

# xWave

## Digital Accelerometer



### Key Features:

- Rugged aluminum enclosure with IP67 protection
- Can be used as standalone accelerograph or as a digital accelerometer in a daisy chain SHM system
- High quality AD conversion with 32-bit Delta Sigma resolution
- Embedded 3 channel accelerometer. (Available in different variants)
- User configurable sampling rate
- Ethernet/Wi-Fi/DigiMESH® or GSM communication protocols
- Internal Micro SD card or Flash Memory for local storing of the event files
- GPS or DigiSync® time and data synchronization
- Easy installation, wireless or using simple CAT5e cable. Included mounting plate for precise leveling
- POE capability
- Ultra low power consumption
- Wide range of Operating Temperature: -40°C ~ 85°C



### Overview

**xWave** is a fully digital solution for building structural health monitoring systems. It offers an affordable and flexible solution for field/remote acquisition and structural data analysis. xWave is designed for applications in harsh environments and small places. Size, weight, and cabling are critical design requirements in almost any installation. By taking advantage of the extreme performance and small size, xWave is able to deliver unprecedented control and acquisition capabilities in a compact, rugged package with extreme industrial certifications and ratings for operation in harsh industrial environments. Temperature ranges of -40° to 55° C (-40° to 131° F) and a variety of international safety, electromagnetic compatibility (EMC), and environmental certifications and ratings are all available with xWave.

xWave can be used as standalone accelerograph or as a digital accelerometer in a daisy chain SHM system. Series of xWave can be connected in a network using standard CAT5e cable for easy installation. xWave can embed different type of accelerometers, also can accept various type of sensors required for SHM instrumentation. The system can be set up to run reliably for days, months, or years without stopping.

### Technical Information

#### Software

Proprietary Digitex Software included with xWave. Fully compatible with xPlover and **Voyager** server software. Available Digitex PC software, **Observer**, for advanced analysis.

General	
Type	20, 24 or 32-bit ΔΣ
Sampling Rate	50, 100, 200, 250, 500, 1000 sps - User Selectable
Storage	SD Card or Flash Memory (4/8/16/32GB)
Advanced Filtering	Anti-aliasing, Option with: SINC1, SINC2, SINC3, SINC4, SSINC.
Communication	Ethernet, Wi-Fi, DigiMESH, GSM
No. of Channels	3 or more per request

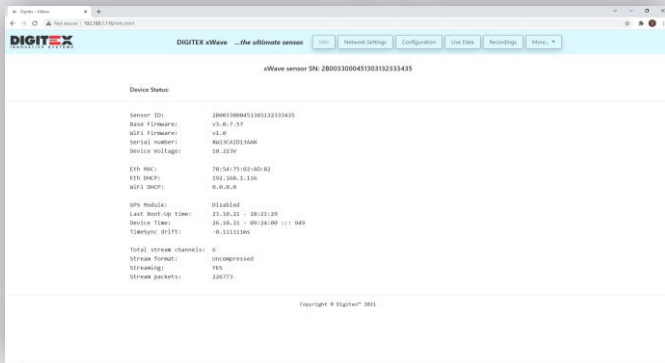
Power	
Input Voltage	12-24 VDC or PoE
Power Consumption	1-2W (depending on option chosen)
Sensor Powering	Supplied from digitizer
Battery	Option with included rechargeable batteries (3 x 18650)
Solar Power	Option with solar panel (10W-30W)

User Interface	
Informational LED, Web Interface	

Environmental	
Operating Temp.	-40°C to 55°C
Humidity	90% non-condensing

Physical	
Packaging	Rugged aluminum
Protection	IP66/IP67
Weight	700g (w/o batteries)
Dimensions	130x120x65mm

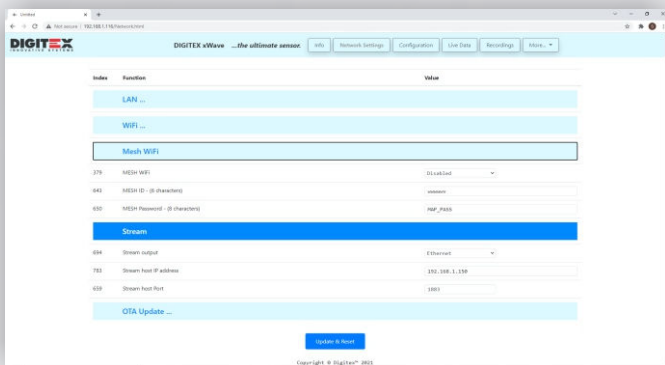
# Web dashboard for configuration and data management



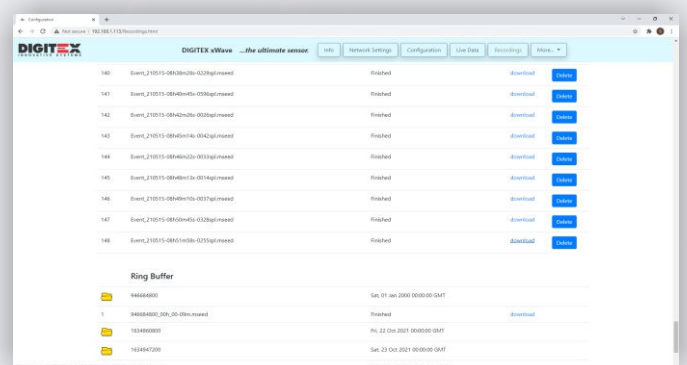
Info Panel



Live Data - Time and FFT



Device Configuration



Data Management - Trigger and Ring Buffer

## Different options for embedded accelerometer

Embedded Accelerometer (D230-T)		
Full-scale Acceleration	±3	g
Noise (In Band)	0.7	µg/√Hz
Noise (Integrated over 0.1Hz to 100Hz)	8	µg
Dynamic Range (0.1Hz to 100Hz)	108.5	dB
Scale Factor Sensitivity	900	mV/g
Bandwidth (±3dB)	550	Hz
Operating Power Consumption	90	mW

Embedded Accelerometer (D225-T)		
Full-scale Acceleration	±3	g
Frequency Range	0 - 200	Hz
Zero Bias Stability	0.03	mg
Noise (In Band)	1	µg/√Hz
Scale Factor Sensitivity	1200	mV/g
Bias Temperature Coefficient	±0.2	mg/°C
Operating Power Consumption	110	mW

Embedded Accelerometer (D220-T)		
Full-scale Acceleration	±3	g
Frequency Range	0 - 700	Hz
Non-linearity (Full Scale)	0.1	%
Noise (In Band)	7	µg/√Hz
Scale Factor Sensitivity	1350	mV/g
Bias Temperature Coefficient	±0.2	mg/°C
Operating Power Consumption	72	mW

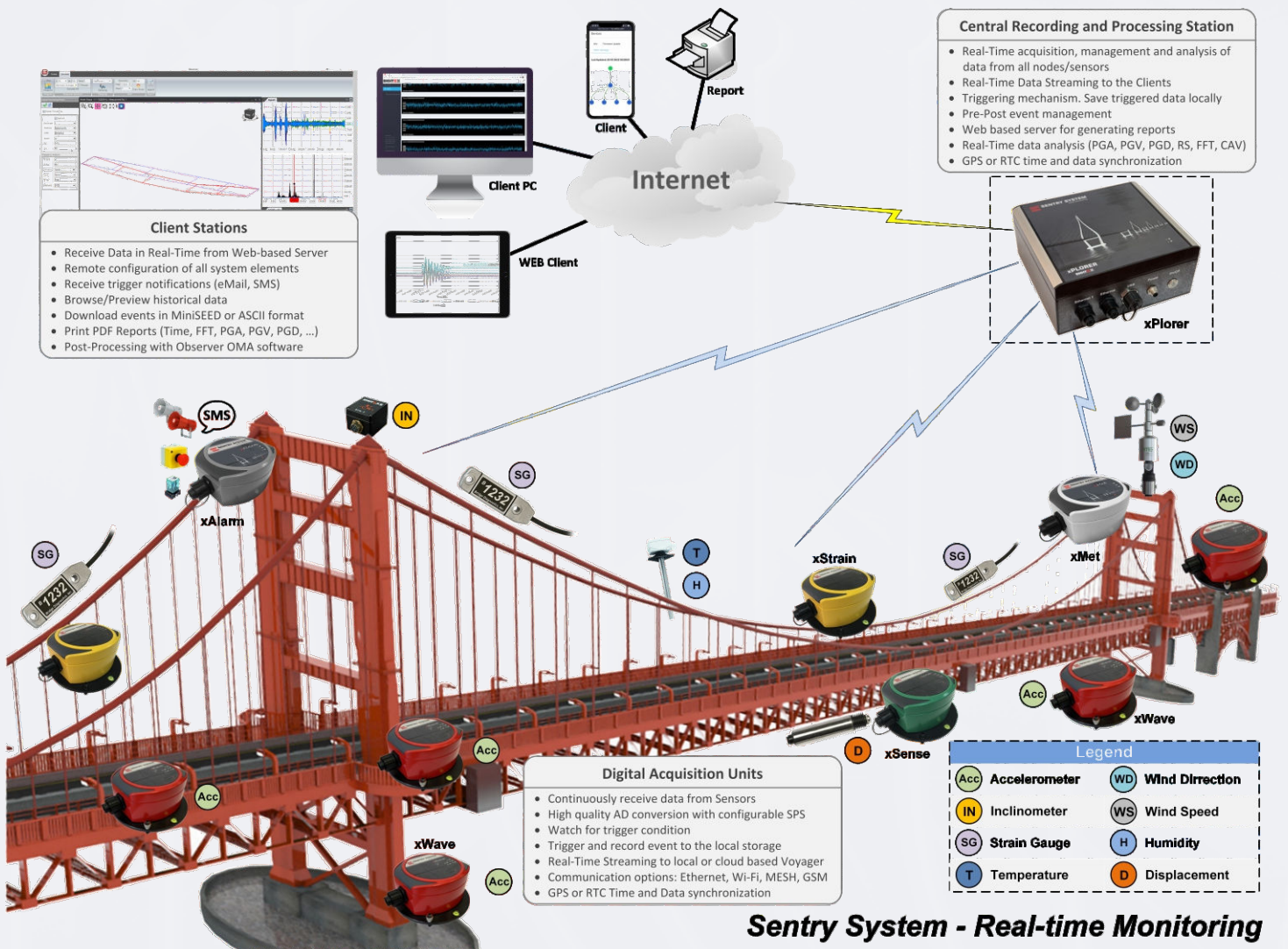
Embedded Accelerometer (D211-T / D212-T)		
Full-scale Acceleration	±2, ±4	g
Non-linearity (Full Scale)	0.1	%
Noise (In Band)	22.5	µg/√Hz
Scale Factor Sensitivity	400	mV/g
Cross Axis Sensitivity	1	%
Sensitivity due to Temperature	±0.01	%/°C
Operating Power Consumption	45	mW

## Real Time Monitoring System Architecture

The Digitex monitoring system is based on a highly efficient, multithreaded software design that allows the system to acquire data from a large number of xDAS units, monitor and condition this data, and distribute it, in real time, over the Internet to multiple remote locations.

Sensors on the structure continuously send out data to the system. If an event such as an earthquake occurs, pre-assigned thresholds of drift are exceeded in one or multiple locations, thus triggering the recording and analyzing of data (including pre-event memory). Once an event is recorded, the system notifies a list of users (via e-mail) and uploads the event via FTP to another site.

Using the "quick analysis" capability of the Digitex system, various measures of the monitored system's response can be distributed to multiple locations and displayed in real time. The system can cross correlate data, plotting useful information about the interaction between the dynamic loads on the structure and its modal characteristics. It can be used for a rapid (rough) estimation of the dominant structure mode being observed in the selected time window, as well as an estimator of the corresponding structure damping parameters.



## Sentry System - Real-time Monitoring

### About Digitex

Digitex is a company specialized in design and development of real time structural health monitoring systems for a variety of industries and applications including: bridges, tall buildings, campuses, windmills, oil rigs and more. Digitex's innovative solution for ambient vibration measurements and quick health assessment of structures is jointly developed and validated with our partners and advisors from the Universities. When properly configured, the Digitex system is capable of measuring and responding to both natural and man-made events such as: earthquakes, wind, explosions and accidental heavy impacts.

Rev 03/22