

QUAKELOGIC · EARTHQUAKE EARLY WARNING

QUAKEAI

AI MEMS ACCELEROGRAPH

Detects the P-wave on the instrument, verifies it with AI and alerts on its own, in the seconds before strong shaking arrives.

TRIAXIAL MEMS · ± 3 g

24-BIT · ≥ 120 dB DYNAMIC RANGE

AI + STA/LTA + Pd DETECTION

GPS TIMING · ± 1 μ s

IP68 ALUMINUM HOUSING



MADE IN USA

With Globally Sourced Materials

PRODUCT OVERVIEW

DECIDED AT THE SENSOR.

A strong-motion accelerograph with its own AI engine, so every station detects, verifies and reports earthquakes without waiting for a central server.

QUAKEAI pairs a triaxial low-noise MEMS accelerometer and a 24-bit Sigma-Delta digitizer with embedded AI computing. It records three-component ground acceleration from DC to 250 Hz and streams it in real time over SeedLink.

On the instrument, an AI phase picker works alongside STA/LTA and Pd triggers to detect the P-wave, reject traffic, machinery and other non-seismic triggers, and give each detection a confidence score. A GPS-disciplined clock holds timing to $\pm 1 \mu\text{s}$ of UTC, and the IP68 machined-aluminum housing operates from -20 to $+70^\circ\text{C}$.



QUAKEAI accelerograph

$\pm 3 \text{ g}$

FULL SCALE

Triaxial MEMS sensor

$\geq 120 \text{ dB}$

DYNAMIC RANGE

Over 0.1–50 Hz

$\pm 1 \mu\text{s}$

GPS TIMING

PPS · NTP · PTP fallback

IP68

ENCLOSURE

-20 to $+70^\circ\text{C}$

STANDARD FEATURES

- Triaxial low-noise MEMS accelerometer
- $\pm 3 \text{ g}$ full scale, DC–1,500 Hz sensor
- 24-bit Sigma-Delta ADC (32-bit optional)
- 1 to 1,500 sps, selectable
- Embedded AI computing
- AI + STA/LTA + Pd P-wave detection
- False-trigger rejection
- Detection confidence scoring
- Automatic P and S phase picking
- Event classification
- PGA, PGV, PGD · MMI, JMA, PEIS
- GPS clock, $\pm 1 \mu\text{s}$ to UTC
- SeedLink real-time streaming
- Ethernet · Wi-Fi 5 · Modbus TCP · MQTT
- microSD and USB storage · backup battery
- IP68 machined-aluminum housing

BUILT FOR EVERY EARTHQUAKE NETWORK

One instrument serves early warning, strong-motion recording and structural monitoring, from a single site to a national network.



EARTHQUAKE EARLY WARNING

Detects the P-wave on site and alerts within seconds, on its own or as one node of a regional early-warning network.



STRONG-MOTION NETWORKS

Records three-component acceleration with GPS timing and streams it in real time to network processing centres.



STRUCTURAL HEALTH MONITORING

Measures building and bridge response to earthquakes and ambient vibration for post-event assessment.



INDUSTRIAL & CRITICAL FACILITIES

Drives protective actions through QUAKE RELAY: sirens, machine shutdown, valve closure and elevator recall.



AFTERSHOCK & RAPID DEPLOYMENT

Compact and quick to install for temporary aftershock deployments and site studies.



SITE RESPONSE (HVSr)

Supports horizontal-to-vertical spectral ratio measurements for site-response assessment and before-and-after comparison.



SCADA & BUILDING INTEGRATION

Publishes detections and ground-motion values over Modbus TCP and MQTT to control and building systems.



CENTRAL EEW SOFTWARE

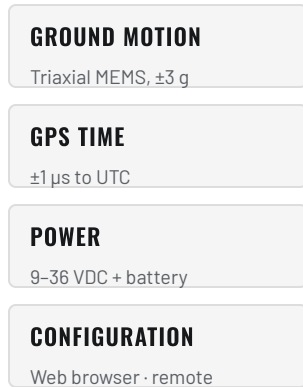
Feeds QuakeVault edge servers and QuakeAlarm central software for network-based detection and alert dispatch.

HOW IT WORKS

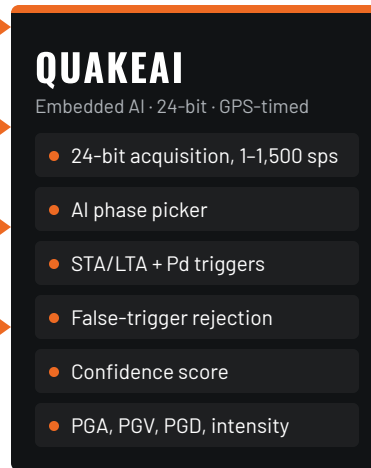
FROM GROUND MOTION TO ALERT

QUAKEAI sits at the start of the alert chain: it measures, decides and shares, so the first decision is made where the earthquake arrives.

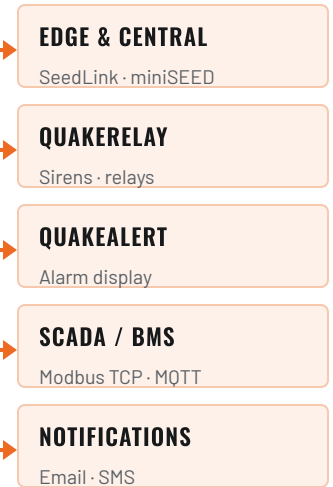
INPUTS



ON-BOARD PROCESSING



OUTPUTS



01

SENSE

The MEMS accelerometer samples ground motion continuously; the GPS-disciplined clock time-stamps every sample.

02

DETECT

The AI phase picker, STA/LTA and Pd identify the P-wave onset and reject non-seismic triggers.

03

SHARE

Detections, confidence and ground-motion values go to edge servers, relays, displays and building systems.

Warning time depends on distance. Sites far from the epicentre can receive several seconds or more of warning. Sites very close to the source may receive little or no warning before strong shaking; QUAKEAI still detects, records and reports the event.

FEWER FALSE ALARMS, FASTER DETECTION

QUAKEAI combines machine learning with proven seismic methods, so detections are both fast and trustworthy in noisy urban and industrial sites.



HYBRID AI DETECTION

An AI phase picker runs alongside STA/LTA and Pd triggers on the instrument, giving fast, redundant P-wave detection with no cloud round-trip.



FALSE-TRIGGER REJECTION

Separates earthquakes from traffic, machinery, blasts and footsteps, and scores every detection with a confidence value.



PHASE PICKING & CLASSIFICATION

Automatic P and S phase picking and event classification support rapid characterization and review.



WEB MANAGEMENT

Configure, monitor and update from any browser on the local network, or securely over a VPN.

TRIGGER AND DETECTION MODES

MODE	BEHAVIOR
AI phase picker	Neural P-wave onset picking with a confidence score
STA/LTA	Short-term over long-term average ratio trigger
Pd	Peak displacement from the first seconds of the P-wave
Amplitude	Threshold on acceleration level
IP voting	Confirmation across networked stations
Scheduled / test	Timed recordings and system tests

- SeedLink
- miniSEED
- Modbus TCP
- MQTT
- HTTP
- FTP
- SSH
- VPN

MEASURE WEAK AND STRONG MOTION

A low-noise MEMS sensor and a 24-bit digitizer cover the band that early warning and strong-motion recording need.

STAGE	TYPE	RATING	NOTES
Sensor	Triaxial MEMS accelerometer	$\pm 3\text{ g} \cdot 300\text{--}500\text{ ng}/\sqrt{\text{Hz}}$	Sensor bandwidth DC–1,500 Hz
Digitizer	Sigma-Delta, 24-bit	$\geq 120\text{ dB}$ over 0.1–50 Hz	32-bit system optional
System response	DC to 250 Hz	$\pm 3\text{ dB}$	Covers 0.1–50 Hz
Sampling	1–1,500 sps	Selectable	100 sps or higher for EEW
Timing	GPS-disciplined clock	$\pm 1\text{ }\mu\text{s}$ to UTC	PPS, NTP, PTP fallback
Power input	9–36 VDC	Surge & reverse-polarity protected	Internal backup battery

Installation rule. Anchor the instrument to a reinforced-concrete slab or a structural wall, away from machinery and foot traffic, and give the GPS antenna a clear view of the sky.

INSIDE THE HOUSING

- Triaxial low-noise MEMS accelerometer
- 24-bit Sigma-Delta digitizer
- Embedded AI computing module
- GPS-disciplined real-time clock
- Internal backup battery for safe shutdown
- microSD and USB mass storage
- Sealed circular connectors: Power, Ethernet, GPS, USB

OPTIONS

32-BIT ADC SYSTEM

Upgrades acquisition to a 32-bit system for low-amplitude and high-resolution studies.

4G LTE MODEM

Streams data and sends alerts independently of the site network, as primary or backup link.

STAINLESS STEEL ENCLOSURE

Outdoor stainless steel enclosure for exposed, coastal or industrial installations.

TECHNICAL SPECIFICATIONS

QUAKEAI AT A GLANCE

SENSOR & PROCESSING	VALUE
Sensor	Triaxial MEMS accelerometer
Full scale	±3 g
Sensor noise	300–500 ng/√Hz
Sensor bandwidth	DC to 1,500 Hz
System response	DC to 250 Hz (±3 dB)
ADC	Sigma-Delta, 24-bit (32-bit optional)
Dynamic range	≥ 120 dB over 0.1–50 Hz
Sampling rates	1–1,500 sps, selectable
Anti-aliasing	Analog and digital FIR
AI computing	Embedded AI computing module
Detection	AI phase picker, STA/LTA, Pd
Discrimination	False-trigger rejection, confidence score
Phase picking	Automatic P and S
Parameters	PGA, PGV, PGD, MMI, JMA, PEIS

QUALITY & COMPLIANCE

Designed and manufactured by QuakeLogic in Roseville, California, under an ISO 9001:2015 quality management system. Each unit ships with a calibration certificate.

Specifications are subject to change without notice. Dimensions and weight available on request. Warning time depends on distance to the earthquake; sites close to the source may receive little or no warning.

INTERFACES & PHYSICAL	VALUE
Time sync	GPS; PPS, NTP, PTP fallback
Timing accuracy	±1 μs to UTC (GPS locked)
GPS antenna	External, 33 ft (10 m) coax
Data interfaces	Ethernet 10/100, Wi-Fi 5, RS232; RS485, LTE optional
Protocols	SeedLink, HTTP, FTP, SSH, Modbus TCP, MQTT
Data formats	miniSEED, SAC, JSON, GSE, SAF
Recording	Continuous and/or triggered
Storage	microSD and USB
Power supply	9–36 VDC, protected
Backup power	Internal battery
Protection	IP68
Housing	Machined aluminum, corrosion-treated
Operating temp.	–4 to +158 °F (–20 to +70 °C)
Humidity	0–100% non-condensing

SUPPORT

Delivered configured for the site's network and alert settings. QuakeLogic engineers provide remote commissioning, firmware and AI-model updates, and technical support from the USA.

QUAKEAI

AI MEMS ACCELEROGRAPH

CORPORATE HEADQUARTERS

QuakeLogic Inc.

2008 Opportunity Dr., Suite 130

Roseville, CA 95678, USA

Monday – Friday, 9:00 AM – 5:00 PM PT

CONTACT

+1(916) 899-0391

sales@quakelogic.net

products.quakelogic.net

ABOUT QUAKELOGIC

California-based engineering company delivering seismic monitoring, earthquake early warning, structural health monitoring and testing systems worldwide.



Scan to view
QUAKEAI online



MADE IN USA

With Globally Sourced Materials