



## **Low power data acquisition unit for autonomous geophysical instrumentation**

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The development of an autonomous instrumentation for field research is always a challenge which needs knowledge and application of recent advances in technology and components production. Using this information a super-low power, low-cost, stand-alone GPS time synchronized data acquisition unit was created. It comprises an extended utilization of the microcontroller modules and peripherals and special firmware with flexible PLL parameters. The present report is devoted to a discussion of synchronization mode of data sampling in autonomous field instruments with possibility of GPS random breaks. In the result the achieved sampling timing accuracy is better than  $\pm 60$  ns without phase jumps and distortion plus fixed shift depending on the sample rate. The main application of the system is for simultaneous measurement of several channels from magnetic and electric sensors in field conditions for magneto-telluric instruments. First utilization of this system was in the new developed versions of LEMI-026 magnetometer and LEMI-423 field station, where it was applied for digitizing of up to 6 analogue channels with 32-bit resolution in the range  $\pm 2.5$ V, digital filtration (LPF) and maximum sample rate 4kS/s. It is ready for record in 5 minutes after being turned on. Recently, this system was successfully utilized with the drone-portable magnetometers destined for the search of metallic objects, like UXO, in rural areas, research of engineering underground structure and for mapping ore bodies. The successful tests of drone-portable system were made and tests results are also discussed.