

Research Article

Implementation of High Security Voicemail Controller system using Xilinx

Jaskirat Kaur^{Å*} and Abhilasha Sharma^Å^ÅDepartment of Electronics Communication and Engineering, Eternal University, Baru Sahib, India

Accepted 10 August 2014, Available online 25 Aug 2014, Vol.4, No.4 (Aug 2014)

Abstract

FPGA technology is used to make logic systems and it is majorly based on Computer-Aided Design (CAD). They are frequently used for ideal system interface. In this thesis, the main aim is to implement our own logic for high security, voicemail controller systems and the decoder for an optical shaft encoder on FPGA using Xilinx software. FPGA is used to design prototype hardware before final implementation. This will reduce cost as well as time. Today's, Security is the most important issue for rucks. Therefore, to reduce their problems of security we implement a high security voicemail controller. By implementing high security voicemail controller, we can prevent unauthorized access to the location, confidentiality of data. It also provides disaster recovery system and prevention of malicious damage. This paper presents how to automate the existing manual using FPGA by less power consumption. There are exclusionary results of time and power efficiency.

Keywords: Voicemail, Voicemail Controller System, VHDL (Very High Integrated Chip Hardware Description Language), FSM (Finite State Machine), FPGA(Field Programmable Gate Array), Xilinx software.

1. Introduction

Now a day, there are many security issues for rucks. It is very important to resolve the security issues by implementing some that type of projects, which helps the people to secure the data from the unauthorized access. To reduce the problem of security, implementation of high security voicemail system is done by using Xilinx software and that prototype is tested on FPGA development kit.

2. Voicemail

Voicemail is a computer-based system that allows users and subscribes to exchange personal voice messages. Voicemail is a conversational interaction between a human and a machine with no feedback from the machine. These systems are typically widget by computers and can be communicate via telephone networks. Voicemail systems can record and store voice messages digitally while the user is away or simply unavailable and can be reviewed when the user returns. Voicemail messages are typically short; convey the reason for the call and a return telephone number. The message should contain the information about the requirement of the caller and the voicemail recipient. The voicemail system allows us to receive the message, listening to the message and manage voicemail either by phone or by computer. Both computer and phone can also manage it. When you listen to your message, which is stored in your computer, is the same when it was delivered to you.

3. Voicemail versus Answering Machine

Voicemail offers many advantages over answering machines in communications.

Traditional answering machines are the system, which needed the user, must be in the same place for retrieving message. On the other hand, Voicemail is the system in which user can retrieve the message from anywhere. It can be retrieved by any phone, landline or cell.

Answering machines have lack of security because one should have only to press button to receive the message. That means anyone can retrieve your personal message. However, in case of the voicemail system, one should have to enter the code and that code is personal. The person can only retrieve the message if they enter the code. It provides the security to your personal information that sometimes contain in your messages.

Voicemail offers more option for managing the message by using only simple keys. The keys are relating to different functions for managing the messages. Example to store message, delete message, forwarding message etc. Therefore, the voicemail user can easily store the message, forwarding message using simple keypad entries. Voicemail also contains the information about the caller and the calling person for example, time of the call, number of the caller and ID of the caller. Not this all features come in the traditional answering machines.

Voicemail Controller System

Voicemail controller is a system that allows the user to send messages, review messages, save messages, delete messages. Normally the starting state is named as main.

*Corresponding author **Jaskirat Kaur** is a M.Tech student and **Abhilasha Sharma** is working as Assistant Professor

From main, the user can select any option according to their needs. The options are to save messages, read messages, forward messages, delete messages etc. Every option is related to any key from 1 to 9. The user is free to choose any option by just pressing a key relating to that function.

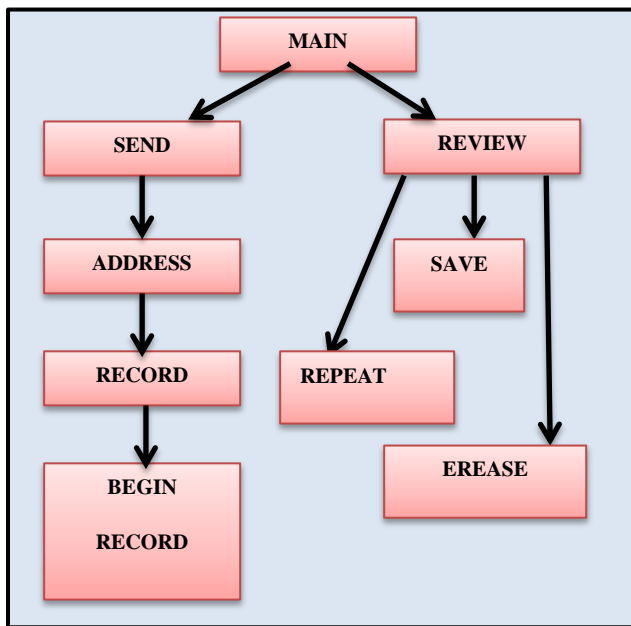


Figure No. 1 Flow Diagram of Voicemail Controller System

The Figure No. 1 shows the flow diagram of voicemail controller system. It shows that the main is the central and initial point of the voicemail system. From that initial point the user can choose any option from the above which they want to use.

4. VHDL

VHDL is an industry standard language, which is widely used for designing hardware systems. VHDL is abbreviation of VHSIC Hardware Description Language. The acronym VHSIC refers to the Very High Speed Integrated Circuit Programs. VHDL emerged out of the United State Government’s (VHSIC) Very High Speed Integrated Circuits Program (Amy Poh Ai Ling et al.2011).

Hardware description language overcomes some of the limitations of algorithmic languages, where the referencing time is not required [Zhang et al.2012]. A VHDL model is basically a text based description of the system. The different model can be created with same system at different level of abstraction. The model with particular level of abstraction represents the detailed information related with it but leaves all information that is not necessary. VHDL is use for the purpose of buildings precise model of complex digital system.

5. Finite State Machines

Finite State Machine is the basic component in the designing of the hardware. Finite State Machine theory

deals with the transition and behavior between input and output states for sequential circuits, which can be apply to any specific object. The specific object can be cite as a device that stores the status of something at a given time and can operate on input to change the status and/or cause an action or output to take place for any given change [Amr T. Abdel-Hamid et al, 2004]. For example, a computer is a state machine, with each instruction acting as input, causing the state transition from present state to a new state. The FSM model has been widely applied to fields such as electrical engineering, computer science, etc. FPGA appeared in the 1980’s. FSM are also called as finite state automata or simply automata. A sequential system is also known as finite state machines. A generic approach allows any sequential systems to be designed. Generally, sequential systems consist of three parts. Registers represent the states of the system. Both next state logic and output logic are entirely combinational logic.

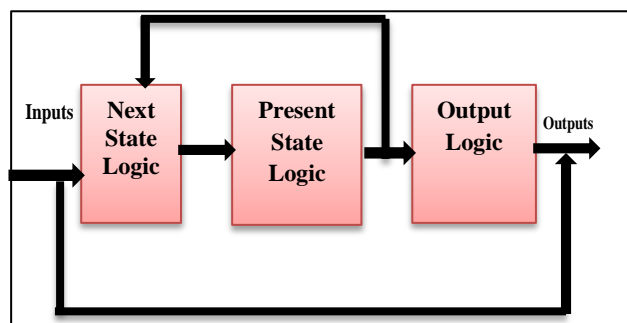


Figure No.2 Block Diagram of simple FSM

A simple block diagram for a state machine is shown in Figure No.2, which contains a Present State Logic section, Next State Logic section and an Output Logic section. Present state logic provides all the information about its past which helps to determine its current state and next state. The basic function of this is to assign the next state to the present state at the active clock edge [Lee,D et al. 1994]. The present state is stored in a binary value in state register. Next state logic section computes the function to establish the next state of the system using FSM’s inputs and present state. This section is implementing with sequential VHDL code with a process. Output Logic Section is used to generate the output of the system and this is implementing with concurrent VHDL code with conditional assignment statements.

6. FPGA

FPGA is an acronym of Field Programmable Gate Array. It is array of gates. Field Programmable Gate Arrays are absolute new intellect class of ICs. FPGAs can implement any logical function. It also has the property to update the functionality after transformation, parallel re-configuration of a portion of the design also possible [John Eichler et al.]. FPGA represents a gradual enhancement in gate arrays technology, which offers ability to reduce cost in prototype systems and product time to market. For these reasons FPGA are more popular as compared to ASIC and

Figure No.7 shows the planning of input and output with selected device used in Voicemail System. It shows the I/O planning with devices.

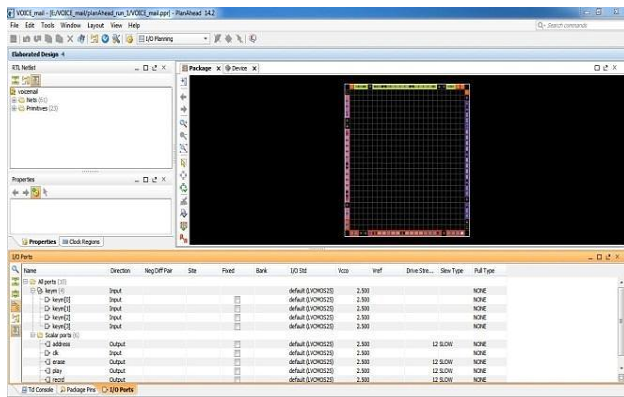


Figure No. 8 I/O Planning with devices of Voicemail System

Figure No.8 shows that the planning of input and output with packages of pins. It shows the planning of input pins and output pins. It gives the package of input and output. It is shown for Voicemail system.

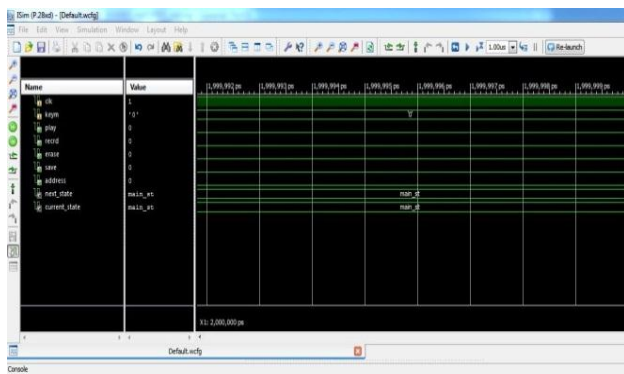


Figure No. 9 Waveform of Voicemail System

Figure No.9 shows that the waveform of Voicemail system. It shows how output is change in accordance with the input.

Conclusions and Future Scope

This paper presents implementation based on FPGA. In this project, implementation of High Security voicemail controller system is done successfully on FPGA using Xilinx software. The prototype is verified on FPGA Spartan 3 development board. State Machine based systems enhances productivity, reduces productivity time and cost. Now days, Security is very important and it is an art of restricting admittance to certain entries. So in this thesis we are reduces the security issues of the rucks (people) by implementing a high security password for voicemail system.

In future, voicemail one day read a caller’s emotions. Voice mail frameworks as of now are getting included in politics, giving individuals the alternative of setting a crusade commercial on their voice mail welcoming so at whatever point guests go to voice mail they're requested to vote in favor of a hopeful. The welcome could be set to play for select companions or anybody from the collector's location book who calls. Numerous voice messages administration suppliers are focused on binding together the different electronic correspondences frameworks into coordinated frameworks. Voice mail - office voice mail, mobile phone voice mail and private voice mail will assume an enormous part in that future without a doubt.

Acknowledgments

I am very thankful to my supervisor Mrs. Abhilasha Sharma, Assistant Professor in Eternal University, who gave me opportunity to work with them. She helps me to explore the field of VHDL in electronics and communication and providing useful information about the history of the voicemail system. I am also thankful to Er.Gagandeep Singh, Software Engineer who helped me to enhance knowledge about the programming. Lastly, I thank to my parents for respecting my dreams and for unconditional love and care.

References

Abdel-Hamid, A. T., et al. (2004). A tool converting finite state machine to VHDL. Electrical and Computer Engineering, 2004. Canadian Conference on, IEEE.

Eichler, J. and R. Rieke (2011). Model-based situational security analysis. Proc. of the 6th Int'l Workshop on Models@ run. time at the 14th Int'l Conf. on Model Driven Engineering Languages and Systems (MODELS 2011), Wellington, New Zealand, CEUR Workshop Proceedings.

Zhang,W, Betz.V et al. (2012). Portable and Scalable FPGA-Based Acceleration of a Direct Linear System Solver. ACM Transactions on Reconfigurable Technology and Systems, Vol. 5, No. 1, Article 6, Publication date: March 2012

Lee, D. and M. Yannakakis (1994). "Testing finite-state machines: State identification and verification." Computers, IEEE Transactions on **43**(3): 306-320.

Ling, A. P. A., et al. (2012). "Enhancing smart grid system processes via philosophy of Security-case study based on information security systems." Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications **3**(3): 94-112.

Sites

Wong (2011) VHDL 3 Finite State Machines: www.cse.cuhk.edu.hk/~kh Wong

Kamal (2005) Welcome to the ECE 449 Computer Design Lab: teal.gmu.edu/courses/ECE449.

sfile:///E:/A%20My%20Data/VOICEMAIL/Voicemail%20%20Wikipedia,%20the%20free%20encyclopedia.htm.