NATIONAL INSTITUTE
OF TECHNOLOGY
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# DTMF HOME AUTOMATION SYSTEM

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# DUAL TONE MULTI-FREQUENCY

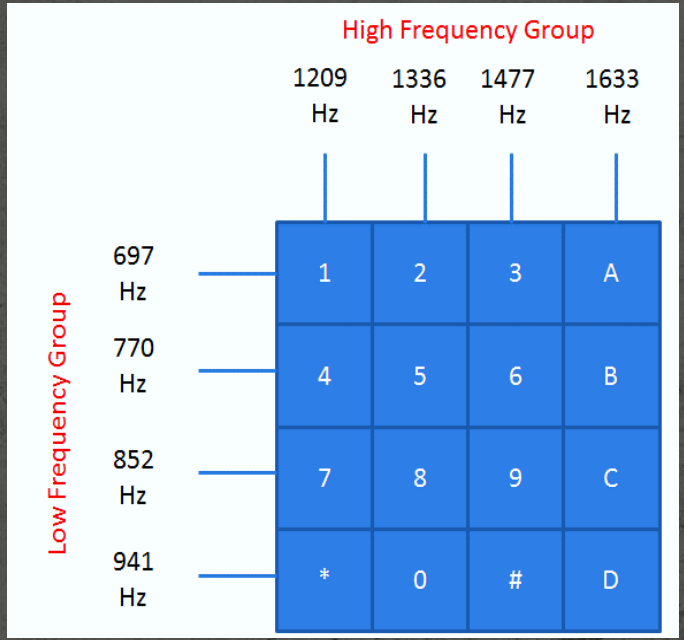
Dual tone multi-frequency (DTMF) is the sounds or tones generated by a telephone when the numbers are pressed. These tones are transmitted with the voice channel. DTMF is used to control automated equipment and signal user intent, such as the number they wish to dial.

DTMF technology works by having the handset generate tones at specific frequencies and playing them over the phone line when a button is pressed on the keypad. Equipment at the other end of the phone line listens to the specific sounds and decodes them into commands. Using DTMF Based Home Automation System allows us to operate up to 4 devices at the same time and the best part is it is wireless. Also the system can be operated using any smart device and with faster response time.

# WORKING OF DTMF SIGNALS

DTMF controlled home appliances project works over mobile DTMF technology that exists in Dial tone. DTMF stands for Dual Tone Multiple Frequency. There are some frequencies that we used to create DTMF tone. In simple words by adding or mixing two or more frequencies generates DTMF tone
These frequencies are given below:

In Given figure we can see two groups of different frequencies. When one upper and one lower frequencies mixed then a tone is created that tone we calls Dual Tone Multiple Frequency. In this project we control ac appliances by pressing dial pad keys like 1, 2, 3, 4, 5 and more.

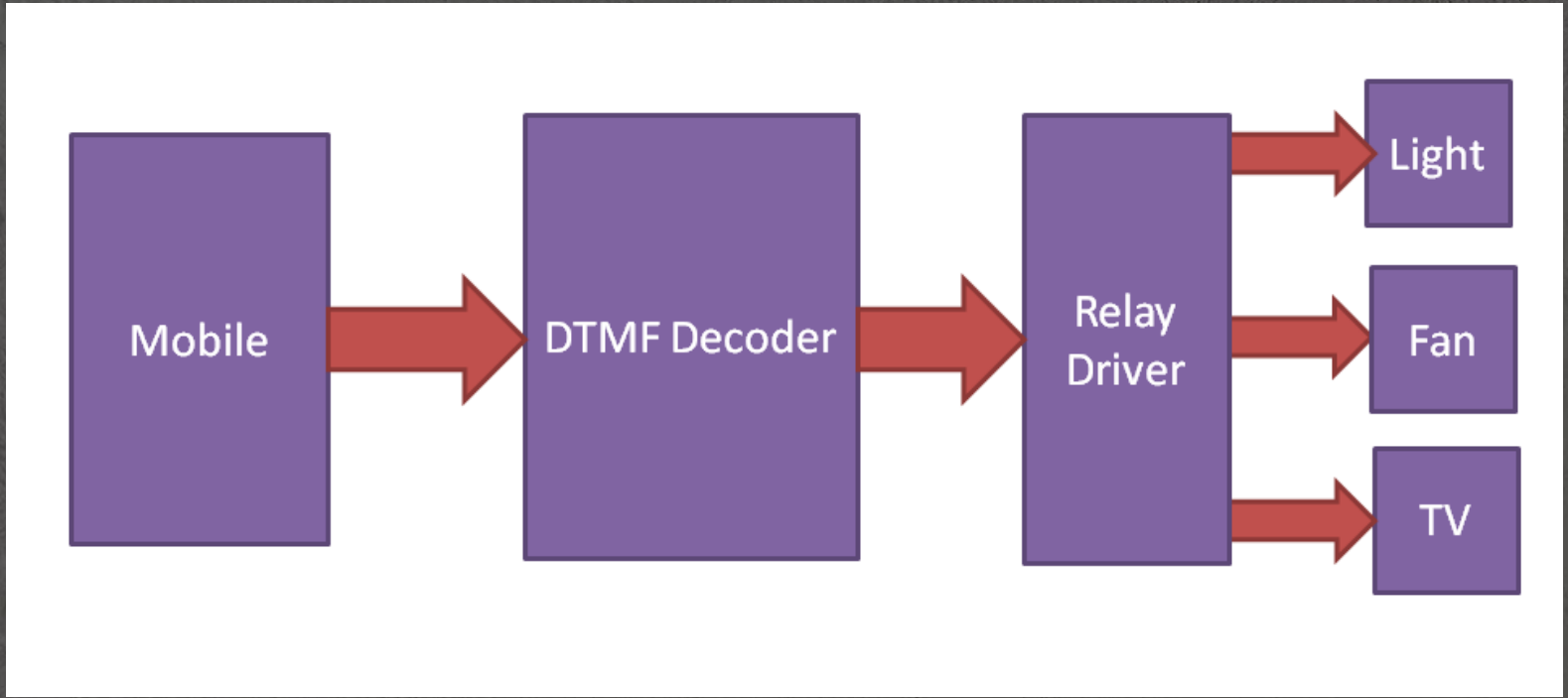


# IMPLEMENTATION ON HOME DEVICES

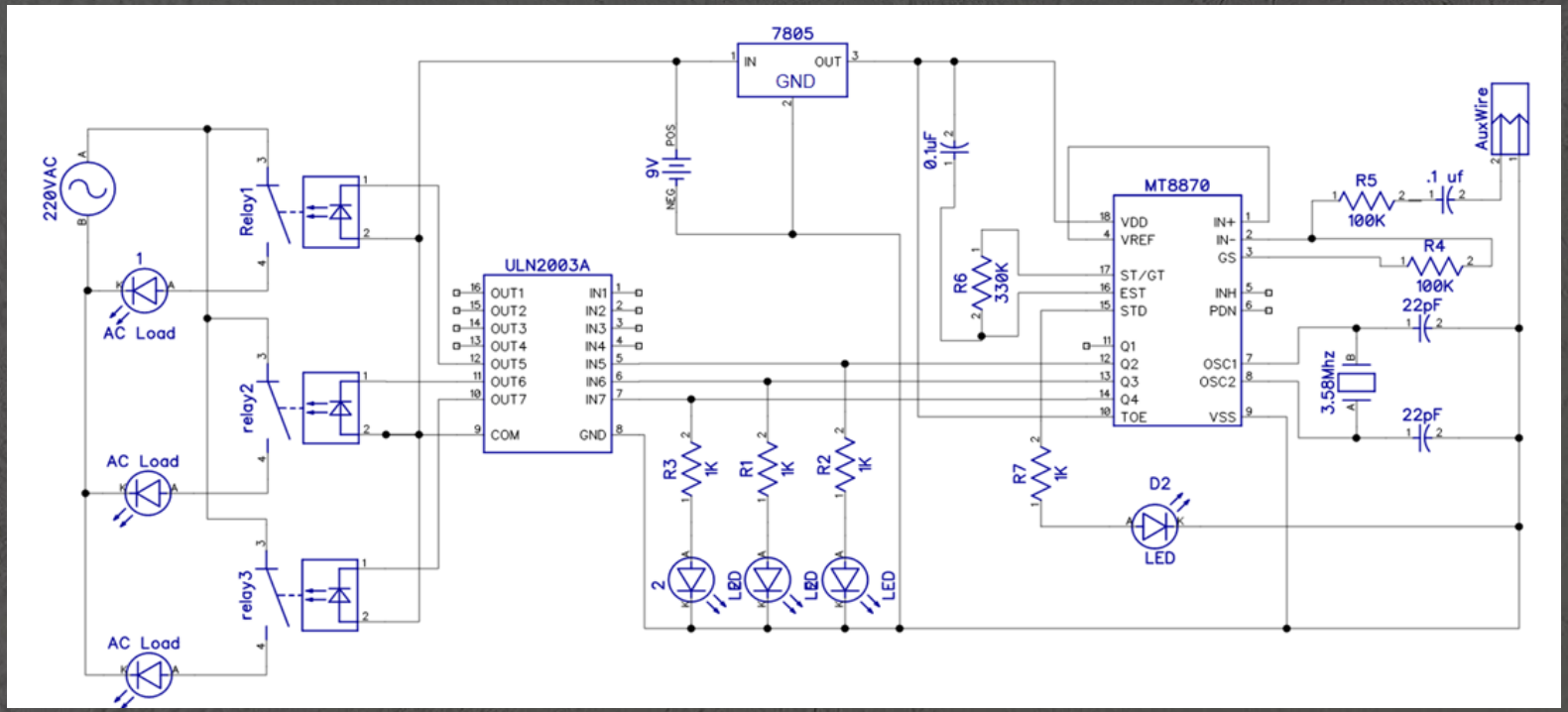
In circuit diagram at Q1 LIGHT is connected, at Q2 FAN is connected and at Q3 TV is connected through relay driver IC. We have left Q4. Now when we press key 1 at the dial pad of mobile phone DTMF decodes this tone and generates a digital output given in table. Now According to given output in table Q1 is HIGH and Q1 is connected with light so LIGHT turned ON. If we want turned OFF the LIGHT, we need to press key number 8. Because in the output of key8, Q1, Q2 and Q3 LOW and Q4 are HIGH and we have not used Q4.

| S.No. | key | Digital Output | | | |
|---|---|---|---|---|---|
| | | Q4 | Q3 | Q2 | Q1 |
| 1 | 1 | 0 | 0 | 0 | 1 |
| 2 | 2 | 0 | 0 | 1 | 0 |
| 3 | 3 | 0 | 0 | 1 | 1 |
| 4 | 4 | 0 | 1 | 0 | 0 |
| 5 | 5 | 0 | 1 | 0 | 1 |
| 6 | 6 | 0 | 1 | 1 | 0 |
| 7 | 7 | 1 | 1 | 1 | 1 |
| 8 | 8 | 1 | 0 | 0 | 0 |
| 9 | 9 | 1 | 0 | 0 | 1 |
| 10 | 0 | 1 | 0 | 1 | 0 |

# BLOCK DIAGRAM



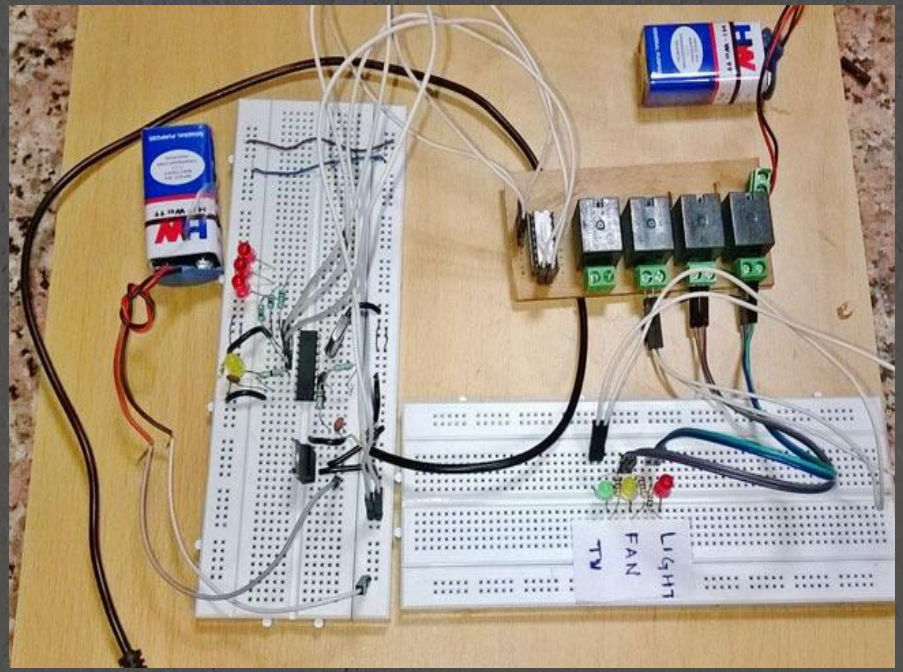
# CIRCUIT DIAGRAM



# WORKING PROTOTYPE

**USED COMPONENTS:**

| | |
|---|---|
| MT8870 DTMF DECODER | 1 |
| ULN2003 | 1 |
| RELAY MODULE (4 CHANNEL) | 1 |
| CONNECTING & AUX WIRES | - |
| LEDs | 6 |
| 3.57 Mhz CRYSTAL OSCILLATOR | 1 |
| RESISTORS (1K,100K,330K) | 9 |
| 7805 VOLT-REGULATOR | 1 |
| 0.1uF & 22pF CAPACITOR | 2 |



# DISADVANTAGES OF DTMF HOME AUTOMATION SYSTEM

- As the controller is directly influenced using numpad, no.of devices that can be controlled is limited.
- Anyone can operate the connected devices by calling the device that is currently connected to the circuit. Therefore, less security.
- The system may not be as accurate since poor line or connection may lead to misinterpretation of transmitted data.
- The system may face compatibility issues as connecting some high power home devices will be difficult for the circuit to handle.

# THE CONCLUSION