

BUILDING AN EMBEDDED SYSTEM FOR FOOTBALL MATCH APPLICATION WITH FPGA TECHNOLOGY

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Abstract

In recent years, embedded systems have emerged at a faster rate and used in every field. They range from household products such as microwaves, to automotive products such as air bags sensing and control, to industrial robots which employ distributed processing and coordination as well as getting an integrated part of military solutions. The design of embedded systems is now becoming increasingly difficult due to the tight constraints on area usage, size, power consumption and performance. In addition to these constraints, many embedded system developers are faced with tight time-to-market deadlines. The product should be deployed when the demand for the product still exists, if the demand ceases then the product would not yield any profit for the company.

To develop these products, various tools and technologies have been used: microcontroller, DSP processor, ASIC, and now FPGA. FPGA is one of the most efficient methods. Informally, an FPGA can be thought of as a “blank slate” on which any digital circuit can be configured in the field – that is, after the device has been manufactured, installed in a product, or, in some cases, even after the product has been shipped to the consumer. This makes the FPGA device fundamentally different from other Integrated Circuit (IC) devices. In short, an FPGA provides programmable “hardware” to the embedded systems developer. The use of FPGAs (Field Programmable Gate Arrays) and configurable processors is becoming increasingly important. FPGA offer a great deal to the embedded systems designer. FPGAs not only meet the complex and demanding requirements of embedded systems that are becoming so universal today but also offer a low-risk, quick time-to-market solution that designers can easily modify when they need to make changes, fix bugs or create product derivatives at some point in the future.

Here in our project we have tried to implement such powerful FPGAs in the design of football match application. The aim of the project is to develop a 5-player soccer system on multiple Xilinx FPGA boards using embedded processors. Besides making us similar with FPGA technology, the project also makes us understand real-time concepts like scheduling, handling shared resources and priority management and some another typical embedded system requirements.

Keywords: Real time embedded system, FPGA technology, Football match application.

