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# Wearable biopotential measurement using the TI ADS1198 analog front-end and textile electrodes

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T. Pereira ; H. Carvalho ; A.P. Catarino ; M.J. Dias ; O. Postolache ; P.S. Girão    All Authors

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**Abstract:** The development of mobile systems for monitoring bioelectric signals outside a hospital environment involves many challenges that do not arise when it is in a controlled environment, like a hospital. The dimensions of these systems are an important factor to consider in order to facilitate their use without interfering with the daily activities of individuals. The purpose of this work is the implementation of a single-supply battery-powered, low power ECG/EMG signal monitoring system based on the ADS1198 Analog Front-End from Texas Instruments. The system was designed to acquire ECG signals from three electrodes using the integrated Right-Leg-Drive (RLD) circuit from the ADS1198. The developed analog front-end was connected for testing purposes through the SPI interface to a NI-USB 8451 board and signals were acquired using LabVIEW. The circuit was tested in several situations and proved to provide high quality signals using textile integrated electrodes and conventional disposable gel electrodes.

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I Introduction

The main objective of this work is the evaluation of the requirements and performance of the ADS119x/129x as a multichannel three-lead Electrocardiography/Electromyography (ECG/EMG) measurement device for etextile applications. In particular, the acquisition of ECG and multiple EMG signals using wearable electrodes is aimed for. The ADS119x/129x family provides up to 8 channels of three-lead ECG/EMG acquisition, being thus an interesting option for the application in hand. However, this chip has been introduced to the market very recently and few works have reported on its application. In this work, an evaluation of its performance and requirements in terms of external circuitry for a battery-powered application is examined to assess its potential as a conditioning chip for e-textile applications such as the Bioswim instrumented swimsuit [1] [2] or other EMG/ECG monitoring applications[3] [4].

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