

IoT Ultrawide Broadband Vibration Sensing

Safety | Environment | Optimization

Introduction

Symroc's R&D team has developed Ultra-Wide Broadband Seismic/Vibration Sensing Technology, with a flat response bandwidth of 0.01Hz to 1600Hz, beyond all other systems in the market.

The technology is an ideal non-intrusive, cost effective condition-based asset monitoring solution.

Symroc provides customized vibration and seismicity solution that combines hardware, connectivity and data analysis service.

Currently serving governments, railways, infrastructure, oil and gas and renewable energy industries. Symroc's innovative technology has helped organizations improve safety, optimize operations and save cost.



The Highest Dynamic Range In The Industry

The Widest Broadband Detection Frequency Range

The Only 32 Bit Broadband Sensor

Best Data Quality For AI

Why Low Frequency Matters

Most earthquakes, natural or induced, occurs in the low frequency range. The low to mid frequency vibration, especially < 1 Hz, is also considered critical to infrastructure health as excessive vibration in this range can lead to structural integrity issues. Acquiring and analyzing ultrawide broadband vibration data is a powerful tool for digitized asset condition monitoring, risk management and disaster prevention and early warning.

KEY SYSTEM FEATURES



Sensor Performance

- Bandwidth coverage from 0.001 Hz to 1600Hz
- >120dB dynamic range across the entire passband
- High sampling rate
- Clock trimming sync with 1 micro second accuracy
- Record acceleration, velocity and displacement simultaneously.



Ease of Installation

- Low power consumption
- Compact size
- Can be battery, plugged-in or solar powered
- Attached by any method desired



Customized Solution

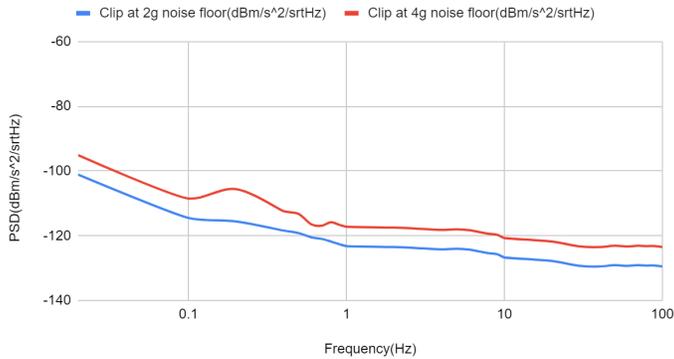
- Wireless, no cabling for data transmission
- Integrate easily with multiple sensors
- Data transmission through mesh network, radio frequency, satellite, Wi-Fi, LTE, 3G, 4G, 5G or Bluetooth.
- Triaxial or single component setup



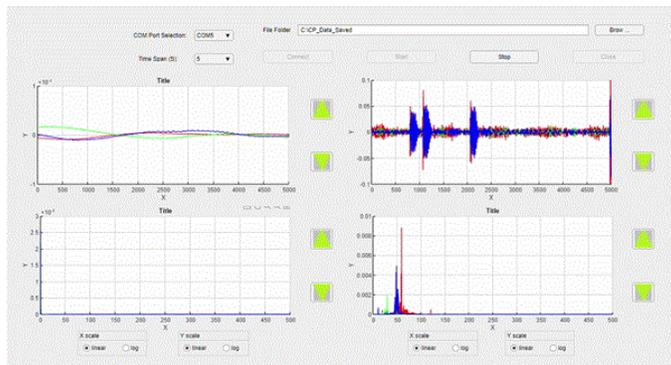
Data Analysis

- Flexible data output format compatible with most common AI platforms, customer devices and control systems that allows on-site analysis
- Integrate with edge computing, AI analysis, and geospatial software

Instrument Self Noise Curve



Interface Display



Symroc's user interface displays and records real time velocity, acceleration and displacement data at the same time.

Technical Specifications

Description	Specification
Passband (<3db) selection range	0.001Hz – 1600Hz
Noise level	≤5ng/sqrtHz
Phase distortion	< 0.75 degree
Total Harmonic distortion	less than 0.075%
Ripples in bandwidth	< +/- 0.2db
Dynamic Range:	>120dB across the entire passband
Programmable sample rate	62.6, 125, 250, 500, 1000, 4000 (or greater) Sampling points per second
Clock synchronization error	< 1 Microsecond
GPS Longitude and latitude coordinate error	Less than 2.5 Meters.
Operating Temperature Range	-40°C to +70°C
Power consumption	23.5mw per component without wireless communication
Data communication	Wireless or wired
Wireless communication method	LTE, 4G, 3G, Wi-Fi, Bluetooth
Wired interface	UART serial port with communication rate of 1000000 Baud
Data Output	32Bit digital output with flexible output selection of displacement, velocity or acceleration
Velocity Measurement	Full scale increase by 12db per octave frequency drop

Technology Applications

Natural Disaster Risk Management

- Earthquake Early Warning (EEW)
- Slope stability monitoring and landslide prevention
- 4D seismic subsurface structure mapping
- Induced seismicity by energy production activities

Structural Condition Monitoring and Diagnosis

- Bridges
- Buildings
- Railroads, highspeed trains
- Wind turbines
- Dams, electric power infrastructure
- Dykes
- Mines

Industry Facility Preventative Maintenance

- Large industrial motors and compressors
- CNC machines and other complex industrial machinery
- Multi-phase flow measurement
- Medical equipment and laboratory monitoring