Data Acquisition and Control on FPGA SoC

Abstract

This project deals with the development of Data Acquisition System (DAS) on FPGA SoC (System on Chip). System on Chip (SoC) devices, such as the Zynq-7000 have architectural features which provide designers with an advanced ARM based Processing System (PS) and a flexible region of Programmable Logic (PL) based on FPGA fabric. The PS and the PL communicate using an interface standard called ARM eXtensible Interface (AXI). Here in this project the DAS will be realized using an external serial ADC, serial DAC and SoC. The digitized output from ADC will be first digitally isolated and then received into the PL section of FPGA, where it will be processed and sent to DAC to control the different systems. The serial data received into PL will also be sent to the PS section using AXI interface where it is processed to perform various algorithms such as FFT or any other complex algorithm and to transfer the data to remote PC/Server through Ethernet from where the data can be retrieved for further analysis. A custom IP core for ADC and DAC will be developed using VHDL in Vivado tool. The design is well suited for instrumentation application in industrial and automotive systems as well as for different control applications in Plasma Tokamaks.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.E./B.Tech. Electronics and Instrumentation Engineering

3) Academic Project duration:

(a) Total academic project duration: 19 Weeks
(b) Student's presence at IPR for academic project work: 5 Full working Days per week

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