REMOTE CONTROL VIA TELEPHONE

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This report is submitted in partial fulfillment of requirements for the award of
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Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer
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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

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Tajuk Projek : REMOTE CONTROL VIA TELEPHONE

Sesi Pengajian : SESI 2006/2007

Saya ...ELVAINEY PANUS..

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DECLARATION

"I hereby declare that this report is the result of my own work except for quotes as cited in the references."

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DEDICATION

I dedicate this to my beloved parents, my whole family, and to all my friends who have stood by me throughout these 4 years

ACKNOWLEDGEMENT

First of all, praise to God Almighty, for blessing and guiding me through this entire project and gave me physical and mental strength to finish this Final Year Project and for everything **HE** has provided me.

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Last but not least, to anyone who contributed their help and time who has directly or indirectly involved in the completion of this project.

ABSTRACT

This project is to design a circuit that will allow us to remotely control home or office appliance through a telephone. This project is developed to complete our daily needs where we can activate or switch on domestic appliances from a great distance using only telephone or cellular phone. This project involves decoding of telephone signal and channeling it to the relevant appliances through a Demultiplexer. The Demultiplexer is connected to the relays that operate the relevant appliance. The appliances must be full time connected to the power supply in order to function immediately and automatically when the project circuit operates once received command to switch on the appliances. This project circuit is to be connected in parallel to the telephone instrument to allow the telephone can be used to switch on or switch off the appliance and also can used for normal conversation.

ABSTRAK

Projek ini bertujuan untuk mereka bentuk sebuah litar yang boleh membenarkan kita untuk mengawal perkakasan di rumah atau pejabat dengan menggunakan telefon. Projek ini dibangunkan untuk memenuhi keperluan semasa dimana kita dapat menghidupkan peralatan domestik dari jarak jauh dengan hanya menggunakan telefon atau telefon sel. Projek ini melibatkan pentafsiran isyarat telefon dan kemudiannya disalurkan kepada perkakasan yang berkaitan melalui satu *Demultiplexer*. *Demultiplexer* kemudiannya disambung kepada beberapa geganti untuk menjalankan perkakasan yang berkaitan. Perkakasan tersebut pula perlu sentiasa disambungkan kepada bekalan kuasa supaya apabila litar projek ini beroperasi dan menerima arahan untuk menghidupkan perkakasan, ia akan dapat dihidupkan secara automatik. Litar projek ini pula disambungkan secara selari pada telefon untuk membolehkan telefon digunakan untuk menghidupkan atau memadamkan perkakasan dan juga boleh digunakan untuk perbualan biasa

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CHAPTER 1

PROJECT OVERVIEW

1.1   Introduction Of The Project

Generally, this project involves the remote control of electrical or electronics appliances via telephone line. For this project, telephone is preferred as the media for distance control as it commonly available at every home, office and industry. The project is more towards designing a switching system for home appliance. This project uses an IC Dual Tone Multiple Frequency (DTMF) decoder. This IC takes the DTMF signal coming via telephone line and converts that signal into a BCD number.

This project is developed to complete our current needs, where we could turn on the air-conditioner or lamps while we are on the way go back to our home by just using a cellular phone. We also could have a cup of hot tea just before we reach home or probably recording favorite program by pressing the button on our hand phone set. Beside that, sometimes we forget to turn off any appliance before we leave whether our house or office. This project will allow us to call back to our home or office to turn off the appliance.

1.2   Project Objective

The objective of this project is to design a circuit which enables switching 'on' and 'off' of home appliances through telephone lines. It can be used to switch the appliances from far.

1.3   Scope Of Project

The scope of this project is to design a system through which the dial tone of the home-phone can operate the appliance. Other than that, solution and way of commanding dialing tone towards selected appliance must also be figured out. A distribution board for appliances will also be designed.

1.4   Thesis Structure

This thesis contains five chapters that will explain details about this project. The first chapter will explain about the project background, project problems, project objectives and project scopes.

The second chapter is about the theory of telephone system. It is important to understand the concept and the way it function, because the project needs to connect to the telephone in order to be able to control appliances from a great distance.

The third chapter is about the Remote Control Dialer design. This chapter explains the steps taken to ensure the completion of this project. It is includes the hardware development.

The fourth chapter is focused on the results done for this project. This chapter will present a few tests that had been conducted. The purpose of the test, expected result, procedures and result for each test will be detailed out in this chapter.

The last chapter is about the discussion, suggestion and the conclusion of the project and also some of encountered the problems while making the projects also show here and the suggestion of the solving methods.

CHAPTER 2

TELEPHONE SYSTEM

2.1 The Conventional Telephone Set

Telephones perform a remarkable number of functions. Basically, its functions are that you lift the 'handset' which indicates the system being ready for usage by receiving a tone which is referred as the 'dial tone'. Then you dial the required number to be called with the system [1].

It can also indicate the state of call in progress by receiving tones which indicates the status of being busy or if the line is available. An incoming call to the telephone can be indicated by using a 'ring detector' or other audible tones. Other functions include changing of speech to an electrical signal that when received by a distant party, it will be reconverted into a speech signal otherwise known as the 'audio' [1].

2.2 Telephone Diagram And Terms

Shown below is a diagram of a single-line telephone. The terms listed provide information about the physical features of the telephone set and tones or signals received from the system, and can help when describing telephone troubles [1].
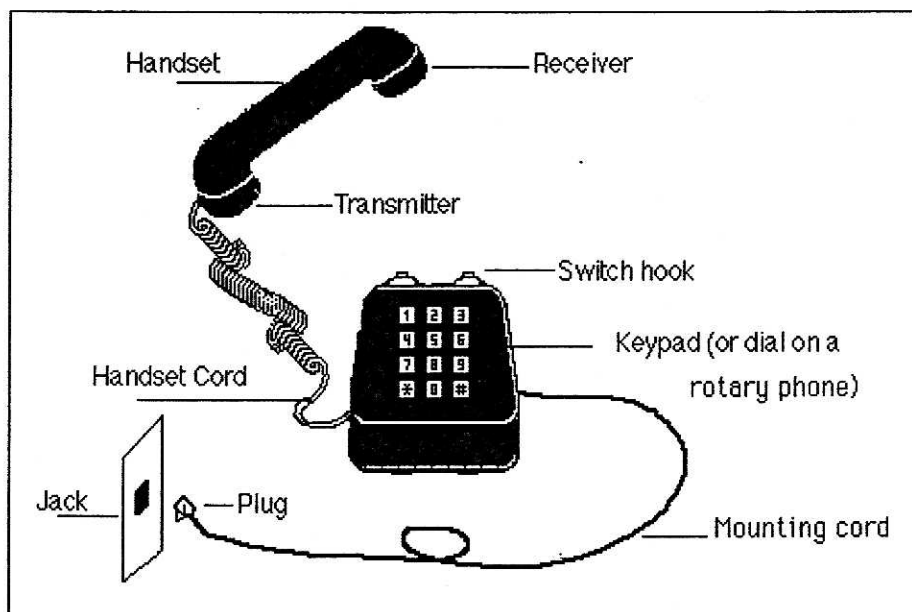
Figure 2.1: Telephone Diagram

Dial: Rotating disk or push-button assembly used for entering digits and accessing features.

Direct-In-Dial: A telephone number which rings directly at a person's desk; the call does not go through an operator or receptionist. (See also Private Branch Exchange below).

Handset: The portion of the telephone containing the transmitter and receiver which is hand held when the telephone is in use.

Handset Cord: The coiled connection between the handset and the base of the telephone.

Hookflash: The process of pressing the Switchhook down for one-half second and releasing. The Hookflash is used to access system features. (Refer to Introduction above for further information about Hookflash.)

Hunt Group: A series of telephones or telephone numbers on multi-button or single-line phones, which search for a free line when the main number is called. If the first line is busy, the call will ring at the next available line. Members of a hunt group are often referred to as terminals or "terms" of the main number.

Key Telephone System: Electronic (EKS) or electromechanical (KS) telephone system allowing several users access to the same lines. Telephone instruments are usually multi-button (line) sets with a hold button and internal intercom features.

Mounting cord: The connection between the base of the telephone and the wall or floor.

On-hook: The handset is in the cradle.

Off-hook: You are talking the handset is in your hand.

Private Branch Exchange (PBX): Local departmental automatic telephone system providing internal features and connection of extensions as well as access to the UT campus and public network. (See also Direct-in-Dial, above.)

Receiver: The earpiece or portion of the handset through which you hear the other party's voice.

Station Number: The last five-digits of an on-campus phone number. (Also used to refer to a two-digit or three-digit intercom number or a three-digit PBX extension.)

Switchhook: A device in the cradle, on the side, or on the top of the telephone which signals the status of the telephone to the switching equipment; on-hook (not in use), or off-hook (in use).

Transmitter: The portion of the handset into which you speak.

2.3   Telephone Switch-Hook

2.3.1   On-Hook

As refer to basic construction of telephone set, there devices connected across the line (Ring and Tip lines) so it can receive an incoming signal. When a signal received by ringer circuit, it will generate a ringing bell or other audible tones.

When handset is 'on-hook', the telephone set is isolated from the line by the open contact of switch flows (except maybe a small leakage current), since the ringer has a capacitor which blocks direct currents (DC) from flowing through it [1].
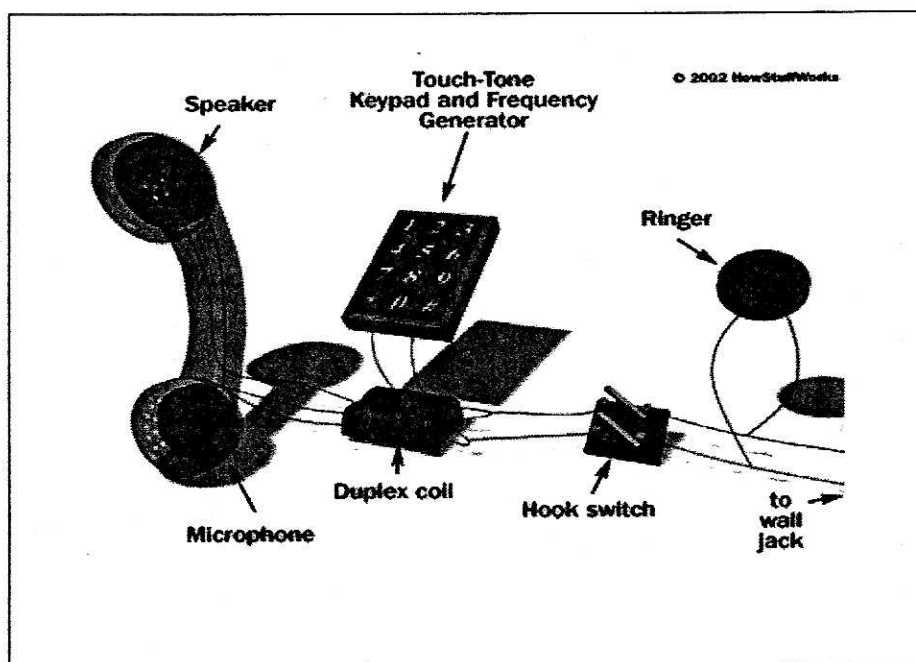

Figure 2.2: Block Diagram of Typical Telephone Set

2.3.2 Off-Hook

During the 'off-hook' status, both the switch hook will be closed causing a loop current flowing from the exchange through the telephone set and through the relay coil at the exchange.

This relay will energized when sufficient currents flows through the relay coil, and closed contact, signals to the other central office equipment that the subscriber telephone is 'off-hook. Prior to receiving the telephone number, the line finder will set up a connection with the switching equipment. Now, the tone generator will send a dial tone to a caller. Dialing mat be done by pulsing (interrupting) the loop current or by sending audio tones. The dial tone will be removed immediately when first dialed digit is received at the exchange [1].

2.4 The Telephone Dial Tone

The telephone or phone is a telecommunications device which is used to transmit and receive sound (most commonly voice and speech) across distance. Most telephones operate through transmission of electric signals over a complex telephone network which allows almost any phone user to communicate with almost any other.

A dial tone (known in the British Isles as a dialing tone) is a telephony signal used to indicate that the telephone exchange is working and ready to accept a call. The tone stops when the first numeral is dialed, or if there is no response after going off-hook (a timeout), when it is usually followed by a special information tone. When automated telephone systems were first being deployed, telephone companies noticed that customers were often confused by the apparent lack of response (before this, a telephone operator would answer), and would often assume the phone was not working. To avoid this, exchange systems would play a small buzzing sound into the line instead. Before modern electronic telephone switching systems came into use, dial tones were usually generated by electromechanical means; in the United States, the standard "city" dial tone

consisted of a 600 Hz tone amplitude-modulated at 120 Hz. Some dial tones were simply adapted from 60 Hz AC line current [1].

The modern dial tone varies between countries, being a "buzz" of two interfering tones (350 Hz and 440 Hz, as defined in the Precise Tone Plan) in the NANP (most of North America), and a constant single tone (425 Hz) in most of Europe. Modems, fax machines, and auto dialers must be designed to recognizes these so-called call-progress tones, as well as comply with differing standards and regulations. [1].
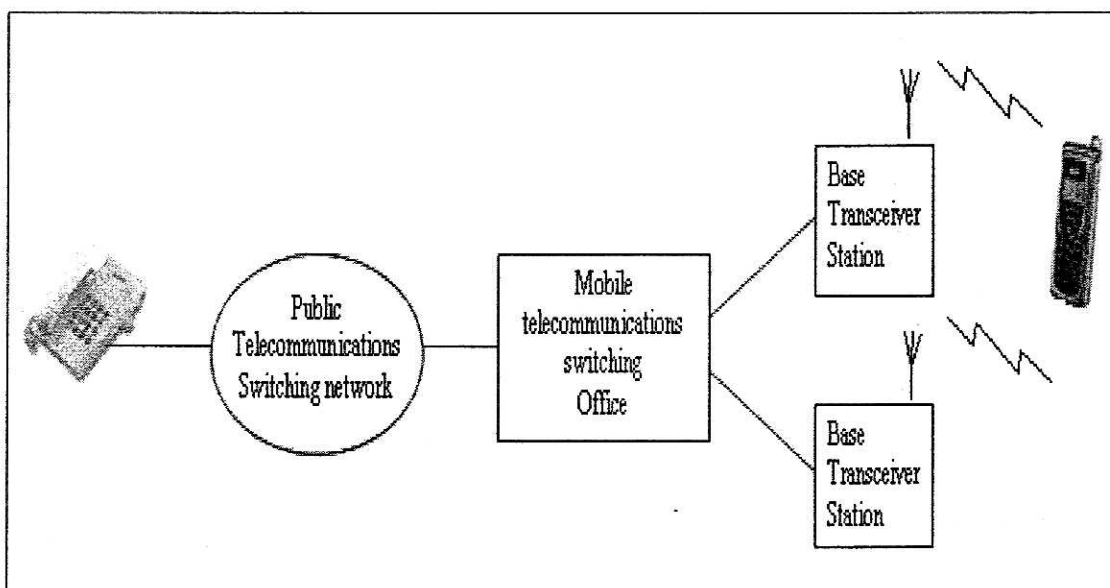
2.4 How Mobile Phone communicate to Home Phone

Figure 2.3: Overview of Cellular System

Figure 2.3 shows the principal elements of cellular system. In the approximate center of each cell is base station (BS). The BS includes an antenna, a controller and a number of transceivers, for handle the cell process between the mobile unit and the rest of network. At any time, a number of mobile user units may be active and moving about