Flexible, Smart Value
Seismic Instruments and Technologies

HAT

Products:

A tri-axial accelerometer with the technology of micro-electromechanical systems (MEMS). It provides exceptional performance over wide frequency range from DC to 2000 Hz. The output of the HAT is digital.

HAT 3CS

3CS is a unit to gather data from multiple HAT accelerometer, stamp data stream with time signal from GPS, process data, provide state-of- health report of the system, send raw or processed data over standard communication protocols and receive remote commands. 3CS stands for Control, Computation and Communication system.

HAT Power Unit

A main part in every seismic acquisition and processing unit is to provide a reliable and stable power to the system. HAT power unit is an answer to this demand. In the absence of any external source of electricity, it can provide powers to the system for 24, 48 and 72 hours. It also provides a controlling means to manage external power sources like solar system and national electricity network

HAT Digitizer and Recorder

HAT digitizer is a 24 bit, 3 channel high precision devices to digitized, record and transmit seismic signal from analog sensors. It also has an accurate internal clock. It can digitize analog signal in 50, 100, 200 and 500 samples per seconds.

The internal memory has 1 Giga Byte capacity

HAT Data Logger

This data logger is equipped with 16 independent channels to digitize and record analog signals from 16 different equipments with different sampling rates and 12 Bit precision.

Sampling Rate: Max 1.6 Msp

Full Scale Input Range: +- 15 mV - +- 15 V

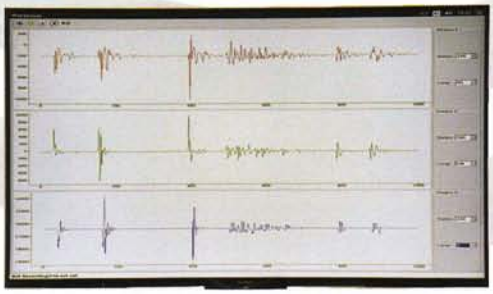
Internal Memory: 1 Giga Byte

Fast Digital Input: 4

Fast Digital Output or PWM: 4

HAT Accelerometery System (HAS)

HAT tri-axial accelerometer is a sensor with the technology of micro-electromechanical systems (MEMS). It provides exceptional performance over wide frequency range from DC to 2000 Hz. Important DC response allows simple field calibration and reduces post-processing confusion.
The output of the HAT is digital, with the aid of its internal microcontroller. This microcontroller also provides the ability of performing some strong motion processing inside the sensor in real time. This ability makes HAT accelerometers an ideal device for earthquake early-warning systems. The HAT accelerometer is also useful for many types of earthquake recordings besides structural health monitoring applications.



Major applications of IIEES-HAT

Structural health monitoring of buildings, bridges, monuments, dams, etc.
Earthquake early warning systems
Earthquake rapid response system
Strong motion recordings
Research projects in different fields of earthquake engineering and seismology and vibration analysis
Educational purposes
Geo-hazard Monitoring (Landslide, Slopes, ...)

HAS Technical Specifications

No.	Performance Metric	Value
1	Number of Components/axes	3
2	Clip-level	1.7g
3	Sensor Dynamic Range	85dB
4	Generator Constant at Output	≥1.0V/g
5	Self-noise (RMS)	$<10\,\mu g/\sqrt{Hz}$
6	Sensitivity Accuracy	<1% <10Hz
7	Cross axis coupling	<-35 dB
8	Linearity	<-35 dB
9	Temperature-Induced Sensitivity Errors	<0.5% over -20 to +40° C
10	Operational Temperature Range	-20~60° C
11	Sensor output	Digital-RS485
12	Sampling rate	50-100-200 Hz
13	No of sensors per line	12 (sampling rate of 50 Hz)
14	Environmental Protection	IP67
15	Storage	64-128-256 Gbytes SSD
16	Battery Capacity	24-48-72 hours
17	Processing Unit	ATOM E3800 series-Quad Core
18	Memory	4 G Bytes

HAT

The HAT: A Flexible, Smart Value

HAT's first concern is to provide a bridge between science and technology in the field of seismology, earthquake engineering and earthquake disaster management. Earth Seismo-monitoring Tech. (EST, LarzehZaminPayesh Corp.) is a knowledge-based corporation to provide state of the art technologies based on the results of applied research projects, in cooperation with International Institute of Earthquake Engineering and Seismology (IIEES),
HAT tries to provide feasible solutions, mainly in the fields of

Structural health monitoring
Earthquake early warning systems
Earthquake rapid response systems
Seismic data gathering and processing
Geo-hazard Monitoring

Features of HAT Acceleremetery System (HAS)

-MEMS technology and extended bandwidth
-Various sampling rates
-Digital output on Rs485
-Ability to transmit data up to 1000 m without any accessories
-Transmission of data from 12 distinct HATs with only one RS485 cable
-Ability to program and making various calculations inside the sensor
P-phase detection, spectral calculations, early warning parameters, etc
-Remote updating internal software of the sensor
-High degree of ambient protection (20g impact survival, Ip67)
-Operating temperature from -20° to 60° C
-Accurate timing (internal clock and GPS)
- High flexibility in customizing with different fields of applications
-Ability to send action commands to other devices (in rapid response applications)
-Performance without external power for more than 72 hours.
-Capability to store data for more than 30 days (continuous data)
-Ability to send data over standard communication protocols
-Ability to receive remote commands
-Provide State-of-Health (SoH) report of different components of the system

No. 21, Arghavan St., North Dibajee, Shahid Lavasani (Farmanieh)
Tehran, Islamic Republic of Iran
Tel.: +98 21-22 80 82 84 Fax: +98 21-22 83 32 92
www.iiees.hat.com I **info@iiees-hat.com**

Earth Seismo-monitoring Tech.