



### RAEM1-6 Introduction

RAEM1-6 is a multi-channel intelligent IoT acoustic emission acquisition system that integrates automatic signal acquisition, processing and analysis with clock synchronization and wired/wireless transmission. RAEM1-6 is a stand-alone AE instrument, which can be used as not only a benchtop AE testing equipment with Windows software SWAE, but also as a remote unattended online monitoring system with servers or clouds.

RAEM1-6 has flexible channel numbers to install, min 2 and max 6 channels. Cascading more RAEM1-6 together can form a large AE network system.

### Working Principle

The AE sensor converts the acoustic waves signal of material into electrical signals through piezoelectric effect, and the built-in preamplifier amplifies the electrical signals from the sensor to increase the signal-to-noise ratio of the signal to facilitate signal transmission to RAEM1-6 via a coax cable. The RAEM1-6 performs A/D conversion, processing and analysis of the signal, and then transmit the result data to computer/cloud/servers via wired or wireless communication methods.

### Features

- Multi-channel system with high clock synchronization
- Wired and wireless communication methods
- Real-time automatic acquisition and transmission
- Alarm outputs and external inputs available

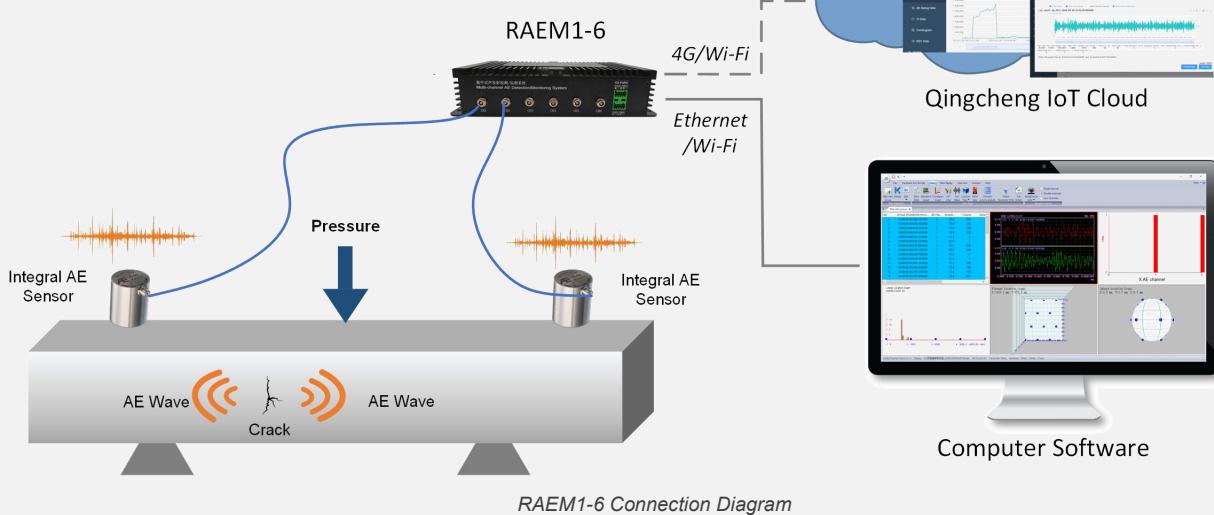


RAEM1-6 Front Side Indication

### Applications

RAEM1-6 can real-time monitor cracking, corrosion, leakage, wears, lubrication and other failures or defects in the early stage to predict and alarm early fault detection and maintenance. The typical applications are:

- Bridge wire break monitoring
- Rotating machine condition monitoring
- Structural health monitoring
- Valve leak monitoring
- Storage tank testing and monitoring
- Pressure vessel testing and monitoring
- Cutting tool condition monitoring



RAEM1-6 Connection Diagram

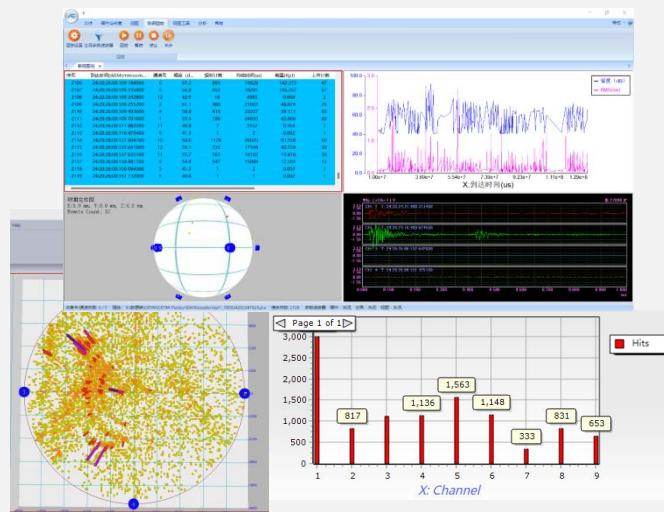
### Technical Specification

Channel Combination	Flexible from 2 up to 6 channels per case, or can be cascaded
Trigger Mode	Threshold/external input/software trigger
Sample Mode	Envelop/ fixed-length/streaming mode
Time Mode	Continuous/ Schedule/ Interval timing
Sample Speed	Maximum 2000,000S/s (2000kHz) per channel
Sample Resolution	16-bit
Waveform Sample Length	Up to 128,000 points per waveform sample length simultaneously
Waveform Pre-sample Length	Up to 128k sample points
System Noise	Better than 30dB
Dynamic Range	Better than 70dB
Input Bandwidth	10kHz-800kHz (-3dB, pass-through)
Analog Filter (kHz)	20-100kHz/ 20-400kHz/ 70-100kHz/ 70-400kHz/ Pass-through/ Bypassed
Digital Filter (kHz)	0 to 1000 kHz frequency range as pass-through/ high-pass/ low-pass/ band-pass filter
Preampl Voltage	28V40dB / 12V34dB / 5V26dB
Output Data	Waveform, parameters, parameter ratings
AE Characteristic Parameters	Arrival time, amplitude, counts, energy, rise time, duration, RMS, ASL, frequency centroid, peak frequency, 5 partial power spectrum
Clock Synchronization	Synchronization options include RS485 (long-distance wired), cascaded (short-distance wired), WiFi (indoor wireless), or GPS (outdoor wireless). Synchronization accuracy: within RAEM1-6 is $\leq$ 100ns; between multiple RAEM1-6 can be 500ns or better.
Communication	Ethernet port (Gigabit) / WiFi /4G <i>Note: Ethernet port is compulsory. Users can add one wireless communication, either WiFi or 4G.</i>
External Input	Up to 4 inputs, input range from -10V to 10V. Maximum sample rate of 1MHz; external trigger capability.
Alarm Output	2 channels
Temperature Range	-20°C~60°C
Power Input	Rated 24VDC/2A, operating voltage range 9V-36V
Dimension	Length $\times$ Width $\times$ Height: 23.2cm $\times$ 12.5cm $\times$ 5.2cm
Weight	1.25kg

### SWAE software

SWAE software is a professional and user friendly AE data display and analysis Windows desktop software. It is compatible with RAEM1, RAEM1-6 and SAEU3H series products.

- High degree of customization, various acquisition configuration and visualization of AE parameters and waveform
- Various 3D positioning diagram display, linear, planar, cube, cylinder, tank bottom, sphere location etc.
- FFT, wavelet, intensity and activity, clustering analysis etc.



SWAE Screenshots

### Qingcheng IoT Cloud

Qingcheng IoT Cloud platform is the cloud platform developed to store, display and analyse our IoT products. Customers can choose to rent and use our cloud platform for their IoT product data upload, display and analyse in real-time.

- Real-time visualization of AE parameters and waveform
- Remote configuration of the IoT products
- Historic data storage and download
- Data classification (rating) and alarm notification



Qingcheng IoT Cloud Screenshots