ISSN 2395-1621

Industrial SOS Band

Asst. Professor. Suprriya Lohar, Rushikesh Salve, Khushali Popat, Harsh Piparwar

suprriya.lohar@yahoo.com
rushikesh55salve@gmail.com
khushipopat18@gmail.com
harshpiparwar@gmail.com

Electronics and Telecommunication Department,
AISSMS IOIT, SPPU

ABSTRACT

Industrial SOS band mainly focuses on alerting staff members of huge industry because huge death roll and injuries occur due to late or no alerting. This band possess quick transmitting capacity for fast response to accident. This SOS band system possess multiple transmitter and single receiver for simpler and faster communication. This band takes input in the form of push button from eye witnessing employee in industry. It is featured with four push buttons, each for specific problem. One is alerting the fire caused, another is for alerting any variation is power supply, third is used for alerting leakage occurred and last button is interrupt pressed when any of the above button is pressed by mistake. According to the trouble, the pre-recorded voice message is played to warn and aware employees to evacuated that place within no time. Moreover, this band system does not depend on sensors for alerting and hence instead of multiple security system only band can perform all multiple task. It ultimately reduces the cost and does not required different systems and it is way faster. As the band possess particular button for a specific problem it is fast and simple.weight of transmitter is 55 grams which is easy to carry and its size is 4*6 cm that fits right in user's hand. Other main feature of this transmitter prototype is it can also be used like pendant.

Keywords— HT12D decoder, HT12E encoder, Transmitter module, Receiver Module, AT mega microcontroller

ARTICLE INFO

Article History

Received: 8th March 2020

Received in revised form :

8th March 2020

Accepted: 10th March 2020

Published online :

11th March 2020

I. INTRODUCTION

When go to work in industry, they will not know what will happen to their, either they will have a good working day or any incident, especially in the case of fire that can cause losses. If fire occurs without any notice, there would be a lot of losses that need to be borne by the suspect who encounters the faults or error in minimum time.

Industrial SOS band mainly focuses on alerting staff members of huge industry because huge death roll and injuries occur due to late or no alerting. This band possess quick transmitting capacity for fast response to accident.This SOS band system possess multiple transmitter and single receiver for simpler and faster communication.This band takes input in the form of push button from eye witnessing employee in industry. As the band possess particular button for a specific problem it is fast and simple. It is featured with four push buttons, each for specific problem.One is alerting the fire caused, another is for alerting any variation is power supply, third is used for alerting leakage occurred and last button is interrupt pressed when any of the above button is pressed by mistake. Industrial SOS band Works on RF wave for communication between two antennas. Here there are many numbers of transmitter and single receiver and alert message will be made listen through speaker by a prerecorded message. Materials needed for this project Arduino microcontroller, HT12E, HT12D and transmitter and receiver. All these are easily available and makes the project simpler. Moreover, it makes use to simpler technology to communicate between two ends. It generates alert to cure the damaged that has been already caused.

II. LITERATURE SURVEY

The plan is to make a system of Industrial SOS band in which there may be any number of transmitter but the receiver will be single. Receiver gets the encoder data from transmitter in form of 4-bit digital signal. It primarily

decodes the data received and feed to microcontroller. Microcontroller is programmed to perform various task such as to ON/OFF AC main load while arising of any major fault and/or display the problem occurred and buzzing. Main advantage of this alerting system is that it has microcontroller programmable audio player. This recorded voice is then applied and at last speaker is provided so that it can be reached to each and every staff member.

There are various drawbacks:

1. May be any particular band works improperly so regular checking is required.

2. Speaker used must be louder than huge machine voice which may cause noise pollution and it is essential to maintain louder voice for better communication.

3. User should not misuse the functions of the band. He/She should use the band as per instructions.

III. IMPLEMENTATION METHODOLOGY AND SIMULATION

A.Methodology

Main function of such system is to alert rest of staff members during case of major failure. This system tries at its best to provide cure after a damage or at least a evacuating message. It provides assistance in case of major power failure or heavy fault in machinery. This system is designed in such way that it consists of transmission and receiving part. The main feature of this system is that there can be many transmitters but only a single receiver. Band consist of transmitter which is used to alert the specific disaster which may be caused in any industry. This band consists of four main specific push buttons for four various functions along with power push button and slider buttons to switch into different sectors. Transmitter part uses HT12E encoder IC and STT-433 transmittermodule. Communication between Band and receiver part is takes place through 433 MHz radio frequency. Receiver part consist of HT12D decoder IC, STR-433 receiver module, AT mega microcontroller, Relays, servo motor, DC motor, speaker.

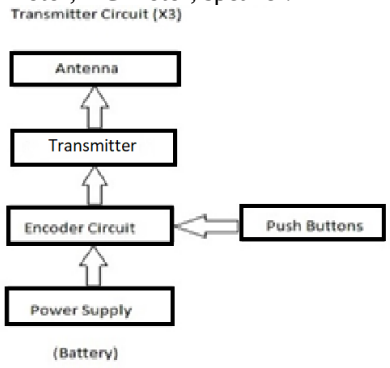

Fig. 1. Transmitter Block Diagram

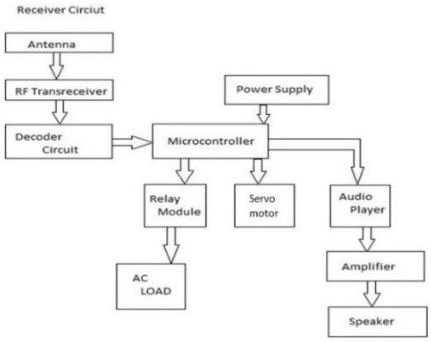

Fig. 2. Receiver Block Diagram

As the band possess particular button for a specific problem it is fast and simple. It is featured with four push buttons, each for specific problem.According to thetrouble, the pre-recorded voice message is played to warn and aware employees to evacuated that place within no time.

B. COMPONENT SPECIFICATION

1. STT-433 Transmitter (433MHz)

This transmitter IC is mostly used for longer and wider range, for remote control applications and lower cost. It operates at 1.5V to 12V and which is suitable for even battery-powered application. The transmitter is a stabilized oscillator, ensuring accurate frequency control for best range performance. Output power and emissions are easy to control it. Being manufacturing – friendly SIP package and wider application makes suitable for high volume applications.

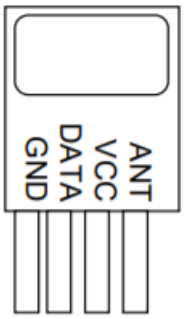

Fig. 3. Transmitter Module

1. 11mA current consumption at 3V
2. 433.92MHz frequency.
3. 5V operation Low cost.

2. STR-433 Receiver Module (433 MHz)

It is mostly used where range and cost are main concern and used for remote-control applications. Here no emissions generated virtually. The receiver module do not require any external RF components except for antenna.Its

design of low-cost make manufacturing of high-volume applications.

- 11mA current consumption at 3V
- 433.92MHz frequency.
- 5V operation.
- Low cost.

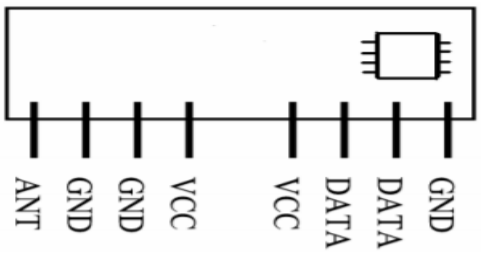

Fig. 4. Receiver Module

3. HT12E Encoder IC

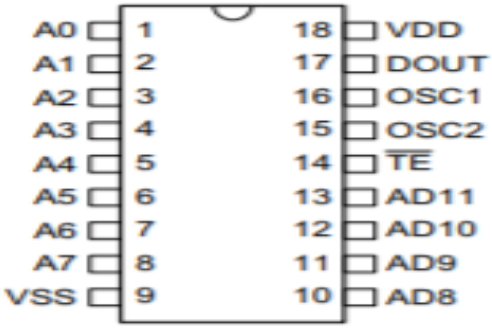

Fig.5 HT12E IC

- Operating voltage 2.4V-12V for the HT12E IC
- It's immunity towards noise is high and power consumption is low.
- Low standby current: 0.1A (typ.) at vdd=5V

4. HT12D Decoder IC

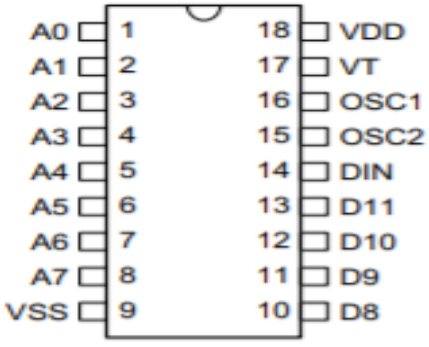

Fig.6 HT12D Decoder

1. Operating voltage: 2.4V~12V
2. It's immunity towards noise is high and power consumption is low.
3. Low standby current
4. Capable of decoding 12 bits of information
5. Pair with Holter's 212 series of encoders
6. Binary address setting
7. Received codes are checked 3 times.

C. HT12E encoder IC and the RF transmitter

The RF transmitter consists of four pinswhich are GND, data,VCC and ANT. The A8-A12 pins of the encoder IC are connected to Switches. The 4-bit data information is taken from these I/O pins. The address pins A0-A7 are grounded. The TE pin is connected to ground pin, to enable the information transmission. The DATA pin of transmitter is connected to Dout pin which gets the serially encoded data. The Antenna pin transmits the data.

D. HT12D decoder IC and the RF receiver

DATA pin of the receiver is connected to Din pin. The address pins Tx-Rx are connected to the Arduino. The A4-A5 pins of the IC provide the decoded 4-bit parallel data, converted from the serially received
data. SPK1 and SPK2 are connected to speaker.

D.TEST AND RESULTS

Initially it was tested the circuit diagram with help of software simulation in proteus. After from correct circuit diagram it was tested with help of physical components. Components of transmitter end were tested. Henceforth by placing the receiver end components and checked the connectivity by placing just a LED, checked that transmitter is working up to the mark. This connect ensure efficient communications between two ends. This prototype uses STT-433 as Transmitter module and STR-433 as Receiver Module. HT12E is used to encode the data of RF Transmitter and HT12D is used to decode the data received by RF receiver.

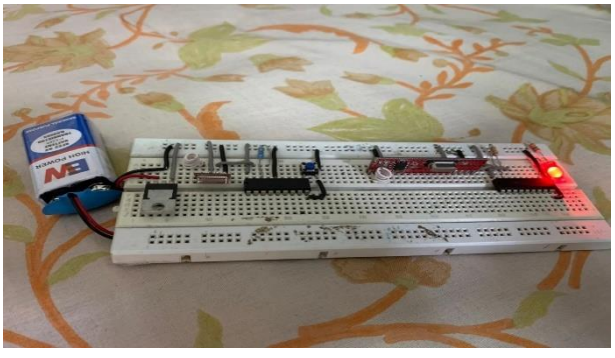

Fig. 7 Testing Transmitter-Receiver Module

This transmitter and receiver circuit requires 5V supply so for testing purpose we are using 9V battery as a supply and 7805 voltage regulators to provide regulated 5V.

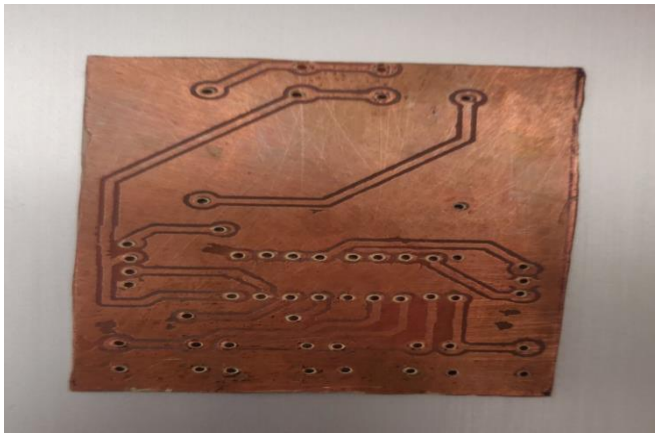

Fig. 8 Printed PCB of Band

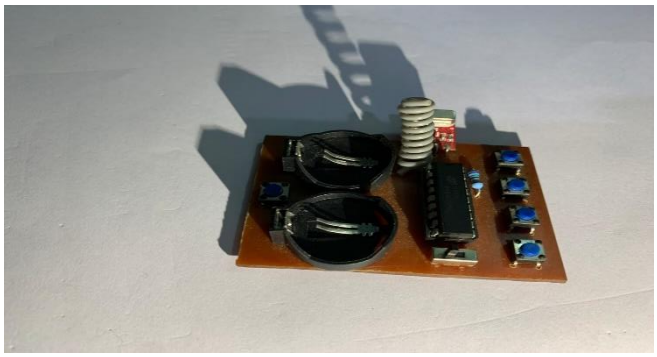

Fig. 9 Transmitter Band

Initially,we are using LED for testing the correct circuit of transmitter and receiver. Glowing of LED indicates that the communication between two end is precise and accurate. In

.

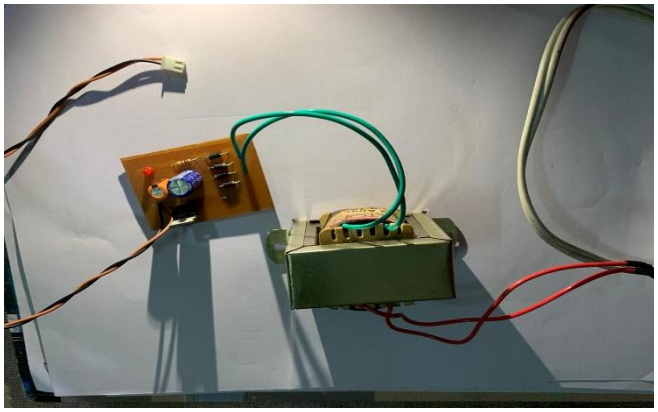

Fig. 10 Power Supply

Final prototype is using respective assigned operation such as pre-recorded message for alerting in particular disaster .After PCB printing of transmitter and receiver, components were being tested and placed according to design. Design of transmitter is kept minimal and convenient that it fits right in the hand. Power button placed at transmitter band also acts as reset button. For receiving end initially code was made according to desire need and then it was tested. According to coding of microcontroller relays are placed at output end . LCD is also configured with microcontroller to display particular problem of respective section. Moreover prototype is made in such a way that it can accepts more than one input simultaneously. So at result part it was tested and implemented successfully.

IV.CONCLUSION

Industrial SOS band System focus mainly on cure rather than precaution. Here the prototype is tired to make simple and effective for ensured end-to-end communication. As system uses RF waves various number to transmitter are possible to single receiver. This band provide different button for different problem that has already occurred. By pressing of buttons on band Microcontroller gets activated and respective action is taken besides of altering rest of the members of whole organization. As it is eye witness process it is more reliable way of providing secure escape during disaster.

So, it can be concluded that RF waves provide accurate communication and such band are more reliable at time of Fire events or heavy fault in machines.

The main advantage of such system is that alerting made is fast and reliable. The battery cell used in the transmitter band is long lasting and low consumed power which can last unto 100 working hours. For indication of battery which is not dead LCD is placed and by pressing power button LCD indicated whether cells are working or not by displaying a message. Another advantage of this system is that transmitter is small and compact and hence it is easy to carry and maintain. Approximate weight of transmitter is 55 grams which is easy to carry and its size is 4*6 CM that fits right in user's hand. Other main feature of this transmitter prototype is it can also be used like pendant.

V. REFERENCES

[1]. Authors: Jiandong Wang, Fan Yang, Tongwen Chen, and Sirish L. Shah, "An Overview of Industrial Alarm Systems: MainCauses for Alarm Overloading, Research Status, andOpenProblem"2015 pp.1-17

[2]. Authors:Mohamed Y. E. Simik ,Feng Chi," Design of Simple Bleeding Detector and Alarm System Using RF Transceiver and GSM System".2014 pp.1-5

[3]. Authors: Jaydeep Rusia ; Shubhankar Majumdar; Alok Naugarhiya ; Saikat Majumder; Shrish Verma," RF based wireless data communication between two FPGAs-IEEE"2016 pp.1-6

[4]. Author: Dr. Shreedhar A Joshi," Wireless Controlled Military Combat Robot system" 2017 pp.1-4

[5]. Author: Prajwal Sharma, Prakhar prasad,"RF Controlled Multi Utility Robot" 2018 pp.1-6

[6]. Author: Waheb A. Jabbar1, Muhamad Aznawi Bin Yuzaidi,"Smart and Green Street Lighting System Based on Arduino and RF Wireless Module" 2019 pp.1-6

[7]. Author: Jalpa Shah, Bhavik Modi,"Wireless Home Appliances Controlling System" 2014 pp.1-6

