Automating Industrial Homes using Cell Phones

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Abstract

If home automation systems have remote controls that are affordable to install, easy to use from a distance, and maintain, they are an incredible feature that everyone would like to have. The idea of remotely controlled home automation is covered in this paper. Numerous features of home automation allow homeowners to control appliances like safety lighting, outside lighting, snow-melt systems, air conditioning, and lamps from a distance.

Keywords: DTMF, Microcontroller, Mobile Phone, Embded System.

1. Introduction

In many cases it is eligible to turn on or off some devices, such as conditioning and heating units before coming home, this is known as home automation systems. This project uses the Dual-Tone Multi Frequency (DTMF) mechanism used in touch tone telephones, to control multi electronic devices from far range using the mobile phone. A practical application case for this system was proceeded to control for electronic equipment's. A test to set the DTMF signal received from different mobile phones was also executed. The DTMF decoder was adjusted for accurate detection of the existence of these tones under diverse conditions. The automation advantages of this work make it endurance for homeowners to remotely control a large number of devices.

2. Methodology

Using the DTMF technology, the system of this project will control multi electronic appliance from long mileage using the mobile phone .This system let the user to control and know the sitting state of home devices by cell phone, it can be done by forward signal over the cell phone (control phone) to other cell phone in the home , this cell phone is linked to an interface circuit generate the DTMF signals and give it the outlet to a control unit which cog the home devices and upset the power of these devices On or Off.

2.1 The System Features

This system can control up to10 equipment's, it may be any electronic or electric appliances, and each one is given a unique blade. There is no hazard for false switching; it makes precise switching any wrong switching the device are not done. This system is cheap and easy to use. Before changing the situation of the device we can emphasize, the current status of the device. The system awards acknowledgement tone after switching on the devices to assure the situation of the devices. Its highly ensured system using the security programs to reject any other call from controlling the home appliances.

2.2 The System Description

The Home is Controller split into two units which is the DTMF detection unit, and the device control unit, these units contain many sub-circuit blocks, beginning with the DTMF decoder, 4-16 lines decoder/de-multiplexer, some D-flip-flops, relay driver circuits, feedback circuitry, etc.

2.3 DTMF Detection Methods

The scheme used to distinguish the two frequencies connected with the button that has been compressed is shown in Figure 1. Here, the two tones are first isolated by a high pass.
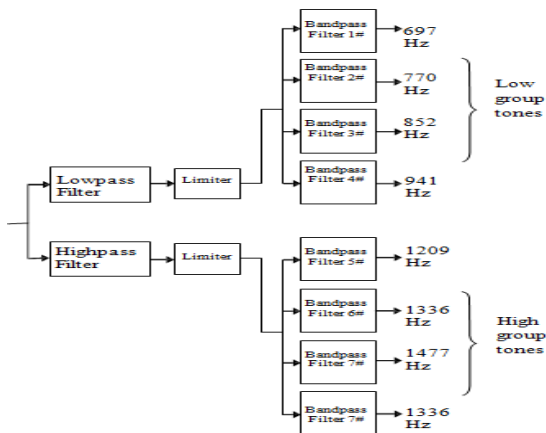

Figure 1: The DTMF Detections

Filter and a low pass filter. The pass band deposes frequency of the low pass filter is partially above 100Hz, whereas that of the high pass filter is partially below 1200 Hz. Then the limiter converts output of each filter into a square wave and then treated by a bank of band pass filters with strict pass bands. The four band pass filters in the low-frequency channel have middle frequencies at 941 Hz, 852 Hz, 770 Hz, 697 Hz, and. The four band pass filters in the high-frequency channel have middle frequencies at 1633 Hz, 1477 Hz, 1336 Hz, and 1209 Hz. The detector following each band pass filter improves the necessary dc switching signal if its input voltage is above a confirmed threshold.

3. System Operation

A Design of a home appliances control system using cell phone offered in our project is referring to Figure(2) as a block diagram, let's starting with the two cell phones the first one is the remote cell phone (Control phone), this phone controls the system after only pressing the buttons that produce the DTMF signal; and the second one is the home cell phone which is based in the home with the home controller board; the home controller is split into two parts, DTMF detection unit, and the control unit. Once the user calls to the home-based phone, in order to control the home devices, the home-based phone responses the call automatically if only one the user in the white list program, that for the
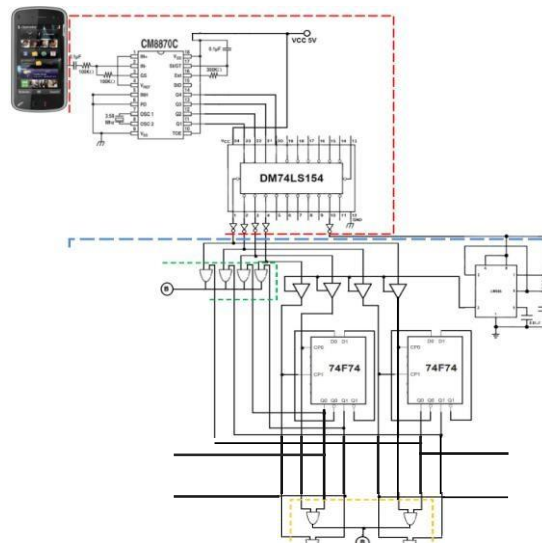

Figure 2: Horne Controller Block Diagram
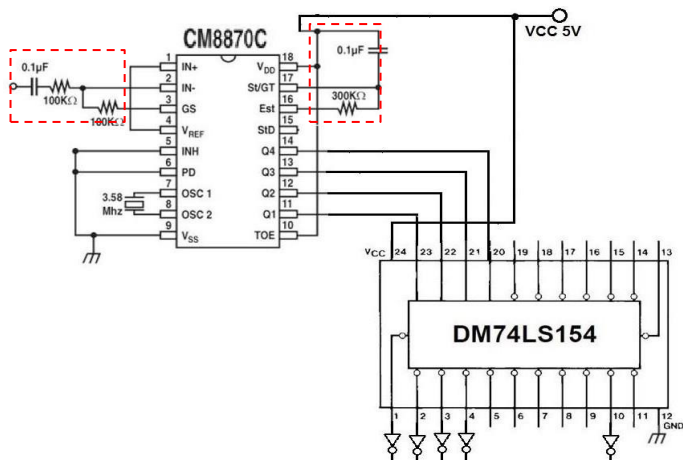**-- DTMF Detection Unit**
-- Control Unit

Figure 2.1: DTMF Detection Construction with Photograph for the Practical Work

4. The Control Unit

This unit consists of device situation check part, device switching part, device status feedback part, and relay driver circuit. Before turn On/Off any device, to avert any ambiguity about the device sitting status of the output, we can fruition the status of any device by fed the decoder adapted output (the button that the user compressed) and the output line of device (from the relay) to autonomous clot of And gates, where the output of the And gates is linked to the beep tone generator, that output a beep if the respective device in the on state.
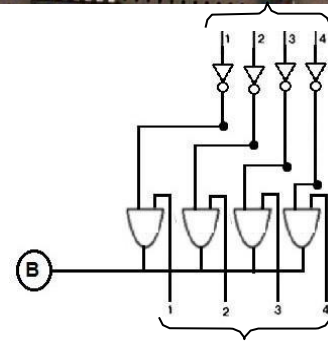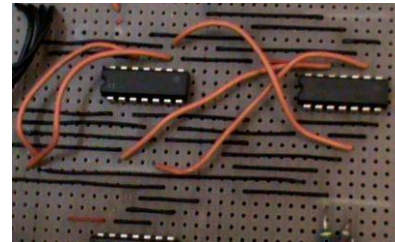

Figure 3: The Device Status Check Section

4.1 Applications

1. This project can be used in industrial to control diverse devices from a remote distance

2. This project can be used at home for a household use.

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5. Conclusions

During the implementation of the approaching project the following points can be considered:

- It is easy to control the operation of any where appliances by using the existing mobile network, it's not important to specify especial network.
- Any kind of mobiles can be used.
- The control circuit is credible and consist simple components.
- High level of security, by refusing all the call number except white list users.
- The system can allow the user know the situation of the devices.
- The system proceeds practically and the predictable, so results are acquired.
- Some problems can be encountered during the implementation
- Of the practical operation and are fixed by substitution component.

6. Recommendations

In this project we did not use any program on the control mobile, so we can develop programs in the future to give more flexible options and high security control. As a future work of the implemented project, we propose to improve the system using Microcontrollers or PLCs instead of using control unit, to give more accuracy and control options, as heat control system and security systems , so the system can be used more complex applications not only On/Off the devices. In this project we did not use any program on the control mobile, so we can develop programs in the future to give more flexible options and high security control. As a future work of the implemented project, we propose to improve the system using Microcontrollers or PLCs instead of using control unit, to give more accuracy and control options, as heat control system and security systems, so the system can be used more complex applications not only On/Off the devices.

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