



**FAKULTI TEKNOLOGI DAN KEJURUTERAAN
ELEKTRONIK DAN KOMPUTER
UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

TECHNOLOGY SKILL AND DEVELOPMENT IN ELECTRONIC AUTOMATION 1

BERL 1112	SEMESTER 1	SESI 2023/2024
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PROJECT: PRINTED CIRCUIT BOARD (PCB) FABRICATION

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PROGRAMME	1 BERL
SECTION / GROUP	
DATE	23 / 1 / 2024
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EXAMINER'S COMMENT(S)	TOTAL MARKS

1.0 INTRODUCTION

Transistors are electronic components that are often used in building flip-flop circuits. In this circuit we use Bipolar Junction Transistor BJT S9013. This flip-flop circuit uses an LED and Buzzer as visible output from the flip-flop process. In this report we show the process of creating this circuit from design circuit until show the validation.

2.0 CIRCUIT DESIGN PROCESS

For design this Flip-Flop circuit, we use the software Proteus V8.3. Design by select component in this library to create the complete schematic Flip-Flop circuit like **figure 2.1**.

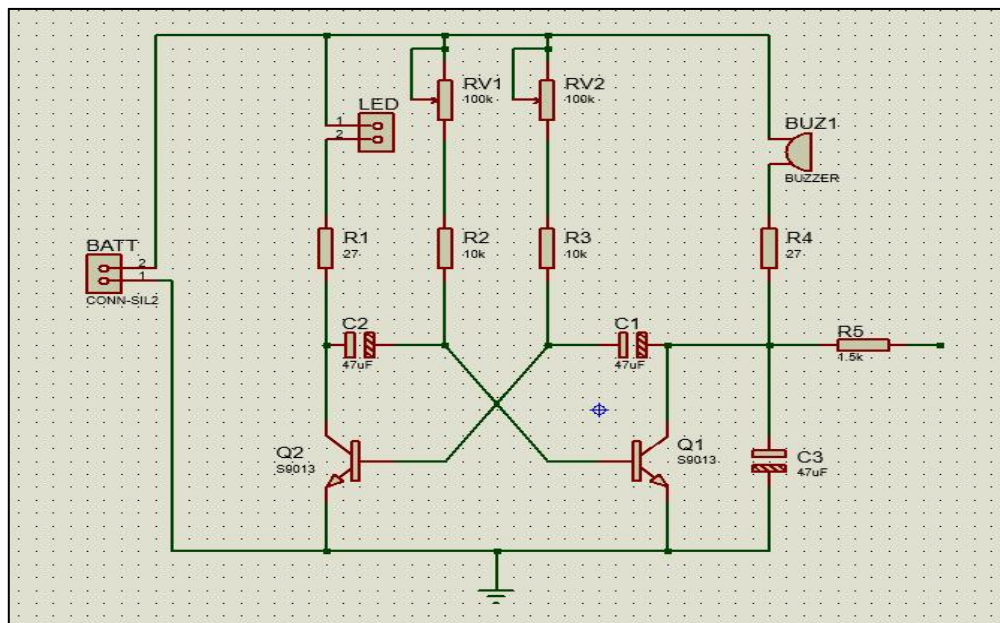


Figure 2.1: Schematic flip-flop circuit in proteus V8.3

After finish design the schematic, convert this schematic design to PCB design like **figure 2.2**. Select component that already use in schematic design for design layer to print to PC board.

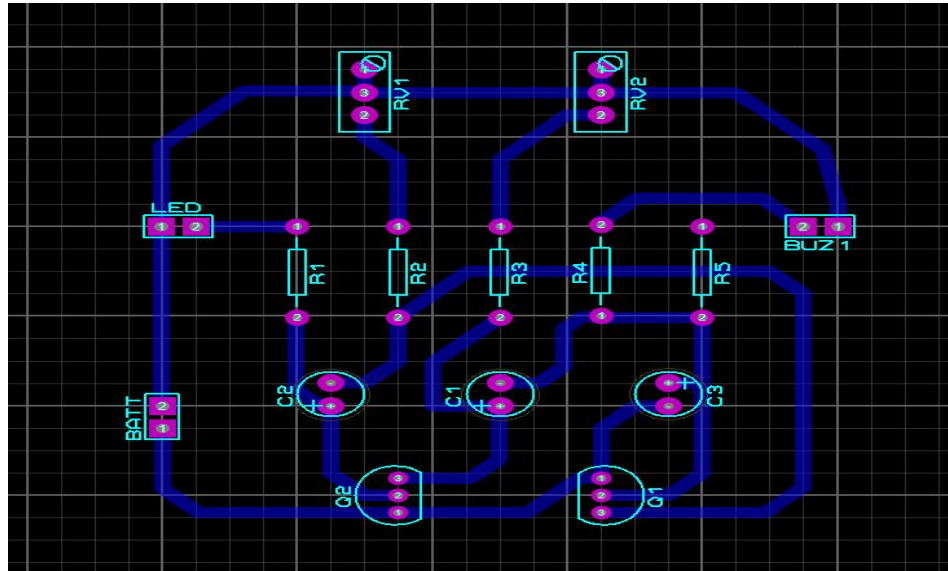


Figure 2.2: PCB design in Proteus V8.3

Confirm the design by viewing the 3D visual like **figure 2.3**. This step can help to make the design of component look interesting.

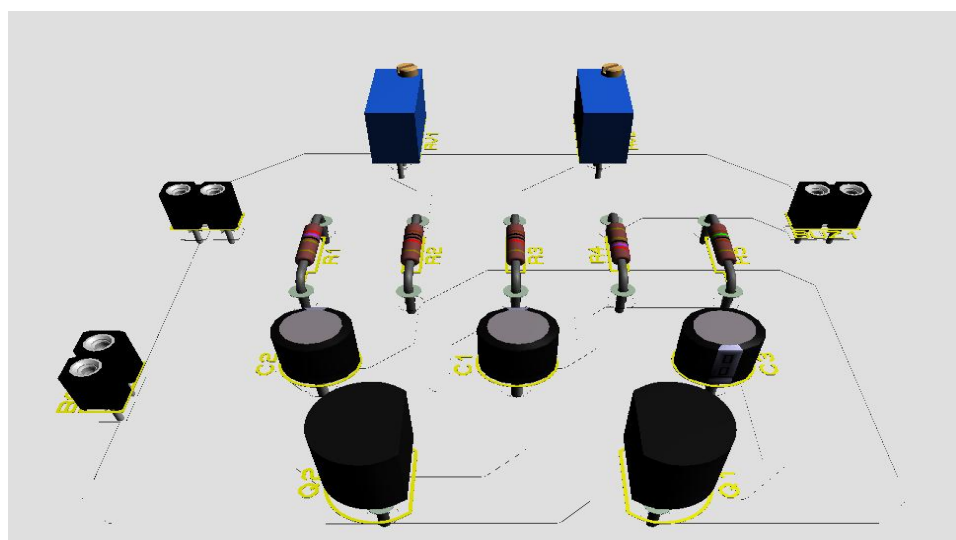


Figure 2.3: 3D visual for PCB design

3.0 PRINT OUT DESIGN

To print out the design, setting the mode,option and printer like **figure3.1**. After that, use laser printer to print out the design. For print the design of circuit must use transparency/glossy paper.

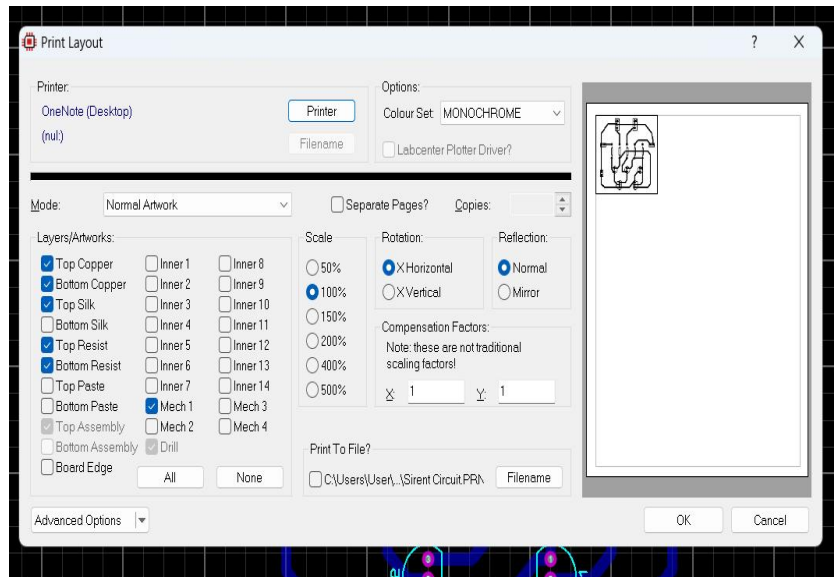


Figure 3.1: Print layout



Figure 3.2: Laser printer and Transparency/Glossy paper

4.0 MAKING PCB PROCESS

i) Ultra Violet Transfer Process

One of the techniques that can be used in PCB production is UV transfer. UV rays are produced by the UV Exposure tool which will transfer the printed circuit on top of the transparency layer to Sensitized PCB. Sensitized PCB equipped with a light protective layer. This protector is necessary opened before doing this process. The transparency layer needs to be attached on top of the Sensitized light sensitive part PCB by using transparent adhesive tape. Make sure the position of the attached transparency layer is NOT REVERSED because this process uses the Positive Acting UV Transfer method. This process take 120 second.



Figure 4.1: Ultra Violet Transfer

ii) Develop Process

This process is done to remove the light-sensitive layer on the PCB has been exposed to UV rays. The PCB needs to be soaked in a developer solution to corrode the layer that has been exposed to UV rays and will leave a circuit shape on the PCB. Make sure the PCB is not soaked for too long to avoid Over Develop.

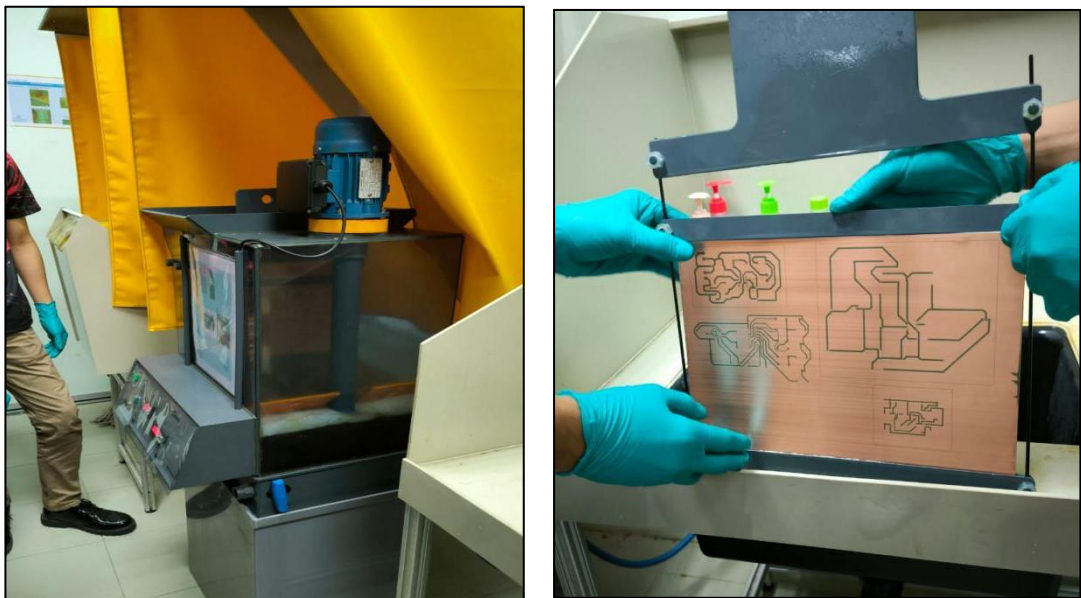


Figure 4.2: Develop process

iii) Etching process

The etching process is done to remove the copper layer not required on PCB by using etchant liquid. This solution will corrode the copper layer on the PCB that is not protected by printed circuit that results through the developer process. The duration of this process depends on the concentration of the solution, the temperature of the solution and the size PCB produced.



Figure 4.3: Etching process

iv) Drilling process

The Drilling process is done to drill holes on the PCB to place leg of the component in the circuit. The size of the hole depends on the type of component used. Use the correct drill bit depends on the size of the leg of the component.



Figure 4.4: Drilling process

5.0 SOLDERING

Soldering is the process of soldering components to be joined to a PCB circuit. The equipment required is solder, solder paste, soldering iron & stand. Soldering iron points must be cleaned first before use. Make sure the components are made neat and sturdy to avoid components are easily removable. Avoid soldering component legs for too long due to the temperature being too hot can damage components.

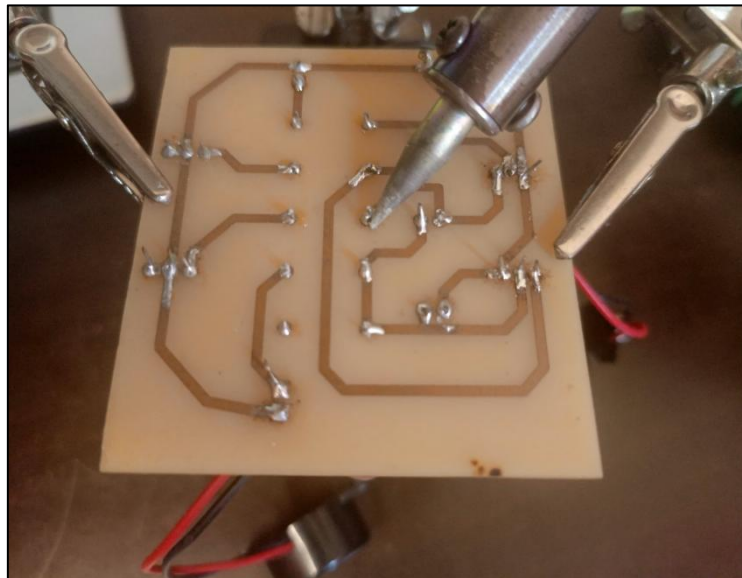


Figure 5.1: Soldering process

6.0 VALIDATION

For validation, this circuit function like what it must be. This Flip-Flop Circuit need power supply 9Vdc to active. The 2 BJT transistor role is for Flip-Flop. The LED and Buzzer will show the output of Flip-Flop. The variable resistor is for control the speed of flip-flop.

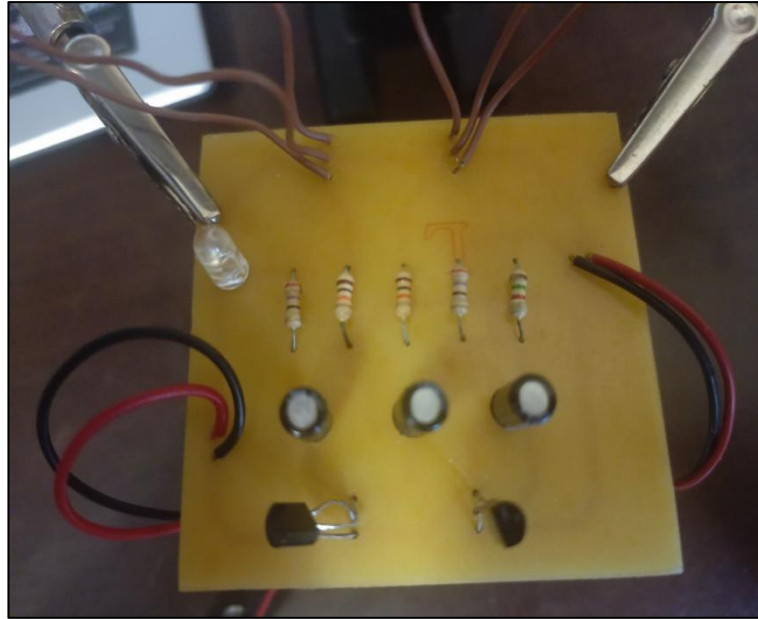


Figure 6.1: Validation process

7.0 FUNCTION

The function of this circuit is for notify emergency or warning. We use this circuit for siren in Ambulance, police car or any emergency alarm. This circuit is for control the speed of flip-flop by watching the output of LED and Buzzer. Buzzer sounded follow blinking LED.

9.0 NOISE

Noise will happen for some reason like power supply noise, bad resistance value and also soldering problem to reduce noise, some preventive measures involve the use of a good PCB (Printed Circuit Board) design, the selection of the right components, a good separation between the signal path and the power supply