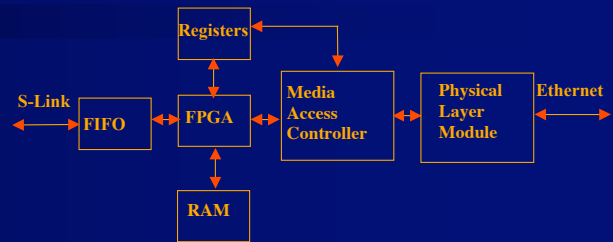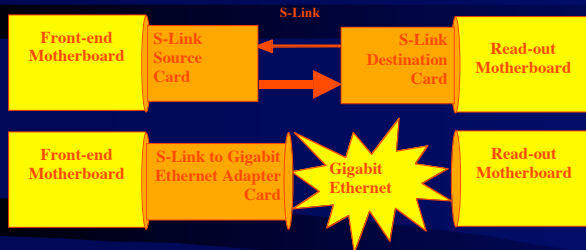# S-Link to Gigabit Ethernet Adapter

New Frame Segmentation
for LHCb Data Acquisition System

Joaquim E. Neves[*,], Richard Jacobsson[*], Niko Neufeld[*] and Beat Jost[*]**

Joaquim.Neves@dei.uminho.pt Richard.Jacobsson@cern.ch Niko.Neufeld@cern.ch Beat.Jost@cern.ch

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Previous Version

- S-Link Data is copied from FIFO to RAM
- Packet Length is calculated
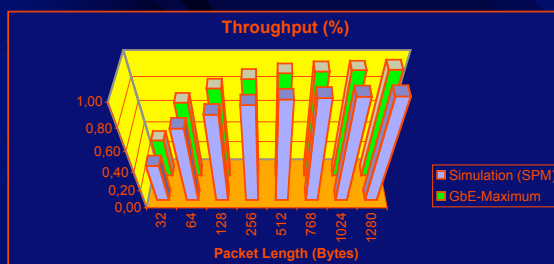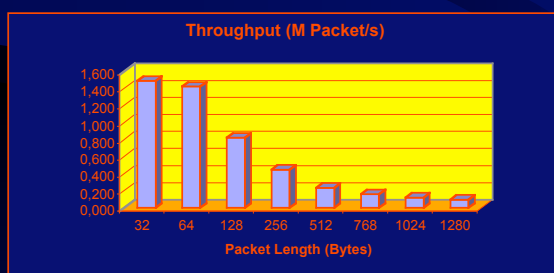- Data is copied from RAM to MAC

New Frame Segmentation

- Transmits Short and/or Long LHCb Packets
- Optional insertion of the Ethernet Source and Destination Addresses
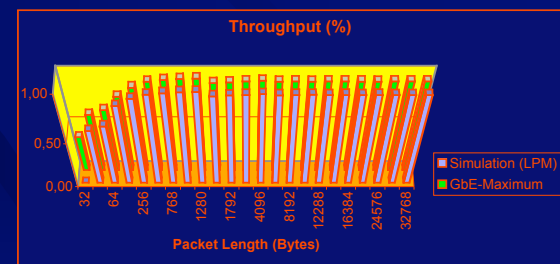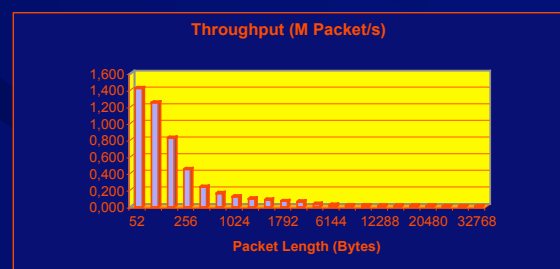- Disables the transmission in case of overflow

Simulation Results

Short Packet Mode

- Forwards S-Link Data from the FIFO to the Mac Controller
- Doesn't Send S-link Control Words
- Packet Header (LHCb Format… or other) is generated by the source.

Long Packet Mode

- Memorizes (RAM) the Header of the Packet
- Splits the Packet in Frames
- Forwards the S-Link Data from the FIFO to the Mac Controller
- Packet Header
    - Is inserted in each frame
    - LHCb Format (Length of Packet) is generated by the source.
- Doesn't Send S-link Control Words

Throughput (M Packet/s) — Packet Length (Bytes): 32, 64, 128, 256, 512, 768, 1024, 1280

Throughput (M Packet/s) — Packet Length (Bytes): 52, 256, 1024, 1792, 6144, 12288, 20480, 32768

Throughput (%) — Packet Length (Bytes): 32, 64, 128, 256, 512, 768, 1024, 1280 — Simulation (SPM), GbE-Maximum

Throughput (%) — Packet Length (Bytes): 32, 64, 256, 768, 1280, 1792, 4096, 8192, 12288, 16384, 24576, 32768 — Simulation (LPM), GbE-Maximum

Expected Performance is sufficient for any possible application in LHCb Data Acquisition System.