# **Transferring an ECG Signal Using GSM Technology**

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### Introduction

Nowadays, there are many growing attempts and achievements to elevate efforts in biomedical field. Best achievements are those to save human life in the first concern.

It is in fact that people are in a growing need of emergency care before being moved to hospitals or health centers. Therefore, patients may suffer from the delay of being aided because of there far place from health centers.

Having the patients' ECG available with the emergency physician helps the emergency doctor in the ambulance to correctly deal with the patient based on the preliminary diagnoses.

This requires the patient's ECG to be transmitted in a compact or portable way to be diagnosed remotely.

#### **Project Objectives**

1. To present a better health service for the patient especially for the critical cases.

2. Proposed an application that used mainly the ECG module, PIC microcontroller, and two GSM's modules to transfer ECG from patient's location to the assigned physician remotely hence facilitate monitoring of at-risk, at-home heart patients at anytime.

#### **Results**

1. Connections between the project components to transmit an ECG signal have been successfully established. The transmission from patient to a doctor is accomplished successfully during 12 seconds using GSM technique over GPRS.

2. Building an application on doctor PC to receive the ECG digital signal and reconvert it to analog signal.

3. Receiving the ECG signal to the doctor PC as it has been generated.

#### **Proposed project**

This project is designed for transferring an ECG of a patient to the specialist doctor to diagnose the patient's case as soon as possible, especially for those who suffer from heart disease.

Transmitting the operation is achieved by GSM network over GPRS as shown in figure1.



Figure 1: Wireless ECG System

#### **Project Block Diagram**

Wireless ECG system is divided into two parts: the first part is placed near the patient. It consists of the ECG module ,PIC microcontroller and GSM module.



Figure 2: Project Block Diagram

The second part is placed in the hospital. This part consists of a peer GSM module connected serially with the PC as shown in figure 2. The sub modules as shown above, consist of:

•ECG and PIC Module

•Communication Module •Medical Center Module: GSM modem (receiver and PC)

## System Design and Implementation

After reading ECG signal from the patient, signal will be transmitted to the PIC microcontroller to make ADC operation, then the digital packets will be transmitted to GSM module. GSM module receives the digital packets to send them to the other GSM module in the hospital, then transmits them to the doctor PC as depicted in figure 3.



Figure 3: PIC Microcontroller Function Steps

The application on PC is responsible for receiving the digital packets then reconverts them to analog signal. To be displayed on the screen and then stored in the patient's database. The Doctor has a software application which is used to receive ECG signal from patients. Figure 4 shows the received (reconverted) ECG for patients.

