

MAILBOX INTEGRATED WITH GSM

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Special dedication to my beloved parents, Suhaimi Bin Ismail and Halimatul Saadiah Binti Abd. Rahman, my entire siblings, my friends Nurul Hanis Binti Shahbudin, Asyraf Bin Abd Razak, Mohd Shaufy Bin Suhaimi, all my dearest friends and my kind hearted supervisor Nur Fatihah Binti Azmi.

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ABSTRACT

Some people mail is very important to them. They works depend on the customer mail. For example, Lawyer, Banker, Online Business and Writer they need feedback letter from their client as their backbone to move forward and to ensure their business well done. Now a day's cellular is one the most important system that been used to connect people. GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM is the most popular standard for mobile telephony systems in the world. This project is mainly about a system based on real monitoring to ensure the mail is arriving at home. The Smart Mail Box is a normal mailbox with a system where it will automatically inform the owner of the house that they got a mail at home. The Smart Mail Box will leave a message via (SMS) short message system to the number that been registered. A sensor from one point to other point is always touching each other act as a sensor to trace the mail. Once the mail cut of the laser the system will send short message system (SMS) via GSM to the number that been record to the system. Therefore, the owner will automatically notify that they got a mail at home, office or etc.

ABSTRAK

Sesetengah orang, emel adalah sangat penting kepada mereka. Mereka bekerja bergantung kepada emel pelanggan. Sebagai contoh peguam, pegawai bank, perniagaan online, dan penulis. Mereka memerlukan surat maklum balas daripada pelanggan mereka sebagai tulang belakang mereka untuk bergerak ke hadapan dan untuk memastikan perniagaan mereka berjalan dengan baik. Zaman kini, telefon mudah alih adalah salah satu system yang sangat penting untuk menghubungkan orang ramai. GSM adalah salah satu rangkaian dimana telefon mudah alih akan berhubung dengan GSM untuk mencari rangkaian-rangkaian lain di dalam kawasan terdekat. GSM adalah alat komunikasi yang diketahui di seluruh dunia. Keutamaan projek ini adalah mengenai sistem yang berdasarkan pemantauan sebenar bagi memastikan surat yang tiba di rumah. Sistem GSM Mailbox dimana ia secara automatic akan memaklumkan kepada pemilik bahawa terdapat surat di dalam peti surat mereka. GSM Mailbox akan meninggalkan mesej melalui SMS ke nombor yang telah didaftarkan. Sensor dari satu titik ke satu titik yang lain akan sentiasa bersentuhan sebagai operasi sensor untuk mengesan surat. Apabila surat memotong sistem sensor, sistem akan menghantar SMS melalui GSM. Oleh itu, sistem akan secara automatik memberitahu bahawa mereka mendapat surat di rumah, pejabat atau sebagainya.

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LIST OF ABBREVIATIONS

PCB	-	Printed Circuit Board
RF	-	Radio Frequency
Rx	-	Receiver
Tx	-	Transmitter
IC	-	Integrated Circuit
DC	-	Direct Current
AC	-	Alternate Current
LED	-	Light Emitting Diode
ADC	-	Analog Digital Converter
I/O	-	Input/ Output
RAM	-	Random Access Memory
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
PIC	-	Peripheral Interface Controller
PSM	-	Projek Sarjana Muda
FYP	-	Final Year Project
V _{cc}	-	Collector voltage
V _{GND}	-	Ground Voltage
GSM	-	Global System for Mobile Communication
SMS	-	Short Messaging Service
RISC	-	Reduced Instruction Set Computing
SRAM	-	Static random-access memory
LCD	-	Liquid Crystal Display

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CHAPTER I

INTRODUCTION

This chapter will discuss a brief about the introduction of the project. Where, it state about the purpose of the project, objective, scope of work, problem statement and advantage acquire from the project.

1.1 Introduction of the project

Some people mailbox is very important to them. They works depend on the customer mail. For example, lawyer, banker, online business and writer they need feedback letter from their client as their backbone to move forward and to ensure their business going well. Also some of country they have a mail robbery issues either their mail has been stolen or their mail post box been smashed.

Nowadays cellular is one the most important system that been used to connect people. GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM (Global System for Mobile Communications: originally from Grouped Special Mobile) is the most popular standard for mobile telephony systems in the world. Its ubiquity enables international roaming arrangements between mobile phone operators, providing subscribers the use of their phones in many parts of the world. GSM differs from its

previous technologies in that both signaling and speech channels are digital, and thus GSM considered a second-generation (2G) mobile phone system. This also facilitates the widespread implementation of data communication applications into the system.

This project is mainly about a system based on real monitoring to ensure the mail is arriving at home. The Smart Mail Box is a normal mailbox with a system where it will automatically inform the owner of the house that they got a mail at home. The Smart Mail Box will leave a message via (SMS) short message system to the number that been registered.

A sensor from one point to the next point will touch to each other to trace the mail. Once the mail cut of the laser, the system will send short message system (SMS) via GSM to the number that have been recorded to the system. Therefore, the owner will automatically notify that they got a mail at home, office or etc. The system also sending information about the letter size which are small, medium and large. Small letter is size from 5.5 cm to 11 cm. While medium size is 12 cm to 16.5 cm and the larger letter is around 17 cm to 22 cm.

1.2 Problem statement

Below show the problem possibilities occur without the GSM Mailbox System:

- Inability of the user to know each mail and packages arrive in their mailbox.
- Worried about the important mail and packages been stolen or loss.

1.3 Objective of Final Year Project

The project will be carried out during the final year. In this project, we will work individually with a supervision of their respective department academic members.

The aim of FYP is to provide the opportunity for student to apply and integrate the theoretical knowledge and principles taught in the course in solving technical problems. It also provides the opportunity for the students to demonstrate independence and originality, as well as to plan and organize project over a certain period of time. The main objectives of the course are to:

1. Document all findings and problem encountered
2. Apply practical hands-on techniques in process, quality control and related analysis in their specialized program.
3. Demonstrate the procedures and methods of project implementation
4. Execute the sequence in various steps required to produce/ manufacture/ test/ solve/ improve the real life industrial projects problem.
5. Analyze findings and results of the project.
6. Produce a technical report and make a presentation.

1.4 Objectives

The aim of the work is to investigate and to design the Smart Mail Box via GSM. In doing so, the bulk of the work can be summarizing as follows:

- To build a Mailbox integrated with GSM network.
- To create detection system that aims to detect the mail that arrives in the mailbox.
- To design a circuit that automatically inform by using mobile network when mail is already in the mailbox.

1.5 Scope of Project

Transceiver (Tx) Data for Smart Mail Box via GSM is an innovation of monitoring the mail in the office or house. The scopes of this project consist of hardware and software. The basic idea is to monitoring software and the main part of the hardware is the keypad, RF wireless and sensor system.

The three level sensor components consist to transmit data through monitoring system. The main processor that controls the whole system is PIC16F877A. Upon this project to be monitor, the data will be transmit and receive through Radio Frequency (RF) to the next processor. The data will then be process to monitor tank level into computer system and record the total condition level.

1.6 Comparison between conventional GSM Mailbox system with GSM Mailbox.

Table 1.1: Comparison between conventional GSM Mailbox system with GSM Mailbox.

No.	Conventional GSM Mailbox System	GSM Mailbox
1	Complete with signature and more secure the letter	More secure the letter
2	Did know Letter Status: i. Number of letter ii. Arrivals Time	Did know Letter Status: i. Number of letter ii. Size of letter
3	i. Price : Too expensive to be built ii. Small number of sensor iii. Electrical wastage	i. Price: Far More Cheaper than other technology. ii. More sensor iii. Avoid electrical wastage

1.7 Advantages and Benefits of the Mailbox Integrated With GSM

- Notify the letter status to their mobile.
- User can know the arrival time and the total letter in their mailbox.
- Notify the size of the letter. (small, medium and large categories)

1.8 Project Basic operation

The Smart mailbox via GSM is operating using 7V adapter. The supply 7V will convert to 5V through Voltage regulator LM7805 to generate the Microcontroller PIC PIC16F877A and 7V to GSM through RS 232 level converter driver or receiver MAX 232.

This system used four IR sensors as detector for incoming letter in to the mailbox. This system will send SMS to the phone numbers that have been set. They will send the details about the letter size and the number of letter. This system wills categories the letter into 3 sizes which are small, medium, and large. The importance of the letter will know by the size of letter. There are four IR sensors that located on the letter slot. The distance between four IR is about 5.5 cm. The GSM mailbox will notify the user regarding the category of letter and the number of letter. After the mailbox is open, automatically the number of letter is reset to zero.

CHAPTER II

LITERATURE REVIEW

In this chapter, it will discuss about the literature review which it contains the information gathered to gain knowledge and ideas in completing the project. There are several sources that have been taken as a resource such as books, thesis, journal and website.

It was included the operation of the circuit, the hardware and software which is useful in the project.

2.1 Voltage regulator module

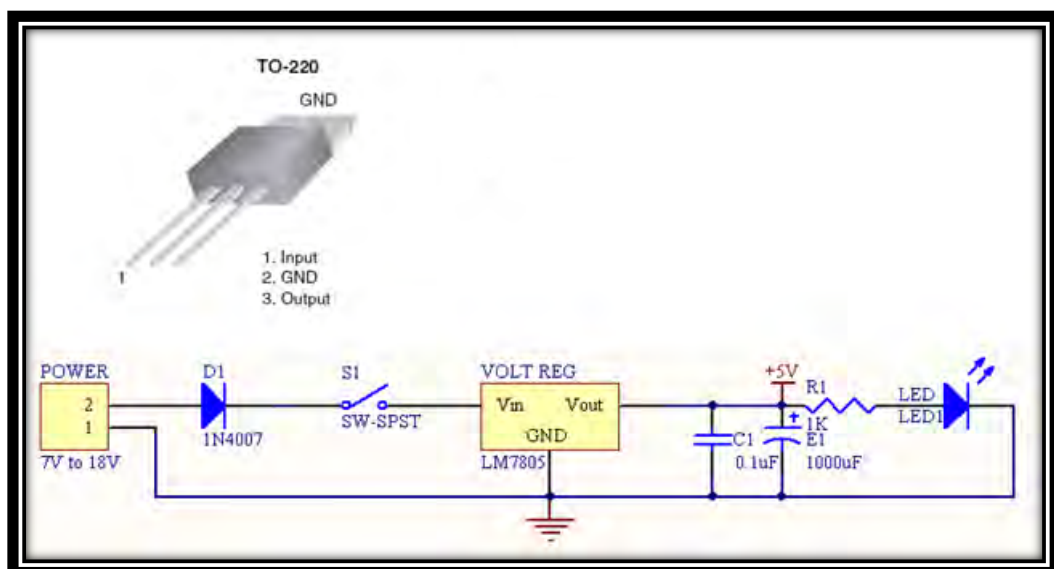


Figure 2.1: The Voltage Regulator System

The voltage regulator module is used to protect PIC and other connected sensors / actuators from over voltage. This is because PIC and all other connected sensors, actuators all support 5V DC only. Over voltage will cause any of the module burn.

LM7805 is used to regulate voltage in the system and output 5V DC (max output current: 1000mA). It supports input voltage from 7V DC to 18V DC. If the input voltage is over, the LM7805 will burn or auto shutdown due to overheat. The generated 5V from LM7805 will be noise filtered by 0.1uF ceramic capacitor and a 1000uF electrolytic capacitor. This is to avoid high frequency oscillation on the outputs which may cause system hang or unstable.

A diode is connected at the input of the LM7805. This is to avoid voltage connected reversely. An on/off switch is used to turn on/off the system and a LED (5V, 5mA) is used to indicate the system is power on/off. The LED is connected through 1KR resistor to limit current pass through LED is 5mA.

2.1.1 Advantages of the LM7805 series ICs

The 7805 series has several key advantages over many other voltage regulator circuits which have resulted in its popularity:

7805 series ICs do not require any additional components to provide a constant, regulated source of power, making them easy to use, as well as economical, and also efficient uses of circuit board real estate. By contrast, most other voltage regulators require several additional components to set the output voltage level, or to assist in the regulation process. Some other designs (such as a switching power supply) can require not only a large number of components but also substantial engineering expertise to implement correctly as well.

78xx series ICs have built-in protection against a circuit drawing too much power. They also have protection against overheating and short-circuits, making them quite robust in most applications. In some cases, the current-limiting features of the 78xx devices can provide protection not only for the 78xx itself, but also for other parts of the circuit it is used in, preventing other components from being damaged as well.

2.1.2 Disadvantages of the LM7805 series ICs

The input voltage must always be higher than the output voltage by some minimum amount (typically 2 volts). This can make these devices unsuitable for powering some devices from certain types of power sources (for example, powering a circuit which requires 5 volts using 6-volt batteries will not work using a 7805).

As they are based on a linear regulator design, the input current required is always the same as the output current. As the input voltage must always be higher than the output voltage, this means that the total power (voltage multiplied by current) going into the 78xx will be more than the output power provided. The extra input power is dissipated as heat. This means both that for some applications an adequate heat sink must be provided, and also that a (often substantial) portion of the input power is wasted during the process, rendering them less efficient than some other types of power supplies. When the input voltage is significantly higher than the regulated output voltage (for example, powering a 7805 using a 24 volt power source), this inefficiency can be a significant issue.

Even in larger packages, 78xx integrated circuits cannot supply as much power as many designs which use discrete components, and therefore are generally not appropriate for applications which require more than a few amps of current.