Electromagnetic Waves Controlled Appliances without Microcontroller

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Abstract: The present project deals with the application of cell phone for controlling home appliances without microcontroller from anywhere in the world. This circuit is developed using readily available components of IC555, CA3130, CD4017. The main advantages of this circuit are to reduce the cost quick operation and easy maintenance. The electromagnetic waves generated from our cell phone are detected by CA3130 and converted into electrical signal. This signal is detected by IC555 and CD4017 and control home appliance though Relay.

Keywords: Cell Phone, CA3130, IC555, CD4017, Relay, Lamp.

I . INTRODUCTION

The aim of the proposed system is to develop cost effective solution that will control home appliances anywhere from the world without microcontroller. This system is available at low cost .It can be made with readily and cheaply available components in the market. The home appliances control system has more components with microcontroller that need a good knowledge of programming and also need a program loader. It cannot be loaded by all. The design of this circuit is simple.

An ordinary RF detector using tuned LC circuits is not suitable for detecting signals in the GHz frequency band used in mobile phones ranges from 0.9 to 3 GHz with a wavelength of 3.3 to 10cm. so a circuit detecting gigahertz signals is required for a mobile bug [1]

CA3130 are op amps that combine the advantage of both CMOS and bipolar transistors. Gate-protected P-Channel MOSFET (PMOS) transistors are used in the input circuit to provide very-high-input impedance, very-low-input current, and exceptional speed performance. The use of PMOS transistors in the input stage results in common-mode input-voltage capability down to 0.5V below the negative-supply terminal, an important attribute in single-supply applications. A CMOS transistor-pair, capable of swinging the output voltage to within 10mV of either supply-voltage terminal at very high values of load impedance), is employed as the output circuit.

The **555 Timer IC** is an integrated circuit (chip) implementing a variety of timer and multivibrator applications. The original name is the SE555 (metal can)/**NE555** (plastic) and the part is described as "The IC Time Machine''555 package includes over 20 transistors,

2 diodes and 15 resistors on a silicon chip installed in an 8-pin mini dual-in-line package[5]

The 4**017 IC** is a16 pin CMOS decade Counter from the 4000 series. It takes clock pulses from the clock input, and makes one of the ten outputs come on in sequence each time a clock pulse arrives [6]

The Existing System is to be detect and locate mobile phones in an area like conference hall, Tutorial Halls etc. The proposed system is modified to switch ON and OFF all electrical and electronic appliances in our residences

II. BLOCK DIAGRAM

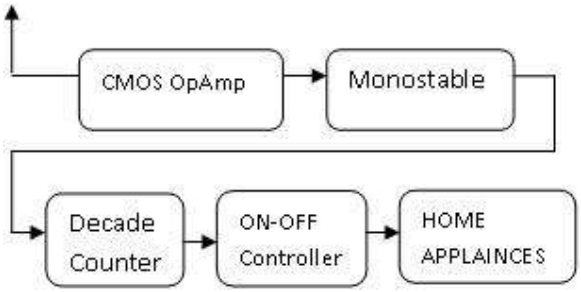


Figure:1. System Block Diagram

In figure shows the block diagram of Mobile phone controller without microcontroller It consist of an Op-amp, Multivibrator , Decade counter, and an ON-OFF Controller [3]

III. CIRCUIT DESCRIPTION:

This circuit is very simple and consist of a 12V power supply Circuit, Monostable Multivibrator build by Timer IC 555, a decade counter build by IC CD4017 and a CMOS operational amplifier build around CA3130. This CMOS Op-AMP has the advantages of both CMOS and Bipolar transistors.

The 12 V power supply for the unit is derived from the AC mains by using a small 12 V 1 A adaptor. Else you can power the circuit from a suitable 12 V compact battery. The DC 12 V output power is regulated by 3 pin fixed voltage regulator IC 7812 for better protection.

The IC 555 will be operating in monostable multivibrator[5]. This circuit is used to generate the clock pulse to provide input clock pulses to the counter IC CD4017[6].

The IC CAC3130 circuit senses high energy electromagnetic radiation from the cell phone when it is on. A antenna coil connected between inverting pin2 and non inverting pin 3 of IC CA3130 senses the electromagnetic radiation from the monitor to generate a minute current. IC CA3130 is a CMOS Op-Amp with gate protected p-channel MOSFETs in the inputs. It has high input impedance and low input current (typically,5pA)[7].The high input impedance and low input current make IC CA3130 suitable for this application. The internal bias of 5pA is sufficient for its working. So external biasing is not required [4]

When we call the cell phone electromagnetic signal received by the antenna coil connected at the pin 2, 3 generates a small current and produces a small voltage in its output .This voltage is applied to the base of transistor T1 and amplified .This amplified voltage is then applied to the trigger pin(2) of 555 IC_2 .Now the 555 IC generates a clock pulse .The width of this clock pulse is depends upon the value of R6 and C8. The clock pulse obtained from IC555 is applied to the pin 14 of IC_3 i.e Decade counter CD4017[6].Based on the clock pulse received the IC produces a voltage and it is applied to relay coil through transistor T_2.Now the position of the relay changes and the device connected with this relay is ON or OFF[2]

IV. SIMULATION IN PROTEUS

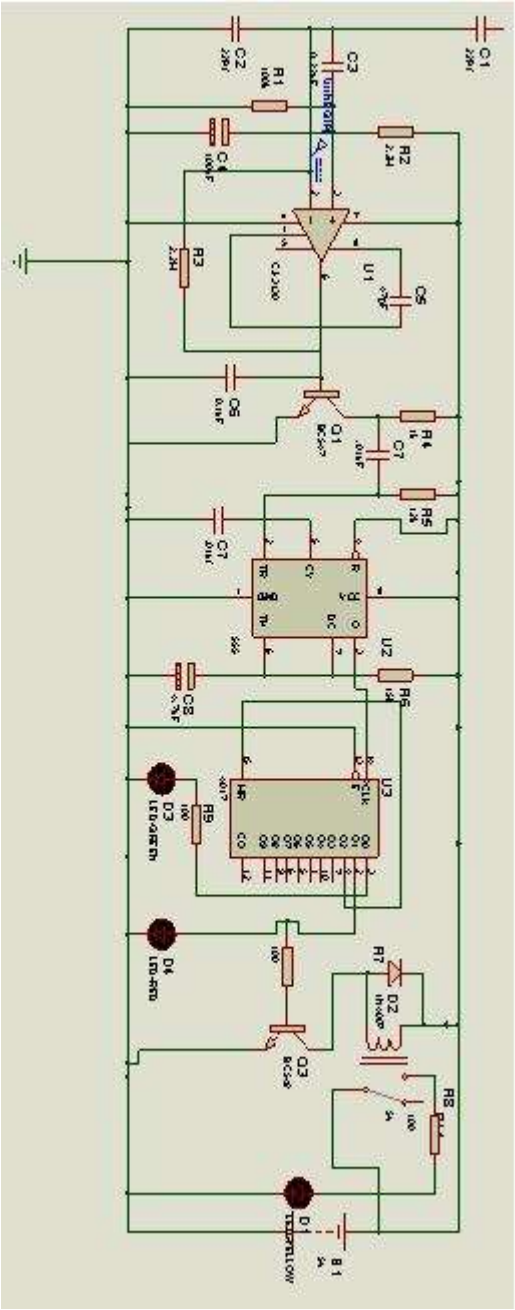
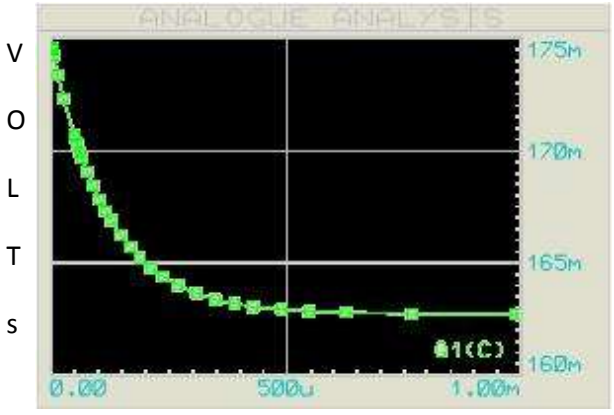


Fig. 2 Circuit diagram

V. HARDWARE DESIGN

Figure .3: Hardware Setup

VI . RESULTS AND DISCUSSION:



V O L T s

Figure 4: Output of CA3130

Time in seconds

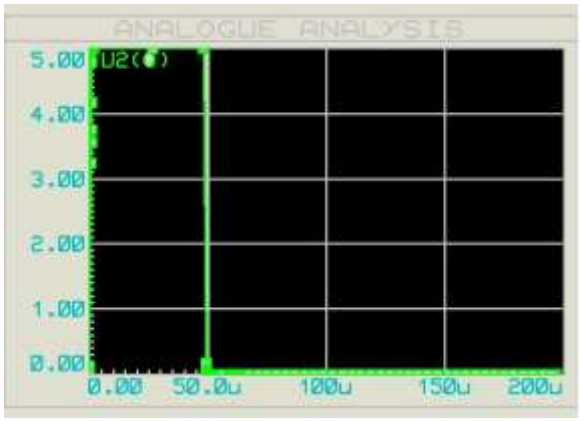


Figure .5 Output of IC 555

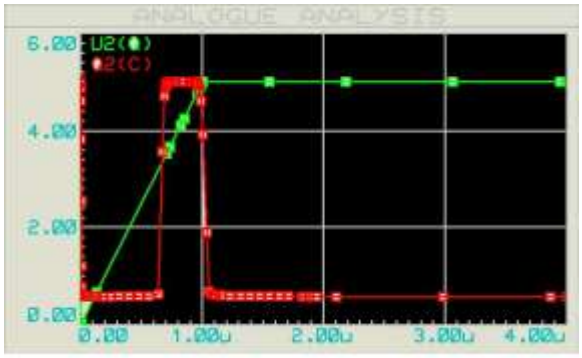


Figure.6: Output of IC 4017 and Transistor Q2

From the Fig(4) we observe that IC CA3130 converts Electromagnetic waves around our cell phone which is converted into small mV. Here we need 10mv for our reference. Due to this 10 mV IC CA3130 conversion into trigger signal, this trigger signal is enough for operating IC555. From Fig(5) shows the output of IC555 in monostable mode. Now this produces a square wave output based on the trigger input. The width of this waveform can be adjusted by resistor R6 and Capacitor C8.From Fig(6) shows the output of IC CD4017 and transistor Q2. The

Output of CD4017 cannot drive the relay directly. So this output is passed through one transistor to amplify this signal. This amplified signal is shown in Fig(6) .This is enough for operating relay coil. So that the device can be controlled

VII CONCLUSION

From the above result, we conclude that the Electromagnetic waves generated from the cell phone which can be used to control any appliances which are being operated by electricity. The simulation result also shows the operation of the circuit

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