Review on DAQ systems using FPGA

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ABSTRACT

This paper presents the review on different implementation of DAQ systems data is a bit coin for everything gleaned and summery data of any embedded and digital system are further analysand by penetrating algorithm's and hence endowing the respective system. In some cases, the data will be live superintend, collected data not only helps in endowing yet in would be used in research. Data acquisition system is a crucial l thing in digital system, in to-days world field's, orientated on different application and requirement the data has been gleaned by divergent methodologies. The paper gives the review about the divergent methodologies in gleaning data in contrary digital systems.

Keywords— *FPGA, DAQ, Acquisition*

1. INTRODUCTION

Data gleaning is one of the important aspect in digital systems ,generally any embedded system and digital system with respect to data acquisition will be having the same structure, the general flow of data acquisition irrespective of divergent methodology will be Generally divided into three forms data capturing digitization and storing process as in the figure 1 ,further these gleaned data s will be analysed or will go through different algorithm with respect to scope of interest of the application

Generally capturing of data will also include divergent methodologies like sensors output or radars output and antennas etc usually the captured data will be an analog signal in most of the scenarios once the capturing is done the data must be stored that for analysis

The storage of an analog data will further lead to usage of excess space and hence the captured data has to be processed and converted into appropriate form so that it can be stored and could be retrieved back to original form during the time of analysis there are various methodologies used for the convention of captured data to storage form and hence the are chosen and applied depending upon the in out (the capture data)parameters like sampling rate and range resolution of signal etc example rs232 in built ADC converters etc

Then comes the acquisition ,in few applications live monitoring is done but most of the cases the data has been store and further analyzed, and again their are divergent methodologies to stream and store via either net if large amount of data or utilizing the flash memory of boards if small data and would be erased on frequent bases. Further FPGA boards are most likely designer friendly and cost effective and further re-configurable. Since most of data acquisition systems deals with the sampling rate of the analog signals the system can be further modified or developed in terms of diff-rent sensors output and sampling rate.

Fig. 1: General Flow of Acquisition System

2. LITERATURE SURVEY

Swamy TN, Rashmi KM [1], presents Data Acquisition system based on FPGA the DAQ is designed and implemented on FPGA using rs232 protocol and SPI interface, The hardware used are the function generator in order to create an virtual data that is analog signal; further the LTC147A-1 is used as an ADC which will sample at 1.5msps further for the data acquisition and serial transmission of data design has been implemented on FPGA board that is spartan the whole design has been designed using the

Xxilinx ISE tool in VHDL. The virtually generated analog data by function generator has been routed to FPGA board via SPI protocol through ADC converter where the analog signals are digitized and liable for storage further the data has been routed to PC from FPGA board VOA serial communication protocol via rs232 and the whole process able system has been designed and implemented on FPGA board. This system is simple and has highest transfer speed and the achieved the 99 percent accuracy of data collected and a sampling rate of 1.5msps has been achieved further this can be enhanced

Ye Fan [2] , presents FPGA based data acquisition system The hardware used are digital signal sensor and an operational amplifier and FPGA board. The sensors like temperature pressure and voice are been used to convert the physical signal to analog signals further these signal are processed through the amplifier for signal conditioning .the ADC has been designed in the FPGA board using xilinx ise tool the analog signals has been sent to FPGA and there it's been converted to digital form and will be stored in the flash memory of FPGA further on necessity this data has been transmitted TP PC via serial communication. The whole system gives a very simple design of an DAQ system of physical signal which is having high processing speed and low power consumption this can be further utilized in occurring diffract sensors physical outputs.

Harshit Devakumar, M.S.Panse, Ajay Khandare, Miheer Mayekar [3],presents "Design of Lightning Acquisition And Smart Triggering Using Kintex-7 FPGA And NI cRIO "The basic hardware used in the system are crio-9-3- and kinte7 and ni9223 ADC module" The processed data which is analog signal of lightening sensors in terms of filters has been digitized using NI9223 ADC converter at 1msps sampling rate further for the note of the correlation and event of occurrence of data it's been processed over ni9467 GPS module for the high speed processing of data the digital processing algorithm has been implemented on kintex7. This module comes out the immense output of time stamped data of lightening sensors the same system can be further utilized for nose estimation by varying the algorithmic

Shruthi Sangani (M. Tech), K. Vikram and S.R. Pankaj Kumar [4], have presented Implementation of Ethernet Based Data Transfer Using FPGA. The hardware used is ml507 development board and rs232 for serial communication and either-net cable and PC. In here the power PC has been configure inside the board using the SDK tool the main advantage of it is the data can be easily processed with high speed further it can be utilized. The data is processed here the sci is used to provide the input to the target hardware and hence the data has been traversed through the board to PC. The whole system gives the implementation of SCD communication with the either-net using TCP/IP protocol over vertex board

3. CONCLUSION
The review gives the overview about different kinds of data acquisition and importance of data acquisition in real world ,basically an FPGA boards are most used since its cost effect and reconfiguration .these reviews can be considered for reconfiguration and development of DAQ systems in research and projects. Since most of data acquisition systems deals with the different sampling rate of the analog signals the system can be further modified or developed in terms of different sensors output and sampling rate.

4. ACKNOWLEDGEMENT

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