

The ALFA Trigger simulator

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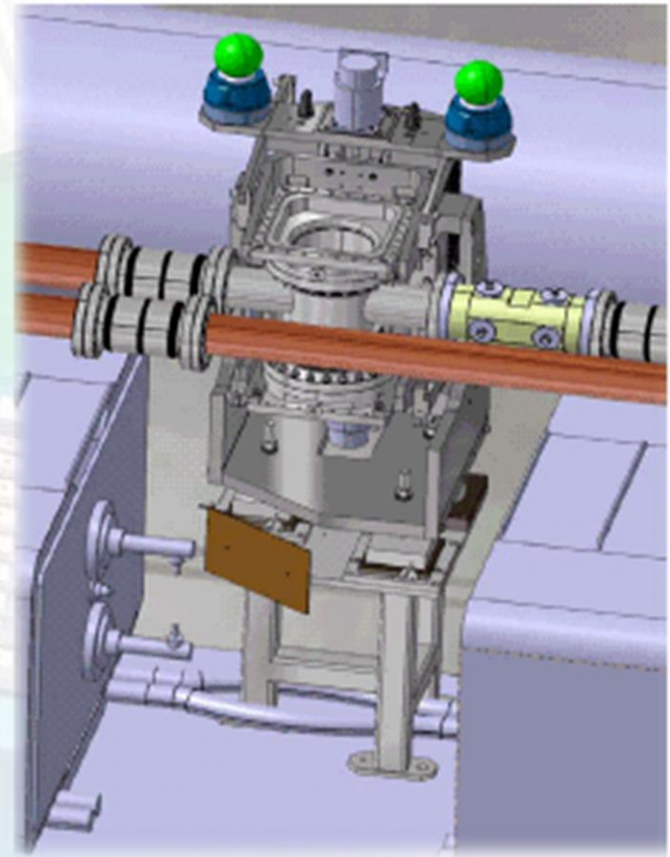
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Plan

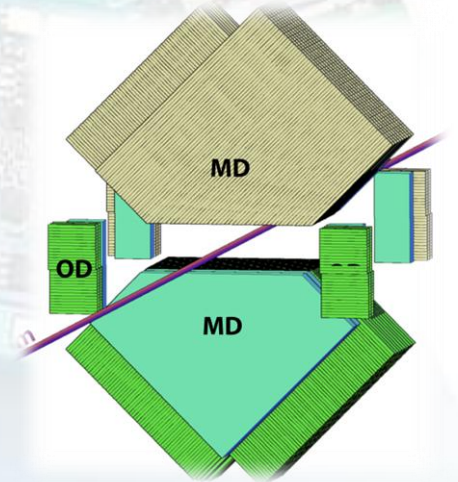
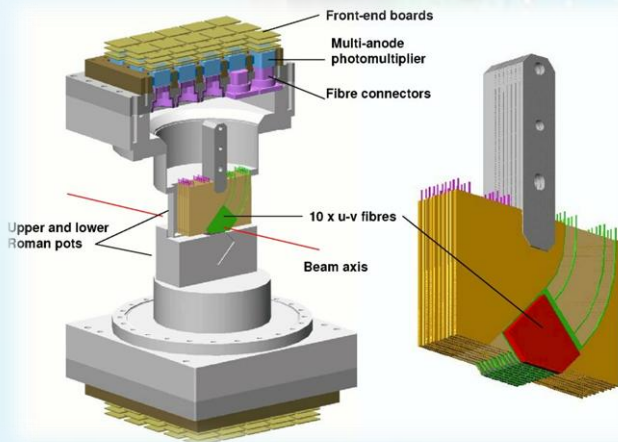
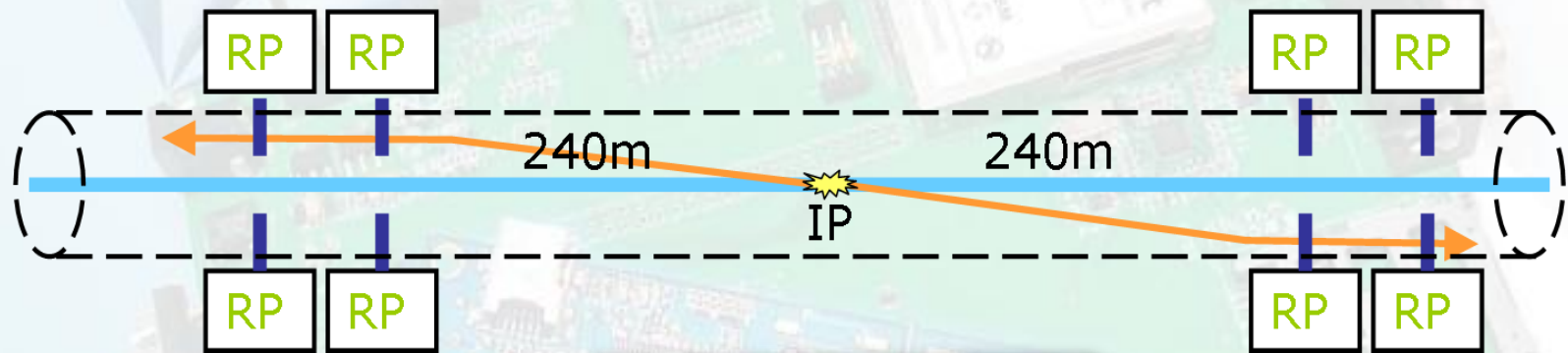
- Few words about ALFA
- ALFA trigger
- Motivation
- Simulating tools
- Hardware simulation
- Future of project
- Conclusion

The Roman Pot Unit

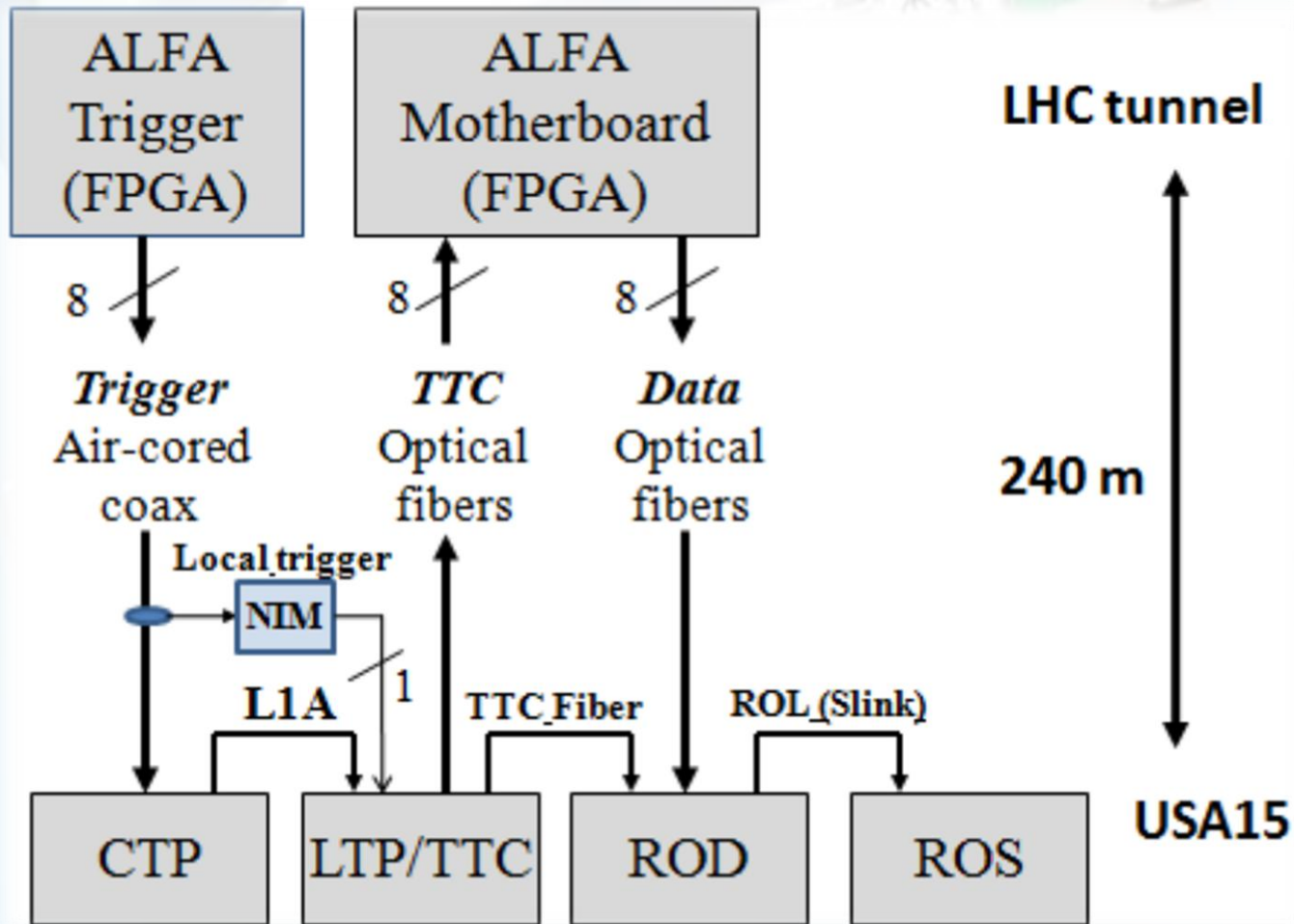


Few words about ALFA

ALFA – Absolute Luminosity For ATLAS



The ALFA trigger and readout



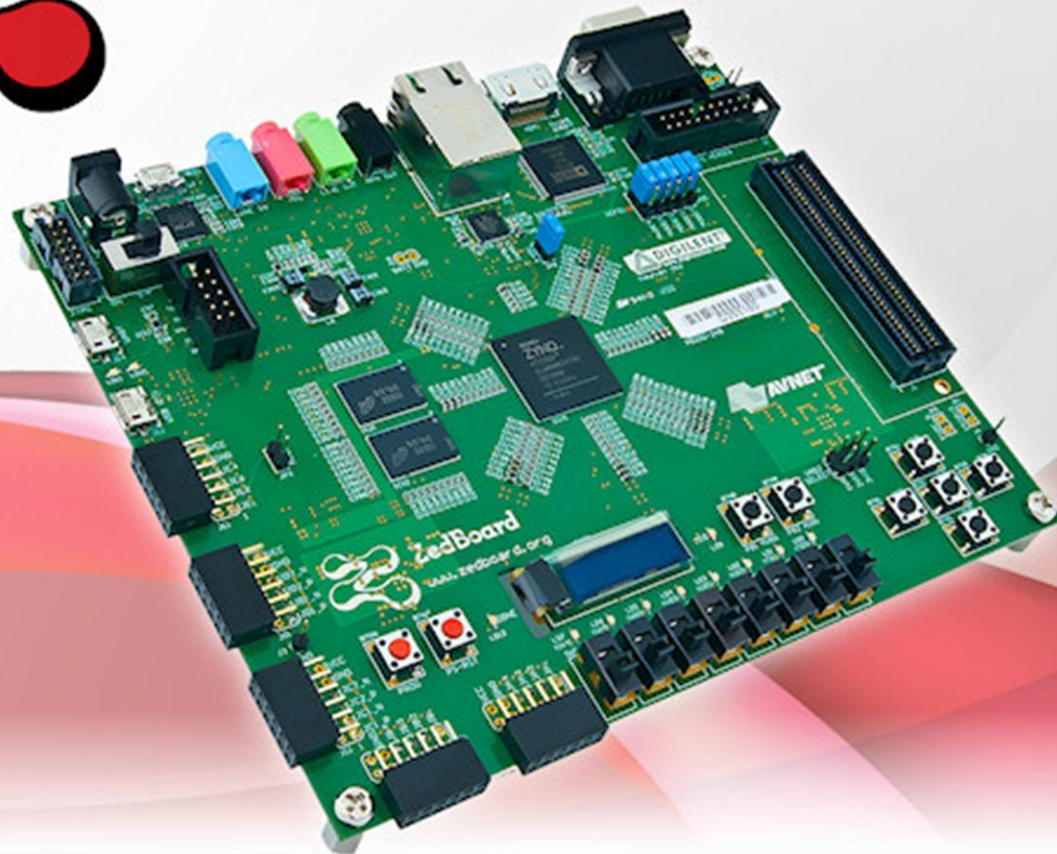
Motivation

- In Run2 ALFA will use dedicated interface to the Central Trigger Processor. We need simulator of ALFA trigger signals (tester) to test this interface
- We can send preprogrammed signals from the tester to detectors, synchronously illuminate LEDs in the detectors and check synchronization of the generated trigger signals
- Using LHC clock and ORBIT signals in the tester we can send signals to illuminate LEDs and generate calibration events

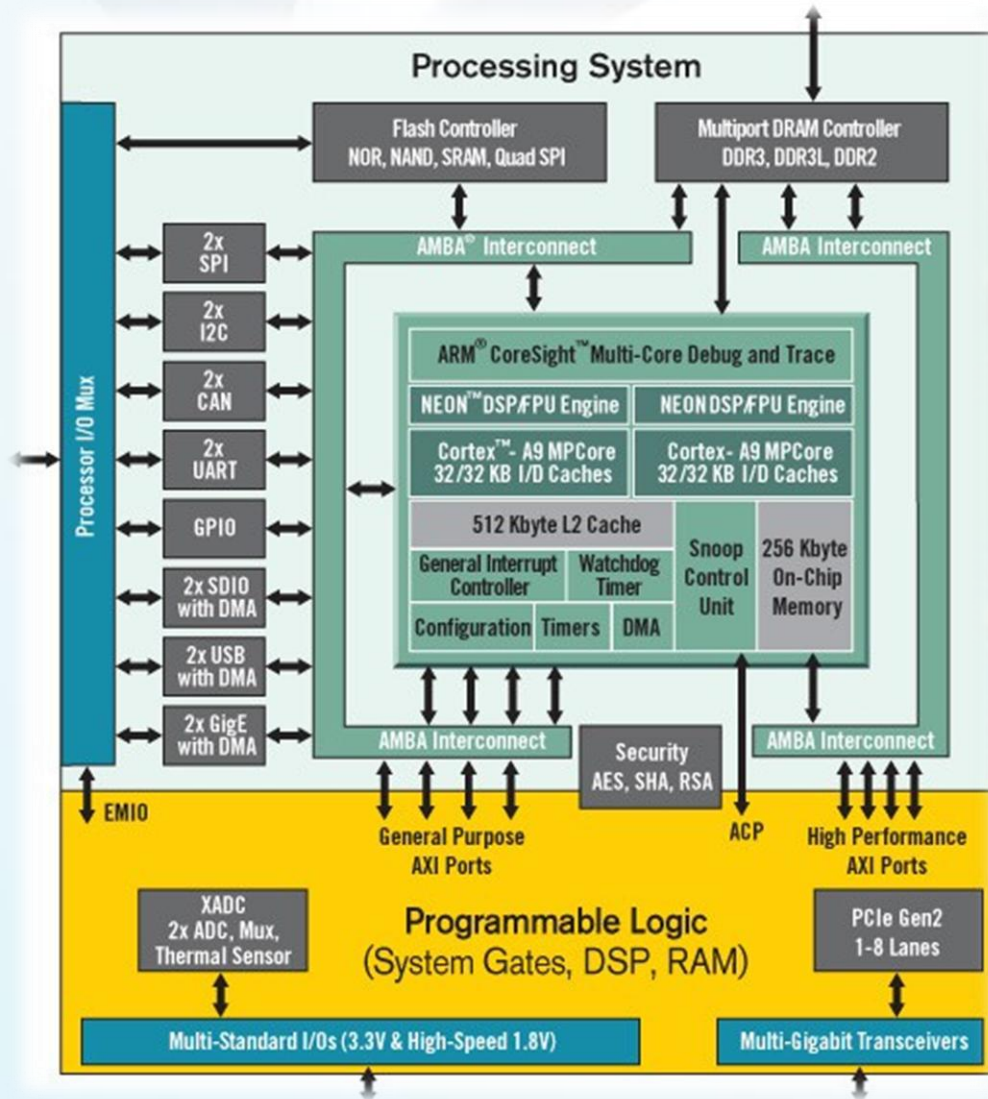
Simulating Tools



ZedBoard



What is inside of Zynq?

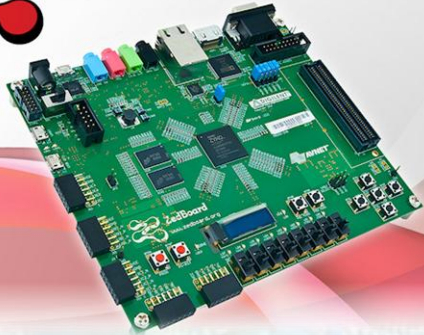


- **ARM**
Advanced RISC Machine
- **FPGA**
Field-Programmable Gate Array
- **FMC**
FPGA Mezzanine Card
- **AXI**
Advanced eXtensible Interface

Hardware Simulation



ZedBoard



ALFA interface to the
Central Trigger
Processor (CTP)



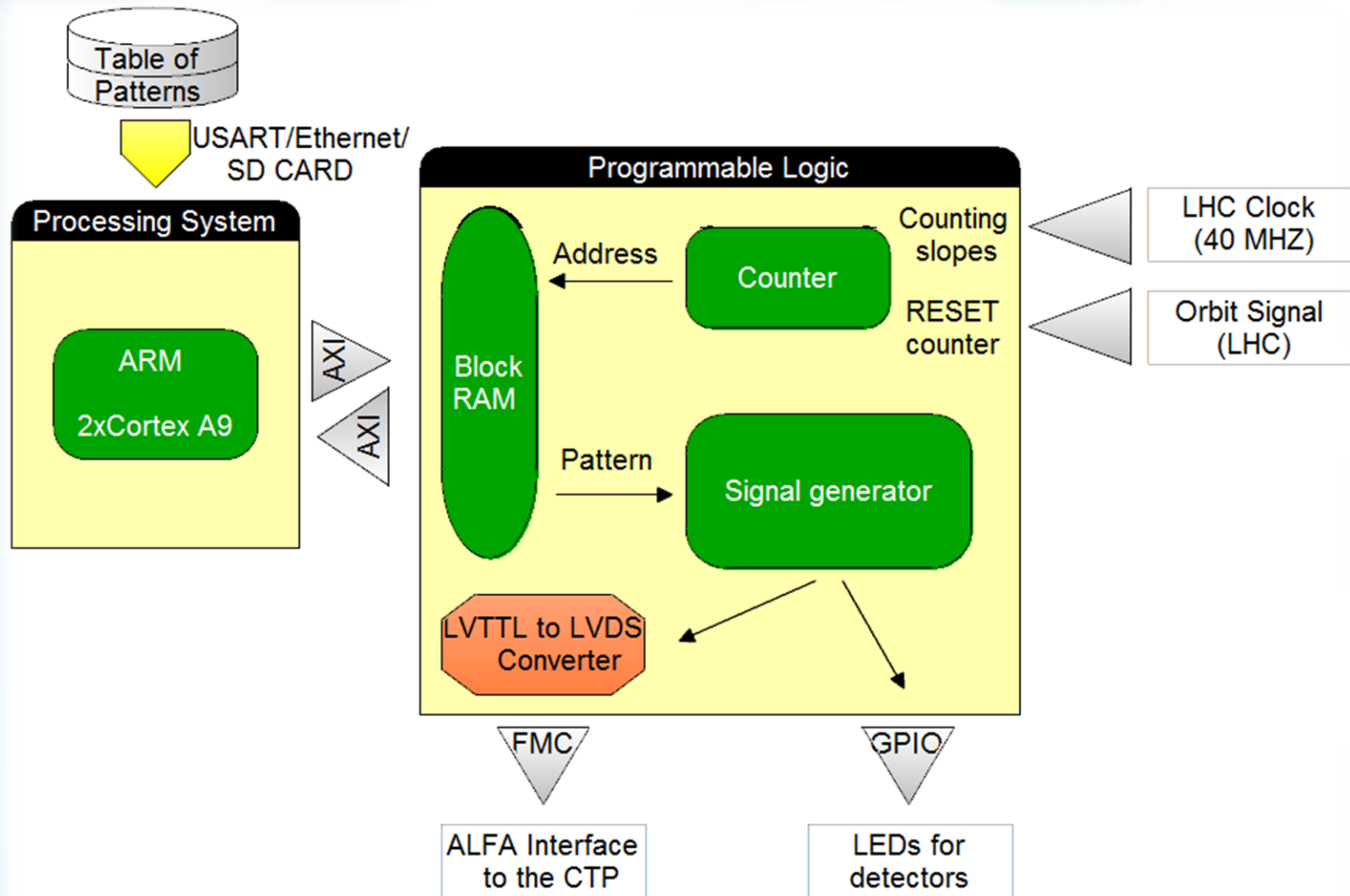
ZedBoard



LEDs



Architecture of the tester



Future of project

- Set the Linux web server on Processing System
- Web application to configure the simulator
- Program to generate the table of patterns
- Predefined tables of patterns



Conclusions

- The tester can be used to test the trigger
- Also it can be used to check detectors
- It can make tests on ALFA easier
- Making physical devices is a great pleasure
(if they work correctly...)

References

ALFA detector: timing and trigger – K. Korcyl - Proc. of SPIE Vol. 8903 89032K-1
http://www.ise.pw.edu.pl/~rrom/SPIE/SPIE8903-WILGA2013/8903/CD/WI13/DATA/8903_118.PDF

Commissioning of the Absolute Luminosity For ATLAS – detector at the LHC – PhD thesis - S. Jakobsen, December 2013
http://www.nbi.ku.dk/english/research/phd_theses/phd_theses_2014/sune_jakobsen/Sune_Jakobsen.pdf