

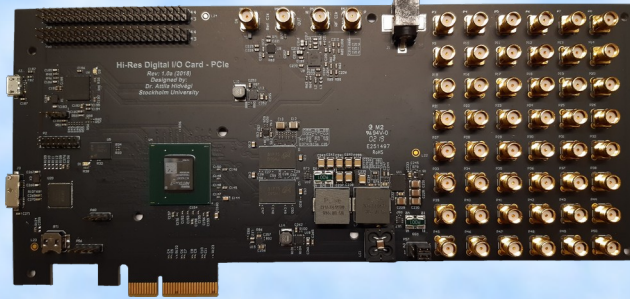
A 32 Channel Time-Tagging and Coincidence Detector Unit with High Data Throughput



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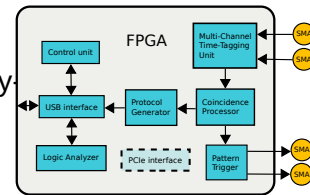
Board Features:

- Maximum pulses per second: 200M
- Time resolution: ~8 ps
- Time Tagging mode
- Coincidence Detector mode
- Real-time histogram generation of coincidence vectors.
- 32 input channels, with programmable offsets delay
- 8 pattern trigger outputs
- Synchronization to external source capability
- High-bandwidth readout:
 - PCIe x4 Gen 2
 - USB-3.0 (SS)



FPGA Architecture

- Xilinx Artix-7 200
- Data capture
 - Based on dedicated delay chain.
 - 256 taps per delay-chain.
 - Sampled at 440 MHz.



Performance Measurements

- Validation of performance is crucial.
- Automated performance measurements.
- Built-in pattern generator.
 - Transmits identical 2 MHz clock signal to all channels.
 - All channels individually measure the time of the pulse edge.
 - Each channel is compared against each other. (Phase and jitter)
- All channels are individually evaluated.
- Detailed results for each channel.

Conclusion

A high-performance Time-Tagging and Coincidence Detector Unit has been developed. The large number of input channels, high data throughput and high timing resolution makes this product unique. Detailed performance measurements were made to validate the high timing resolution and accuracy.