



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

INTELLIGENT KEYCHAIN

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree in Electronics Engineering Technology (Industrial Electronics) (Hons.)

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 degree of Bachelor of Engineering Technology (Industrial Electronic) (Hons.). The member of the supervisory is as follow:

.....

(Project Supervisor)

ABSTRAK

Projek yang telah dicadangkan dan di kenalpasti adalah satu peranti yang mana menyediakan sistem yang akan memberi isyarat kepada rantai kunci yang dilengkapi dengan buzzer. Buzer ini akan berbunyi apabila isyarat telefon masuk yang mana di terima oleh GSM modul dan di process data masukkan oleh Arduino untuk data keluaran. Objektif utama projek peranti ini adalah memudahkan masyarakat terutamanya bagi mereka yang kerap kehilangan barang yang dianggap remeh seperti kunci. Dengan adanya peranti ini, barang yang dicari adalah lebih cepat dan mudah untuk dikesan. Peranti pintar boleh dipasang bersama kunci dan apa juga barang yang kecil dan yang kerap dibawa kemana – mana. Peranti ini menggunakan modul GSM, Arduino sebagai penerima dan memproses data masukkan dan keluaran serta telefon sebagai komponen utama. Arduino digunakan untuk dalam peranti ini kerana sistemnya yang lebih mudah untuk menyelesaikan masalah jika masalah berlaku kesilapan pada masukkan dan keluaran data serta mudah untuk kod semula. Ia juga di lengkapi dengan sokongan berwayar sepenuhnya membandingkan kepada sistem tanpa wayar.

ABSTRACT

The project proposed identified is a device which provides a system that will alert key chain comes with a buzzer. Buzzer will sound when the signal incoming phone which was received by the GSM module and the process data entered by the Arduino to output data. The main objective of this device is to facilitate public especially arrangements are frequently lost items such as keys underestimated. With this device, look for items that are faster and easier to detect. Smart devices can be fitted with locks and any small items that often carry around. This devices is use GSM module, Arduino as a receiver and process the data input and output as well as mobile as a key component. Arduino used for this device because the system that is easier to solve the problem. If the problem is an error in the input and output data as well as easy to code again. It is also equipped with a fully wired support compares to the wireless system.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

GSM	-	Global System for Mobile
G	-	Generation
GPRS	-	General Packet Radio Service
4G	-	Fourth Generation
GND	-	Ground
UART	-	Universal Asynchronous Receiver/Transmitter
RST	-	Reset

CHAPTER 1

INTRODUCTION

1.1 Background

This project is about providing a prototype of system alert for a people which is attach to this keychain (for example car key).This project is combining Arduino and GSM technology. The function of GSM is to receive the information send from phone example call or SMS. Through this action, the Keychain will be ringing or buzz because the keychain is attach with the small buzzer and speaker act as indicator. It contact immediately to inform the location of the keychain in real time. The system covered one type of sensor as the basic of security system for home. The sensor is vibration sensor. The operation of this security system is illustrated in Figure 1.1.

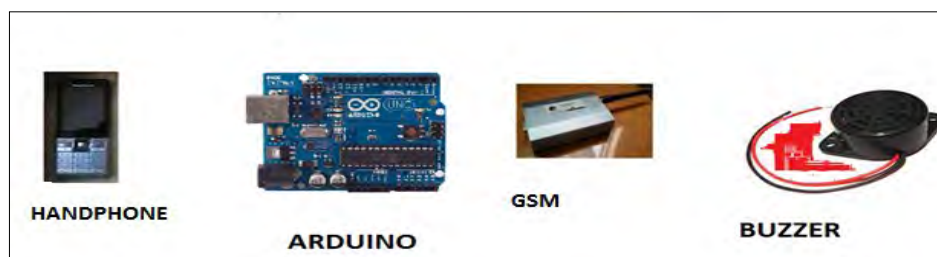


Figure 1.1 Communication Technologies

The new age of technology has redefined communication. Most people nowadays have access to mobile phones and thus the world indeed has become a global village. At any given moment, any particular individual can be contacted with the mobile phone. But the application of mobile phone cannot just be restricted to sending SMS or starting conversations. New innovations and ideas can be generated from it that can further enhance

Technologies such as Infra-red, Bluetooth, which has developed in recent years goes to show the very fact that improvements are in fact possible and these improvements have eased our life and the way we live.

Remote management of several home and office appliances is a subject of growing interest and in recent years we have seen many systems providing such controls. These days, apart from supporting voice calls a mobile phone can be used to send text messages. Sending written text messages is very popular among mobile phone users. Instant messaging, as it is also known, allows quick transmission of short messages that allow an individual to share ideas, opinions and other relevant information. This project used the very concept to design a system that acts a platform to receive messages which in fact are commands sent to control different appliances and devices connected to the platform.

This project designed a control system which is based on the GSM technology that effectively allows control from a remote area to the desired location. The application of our suggested system is immense in the ever changing technological world. It allows a greater degree of freedom to an individual whether it is controlling the household appliances or office equipment's. The need to be physically present in order to control appliances of a certain location is eliminated with the use of our system.

1.2 Problem Statement

- (a) The motivation on developing this project is to decrease lose belonging in our society. This project could be attached with anything as long as our belonging.
- (b) Frequency drop or loss of goods in the community.
- (c) Take a long time to find the lost.

1.3 Project Objective

- (a) To study about GSM and Arduino board.
- (b) To develop prototype GSM Intelligent Keychain using Arduino.
- (c) To help people to relocated the item that they people misplace.

1.4 Project Scopes

The scope of this project is limited and thus, the study is narrowed down to several points. This is to ensure the project is heading to the right direction in order to achieve its objectives. The scopes and guidelines of this project are listed below:

- (a) To learn and understand the basic GSM (Global System for Mobile Communications).
- (b) To study on the Arduino board.
- (c) To study the programming language on Arduino boards.
- (d) To study communication method.

1.5 Report Structure

This report is divided into 5 chapters. Chapter one which is about the introduction has briefly introduced the overall system of the project with title's Intelligent Keychain. This introduction part consists of project background, objectives, scope of project, problem statement, signification of project and report structure.

Chapter 2 presents the literature review which discusses the detailed research on the overall structure of GSM Intelligent Keychain technology. It includes the study of GSM Module (transmitter and receiver), Arduino Uno Board, Buzzer and other theory related with this project and additional component.

Chapter 3 explains about the project methodology. Project methodology gives details about the whole method being used to solve the problems in order to complete this project. This chapter contains the methods used for collecting data, processing and analyzing of data.

Chapter 4 is discusses about the result and discussion of the whole project. It covers the finding and analysis throughout the research and the project development. Besides, this chapter also discusses about the simulation and practical measured results of the circuit used in this project.

Lastly, Chapter 5 explains about the conclusion of this project and recommendations about the future research for the system.

CHAPTER 2

LITERATURE REVIEW

This chapter discusses the research on the overall structure of Intelligent Key Chain which is included the review of GPS GSM module, Arduino Uno, buzzer indicator, programming language and other theory related with this project.

2.1 Reviews on GSM (Global System for Mobile Communication)

GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones. The GSM standard was developed as a replacement for first generation (1G) analog cellular networks, and originally described a digital, circuit-switched network optimized for full duplex voice telephony. For this project, SIM 900 GSM module will be use (Martin, 2013).

First generation refers to the analog “brick phones” and “bag phones” as they were first introduced for mobile cellular technology. Cell phones began with 1G and signify first generation wireless analog technology standards that originated in the 1980s. 1G was replaced by 2G wireless digital standard.

Next is for 2G evolution. 2G signifies second generation wireless digital technology. Fully digital 2G networks have replaced analog 1G, which originated in the 1980s. 2G networks first commercially began on the Global System for Mobil

Communications, or GSM, standard which is first used in commercial practice in 1991 by Radiolinja, a Finnish GSM operator that was founded on September 19, 1988. Radiolinja is now part of Elisa, which was known in the 1990s as the Helsinki Telephone Company.

Between 2G and 3G, 2.5G technology was released. While 2G and 3G have been officially defined as wireless standards by the International Telecommunication Union (ITU), 2.5G has not been defined and was created only for the purposes of marketing. 2.5G has seen some of the advances inherent in 3G networks (including packet-switched systems). Several technologies that have been considered as the evolutionary step to 3G include Enhanced Data rates for GSM Evolution (EDGE) and Code Division Multiple Access (CDMA) 2000 1X (Temple, 2013).

The 3rd generation of mobile networks has become popular largely thanks to the ability of users to access the Internet over devices like mobiles and tablets. The speed of data transmission on a 3G network ranges between 384KBPS to 2MBPS. This means a 3G network actually allows for more data transmission and therefore the network enables voice and video calling, file transmission, internet surfing, online TV, view high definition videos, play games and much more. 3G is the best option for users who need to always stay connected to Internet (Bureau of Telecommunications Regulation, 2012).

4G is the term used to refer to the fourth generation of mobile wireless services that has been defined by the ITU and its Radio Communication Sector (ITU-R) and established as an agreed upon and globally accepted definition in International Mobile Telecommunications Advance (IMT-Advanced).

The ITU has developed requirements for a technology to be considered IMT-Advanced, which is the next-generation wireless technology. An IMT-Advanced cellular system must fulfill the following requirements. In addition to all the 3G facilities, data transmission is believed to go through the roof with speeds ranging between 100MBPs to 1GBPS.

Table 2.1: History of 4G technology

Technology	1G	2G	3G	4G
Design and Implementation	1970 – 1984	1980 – 1991	1990 – 2002	2000 - present
Service	Analog Voice and Synchronous Data to 9.6 Kbps	Digital Voice and Short Message.	Higher Capacity broadband data up to 2 Mbps	Higher capacity complete IP oriented multimedia data to hundreds of Megabyte
Data Bandwidth	1.0 Kbps	14.4 Kbps	2Mbps	100Mbps
Multiplexing	FDMA	TDMA	CDMA	OFDM

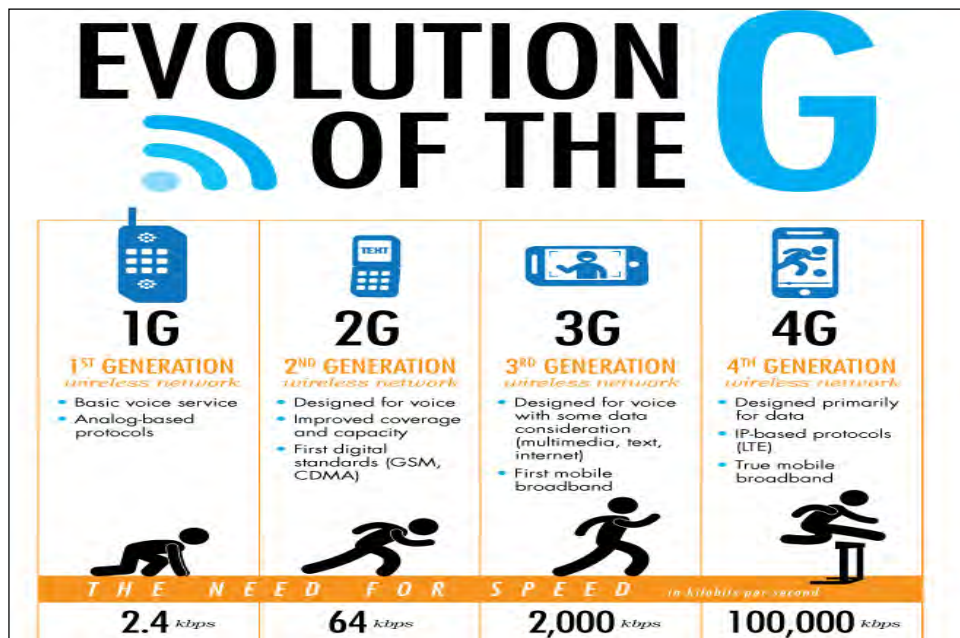


Figure 2.1: Evolution of G

2.2 GSM (Global Review of GSM Module)



Figure 2.2: GSM module SIM900

Designed for global market, SIM900 is a quad-band GSM/GPRS engine that works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM900 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 24mm x 24mm x 3mm, SIM900 can meet almost all the space requirements in User's applications, such as M2M, smart phone, PDA and other mobile devices (SIMCom, 2010).

2.2.1 Power ON GPRS module

User can power on the GPRS module by pulling down the PWR button or the P pin of control interface for at least 1 second and release. This pin is already pulled up to 3V in the module internal, so external pull up is not necessary. When power on procedure is completed, GPRS module will send following URC to indicate that the module is ready to operate at fixed baud rate. Power On/Off and GSM on SwitchText

2.2.2 Indicator LED and Buttons.

NETSTATUS: The status of the NETSTATUS LED is listed in following table:

Table 2.2: NETSTATUS list

Status	Description
Off	SIM900 is not running 64ms On/800ms
Off	SIM900 not registered the network
64ms On/3000ms Off	SIM900 registered to the network
64ms On/300ms Off	GPRS communication is established

STATUS: Power status of SIM900.

PWR: Power status of GPRS module.

PWR: Press the POWER button for a moment to power on the SIM900 module.

RESET: Reset the SIM900 module.

2.2.3 Overview

GPRS module is a breakout board and minimum system of SIM900 Quad-band/SIM900A Dual-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module supports software power on and reset.

2.2.4 Features

- (a) Quad-Band 850/ 900/ 1800/ 1900 MHz.
- (b) Dual-Band 900/ 1900 MHz.
- (c) GPRS multi-slot class 10/8GPRS mobile station class B.
- (d) Compliant to GSM phase 2/2+Class 4 (2 W @850/ 900 MHz).
- (e) Class 1 (1 W @ 1800/1900MHz).
- (f) Control via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands).

2.2.5 Specification.

Table 2.3: Specification of GSM SIM900

PCB size	71.4mm X 66.0mm X1.6mm
Indicators	PWR, status LED, net LED
Power supply	5V
Communication Protocol	UART
RoHS	Yes