

A Practical activity Report submitted For  
Engineering Design Project-II (UTA-024)

by

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**Submitted to**

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## Experiment: 1

### Objective:

- a) To draw a schematic diagram of pulse width modulation (PWM) based transmitter for generating specified pulse width waveforms for gantries placed at different locations on the path using CAD tool (Eagle).
- b) To design a printed circuit board layout of pulse width modulation (PWM) based transmitter circuit using CAD tool (Eagle).

### Software Used: Eagle Software Component Used:

Sr. No	Name of Components	Value	Specifications
1.	DCJ0202		Power Jack
2.	7805TV		Voltage regulator
3.	ATTINY 85-20P		8-bit AVR microcontrollers
4.	22-23-2031		Connector
5.	LED 3MM		Light Emitting Diode
6.	Capacitor	10 uF	
7.	Resistor	330 Ohm	

### Theory:

- 1) **DCJ0202:** This is a common barrel type DC power jack. This is a device that allows an electrical instrument to pass through to it for the exclusive purpose of providing power to a device.



**Fig. 3.1** Image of DCJ0202 [1]

- 2) **7805TV:** Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 Voltage Regulator, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC). The xx in 78xx

indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.



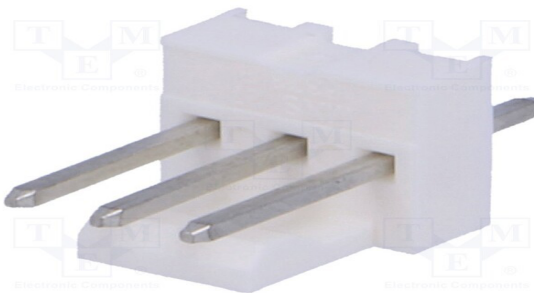
**Fig. 3.2** Image of 7805TV [2]

3) **ATTINY 85-20P**: ATtiny (also known as TinyAVR) is a subfamily of the popular 8bit AVR microcontrollers, which typically has fewer features, fewer I/O pins, and less memory than other AVR series chips.



**Fig. 3.3**Images ATTINY 85-20P [3]

4) **22-23-2031**: is a 2.54mm pitch wire to board connectors with Pin Header, Signal, Wire-toBoard, 2.54 mm, 1 Rows, 3 Contacts, Through Hole Straight.



**Fig. 3.4**Images of 22-23-2031 [4]

5) **MTA02-100**: The MTA-100 interconnection system is used for wire-to-board or wire-to-wire applications using insulation displacement contacts, or IDCs. The MTA connector

system is a wire-to-board and wire-to-wire system based on insulation displacement contact (IDC) technology. TE Connectivity MTA-100 Series Headers & Wire Housings are available at Mouser Electronics. MTA-100 connectors 2,54mm - Signal connectors - Connectors - Wide offer of products at Transfer Multisport Electronics.



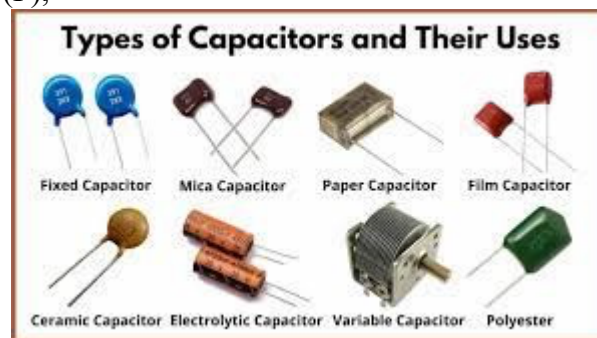
**Fig. 3.5** Image of MTA02-100 [5]

6) **LED 3MM:** LED stands for Light Emitting Diode and 3mm is the size of the diode. They are not as bright but are smaller, and are good for **indication** (like an LED that tells you something is on). They're not as good for illumination because they have a smaller area that is lit.



**Fig. 3.6** Image of LED 3MM [6]

7) **Capacitor:** Capacitor is a device that stores electrical energy in an electric field. It is a passive electronic component with two terminals. The effect of a capacitor is known as capacitance. While some capacitance exists between any two electrical conductors in proximity in a circuit, a capacitor is a component designed to add capacitance to a circuit. The base unit of capacitance is Farad (F),



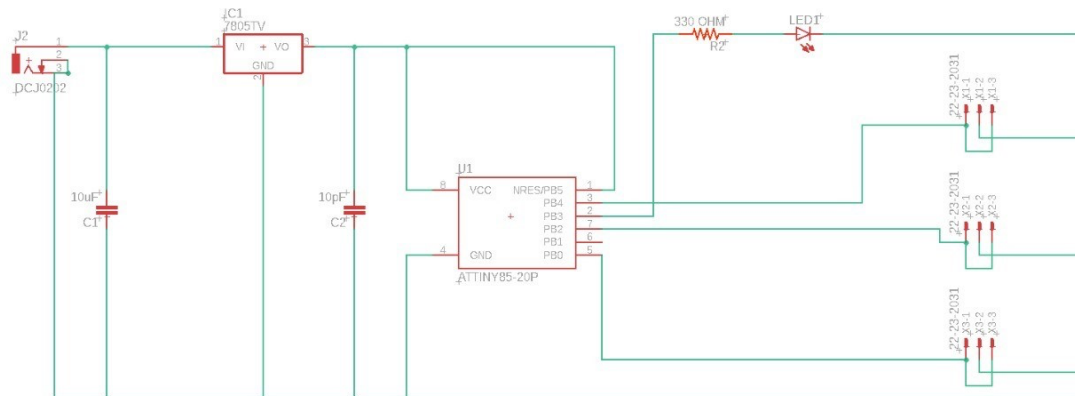
**Fig. 3.7** Image of types of capacitor [7]

8) **Resistor:** Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within circuits. The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance falls within the manufacturing tolerance, indicated on the component.



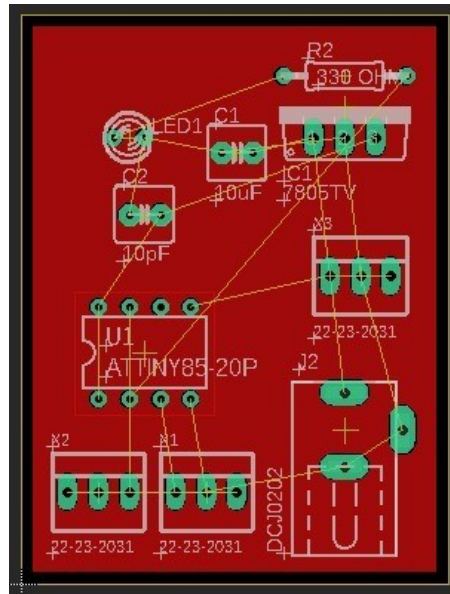
**Fig. 3.8** Image of types of resistor [8]

**Schematic diagram:**



**Fig. 3.9**Schematic diagram of Receiver circuit

**Printed Circuit Board layout:**



**Fig. 3.10**PCB layout of Transmitter circuit **Discussion:**

In this experiment, we have learn by making the receiver circuit by the help of Eagle software and how it works with the help of MBD701,LM311N,Resistor, Capacitor and 22-23-2031.

### **Reference:**

1. <https://www.electricaltechnology.org/2015/01/resistor-types-resistors-fixedvariable-linear-non-linear.html>
2. <https://images.app.goo.gl/GCPFAd5LbtCvbHR56>
3. <https://images.app.goo.gl/zWL3wFt3ZfcM3QdUA>
4. <https://images.app.goo.gl/4rcTe8eLRTx7euYa7>
5. <https://images.app.goo.gl/MKccELUJgVdfuVqX8>
6. <https://images.app.goo.gl/TY7u1BYA5yJB7v4M9>
7. <https://images.app.goo.gl/uCFbRngbuDszySnP6>
8. <https://images.app.goo.gl/BkhEHqZxTHiksnMH6>

**Signature of Faculty member**