1. DRDO, Bangalore

Project Title: Simulation of BCH Encoder and decoder for NAND Flash controller

Project Guide: Prof. Udaya Kumar S

Project Team: Sahana Y, Sinchana, Spoorthy Upadhya V

Abstract:

NAND flash memory devices are used for general storage and transfer of data. It is also used to store configuration data in numerous digital products. There is a chance of error occurring in NAND flash due to manufacturing issues, due to environmental factors and due to the surrounding operations on the NAND cells i.e. while writing, reading and erasing operations on NAND flash. Hence, it is essential to detect and correct errors.

To detect and correct errors occurring in NAND flash devices we use error correcting codes (ECC). An Error correcting code (ECC) is redundant data added to the original data. In event of errors, the combined data allows the recovery of the original data. Extra memory (called the "spare memory area" or "spare bytes region") is provided at the end of each page in NAND which could be used to store the ECC. This area is similar to the main page and is susceptible to the same errors. The number of errors that can be recovered depends on the algorithm used.

The various algorithm used to implement ECC are Reed-Solomon algorithm and BCH algorithm. Reed-Solomon algorithm can be used only for block wise error correction. BCH algorithm can be used for more than four bit error correction and it is a random error correctable code. So, BCH Algorithm is used in this project. BCH codes operate over finite fields or Galois fields. In encoding the code words are formed by adding the remainder after division of message polynomial with generator polynomial. All code words are the multiples of generator polynomial. The decoding process for BCH codes consists of four major steps syndrome computation, determine coefficients of error locator polynomial, find the roots of error locator polynomial and it will indicate the erroneous bits in the received codeword and error correction.

The implementation of BCH decoder (63,39,4) here is done using MATLAB. We have also included some of the proposed improved Chien search algorithms. In the proposed algorithm both the syndrome calculator and the Chien search can be merged by exploiting MPCN based architecture, leading to significant hardware complexity reduction.

2. L&T, Mysore

Project Title: *Hour Meter with WIFI Module*

Project Guide: Mr. Shreyas H

Project Team: Ashwitha A Kudva N, Bhamini K S, Nidhi S, Pooja

Abstract:

Hour meter is a gauge or instrument which holds the records of the time duration of the device to which it is connected. It keeps count of the elapsed time of the device. The main aim of this project is to keep track of working condition of an instrument using hour meter which has Wi-Fi within it, which is used for wireless communication. The instrument status is monitored through a Wi-Fi module, using this, the user can get to know the actual information of the instrument.

The hour meter with Wi-Fi module helps in determining the life span of the device in industries. This hour meter stores the information of 90 days of working hour of the device to which it is connected. It has overcome the problem of time consumption in the existing hour meter to know the working hour of the device, by the use of Wi-Fi communication. Hence the hour meter with Wi-Fi module is more efficient device.

3. DRDO, Bangalore

Project Title: *Simulation of Missile Versus Target Engagement Scenario*

Project Guide: Ms. Sowmya Anil

Project Team: K. Chaithra Bhat, Meenakshi Sudhakar O K, Prajna Rai B, Pratheeksha C Rai

Abstract:

One of important specifications of Electronic Warfare (EW) systems against guided missiles is system reaction time. The algorithms of these EW systems are needed to be optimized for optimal reaction times. To derive the reaction time specifications of the EW systems it is necessary to have an estimate of missile flight time to reach to the target. The flight time of the missile depends upon the various parameters like speed of missile and target, range to target etc.

This project report deals with a simulation of a missile versus target engagement scenario. After deriving the simplified transfer functions of the missile seeker head, missile autopilot, missile dynamics, and target dynamics, a three dimensional simulation is developed using

CLOS guidance. The scenarios have been simulated using state variable design. The missile flight time values are derived for typical engagement scenarios using the simulation model. A Front end GUI has been designed and realized for configuring various parameters during the simulation.

4. MRPL, Mangalore

Project Title: *Study of Yokogawa DCS and PLC*

Project Guide: Ms. Aparna Nair

Project Team: Aishwarya P S, Arpitha Rai S, Ashwini Hegde K, Chaithra Shenoy

Abstract:

In petrochemical industries like the MRPL, controlling and monitoring of the plant plays an important role in maintaining the quality of the product. While a product (oil) passing through many stages in the factory before being sold out, it requires a kind of control in order to adjust its quality. However, to adjust the quality it is required to control many physical quantities such as temperature, pressure, flow and level etc. Furthermore, in some dangerous application the control will be much critical and losing the control may lead to an explosion of the plant. In order to avoid this, Distributed Control System (DCS) and Programmable Logic Controller (PLC) were used for controlling and monitoring of the plant.

DCS is distributed control and centralized monitoring system. In a Distributed Control System, the control function is distributed, but the monitoring is still centralized. All the n field inputs are not fed to a single CPU. Instead they are distributed among multiple CPU's. In DCS terminologies, CPU's are referred as Field Control Stations (FCS).DCS is preferred because of its features such as redundancy, easy maintenance and troubleshooting, low cost etc.

PLC is a digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides etc. Programs to control machine operation are typically stored in battery-backed-up or non-volatile memory. It provides error checking and diagnostics. It will run internal checks for memory, I/P, O/P to ensure that everything is working fine. PLC is preferred because of its features such as smaller physical size, less expensive etc.

5. DRDO, Bangalore

Project Title: *Temperature Controller for Laser Diode Driver Circuit Using FPGA*

Project Guide: Ms. Rajani Rai

Team Members: Latheesh Kumar U, Manasa Shetty, Lasya P, Leema Joylen Martis

Abstract:

Gas sensors are used in almost every modern industry ranging from small to large application. Oxygen sensing is one such type of gas sensor, aimed at sensing the level of oxygen in a medium. The oxygen sensing is done using Tunable Diode Laser Absorption Spectroscopy(TDLAS). This technology has an added advantage of sensing gas molecules in a medium without the need of contact with sensor. Tunable Diode Laser Absorption Spectroscopy based Oxygen sensor development involves Laser Diode Signal Generation, Laser Diode Driver and protection circuit, Laser Diode Temperature Controller.

This project aim at the designing and development of "Temperature controller for Laser diode driver circuit using FPGA" which involves the proportional-integral-derivative (PID) controller which is the most used controller in the industry. Field programmable gate arrays (FPGAs) allow efficient implementation of PID controllers. The temperature regulation system is designed and tested which have the broad aspects of applications in the field of aeronautical engineering such as sensing of oxygen level in aircraft engines.

6. ISRO, Bangalore

Project Title: *Verification of MIL-STD-1553B IPCORE using 8086 IPCORE*

Project Guide: Mr. Shivaprasad

Team Members: Apeksha K, Apoorva AG

Abstract:

Telemetry is a highly automated communication process by which measurements are made and other data are collected at remote or inaccessible points and are transmitted to receiving equipment for monitoring, display, and recording. The intension of this project is to interface MIL-STD-1553B bus interface with the 8086 microprocessor for telemetry applications.

The main goal of this project is the verification of MIL-STD-1553B IP core with 8086 IP core. In this work, the main computer system contains a DDC (Digital Data Control) card which is configured as a Bus controller. The bus controller sends telecommand requests to remote terminals. Here, the number of remote terminals is two and the corresponding

addresses of remote terminals are fed to the system through the front end. The actual code is written in the software and converted into hex files. This information is given to processor through a front end running on another system. Whenever the 8086 processor gets the telecommand from the bus controller, the data is sent to the front end of main computer system. Later, this data is displayed and monitored in the front end.

7. Intact Green Service, Bangalore

Project Title: *X-Band Frequency Synthesizer Transceiver*

Project Guide: Mr. Shrikanth Rao

Team Members: Arpitha N S, Chandrika, Likhitha K S, Manasa P S

Abstract:

Today we are in the world which is growing very fast in terms of technology. So each and every device and equipment needs to be very efficient and must be less time consuming. As we know in any communication area that includes a transmitter and a receiver. But if we can replace these two devices by a single device called as transceiver, which can transmit and also can receive the signals it would be much easier for the transmission. So our project "X-Band Frequency Synthesizer Transceiver" deals with the generation of the frequency in the range of 10.4MHz to 10.6MHz in step of 1MHz.This unit mainly uses the four sub blocks that are frequency synthesizer unit, digital controller unit, power supply unit and RF converter unit. The frequency synthesizer unit is core of this system and it uses a IC called HMC833. The frequency synthesizer unit mainly works based on the phase locked loop, which locks the required frequency in according to the given inputs. This system is very efficient and has good gain factor and also it is small in size so occupying less space compared with any existing synthesizers.