

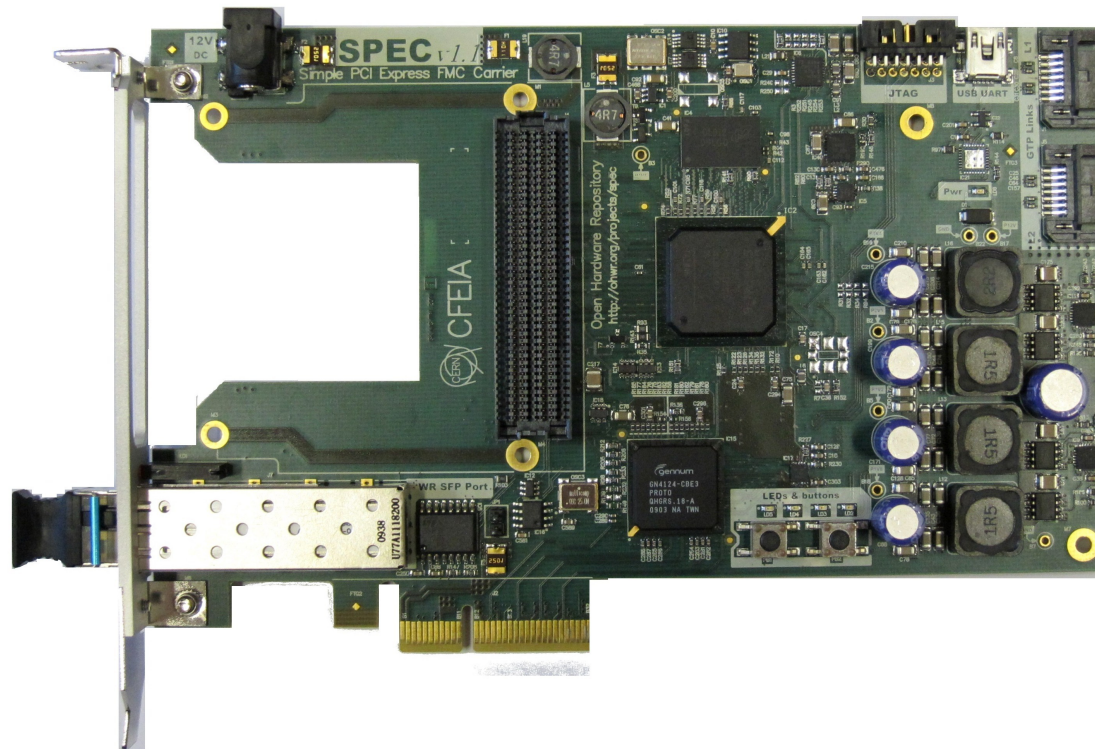
Time tagging events in distributed systems using White Rabbit

Tomasz Włostowski, BE-CO-HT
Geneve, 07.11.2011

System components

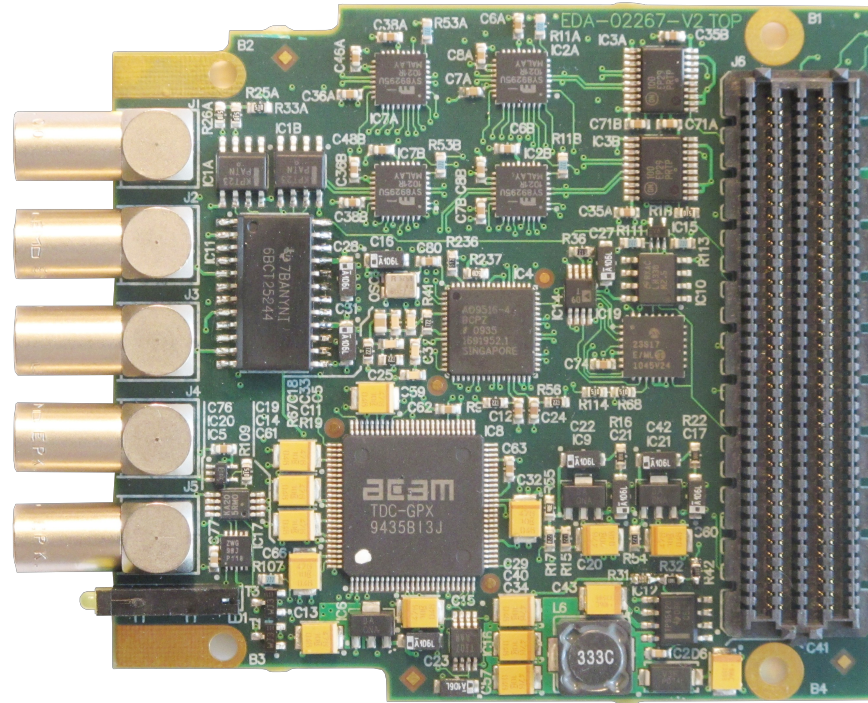
- White Rabbit **Ethernet Switch**, version 2
- Simple PCI-Express FMC Carrier – **SPEC**
- **Fine Delay Generator** FMC, used as a Time-to-digital converter
- Rolls with several kilometers of optical fiber
- A **PC** computer
- and **The Gun**

SPEC PCI-Express Carrier



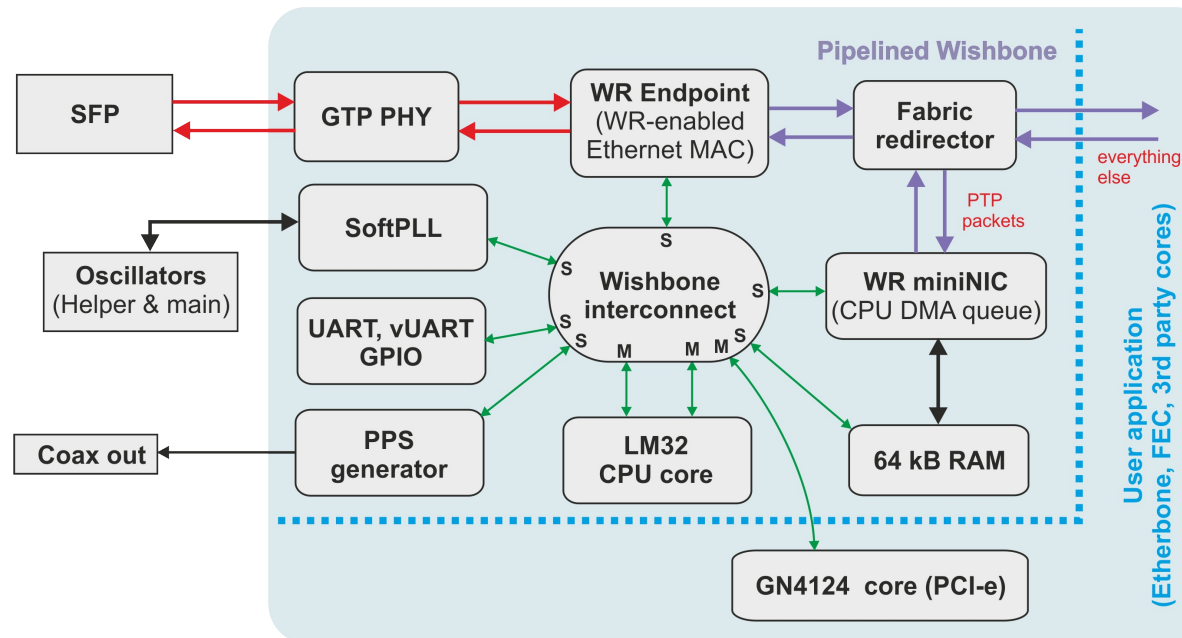
- Simple, cost-optimized PCI-Express card with single FMC slot
- Spartan-6 FPGA, 256 MB DDR3 RAM
- White Rabbit - compatible Ethernet port
- Already commercially available from multiple vendors

Fine Delay Mezzanine



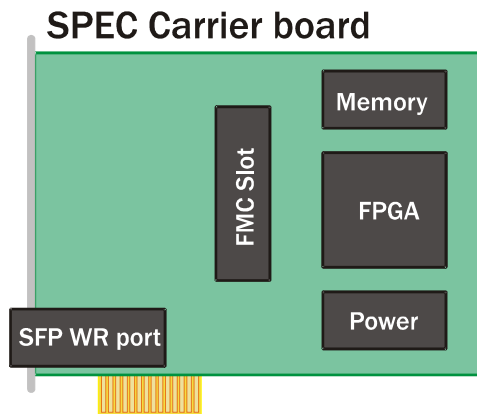
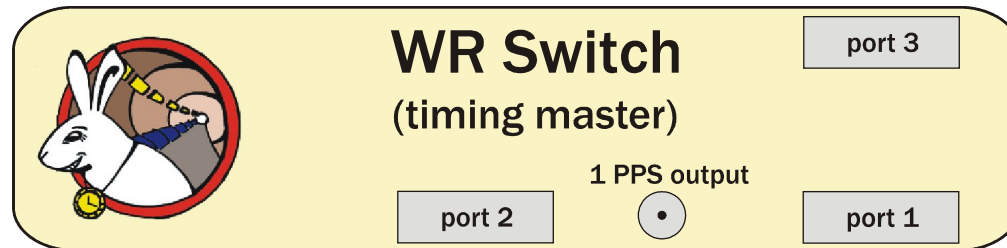
- Programmable digital delay line with $< 1\text{ ns}$ accuracy
- Can be used as a 500 ps p-p Time-to-Digital converter
- and as a programmable pulse generator

WR PTP FPGA Core

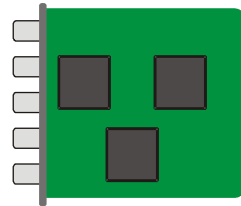


- White Rabbit-in-a-box, easy to use VHDL IP Core
- A fully featured Ethernet MAC with integrated WR/PTP protocol stack
- Communicates with the Fine Delay core through the Etherbone Protocol, developed with GSI

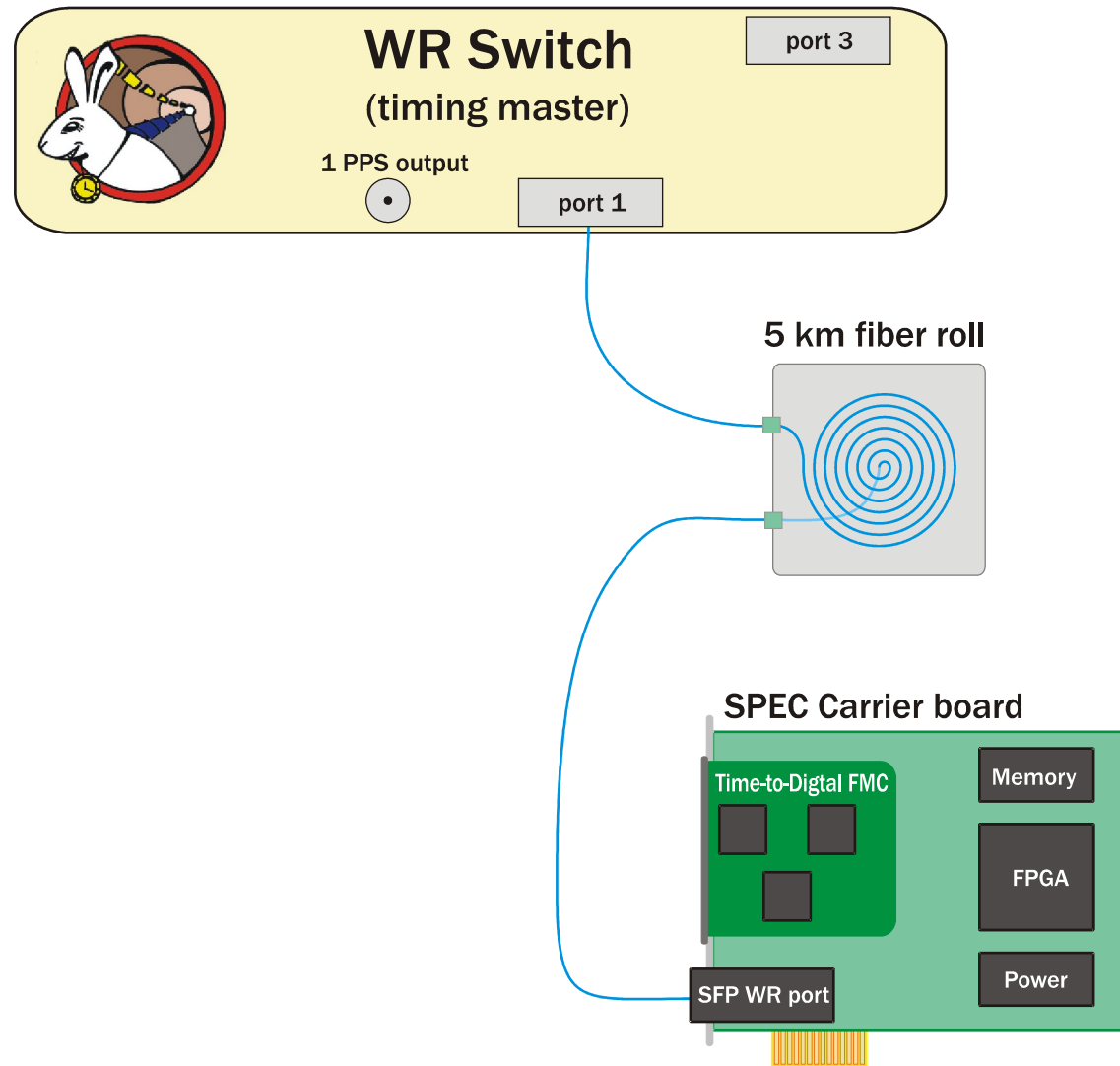
The Demo – system components



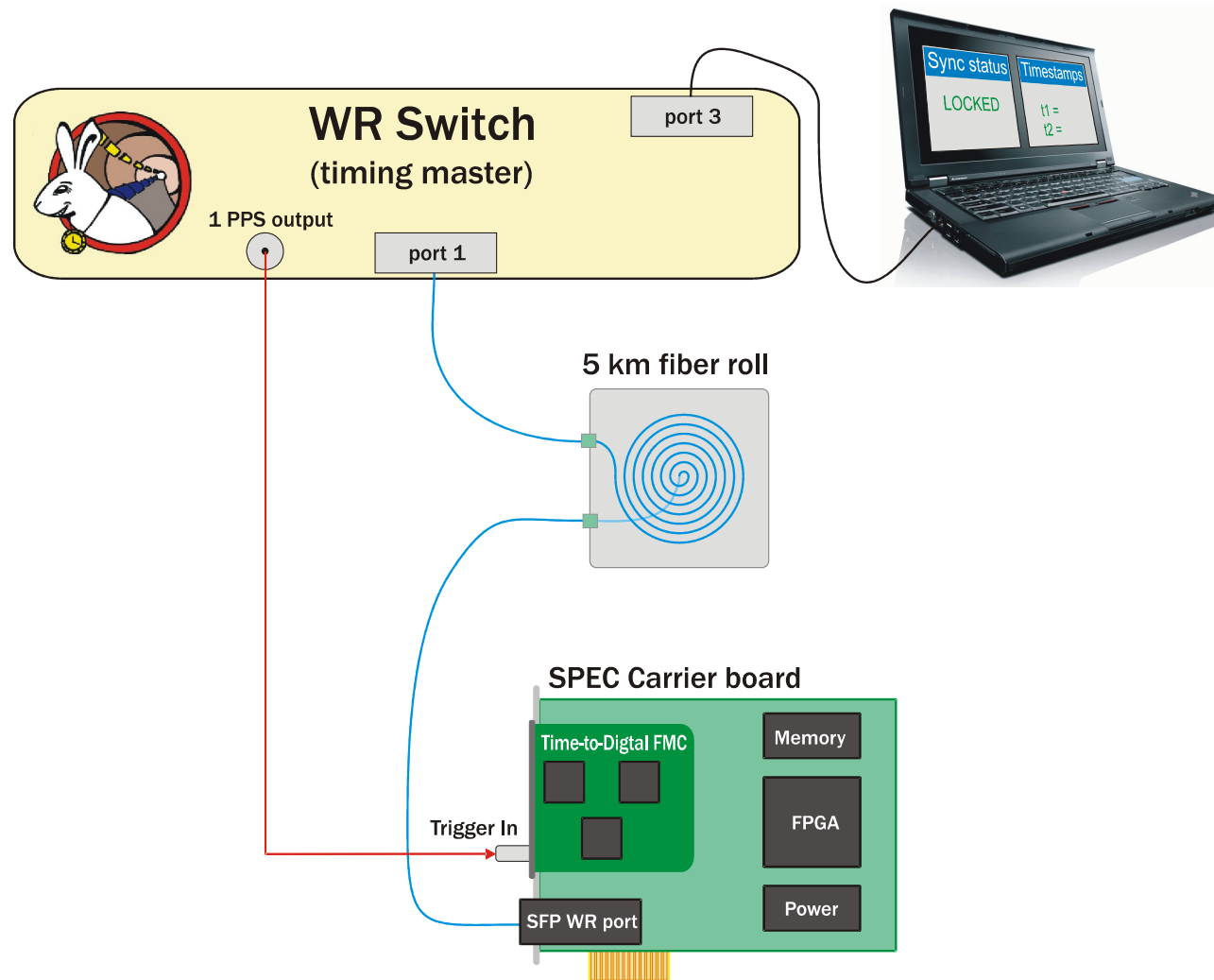
Time-to-Digital FMC



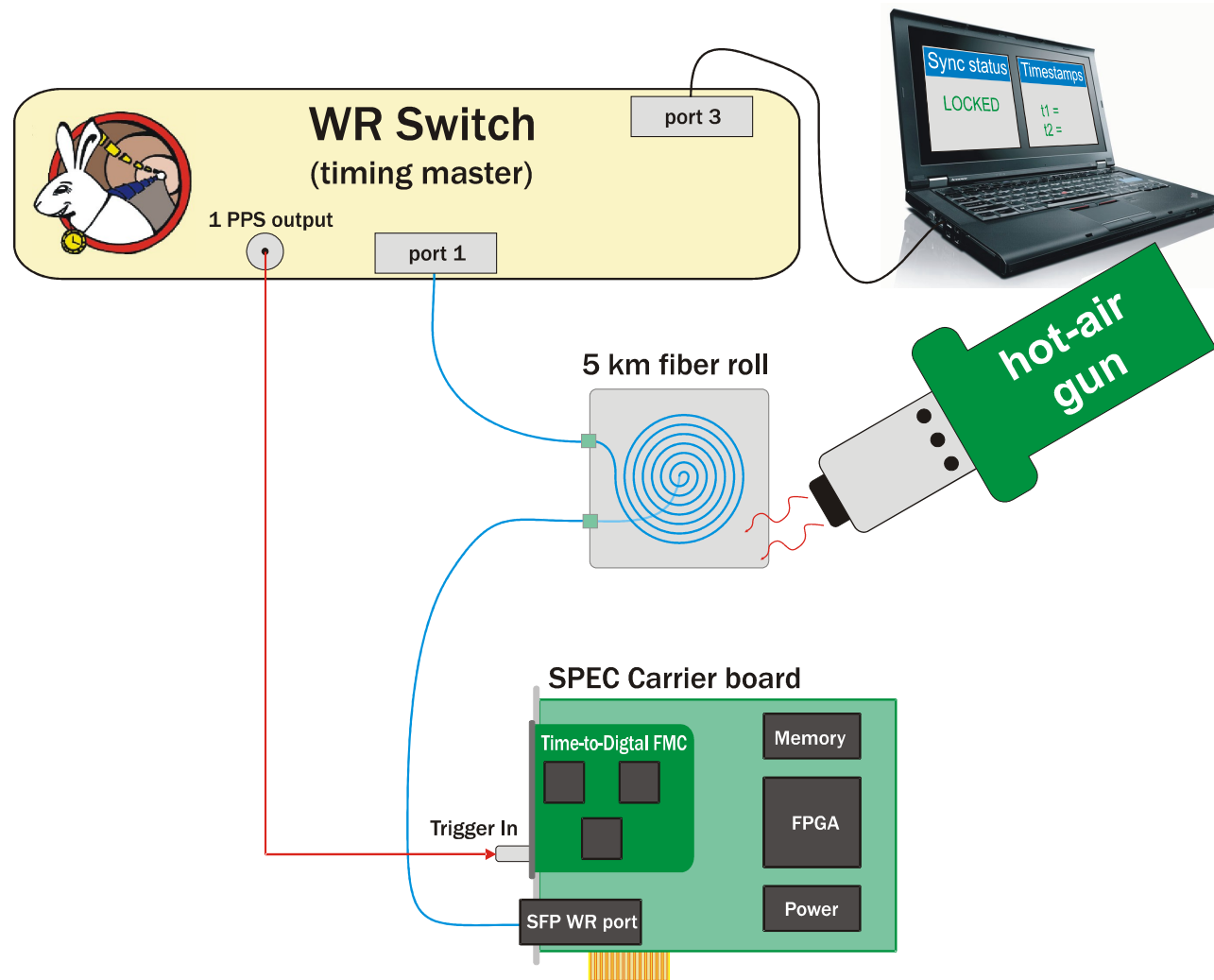
The Demo – fiber connections



The Demo – inputs and acquisition



And here comes The Gun™



Thank you!

