Electrogastrography- A Non-Invasive technique

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Abstract – EGG is abnormal, it confirms that the problem probably is with the stomach's muscles or the nerves that control the muscles.

EGG is a non-invasive method for the recording of gastric myoelectrical activity that controls gastric motility. Abnormality in EGG arises due to recurrent nausea, vomiting, dyspepsia, stomach ulcer, cyclic vomiting syndrome, etc which signals that the stomach is not emptying food normally. If the

EGG is similar to an electrocardiogram of the heart. It is the recording of the electrical signals that travel through the muscles of the stomach and control the muscle's contraction. EGG used when there is a suspicion that the muscles of the stomach or the nerves controlling the muscles are not working normally.

Recording is done by placing the electrode cutaneously over the stomach and the electrical signals from the stomach's muscles are sensed by the electrode and recorded on a computer for analysis.

In normal individuals, EGG is a regular electrical rhythm generated by the muscles of the stomach and the strength of the electrical current increases after the meal. In patients with abnormalities of the muscles or nerves of the stomach, the rhythm often is irregular or there is no post-meal increase in electric power.

Keywords: Non-Invasive, myoelectric, ECG

I.   INTRODUCTION

This project explores the possibility of using a potable medical monitoring system for GASTRIC PATIENTS. This system is used acquired the important parameters which are essential for medical practitioners while monitoring the patients. Data is extracted using simple AgAgCl2 electrodes. This system will be low cost and user friendly. In this system simple instrumentation amplifier with proper bandwidth filter is used to get proper amplified output. This output can be easily interfaced to computer, DSO, or any graphical gadget.

II. SYSTEM OVERVIEW

Our systems consists of a sensor that catches signals from the body (abdomin) which is then given to a RC filter that cancels any type of noise over the cut off frequency set as per the design. The gain is adjusted by he help of pot. This noise free signal is given to microcontroller ,here we are using pic 16f877a whichn is 40 pin microcontroller used o convert analog signal to digital so that it is easily understood by the computer. Once signal is converted to digital form we can represent it on Labview/MatLab/Scilab , here we use virtual oscilloscope for displaying the output.
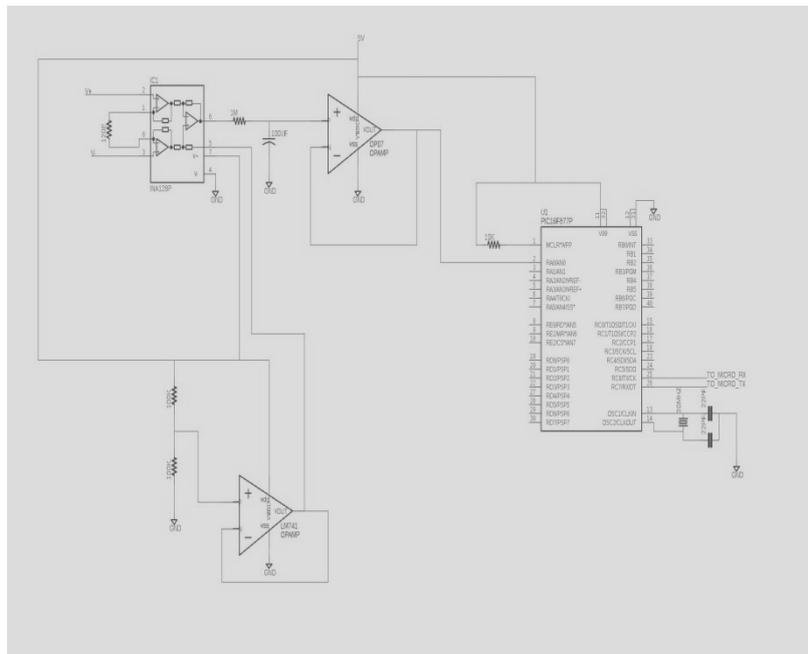
III. SYSTEM HARDWARE

•	**pic16f877a**: The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many pic microcontroller projects. PIC16F877A also have many applications in digital electronics circuits.

•	**Instrumentation amplifier:** Instrumentation amplifier is a kind of differential amplifier with additional input buffer stages. The addition of input buffer stages makes it easy to match (impedance matching) the amplifier with the preceding stage. Instrumentation are commonly used in industrial test and measurement application. The instrumentation amplifier also has some useful features like low offset voltage, high CMRR (Common mode rejection ratio), high input resistance, high gain etc. The circuit diagram of a typical instrumentation amplifier using opamp is shown below.
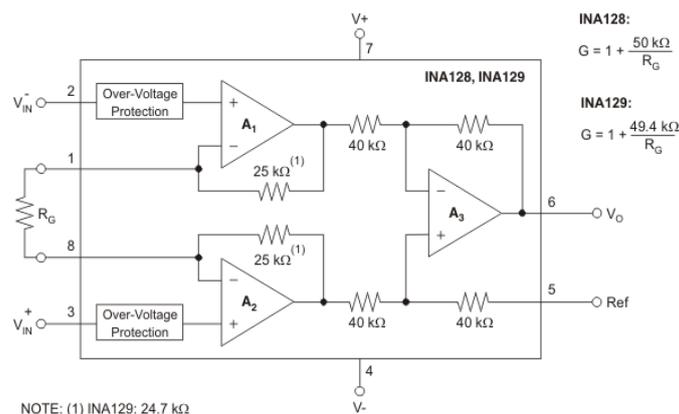

•	**INA128:** The INA128 and INA129 are low-power, general purpose instrumentation amplifiers offering excellent accuracy. The versatile 3-op amp design and small size make these amplifiers ideal for a wide range of applications. Current-feedback input circuitry provides wide bandwidth even at high gain (200 kHz at G = 100).

A single external resistor sets any gain from 1 to 10,000. The INA128 provides an industry-standard gain equation; the INA129 gain equation is compatible with the AD620.

- **Features:**

Low Offset Voltage: 50 µV Maximum
Low Drift: 0.5 µV/°C Maximum
Low Input Bias Current: 5 nA Maximum
High CMR: 120 dB minimum
Inputs Protected to ±40 V
Wide Supply Range: ±2.25 V to ±18 V

Electrode Positioning
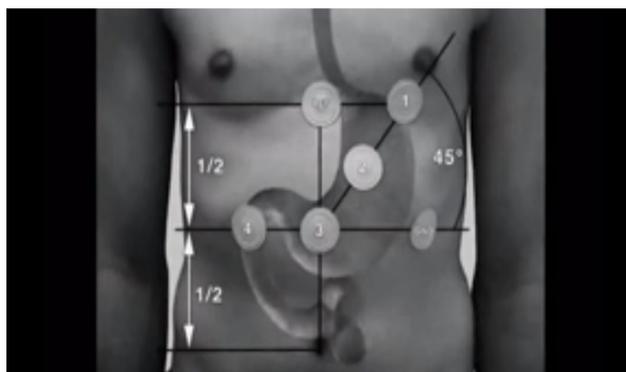
IV. SYSTEM SOFTWARE

We have programmed the microcontroller according to c language as it is easier. The following is the code :

```
#define _XTAL_FREQ 8000000
#include <xc.h>
#include <pic16f877a.h>
#include "uart.h"
// BEGIN CONFIG
#pragma config FOSC = HS
#pragma config WDTE = OFF
#pragma config PWRTE = OFF
#pragma config BOREN = ON
#pragma config LVP = OFF
#pragma config CPD = OFF
#pragma config WRT = OFF
#pragma config CP = OFF
//END CONFIG
void main()
{
TRISB = 0xFF; //PORTA as Input
nRAPU = 0;
UART_Init(9600);
)
do
{
UART_Write(PORTA);
```

}
while(1);

V. CONCLUSION

The proposed paper designs and implements a non invasive method by which we can capture stomach or abdomen signals which can be further used for diagnosis and curing be a certified professional doctor. This system will be less costly compared to big scanning machine an will be handy.

REFERENCES

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