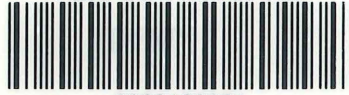


DUAL FUNCTION MOUSE

PERPUSTAKAAN UMP



0000103074

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A report submitted in partial fulfillment  
Of the requirements for the award of the degree of  
Bachelor of Computer Science (Computer Systems & Networking)

Faculty of Computer Systems & Software Engineering  
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JUNE, 2015

## STUDENT'S DECLARATION

I hereby declare that the work in this report is my own except for the quotations and summaries which have been duly acknowledged. The report has not been accepted for any degree and is not concurrently submitted for award of other degree.

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## ABSTRACT

A computer mouse is an input device that is most often used with a personal computer. Moving a mouse along a flat surface can move the on-screen cursor to different items on the screen. Today, many computer mice use wired and wireless technology and have no wire. This Dual Function Mouse developed caused by problems faced by computer mice's users while using the existing device where, the wireless mouse's batteries run out of power accidently in the middle of their activities. Moreover, they need to stop their work or activities and spend money to buy new batteries. It will caused more money spend in a long term period. Besides that, wired mouse's users need to purchase a new wired mouse when the mouse's cable gets broken. Accordingly the problem statement, Dual Function Mouse developed to improve the quality and users performance in doing their activities such as doing work, playing computer games, and so on.

## ABSTRAK

Tetikus komputer merupakan perantiinput yang paling kerap digunakan dengan komputer peribadi. Menggerakkan tetikus di sepanjang permukaan yang rata boleh menggerakkan kursor pada skrin untuk item yang berbeza pada skrin. Hari ini, ramai tikus komputer menggunakan teknologi berwayar dan tanpa wayar dan tidak mempunyai wayar. Ini Fungsi Dual Mouse dibangunkan disebabkan oleh masalah yang dihadapi oleh pengguna tikus komputer semasa menggunakan peranti yang sedia ada di mana, bateri tetikus tanpa wayar kehabisan kuasa sengaja di tengah-tengah aktiviti mereka. Selain itu, mereka perlu berhenti kerja atau aktiviti-aktiviti mereka dan menghabiskan wang untuk membeli bateri baru. Ia akan menyebabkan lebih banyak wang dibelanjakan dalam tempoh jangka panjang. Selain itu, pengguna tetikus berwayar yang perlu membeli tetikus berwayar baru apabila kabel tetikus yang mendapat rosak. Oleh itu pernyataan masalah, Fungsi Dual Mouse dibangunkan untuk meningkatkan prestasi kualiti dan pengguna dalam melakukan aktiviti-aktiviti mereka seperti melakukan kerja, bermain permainan komputer, dan sebagainya.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 INTRODUCTION

Project engineering Dual Function Mouse is system will be develop to help and make it easier to computer's user in doing their activities or work without any disturbing issues. In a meantime, it will reduce time and work performance due to less distraction from existing computers mouse.

Wireless mouse and wired mouse is the examples of peripherals device that control cursor on computers or laptop that contain graphic user interface (GUI) in terms of delivering the output of the system or software. These two types of devices need a medium to transfer data to the workstation that been mentioned above either through USB wired cable or through radio frequency.

The purpose of the project is to combine the function of these two devices into one device and also the battery can be recharge while using the device. This project can help computer users to perform well while doing their work using computers or laptop by reducing the problem. There are several problem that have been faced by computer's users in term of existing device functioning.

## 1.2 PROBLEM STATEMENT

The problem issues arise based on user experience with the current computers mouse device either it is wireless or wired. Dual Function Mouse will be developed based on the problem below.

There are 3 problems that's need to be state accordingly to user experienced.

### Wireless Mouse

- i. The pointing device stops working after several minutes of use.
- ii. The battery is run out of power while using it.
- iii. The signal interference distract by others wireless signal.

### Wired Mouse

- i. The wired cable gets stuck with other things while doing gaming activities which causes you to tug, pull, and reposition the USB cable.
- ii. The range is limit by the wired cable.
- iii. The user need to roll the cable whenever their moves to another place especially for laptop's user

### 1.3 OBJECTIVE

The implementation of this project is expected to reach the following objectives:

- i. To enhance the existing computer wireless and wired mouse into one device.
- ii. To reduce the problem faced while using computer wired and wireless mouse.
- iii. To develop prototype Dual Function Mouse using electrical component.
- iv. To apply alternative method inside the existing device with additional battery rechargeable function.

### 1.4 SCOPE

- Can be use in wired and wireless.
- The battery mouse can be recharge while the cable is plug in.
- The wireless range approximately up to 4.5 meter.
- The mouse can be use in wire without batteries in it.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

This chapter will explain about the existing device that related with this project and the development of Dual Function Mouse. Studies on existing device have been done to find the comparison between the advantage and disadvantage of the existing device. This chapter likewise incorporates the depiction of improvement innovation, methodology and procedure decided to add to the project.

## 2.2 EXISTING DEVICE

There are two types of existing device which is wired mouse and wireless mouse. These two peripheral devices have different type of method to implement the same function to give an output to computer's users. These are comparison between two existing devices:

- i. Wired Mouse
- ii. Wireless Mouse

	Wired Mouse	Wireless Mouse
Batteries consumption	No	Yes
Fast response time	Fast	Faster
Free to move	Limit by cable length	Yes
Wireless interference	No	Yes
Cords	More than wireless	Less

Table 2.1 : Existing Device Comparison



## **2.3 EXISTING SYSTEM DESCRIPTION (Wired Mouse)**

### **2.3.1 Advantages of system**

- i. **More safe**  
Wired mouse does not use any wireless type. Hence, there is no possibility of inadvertently gaining control of someone else's computer.
- ii. **Save cost**  
This device use USB cable that plug into computers to consume power to operate. So, the user does not need to buy and replace the batteries as power supply whenever it run out of power like wireless mouse.

### **2.3.2 Disadvantages of system**

- i. **Limited movement**  
Limit to the length of the USB cable. The user cannot go beyond the bounds of that cable, and if it's too short the user may have to end up moving your entire computer just to use your mouse.
- ii. **Twisted cables**  
The mouse cable can get in the way of users activities (which can be especially problematic for gamers), which causes the user to tug, pull, and reposition the USB cable.

## **2.4 EXISTING SYSTEM DESCRIPTION (Wireless Mouse)**

### **2.4.1 Advantages of system**

i. Free to move

The wireless mouse has more space to move rather than wired mouse because wireless mouse did not attach to any cable.

ii. Smoother movement

This tends to be the biggest draw for wireless users: There is simply no cord to get tangled up in when you're using a wireless mouse. This also tends to make them a bit more travel friendly, with fewer cords making a snarled mess in your carry-on bag.

### **2.4.2 Disadvantages of system**

i. Need to spend more money on batteries

The mouse has to be powered somehow, which means the user going to be replacing the batteries every time they run low, which can end up costing you a significant amount of money in the long run.

ii. Wireless interference

Since the mouse is wireless it's susceptible to wireless interference. A lot of wireless interference with other devices, there is a chance that the mouse will not be able to use.

## 2.5 FLOWCHART

### i. Wired mouse flowchart.

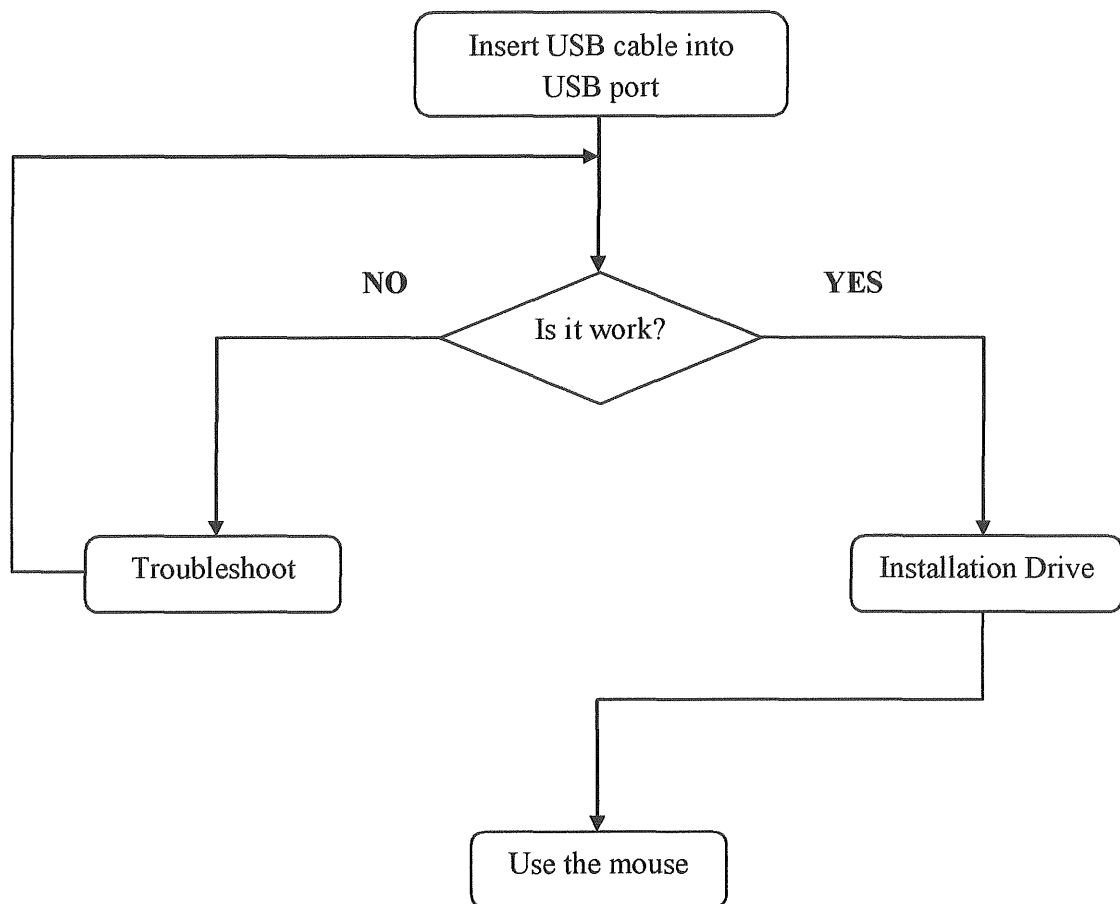


Figure 2.1 : Flowchart for wired mouse

## ii. Wireless mouse flowchart.

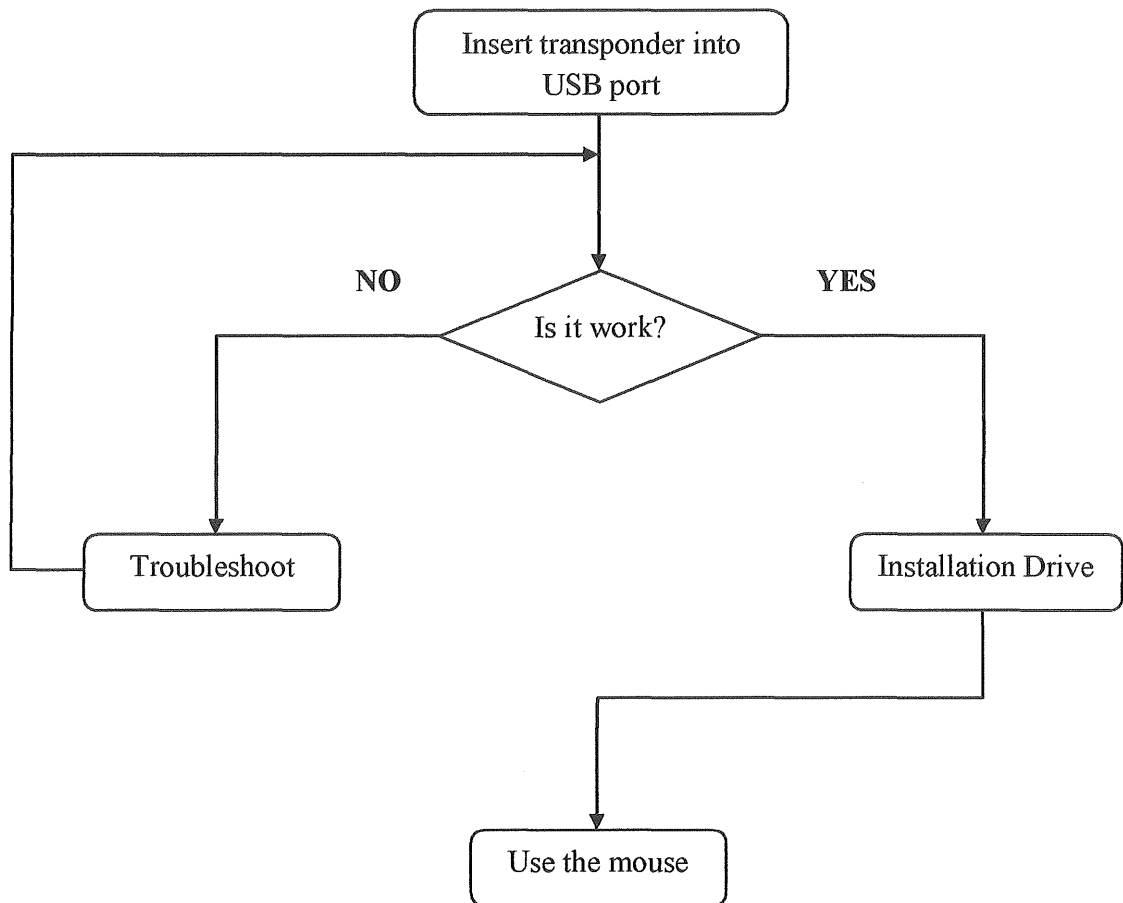


Figure 2.2 : Flowchart for Wireless mouse

## 2.6 CONCLUSION

For the conclusion, this chapter explained about the existing computer mouse pointing device. There are comparison between the existing device which some of them have the own advantages and disadvantages. Based on the explanation and the information on this chapter, this project is to improve and enhance the existing computer mouse pointing device better than existing device. By making computer mouse pointing device with dual function, it will help computer users to reduce their problem in terms of batteries usage, performance, limited range, flexibility and so on.

This new device can be used in two ways which is in wired and wireless. Besides that, by making this new dual function computer mouse pointing device, it will save money for computer users especially that using wireless mouse because this new device will charge the batteries while the computer users connect the USB cable to their laptop or PC. On the other hand, it will fulfill the needs of computer users in terms of computer mouse pointing device performance.

### 3.2 PROJECT METHODOLOGY

The methodology is essential when creating particular project. It is a pointer that can influence the general advancement of the task. An utilization of fitting procedure can control the designer through the whole work to address the issues of client. There are various sorts of systems that have been made via specialists, for example, the Rapid Application Development(RAD), it is the system development life circle ( SDLC ) ,waterfall model, structured systems analysis and design method ( SSADM ) and others.

To achieve all objectives for project Dual Function Mouse, the Rapid Application Development RAD model is the main methodology used in order to develop the system. The stages include: (1) Requirement Planning Phase, (2) Project Design Phase, (3) Development Phase, and (4) Implementation Phase. Figure 3.1 below is a software process model used to represent the different stages in software development in RAD.

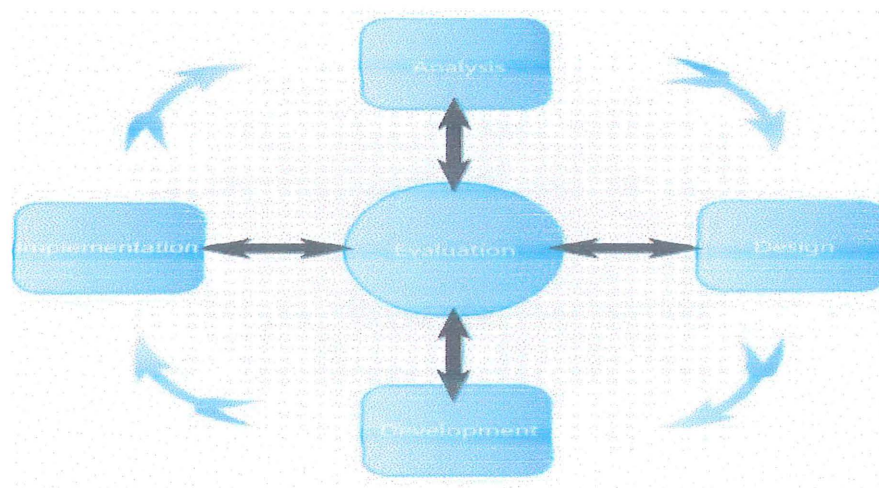


Figure 3.1 RAD model

### 3.3 SYSTEM ANALYSIS

Meaning of necessities is the most critical piece of this task. Need a clarification of what the framework ought to do. For this situation, the product's general structure and degree characterized and useful and non-practical prerequisites, what of the innovation, the basic outline of all the deliberate information for this situation.

The advancement of an instrument utilizing this computer's mice will be the start of the task by the test arrangement. Examination needed for this part will help to guarantee that purchasers comprehend the framework prerequisites either the client or the framework side. For this situation, the issue must settle the characterized venture. The most recent circumstance is dissected, and the objective of this task ought to be chosen.

### 3.4 SYSTEM PLANNING

The System Planning stage begins from characterizing the issue and extent of the venture. This movement is essential in giving the arranging stage. Plus, the following stride in this stage is to make the task plan so that the venture can be done legitimately. A point by point timetable utilization with errand and the action of portable cultivating framework is show in Gantt chart. The Gantt chart will be to apply in Microsoft task and it will be referred through the work and the time it will take. Additionally, it is to encourage and satisfy client needs completely. The strides taken are;

- i. Using a string of innovative offices or exploration through the web to get more data about the framework to be produced
- ii. Use systems for speaking with others to get more thoughts and new routines for experienced individuals as chiefs, instructors, architects and others to build up the project.

### 3.4.1 HARDWARE REQUIREMENTS

Hardware requirements are divided into developer hardware requirements and user hardware requirements. Developer hardware requirements refer to the hardware specification required for developer to develop Dual Function Mouse.

Hardware	Purpose
Soldering tool	To melt solder so that it can flow into the joint between two workpieces.
Solder	Used to join together metal workpieces and having a melting point below that of the workpiece(s).
Wire	To allow electricity flow into the components.
Voltmeter	To measure electrical potential difference between two points in an electric circuit.
Rechargeable batteries	Battery can be recharge.
Electrical components	To make a complete electric circuit.
Computer's mouse	To convert the mouse into dual function.
Micro USB cable	Connector between mouse and computers.

Table 3.1: Hardware requirement

The need to finish this undertaking and everything things need to be utilized as a part of the necessities examination ought to actualize and utilize the framework to guarantee the right working.



### 3.4.2 SOFTWARE REQUIREMENTS

Software requirements play a big role in term to complete this project.

<b>Software</b>	<b>Purpose</b>
Windows 7	Operating System
Microsoft Office Word 2010	Documentation
Microsoft Power Point 2010	Slide presentation
Microsoft Project 2010	Schedule and planning project
Microsoft Visio 2013	Design circuit scheme

Table 3.2: Software requirements

### 3.5 SYSTEM DESIGN

System and software design gives and overview Dual Function Mouse system design, and circuit design. In designing the system, flow is explained using flow chart. The circuit design is explained with computing sketch.

### 3.5.1 SYSTEM ARCHITECTURE

A construction modeling portrayal is a formal depiction and representation of a system, composed in a manner that backings thinking about the basic properties of the project. It characterizes the system parts or building pieces and gives an arrangement, from which items can be secured, and system built up, that will cooperate to actualize the general system.

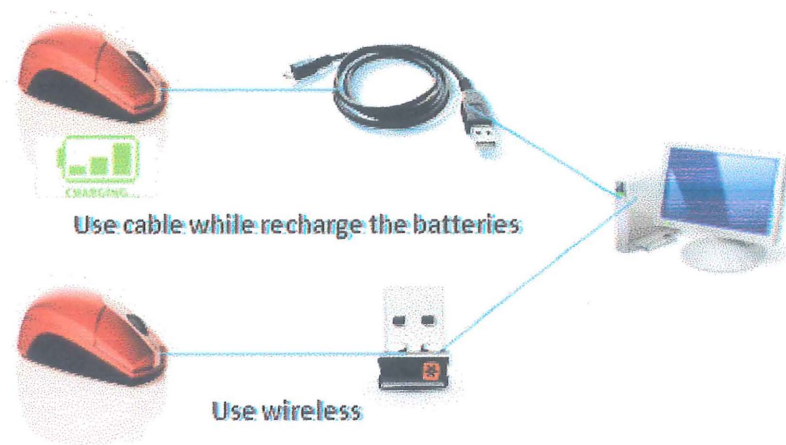


Figure 3.2 System Architecture

### 3.5.2 FLOWCHART

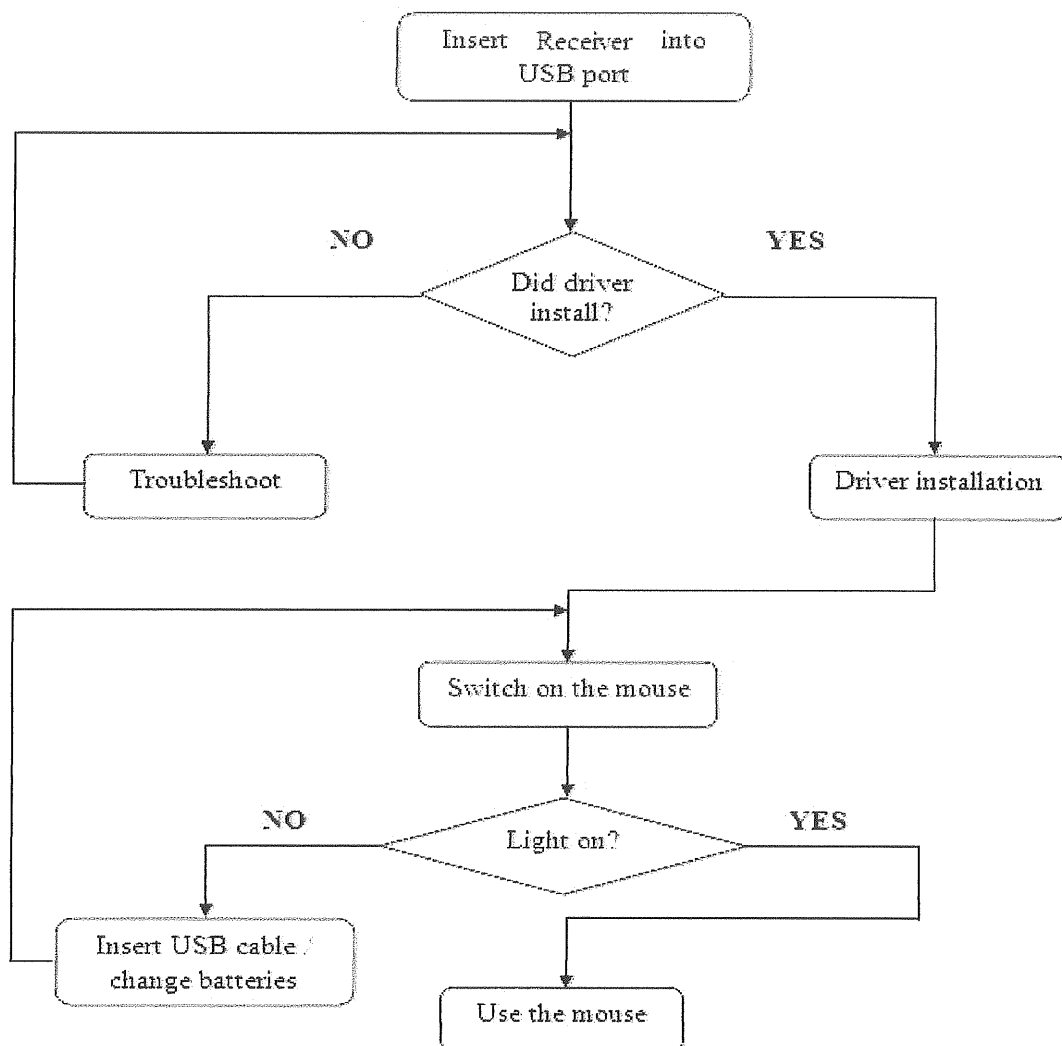


Figure 3.3: System flowchart

Usually when users plug in the receiver into computer, driver will install automatically. The computer mouse will operate when there were electrical power supplies to it according to its voltage. By connecting between computer USB port and the micro USB cable into the computer mouse, the batteries will recharge due to power coming through the micro USB cable while the computer mouse is operating.

### 3.5.3 CIRCUIT DESIGN

In the system, the electrical components should be place based on the design below.

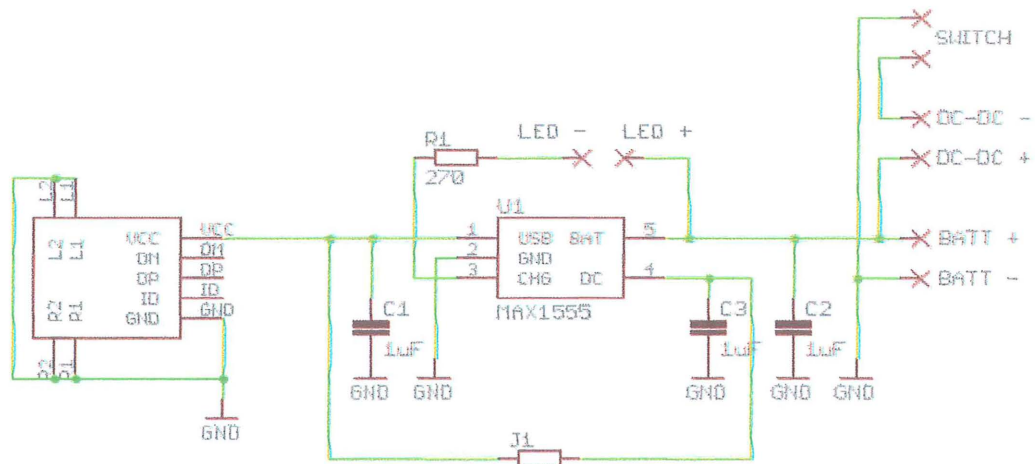


Figure 3.4: The circuit scheme for charger

### 3.6 IMPLEMENTATION PHASE

Otherwise called as the Deployment Stage, this stage includes final user testing and training, data conversion, and the implementation of the application system. This system will be developed based on the design that is created on design phase. In this phase, the actual electrical components shall be done according to the standard requirement. This phase develops and implements all the design requirements identified in the earlier phase. The development involves the installation electrical components part into printed circuit board that been design using Microsoft Visio 2013.

### **3.7 SYSTEM TESTING**

Once the schemed have been design, the circuit testing is begun. The testing process focuses on each phase to determine the best technique. The result will be discussed in Chapter 4. Testing process uses actual components that been assemble onto printed circuit board. A sample rechargeable battery has been used and voltmeter has been used to determine either the power increase or decrease while micro USB cable was connected into computers USB port. The safety precaution is important during this testing phase.

### **3.8 CONCLUSION**

The greater parts of the procedures and procedures that operate in this system have been clarified in this section. For this part, RAD method has been picked as a source of perspective and direction to add to the undertaking.

## **CHAPTER 4**

### **IMPLEMENTATION**

#### **4.1 INTRODUCTION**

This chapter describes more detail in structure design and implementation requirements in terms of designing the circuit, functionality, guide in the development, and documentation. Generally, this chapter describes the development of the projects that have been designed. In addition, the structure of the circuit is the main role to carry out the function of this project.

## 4.2 IMPLEMENTATION REQUIREMENT

There are tools and technologies need to be use to develop this project. such as soldering tool, Printed Circuit Board, USB cable, Li-Po 3.7 battery, and others electrical component.

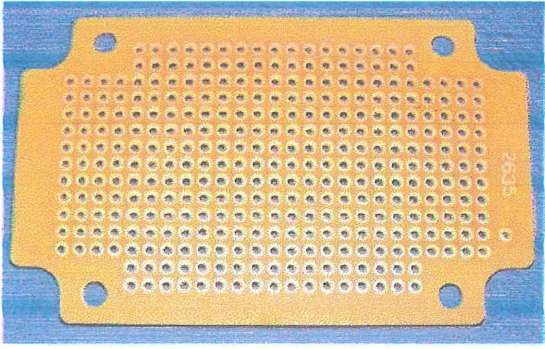
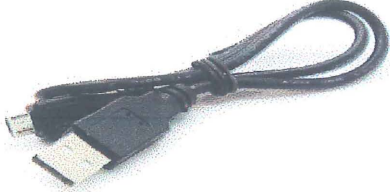

Printed Circuit Board	
USB cable	
Rechargeable AAA battery 1.5V	

Table 4.1 : Implementation requirement

### Charger components

- IC 555
- Transistor BC 548
- Diode (6A4 x5 ,1N4007
- Zener diode (5.1V)
- LED (red, blue)
- Capacitor 4700uF,25V
- Resistor (1K x 3,820,2x10E 10W)
- Variable resistor 10K
- Relay 12V,10A
- Transformer 230V/0-15,5A

All the components above need to be attach to the Printed Circuit Board.



### 4.3 SYSTEM IMPLEMENTATION

In this phase, each part plays important role to its own particular parts.

Positive terminal of the upper comparator of 555 is associated with reference voltage so as to kill the charger if the battery charges over 3.7V

Reference voltage is gotten by uniting a zener diode in arrangement with a resistor.

In the event that the battery voltage is more noteworthy than 3.7V, comparator yield goes high and flip lemon will be set. This turns OFF the transistor and the transfer.

In the event that the battery voltage is underneath the preset voltage (set by us), lower comparator will reset the flip lemon. This turns ON the transistor and the transfer will change to charge the battery.

The revive voltage (preset voltage) can set by shifting the variable resistor.

Power ON is shown by a red LED and charger ON status is demonstrated by a green LED.

### 4.4 SYSTEM DESIGN

In this phase, the method of the circuit design will be explained in detail. In implementation phase, Microsoft Visio 2013 has been used as a tool in designing circuit scheme for this project.

#### 4.4.1 INTERFACE

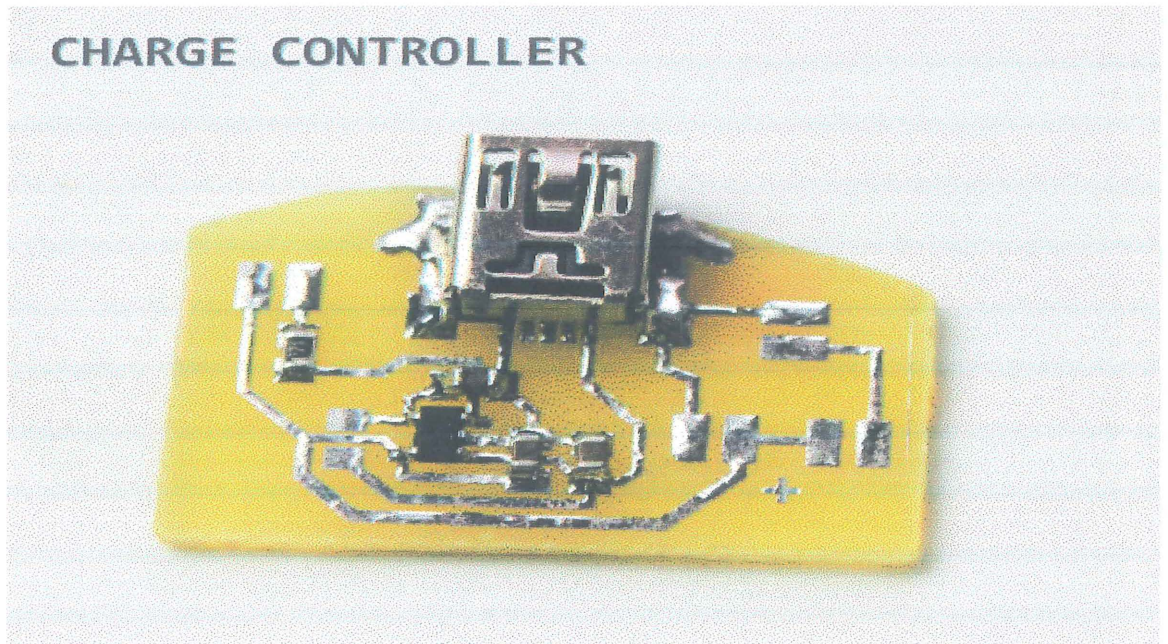


Figure 4.2: The custom charger board

Based on figure 4.3, the role of the circuit is to supply battery power from computer's USB port by using micro USB cable.

## CHAPTER 5

### RESULT AND DISCUSSION

#### 5.1 INTRODUCTION

In this chapter, a brief explanation about the output of Dual Function Mouse will be described. The scope of the project must be achieved at the end of the project based on the requirement and objective that have been discussed. Following is the results of the Dual Function Mouse.

#### 5.2 RESULT ANALYSIS

After completion of testing and implementation, there are several things that can be bring trough this deviceto determine the potential of the system meet the ultimate goal. Overall, this system has been successful in meeting objectives such as:

- i. To convert single function mouse to dual function mouse.
- ii. To design a computer mouse battery can be rechargeable while using the device.
- iii. To develop computer mouse with more systematic and faster by using wireless and wired in one device.

Dual Function Mouse has three function categories and they have respective duties. Among these tasks are:

i) Wireless connection via RF

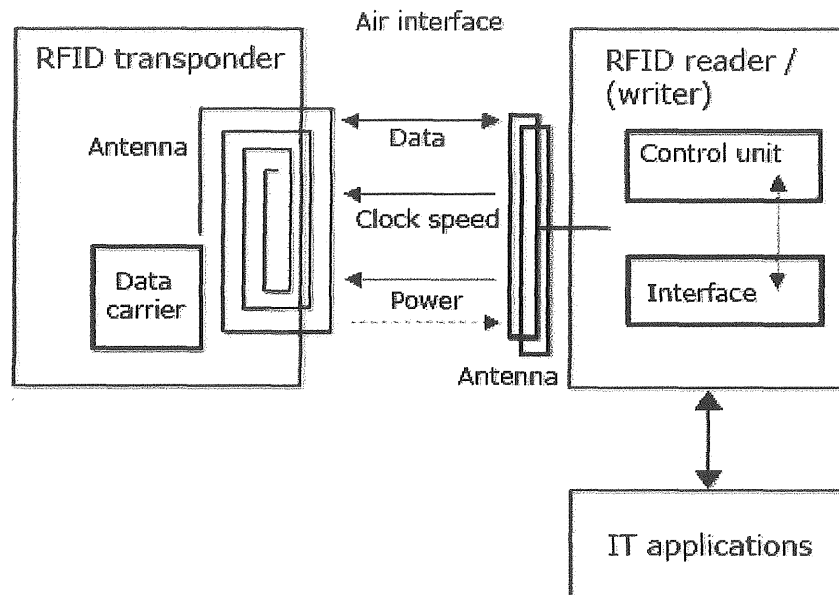


Figure 5.1: Wireless application

Figure 5.1 shows the radio frequencies works between transponder and reader. The radio frequency RF's transmitter squirming an electron in one area. This squirming electron causes an expansive influence, to some degree much the same. The impact is an electromagnetic (EM) wave that goes out from the introductory area bringing about electrons squirming in remote areas. A RF collector can identify this remote electron squirming.

The range determined by following equation:

- **dB - Decibels**

Decibels are logarithmic units that are often used to represent RF power. To convert between milliWatts (mW) and decibels (dB), use the following conversion equations ( $P$  = power): (mW to dBm)  $P_{dBm} = 10 * \text{Log}_{10}(P_{mW})$   
(dBm to mW)  $P_{mW} = 10^{(P_{dBm}/10)}$

The installation for using wireless is the following given:

1. Insert the batteries into the mouse.
2. Connect the receiver to the computer.
3. Connect the mouse to the receiver.
4. Test the new mouse. At the point when the cursor moves when you move the mouse, you have joined the mouse legitimately.
5. Adjust the mouse settings. Utilize through PC's settings to modify the mouse's sensitivity.

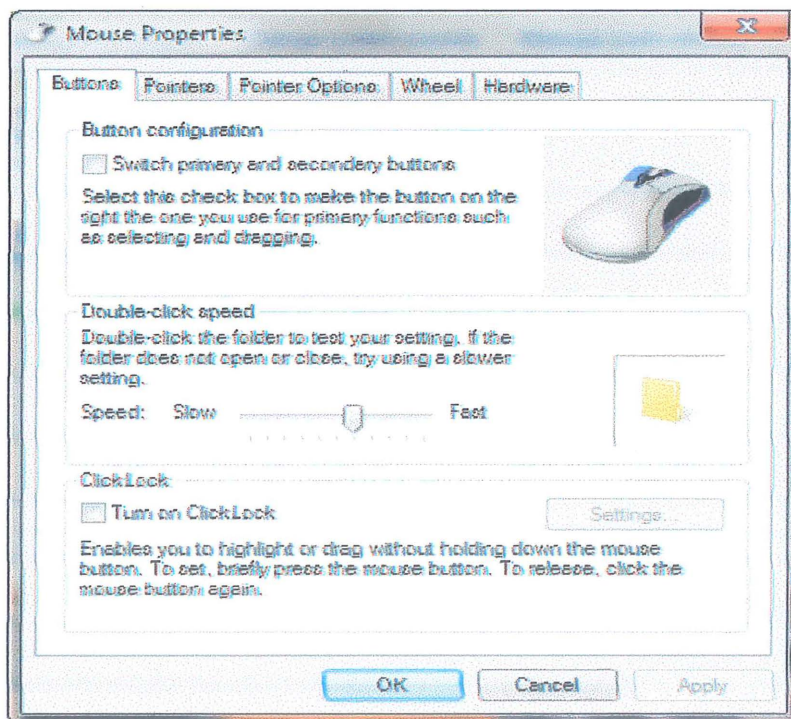


Figure 5.2: Adjust mouse settings

- ii) Wired connection by using micro USB cable.

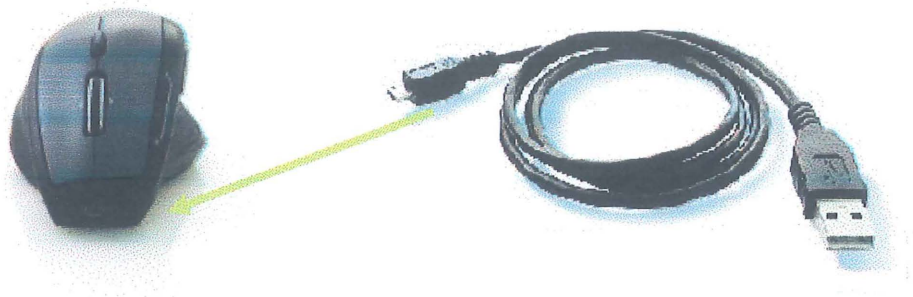


Figure 5.3: Cable attachment

Figure 5.2 show the micro USB cable attachment into the mouse. The micro USB functions are following below:

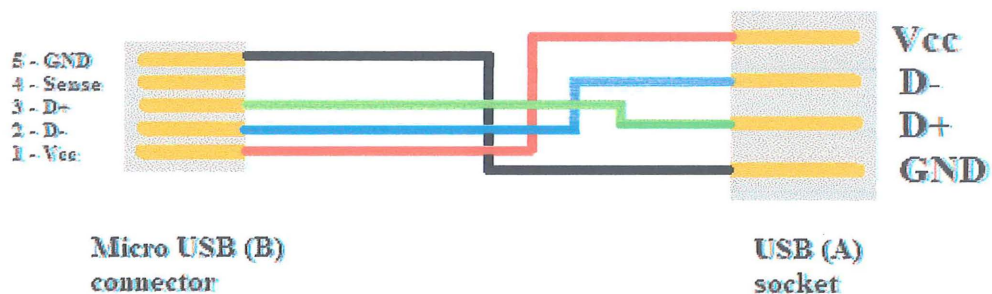


Figure 5.4: Micro USB function

Pin	Name	Color	Function
1	Vcc	Red	+5V supply voltage
2	D-	White	Data- signal line
3	D+	Green	Data+ signal line
4	Sense	-	Not connected: works as B connector connected to GND: works as A connector
5	GND	Black	Supply ground

Table 5.1: Micro USB connector pin names and function

iii) Rechargeable battery.

While micro USB is connected into the mouse, the battery will recharge its power due to power that been supply from computer's USB port that goes through micro USB cable.

### 5.3 ASSUMPTIONS AND DEPENDENCIES

There were several constraints identified during the project development. The constraints are the strength and the weaknesses of the system.

Weakness:

- i. This device need power voltage to operate.
- ii. Its only can be use on a flat surface.
- iii. The range of wireless is only up to 10m.

Strength:

- i. Can be use in wired and wireless
- ii. Do not need to worry about battery power consumption because in can be recharge.
- iii. Easy to use and user friendly.

#### 5.4 FURTHER RESEARCH

Based on the problem and the weaknesses, several improvements have been proposed which are:

- i. Upgrade the Dual Function Mouse with battery percentage indicator on the device to easier for user to know the battery power.
- ii. Adding CPI (or Counts per Inch) button to allow user adjust the sensitivity of the mouse without go to the mouse setting in PC or laptop.
- iii. Add more function on this project.



## **CHAPTER 6**

### **CONCLUSION**

#### **6.1 INTRODUCTION**

The reason for this last chapter is to quickly finish up and compress about the develop project. The assembled information and survey on the objective and undertaking issue, philosophy and methodology improvement likewise will be discussed.

#### **6.2 PROJECT SUMMARY**

Dual Function Mouse is basically a project to introduce a better alternative in doing computing activity through workstation that using graphic user interface such as PC and laptops. The device will not use the internet or intranet, but using data transfer trough USB cable and radio frequency that have been set. Dual Function Mouse is a new implementation system concept in doing computing activity that can be use wireless and wired while the battery is charging. Looking for the problem statements solutions that facing by current device, the objective have been decided to improve the problems. To achieve the

primary objective, the research that related to project has been done in literature review. Besides that, appropriate methodology which RAD has been chosen to develop the project. By the end, the development for the prototype of Dual Function Mouse is successful by follow the methodology and other project requirements. The main objective and scope were achieved in this project.

### **6.3 SUMMARY OF LITERATURE REVIEW**

The research is divided by two parts; there are existing device and implementation technique. Research is conducted to find the related information to implement in the project. First part is the research and explains about the existing device that is implemented to other parties. Then it will compare with advantages, future and also the method how to implement the project. Second part will be discussed about the implementation technique, method and equipment or technology that suitable for the project.

### **6.4 SUMMARY OF METHODOLOGY**

Methodology is instantiated and materialized by a set of methods, techniques and tools. A methodology does not describe specific methods; nevertheless it does specify several processes that need to be followed. To achieve all objectives for project Dual Function Mouse, the RAD model is the main methodology used in order to develop the system. It is the standard process to conduct all steps necessary to analyze and quick design, build, demonstrate, refine, testing and implementation of the system. Each of the phases in the methodology plays its own roles so that the project and development will run smoothly.

## 7.0 REFERENCES

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## APPENDIX

	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1	★	Identify reseach issue	3 days	Thu 2/20/14	Mon 2/24/14	
2	★	deciding the topic and research objective	30 days	Tue 2/25/14	Mon 4/7/14	1
3	★	approve of the topic and research objective	3 days	Tue 2/25/14	Thu 2/27/14	1
4	★	preparation of project research proposal	30 days	Fri 5/23/14	Thu 7/3/14	7
5	★		1 day?	Fri 4/25/14	Fri 4/25/14	6
6	★	chapter 1	1 day?	Thu 4/24/14	Thu 4/24/14	1
7	★	introduction	19 days	Tue 2/25/14	Fri 3/21/14	1
8	★	backgroud of study	1 day	Mon 4/28/14	Mon 4/28/14	5
9	★	problem statement	1 day	Tue 2/25/14	Tue 2/25/14	1
10	★	research objective	2 days	Tue 2/25/14	Wed 2/26/14	1
11	★	scope of study	1 day	Fri 2/28/14	Fri 2/28/14	3
12						
13	★	chapter 2				
14	★	literature review	35 days	Fri 2/28/14	Thu 4/17/14	3
15						
16	★	chapter 3				
17	★	research methodology	25 days	Fri 2/28/14	Thu 4/3/14	3
18						
19	★	final complication	2 days	Tue 4/8/14	Wed 4/9/14	2
20	★	prepair presentation	2 days	Tue 4/8/14	Wed 4/9/14	2
21	★	presentation	1 day	Tue 2/25/14	Tue 2/25/14	1

