

# An Intelligent Smart Home Controlling and Monitoring System Using PSOC Technology

Ramavath Ravinder & Bandari.Shubhaker

PG Scholar, Dept of ES, Assistant Professor, Dept of ECE

[ravinder7641@gmail.com](mailto:ravinder7641@gmail.com), [shubhaker.subbu@gmail.com](mailto:shubhaker.subbu@gmail.com)

St. Martins Engineering College, Jawaharlal Nehru Technological University,  
Hyderabad, Telangana, India.

## ABSTRACT

*Now-a-Days mechanization will be playing a paramount part for each What's more each field for example, such that Industrial, Home, country What's more agricola zones. Generally we used to control those modern gear by manual operation, which increments the mankind's exertion Also support expense. So as with succeed this problem, the framework is planned with control gadgets In remote spot. Will control those gadgets starting with remote spot we need aid utilizing An DTMF procedure. DTMF (Dual tone arm Multi Frequency) may be utilized which changes over the fancied recurrence for on simple signs which will be accepted by DTMF decoder Also provided for with microcontroller.*

*Those microcontroller may be utilized for exchanging the load gear as stated by the recurrence accepted Eventually Tom's perusing those DTMF collector by utilizing a consolidation about MOC (Opto Coupler) 3021 and TRIAC (BT136) will be utilized for load crashing.*

*This venture employments controlled 5V, 500mA energy supply. 7805 three terminal voltage controller will be utilized for voltage regulation. Span kind full wave rectifier may be used to amend those ac out place from claiming optional from claiming 230/12V venture down transformer.*

## INTRODUCTION

Now-a-Days mechanization may be playing a paramount part for each What's more each field for example, Industrial, Home, country What's

more agricola ranges. Typically we used to control those modern gear by manual operation, which increments those human exertion and upkeep cosset. So as on succeed this problem, those framework is intended will control gadgets toward remote put.

Will control the gadgets from remote put we would utilizing An DTMF technobabble. DTMF (Dual tone arm Multi Frequency) will be utilized which proselytes the wanted recurrence in to simple signs which is gained Eventually Tom's perusing DTMF decoder and provided for should microcontroller. Here we need aid utilizing PSOC Likewise our controller. PSoC (Programmable framework looking into Chip) speaks to an entire new particular idea done microcontroller advancement. What's more will every last one of standard components from claiming 8-bit microcontrollers, PSoC chips characteristic advanced What's more simple programmable blocks, which themselves permit execution about vast number about peripherals.

Those microcontroller will be utilized for exchanging the load gear as stated by the recurrence gained by those DTMF collector Toward utilizing a mix from claiming MOC (Opto Coupler) 3021 and TRIAC (BT136) will be utilized to load crashing.

This task utilization controlled 5V, 500mA control supply. 7805 three terminal voltage controller will be utilized to voltage regulation. Span sort full wave rectifier is used to amend those ac yield about optional of 230/12V venture down transformer.

### **EXISTING METHOD**

Existing method we has the Radio frequency or RF remote control technology based home automation is another technique for implementing remote controlled home appliances. It consists of RF transmitter circuit and RF receiver circuit.

### **PROPOSED METHOD**

To control the devices from remote place we are using a DTMF technique. DTMF (Dual Tone Multi Frequency) is used which converts the desired frequency in to analog signals which is received by DTMF Decoder and given to microcontroller.

### **LITERATURE SURVEY**

This may be a intriguing one task constructed for a ir sensor and a decade counter. By utilizing this project, particular case camwood control as much lights / fans / AC / whatever electrical machine for An television remote. CD4017 will be a CMOS decade counter. It camwood identify An clock pulse and the BCD crazy set will be incremented Eventually Tom's perusing person to every CLK pulse. In we watch the BCD numbers, those LSB (Least huge Bit) about BCD complemented each the long haul. This venture utilization this LSB to switch on / off an electrical machine.

Those microcontroller may be utilized to exchanging those load gear as stated by those recurrence accepted Toward the DTMF recipient by utilizing a consolidation about MOC (Opto Coupler) 3021 What's more TRIAC (BT136) is utilized to load crashing.

This task utilization directed 5V, 500mA control supply. 7805 three terminal voltage controller is utilized for voltage regulation. Span kind full wave rectifier will be used to amend the ac yield of optional of 230/12V venture down transformer.

## BLOCK DIAGRAM

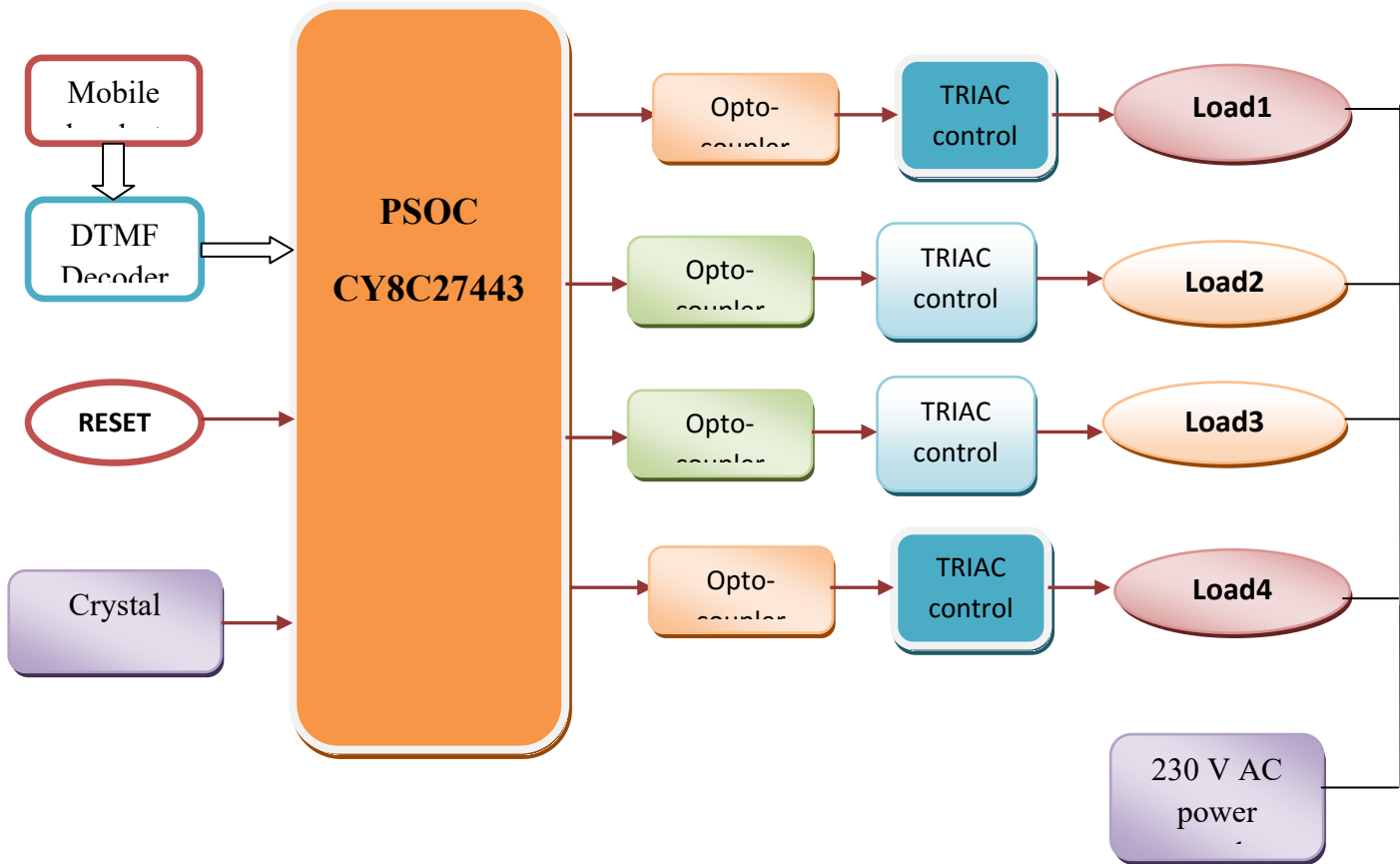


Fig 1: BLOCKDIAGRAM

### PSOC:

When developing more complex projects, there is often a need for additional peripheral units, such as operational and

instrument amplifiers, filters, timers, digital logic circuits, AD and DA convertors, etc. As a general rule, implementation of the extra peripherals brings in additional difficulties: new components take space, require additional

attention during production of a printed circuit board, increase power consumption... All of these factors can significantly affect the price and development cycle of the project. The introduction of PSoC microcontrollers has made many engineers' dream come true of having all their project needs covered in one chip.

**PSoC:** Programmable System on Chip

PSoC (Programmable System on Chip) represents a whole new concept in microcontroller development. In addition to all the standard elements of 8-bit microcontrollers, PSoC chips feature digital and analog programmable blocks, which themselves allow implementation of large number of peripherals. Digital blocks consist of smaller programmable blocks that can be configured to allow different development options. Analog blocks are used for development of analog elements, such as analog filters, comparators, instrumentation (non-)inverting amplifiers, as well as AD and DA convertors.

There's a number of different PSoC families you can base your project upon, depending on the project requirements. Basic difference between PSoC families is the number of available programmable blocks and the number of input/output pins.

Number of components that can be devised is primarily a function of the available programmable blocks. Depending on the microcontroller family, PSoC chips have 4–16 digital blocks, and 3–12 analog programmable blocks.

### **Characteristics of PSoC microcontrollers**

Some of the most prominent features of PSoC microcontrollers are:

- MAC unit, hardware 8x8 multiplication, with result stored in 32-bit accumulator,
- Changeable working voltage, 3.3V or 5V,
- Possibility of small voltage supply, to 1V,
- Programmable frequency choice.

### **Programmable blocks allow you to devise:**

- 16K bytes of programmable memory,
- 256 bytes of RAM,
- AD convertors with maximum resolution of 14 bits,
- DA convertors with maximum resolution of 9 bits,
- Programmable voltage amplifier,
- Programmable filters and comparators,
- Timers and counters of 8, 16, and 32 bits,
- Pseudorandom sequences and CRC code generators,
- Two Full-Duplex UART's,

### **LIQUID CRYSTAL DISPLAY**

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
4. Ease of programming for characters and graphics.

These components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC

circuits. They are used for writing different messages on a miniature LCD.

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (*Hitachi*) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

## DTMF

**Dual-tone multi-frequency signaling (DTMF)** is used for telecommunication signaling over analog telephone lines in the voice-frequency band between telephone handsets and other communications devices and the switching center. The version of DTMF that is used in push-button telephones for tone dialing is known as **Touch-Tone**. It was first used by AT&T in commerce as a registered trademark, and is standardized by ITU-T Recommendation Q.23. It is also known in the UK as *MF4*.

Other multi-frequency systems are used for internal signaling within the telephone network.

The Touch-Tone system, using the telephone keypad, gradually replaced the use of rotary dial starting in 1963, and since then DTMF or

Touch-Tone became the industry standard for both cell phones and landline service.

The DTMF keypad is laid out in a 4×4 matrix, with 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 for each of the two frequencies (697 and 1209 hertz (Hz)). The original keypads had levers inside, so each button activated two contacts. The multiple tones are the reason for calling the system multifrequency. These tones are then decoded by the switching center to determine which key was pressed.

## TRIAC

The TRIAC is a three-terminal device similar in construction and operation to the SCR. The TRIAC controls and conducts current flow during both alternations of an ac cycle, instead of only one. The schematic symbols for the SCR and the TRIAC are compared in figure 3-23. Both the SCR and the TRIAC have a gate lead. However, in the TRIAC the lead on the same side as the gate is "main terminal 1," and the lead opposite the gate is "main terminal 2." This method of lead labeling is necessary because the TRIAC is essentially two SCRs back to back, with a common gate and common terminals. Each terminal is, in effect, the anode of one SCR and the cathode of another, and either terminal can receive an input. In fact, the functions of a TRIAC can be duplicated by connecting two actual SCRs as shown in figure 3-24. The result is a three-terminal device identical to the TRIAC. The common anode-cathode connections form main terminals 1 and 2, and the common gate forms terminal 3.

Figure 3-23. - Comparison of SCR and TRIAC symbols.

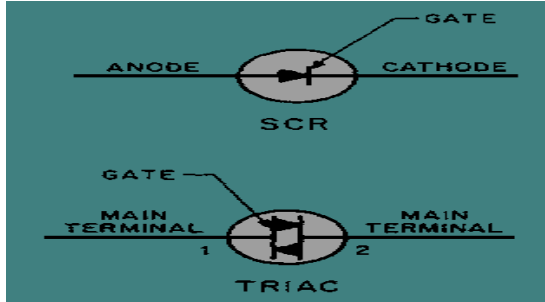


Fig2 : Back to back SCR equivalent circuit.

## OPTOCOUPLEDERS

There are many situations where signals and data need to be transferred from one subsystem to another within a piece of electronics equipment, or from one piece of equipment to another, without making a direct ohmic electrical connection. Often this is because the source and destination are (or may be at times) at very different voltage levels, like a microprocessor which is operating from 5V DC but being used to control a triac which is switching 240V AC. In such situations the link between the two must be an isolated one, to protect the microprocessor from overvoltage damage.

Relays can of course provide this kind of isolation, but even small relays tend to be fairly bulky compared with ICs and many of today's other miniature circuit components. Because they are electro-mechanical, relays are also not as reliable .and only capable of relatively

low speed operation. Where small size, higher speed and greater reliability are important, a much better alternative is to use an optocoupler.

*Optocouplers use a beam of light to transmit the signals or data across an electrical barrier, and achieve excellent isolation.*

Optocouplers typically come in a small 6-pin or 8-pin IC package, but are essentially a combination of two distinct devices: an optical transmitter, typically a gallium arsenide LED (light-emitting diode) and an optical receiver such as a phototransistor or light-triggered diac. The two are separated by a transparent barrier which blocks any electrical current flow between the two, but does allow the passage of light.

An optocoupler is a combination of a light source and a photosensitive detector. In the optocoupler, or photon coupled pair, the coupling is achieved by light being generated on one side of a transparent insulating gap and being detected on the other side of the gap without an electrical connection between the two sides (except for a minor amount of coupling capacitance).

In the Fairchild Semiconductor optocouplers, the light is generated by an infrared light emitting diode, and the photo-detector is a silicon diode which drives an amplifier, e.g., transistor. The sensitivity of the silicon material peaks at the wavelength emitted by the LED, giving maximum signal coupling. Usually the electrical connections to the LED section are brought out to the pins on one side of the package and those for the phototransistor or diac to the other side, to physically separate them as much as possible. This usually allows optocouplers to withstand voltages of anywhere between 500V and 7500V between input and output. Optocouplers are essentially digital or

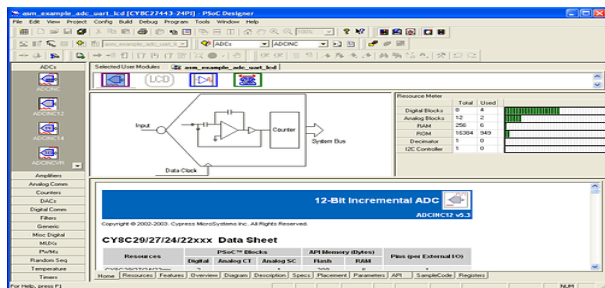


switching devices, so they are best for transferring either on-off control signals or digital data. Analog signals can be transferred by means of frequency or pulse-width modulation.

## SOFTWARE DESCRIPTION

### 1 Programmable Component Selection

The greater part significant and only those programmable part determination window may be set on the cleared out side. Segments sort program to a few groups, like advertisement converters, amplifiers, simple communications, counters, and so forth. Then afterward gathering selection, fundamental part for task ought make chosen for double-click, or right-click for select. On account about great selection, proper graphical image might make indicated for those parts opening.



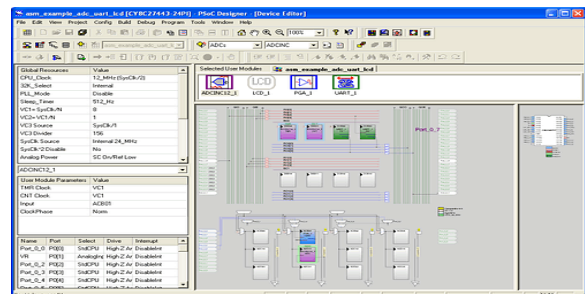
**Fig 3: programmable component selection**

Whatever remains of the window offers some other suitable data. Asset meter indicates upon what amount of space is left to new programmable pieces. For example, 16-bit counter takes two programmable blocks, something like that it may be could be allowed on spot 4 counters like this person inside and out. Throughout determination from claiming every of the components, Previously, easier side

of the window will be opened point by point instruction, which provides for majority of the data something like piece characteristics, use and code illustration.

### intercontinental view

Formerly chosen segments would even now unusable, until they would set Previously, advanced alternately simple programmable blocks, and until suitable parameters are set. This imperative and only fill in camwood make finished done intercontinental perspective window. National and only this window is graphical representational of programmable pieces and association lines. On account of microcontroller of CY8C27xxx series, eight advanced and twelve simple programmable obstructs could a chance to be utilized. In the put between obstructs there would inside lines for interconnection, and worldwide reason for existing input/output lines. Despite this plan takes a gander confounded right away sight, you could a chance to be indeed that it isn't tough will expert those lifestyle it will be all joined. Somehow it resembles PCB routing, Anyhow generally much simpler.



**Fig 4 : interconnection view**

## RESULTS



**Fig 5 : Hard ware out put**

## CONCLUSION AND FUTURE SCOPE

This one task displays the DTMF built home mechanization Furthermore it may be planned Furthermore actualized for MCU for installed framework space. Test fill in need been conveyed out deliberately. The effect demonstrates that higher effectiveness is In fact attained utilizing those inserted framework. Those recommended technique will be checked on a chance to be profoundly advantageous to the Domesticated and mechanical reason for existing.

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## Author Profile:



**RAMAVATH**

**RAVINDER** received M. Tech in ECE Embedded Systems from St. Martins Engineering College, Dhulapally, Seunderabad in 2017. He was graduated in Electronics and Communication Engineering from ST'peters engineering college Hyderabad,Telangana, India in 2015.

## Author Profile:





**BANDARI SHUBHAKER** received M. Tech from JNTU Hyderabad. , he was been working as assistant professor in the department of Electronics and Communication Engineering for different colleges in TS, India. He is currently working with St. Martins engineering college, Dhulapally, Secunderabad, India as assistant professor in Dept. of ECE.