ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

Implementation of Integrated System to Avoid Flood like Situation

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ABSTRACTFlooding has significant impactson human activities, it can threaten people's lives, their property and the environment. Assets at risk can include housing, transport and public service infrastructure, and commercial, industrial and agricultural enterprises .In our project we attempt to create an inexpensive flood detection system to monitor rising water in water reservoir (dams, water bodies)and to alert people living in nearby area. This system divides into 3 parts: water sensing unit ,data display unit and warning system. Various parts of a system are Float sensor ,we synthesis our code with the help of DEO NANO Board and ALTERA QUARTUS II also perform simulation using ModelSim.

KEYWORDS: VHDL, Altera Quartus II

I.INTRODUCTION

Flood has severe effect over life, major thread is to human life, it once lost cannot be recovered by any technology and flood also causes serious destruction to residential properties and it also threatens public safety, particularly residents in the coastal regions or in the areas with heavy rainfalls or places nearby water reservoir . The Federal Insurance and Mitigation Administration (FEMA)'s National Flood Insurance Program (NFIP) estimates that total losses due to six-inch flood are approximately $20,000 per 1,000 square foot home. From the following pie diagram we can take a look over life loss

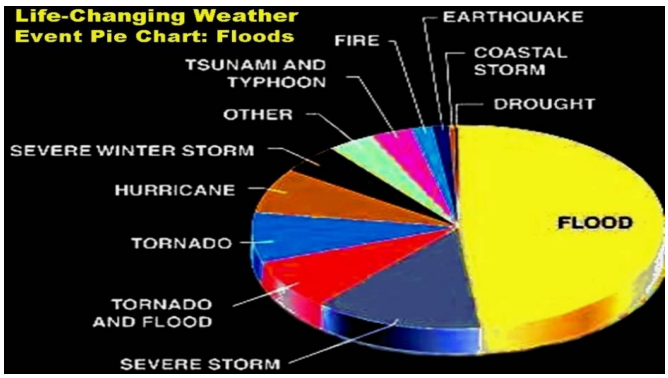

Fig 1.1: Life Changing Weather Event Pie Chart

This data show human and wealth loss due o flood over the world .Every country in the world now investing in flood warning projects, as everyone understood that prevention is better than cure. Floods are without doubt the most devastating natural disasters, striking numerous regions in the world each year. During the last decades the trend in flood damages has been growing exponentially. In general, developing countries are the most vulnerable to floods, causing damages that significantly affect the national GDP.

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II.RELATED WORK

AbubakrRahmtalla, AbdallaMohamed , Wang Guang Wei[1] Theyhad purposed a real time wireless flood monitoring system by using the concept of the ultrasonic waves. Everything in the modern human life has undergone rapid development. This development was supported by the advance of electronics and information technology, so we had built a system which can automatically sense the water level and then send this value to the control room through the wireless system to display it on LCD, Then depending on the measurements of the previous years for the same river we also have a set of LEDs to show that the current value of the water level located in which area.

Chen-hang Yen [2] had designed project to create an inexpensive flood detection system to monitor rising water in remote locations or residential areas. The high water detection system divides into two parts: water sensing unit and data display unit. Both subsystems are based on the ATmega 328P microcontroller and they are communicating wirelessly via radio frequency (RF) transceivers. Additionally, several custom-built modules, including water sensors, charging regulator, and status board, are designed to support moisture detection, power management, and information display. The wireless high water detection system was built to identify rising water levels and to warn any potential flood risk. Using solar panel and power management module, the transmitter system is able to serve for a long period of time with minimum maintenance

JaymalaPatil ,Anuj Kulka S. M. Khaled Reza, Shah Ahsanuzzaman Md. Tariq, S.M. MohsinReza[3].They had introduced the notion of water level monitoring and management within the context of electrical conductivity of the water. More specifically, it investigated the microcontroller based water level sensing and controlling in a wired and wireless environment. Water Level management approach would help in reducing the home power consumption and as well as water overflow. Furthermore, it had indicated the amount of water in the tank it supported Global Water types including cellular data loggers, satellite data transmission systems for remote water monitoring system. Moreover, cellular phones with relative high computation power and high quality graphical user interface became available recently. From the users perspective it is required to reuse such valuable resource in a mobile application. They had designed a web and cellular based monitoring service protocol would determine and senses water level globally.

rni,[4]paper had presented that Wireless Sensor Network was architecture with a variety of potential application. Wireless sensor network have emerged as an important application of the ad-hoc networks paradigm, such as for monitoring physical environment. Wireless Sensor Networks (WSNs) have been attracting increasing interests in the development of a new generation of embedded systems with great potential for many applications such as surveillance, environment monitoring, emergency medical response and home automation. A WSN is typically composed of a large set of nodes scattered in a con-trolled environment and interacting with the physical work

III.SYSTEM ARCHITECTURE

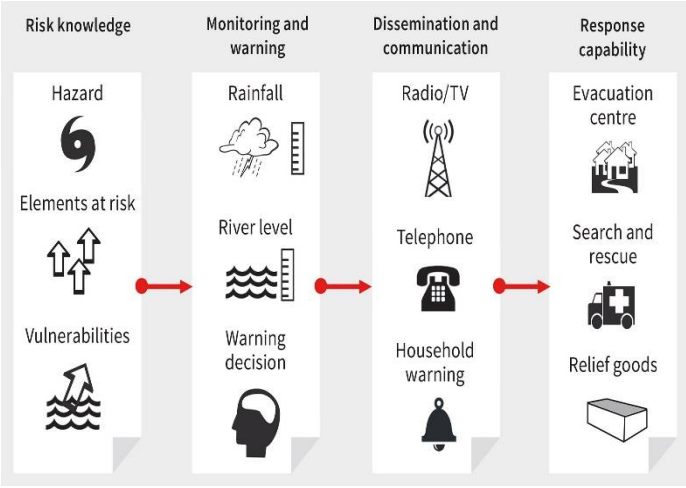

Fig 3.1 System Architecture

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International Journal of Innovative Research in Computer and Communication Engineering

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The goal of this design project is to create a low-cost wireless high water detection system that senses rising water in real time and determines any potential flash floodsThe current design includes a gsm module ,which will transmit message to respective department and to some people.So that rescue operation should be implemented efficiently.

IV. RESULT AND DISSCUSION

Simulation is done with help of ModelSim which shows that our code is optimized and the synthesis is performed using Altera for analysis purpose and gives idea of power dissipiation , no. of components and no. of elements .Overall functioning of my project can be summarized in the form of flow chart as follow:

Using Modelsim

Baud rate generator

The modelsim snapshot is shown in figure having various signals as clock, sel, sys_clk, baud_clk , temp.

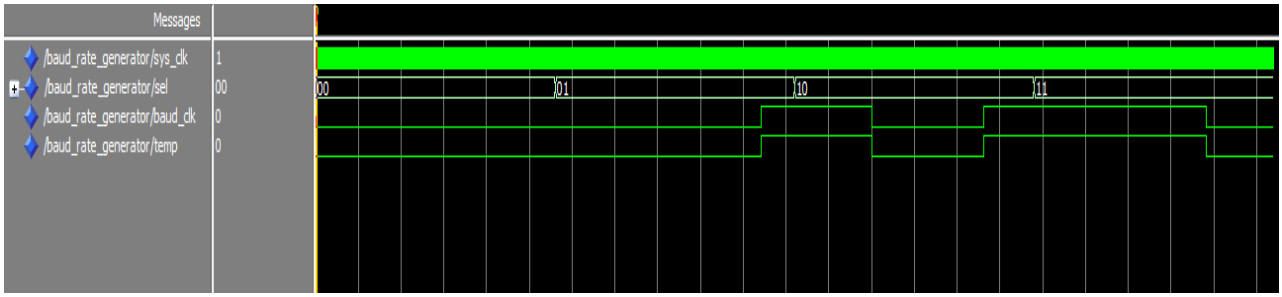

Fig 4.1 Baud rate generator MODELSIM snapshot

Transmitter

In modelsim we generate Waveforms to analysize the working of transmitter. For this purpose we have various waveforms such as txd,clk,enable, act as input where as empty, data out and frame error resultant waveforms.

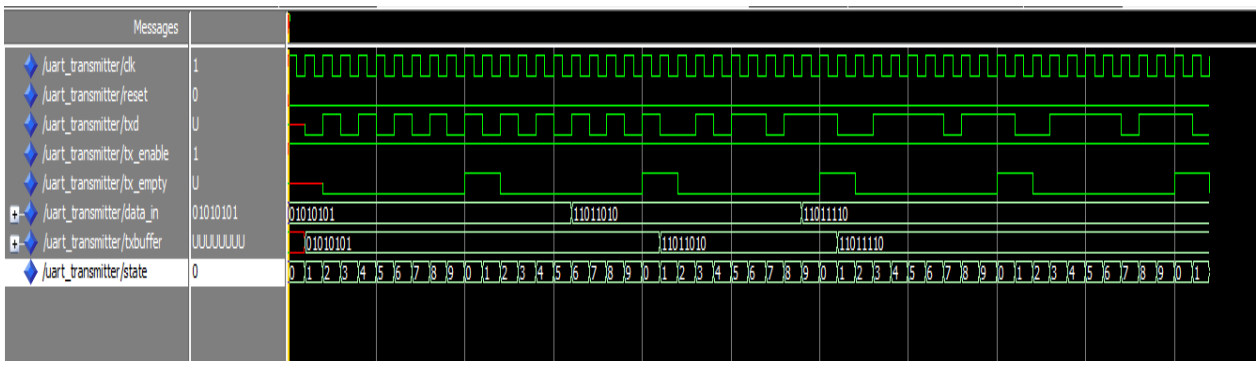

Fig 4.2 Transmitter MODELSIM snapshot

Receiver

In modelsim we generate Waveforms to analysize the working of receiver. For this purpose we have various waveforms such as rxd,clk,enable, act as input where as empty, data out and frame error resultant waveforms.

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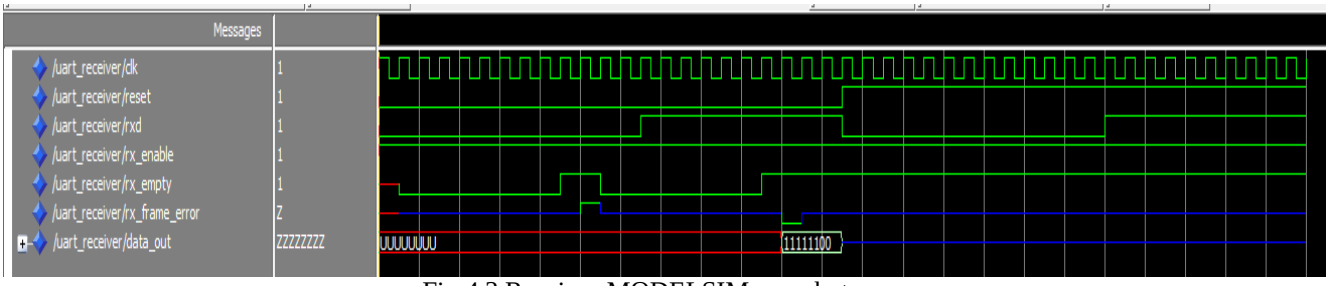

Fig 4.3 Receiver MODELSIM snapshot

Here we consider cases for rxdI and reset. Data out depends on reset and rxd ,frame error only on rxd.frame error shows high impedance untill it receives data with start bit 0 and stop bit 1.otherwise show transition or generates waveform

CASE 1 reset=0 , rxd=0 .

It shows the counting of 8 data bit is over, therefore empty single changes from low to high.continues it denotes the stop bit of first 8bits then continue to remain state one upto to the 10^{th} clock cycle which indicates the start of next 8 bit data .There are 10 bits in one RS fame i.e.start data bit n stop bit . Then frame error changes its state from high impedance(z) to high state(1).When the rxd continues to be one.

Water level detector

In the simulation we get 3 levels result when the water level is at zero level then all respective signals are at zero level.and at level 3 we get all ones .

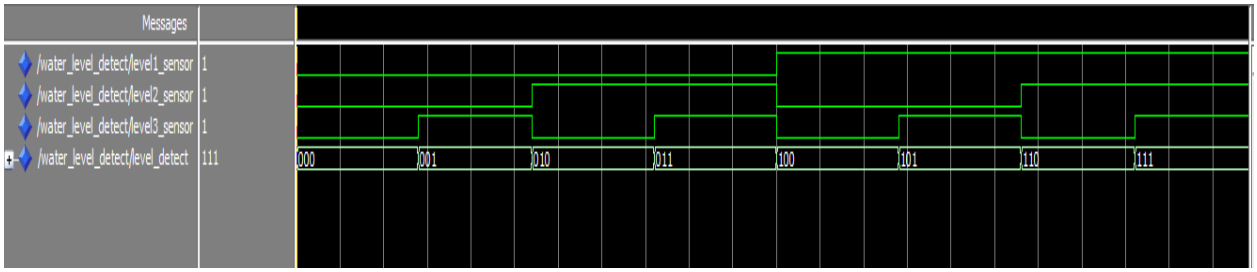

Fig 4.4 Water Level Detector MODELSIM Snapshot

Synthesis Using ALTERA

Baud rate Generator

RTL VIEW

RTL View of the circuit i.e. register transistor logic of baud rate generator.

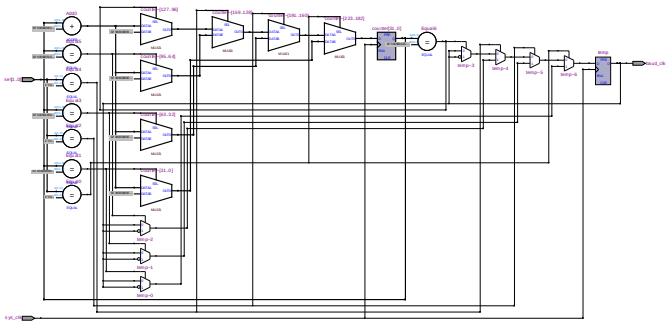

Fig 4.5 Snapshot Of Baud Rate Generator RTL VIEW

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Summary
Overall summary of powerplay analysis ,analysis and synthesis and time propagation of baudrate generator.

No. Logic Of Elements	89
Total Power Dissipation	91.28 mw
Total Time	2.735 ms

Table 4.1 Summary of Baud rate Generator

Transmitter
RTL VIEW
RTL View of the circuit i.e. register transistor logic of transmitter.

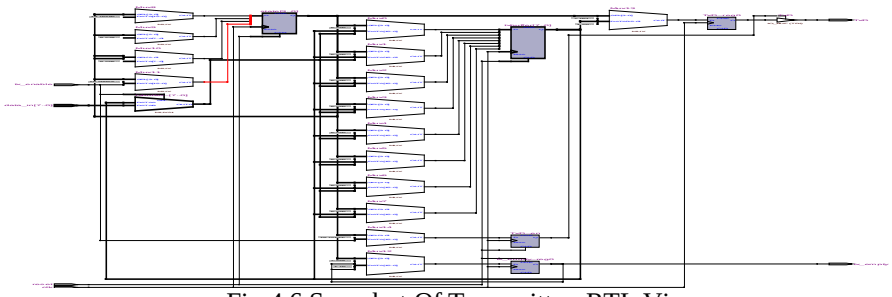

Fig 4.6 Snapshot Of Transmitter RTL View

Summary
Overall summary of powerplay analysis ,analysis and synthesis and time propagation of transmitter.

Total No. Of Logic Elements	24
Total Power Dissipation	92.12 Mw
Total Time	.270 ms

Table 4.2 Summery Of Transmitter

Receiver
RTL VIEW
RTL View of the circuit i.e. register transistor logic of receiver.

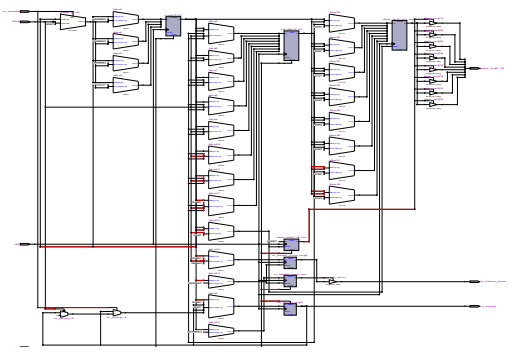

Fig 4.7 Snapshot Of Receiver RTL VIEW

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Summary
Overall summary of powerplay analysis ,analysis and synthesis and time propagation of receiver.

Total No. Of Logic Elements	39
Total Power Dissipation	92.21 Mw
Total Time	3.383 ms

Table 4.3 Summary Of RECEIVER

Water level detector
RTL VIEW
RTL View of the circuit i.e. register transistor logic of Water Level Detector

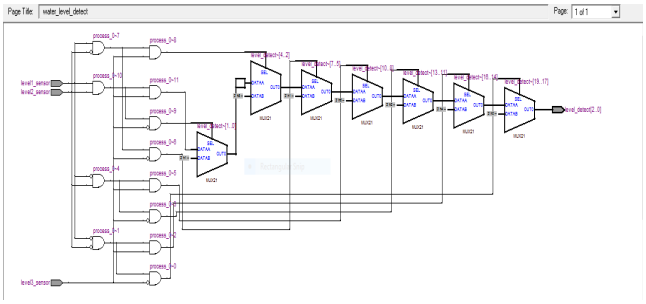

Fig 4.8 Snapshot Of Water Level Detector RTL VIEW

Summary
Overall summary of powerplay analysis ,analysis and synthesis and time propagation of
Water level detector .

Total No. Of Logic Elements	0
Power Dissipation	91.96 Mw
Total Time	6.187 ms

Table 4.4 Summary Of Water Level Detector

LCD CONTROLLER

RTL VIEW
RTL View of the circuit i.e. register transistor logic of LCD controller

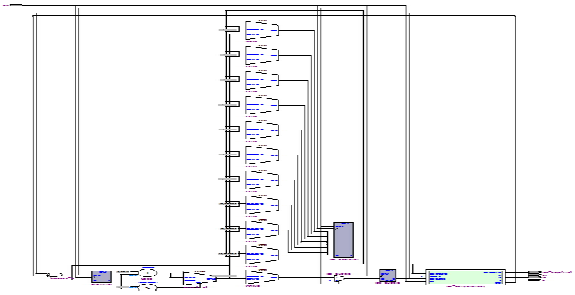

Fig 4.9 Snapshot Of LCD Controller RTL VIEW

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ISSN (Print): 2320-9798

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Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

Summary

Overall summary of powerplay analysis ,analysis and synthesis and time propagation of LCD controller.

Total No. Of Elements	217
Power dissipation	92.04 Mw
Total Time	5.682

Table 4.5 Summary Of LCD CONTROLLER

V. CONCLUSION AND FUTURE WORK

Not only the flood victims but also the rescuing team members are at risk during such operations. Such warning system is essential to save the life of people. Our project is prototype implementation of flood alarming system using FPGA In this project we simulate the vhdl code by using modelsim software and waveforms is analyzed and code synthesis can be done by using DEO NANO BOARD to get optimize solution The prototype delivers the message to near by locality and show all levels to the control room for monitoring purpose. As such this project will contribute little bit towards national security. We can implement this prototype into Soc or ASIC .

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