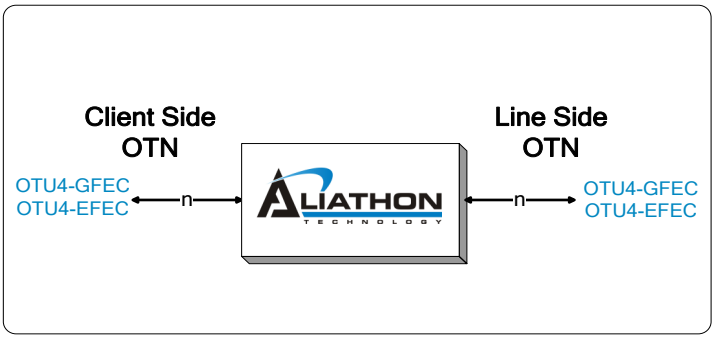
Overview

Aliathon's 100GE-OTU4 regenerator/ repeater is targeted towards long haul transport in the OTN network. The application is either the simple repeating of the same signal, including FEC type or the introduction of eFEC on the egress side to enable distance boosting regeneration.

The solution is fully ITU G.709 compliant and resides in a single FPGA.



Headline Features

- 200MHz+ push button core performance.
- All products designed from ground up to allow future datapath & channel scaling.
  - Built on technology developed at 10G & 40G rates.
  - Enabling migration path to 400G solutions in the future.
- Softcore Microprocessor subsystem connected to generic core registers.
  - Enabling instant abstraction layer access or easy integration with existing software environment.
- OTL4.4 client & line interface.
- OTU4 framing and section/path overhead processing.
- Support for both standard and enhanced FEC;
  - 7db NECG @ 6.7% OH G.709 GFEC.
  - 9.35db NECG @ 7% OH Enhanced FEC (CI-BCH-3™).

Figure 1 Overview

On the ingress OTU4 side the design implements an OTL4.4 interface (supports 1024bits of skew matching the IEEE MLD Requirement). This incorporates 4 27.95G SERDES with individual lane framing (based on the OTU4 FAS pattern and the inserted LLM bytes), skew adjustment and reordering.

The ingress OTU4 core provides standard G.709 OTN framing, scrambling, detection of parity errors and adds/drops the overhead.

FEC Options on both ingress & egresss side's are;

- G.709 Standard Compliant FEC: 6.7% OH, delivering 7db of Net Electrical Coding Gain (NECG). Stats provided are corrected/uncorrected bits, blocks and codes
- Continuously Interleaved, 3-error correcting BCH (CI-BCH-3™) eFEC - 7% OH, delivering 9.35db of Net Electrical Coding Gain (NECG). Stats provided are corrected/uncorrected bits, blocks and codes

In both directions, asynch FIFO's are used to lock the respective ingress and egress interfaces together and ensure datapath integrity.

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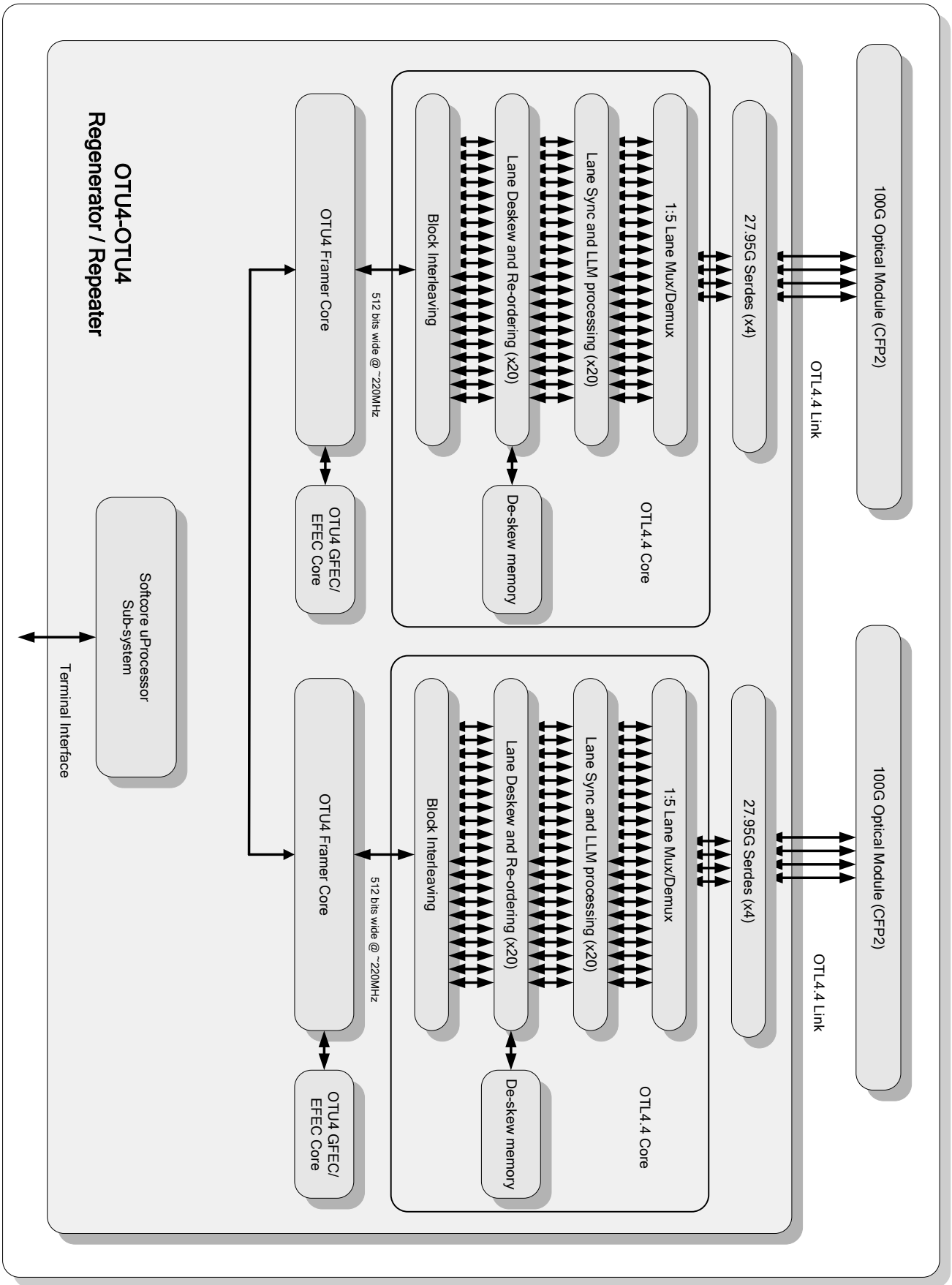
Figure 1: Architectural Block Diagram



OTN Overhead Alarms Supported / Processed

Frame

- OOF: Out of Frame (FAS error).
- LOF: Loss of Frame (OOF persistence).
- OOM: Out of Multiframe (MFAS error).
- LOM: Loss of Multiframe (OOM persistence).

OTU Section Monitoring

- SM-BIP-8: SM Bit Interleaved Parity.
- SM-BEI: SM Backward Error Indication.
- OTU-AIS: OTU Alarm Indicator Signal.
- SM-BDI: SM Backward Defect Indicator.
- SM-IAE: SM Incoming Alignment Error.
- SM-BIAE: SM Backward Incoming Alignment Error

ODU Path Monitoring & TCM

- PM-BIP-8: PM BIP Error
- PM-BEI: PM Backward error Indication.
- ODU-AIS: ODU Alarm Indicator Signal.
- ODU-OCI: ODU Open Connection Indication.
- ODU-LCK: ODU Lock Defect.
- PM-BDI: PM Backward Defect Indication.
- PM-TIM: Trace Identified Missmatch.
- TCMi-BIP-8, TCMi-BEI, TCM-BDI, TCM-BIAE, TCM-AIS, TCM-OCI, TCM-LCK, TCM-LTC, TCM-IAE, TCM-TIM.

OPU

- PTM: Payload Type Missmatch
- CSF: Client Signal Fail.

Target Families & Deliverables

Altera

- Stratix
- Arria

Xilinx

- Virtex
- Kintex

IP

- EDIF/BIT/SOF/QSF/UCF. Encrypted ModelSim & Back annotated VHDL

Documentation

- Datasheet, Verification Results, User Guide.

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