

---

## **Design and implementing a microcontroller based smart ECG adapter for healthcare**

Y.S.P. Weerasinghe <sup>1\*</sup>, G.D. Nanayakkara <sup>2</sup> and M.W.P. Maduranga <sup>1</sup>

<sup>1</sup>*Department of Electronic and Telecommunication, University of Moratuwa, Sri Lanka.*

<sup>2</sup>*Institute of Technology, University of Moratuwa, Sri Lanka.*

Electrocardiography (ECG) has a significant place in diagnosis for giving medical treatment especially for patients who are suffering from heart ailments. In Sri Lanka, the government has provided facilities to obtain ECG reports for free of charge. But this facility is not enough due to the enormous number of patients in government hospitals and takes considerable time per patient. Most of the time patients seek assistance of private medical centres. Also the hospitals in remote areas have lack of facilities, and then the patients have to get reports from private Medical centres with paying exorbitant fees. To minimize this problem, we have designed and implemented a low cost smart microcontroller based ECG adaptor. This has been implemented using a Peripheral Interface Controller (PIC) microcontroller as the main controller to acquire the ECG signals and display them on a Personal computer (PC) or Laptop. An ECG monitoring software was implemented as a part of this research in order to monitor ECG signal via a RS-232 interface. In addition this ECG monitoring software is capable of saving the previous records and comparing them with the current record. This will help Cardiologists to study any changes to the heart conditions of the patient. Also, printed paper is not required to keep ECG records. It helps Cardiologists to determine the patient's condition even in rural areas and it is possible to transmit them via a mobile network to consultants. The resultant ECG reports were verified using a standard ECG machine (Cardiofax ECG6501/6511.01 machine) and also verified by the Principal of school of Cardiography, in the Cardiology Unit National hospital, Colombo.

**Key words:** Electrocardiography (ECG), Cardiology, Microcontroller, Peripheral Interface Controller (PIC).

**Acknowledgements:** Our special thanks go to Mrs. Kumudu Liyangma Principal, School of Cardiography Cardiology unit National Hospital Colombo, the person who help us to verify the results.

\*yspraveenw@gmail.com