

A13-061

An ECG Signal Acquisition and Data Compression System Applied in a Portable Smart Device

適用於手持式智慧型裝置之心電訊號擷取與資料壓縮系統

作品摘要 Abstract

本設計提出一可應用於遠距醫療照護之無線生理訊號感測系統，透過電極貼片量測人體產生的心電訊號，經藍芽傳輸即時呈現於個人智慧型行動裝置上，亦或透過無線傳輸系統傳送至遠距醫療照護系統之雲端資料庫，便於監測及掌握個人生理訊號狀態。

本設計之心電訊號擷取與資料壓縮系統，其技術與特色總結如下：

- 以市售IC自行研製前端心電訊號讀取電路（Read-out circuit）與類比數位轉換電路（ADC circuit）。
- 開發新穎高壓縮比與高品質分數之失真/無失真資料壓縮演算法。
- 自行研製高效能傅立葉轉換晶片，並將其整合至DE2-115平台，完成軟硬體共同設計與功能驗證。
- 透過藍芽無線傳輸進行Android智慧型裝置的溝通與系統建置，及其APP介面設計。
- 系統內建OFDM，可使信號在傳輸過程中避免干擾造成資料受損。

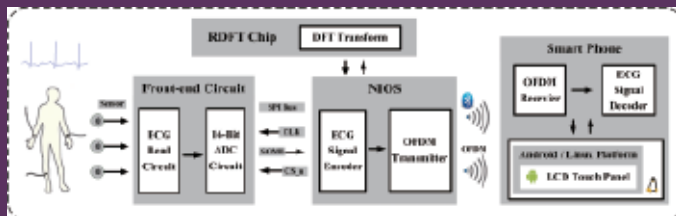


圖1 > 心電訊號擷取與資料壓縮系統架構圖

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The proposed design presents a wireless physiological signal sensing system applied for telehealth system and telemedicine. Through wet electrodes, front-end readout circuit, we can monitor human's real-time ECG signal. The acquisition signal is wirelessly transmitted to a smart and portable device (or a cloud server) by Bluetooth (or internet). The proposed design is very useful for healthcare taker to obtain patient's physiological information and situation. The feature of the proposed design can be summarized as follows:

- Use ready-made IC to develop the front-end readout circuit (included an ADC component).
- Develop high-compressing-ratio and high-quality-score compression algorithms included lossy and lossless compression methods.
- The proposed high-performance DFT chip is integrated with a DE2-115 platform, and the verification of hardware and software co-design is successful.
- Design an APP for a smart device communicated with the proposed acquisition circuit by Bluetooth.
- The proposed acquisition circuit embedded the OFDM design is helpful to avoid the data loss because of channel interference during the period of data transmission.

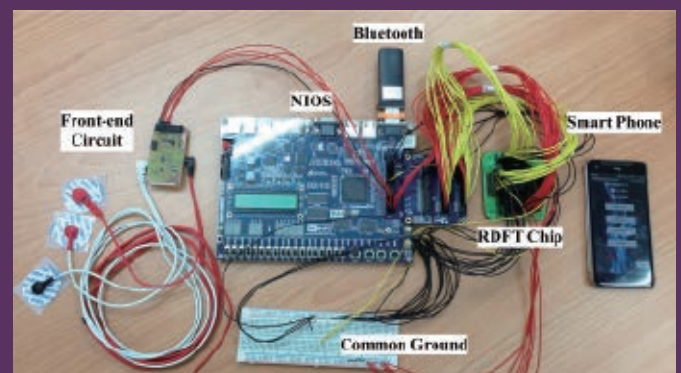


圖2 > 心電訊號擷取與資料壓縮系統實體圖