

BATTERY TESTER ARDUINO

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BATTERY TESTER ARDUINO

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RECOGNITION

Here my group declare that this report is based on the work of our own with the help of information from sources that are told in confession. We also declare the results of my project was never produced by any other student as well as students from other institutions.



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ABSTRACT

This report describes the projects we've done over the period of project implementation. Battery tester is about software and hardware to use Arduino to check the supply of energy contained in the battery. It can also allow users to control the supply of batteries can still be used.

In this report describes in detail the problem statement on the project we performed throughout the project. The problem that often occurs among users is the battery usage battery life without knowing it until it runs out for unpredictability. This project will be implementing using ARDUINO by using C programming language.

Hopefully any information which will be explained in many ways readers can also benefit us. in addition, it can provide guidance and strength in the face of all the problems we confronted when I will make a real project.

Appreciation

After struggling finally, our group can prepare the final report of this successfully. Appreciation and gratitude to Mrs. Norlizah Binti Ismail as the supervisor for giving full trust and support and are willing to take the time to provide guidance to our group as one of her groups. Appreciation and gratitude also goes to colleagues who were willing to cooperate and guidance to me as a colleague and also managed to book this industrial training report.

Do not forget also to thank all the members of our group family who also provide support and encouragement in their project and all those involved directly or indirectly. Do not forget to lecturers in the Department of Electrical Engineering who was also involved in giving us guidance throughout the project. Lastly, thanks to all those involved and without the cooperation of Polytechnic lecturer's it is impossible for us to participate in this project. May Allah S.W.T repay and service of you who have helped us in this project. Thank you.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Battery is a device consisting of one or more cells with external connections provided to power electrical devices such as flashlights, smartphones, and cars. Life without batteries would be a trip back in time, a century or two, when pretty much the only way of making portable energy was either steam power or clockwork. Convenient power supplies as small as a fingernail or as big as a trunk give make sure and steady supply of electrical energy whenever. Although this project can get through billions of them every year and they have a big environmental impact, couldn't live our modern lives without them. People now day just know use a battery but don't know how about battery life or how long the life span of a battery can hold out. This battery tester to test a battery so people can know about a life span of battery.

1.2 Background

In today's environment, many of us are carrying a heavier workload than we used to, and feeling the crunch. You may not be able to control your workload, but you can control how you react to it. You can choose to be overwhelmed, or you can choose to receive you today, in addition to taking steps to improve your situation. In order to cope with all situations, as people need to be prepared with

fresh ideas and surround ourselves in harmony with its surroundings. There is one way that can help to improve ourselves and to relax our mind. It just has to have a battery tester, you can know the status of your battery remaining. Up to now there is no one industry that provide products such as battery tester with Arduino in our lives. Therefore, we only make battery tester with Arduino to test the battery so we can know about the battery life can hold.

1.3 Problem statement

- a) The problem that often occurs among users is the battery usage battery life without knowing it until it runs out for unpredictability.
- b) Next, as a precautionary measure to change the battery when it can identify that the battery power is significantly reduced by using this tool.
- c) This battery tester can solve the problem of battery suddenly depleted and easy to use because it can display the amount of energy that can be used.
- d) This battery tester also suitable for all ages as well as the elderly and young. In addition, by using this tool can save cost, easy to carry and safe to use.

1.4 Objectives

The objective of this project was to design a small-scale automated irrigation system for indoors that would use water in a more efficient way, in order to prevent water loss and minimize the cost of labor.

The following aspects were considered in the choice of a design solution:

- Installation costs.
- Water savings.
- Human intervention.
- Reliability.

- Power consumption.
- Maintenance.
- Expandability.

The objectives to be achieved after the implementation of this project are:

- a) Content easier for users to check the remaining battery power.
- b) Can save user costs.
- c) Easy to keep in small place like in the drawer.

1.5 Project scope

The scope of the project should be made as a reference to ensure that the implementation of the project is not out of the objective to be achieved. The scope of the project is determined by the objectives or goals of the project. Therefore, battery testers Arduino project must not exceed the goals and functions. This product was designed to compare the cost of materials and designs available. In addition, it can be introduced to the public that the product of this project can compete with existing products.

1.6 Term Definition

Terms described more in depth about this project are as follows:

1.6.1 Arduino

Arduino is an important part in this project Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. This board can program what to do by sending a set of instructions to the microcontroller on the board.

1.6.2 Variable resistor

A resistor restricts current flow in an electrical circuit without switching the current off. A variable resistor allows more control over current flow by changing the amount of resistance. When resistance increases in a variable resistor, the amount of current that is allowed to flow in a circuit decreases.

1.6.3 LCD display 16x2

To display a word of a output from battery using battery tester

1.7 Conclusion

In conclusion, this paper discusses the overall project to be carried out and project background. Next, identify problems and solve the problem. In addition, display materials needed to make the project and lists the total cost required for this project. Finally, explain the advantages inherent in this project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Before starting this project, this project need to made the observation and study of all aspects of the existing battery tester. There are many aspects that need to be addressed so that the resulting product has a high capability in addition to saving costs.

Among the things that have been emphasized is the selection of the reference battery tester, the selection of every component, the advantages and disadvantages of each. Below have been told little about the results of the study.

2.2 **Arduino**

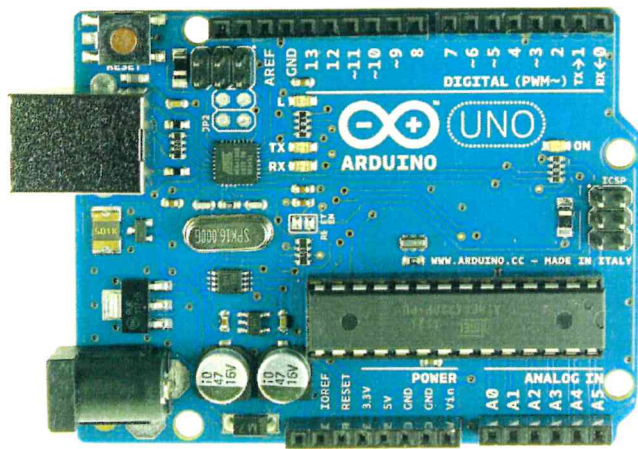


Figure 2.2: Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. The board can program what to do by sending a set of instructions to the microcontroller on the board. This board need to use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

2.2.1 **Cross-platform**

The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.

2.2.2 **Simple, clear programming environment**

The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.

2.2.3 Open source and extensible software

The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, this project can add AVR-C code directly into your Arduino programs.

2.2.4 Open source and extensible hardware

The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

2.3 Advantages and Disadvantages of Using Arduino

2.3.1 Advantages

2.3.1.1 Ready to Use

- The biggest advantage of Arduino is its ready to use structure. As Arduino comes in a complete package form which includes the 5V regulator, a burner, an oscillator, a micro-controller, serial communication interface, LED and headers for the connections.

2.3.1.2 Effortless functions

- During coding of Arduino, need to notice some functions which make the life so easy. Another advantage of Arduino is its automatic unit conversion capability. This can happen that during debugging you don't have to worry about the unit's conversions. Just use all force on the main parts of your projects. Don't have to worry about side problems.

2.3.1.3 Large community

- There are many forums present on the internet in which people are talking about the Arduino. Engineers, hobbyists and professionals are making their projects through Arduino. This can easily find help about everything. Moreover the Arduino website itself explains each and every functions of Arduino.

2.3.2 Disadvantages

2.3.2.1 Structure

- During building a project must have to make its size as small as possible. But with the big structures of Arduino need have to stick with big sized PCB's. If working on a small micro-controller like ATmega8 this can easily make PCB as small as possible.

2.3.2.2 Cost

- Arduino have many type each type have different cos it look what Arduino u use for your project.

2.3 The selection of base (Board battery tester)

There is a battery tester that has been designed before. Each design has its advantages and disadvantages of each. Guided by this basic form that will generate production battery tester. The board design plays an important role because it will produce output that will attract customers. This is because customers prefer to concentrate on board for this project we use a PCB board.

2.3.1 PCB Board

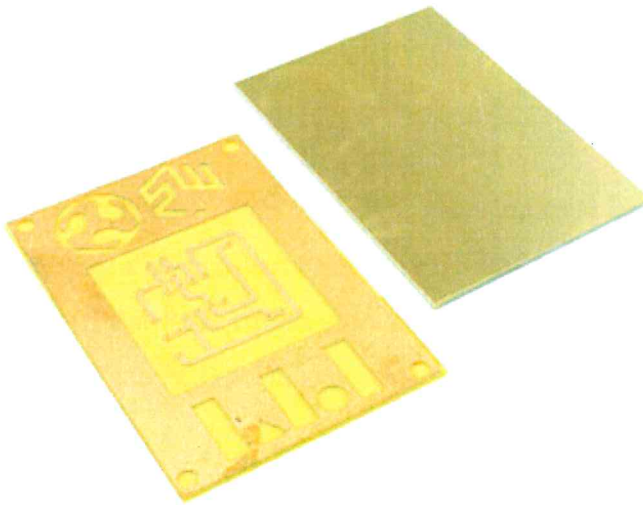


Figure 2.3.1: PCB board

Printed Circuit Board (PCB) is a circuit board that is used as a connecting strip conductors and arranging park electronic components. What is meant by the conductor path is the wiring system between components as part of the relationship and the electrical data on the components. Various forms of PCBs are generally available on the market is the PCB Matrix Strip Board (Board Matrix Striped) and Cooper Clad PCB (copper plated).

2.3.1.1 PCB type:

2.3.1.1.1 PCB matrix strip board

Commonly known PCB 'hollow' is one of the forms PCB consists of a set of holes. However, limitations in the use of this PCB is difficult to set up the system connecting wiring between the components with other components, causing the wires are connected to each other crosswise. Another difficulty is also to be found when soldering legs of the connecting cable components with 2 or more, at the point of the solder (pad) the same.

2.3.1.1.2 PCB Copper Clad

Cooper Clad PCB type is a PCB made of fibre glass material Ebonite or that one or both sides coated by a layer of copper. The PCB has copper layer only on one side of the surface of the PCB called side (Single Side). The PCB has copper layers on both sides of the PCB surface on both sides (Double Side).

2.4 LCD Display 16x2



Figure 2.3.2: LCD Display

The LCDs have a parallel interface, meaning that the microcontroller has to manipulate several interface pins at once to control the display. The interface consists of the following pins:

- 2.3.2.1 A **register selects (RS) pin** that controls where in the LCD's memory writing data to. Make sure select either the data register, which holds what goes on the screen, or an instruction register, which is where the LCD's controller looks for instructions on what to do next.
- 2.3.2.2 A **Read/Write (R/W) pin** that selects reading mode or writing mode.
- 2.3.2.3 An **Enable pin** that enables writing to the registers.
- 2.3.2.4 **8 data pins (D0 -D7)**. The states of these pins (high or low) are the bits that you're writing to a register when write, or the values reading when it read.
- 2.3.2.5 There's also a **display contrast pin (Vo)**, **power supply pins (+5V and Gnd)** and **LED Backlight (Bklt+ and BKlt-)** pins that can use to power the LCD, control the display contrast, and turn on and off the LED backlight, respectively.

2.5 Variable resistor

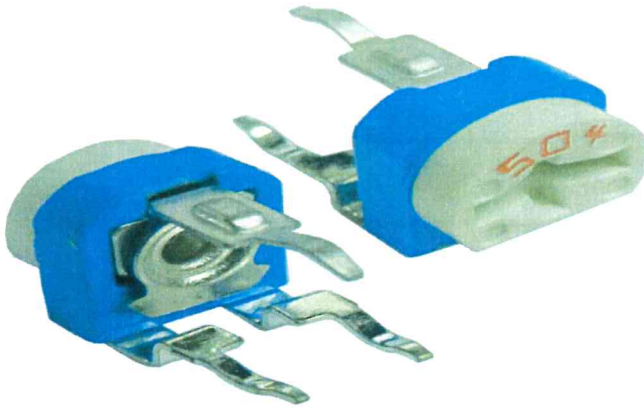


Figure 2.3.3: Variable resistor

A resistor restricts current flow in an electrical circuit without switching the current off. A variable resistor allows more control over current flow by changing the amount of resistance. When resistance increases in a variable resistor, the amount of current that is allowed to flow in a circuit decreases. Two basic components make up variable resistors. The resistive material is the first component and is called the element. The second component, called the wiper or brush, is used to set the resistance, and is often controlled with a knob or sliding switch.

2.6 Resistor



Figure 2.3.4: Resistor

Resistors are electronic components that are most frequently used on any electronic circuit, electronic gadgets and electronics projects. Hinder or limit the functioning resistor voltage flowing through it. It also functions as a voltage divider. Resistors have two feet and that there are no positive polar System. Connection to the circuit does not require a special connection of the foot. Steeplechase value called Ohm resistor in the form Ω . It contains the values of the stages as of Ohm increased to Kilo Ohm (K) up to Mega Ohm (M).

Over heat the resistor can cause a burn. Therefore, to safely use a resistor in the circuit, should know the resistor value. For large resistors, resistor values recorded in the body of the resistor and resistor small resistor value is determined using the resistor colour code through the colour tolerances can also be known. Resistor value can also be measured using ohm meter run.

2.3.4.1 Code colour resistor:

Color	Value	Multiplier	Tolerance
Black	0	$\times 10^0$	$\pm 20\%$
Brown	1	$\times 10^1$	$\pm 1\%$
Red	2	$\times 10^2$	$\pm 2\%$
Orange	3	$\times 10^3$	$\pm 3\%$
Yellow	4	$\times 10^4$	- 0, + 100%
Green	5	$\times 10^5$	$\pm 0.5\%$
Blue	6	$\times 10^6$	$\pm 0.25\%$
Violet	7	$\times 10^7$	$\pm 0.10\%$
Gray	8	$\times 10^8$	$\pm 0.05\%$
White	9	$\times 10^9$	$\pm 10\%$
Gold	—	$\times 10^{-1}$	$\pm 5\%$
Silver	—	$\times 10^{-2}$	$\pm 10\%$
None	—	—	$\pm 20\%$

Table 2.3.4.1: Code Colour of Resistor

2.7 Buzzer

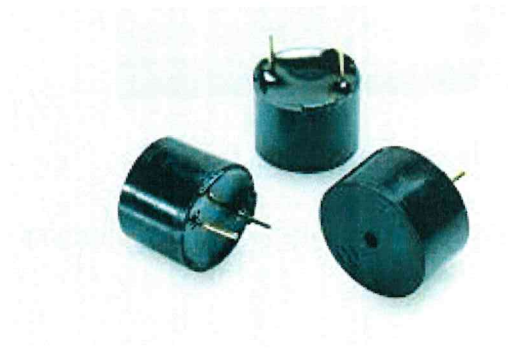


Figure 2.3.5 Buzzer

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

2.3.5.1 Electromechanical



Figure 2.3.5.1: Electromechanical

Early devices were based on an electromechanical system identical to an electric bell without the metal gong. Similarly, a relay may be connected to interrupt its own actuating current, causing the contacts to buzz. Often these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that electromechanical buzzers made.

2.3.5.2 Mechanical



Figure 2.3.5.2: Mechanical

A joy buzzer is an example of a purely mechanical buzzer. They require drivers.

2.3.5.3 Piezoelectric



Figure 2.3.5.3: Piezoelectric

2.3.5.4 Piezoelectric disk beeper

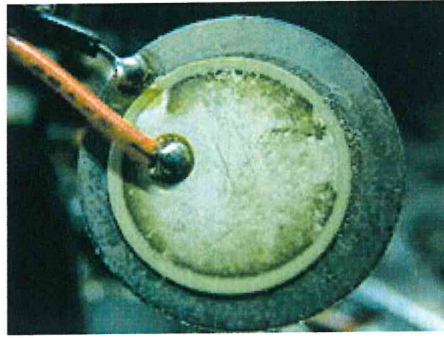


Figure 2.3.5.4: Piezoelectric disk beeper

A piezoelectric element may be driven by an oscillating electronic circuit or other audio signal source, driven with a piezoelectric audio amplifier. Sounds commonly used to indicate that a button has been pressed are a click, a ring or a beep. Interior of a readymade buzzer, showing a piezoelectric-disk-beeper (With 3 electrodes ... including 1 feedback-electrode (the central, small electrode joined with red wire in this photo), and an oscillator to self-drive the buzzer.

2.8 Circuit Description

The circuit on this system can be divided into 3 parts

1. A brain which is Arduino which will control instruction the whole system.
2. Second circuit, connection of LCD to the Arduino.
3. Third circuit, connection buzzer to the Arduino.

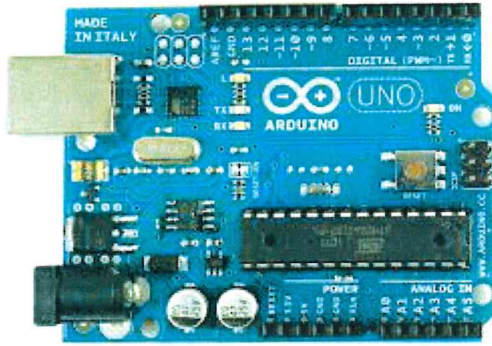


Figure 2.4a: Arduino circuit

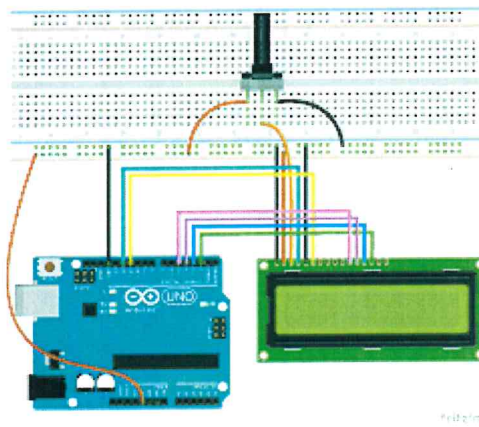


Figure 2.4b: Connection of LCD to the Arduino

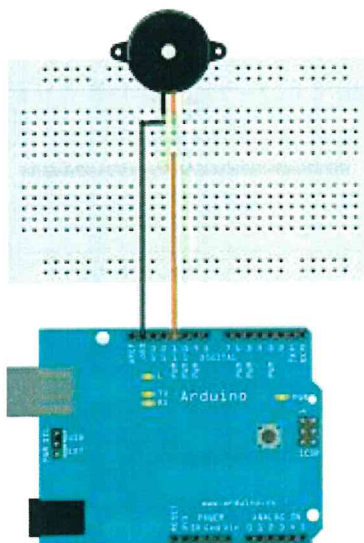


Figure 2.4c: Connection Buzzer to Arduino

2.9 SOFTWARE

Software to write code to is Arduino , which has written in C language. Below is the code to for this system

```
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

const int buzzer = 9; //buzzer to arduino pin 9

void setup() {
    // set up the LCD's number of rows and columns:
    lcd.begin(16, 2);
    // Print a message to the LCD.
    lcd.print("Syafiq dan Paan");
    delay(1000);
    lcd.clear();
    pinMode(buzzer, OUTPUT); // Set buzzer - pin 9 as an output
}

void loop() {
    lcd.clear();
    lcd.setCursor(0, 0);           //Print in the first line:
    lcd.print("Battery Tester");
```

```

lcd.setCursor(0, 1);                                //Now in the second line

lcd.print(analogRead(0)*5.00/1023.00);              //we print the voltage

lcd.print("V =>");

lcd.setCursor(9,1);

if ((analogRead(0)*5.00/1023.00) > 0.90)            //And choose what is the battery
status

{

    lcd.print("Perfect");

    tone(buzzer, 1000); // Send 1KHz sound signal...

    delay(1000);    // ...for 1 sec

    noTone(buzzer);    // Stop sound...

    delay(1000);    // ...for 1sec

    tone(buzzer, 1000); // Send 1KHz sound signal...

}

else if ((analogRead(0)*5.00/1023.00) > 0.80)

{

    lcd.print("Good");

    tone(buzzer, 1000); // Send 1KHz sound signal...

    delay(700);    // ...for 0.7 sec

    noTone(buzzer);    // Stop sound...

    delay(700);    // ...for 0.7sec

    tone(buzzer, 1000); // Send 1KHz sound signal...

}

else if ((analogRead(0)*5.00/1023.00) > 0.00)

{

```

```
lcd.print("Bad");

tone(buzzer, 1000); // Send 1KHz sound signal...

delay(500);    // ...for 0.5 sec

noTone(buzzer); // Stop sound...

delay(500);    // ...for 0.7sec

tone(buzzer, 1000); // Send 1KHz sound signal...

}

else

{

noTone(buzzer); // Stop sound...

lcd.print("");

}

delay(250);

}
```