

ADU-08e

24/32-Bit Geophysical EM Measurement System

As in seismics, technological advances in electromagnetic recording systems have emphasised the requirement for simultaneous multi-channel data acquisition.

The Multi-Method Network Geophysical Measurement System GMS-08e is the result of over 40 years of metronix's experience in the design and manufacture of electromagnetic geophysical instruments. The electric and/or magnetic field sensors are connected directly to the ADU-08e (**A**nalog/**D**igital Signal **C**onditioning **U**nit), which is the core unit of this system. Multiple ADU-08e units can be connected to a network using simple, light-weight and inexpensive network cable or WiFi.

Each ADU-08e can be operated as a stand alone system, in a network or as part of an array in which each unit is synchronized by its in-built GPS clock.



ADU-08e

Features

- High data quality due to 24/32 Bit Analog/Digital conversion technology
- Can be operated as a stand alone or as a multi-channel network system when connecting multiple ADU-08e in a Local Area Network (LAN, WiFi)
- Multiple stand alone systems are synchronized with GPS clock accuracy
- Compatible with all metronix sensors
- Automatic unattended recording mode
- Automated system self check of ADU-08e and sensors during set up
- Automatic input offset compensation eliminates self potential of electrodes
- Realtime display of time series and spectra in online mode
- 12 V battery powered. Only a single battery is required for each ADU incl. sensors
- Compact, light-weight, ruggedized and waterproof instrument design
- Wide operating temperature range from -30°C to +50°C

Hardware

The ADU-08e electronics are housed in a small waterproof box only 7kg in weight. It comprises the complete circuitry for analog signal conditioning, 24/32 Bit A/D conversion and data storage. A very precise GPS-controlled time base guarantees synchronous recordings even under difficult GPS reception conditions.

The ADU contains 6 slots which can be equipped with different types of A/D converter boards. The A/D converter type broadband is optimized for lower frequency recordings in a range from DC up to 1024 Hz with 32 bit precision whilst the signal range from 1 Hz up to 250 kHz is measured with 24 bit precision. The 6th slot can contain an autonomous 5 channel module: a fluxgate sensor can be connected for low-frequency sounding and induction coils cover the higher frequency range simultaneously.

Software

The ADU-08e has a built-in web server. All necessary setups to run a measurement are controlled by the web interface and can be accessed by any web browser; no software needs to be installed on your laptop or tablet.

Additionally the system can be controlled by easy to use Android / iOS mobile app.

The software ProcMT (free) performs standard and remote reference processing of the time series data using robust algorithms. Online processing inside the ADU-08e with unattended data publishing on the ADU's web server is available.

Using an external GPS controlled transmitter the ADU-08e provides CSAMT / CSEM recordings with real-time stacking.

Configuration Examples

Single Site Configuration

In this configuration a single ADU-08e runs either in a stand alone mode and records the data according to a time schedule pre-programmed on its internal flashdisk.

Multiple Site Configuration

In this configuration several ADU-08e systems are synchronized by their built-in GPS clocks, and they record the data synchronously. A typical application for this configuration is the Remote Reference method or Array Mapping. This arrangement is used for a grid with wide-spaced recording sites where cabling is impractical or cannot be handled economically.

Network Configuration

Multiple ADUs are connected to a network by cable or WiFi. A typical example for this configuration is E-MAP or field setups, where a close-spaced station grid is required.

ADU-08e data sheet

Sample rates	256 Hz to 524 kHz; lower 8, 64 Hz by online filtering
Number of channels	1 up to 10 per ADU-08e (5 broadband, 5 multi purpose)
Bands	Free choice of recording frequencies
A/D conversion	32 Bit (max. data rate 4096 samples/sec) LF mode 24 Bit (max. data rate 524,288 samples/sec) HF mode
Dynamic range	> 130 dB
System controller	32 bit embedded controller with 4 CPU cores, Linux® System
Storage media	Pluggable SD card 32GB, max. 128GB; USB devices
Test facilities	Automatic power up self test of all important system functions including sensors, and display of results on the instrument.
Calibration	Automatic calibration of all channels
E-field connector	input resistance > 10 MOhm, ODU G32KON-T06QP00-000 (ADU E socket) ODU S22KON-T06MPL0-4000 (E-Field cable plug)
H-field connector	input resistance 20 kOhm, socket ODU G32KON-T10QJ00-000 (ADU H socket) ODU S22KON-T10MJG0-7000 (H-Field cable plug)
Multipurpose connector (E/H)	input resistance > 10 MOhm (E), 20 kOhm (H) ODU G33KON-T30QF00-000 (ADU socket) ODU S23KOC-T30MFG0-7000 (cable plug)
Network connection	standard 1 Gbit Twisted Pair RJ45, USB 2.0, WiFi
Synchronization	GPS + GLONASS + Galileo clock +/- 30ns to satellite reference. Station position is also determined and stored
Interfaces	network, magnetometers, E-field lines, 3 battery inputs, GPS antenna, USB, WiFi
Case	ruggedized, waterproof polycarbonate case
Weight	appr. 7 kg
External dimensions	400 x 330 x 170 mm
Power consumption	Approx. 5W @ max. sample rate 4096Hz (LF mode) Approx. 12W @ higher sampling rates (HF-mode)
Operating temperature range	-30°C to + 50°C ambient temperature

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