Bilingual/Bi-annual Pakistan Studies English / Urdu Research Journal VOl.No.10, Issue No. 02

July -December, 2019

The Role of Emergency Communication System in Earthquake Disaster Response:

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Abstract:

Occurrences of natural disasters have been constantly increasing worldwide due to global warming and environmental destructions. They may cause loss of life, injury or other health impacts property damage, loss of livelihoods and services, social and economic disruption or environmental damage. The Role of Emergency responses communication system based on two-way radio in disaster response is very significant in both man-made and natural catastrophes that happen anywhere. This paper comprehensively describes the emergency communication system based on two –way radio for natural disaster. The system design of emergency communication comprised of o two-way radio system, specified it interface multiple user for emergency response. The interface was carried out using microcontroller and different frequency channel in short wave radio bands individually of design. The two-way radio communication system with result showed the implementation in lab.

Keywords: Emergency communication System(ECS), Microcontrollers RFT (Radio frequency Transmitter), RFF (Radio Frequency Receiver) wireless communication system, two-way radio system.

Introduction:

The system of seismic quake faulting for the most part acknowledged to be the discharge of tectonic flexible strain vitality put away in a stone volume by debased slip on a prior or new fault (Brace and Byerlee 1966) that has been discussed. Additionally, a short discussion has been included on how

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rate-and state-variable frictional dependability may influence the rate at which fault slip happens (Dietrich 1972, 1979).
A conceptual fault zone model that has been built on the previous works. (e.g. Sibson 1983; Scholz 2002), that depends on perceptions of the profundity distribution of fault rocks, deduced fluctuation in twisting system, fault (mendlay) (mendlay) stability and frictional strength with depth is additionally depicted. It is clarified how this model gives fundamental controls on the profundity furthest reaches of the crustal seism genic zone. The earthquake size and scaling parameters, in connection to translating information from various scales and techniques,
By adopting disaster management policies and by the usage of information technology applications. The impact and serve of disasters can be controlled in same instance. The scientific technology, skills, and sufficient resource minimized the annihilation of disaster timely information and warning of hazards are the basic key of effective response (Farzad, 2015).

In the statement of problem Pakistan generally is earthquake porn region particularly Quetta lies in the high seismic zone. It has been effected by a number of earthquakes in its recent history in developing countries like Pakistan, the emergency communication system has no local setup to reduce the risk of life and property. Hence local and portable setup for emergency communication system based on two-way radio for earthquake disaster is required.

The purpose of Research in emergency communication systems based on two-way radio for earthquake disaster response that ubiquitous components can provide relevant information during all phases of the emergency lifecycle that can contribute to saving human lives. The broad objective of the study is to develop emergency communication system for earthquake disaster in Baluchistan. To make the system Portable, easy to integrate to all available communication means in an affected area.

The emergency communication totaling on the location, time, and nature of the emergency, an oversized type of limitations might gift themselves once it human action of any emergency communication to find the resultant of their activities. which will should to be taken to guard life and property.

Literature Review:

The second stage of disaster management cycle is Disaster Response. Different elements are involved in disaster Response such as warning / evacuation, search and Rescue, providing instantaneous assistance assessing damage, and instantaneous Rehabilitation. The main theme of

emergency response is to ameliorate the life, health, morals of the affected masses. providing assistance such as transports, shelters, food, temporary settlement in camps are the basic onus of disaster Respond management. Exquisite and lenient communication and information are the yard stick to a community's Resilience.

Telecommunication plays a proactive role in disaster prevention. A worthy telecommunication not only inform about the impending danger, but also alerts the people to take proper pre-caution and war footing steps. Application such as remote sensing and global positioning system (GPS) play an indispensable role in order approaching hazards, alerting, co coordinating relief operation and amplifying the pain and loss of the affective. It was an uphill task to establish communication in remote areas,

Two-Way Radio Communication System:

A proper two-way communication during a disaster can modify, sweeten the calamities and human loss. Communication technology plays a vital role and no one can deny the lucrative advantages in the field of disaster emergency communication technologies. The role of communication technology involved four phase of disaster management namely response, preparedness, mitigation and recovery. As all disaster climates are chaotic and devastated in nature, and create enigmatic such as physical, emotional and social disorder. In such harsh crisis, communication plays unfathomable role in order to reduce and mitigate emergencies and risk. It also manages risks and communication a bridge between the effective and organizations.

The Role of Two Way Radio Communication:

Methods and Results:

In the last decade the radio communication system has advanced in inestimable ways. the new technology of techniques in the disaster situation that might improving the technologies in two-way radio communication system. Radio communication has an integral role in disaster management. The communication system of Radio is a vital element in the monitoring of environment. the role of two-way radio communication to provide a huge way to satay contact with other team members of user. it's especially true in times of emergency.

During in an emergency the team member guessing where the other team is located. it's a wastage of time. emergency communication system in two-way radio communication come with GPS tracking capabilities. We can

always find out the team is at relation to the GPS on their two-way radio communication system reach up to 300 miles in distance. if any emergency situation a lot of time required but two-way radio compact to not get in the technique. the distance arrives internet based forms of communication will likely go down but the communication of two-way radio is not damaged. they will continue to work long past other forms of communication.

Basically two-way radio communication system to operate on a several miles range and two devices consists of capable to send and receive data from multiple users at a time to continue this process.

System Design:

The system model used for Emergency communication system based on two-way radio for natural disaster response research illustrated in figure 1. the transceiver the data injected into microcontroller, which is the information in the form of (voice, Data) it switches different users over channels in short way. The short way is as long range communication 10M is available to ionosphere. The microcontroller users. The users to radio network via USB serial port to handshake in instated through a call signal overall design of the system connected to two-way radio networks with different bands, which connect with each other by extracting audio from network and diverted to another network for transmission by using a programmed control.

1.1 The Case for Controller Design:

The design represents the third party console with microcontroller and control signals to assign the connections.

A. System Architecture:

The overall design of the system contains RF transmitter and RF Receiver of two-way radio networks with different bands, HF, and VHF which connect with each other by extracting audio from network and diverted to another network for transmission by using a microcontroller unit driven by different users signals in order to select one of the other two networks. Fig.2.

Hardware Design:

1.2 Receiver:

The opposite of radio transmitter of radio receiver. the radio waves capture to an antenna. those waves only process to extract that are vibrating at a preferred frequency those waves that were added that the audio signals abstract and amplifies the radio signals. The amplifies signal were added to those waves. the speaker on play them by amplifies the audio signals. The fixed frequency received by receiver and turned on transmitted by ours.

Its architecture of super heterodyne of receiver the use. heterodyne receiver mixing uses of frequencies intermediate a fixed frequency signal and a received signal convert in heterodyning. the intermediate frequency to receive a fixed signal (IF). The original radio carrier frequency which can be more expediently processed.

The FM and AM stations increase the number of high rate of between station. three function are utilized manufacturing of receiver one of as an oscillator and Transistor, amplifying and mixer of RF. Intermediate frequency working as filter tool, the transistor installed for intermediate frequency (IF).

Detection is the second step of Radio frequency (RF). The audio section to detects the diodes and to received information of signals. Finally, to connected the speaker the circuit and block diagram as shown in figure

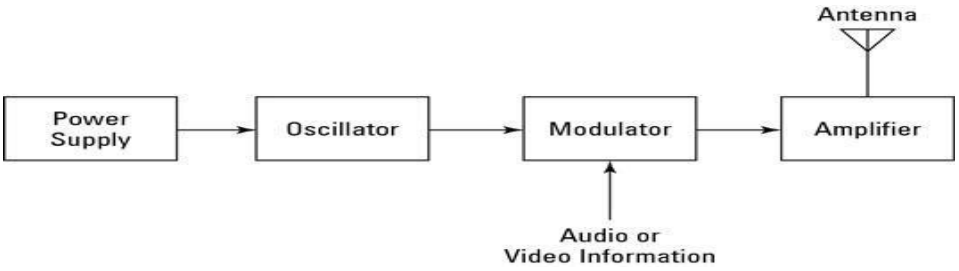


Figure 4.1 Radio Frequency Transmitter System Module

1.3 Transmitter:

The transmitter making a three steps that is the initial structure of transmitter as power amplifier, Audio amplifier and oscillator. The fixed frequency of oscillator that is 11MHZ.the wireless communication of radio to send signal in transmitter communication for voice and audio section. Multiple port of transmitter in this section to give power supply carrier of oscillator generate and the oscillator give us frequency 11MHZ and to give another feedback of audio from the modulator. the two inputs of modulator one the carrier way and the other is modulator mix up our information signals and to generate the output signals. The two signal to send the data through power amplifier and other one is transmitted to class C amplifier by Antenna.

Result and Discussion:

1.4 Result of Transmitter Circuit Design:

The figure 5.1 depicts the successful implementation of transmitter circuit in hardware. It is evident from the implementation that the transmitter section comprised of crystal oscillator and RF amplifier.

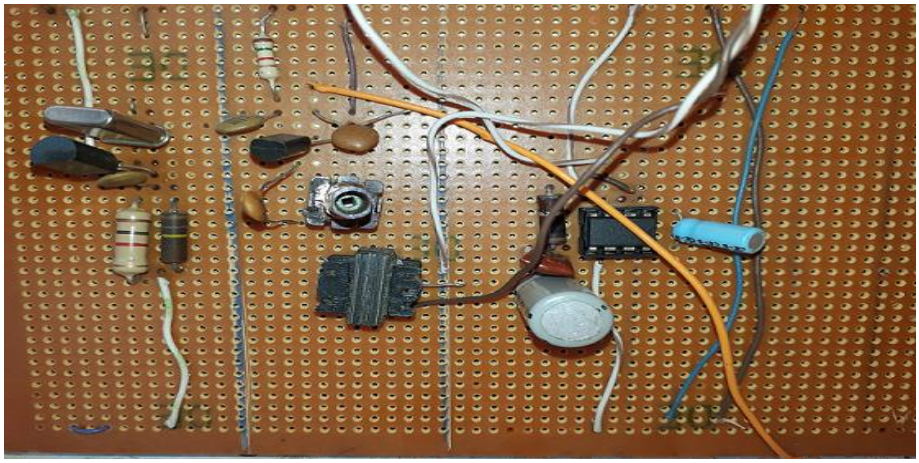


Figure 5.1 Receiver Module System

Crystal Oscillator:

The output of crystal oscillator is depicted in figure 7.2. The result, obtained on oscilloscope, clearly display the working of oscillator section with frequency 11 Mhz. The output amplitude is 2.5 V peak to peak.

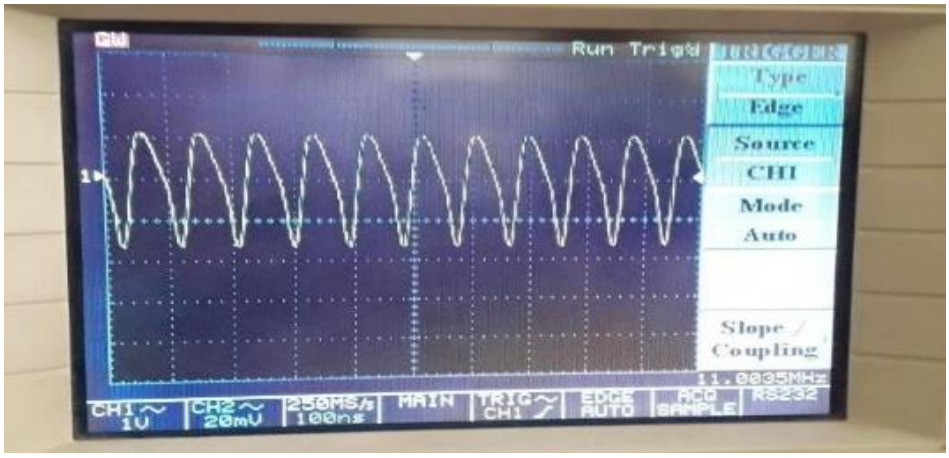
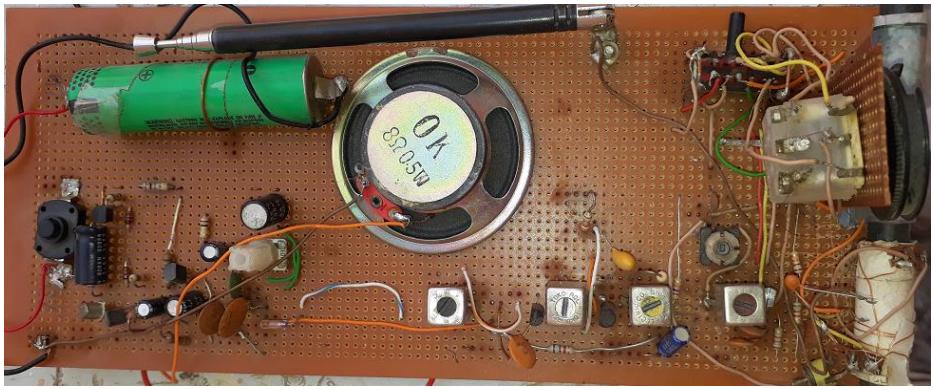


Figure 5.2 Radio Frequency System

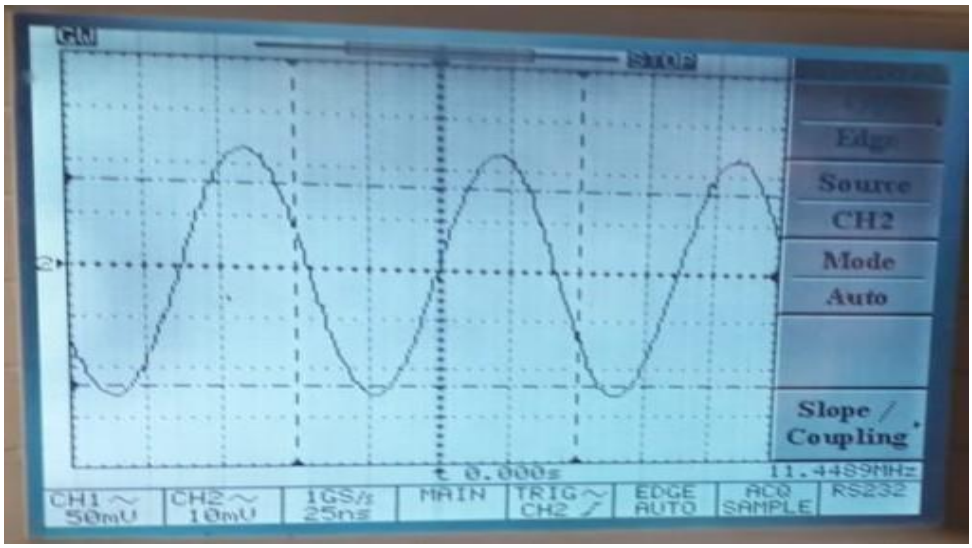
Result of Receiver Circuit Design:

The implemented receiver, comprised of three stages, is depicted in figure



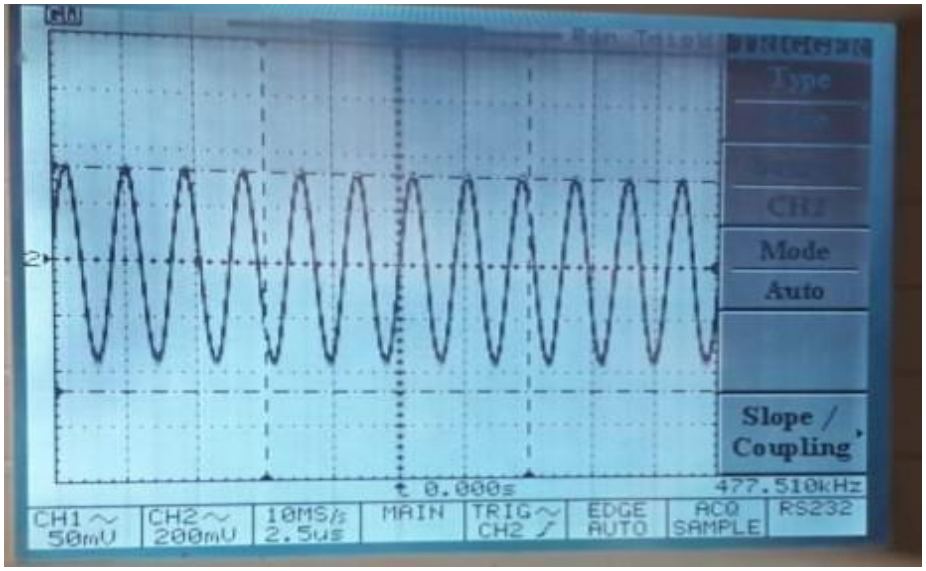
5.4 RF amplifier/mixer converter

The stage contains a single transistor. The generated RF signal from the stage is depicted in Figure



IF Amplifier:

The output from mixer converter is the difference of transmitter 11 MHz and local oscillator 11.455 MHz signal. This signal is called intermediated frequency signal or IF signal and is 455 KHz. The signal from converter was then applied to IF amplifier. The output of the amplifier is shown in figure



Conclusion:

By adopting disaster management policies and by the usage of information technology applications. The impact and serve of disasters can be controlled in same instance. The scientific technology, skills, and sufficient resource minimized the annihilation of disaster timely information and warning of hazards are the basic key of effective response. In developed countries some sort of emergency communication system is already in service to reduce the effects after earthquake events. In developing countries like Pakistan, the emergency communication system has no local setup to reduce the risk of life and property. The purpose of Research in emergency communication systems based on two-way radio for earthquake disaster response that ubiquitous components can provide relevant information during all phases of the emergency. A proper two-way communication during a disaster can modify, sweeten the calamities and human loss. Communication technology plays a vital role and no one can deny the lucrative advantages in the field of disaster emergency communication technologies. The two-way radio for natural disaster response. the transceiver the data injected into

microcontroller, which is the information in the form of (voice, Data) it switches different users The main purpose of this paper a two way AM RI communication system was designed. The AM transmitter was implemented with carrier frequency of 11MHz. The portable receiver was implemented and tested for a range of 100 yard The result clearly identified the successful implementation of two radio frequency communication system.

Recommendations:

Two-way communication system in future coverage for normally design small area scale and low power. To design particular specific area for the case of major disaster integrations of several emergency systems. we required integrations it's a future recommendation on one range. The two-way radio system proposed for emergency communication system is based on portable unit. The range of the transmitter was above 100 yards which is not sufficient for long range communication. Moreover, the system was design on single frequency which may restrict the communication on a particular carrier. To provide a long range and a multiband or multicarrier communication, the hardware system requires an extended design which is the content of future work.

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