DECLARATION

"I hereby declare that I have read this report and my opinion,
it is suitable in terms of scope and quality for the purpose of awarding a
Bachelor Degree Of Electronic Engineering (Computer Engineering)"

Signature : .....

Supervisor : EN HO YIH HWA

Date : 15/05/2006

PC BASED TELEPHONE CALL LOGGING SYSTEM

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This Report Is Submitted In Partial Fulfillment Of Requirement
For The Bachelor Degree Of Electronic Engineering
(Electronic Computer)

Fakulti Kejuruteraan Elektronik Dan Kejuruteraan Komputer
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DECLARATION

"Hereby, I declare that this report entitled
Designing A PC Based Telephone Call Logging System
is the result of my own research and idea
except for works that I have been clearly cited in references."

Signature : .....
Name : NOORHASNI BT YAAKOP
Date : 05-05-2006

To the greatest love in my life.....

Father, Mother, Family

And last but not least to all my friends

ACKNOWLEDGEMENT

Firstly, I would like to say a most prayer to Allah the Almighty for always being there for me.

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Last but not least, my heartfelt appreciation goes to all who have directly or indirectly played parts in the completion of this project.

ABSTRACT

The objective of this project is to develop a call logging system that can track the dialed number, duration, date and call cost. The Dual Tone Multi-frequency (DTMF) Detector was developed to detect the frequencies of the telephone keypad and send the data through the computer. The concept of this system is when the dialer pressed the keypad at the telephone, the DTMF detector detect the frequencies and then sends the bit through the computer to recognized and record the number on the Graphical User Interface (GUI). This system uses the Microsoft Visual Basic 6.0 as a Graphical User Interface (GUI) to record the information. The final output of this project is a complete telephone call logging system that operates together with Personal Computer (PC). The advantage of using this system is it can reduce the call cost and less time to check the dialed number.

ABSTRAK

Projek ini bertujuan merekacipta suatu sistem pengawal panggilan yang boleh mengesan nombor yang dipanggil, jangka masa, tarikh dan kos panggilan. Pengesan Nada Gandaan Pelbagai Frekuensi (DTMF) dibangunkan untuk mengesan frekuensi pada papan kekunci telefon dan menghantarnya terus ke komputer. Konsep sistem ini adalah apabila pemanggil menekan papan kekunci pada telefon, Pengesan Nada Gandaan Pelbagai Frekuensi mengesan frekuensi tersebut dan menghantar bit kepada komputer untuk mengenal pasti dan merekod nombor pada laman antara muka (GUI). Sistem ini menggunakan perisian Visual Basic 6.0 sebagai laman antara muka grafik untuk merekod maklumat. Hasil akhir projek ini ialah satu sistem pengawal panggilan yang lengkap dimana beroperasi bersama-sama dengan komputer. Kelebihan menggunakan sistem ini ialah ia dapat mengurangkan kos panggilan dan mengambil masa yang kurang untuk memeriksa nombor panggilan.

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NOMENCLATURES

DC	-	Direct current
LED	-	Light Emitting
IC	-	Integrated Circuit
GUI	-	Graphical User Interface
DTMF	-	Dual Tone Multi-frequency
PC	-	Personal Computer
SCR	-	Silicon Controlled Rectified
LCD	-	Liquid Crystal Display
PCM	-	Pulse Code Modulation
PABX/PBX	-	Public Automatic Box Exchange

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The PC Based Telephone Call Logging System is the system that provide a monitoring system where the telephone and computer work together to provide a monitoring system. This chapter will discuss the problem with telephone call management to bring out the causes of why this title was selected for this project. This chapter also will include the objectives, scope of the project, background of the project and methodology to carry out the project. At the end of this chapter, it will view the structure of the overall report.

This system is users friendly call logging and call management. It can record calls made such as number of calls, dial number, durations and call costs. These call information is display in Graphical User Interface (GUI) and can be check anytime. This system will save the time to operate and reduce call costs. There is no need the cost for the management.

1.2 Problem Statement

The increasing telephone bill and the error in billing system occur and we do not know. From this effect, the users have to pay much in their bills. The bill that arrives is late and the user may confuse in checking the number. The problem that must develop this system is do not have a call management. With this system, it can give the self awareness of phone bill control where we can limit the outgoing calls.

1.3 Objectives

The objectives of this project are:

a) Develop a PC Based Telephone Call Logging System.
b) Provide a monitoring system such as record calls, duration and call cost.
c) Develop a call management and check the calls that we have made before.

1.4 Scope of Works

The whole project included 2 scope of works and the methods are:

i) Develop the DTMF (Dual Tone Multi-Frequency) Detector

Detect the number that has been dialed. Simulate the circuit and then construct the circuit. Then the circuit is test to make sure of its functionality.

ii) Software Implementation

Visual Basic is selected as software for the interface of the telephone call logging system. This is called Graphical User Interface (GUI) which is design to be a user friendly that contain the information of the calls that have been made such as dialed number, duration, date and call cost.

1.5 Project Background

The idea of PC based telephone call logging system project is an adaption from the PC based call logging management software. Call logging system is an important system to control the call management.

The project utilized the development of the DTMF detector. This device intercepts Dual-Tone Multifrequency (DTMF) tone pairs and activates one of the sixteen outputs. Each output can be connected to a relay. Light emitting diode (LED), silicon controlled rectifier (SCR), alarm or any other device that we want to control.

The DTMF decoder can be directly connected to a parallel port to view the digits in Hyper Terminal in Computer but without an interface. The decoder stores the last 234 received digits in EEPROM. The contents of EEPROM can be viewed on the LCD screen via two scroll buttons. Total power consumption is 12mA. The DTMF decoder has two inputs. The RJ 11 jack is for connecting the phone line.

All the concept and idea that came from the reference are combined and adapted to my project. The IC MT 8870 is selected as my DTMF decoder.

1.6 Methodology

In this project, the DTMF detector is designed using the MT 8870 IC as a decoder. The input is from the telephone line itself.

This project is guided with following methodology. The detail explanation for methodology of this project will be discussed more detail in Chapter 3.

After circuit is designed, the circuit is simulated using the simulation software such as Multisim 2001. Using this methodology, the circuit operation will be observed. Then, the circuit failure will be detect and troubleshoot.

1.7 Overview report structure

This report consists of five chapters. Chapter I is the introduction of this project where it discusses about the objectives and background of the project.

The literature review of this project are describes in Chapter II. All theoretical and basic idea for this project is explained in a detail.

Chapter III are discussed the methodology of this project. This chapter consists of the step by step of methodology to complete the project. Figures are used to make the discussion on this chapter clearer.

Chapter IV is a project result. The project results as project analysis and project data will be shown in this chapter.

The last chapter of this report is a Chapter V. This chapter consists of project conclusion and discussion. This chapter will review the project. Some additional idea will be discuss on this chapter to make the project better the next time or to implement the project in the actual field.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss literature review of this project. The content of literature review is one of the important steps to gather information about the project. Literature review will explore the basic history and the evolution of the telephone.

2.2 Telephone

Telephone is one of the telecommunication devices. Nowadays, telephone becomes an important device in communication especially business. It is cheaper, faster and consistent. The telephone or phone (Greek: tele means far away while phone means voice) transmits sound great distances. Most telephones operate by means of electric signals.

2.3 Early development

The following is a brief summary of the history of the invention of the telephone:

In 1849 Antonio Meucci demonstrates a device later called a telephone to individuals in Havana. 1854 Charles Bourseul publishes a description of a make-break telephone transmitter and receiver but does not construct a working instrument and later, Meucci demonstrates an electric telephone in New York. Then, in 1860 Johann Philipp Reis demonstrates a make-break transmitter after the design of Bourseul. Meucci supposedly demonstrates his telephone on Staten Island.

In the 1861 Reis manages to transfer voice electrically over a distance of 340 feet. Meucci files a patent caveat (a statement of intention to patent) in 1871. Later in 1872, Elisha Gray founds Western Electric Manufacturing Company. July 1873 Thomas Alva Edison notes variable resistance in carbon grains due to pressure, but shelves the discovery. 1874 Gray demonstrates his liquid transmitter telephone at the Highland Park Presbyterian Church. Alexander Graham Bell first transmits voice in 2 June 1875.

1 July 1875, Bell first uses a bi-directional capable telephone (Both the transmitter and the receiver were identical membrane instruments) 14 February 1876 Bell files his first patent on the telephone. Two hours later Gray files his patent caveat. Later in 30 January 1877 Bell patents the electro-dynamic transmitter, receiver telephone. The Ericofon was a very futuristic handset when it was introduced in 1956 as shown in figure 2.1.

Figure 2.1: The Ericofon

2.4 Later history

The history of additional inventions and improvements of the electrical telephone includes the carbon microphone (later replaced by the electret microphone now used in almost all telephone transmitters), the manual switchboard, the rotary dial, the automatic telephone exchange, the computerized telephone switch, Touch Tone dialing (DTMF), and the digitization of sound using different coding techniques including pulse code modulation or PCM (which is also used for .WAV files and compact discs).

Newer systems include IP telephony, ISDN, DSL, cell phone (mobile) systems, digital cell phone systems, cordless telephones, and the third generation cell phone systems that promise to allow high-speed packet data transfer.

The first transatlantic telephone call was between New York City and London and occurred on January 7, 1927.

2.5 Dual Tone Multi-Frequency (DTMF)

The Dual Tone Multi-Frequency also known as Touch Tone and is used for telephone signaling over the line. It is an example of a multi-frequency shift keying system. Today the DTMF is used for most call set up to the telephone exchange.

DTMF was developed at the Bell labs in order to allow dialing signal to dial long-distance numbers. The Touch Tone system also introduced a standardized keyboard layout. After testing 18 different layouts, they eventually chose the one familiar for us today, with 1 in the upper-left and 0 at the bottom as in figure 2.1 below. This is the famous type of the dial pad used today.

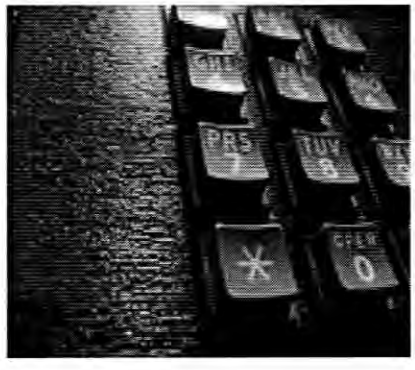

Figure 2.2: Telephone Dial Pad

The DTMF keypad is laid out in a 4×4 matrix, but recently in most keypad that we used today is laid out in 3 x 4 matrix which each row representing a low frequency, and each column representing a high frequency.

Pressing a single key such as '1' will send a sinusoidal tone of the two frequencies 697 and 1209 hertz (Hz). The two tones are the reason for calling it multi-frequency. These tones are then decoded by the switching center in order to determine which key was pressed. The frequencies of each of the keypad are listed in the Table 2.1 below.

1	2	3	**697 Hz**
4	5	6	**770 Hz**
7	8	9	**852 Hz**
*	0	#	**941 Hz**
1209 Hz	**1336 Hz**	**1477 Hz**	

Table 2.1: The DTMF keypad Frequency

Table 2.2 shows the frequency signal of many events. The tone frequencies are selected such that harmonics and intermodulation products will not cause an unreliable signal. No frequency is a multiple of another, the difference between any two frequencies does not equal any of the frequencies, and the sum of any two frequencies also does not equal to any of the frequencies.

Event	Low frequency	High frequency
busy signal	480Hz	620Hz
dial tone	350Hz	440Hz

Table 2.2: Frequency signal of many events

The frequencies were initially designed with a ratio of 21/19, which is slightly less than a whole tone. The frequencies may not vary more than ±1.5% from their nominal frequency, or the switching center will ignore the signal. The high frequencies may be the same volume or louder as the low frequencies when sent across the line. The loudness difference between the high and low frequencies can be