UNIVERSITI TEKNIKAL MALAYSIA MELAKA

WIRELESS ANNOUNCEMENT BOARD AT SCHOOLS AND COLLEGES

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree in Electronic Engineering Technology (Telecommunication) with Honours

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the Bachelor's Degree of Electronics Engineering Technology (Telecommunications) with Honours (Department of Electronic & Computer Engineering Technology). The member of the supervisory is as follow:

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(SITI ASMA BINTI CHE AZIZ)

ABSTRAK

Papan pengumuman adalah satu perkara yang penting di sekolah dan kolej. Sekiranya ada pengumuman yang perlu disampaikan kepada semua pelajar, orang yang menjaga papan pengumuman perlu menukarkan pengumuman yang terbaru. Masalah papan pengumuman wujud adalah ia memerlukan operasi manual dan sukar untuk mengendalikan. Projek ini adalah mengenai reka bentuk dan pelaksanaan papan pengumuman, dimana ia boleh menghantar mesej dengan menggunakan GSM. Projek ini berdasarkan memapar maklumat di atas papan matriks LED oleh mana-mana destinasi di dunia melalui rangkaian GSM, yang boleh berfungsi untuk mengawal mana-mana papan mesej di peringkat global dari lokasi yang berbeza. Sebelum maklumat yang dipaparkan, buzer dan LED akan hidup untuk memberi perhatian kepada orang ramai tentang pengumuman yang akan datang. Data yang dihantar dipaparkan di papan matriks LED. Setiap kali mereka ingin menyampaikan maklumat, mereka hanya perlu SMS kepada SIM yang berada didalam GSM Modem yang disambungkan untuk pengumuman dipaparkan dan buzer dan LED akan hidup sebelum paparan pengumuman di paparkan. Jadi, mana-mana pensyarah atau guru boleh SMS maklumat yang hendak disampaikan sebagai contoh perhimpunan yang akan diadakan di dewan seminar. Beberapa analisis telah berjaya untuk mengetahui pencapaian sistem dalam memaparkan pengumuman melalui teknologi tanpa wayar. Analisis yang telah dilakukan adalah berdasarkan kepada fungsi lokasi SMS, jumlah watak yang akan dipaparkan dan kelajuan teks penatalan. Kesimpulannya, sistem ini telah berjaya membangunkan dan dianalisis melalui fungsi yang boleh menerima SMS yang dihantar dari telefon mudah alih, memberitahu melalui menghidupkan loceng dan kemudian memaparkan di papan matriks LED.

ABSTRACT

Announcement Board is a primary thing in schools and colleges. When every announcement need to be conveyed to all, a separate person is required to take care of this notices display. In the case of digital displays if they want to change the message or style an operator have to go there. The problem of existed announcement board is that it requires manual operation and hard to handle. This project is mainly about a design and implementation of announcement board, which can send messages by using GSM. This project is based on displaying information on LED matrix board by the any part of world through GSM network, which can function to control any message board globally from different location. Before the information is displayed, the buzzer and LED will turn on to alert people's attention about the upcoming announcement. The data are processed by microcontroller. The data that is sent are displayed on LED matrix board. As this will be the announcement board that will be used in school and colleges, so it will be easier for teachers and lecturers to convey the information. Whenever a message needs to be conveyed, they just need to SMS the message to the SIM in GSM Modem, which is connected, to the Announcement Board and the buzzer will be on before the announcement display on the board. So, this any lecturer or teacher can SMS it the message to be conveyed like urgent gathering of class students at seminar hall. Some analyses have been successfully done in order to find out the system achievement in displaying the announcement through wireless technology. The analyses that have been done are based on the location SMS function, the total character to be displayed and the speed of the scrolling text. In conclusion, the system have successfully developed and analyzed through the function that can accept the sent SMS from mobile phone, notify by switching on the buzzer and then display on the LED matrix board.

DEDICATION

To my beloved parents, supervisor and all friends.

ACKNOWLEDGMENTS

Firstly, thank ALLAH SWT because for HIS blessing, finally I able to complete my final year project with this thesis as well within the allocated time.

I would also like to convey my appreciation to the one and only supervisor, Mrs. Siti Asma binti Che Aziz who has gave me guidance and supported me to complete this project.

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Lastly, my appreciation also goes to lecturers and friends for giving and sharing information for this project development.

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LIST OF ABBREVIATIONS

GSM	-	Global System Mobile Communication
LED	-	Light Emitting Diode
SMS	-	Short Message Service
SIM	-	Subscriber Identity Module
GPRS	-	General Packet Radio Service
RX	-	Receiver
TX	-	Transmitter
AT	-	Attention Commands
TCP/IP	-	Transmission Control Protocol/Internet Protocol
EGSM	-	Extended Global System Mobile Communication
DCS	-	Digital cellular Service
MS	-	Mobile Station
BTS	-	Base Transceiver Station
BSC	-	Base Station Controller
WI-FI	-	Wireless Fidelity
IDE	-	Integrated Development Environment
PWM	-	Pulse Width Modulation
ICSP	-	In-Circuit Serial Programming
I/O	-	Input/Output

CHAPTER 1
INTRODUCTION

1.1 Project Background

Wireless communication has become the most important thing nowadays. Everyone wants simple lives, which do not need to move to control everything. This project, which focuses on wireless technology will ease the human work especially lecturers and students. This project is mainly about the application of wireless technology. It is based on the idea of wireless communication between a mobile phone and GSM network. Announcement boards that are existed nowadays use electronics displays, which is a programmable where it needs to be programmed each time the announcement or notice will be announce. This GSM based announcement board can be used to make existing electronic displays are truly wireless. Through this wireless announcement board, lecturers or teachers can send message to be displayed by using GSM network. The data that sent by the mobile phone through the GSM modem will be processed by the microcontroller. After that, data that have been processed will be displayed on LED matrix board. The system works when an SMS is sent to the GSM modem and the data is processed by microcontroller on Arduino Board and displayed on the LED matrix board. Before the SMS is displayed on the board, microcontroller triggered the buzzer and LED to turn on. After the buzzer and LED is turn off, the SMS will be displayed.

1.2 Problem Statement

Announcement Board is a primary thing in schools and colleges. When every announcement need to be conveyed to all, a separate person is required to take care of this notices display. In the case of digital displays if they wants to change the message or style an operator have to go there. The problem of existed announcement board is that it requires manual operation and hard to handle. Therefore, by using GSM technology which can transfer the message straight to the board, it can lighten the burden and become easy to handle.

Another problem are requiring high cost where they need to pay for the photocopy if they want to share the information through papers for each students as well as waste time and efforts of lecturers as they have to go to attach notices on board. Therefore, design a GSM based Announcement board can fulfill the needed, which is less manual operation and same notice can be displayed at the different places at the same time.

As we wish to control everything without moving an inch, announcement board needs to have wireless access. In present digitalized world, the exploit of GSM and SMS is popular. A new display using the GSM technology to access it by communication between microcontroller and mobile would be effective.

1.3 Objectives of Project

The objectives of this project are:

1. To study about GSM based system application.
2. To design an automatic display based on SMS driven to reduce manual operation.
3. To develop a wireless announcement board where the contents can be updated simply through an SMS which is realized through a microcontroller.

1.4 Scope of Project

This wireless announcement board is a system that microcontroller and GSM technology to display the information. The main component of this system are Arduino board, GSM modem and LED matrix board. The system works when an SMS is received by GSM from mobile phone. The information received are serially transfered through receiver and transmitter connection to the GSM modem. Then, the task will be continue by the microcontroller to process the message and displays on the LED matrix board. The GSM modem used in this system is SIM 900 GSM/GPRS TTL UART Modem that is build with Quad Band GSM/GPRS engine. GSM is used as the wireless communication for this system instead of other wireless technology. Meanwhile, the microcontroller used to processed the information or announcement is ATMEGA328P-PU, an 8-bit microcontroller manufactured by ATMEL. The limitation of this project is the wireless announcement board can only displayed one message of information at a time. If there is any new message sent to the GSM network, the system will automatically deleted the first message and replaced with the new one. Before the information is displayed, the buzzer and LED will turn on to alert people's attention about the upcoming announcement. Therefore, the main focussed on this system is to display the announcement to the LED matrix board from anywhere by using GSM technology.

1.5 Project Overview

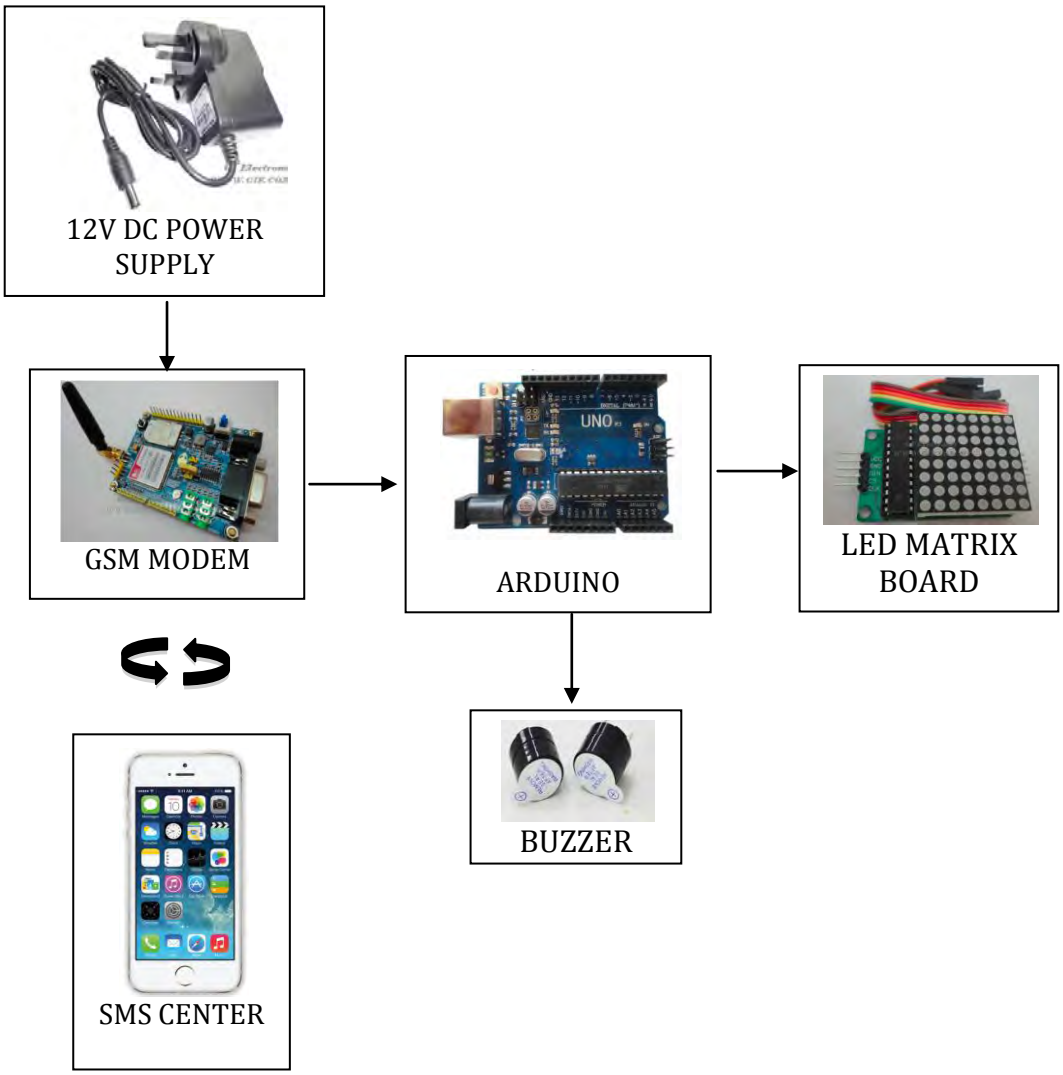

Figure 1.1: Block diagram of project

1.6 Thesis Outlines

This report overall consist of five chapters. These chapters are the implementation of wireless announcement board on school and colleges.

1. Chapter 1 is discussing the project overview such as introduction, objectives, problem statement, and work scope.

2. Chapter II will have the review about previous project and information about the project, which are several components, technology and tools used. There will be also included with details in software and hardware design for wireless announcement board.

3. Chapter III will contain the details about the methodology used to solve problem. All those methodology should be followed to get a better performance.

4. Chapter IV is discussing on the results from the system created which is wireless announcement board. There are also discussing on the analysis based on the system as well as overall project discussion.

5. Chapter V will conclude overall project and recommendation for the project enhancement.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter includes the researches and information about the project that used wireless technology, which is GSM technology and tools used in the study. Besides that, the details on the software and hardware devices for this project are explained.

2.2 Related work

This part shows the literature study on previous project that relate this wireless announcement board. Studied on the previous project have been done based on the technology used and devices used. The hardware and software that have been used also have been study in to develop a new project based on GSM technology. There are some use the other used the other technology like Bluetooth or Wi-Fi instead of GSM technology as the wireless communication.

2.2.1 Display Message on Notice Board using GSM

This notice board basically same with this project as it used GSM technology, but the component and display used is LCD display that makes it different. The idea to design this wireless announcement board is based on this Display message on notice board. Besides that, the operation is based on microcontroller and SIM900 which differ. This system display message shows the use of GSM in sending the message to the board by using the microcontroller (Eh Moderators Team, 2014).

2.2.2 Microcontroller Based Home Security and Load Controlling Using GSM Technology

This microcontroller based home security is mainly about the automation of daily task with electrical devices which is basically used at home. The system is mainly want to control the light or complex chores like remote viewing for the home surveillance. This project is used the GSM technology where it can control home appliances using a basic mobile phone. Moreover, the system shows an advanced security as it can send the massages to the user about the action in the house. It shows the usage of GSM technology that is used as the wireless communication.

2.2.3 Integrated Billing System through GSM Network

This is another project that use the technology of GSM compares to the other wireless technology. The Integrated Billing System is mainly about the development of Water Billing via SMS, which can only receive the SMS through the mobile phone, that is ease the consumer. The system is basically based on a system that is used to processed the water authorized in order to manage the billing without need anyone to do it like before. It is design to receive messages from the meter to central database. The messages about the billing will be processed and then generated the monthly billing at the same time.

Then, the system function by sends another SMS as the notification to the user or owner about the amount of water billing every month. The system was the implementation that used Visual Basic and database to perform the system that works by sending the SMS notification to the user (Mohd Helmy Abd. Wahab,2007).

2.2.4 Vehicle Speed Detection by using SMS

Vehicle speed detection by using SMS is a system that control the speed by using SMS. This system was implemented to a black box for a warning system which function in controlling the speed limitation of express bus via SMS. There are three main part of the system. Firstly is the mobile phone, second is the microcontroller circuit and lastly is relay driving circuit. This system is design so that the bus driver that drove over the permitted limit can be prevented and teach the bus driver to obey the road regulation in order to prevent any accident which cause by the speed driving. These projects have been used PIC 16F873A microcontroller, mobile phone and JAI software for the programming (Elia Nadira Sabudin, 2008).

2.2.5 Power Meter Reading System using GSM Network

The Power Meter Reading System that can function automatically have used the GSM network that is basically about the automation power meter reading. It works by sending the energy consumes to e- billing system.the GSM modem will integrate the digital power meter in kWh. This system shows the function of GSM network that can send the power usage reading in messages straightly to the authorized office. The authorized office will take place by collecting and managing the received message that contains the meter reading to calculate the cost and send back the cost to the respective consumer through message (Tan, H.G.R. Lee, 2007).