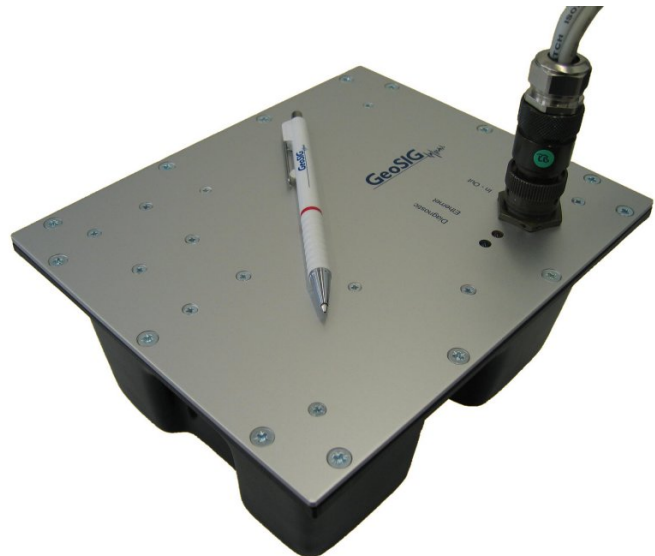


IA-1 Internet Accelerograph

Features

- All-in-one: Sensor, Digitiser, Recorder, Data Server, Memory, Communication, UTC Timing, Power, Autonomy
- Internet based communication and timing
- Continuous Recording (5-minute files) Event Recording
- Event and Parameter reporting
- Noise floor: 0.5 mg RMS
- Full Scale: ± 4 g
- Frequency range: 0 - 42 Hz



Outline

The Internet Accelerograph IA-1 opens a new era in the urban seismic research and engineering, which requires a **high spatial density of seismic instruments**. For major urban centres several hundred instruments are required. Thus unit cost as well as operating costs are of major concerns. The state of the art, all-in-one IA-1 offers a **substantially lower cost solution** when compared to any other equipment doing the same job. Since the instrument and communication design takes advantage of the latest micro electronic technology in design and the existing Internet infrastructure for station management, data retrieval and event-reporting; network operating costs drop to a small fraction of conventional strong-motion seismograph networks.

IA-1 encompasses a three component acceleration sensor and stores approx. 1.5 days worth of full-waveform acceleration data in a volatile ring-buffer, which is securely accessible over the Internet.

The instrument's software processes data in real time. If triggered by a seismic event, IA-1 calculates Peak Ground Acceleration (PGA), Peak Ground Velocity (PGV), Peak Ground Displacement (PGD) and simulated Peak Wood-Anderson response (PWA) of the event. IA-1 reports

these parameters, which are related to the strength of shaking, to one or many data centres where a synopsis (such as a shakemap) for disaster management facilities can be generated in almost real time over the Internet. An event file is also recorded in the memory, which is also securely accessible over the Internet.

IA-1 is self-contained and is equipped with an uninterruptable power-supply, which provides for more than six hours emergency operation without external power.

In lieu of an internal clock, software-protocols based on Internet UTC timing, provide for timing accuracy, typically better than 10 ms.

GeoDAS supports connecting, status checking, downloading and analysing files from the IA-1. Configuration of the IA-1 can be performed locally through a RS-232 connection or remotely through a SSH connection on a LAN or WAN (like Internet). This allows to **connect to an IA-1 anywhere in the world** from your computer.

Revolutionary Internet Accelerograph features a virtually maintenance free design, which makes this innovative equipment the best choice for numerous applications.

Specifications IA-1 Internet Accelerograph

General Characteristics

Applications: Urban seismology,
High density monitoring networks
Shake / Hazard mapping

Disaster Management

Configurations: IA-1 triaxial package
Full Scale Range: ± 4 g

Sensor

Type: MEMS
(Micro Electro Mechanical Systems)
Noise: 0.5 mg RMS
DC to 42 Hz
Nonlinearity: 0.2% of full scale
Cross Axis: $\pm 1\%$
Bandwidth: DC to 42 Hz
set by 151- coefficient FIR filter

Digitiser

Sampling rate: 100 SPS

Power

Supply Voltage: 12 VDC, 1.5 A regulated
Consumption: 8.1 W max at + 9 to + 18 VDC
5.7 W typical when the internal battery is fully charged
Autonomy: More than 6 h with internal 6 V lead-acid battery

Computer / Memory

Hardware: National Semiconductor Geode
266 MHz
128 MByte RAM
128 MByte Compact Flash
Optional up to 512 MByte
Memory: Approximately 1.5 days worth of 3-
component full-waveform data are stored
in volatile 80 Mbyte RAM Disk.
Event files are stored in the non-
volatile memory with capacity
approximately 5 MByte less than the full
Compact Flash capacity.
Operating System: Linux, Kernel 2.2.16
Data Format: miniSEED
optional ASCII or
CNSN 5 minute CA data

Timing

± 10 ms accuracy, assuming reasonable
access to NTP-servers

Communication

Data Retrieval: Via SCP, FTP or TFTP
Total Data Time Lag: 690 ± 10 ms, due to FIR filter length
Internet security: Password protection for FTP access,
secure shell (SSH) access for
maintenance
Connector: 10-pin Bayonet connector
cable pig-tail with break-outs for RJ-45
and DC power supply, DB-9 serial
provided on installation cable

Indicators

Green: Diagnostic LED
Yellow: Ethernet activity LED

Environment/Housing

Housing Type: ABS enclosure with aluminium lid
Housing Size: 220 x 180 x 110 mm
Weight: 3.25 kg incl. battery
Temperature Range: -20 to 50 °C (operating)
Sensitivity less than $\pm 0.5\%$ change over
the operating temperature
Orientation: To be installed level
Mounting: Optional single bolt, surface mount