SMART AUTOMATED BUZZER / BELL USING ARDUINO AND RF TRANSMITTER AND RECEIVER MODULE

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ABSTRACT

The venture attempted in this paper covers the development of a remote doorbell. The significant thought behind the venture is to wipe out or limit the utilization of wires and to dispose of the static idea of the customary doorbells. To actualize this, the standard electric circuit is supplanted with a RF based transmitter collector circuit joined with an Arduino Uno board. The thought is to transmit a flag by means of the transmitter circuit utilizing a push catch. The transmitter circuit comprises of 434 MHz RF transmitter module working nearby a HT-12E Encoder circuit. When the push catch is squeezed the transmitter which is fueled by a 12 volts battery, starts to transmit motions as radio waves. These signs started to stream by means of the air until the point when they are caught by a beneficiary circuit radio wire. Consequently, the transmitter and the collector circuit should be available in the region of each other. The recipient circuit comprises of a 434 MHz RF collector module combined with a HT-12D Decoder IC which gets the radio wave flags and after that proselytes them into electrical signs. These electrical signs are then bolstered to the Arduino Uno board which is modified to get the directions. When it gets the guidelines, it at that point maps it over the customized code and on the off chance that they coordinate, the ringer starts to buzz. This rendition of the doorbell is anything but difficult to introduce and uninstall at whatever point the client requires, and it additionally takes out the static part of a doorbell which has not been altered since long time past days.

Keyword: RF Transmitter, RF Receiver, Arduino code, Battery, HT-12E encoder, 12D decoder.

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1. INTRODUCTION-1

In the forever changing field of technology, it is very important to keep up with this change. Smart homes are becoming a way of life these days and everyone wants to adapt to a more techie lifestyle. In recent years, with the technological advancement, people always want the best and most cost efficient gadgets installed in their homes. The demand for compact and less complex devices is ever increasing.

A doorbell is a device used to signal something or the other. It is basically used to inform the people inside the home that someone is at the door waiting for them. Doorbells since the past few decades haven't seen a significant change. The doorbell proposed in this paper is based on a RF-transmitter-receiver module and Arduino Uno kit. The main idea behind this is to reduce the hassle of wires and static sense of a bell.

With the RF-transmitter-receiver module in play, we can eliminate the complex connections of wires and the static nature of the bells. The project delineates how the radio frequencies can be used to run it through the

Arduino circuit and make the buzzer go off. Since the project involves transmitting and receiving via the radio waves, and no direct connections are made between the transmitter and receiver circuits, this doorbell can be placed and replaced anywhere as per the requirements

2. EXISTING SYSTEMS AND ITS DRAWBACKS-2

2.1 Existing System-1

The existing system of doorbells was invented by Sir Joseph Henry in the year 1831. This model involves ringing a bell via an electric current passed through circuit. This is system had become pretty common during the early 1900s.
The wired doorbells are implemented using a switch on the outside of the door and the signaling system is placed inside the house. The switch uses a single pole-single throw (SPST) button which temporarily closes the circuit and lets the current flow through the wires into the signaling circuit.
The signaling device is built using a small hammer
which is connected to the wires and is controlled using the current flowing in the circuit. The circuit also consists of small metal bars which are struck by the hammer and the ringing sound is produced. With the recent advancement in technology the hammer-metal bar arrangement is replaced by a buzzer circuit. In this arrangement, when the switch is pressed, the circuit closes and the current flows through the wires and to the buzzer which makes it ring.

2.2 Drawbacks of Existing System-2

Drawbacks of the existing system-
1. The major drawback of the current existing system is that it is static and once installed cannot be easily replaced to a different location.
2. The wired system is a hassle to set up and to remove when changing the place and locations.
3. It is not economically viable to install the bell or to uninstall the bell.
4. If the circuit fails due to some reason it is difficult to know the reason clearly as to what is causing it.

3. PROPOSED SYSTEM-3

To avoid the uses of wires or to minimize the use of wires, the proposed system is based on the principle of the propagation of the radio wave frequencies as signals.
The two circuits involved in this process are-
1. Transmitter
2. Receiver

3.1 The Transmitter circuit-1

The transmitter circuit comprises of a RF transmitter which is controlled by means of a 12V battery source, and a power catch which is associated with the transmitter and a bread board. At the point when the catch is squeezed the transmitter circuit shoots out a flag in type of radio waves by means of the recieving wire. Transmitter module utilized for this here is 434 MHz RF Transmitter Module with a HT-12EEncoder.

3.2 The Receiver circuit-2

The beneficiary circuit comprises of a RF recipient which is fueled by a 12V battery source, Arduino Uno, bread board and a ringer. The flag which was transmitted by the transmitter is caught by means of the reception apparatus exhibit in the 434 MHz RF Receiver Module. The flag is then gone through the Arduino where it is changed over to code and is coordinated with the customized code on Arduino and the signal is made to buzz.

3.3 Required Hardware for Transmitter-3

- 434 MHz RF-Transmitter Modules
- HT–12E Encoder IC
- 750 KΩ Resistor
- Push Button
- Power Supply
- Connecting Wires

- Prototyping Board (Breadboard)

3.4 For Receiver-4

- Arduino UNO
- 434 MHz RF Receiver Module
- HT – 12D Decoder IC
- 33 KΩ Resistor
- Small Buzzer
- Power Supply
- Connecting Wires
- Prototyping Board (Breadboard)

3.5 Advantages over existing system-5

- Circuits are anything but difficult to plan.
- As less number of wires are utilized, the issue to introduce and uninstall is dispensed with.
- It isn't settled and can be put any place in the region of the span of the transmitter recipient module.
- It is fetched productive.

4. SYSTEM ARCHITECTURE AND DESCRIPTION-4

The graph outlines the well-ordered development of the venture from production of the transmitter circuit to the ringing of the ringer. In the Figure no. 1 Signals from the transmitter circuit are caught by the beneficiary circuit and the gone through the Arduino circuit to ring the ringer.

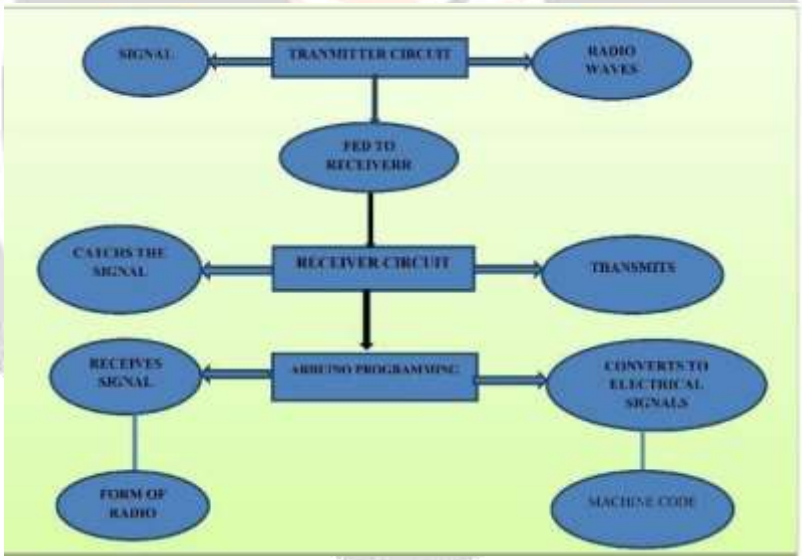

Fig -1: Architecture Diagram

4.1. Transmitter Circuit-1

In transmitter circuit, RF Transmitter used to transmit radio waves as signs. Its capacity is to bolstered the signs to the beneficiary.

4.2. Receiver circuit-2

It gets the flag from the transmitter circuit that is transmitted by it.

4.3. Arduino Programming-3

Radio waves that are gotten as signs are changed over to electrical signs. What's more, additionally changed over into machine code.

4.4. Circuit Diagram- 4

The diagram given underneath shows the associations that are made to run the circuit. It demonstrates where every one of the segments are appended to on the breadboard and how the Arduino is associated with the speaker and the decoder. In the figure no. 2 it likewise demonstrates the best possible associations how the pins engaged with the encoder and the decoder circuits separately calling attention to where the individual segments should be joined so as to finish the circuit.

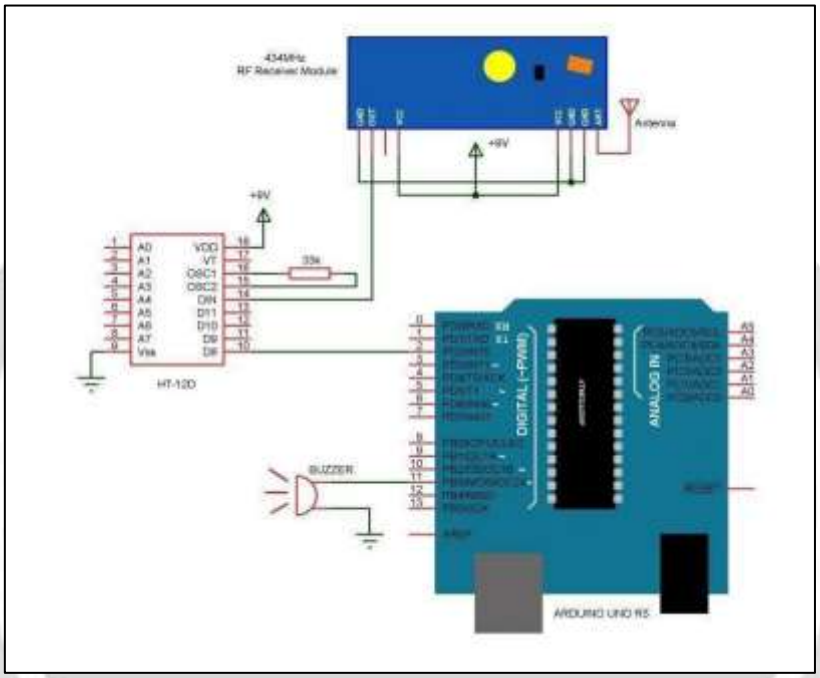

Fig -2: Circuit Diagram

5.SYSTEM IMPLEMENTATION-5

List of modules: -

- Design of Transmitter Circuit
- Design of Receiver Circuit
- Programming the Arduino

5.1. Design of transmitter circuit-1

The transmitter comprises of different segments to be specific a 434 MHz RF Transmitter Module, HT – 12E Encoder IC, 750 Kω Resistor and a push catch. The HT-12E Encoder IC principle part is to change over the parallel information from its contribution to the serial information for the RF Transmitter Module to transmit the signs to finish the predefined activity that are made by the client. The outline of the transmitter circuit is extremely basic. Pins 18 and 9 are associated with supply and ground terminals individually. The information out stick (Pin 17) of HT – 12E is associated with information stick of the RF Transmitter.

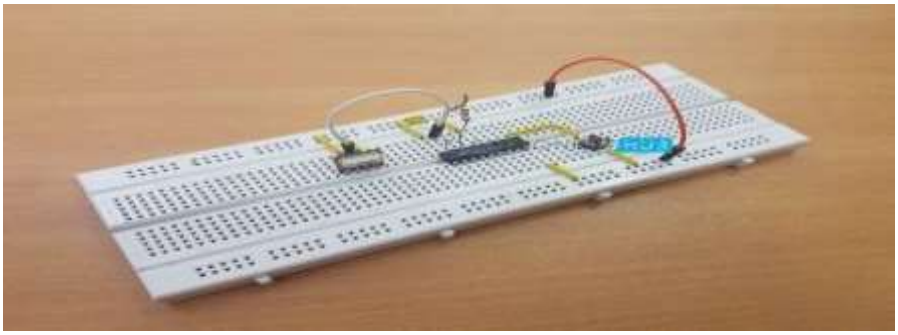

Fig -3: Transmitter Board

5.2. Design of Receiver Circuit-2

A 750 Kω is associated between the oscillator (Pins 15 and 16) of the HT – 12E.The transmission empower stick (Pin 14) is associated with ground. A push catch is associated between AD8 (Pin 10) and ground. The recipient part of the venture comprises of different segments specifically 434 MHz RF Receiver Module, HT – 12D Decoder IC, 33 Kω Resistor, Arduino UNO and a little ringer. HT – 12D Decoder IC is the partner of the Encoder IC. The RF Receiver gets the serial information from the RF Transmitter. The Decoder IC takes this serial information and believers it back to the parallel information. Pins 18 and 9 i.e. VDD and Vss pins are associated with supply and ground terminals separately.
The information in stick (Pin 14) of the decoder IC is associated with the information stick of the RF Receiver Module. A 33 Kω Resistor is associated between the oscillator (Pins 15 and 16) of the decoder IC. The D8 stick (Pin 10) is associated with Pin 2 (or any computerized I/O stick) of Arduino UNO. A little bell is associated between stick 11 of Arduino and ground.

5.3. Programming with Arduino-3

In the Arduino UNO's, it is customized to such an extent that, at whatever point a Logic '0' is identified by the Arduino, the signal is turned on. Arduino is an open source PC equipment and programming organization, undertaking, and client group. It outlines and produces single-board microcontrollers and microcontroller units for building computerized gadgets and intuitive objects that can detect and control questions in the physical and advanced world. Subsequently, at whatever point the catch is squeezed, the bell is turned on remotely.
Additionally a program for Arduino can be composed in any programming dialect. It is customized utilizing the Arduino developer application and when the push catch on the transmitter circuit is squeezed it sends RF waves out. These RF waves are then caught by the radio wire of the collector circuit and went through the Arduino where it is modified to ring the signal.

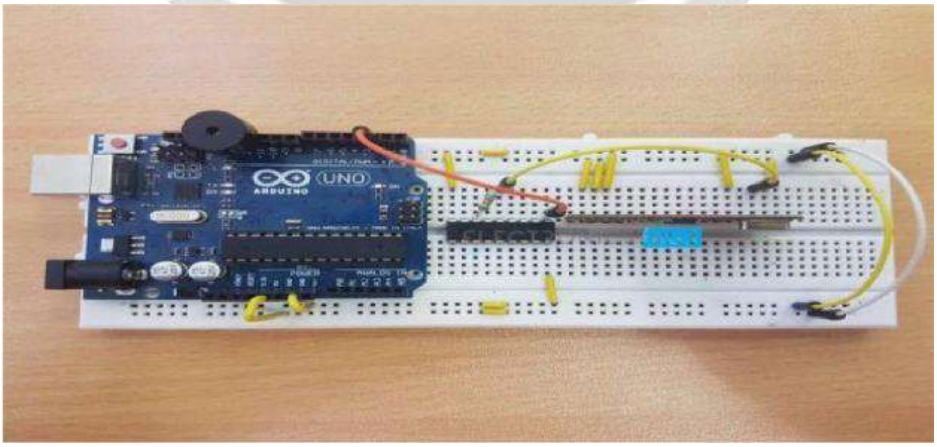

Fig -4: Transmitter Board

5.4. CODE TO BE USED-4

```
int buz=11;
int sen=2;
void setup()
{
pinMode(buz, OUTPUT);
pinMode (sen,INPUT);
digitalWrite(buz,LOW);
digitalWrite(sen,HIGH);
}

Void loop()
{
While(digitalRead(sem)==HIGH);
digitalWrite(buz,HIGH);
while(digitalRead(sen)==LOW);
digitalWrite(buz,LOW);
}
```

6. CONCLUSION AND FUTURE ENHANCEMENT -6

The remote doorbell planned is to beat the intricate establishment and administration of the wired static doorbells. Utilizing the RF-Transmitter-Receiver Module is utilized to limit the use of battery and to make the general item suitable for the end client. Future improvement scopes for this item are in various. The RF Transmitter-Receiver module can be moved up to a Wi-Fi or a Bluetooth module with a superior power supply to last more. Since it comprises of least wire utilization and it isn't settled at a solitary place, it can be set by the client's comfort. In the event that the client chooses to move places or change homes, it would be nearly less demanding to reinstall the chime at the new place. In addition, since the doorbell is minimal, it is anything but difficult to oversee when harms happen while in the conventional framework it is hard to recognize the underlying driver of the issue. Consequently, to close, this item upsets the present doorbell business improving it generally.

The proposed framework has created Home computerization utilizing Arduino, Transmitter, and Beneficiary. This is financially savvy, low upkeep and easy to use programmed framework which helps elderly and diversely abled individuals. The principle point of this framework is to expel an unpredictable circuit of wired doorbell with remote doorbell which makes it free and portable chime. This aides in setting chime anyplace in house without aggravating the fundamental circuit. As it is moveable it can bring amid house moving. This framework utilizes Arduino which helps in changing sound of ringer likewise. The thought proposed in this framework can likewise be utilized as a part of computerization industry, schools and doctor's facilities.

7. REFERENCECS -7

[1] T.Venkat Narayana Rao , Karttik Reddy Yellu "Programmed Safety Home Bell System with Message Enabled Features" Issue 12, 410-413/December 2016.

[2] Kunal, Tushar, Pooja, Vaibhav, Lodha "Savvy Home Automation utilizing IOT" International Journal ofAdvanced Research in Computer and Communication Engineering Vol. 5, Issue 2,February 2016.

[3]Andi Adriansyah, Akhmad Wahyu Dani "Outline of Small Smart Home Control Systems Based on Wireless Sensor Networks and Power Line Communications" 10.1109/TIE .2014 .2379586, IEEE Transactions on Industrial Electronics.

[4] Rajeev Piyare "Web of Things: Ubiquitous Home Control and Monitoring System utilizing Android based Smart Phone" International Journal of Internet of Things 2013, 2(1): 5-11 Yue Li"Design of A Key Establishment Protocol for Smart Home Energy Management System" 2013 Fifth International Conference on Computational Intelligence, Communication Systems and Networks.

[5] Nazrul Anuar Nayan, Ili A.M. Ikhsan, Yasuhiro Takahashi " Using ZigBee Communication Technology in a keen Home Wireless Sensor Network "Procedures of Second International Conference on Modern Trends in Science,Engineering and Technology 2014".

[6] ZigBee Communication Technology in a keen Home Wireless Sensor Network "Procedures of Second International Conference on Modern Trends in Science, Engineering and Technology 2014" Arduino Technical specs "www.ardui no.cc/en/M ain/arduino board uno Getting Started with XBee RF Modules" Version 1.0 by Martin Hebel and George Bricker with Daniel Harris.