CHIDIYA-UDD

By: Pradeep Kumar

ACKNOWLEDGEMENT

With profound respect and gratitude we take the opportunity to convey our sincere thanks to Prof. Dhananjay V. Gadre for introducing us to such practicality of the subject and providing valuable guidance and resources leading to the accomplishment of the project titled as

“ CHIDIYA UDD” based on MSP430 Microproccessor.

Special thanks to our seniors and peers at CEDT for their constant support and guidance.

INTRODUCTION

CHIDIYA UDD is an electronic remake of the age old game using MSP-430 which otherwise does not require any physical objects for it to be played. This game consists of an Graphical LCD(Liquid Crystal Display) onto which the names of objects are displayed in a random manner and a touchpad is provided corresponding to the human player who after observing the displayed object's name on the Graphical LCD makes a quick decision whether the object flies or not.

If the object comes in the flying category, the player is supposed to lift off his finger from the touchpad immediately and if it comes in the flightless category, then the player has to maintain his finger steadily on the touchpad. The system analyzes the right and wrong moves and accordingly. If at any point the player doesn't respond correctly then the led given next to the touchpad begins to glow indicating the player has responded incorrectly and that marks the end of the game of the player.

The game ends with the points scored by the player displayed on the LCD in the end.

COMPONENTS REQUIRED:-

1). IC-MSP430-G2553

2). Resistors

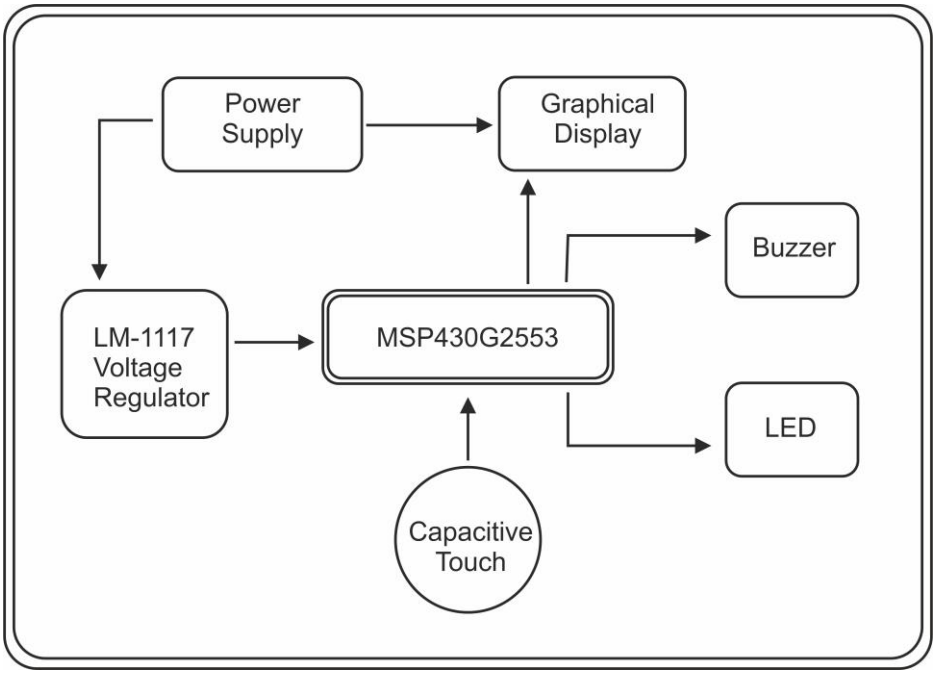
3). Capacitors

4). LED's

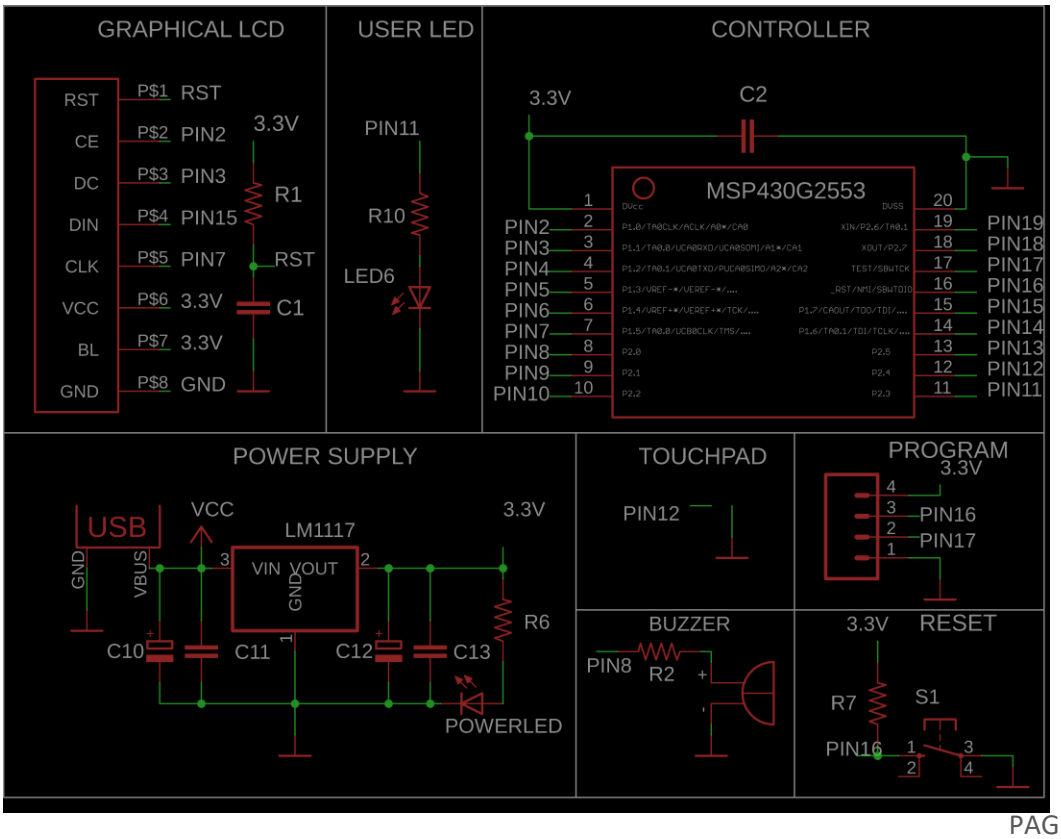
6).GRAPHICAL LCD

7). Capacitive Touchpad

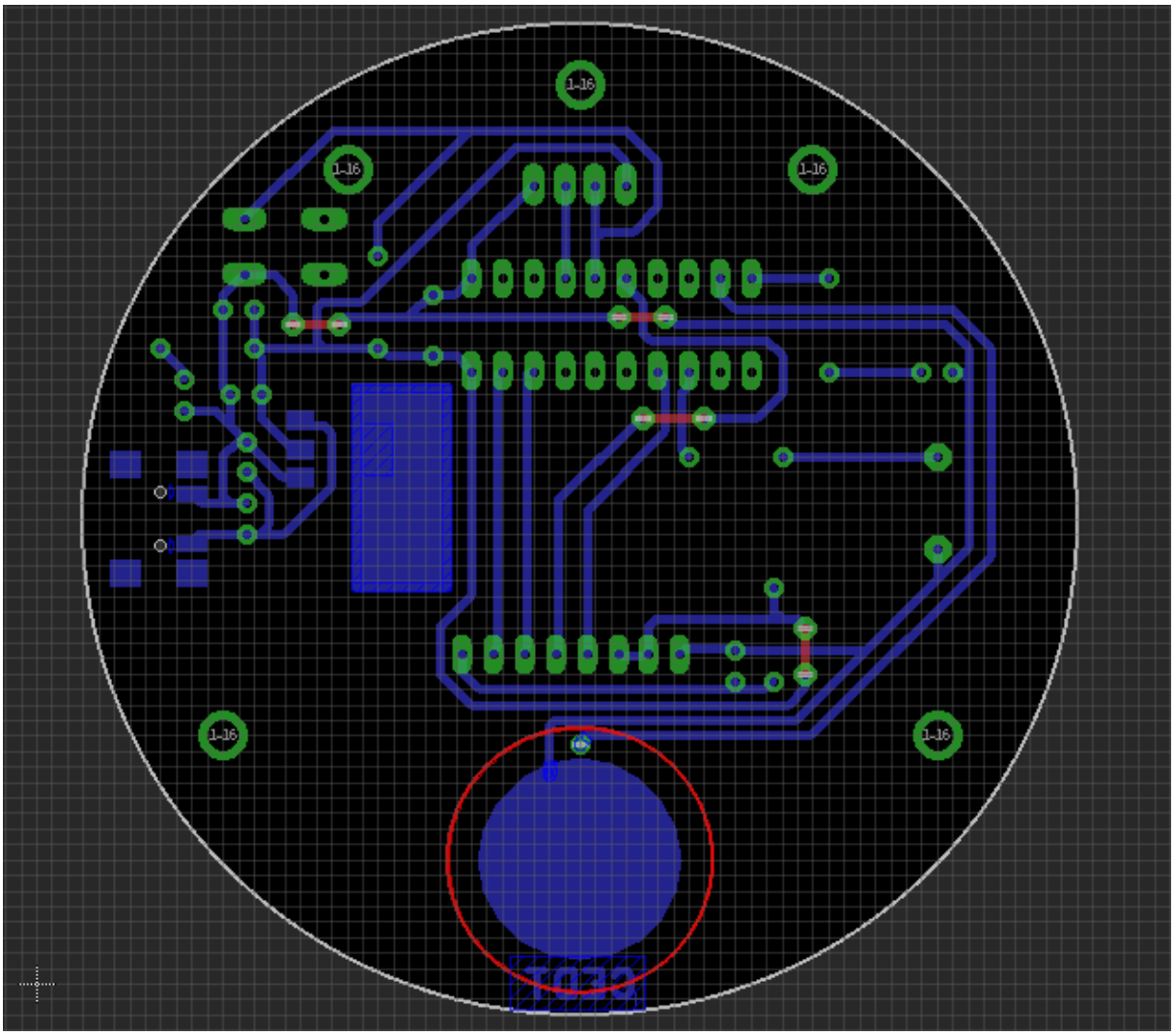
BLOCK DIAGRAM:-



SCHEMATIC OF THE PCB:



BOARD LAYOUT:



Project description

The Chidiya Ud game runs on MSP430G2553 microcontroller.

A micro USB connector has been used to power the board it provides 5V to the board which is fed into a 3.3V voltage regulator i.e LM1117

LM1117 provides 3.3V that is the operating voltage of the micro-controller MSP430G2553.

A crystal of 16Mhz has been used as a clock. On powering the board the LCD shows Welcome to CHIDIYA UD.

This screen is followed by the on screen instructions on how to play the game.

The game can be played by a single player at a time. This project comprises mainly of a graphical LCD screen, Power Supply Circuit, MSP-430 microcontroller, touchpad for user input, a buzzer and an LED which is used as output and user feedback.

The LCD would display the name of the creature or object under test the person playing the game would have to react to the word displayed on the screen by deciding whether the object can fly or not as was done in the traditional game .

The first word to be displayed on the LCD is chidiya ud, as is done when the game is played in the traditional method i.e. the player who calls out the names begins by calling out names in the order chidiya ud-tota ud –maina ud …. so on , thereafter we get random words in the game.

The finger should remain on the touchpad as long as the player has to input that the object is flightless.

Whereas the player has to immediately release the touchpad if the player has to provide an input that the object name shown is capable of flying.

Each new word being displayed on the screen is preceded by a beep sound from the buzzer that is incorporated on the board.

It acts as a feedback and warning to the user that the next word is about to be displayed on the screen and also imply that the user should get ready to react accordingly.

It gives feedback to the user in two modes it complements the visual feedback by giving an auditory feedback and secondly it helps to attract the attention of the player to the upcoming word and helps in engaging the player in the game so that no time is lost while giving response.

So what basically needs to be done by the player is that when a player sees the name of the creature/object on the screen, the player decides whether not the object flies. If according to him it flies the player releases the touchpad and if it doesn't fly the player lets the finger rest on the touchpad.

Now this display of names occurs randomly and every name is displayed after 2 seconds. So the player effectively gets approximately 2 sec to judge whether the player should fly it or not. The input given by the player on the touchpad is analyzed by the microprocessor and accordingly his score is incremented by one if the player makes a correct move.

For the player it becomes a challenge because this game basically puts his visuo-auditory and motor skills to the test by competing with a computer and the player plays to make a high score with which he can challenge other people.

Working of the Capacitive Touchpad:

There are two ways by which we can operate the capacitve touchpad which are enlisted below:

1. **Oscillator-Based Capacitive Measurement.**
2. **Resistor-Based Capacitive Measurement.**

Oscillator-Based Capacitive Measurement:

a simple relaxation oscillator can be created using the MSP430's onchip comparator and the capacitive sensor as the tuning element. Any change in capacitance of the sensor corresponds to a change in frequency which can be measured using the internal Timer_A hardware of the MSP430.

$$f_{osc} = 1/[1.386 \times RC \times CSENSOR]$$

Capacitve sensor is not ideal and has some series resistance also the parasitic capacitance gets added up too and it forms a network

in this case the time interval is fixed so there are always a limited no of charging and discharging cycles in a fixed gate time

so the MSP charges and discharges the capacitor continuously the no of oscillations is fixed

But when the Capacitive sensor is touched the capacitance changes basically it increases and thus the charging and discharging time increases and as a result the frequency of oscillation decreases.

This generates an interrupt which is detected via the MSP and thus touch is detected.

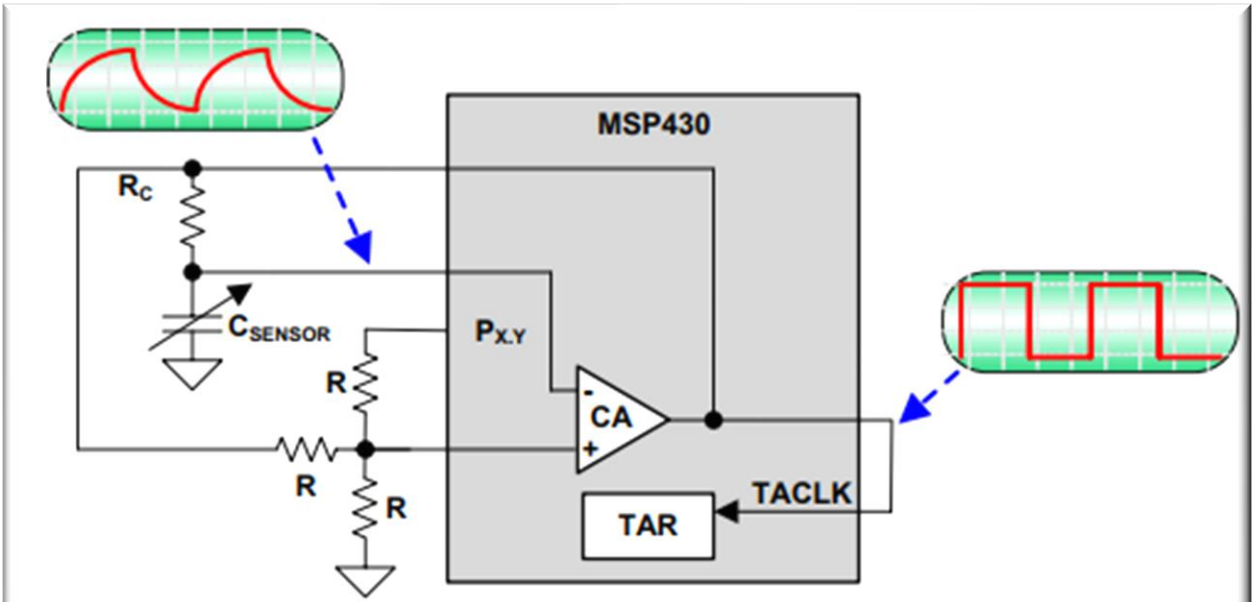


Figure 7. Basic Capacitive-Dependent Relaxation Oscillator

Resistor-Based Capacitive Measurement:

The second methodology to be described uses an external resistor to charge or discharge the given capacitive sensor.

Using the port pins of the MSP430 to charge or discharge the sensor cap, the internal Timer_A can be used to measure the corresponding charge or discharge time.

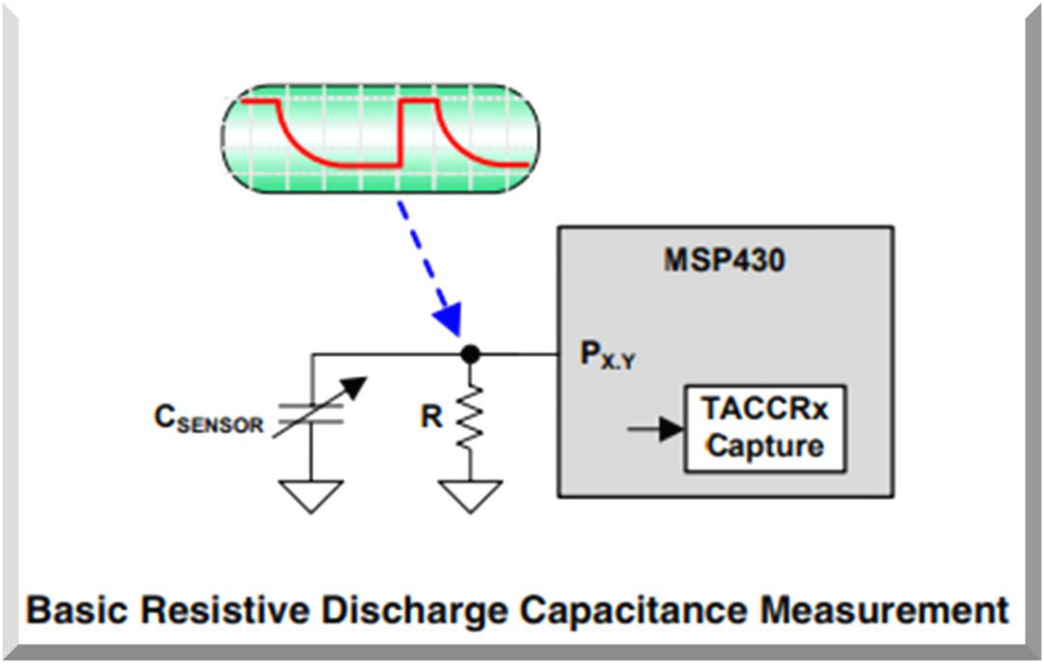
Given a fixed external resistance to provide the charge/discharge path, the capacitance of the sensor can be measured.

Now the MSP no. peaks is fixed (say for example 1000)

when not touched the time for 1000 peaks is a of a particular value say ‘t’

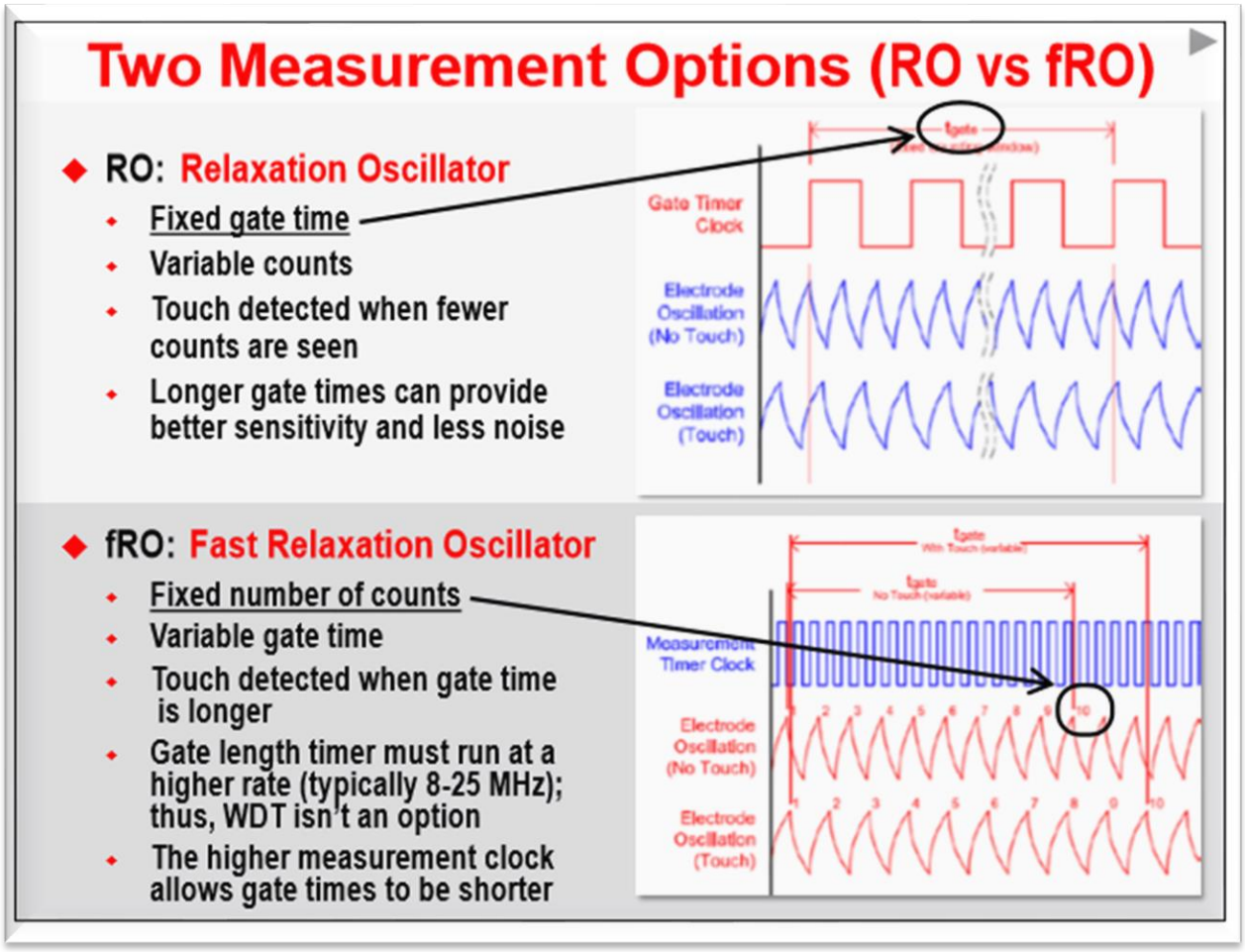
when touched the time for 1000 peaks is increased as the capacitance is increased and thus the charging and discharging time is increased.

Typically the series resistance used here is of the order of 5 Mohm. And the capacitance of the sensor when not touched is of the order of 10pF

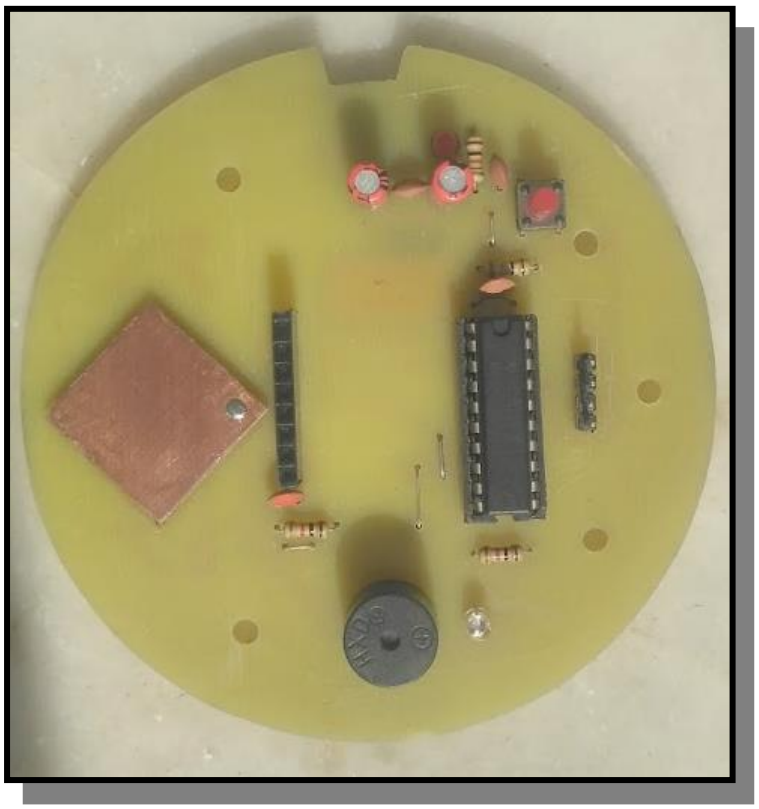


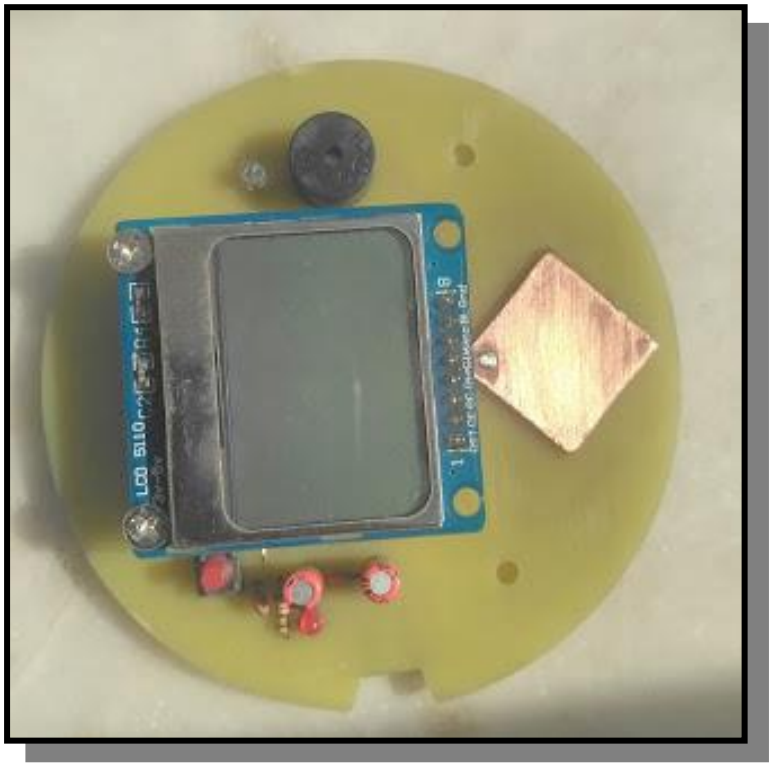
Basic Resistive Discharge Capacitance Measurement

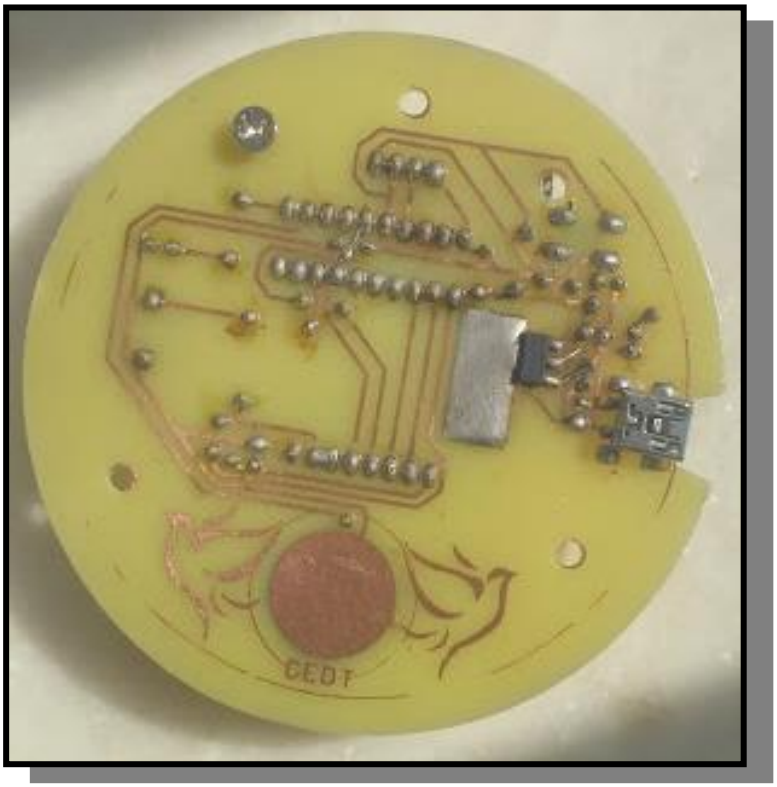
Brief Pictorial description of the two methods:



SOLDERED PCB :






CEDT