feature of the Digitex system, various metrics pertaining to the monitored system's response can be disseminated to multiple locations and displayed in real time. The system possesses the capability to cross-correlate data, generating insightful information about the interaction between dynamic loads on the structure and its modal characteristics. This functionality enables a swift (preliminary) assessment of the predominant structural mode observed within the selected time window, serving as an estimator for the corresponding structural damping parameters.



## Sentry System - Real-time Monitoring

### About Digitex

Digitex is a specialized company dedicated to the design and development of real-time structural health monitoring systems tailored for various industries and applications. Our expertise spans diverse structures, including bridges, tall buildings, campuses, windmills, oil rigs, and more. Collaborating with our partners and advisors from leading universities, Digitex has crafted an innovative solution for ambient vibration measurements and the rapid health assessment of structures.

The Digitex system, when appropriately configured, demonstrates the capability to measure and respond to a spectrum of events, both natural and man-made. This includes but is not limited to earthquakes, wind forces, explosions, and accidental heavy impacts. Our commitment to collaboration and validation with esteemed partners ensures the reliability and effectiveness of our cutting-edge solutions

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