

WIRELESS ELECTRICAL APPLIANCES CONTROLLER

Nirlipta Mohanty¹, Lipika Nanda²

PG Scholar, School of Electrical Engineering, KIIT University, Bhubaneswar, India¹

Assistant Professor, School of Electrical Engineering, KIIT University, Bhubaneswar, India²

Abstract: The wireless electrical appliances controller eliminates the obstruction and range problem used in big work sites, farmhouses, industries etc. This circuit employs 433MHz ASK transmitter and receiver.

Keywords: ASK transmitter & receiver, TRIAC based output controller

I. INTRODUCTION

This paper is about the circuit, which can control a number of electrical or electronic gadgets connected to it using wireless technique. Unlike IR remote control this circuit employs 433MHz ASK transmitter and receiver and hence it can be used for comparatively longer range without any obstruction. Any gadgets can be switched ON/OFF by keying the key allocated to it. Four switches are allocated for this purpose. The system is thus composed of two subsystems like transmitter section & receiver section, which are described in later sections.

In receiver section relay made ON/OFF by using microcontroller at the output of the serial decoder. Using this method we can ON/OFF four loads.

II. CIRCUIT DESCRIPTION

The present circuit is build around Microcontroller PIC16C84/PIC16C54. It is a 18 pin IC. The software is main thing which works and controls everything. So the logic oriented components is reduced. So less complicated. Hence it is very easy to understand everything. The microcontroller section which contains only microcontroller & few components like RC oscillator, resistors & polarity preventing diodes.

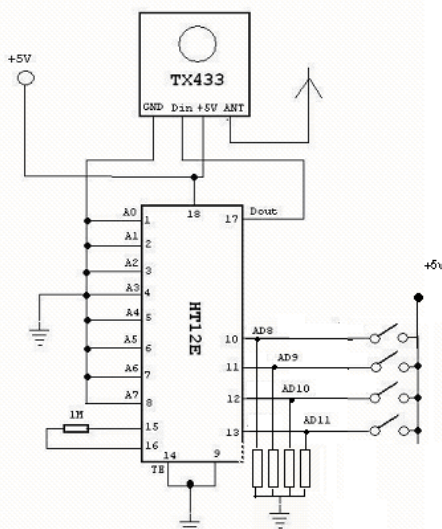


Fig:1.1 Transmitter section

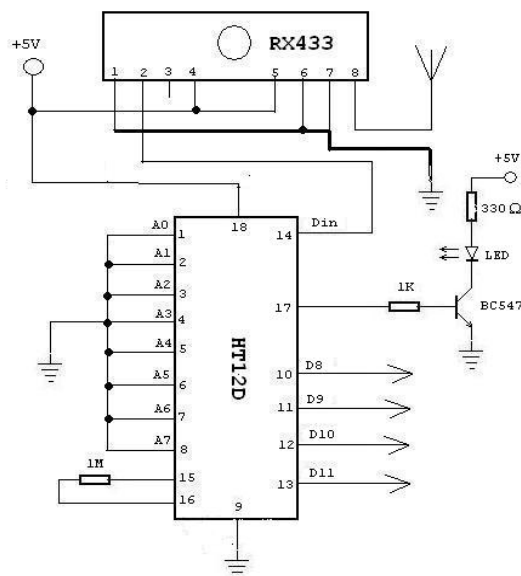


Fig:1.2 Receiver section

A. ASK transmitter & serial encoder :-

Here TX433 ASK transmitter circuit is used. It is a integrated chip. It operates in +5 volt. There four terminals.

- Pin 1 - Ground
- Pin2 - Data input from serial encoder
- Pin3 - Vcc
- Pin4 - Antenna

12 bit serial encoder HT12 E is used for converting the binary data input to serial data. Inputs are provided at pin 10 to 13 from microcontroller. There is a oscillator resistor 1 M connected in between 15 & 16. Pin 1 to 8 is for address pin.

B. Receiver & serial decoder :-

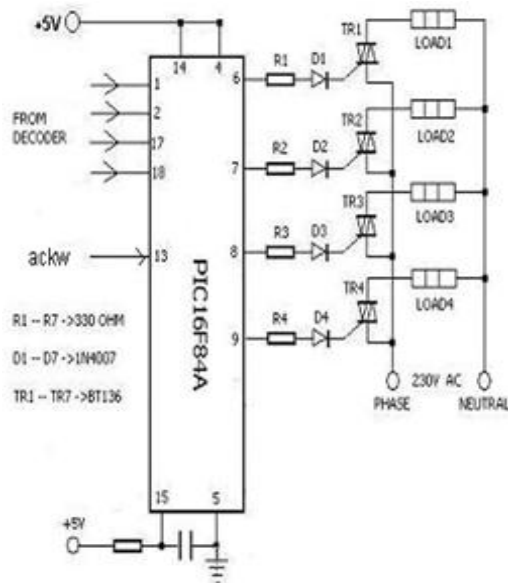
ASK receiver RX433 operates at 433 MHz. There are 8 pins in this chip.

- Pin 1 , 6 & 7 --- GND
- Pin 2 --- data output
- Pin 4, 5 --- + Vcc
- Pin 8 --- Antenna

The data is fed into HT12D, the serial decoder. It converts the serial data into four bit binary output.

- Pin 10 to 13 --- four bit binary output to microcontroller
- Pin 14 --- data input
- Pin 1 to 8 --- address pin
- Pin 15 & 16 --- Oscillator resistors
- Pin 17 --- data receive acknowledgement

III. CIRCUIT DESCRIPTION



The present project is build around Microcontroller PIC16C84/PIC16C54. It is a 18 pin IC. The software is main thing which works and controls everything. So the logic oriented components is reduced. So less complicated. Hence it is very easy to understand everything. The microcontroller section which contains only microcontroller & few components like RC oscillator, resistors & polarity preventing diodes. Microcontroller programmed to receive the inputs coming from the HT12D decoder. There are all total four inputs. These are connected to pin no. 17, 18, 1 & 2 of microcontroller. Data received is acknowledged by checking ackw output from the HT12D. This pin is of decoder connected to microcontroller at pin 13. Here for one switch pressed at transmitter end is collected at receiver end. After decoding the binary output decoder provides only binary. Microcontroller decodes BCD data to decimal number.

There are all total four outputs are taken from it. For one switch pressed microcontroller ON the particular output channel. Again pressing of the same switch microcontroller will detect the ackw signal for same output and this time microcontroller will OFF the output.

Outputs of the microcontroller are connected with triacs through polarity preventing diodes (1N4007) and current limiting resistance (330 ohms) in series. Triac is a solid state device therefore it is more advantageous than using relay. Triac circuit makes more compact and more longevity of the product. It is easy to use.

IV. POWER SUPPLY

The microcontroller needed to be operate in DC power supply. The microcontroller needs +5V supply. The

transformer is a centre tap 12-0-12V 500mA. It is then rectified using full wave rectifier. A 1000µF capacitor is used for filtration purpose. The three terminal voltage regulators 7805 provides regulated DC outputs for the operation of the circuit. A good grounding is necessary for the proper functioning of the circuit.

A. CONSTRUCTIONAL GUIDELINES :

The construction part is also important other than design. Therefore for perfect result the construction part must be error free. In construction part soldering is important , identification of components, polarity, mounting is also important.

The board is microcontroller based therefore the during construction it is important to assemble it in care.

- Study the circuit diagram in careful manner, the starting pin of the microcontroller, transistor pins, power supply circuit, capacitor polarity.
- Then observe the PCB using a eye glass to the tracks. See if there is any cracks and short circuits on the board. If there is any cracks and short circuit then choose another PCB or repair the same.
- Collect components together and soldering iron and solder wire and flux.
- Follow the rules and techniques for mounting components on the board.
- For switches one should use jumpers
- All chips are soldered on PCB.
- A 17 cm long antenna wire is connected to it.
- As there is two boards. Power supply regulator IC is to be placed in one board and another board is microcontroller board.
- After all the circuit is assembled , all the circuit board are placed on a big ply wood board.

B. OPERATION GUIDELINES :

After complete of the project assembling check all the connections. If all things are alright. Now without inserting the ICs check the power supply pins and ground pin. If all things right. Then insert ICs in IC bases in particular orientation. Now set apart the transmitter part from receiver part.

- For power supply to receiver use 9v battery
- Give power to receiver from 230v AC mains.
- At transmitter put the jumper to ON the load no. 1
- Now press the transmission enable switch at transmitter section transmit the data.
- Now see the data receive acknowledgement signal LED to glow. This confirms that the project is working.
- At same time the load no. 1 will ON.
- To make off the load 1 put off the jumper and press the transmission enable switch.
- To switch on the multiple loads , put on the jumper in similar fashion and press transmission enable switch.



VI. CONCLUSION

It is the paper about incorporate wireless electrical switching of loads. This is totally digital communication based project. It's working range is up to 100 m and more in free area. So it can be used industrial sector for load control with security feature & the control. Also it is operated by a wireless set so it is more secure. The project are built around chips therefore it is less complex. There is no noise affected problem.

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