HOME EQUIPMENT CONTROL USING HOME PHONE SIGNAL

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This report is submitted in partial fulfillment of requirement for the award of Bachelor of Electronic Engineering (Industrial Electronic) With Honours

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To my beloved father, mother, and to all my siblings and friends.

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ABSRTACT

This project is to control ON and OFF home equipments using home phone signal. The telephone signal will convert the dual tone multi frequency (DTMF) signal to electrical signal. Two circuits are designed in this project. The first circuit used DTMF chip that converts tone signal from home phone line to electrical signal while the second circuit will concentrate on interfacing the low and high voltage using relays. All appliances must connected all the time to the power supply in order to function immediately and automatically when the project circuit operates and receive command to switch ON or OFF. Both of the circuits will have their own power supply to support the operation of this project. When the telephone handset is picked up and then the key pressed, DTMF signal from home phone will be transmitted to the DTMF IC, the digital output will be transferred to the demultilpexer. Then the 5-volt circuit will connected to relay circuit to convert low voltage to high voltage to the appliances. For those who live in double stony houses, it is very important because it can save time to on or off appliances. The home phone can be used to control the appliances by pressing any key needed.

ABSTRAK

Projek ini digunakan untuk mengawal buka dan tutup perkakasan rumah seperti penghawa dingin, lampu depan, dan lampu belakang menggunakan isyarat telefon rumah. Isyarat telefon akan ditukarkan daripada dual tone multi frequency (DTMF) ke isyarat elektrik. 2 litar direka pada projek ini untuk proses sambungan. Litar pertama direka dengan menggunakan DTMF chip dimana ia menukarkan isyarat ton daripada talian telefon rumah ke isyarat elektrik, litar kedua akan bertumpu pada menukarkan voltan rendah kepada voltan tinggi dengan menggunakan geganti. Semua peralatan perlulah disambungkan pada bekalan kuasa sepenuh masa supaya peralatan tersebut dapat berfungsi secara automatik apabila litar menerima dan arahan untuk menbuka atau menutup perkakasan. Kedua – dua litar haruslah memiliki bekalan kuasa masing – masing untuk menyokong operasi projek ini. Objektif utama projek ini adalah untuk mereka satu sitem dimana pengguna boleh mengawal peralatan rumah mereka hanya dengan menggunakan telefon rumah. Apabila ganggang telefon diangkat, dan kekunci nombor ditekan, isyarat DTMF daripada telefon rumah akan dihantar ke IC DTMF, keluaran dalam bentuk digital akan terhasil dan dihantar ke demultiplexer. Kemudian litar 5 Volt akan disambungkan pada litar geganti untuk menukarkan voltan rendah kepada voltan tinggi terhadap perkakasan – perkakasan tersebut. Untuk mereka yang tinggal di rumah dua tingkat, projek ini amat penting kerana akan menjimatkan masa untuk membuka dan menutup peralatan – peralatan rumah. Telefon rumah boleh mengawal buka dan tutup perkakasan tersebut dengan hanya menekan mana – mana butang yang dikehendaki.

CONTENT

II LITERATURE RIVIEW

TABLE

FIGURE

ABBREVIATION

Z	-	High Impedance
H	-	High Logic Level
L	-	Low Logic Level

CHAPTER 1

INTRODUCTION

This chapter 1 is contains about the introduction of the project where it involve of the objectives, problem statements, scope, methodology, and report structure.

1.1 Introduction of Project.

Nowadays, everybody has his or her own telephone whether it is a home phone or a mobile phone. The telephone can also be used as an important tool for conversation and transmitting or receiving information. Besides that, it also can be used as a basic switch to control home appliances. Hence, it is proven that the telephone is used in variety application.

This project is to design a circuit to control the "on" and "off" of the home equipments such as aircond, front lamp, back lamp, and etc using home DTMF signal. It is operated by dialing a number that already programmed in the DTMF IC. All devices are coded to differentiate between each other. The circuit design converts the dual tone multi frequency (DTMF) signal to electrical signal.

Two circuits are designed in this project for the connection process. First circuit is DTMF circuit and second circuit is relay circuit. DTMF chip (KT 3170) used at the

first circuit is to convert tone signal to electrical signal while the relay at the second circuit will concentration on interfacing the low and high voltage. In order to make the system function and operate the home phone been use with the telephone line type C. 'Beep' sound after picking up telephone handset will indicate whether the appliances are ON or OFF condition.

1.2 Objectives

The main objective for this project is to design a system where the user can control home appliances by using DTMF signal. Home appliances then can be switching ON or OFF after pressing any key need on the telephone keypad.

The second objective is to interpret and receive DTMF signal from home phone to control the home equipments. DTMF IC will be using to achieve the objective.

The third objective is to interface the low voltage to high voltage for home devices using relay circuit. Relay that able to receive voltage input of 5V and distribute maximum voltage output of 230V is a very suitable component to use because all devices are AC (alternative current) types.

1.3 Problem statement

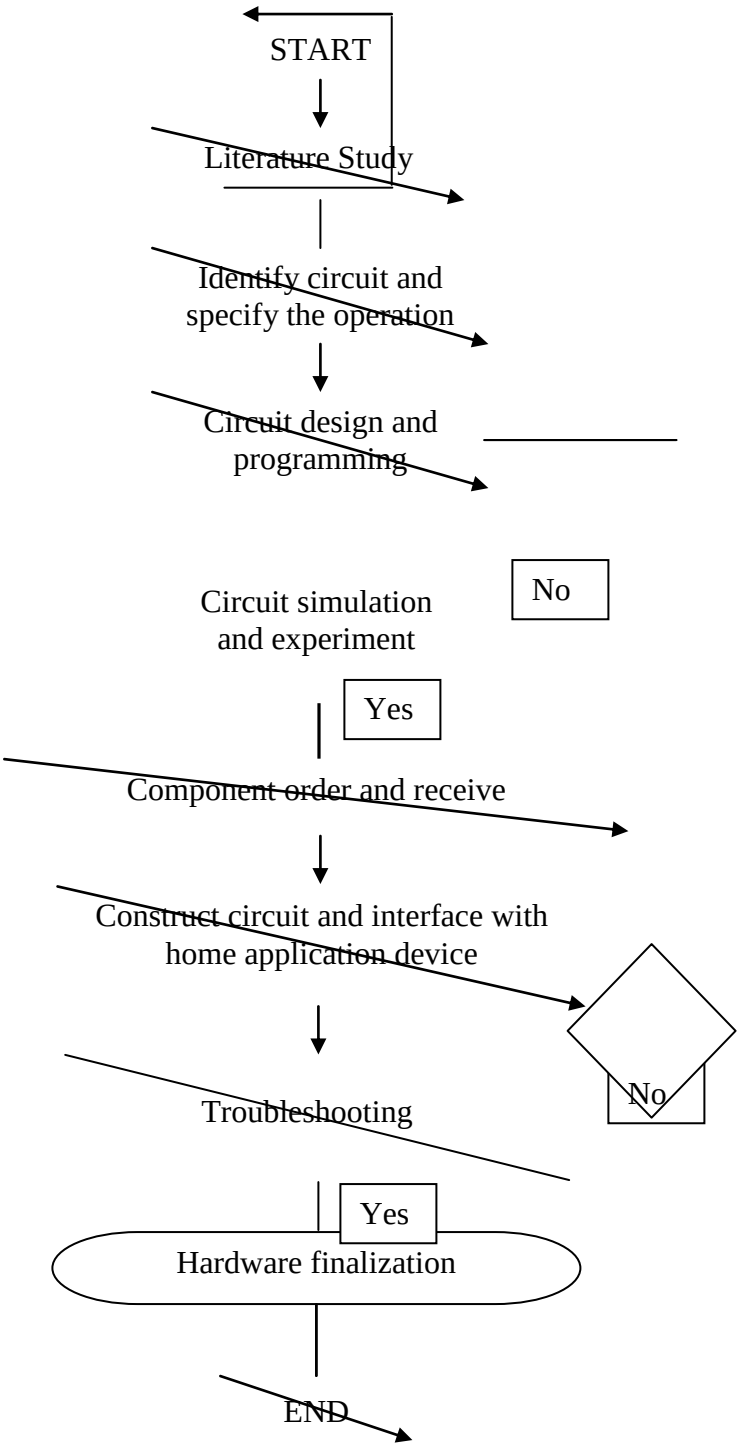
A lot of people nowadays are busy everyday and sometimes not having enough time even though just do the very simple task such as switch ON and OFF lamp in their homes. In addition to those who live in double staying or big houses, it may take quite some time to switch ON and OFF few devices such as aircond or lamps at rooms. The devices placed at home are also far from each other, so they waste a lot of time everyday and sometimes because of that make they forget to switch OFF the devices. Recent technologies make it possible to solve the problem. Home phone are choose where it

can use as a switch to control on and off appliances only by pick up their home phone and dial number needed. The 18 legs of IC called DTMF IC's will be used to generate DTMF tone from telephone keypad. Voltage regulator has to use for step down the 9-volt supply from battery at DTMF circuit and relays circuit. Other important component that used is timer 555, combinational gets, flip-flop D and IC MCT2E. Relays used as the main element for switching the devices.

1.4 Scope

The scopes that are to be concentrating in this project are the DTMF circuit and relay circuit. This project uses DTMF IC inside the DTMF circuit to convert DTMF signal from the telephone line. The DTMF IC is KT 3170, also connects to demultiplexer (DM74154) and flip-flop D (74F74) in order to convert DTMF signal to electrical signal where the voltage is used is 5V. The relays are use as a switching circuit for appliances or devices where it can handle a high voltage of 230V or more where 10Amps need to energize the electromagnetic coil of the relays +5V. It is because of home equipments will use more than 230V while circuit at this project just use +5V and cannot operate to ON or OFF devices. To make it commercially possible, the circuit will be powered by a 5V power supply. This is achieved by using a 9V battery and voltage regulator (KA 7805).

1.5 Methodology



This project starts by searching for literature reviews from readability source as books and journals. A few circuits found are studied to make sure all the information is reliable for the title given.

Then the suitable circuits were identified. It is DTMF circuit and relay circuit. The first circuit is interfaced to second circuit because DTMF signal are converted to electrical signal.

After having enough information, circuit is design using PROTEL, PROTEUS and MULTISIM softwares.

A simulation for the circuit was done to make sure the circuit used is corrected. If the simulation shows an incorrect outcome, the circuit will be redesigned until the correct circuit is obtained. Labs experiments are also done to verify the overall designed are operation.

Next, all components need are ordered refer to component code that include at data sheet. KT3170 are ordered outside Melaka because the IC is not locates at here. After about 1 week the component was received.

Then hardware circuit will be transferred to PCB board and the etching process will be done. The complete circuit then will be interfaced with the home appliances.

After that, troubleshooting will be done to both circuits until the project function successfully. A model was build to place the project and easy to use.

1.6 Report structure

This report contains 6 chapters that explain detail of the project. The first chapter is the introduction of the project that included the objectives, scope, problem statement and flow chart for project methodology.

The second chapter is the literature review about telephone, DTMF, IC KT3170, demultiplexer, D-flip-flop, inverter, IC 7408, timer555, DM74LS126A, MCT2Erelay and power supply unit. These chapters explain the sources or articles that are related to the project. It is consisting of the product that has been appearing in the market nowadays.

The third chapter is about circuit design that content of process during designing the project.

The fourth chapter is the experiment, result, and the analysis of the project.

Fifth is the discussion where be explain about the any result from this project and discuss about design process, problem statement and some new idea.

Lastly is chapter five where include the conclusion future recommendation which conclude the final project relate to objectives. A few suggestions also given to upgrade the system.