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Monitoring Of Timing Module through Ethernet based on NIOS II FPGA Platform

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***Abstract* - The paper describe and gives the method of designing simple Ethernet module server on FPGA with Nios II core. Usage of any application on risc processor can be simple by using web server and monitoring. A Web-server through ethernet is connection that transfers the content on a computer or a system with web browser through network. Every FPGA or Ethernet will have a different MAC ID or a unique IP address. Any computer can perform as a Web server by installing a standard browser software.**

Keywords - FPGA With NIOS II chip,QSYS Tool,NIOS build tools for eclipse,ethernet,timing module,web server.

I . I NTRODUCTION

For an embedded work, it's difficult to select the processor that satisfies the requirements. It defines with a group of memory, protocols and hardware interfaces. designers give up either buying or creating more than they need (to get right mix of peripherals, interfaces etc) or settling for a less than ideal solution to keep cost . In using an embedded web server is a remarkable powerful work for easily implementing a variety of key features and functions . Although the word "server" is often associated with things that are complex and costly, With the Nios II processor, designers will be able to create a small web servers efficiently. The web servers available in market are based on software packages mainly IIS, Sun java and Apache no any immediate support as like any other commercial servers.IIS is costly for a user to get work on it for a simpler work. Sun-java is emerging and complex for a embedded designer. To overcome these drawbacks we have use embedded web server which has features like high speed, reduced cost, complex. Embedded systems are application specific computers that interact with the physical world. New emerging capabilities in FPGA including improvements in power consumption, cost are enabling us to incorporate these devices in several designs as reconfigurable embedded processor. In this project the hardware part is developed using qsys tool, Nios development board and software part includes different programs in ANSI C for development of web server which includes programming for different communication protocol like Ethernet, TCP / IP, ARP, HTTP. These protocols are used to communicate through different layers of TCP / IP model system. This software development part is done using Nios II integrated development environment (IDE).

II. LITERATURE REVIEW

Ahmed Hanafi, Mohammed Karim [i] describes an approach for the development of distant control and monitor system with an embedded web server based software design, which takes Xilkernel as "real-time operating system". p.orduna et.al [ii] analyzes most familiar non-standard technology that are still used 'day-to-day' in laboratories. It also proposes two methods which utilizes modern Web technologies (Canvas and WebGL).Raghuvaran et al [iii] using the TCP/IP protocol are socket 'API' and RAW 'API' and controlling and monitoring of the components boarded by sending post(XHR command) and receiving the post. Girish birajdar et al [iv] proposed design an web server on rasberry PI based on ARM11, this implementation has drawback of complexity in usage of protocols like apache2 for the HHP command and PHP5 for scripting language for web design. K. Gomathy et al [v] describes about lowering power compact ability in an web server on FPGA platform network on chip. the method of ecc which provide a cryptographic technique to provide the communication between server to user monitor. Sankett *Desai et al* [vi] designed using RTOS and TCP/IP configured on ARM11 using keil vision tool specific application is written for an

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RTOS on target. The embedded development on advanced processor results in a ease of designing.

III Existing System

The embedded monitoring is usually based on a display monitors like LCD 16*2 display, monitor connected with different set of operations or through a LAN connection based method.GSM technology , "WI-FI" or a zigbee module are normal usage systematically.

Web servers exist in a range of methods which gives a less of cost and complexity of design in a methodology. many of standard web servers are based on the scripting languages which requires different set of functionalities.

IV. Proposed system

The status monitoring module for military communication equipment includes time management that can be possible by using an IP address in the web browser. The IP address is based the module used in FPGA or specific processor kit .

- Ethernet connection system with DHCP server
- Module loading in FPGA

The FPGA supports DHCP connection in the host having an Ethernet port. The module loading onto FPGA is based upon HDL programming and the C code onto the NIOS II processor.

V . Technology Overview

a)SoftCore Processor

A microprocessor will be fully modeled in software, normally in "HDL" languages, which can be analyzed and mapped in hardware like as FPGAs. A processor target FPGA's is standard and easy because its design methods can be changed at time change by reprogramming the fpga .

The system can be designed through the processors which generally used like ASICs, which will be implemented on a hardwired or on a printed circuit board which will again come under FPGA results in flexible user logic. The software processors are popular because of reconfiguration. There exists different types of software available like lattice micro, Altera NiOS and microblaze etc. the FPGA is available with logic elements, different inputs for fast developing of SOPC

b) NIOS II

NiOS ii Processor is a general purpose reduced instruction based architecture with different applications. This family consists of three different sets, fast, economy and standard. This paper selects the fast NiOS ii machine. It defines different sets of intercept handling mechanism, cache, JTAG, ALU etc. the processor makes the connection and relates the communication between embedded processors and hardware on development board.

VI . Implementation Methodology

The contents and software programs of various protocols are downloaded into development board using programmer. The system is formed using the QSYS tool by using different hardware components and the system is build to obtain sopc file to create board support package. The FPGA chip consists of an Ethernet port. The cable originate or starts from Ethernet port slot connect computer through FPGA chip. The switch which connects different computer to the web through an FPGA. Now, if IP address is searched on the browser of monitoring computer, the required information is accessed through it.

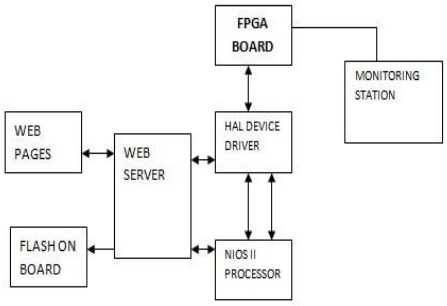

Fig Implementation architecture

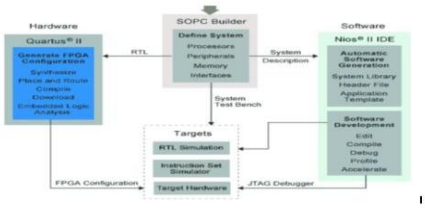

Fig : configuring development flow

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- IMPLEMENTATION OF HARDWARE USING SOPC OR QSYS TOOL

a)QSYSTool:
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Qsys tool is use to instant usage of different components like memory, Ethernet ,cpu, pio as well as sdram controller etc., intellectual property is use implement on chip application. SOPC provides a good and easy way of linking the internal connection or external to FPGA. There is choice of defining the QSYS hardware component From a HDL language. It occur by design generates the component interconnection of logic.

b)QSYS tool system:-
QSYS tool is available in the quatrus ii tool . It define to make system design hardware components. The main used components are given below:-

- *Nios II core:*- Nios II /f, 4 Kbytes i-cache, 2 Kbytes d-cache, JTAG debug module: hardware breakpoints, trace enabled. This

  module functions as a control center, data processing center.

CONCLUSION

NIOS II processor development board approach gives reconstructing or configuring the flow software or hardware. It is a simple method comparing to the complex web servers with a cost effective method. the construction and cost are most reduced due to use of available tool and the specific silicon on chip method .possibility of creating a hardware as well as software together reduce the time consumption of design cycle which shows flexibility in the development board of NIOS II processor.

FUTURE WORK

Different application can be made on a specific processor helps in monitoring of remote device controlling through a Ethernet . with a cheap cost ,complexity and less time consuming process

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