Device Control using mobile phone

Abstract

It often happens that we forget to switch off some electric devices while leaving home for a journey. This will result in wastage of energy and even the device may get damaged due to overheating. Even if we remember that we have not switched off some devices, it may be difficult for us to come back and switch them off. Also, if we are away from home we may have to turn on the lights at night. These are normally not possible in present condition. Our project offers a novel solution for this problem by using a mobile phone, a common electronic gadget. This device is build around PSoC, a powerful system-on-chip. This uses DTMF (Dual Tone Multi Frequency) signals from mobile phone keypad to attain its functionality. For decoding the DTMF tones, we are using MT8870, CMOS Integrated DTMF Receiver. For eliminating any unauthorized entry into the system, we are providing a password checking facility.

Features

The main features of our device control system are:-

- Easy control of devices through mobile phone
- Can control (on/off) a maximum of 8 devices(by using decoder we can increase this number to 256)
- Password facility for controlling unauthorized access
- Password can be changed by the user
- Storage of past 5 actions (device no. and status - on/off), including date and time
- Date and time can be set by the user
- History can be cleared
- Return to main menu after an idle time of 10 seconds, for eliminating ‘dead loops’
- Display of all actions on LCD (irrelevant for mobile user)

User modules of PSoC used

The different modules in PSoC that we are using in our project are:-

- **EEPROM**: - Used to store the information such as password, history, date and time. The in–built memory in PSoC eliminates the use of external memory chip, thereby reducing hardware overhead in the project.
- **Sleep Timer**: - Used to make a delay time of 10 seconds in order to eliminate dead loop in the system. This will work in the background, without interfering with other operations.
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- **Timer**: Used to generate the time information of the system. 8 Bit timer in the PSoC is used here. This will generate interrupt at particular intervals.
- **LCD**: Used to display all the actions performing in the system. Even though irrelevant for mobile user, this is much helpful for applications such as password change, time and date setting.

### Block diagram

![Block diagram of the system](image)

### Operation of the system

Upon coming up, the system will ask for time and date setting. We can do that at that time itself or later, when required. After that, there will be options displaying on LCD and we can perform the operation as displayed in LCD module. For a remote user, he has to first press the ‘*’ key for controlling. Before accessing, he has to enter the password for gaining control over the device. After that, he has a choice to select a device from ‘0’ to ‘7’. Then for switching that device on, he has to press ‘*’ and for switching it off press ‘#’ key.
The settings change is normally done using the mobile phone attached to the device. This is to ensure that the being entered can be verified in the LCD module. For accessing the settings, user has to press ‘#’ in the main menu. The different options present in settings are

- **Change password**
  The user can change password by using this feature. For changing the password he needs to enter the old password. This is to make sure that the user is an authorized person.

- **History**
  User can check the history status of the device, whether the device was turned on/off including the time & date of that. History can be cleared.

- **Date & time**
  It is possible for the user to set the date and time of the device by making use of this feature.

**Photograph**

![Image of a device control setup]