MAR BASELIOS INSTITUTE OF TECHNOLOGY AND SCIENCE

NELLIMATTOM, KOTHAMANGALAM

DEPARTMENT
OF
ELECTRONICS AND COMMUNICATION ENGINEERING

ECD334 MINIPROJECT

ZEROTH REVIEW

Guided by:

Prof. Teena Abraham, Asst Professor

Mr.Eldhose Joy, Tradesman

ECE DEPARTMENT

Presented by:

Jesald Tony
Richard S Arreckal
Sreejith VB

S6 ECE

OUTLINE

1. Introduction
2. Block Diagram
3. Circuit Diagram
4. Components Required with Specification
5. Advantages & Applications
6. Conclusion
7. References

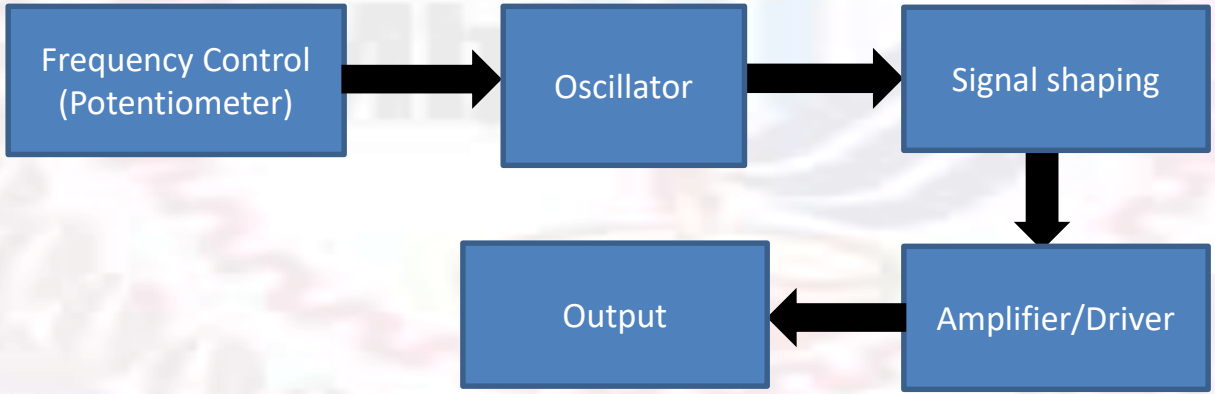
TOPIC NO: 1

“TUNABLE FREQUENCY GENERATOR USING MINIMAL ANALOG COMPONENTS”

1. INTRODUCTION

- Designed using commonly available components for simple construction and maintenance
- LM741 operational amplifiers generate stable and tunable oscillations
- Resistors, potentiometers, and capacitors enable frequency adjustment
- Zener and switching diodes ensure voltage control and signal stability
- 2N2222 and PN2907 transistors provide signal shaping and amplification
- Suitable as a low-cost signal source for educational and laboratory use
- Offers a clear demonstration of core analog electronics principles with minimal circuit complexity

2.BLOCK DIAGRAM



3. CIRCUIT DIAGRAM

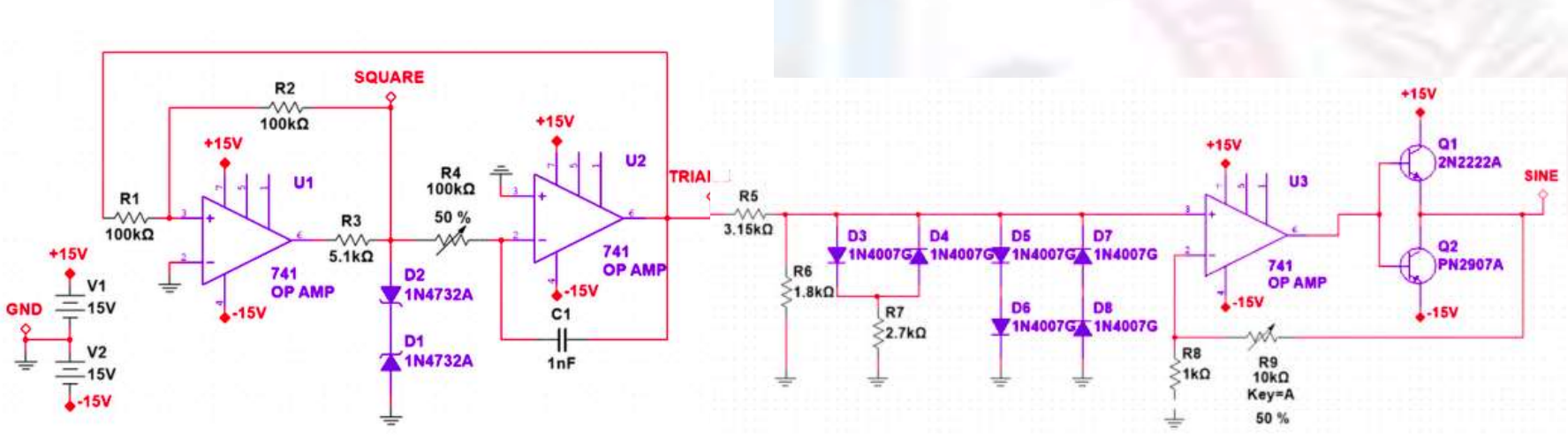


Fig 2: Tunnable frequency Generator

4. COMPONENTS REQUIRED

1. LM741 Operation Amplifer
2. 2N2222 NPN transistor
3. PN2907 PNP transistor
4. Zener diodes
5. Switching diodes
6. Potentiometer for frequency tuning
7. Capacitors

5. ADVANTAGES & APPLICATIONS

- Low-cost and simple design using minimal analog components suitable for educational use.
- Provides stable and tunable frequency output for testing and experimentation.
- Easy to understand and modify, making it ideal for learning core analog electronics concepts.
- Used for educational laboratory experiments and academic demonstrations.
- Applied in signal injection and testing of electronic circuits.
- Suitable for hobbyist projects and basic analog system evaluation.

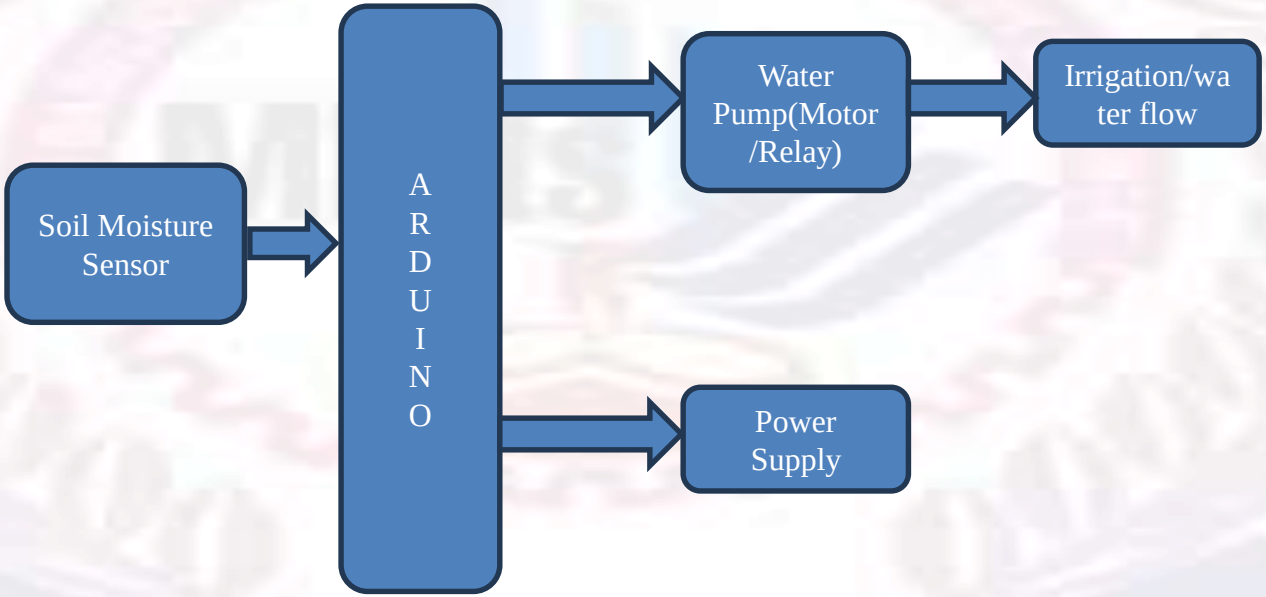
TOPIC NO:2

“SMART IRRIGATION SYSTEM USING ARDUINO”

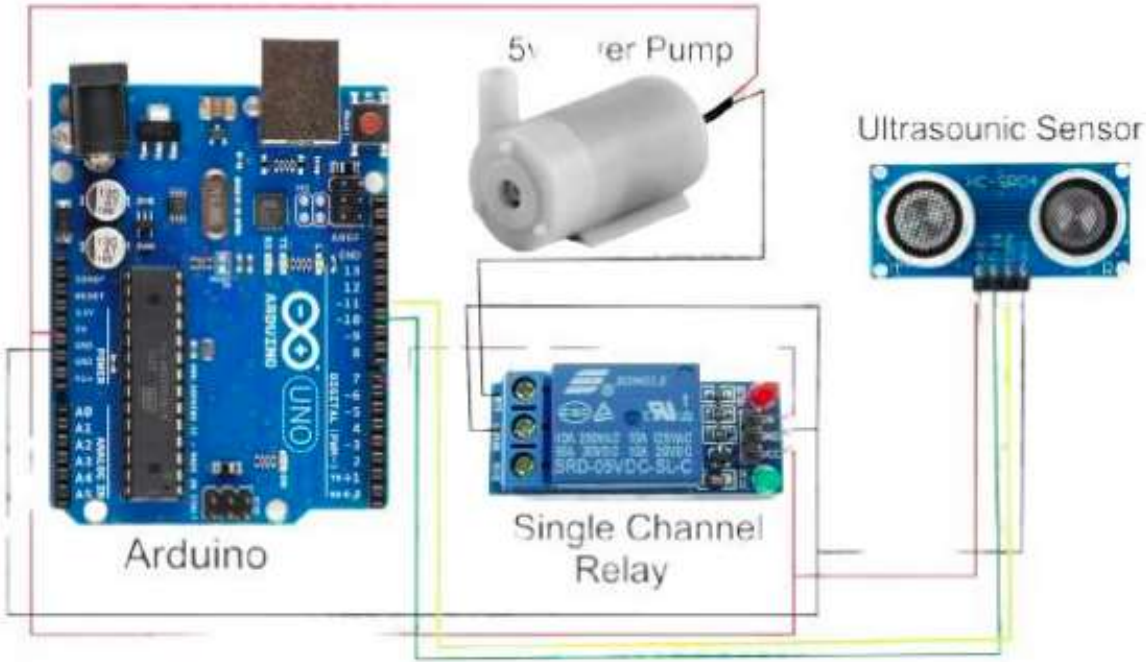
1. INTRODUCTION

- The increasing demand for efficient water management has made automation essential in modern irrigation practices.
- Traditional irrigation methods often lead to water wastage due to over-watering or delayed watering.
- This project presents a smart irrigation system that automatically monitors soil moisture levels in real time.
- An Arduino microcontroller processes sensor data to control a water pump based on predefined moisture thresholds.
- The system ensures optimal water usage while reducing manual effort and human intervention.
- By conserving water and supporting healthy plant growth, the system provides a cost-effective and sustainable solution for agriculture and home gardening.

2.BLOCK DIAGRAM



3.CIRCUIT DIAGRAM



4.COMPONENTS REQUIRED

1. Arduino microcontroller board
2. Soil moisture sensor
3. Water pump (DC pump)
4. Relay module or motor driver
5. External power supply or battery
6. Connecting wires
7. Breadboard or PCB
8. Water pipes or tubing

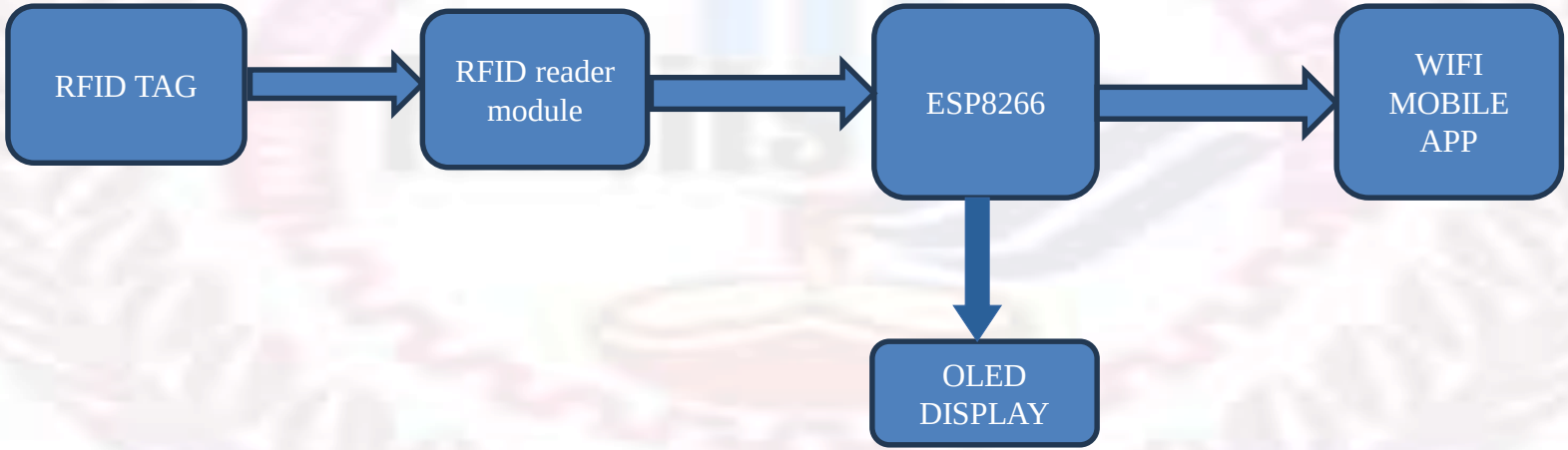
TOPIC NO:3

“SMART SHOPPING CART SYSTEM”

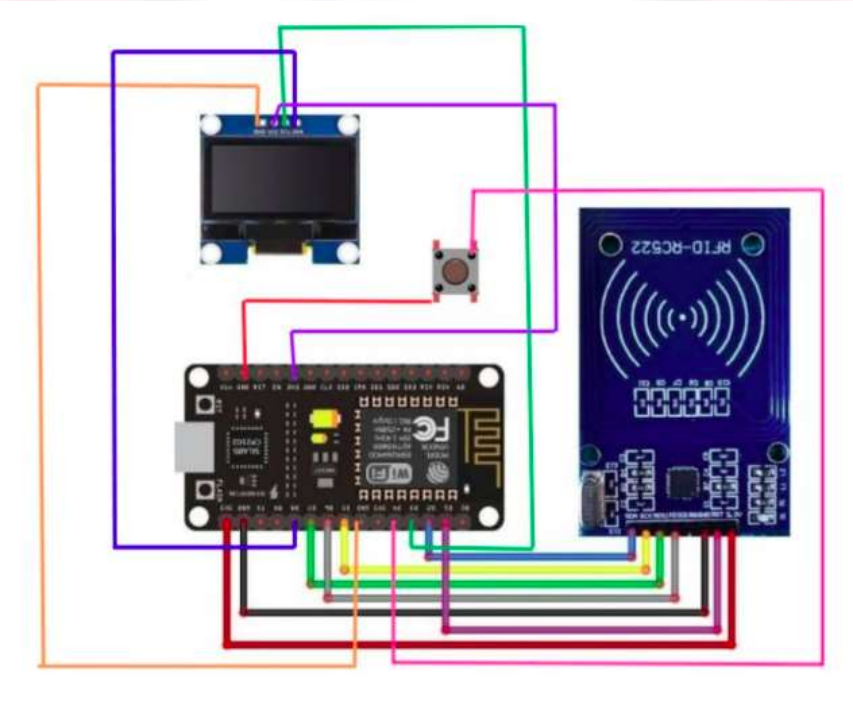
1. INTRODUCTION

- The smart shopping cart system is designed to automate item detection and billing in retail environments.
- The system uses an ESP8266 microcontroller along with an RC522 RFID reader to scan RFID-tagged products.
- Scanned item details such as name, price, and wallet balance are displayed on an OLED screen.
- A running list of purchased items is maintained for accurate and transparent billing.
- The Blynk application enables remote monitoring and access to shopping data.
- This system reduces manual effort, minimizes checkout queues, and supports a smart cashless shopping experience.

2.BLOCK DIAGRAM



3.CIRCUIT DIAGRAM



4.COMPONENTS REQUIRED

1. ESP8266 microcontroller
2. RC522 RFID reader module
3. RFID tags
4. OLED display
5. Blynk mobile application
6. Power supply
7. Connecting wires
8. Breadboard or PCB

6. CONCLUSION

- The selected projects demonstrate the practical application of electronics, embedded systems, and automation concepts.
- Each project focuses on solving real-world problems using cost-effective and efficient technological solutions.
- The frequency generator emphasizes core analog electronics and signal generation fundamentals.
- The smart irrigation system highlights sensor-based automation and sustainable resource management.
- The smart shopping cart showcases the integration of IoT and embedded systems for smart retail solutions.
- Together, these projects reflect a balanced understanding of analog, digital, and IoT-based system design.

7. REFERENCES

- Sedra, A. S., & Smith, K. C., Microelectronic Circuits, Oxford University Press – Reference for analog oscillators and frequency generator concepts.
- Banzi, M., & Shiloh, M., Getting Started with Arduino, Maker Media – Reference for Arduino-based smart irrigation systems.
- Kumar, S., & Pande, R., "RFID Based Smart Shopping Cart System," International Journal of Engineering Research and Technology (IJERT) – Reference for RFID and IoT-enabled shopping cart systems.

THANK YOU