PMC TECH

Er. PERUMAL MANIMEKALAI POLYTECHNIC COLLEGE,

DEPARTMENT OF ELECTRONICS {ROBOTICS} ENGINEERING

JULY 2024 – APRL 2025 **NEWS LETTER** Volume: 01

AT A GLIMPSE

- Training Programme
- Industrial Visit
- Placements

Chief Editor

Head of Department Robotics Engg

Faculty coordinator

Singaravelan M / Lecturer

Student coordinator

Pavan Kumar G -3rd yr.

Madhu Kiran B -2nd yr.

Vinesh M-1st yr.

DIRECTOR MESSAGE

Er. Peurmal Manimekalai Polytechnic College is an institution dedicated to the comprehensive development of students, where our staff are carefully selected and trained to provide unwavering support to ensure students receive every possible assistance in their endeavors. Our students are encouraged to broaden their knowledge base and explore beyond the constraints of the syllabus. We are committed to becoming a Center of Excellence in all learning areas, and our continued success indicates that we are making significant strides towards achieving our goals.

PRINCIPAL MESSAGE

Er. Peurmal Manimekalai Polytechnic College continuously strives to impart quality education alongside high ethical and moral values, aiming to mould our students not only into successful Diploma Engineers but also into disciplined citizens of our nation. As it is said, "A dream does not become reality through magic. It takes sweat, determination, and hard work." We are honored to educate our students, and our goal is to assist each student in preparing for their life journey.

HOD MESSAGE

In the dynamic realm of electronics and robotics, our department continues to thrive on the principles of innovation, collaboration, and excellence. As we embark on this journey, let us remain steadfast in our commitment to pushing the boundaries of knowledge, creating socially responsible solutions, and preparing the next generation of trailblazers. Together, we will continue to shape the future through our relentless pursuit of technological advancement and our dedication to create a positive impact on society.

Vision of the Institution

PMC Tech Polytechnic College shall emerge as a premier Institute for valued added technical education coupled with Innovation, Incubation, Ethics and Professional values.

Mission of the Institution

To foster the professional competence through excellence in teaching and learning.
To nurture overall development of students by providing Quality Education & Training.
To provide innovative environment to learn, innovate and create new ideas for the betterment of oneself and society.

Vision of the Department

To develop Electronics (Robotics) Engineering diploma holders to meet the growing needs of industry and society.

Mission of the Department

To provide goal-oriented, quality-based and value-added education through state of art teaching & training method.
To provide Environment to promote practical knowledge on robotics to meet the needs of the industry and society.
To provide a platform to learn leadership, ethics and entrepreneurship experience among students for their sustained growth.

Programme Educational Objectives (PEOs)

Diploma Graduates of Electronics {Robotics} Engineering Program shall

PEO-1	Core competence – exhibit the knowledge in Mathematics, science, fundamentals if Mechanical, Electrical, Electronics and Computer Engineering to solve Engineering problems in Robotics.
PEO-2	Breadth – design and create novel products and solutions for real life problems.
PEO-3	Professionalism: Exhibits professional and ethical attitude, effective communication skills and teamwork over multidisciplinary areas.
PEO-4	Higher students and employability – succeed in industry / technical profession by creating an environmental of excellence and a higher order of ethics and a zeal for life-long learning.

QUALITY POLICY

PMC TECH is committed to create Quality professionals to meet the emerging industrial and social needs through

- Innovative Teaching
- Institution – Industry Interaction
- Placing faith in Human Values

WORDS OF WISDOM

"Success is not final, failure is not fatal: It is the courage to continue that counts."

- Winston Churchill

Mini project for final-year students based on PCB

Project Topic Name : 555 Timer IC using LED BLINK		
SI.NO	REG.NUMBER	NAME OF THE STUDENTS
1	23407422	Aravindkrishna.BA
2	23407438	Krithik Roshan.V.
3	23407438	Kunal .R
4	23407432	Hari Singh. M
5	23407462	Shashank .S
6	23407450	Pavan Kalyan .M
7	23407417	Ajay.K

Introduction

This project focuses on designing an LED blinking circuit using a 555 Timer IC in astable mode. The circuit generates a continuous square wave that turns the LED on and off at regular intervals. The PCB design ensures a compact and reliable implementation.

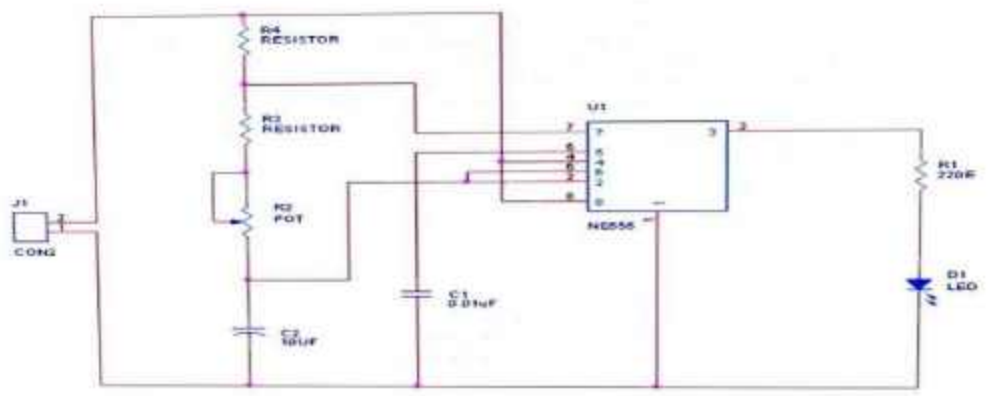
Components Required

- 555 Timer IC
- Resistors: 1kΩ, 10kΩ
- Capacitor: 10µF
- LED
- Power Supply (5V or 9V Battery)
- PCB Board and Soldering Equipment

Circuit Design & Working

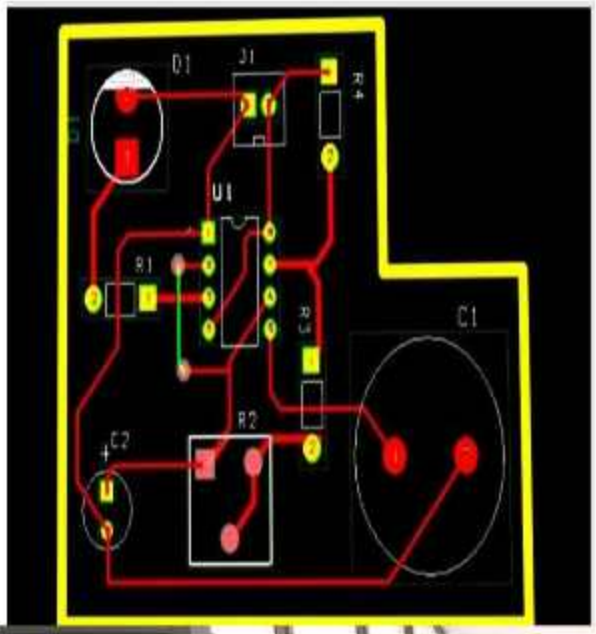
The 555 Timer IC operates in a stable mode, producing a square wave output. The blinking rate is determined by the resistors (R1, R2) and capacitor (C):

Circuit Schematic screenshot:--



- Time High (T1) = 0.693 * (R1 + R2) * C
- Time Low (T2) = 0.693 * R2 * C
- Frequency (f) = 1.44 / ((R1 + 2R2) * C)

Layout and Rooting screenshot:--



Hardware photos:

Connections:

1. Pin 1 - Ground
2. Pin 2 - Trigger (linked to capacitor)
3. Pin 3 - Output (LED via 1kΩ resistor)
4. Pin 4 - Reset (connected to VCC)
5. Pin 5 - Control Voltage (optional capacitor)
6. Pin 6 - Threshold (linked to Trigger)
7. Pin 7 - Discharge (between R1 and R2)
8. Pin 8 - VCC (5V or 9V)

PCB Design & Fabrication

1. **Schematic Design:** Created using Easy EDA/Ki Cad.
2. **PCB Layout:** Components arranged for compactness.
3. **Fabrication:** Copper-clad board etched and soldered.
4. **Testing:** Verified connections and functionality.

Applications & Conclusion

This circuit is useful for learning electronics, indicator systems, and alarms. The PCB design ensures reliability, making it a practical project for beginners and professionals alike.

Keywords: 555 Timer IC, LED Blinking, A stable Mode, PCB Design

Project Topic Name : LM7805 Voltage Regulator		
SI.NO	REG.NUMBER	NAME OF THE STUDENTS
1	23407459	Sarathkumar.G
2	23407446	Nandeeshkumar.M
3	23492543	Sabari.K
4	23407418	Praveen.V
5	23492541	Kalyan.C
6	23407467	Vignesh.v

Introduction

The LM7805 is a commonly used linear voltage regulator that provides a stable 5V DC output from a higher voltage source. It is widely used in power supply circuits for microcontrollers, sensors, and embedded systems. This project focuses on designing a PCB-based LM7805 voltage regulator circuit for efficient and compact power regulation.

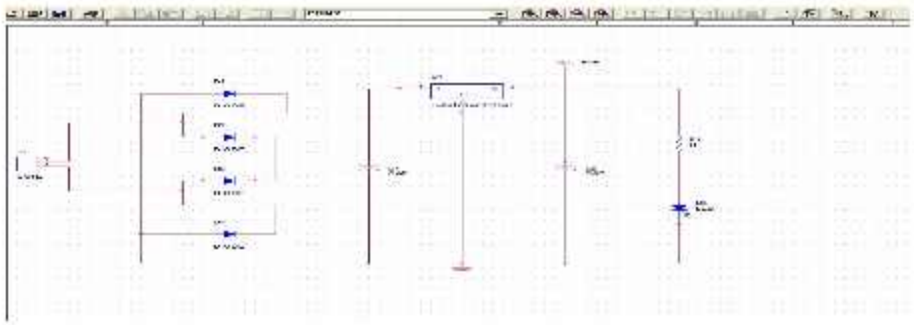
Components Required

- LM7805 Voltage Regulator IC
- Input Capacitor: 0.33µF
- Output Capacitor: 0.1µF
- Diodes: 1N4007 (for protection)
- Heat Sink (optional for high currents)
- Power Source: 9V-12V DC
- PCB Board and Soldering Equipment

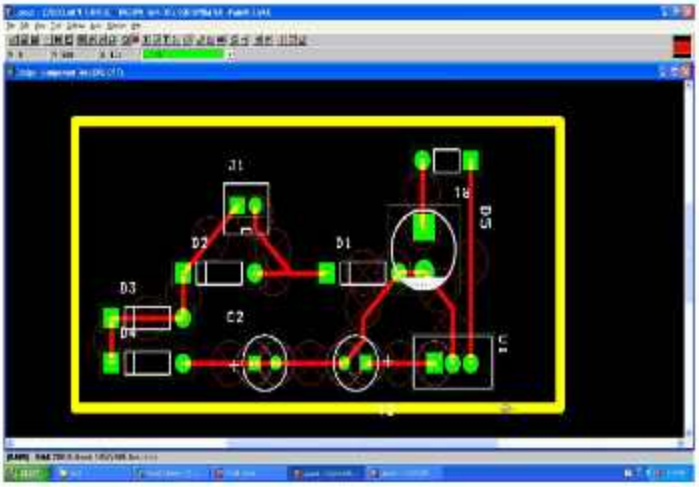
Circuit Design & Working

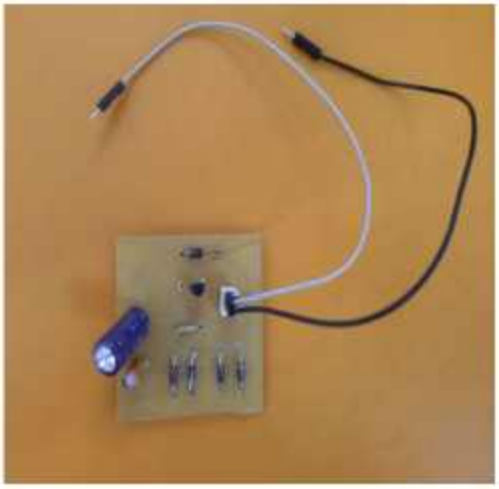
The LM7805 takes an unregulated DC voltage (7V-35V) and regulates it down to a stable 5V. The capacitors smooth out voltage fluctuations and improve stability.

Schematic Circuit :



Layout and Rooting Diagram:





Connections:

1. **Input Pin (Pin 1):** Connect to DC input voltage (9V-12V recommended).
2. **Ground Pin (Pin 2):** Common ground for input and output.
3. **Output Pin (Pin 3):** Provides regulated 5V output.
4. **Capacitors:**
    - 0.33µF at the input for noise filtering.
    - 0.1µF at the output for voltage stability.

5. **Diodes (1N4007):** Placed at input and output to prevent reverse polarity damage.

PCB Design & Fabrication

1. **Schematic Design:** Created using EasyEDA/KiCad.
2. **PCB Layout:** Compact placement for optimal performance.
3. **Fabrication:** Copper-clad board etched and soldered.
4. **Testing:** Verified output voltage and efficiency.

Applications & Conclusion

This circuit is widely used in microcontroller projects, sensor modules, and low-power embedded systems. The PCB design ensures a compact and reliable power regulation solution.

Keywords: LM7805, Voltage Regulator, 5V Power Supply, PCB Design

Summary: Mini Project for Electronics & Robotics Diploma Students (PCB Design)

This mini project focuses on designing and fabricating a **custom PCB-based circuit** for an electronics or robotics application. The project enhances students' practical skills in circuit design, PCB layout, and soldering techniques.

Project Overview:

- **Project Idea:** Developing a simple yet functional PCB-based circuit such as an **LED chaser, motor driver, sensor module, or power supply** for robotic applications.
- **Components:** Includes **microcontrollers (e.g., Arduino, AT mega), sensors, transistors, voltage regulators, and motor drivers** based on the project requirements.
- **PCB Design:** Using **Easy EDA, Ki Cad, or Proteus** for schematic and layout design.
- **Fabrication:** Etching, drilling, and soldering components onto the PCB.
- **Testing & Implementation:** Ensuring circuit functionality and troubleshooting issues.

Learning Outcomes:

- Understanding PCB design principles.
- Hands-on experience with circuit fabrication.
- Practical application of electronics in robotics.

This project serves as a stepping stone for **real-world automation and embedded systems development.** 🚀

ATAL FDP on Automating Excellence: Robotics & Process Automation

INAUGURATION PROGRAM

The inauguration was held on **16th August 2024 at 09:00 AM**. The **Chief Guest** of the program was **Mrs. P. Saratha, M.E. (Principal, Govt. Polytechnic College, Krishnagiri)**. **Mr. C. Veeramani (HOD/E-Robotics)** delivered the **welcome address**.

The event was graced by **Dr. S. Jaishankar (Dean-R&D, PMC Tech), Prof. N. Sudhakaran (Director, PMC Tech), Prof. N. Balasubramaniam (Principal, Er. PMPC), Dr. R. Saravanan (Principal, Er. PMCE), Mrs. P. Mallar (Secretary, PMC Tech), and Mr. P. Kumar (Chairman, PMC Tech)**, who facilitated the gathering.

Mrs. V. Dhivya (Lecturer/E-Robotics) delivered the **introduction of the Chief Guest**.

Some snapshots of the inaugural function are shown below.

Day 1 (16-08-2024) FN:
Introduction to Robotics process Automation &RPA Tools – Mr. Muthukrishnan G

Day 1 (16-08-2024) AN
National Educational Policy – Dr. Sahithullah

Day 2 (17-08-2024) FN

Robotics Kinematics – Mr. Mathan C

Day 2 (17-08-2024) AN

Sensor Integration for Robotics and Automation – Dr. Nagarajapandian M

Day 3 (19-08-2024) FN

Control system Design for Robotics & Automation – Mr. Saravanan Balaji M

Day 3 (19-08-2024) AN

Programming for Real Time Robotics Applications – Mr. Gunaseela Manikandan

Day 4 (20-08-2024) FN

Hardware Implememntation for Robotics Automation – Dr.Rajesh T

Day 4 (20-08-2024) AN

Art of Living – Mr. Shanmugam S

Day 5 (21-08-2024) FN

Industrial Visit – Elkayem Auto Ancillaries (P) Ltd. Hosur

Day 5 (21-08-2024) AN

Electrical Drives and control for Robotics & Automation – Mr. Nivesh Kumar K

Day 6 (22-08-2024) FN
Automation in Manufacturing – Dr. Sudhagar M

Day 6 (22-08-2024) AN
Valedictory Function

The **valedictory function** was held on **22nd August 2024 at 03:00 PM** with great enthusiasm and participation. The event marked the successful conclusion of the program, celebrating the efforts and achievements of all participants.

The **Chief Guest** of the program was **Mr. P. P. Govindaraju, M.E., Ph.D. (Principal, Govt. Polytechnic College, Kelamangalam)**, who addressed the gathering and emphasized the importance of skill development and continuous learning in the field of technology.

The function commenced with a **warm welcome address** delivered by **Mr. R. Ramachandran (HOD/Mechanical T&D)**, setting the tone for the proceedings. The gathering was honored by the presence of esteemed dignitaries, including **Dr. P. Ravichandaran (Dean - External Affairs, PMC Tech), Prof. N. Sudhakaran (Director, PMC Tech), Prof. N. Balasubramaniam (Principal, Er. PMPC), Dr. R. Saravanan (Principal, Er. PMCE), Mrs. P. Mallar (Secretary, PMC Tech), and Mr. P. Kumar (Chairman, PMC Tech)**. Their presence and words of encouragement motivated the attendees.

Mrs. V. Dhivya (Lecturer/E-Robotics) introduced the **Chief Guest**, highlighting his achievements and contributions to the academic and technical community.

During the event, the distinguished guests shared valuable insights, congratulated the participants for their dedication, and encouraged them to apply their knowledge in real-world applications. The program concluded with a heartfelt **Vote of Thanks** delivered by **Mr. C. Veeramani (HOD/E-Robotics)**, expressing gratitude to all who contributed to the success of the function.

The event ended on a high note, leaving participants inspired and motivated for future endeavors.

Some snapshots of the valedictory function are shown below.

VALUE ADDED SKILL TRAINING

Day 1: Introduction To Mobile Robotics

What is Mobile Robotics?

Mobile robotics is a field of robotics that focuses on the design, development, and operation of robots capable of moving in their environment. Unlike stationary robots, mobile robots can navigate autonomously or semi-autonomously, using sensors, controllers, and actuators to interact with their surroundings.

Importance of Mobile Robotics

Mobile robots play a crucial role in various industries, including manufacturing, healthcare, logistics, and agriculture, defense, and space exploration. Their ability to perform tasks in dynamic environments without human intervention makes them valuable for automation and efficiency improvement.

Day 2: Sensors and Actuators

Sensors and actuators are essential components of robotics, enabling robots to perceive and interact with their environment. Sensors detect and measure physical parameters such as distance, temperature, motion, and pressure. Common types of sensors include proximity sensors for object detection, vision sensors like cameras for image processing, motion sensors such as gyroscopes for stability, and force sensors for tactile feedback. These sensors help robots make real-time decisions and navigate complex environments efficiently.

Actuators, on the other hand, convert electrical signals into mechanical movement, allowing robots to perform tasks such as gripping, lifting, or moving. They can be electric (motors and servos), pneumatic (air-powered cylinders), or hydraulic (fluid-powered systems), depending on the application. Actuators work in coordination with sensors to enable automation in industries like manufacturing, healthcare, and logistics. Together, sensors and actuators form the core of modern robotics, making machines more intelligent and responsive.

Day 3: Microcontrollers and Programming

Microcontrollers and programming play a crucial role in embedded systems and robotics, enabling automation and intelligent control. A microcontroller is a compact integrated circuit (IC) that contains a processor (CPU), memory, and input/output (I/O) peripherals on a single chip. It acts as the brain of an embedded system, processing data from sensors and controlling actuators based on programmed instructions. Popular microcontrollers include Arduino, PIC, and ARM-based controllers, which are widely used in applications such as home automation, automotive control, and industrial machinery.

Programming microcontrollers involves writing code in languages like C, C++, or Python to define their behavior. The program is uploaded onto the microcontroller using an Integrated Development Environment (IDE), such as Arduino IDE or MPLAB. This code dictates how the microcontroller processes inputs, executes logic, and controls outputs. By integrating sensors, actuators, and communication modules, microcontrollers enable smart devices, making them essential for IoT applications, robotics, and real-time automation systems.

Day 4: Robot Navigation and Control

Robot navigation and control are essential aspects of autonomous robotics, enabling robots to move efficiently and interact with their environment. Navigation involves determining the robot's position, planning a path, and avoiding obstacles. It relies on various sensors such as LiDAR, cameras, GPS, and ultrasonic sensors for mapping and localization. Techniques like Simultaneous Localization and Mapping (SLAM) and path planning algorithms help robots navigate unknown environments autonomously. These methods are widely used in self-driving cars, warehouse robots, and robotic vacuum cleaners.

Control systems ensure that robots execute planned movements accurately and respond to changes in the environment. Open-loop control operates without feedback, while closed-loop control adjusts movements based on sensor inputs. Advanced control techniques like PID (Proportional-Integral-Derivative) controllers, fuzzy logic, and machine learning improve navigation precision. By integrating sensors, actuators, and intelligent control algorithms, robots achieve smooth and efficient movement, making them capable of performing complex tasks in various industries, from healthcare to logistics.

Day 5: Advanced Topics and Project Work

Summary Report on Value-Added Program for Second-Year Electronics & Robotics Students

Introduction

The **Value-Added Program** was conducted for **second-year Electronics & Robotics students** to enhance their practical knowledge and technical skills in **Mobile Robotics, Sensors & Actuators, Microcontrollers & Programming, Robot Navigation & Control, and Advanced Topics & Project Work**. The program aimed to bridge the gap between theoretical learning and real-world applications, equipping students with hands-on experience in solving industrial and automation-related challenges.

Key Areas Covered

1. **Mobile Robotics:**
    - Focused on the development of autonomous and semi-autonomous robots.
    - Applications: Industrial automation, healthcare, agriculture, and disaster management.
2. **Sensors & Actuators:**
    - Explored various sensors and actuators used in robotics and automation.
    - Applications: Self-driving cars, smart homes, medical devices, and manufacturing automation.
3. **Microcontrollers & Programming:**
    - Introduced microcontrollers like Arduino, PIC, and ARM and their programming in C, C++, and Python.
    - Applications: IoT-based monitoring, wearable devices, industrial robotics, and automated vehicles.
4. **Robot Navigation & Control:**
    - Covered navigation techniques such as SLAM, GPS-based tracking, and vision-based control.
    - Applications: Autonomous delivery robots, warehouse management, space exploration, and traffic control.
5. **Advanced Topics & Project Work:**
    - Focused on AI, Machine Learning, and Edge Computing in robotics.
    - Applications: Smart agriculture, robotic exoskeletons, predictive maintenance, and autonomous drones.

Outcome & Benefits

- **Skill Development:** Students gained hands-on experience with real-world robotic applications.
- **Industry Readiness:** Enhanced knowledge of automation and robotics for future career opportunities.
- **Problem-Solving Ability:** Encouraged students to develop innovative solutions for industrial challenges.
- **Project-Based Learning:** Provided exposure to real-time projects in robotics and automation.

Conclusion

The **Value-Added Program** successfully provided students with the necessary skills and knowledge in robotics and automation. By integrating **theory with practical applications**, students are now better equipped to solve **real-world problems** in industries such as **manufacturing,**

ROBOTICS INDUSTRIES

- **NOVATEK**
- **BHAVA ROBOTATON CO**
- **SCANNER ELECTRO LAB**
- **A2Z AUTOMATION TECHNPLOGY**
- **KRISHNA ELECTRIC ENGINEERING**
- **KRISAM AUTOMATION**
- **BOTSYNC**
- **R3 AUTOMATION**
- **ADATRONIX PVT LTD**
- **SYSTEMANTICS INDIA PVT LTD**
- **MYLAN LTD**
- **BANGALORE ROBOTICS PVT LTD**

FINAL REVIEWER:

Prof.N.Sudhakaran, Director

Prof.N.Balasubramaniam, Principal

Mr.C.VEERAMANI, HOD/Robo Engg

EDITORS:

Mr. SINGARAVELAN M ME, Lecturer/Robo Engg