Contribution ID: **102** Type: **Poster**

A small portable test system for the TileCal Digitizer system

Thursday, 18 September 2008 16:15 (20 minutes)

The TileCal hadron calorimeter in the ATLAS detector contains about 2000 digitizer boards, developed and maintained by Stockholm University. A rather complex test system has until now been used to verify the functionality of the boards. However, it was built almost 10 years ago and is now in itself difficult to maintain since it consists of several already obsolete parts. The development of a new simple, reliable and portable test system that could survive the digitizers was therefore initiated. Its components have been chosen to reduce the problem with obsolescence and to allow easy migration to new platforms.

Summary

The new system is based on commercially available components, for easy upgrade and service. It consists of a Xilinx development board (ML506), equipped with a Small Form-factor Pluggable (SFP) module for optical transmission and reception, and a laptop (optional). The system is communicating with the digitizers by transmitting TTC signals and receiving G-Link signals back through the same SFP module, utilising a single gigabit transceiver in the Virtex-V FPGA. The FPGA can easily be reconfigured for future upgrade and improvements, such as hardware acceleration for different kind of high-speed tests. It also contains an embedded CPU system running Linux and test software. The board is communicating with a host computer over Ethernet. This computer, which is running the debug software, can therefore be located anywhere. If the system needs to be mobile a laptop is preferable. The main debug software is running in a virtual environment for easy maintenance and compatibility.

This system needs to function during the next 10-15 years, as long as the digitizers needs to be maintained. It needs to be reliable and robust. However, some hardware may have to be replaced since they may not last that long. The development board could break down at some point. However, the board is commercially available and could easily be replaced with a new one without significant testing and debugging. If the board after some years for some reason would not be available, it could be replaced with a newer generation since the necessary part of the design is written in VHDL and could easily be implemented on a new FPGA. A newer board would most probably be better and still have all the required features. Generation of a new embedded system and a Linux system will most certainly be easier. The computer can not be expected to be in use for 15 years either. However, running the debug software in a virtual operating system makes it independent from the hardware and the operating system it is running on. Virtualization technology will be maintained in the future by software developers and will most certainly still be freely available. This eliminates the need for software maintenance from our side, by allowing us to stay with the old operating system on any new hardware.

The system could be used to test other systems as well in a similar way, requiring only some software development for the board. Even the hardware could be modified if other communication links than TTC and G-Link would be desired.

Primary author: Mr HIDVEGI, Attila (Stockholm University - Physics Dept.)

Co-authors: Prof. BOHM, Christian (Stockholm University - Physics Dept.); Mr ERIKSSON, Daniel (Stockholm University - Physics Dept.)

Presenter: Mr HIDVEGI, Attila (Stockholm University - Physics Dept.)

Session Classification: POSTERS SESSION