metronix

Product Memo

ADU-07e

24-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-07 is the result of over 35 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-07e (**A**nalog/**D**igital Signal Conditioning **U**nit), which is the core unit of this system. Multiple ADU-07e units can be connected to a network using simple, light-weight and inexpensive network cable or Wireless LAN.
Each ADU-07e 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-07e

Features

- High data quality due to 24 Bit Analog/Digital conversion technology
- Can be operated as a stand alone or as a multi-channel network system when connecting multiple ADU-07e in a Local Area Network (LAN, WLAN)
- 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-07e 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 water-proof instrument design
- Wide operating temperature range from -40°C to +60°C

Hardware

The ADU-07e electronics are housed in a small waterproof box only 7kg in weight. It comprises the complete circuitry for analog signal conditioning, 24 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-07e can be tailored according to the user´s requirements.
The ADU contains 10 slots which can be equipped with different types of A/D converter boards. A/D converter Type L is optimized for lower frequency recordings in a range from DC up to 1 kHz whilst the second type H is optimized for high frequency recordings in a signal range from 1Hz up to 250kHz. For instance a broadband standard ADU-07e is equipped with 5 low-frequency and 5 high-frequency A/D converter modules. It is possible to obtain high-frequency soundings during running low-frequency recording. Different types of sensors can be connected to the ADU and can even be operated in parallel. Example: A fluxgate sensor is connected for low-frequency sounding and induction coils cover the higher frequency range simultaneously.

APEX TOOL GROUP

Software

The ADU-07e 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 PDA. The software MAPROS (free) performs standard and remote reference processing of the time series data using robust algorithms. Online processing inside the ADU-07e with unattended data publishing on the ADU's web server is available.
Using an external GPS controlled transmitter the ADU-07e provides CSAMT/CSEMM recordings with real-time stacking.

Configuration Examples

Single Site Configuration
In this configuration a single ADU-07e runs either in a stand alone mode and records the data according to a time schedule pre-programmed on its internal flashdisk. For highest performance an external computer can control the ADU via the USB 2.0 interface.
Multiple Site Configuration
In this configuration several ADU-07e 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 WLAN. A typical example for this configuration is E-MAP or field setups, where a close-spaced station grid is required.

ADU-07e data sheet

Frequency range	DC to 250 kHz (*with LF & HF boards*)
Number of channels	1 up to 10 per ADU-07e
Bands	3 Bands (LF DC-512Hz; MF DC-16kHz; HF 1 Hz-250kHz) Sub-bands are created by digital filtering Both bands can be recorded simultaneously
A/D conversion	24 Bit (max. data rate max. 2048 samples/sec) LF Board 24 Bit (max. data rate max. 65536 samples/sec) MF Board 24 Bit (max. data rate 524,288 samples/sec) HF Board
Dynamic range	> 130 dB
System controller	32 bit embedded controller, Linux
Storage media	Internal µSD up to 32 GB or more, USB devices
Test facilities	Automatic power up self test of all important system functions including sensors and display of result on the instrument. Automatic creation of logfile
Calibration	Automatic calibration
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 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 100 Mbit Twisted Pair, USB 1.1, 2.0, (wireless/Bluetooth)
Synchronization	GPS clock +/- 30ns rms to satellite reference. Station position is also determined and stored
Interfaces	network, magnetometers, E-field lines 2 battery inputs, GPS antenna, USB, wireless, Bluetooth
Case	ruggedized, waterproof polycarbonate case
Weight	appr. 7.1 kg
External dimensions	400 x 330 x 170 mm
Power consumption	appr. 3-10 W (LF); 12 -20 W HF @ 64 kHz up to 524 kHz sample rate
Operating temperature range	-40°C to + 60°C (with flash disk)

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