

OVERVIEW

xWave Ambient® is Digitex Systems' portable digital accelerometer, engineered for field Ambient Vibration Measurements (AVM) and short-term Structural Health Monitoring (SHM) campaigns. It provides the same high-quality data acquisition performance of permanent xWave units, with the added flexibility of a fully portable design. Equipped with an embedded battery, Wi-Fi communication, and rugged IP67 aluminum housing, xWave Ambient is optimized for rapid deployment, autonomous operation, and reliable field measurements in challenging environments.

DESCRIPTION

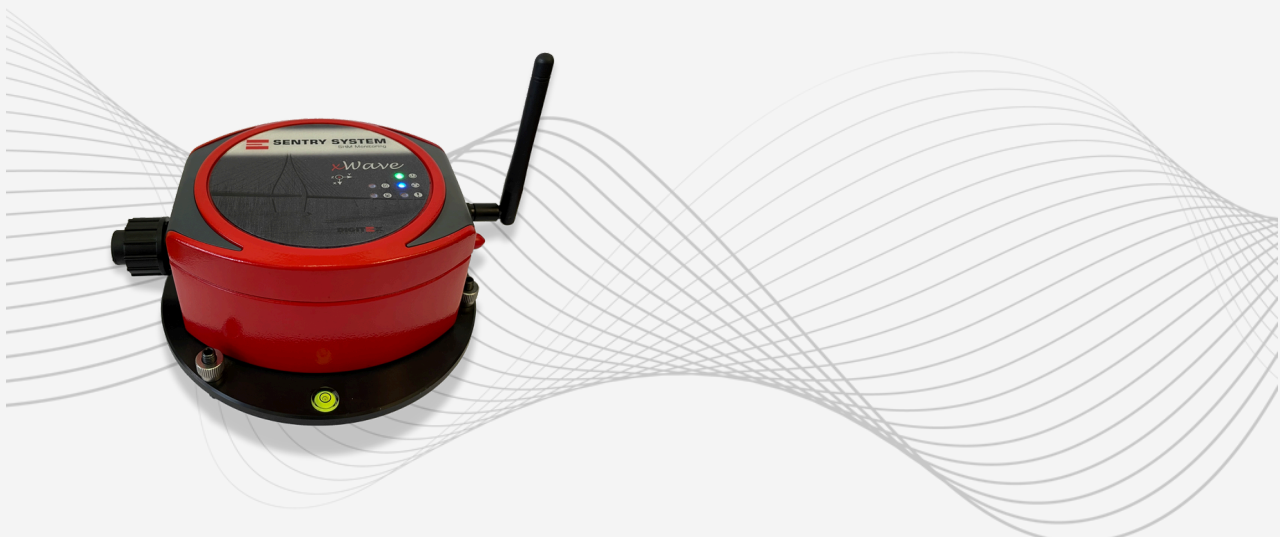
xWave Ambient integrates the D305 ultra-low-noise tri-axial accelerometer with a high-resolution digital output, delivering true 24-bit-class performance. With a noise floor $\sim 0.2 \mu\text{g}/\sqrt{\text{Hz}}$ and a flat bandwidth from 0–460 Hz, it cleanly resolves ambient micro-vibrations needed for OMA and earthquake engineering. The wide linear range avoids clipping during transient events, while precision timing and wireless options make rapid field deployments simple and reliable. The device is operating as part of an xDAS Ambient network with xPlorer Ambient. It features GPS/DigiSync® time synchronization, Store&Forward® technology, and optional local storage via SD/eMMC. The unit is battery-powered for more than 12 hours of continuous operation, with an optional POE supply. Its portability, ease of installation, and compatibility with Voyager® and Observer® software make it ideal for engineers and researchers performing AVM and campaign measurements.

APPLICATIONS

- Ambient vibration tests of bridges, buildings, towers, and dams
- Rapid post-earthquake or disaster structural assessments
- Construction monitoring during piling, blasting, or retrofitting
- Academic and research campaigns requiring portable instrumentation
- Supplementary measurements in existing SHM networks

KEY FEATURES

- Portable & Rugged: IP67 aluminum enclosure; compact and lightweight (1.3 kg with battery).
- Embedded Tri-Axial Accelerometer: D305 model; Up to $\pm 15 \text{ g}$ range; ultra-low noise $\sim 0.2 \mu\text{g}/\sqrt{\text{Hz}}$; 0–460 Hz bandwidth; $\sim 153.5 \text{ dB}$ dynamic range (0–10 Hz); true 24-bit-class digital output for ambient vibration measurements.
- High-Performance ADC: 32-bit digital output; true ~ 24 -bit effective resolution in the 0–10 Hz SHM band.
- Flexible Communication: Ethernet, Wi-Fi, DigiMESH®; simple CAT5e cabling or wireless setup.
- Battery Autonomy: Internal rechargeable battery with $>12 \text{ h}$ continuous operation; optional POE support.
- Time Synchronization: GPS or DigiSync® ensures sub-millisecond alignment across distributed sensors.
- Local Storage: Optional SD/eMMC card for storing MiniSEED events with pre/post buffers.
- Data Handling: Store&Forward® for communication outages; data compression in proprietary Digitex format or MiniSEED.
- User Configurable Sampling Rates: 50, 100, 200, 500, or 1000 sps.
- Web Interface: Embedded web server for configuration, charts, downloads, and OTA firmware updates.
- Installation: Mounting plate with bubble level for precise alignment with a single anchor.
- Indicators: Informational LED for status monitoring.
- Seamless Integration: Fully compatible with xPlorer Ambient, Voyager® central acquisition, and Observer® advanced analysis suite.



SPECIFICATIONS

Sensor

Type: Digital output and SMS notification interface designed for user alerts and automated control of external applications and systems

Full-scale Acceleration: Up to $\pm 15g$

Noise (In Band): $0.2\mu g/\sqrt{Hz}$

Dynamic Range (0 - 10Hz): $>153dB$

Frequency Range: 0-460Hz

Non-linearity (Full Scale): 0.1%

Bias Temperature Error: $\pm 2mg$

Zero Bias Stability: $\pm 0.2\mu g$

Digitizer

Channels: 3 differential analog channels. SW configurable to uni-axial or bi-axial operation.

Resolution: True 24-bit Sigma-Delta ADC per channel (32-bit word)

Sampling Rates: User-selectable from 50 to 1000 samples per second (SPS)

Modes of work: Multiple user-selectable sampling rates (50-1000 SPS) with configurable FIR filter orders (64-512) and cutoff frequencies (DC-460 Hz) for optimized signal fidelity and aliasing control

Anti-alias Filter: Built-in low-pass anti-aliasing filter with selectable cutoff frequencies

Digital Filter: Software-selectable Butterworth and Chebyshev types; per-channel configurable

Interface

Connectivity: Ethernet (10/100 Base-T), Wi-Fi, GSM/4G (model dependent)

Led Interface: Power, Streaming Type, State of Health, Battery Voltage, and Charging Status

Embedded Web server: Integrated HTTP interface for configuration. Provides access to device logs, user actions (reboot, backup, restore, and configuration management), and device diagnostics

Power

Supply Voltage: 9 - 28 V DC (typ. 12 V) PoE compatible

Power Consumption: ~ 2.5 W (average)

Backup: Optional Li-Ion battery pack (~ 12 h autonomy)

Protection: Reverse voltage, over/under voltage, surge protection up to 2 kV DC (optional)

AVAILABLE OPTIONS

SSWiFi: Wi-Fi Communication Module

SSGPS: GPS Module for time and data synchronization

SSGSM: 4G GSM module for streaming and/or SMS alarming

SSPW: Power protection module (2.25KV, 10-36V Input)

SSSDG: SD Memory Module (Non detachable 32GB SD card)

SSHWF: Five (5) user selectable hardware filters (only 32-bit ADC)

xWave Ambient

PORTABLE DIGITAL ACCELEROMETER UNIT

Synchronization

Time Base: GPS-disciplined oscillator or DigiSync® network synchronization protocol

Accuracy: Sub-microsecond (GPS mode) or sub-millisecond (DigiSync® mode) timing precision across networks

Trigger

Modes: STA/LTA, Above Max, Under Min, Over Relative, Over Absolute

Pre-/Post-Event User configurable

Buffers:

Configuration: Voting logic with user-defined weighting per channel; configurable STA/LTA windows

Communications & Output

Data Modes: Continuous real-time streaming; user-configurable ON/OFF operation in standalone mode

Protocols: Embedded SeedLink protocol for data redundancy via Nexus application

Internal Storage: Optional 32 GB non-volatile SDHC card.

Operation Mode: Ring Buffer and Triggered Event modes; miniSEED format

Stream Data DigiWLC®, miniSEED STEIM1 or Uncompressed

Protection:

Data Reliability: Store&Forward® buffering - retains data during communication loss and automatically forwards upon link restoration, ensuring zero data loss

Environmental

Operating Temp.: $-20^{\circ}C$ to $+60^{\circ}C$

Humidity: 0 - 100 % RH (non-condensing)

Software Updates

Firmware: Over-the-air (OTA) updates via Voyager® or embedded HTTP server

Physical

Dimensions: $130 \times 120 \times 65$ mm ($5.12 \times 4.72 \times 2.56$ in)

Weight: 1.3 kg with battery

Enclosure: Rugged coated aluminum housing, IP67 rated

Mounting: Horizontal or vertical using mounting plate; single anchor point, three leveling bolts, and integrated bubble level

Certification & Calibration

Standards: CE, RoHS, ISO9001, ISO14001

Calibration: Factory calibrated; individual calibration certificate included

SSBAT: Battery option (12h autonomy)

SSDO: Digital Relay Outputs Module with ext. JB (4, NO/NC)

SSDSP: Informational display (2.8 Inch at the top)

SSPOE: Power Supply: 24VDC; 1A; 24W and PoE Injector

SSMP: Mounting plate