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Seismic Noise Analysis with Low-Cost Variable Gain Recorder

Serrano I.S.P. ✉, Vera C.S.A. ✉, Leon J.S.P. ✉, Baculima R.C.G. ✉

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^a Universidad de Cuenca Red Sismica Del Austro, Universidad de Cuenca, Red Sismica Del Austro, Cuenca, Ecuador

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Abstract

This paper presents the design and implementation of a seismic noise analysis recorder. Specifically, the system has three main blocks. A configurable gain amplifier, a microcontroller for data acquisition and storage, and finally, both a GPS module and a real-time clock in order to ensure the time synchronization. With regard to the device management, a mobile application was implemented which provides users with tools to analyze data in real time as well to configure operational parameters (i.e., the sampling frequency, the gain of the amplifier and the recording start time). Regarding the architecture evaluation a set of experiments were designed in order to determine the intrinsic noise of the equipment and for verifying the proper operation on the continuous recording system. Finally, results were thoroughly analyzed in both temporal and the frequency domain with respect to data captured with a certified commercial equipment. The comparison carried out reveals a percentage error with a maximum of 7.68% and 3.40% for the time and frequency analysis, respectively. Consequently, the proposed system represents a reliable solution and low-cost alternative which contributes for the acquisition and analysis of seismic data © 2003-2012 IEEE.

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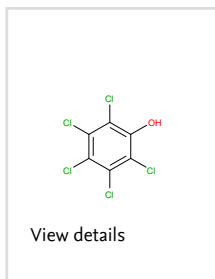
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