Marvell® Alaska® C 88X5111

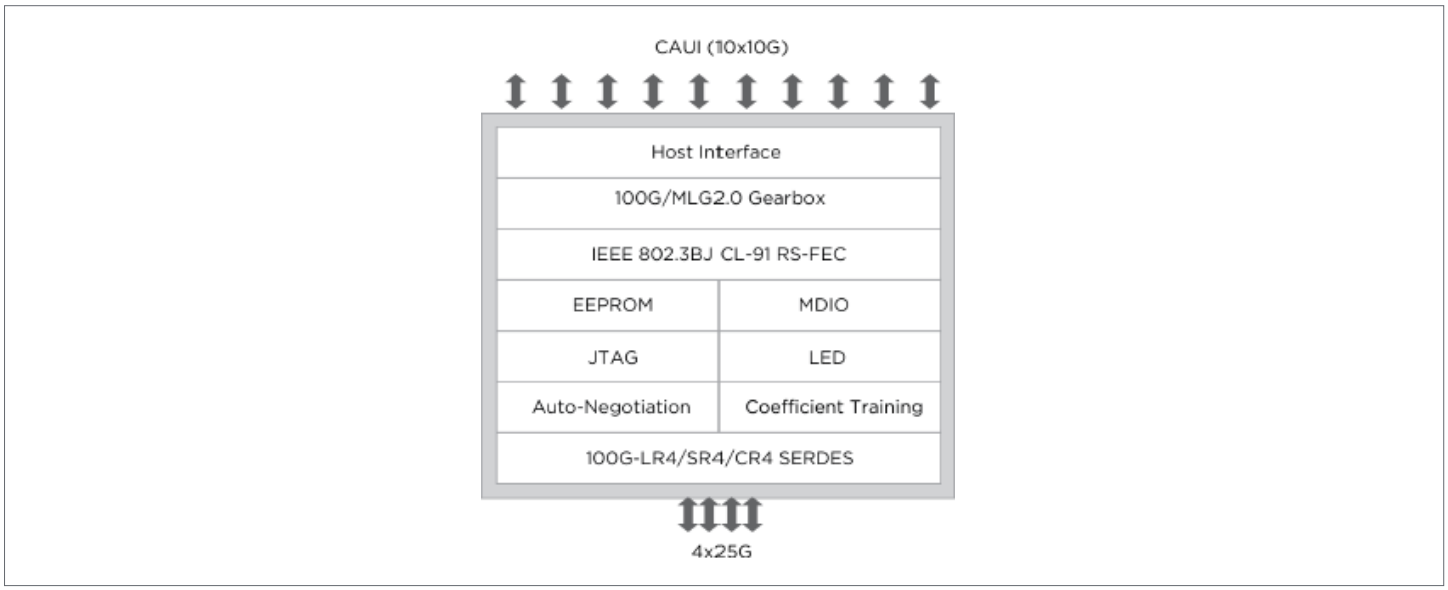
Integrated 100 Gbps Ethernet Gearbox with Copper Cable and Backplane Drive Capability

Overview

The Marvell® Alaska C 88X5111 is a fully integrated single chip port Ethernet transceiver that performs all physical layer functions required for 100 Gbps Ethernet Gearbox functionality, and drive 100 Gbps full duplex transmission, over a variety of media including optics, backplanes and passive copper cables. Manufactured with 28 nanometer lithography, in a 17mmx17mm package footprint, the Marvell 88X5111 enables low-power dissipation, high-density 100GbE card designs. The line interface of the 88X5111 is fully compliant to the IEEE 802.3BJ standard that defines the physical layer specifications for 100 Gbps Ethernet transmission over backplanes and copper cables. The device supports the Reed Solomon Forward Error Correction (RS-FEC) function required for 100G-CR4, 100G-KR4, and 100G-SR4 operation, as well as auto-negotiation and coefficient-training protocol required by the IEEE 802.3. The device also supports the Multilink Gearbox (MLG) functionality specified by the OIF MLG 2.0 specifications. The MLG functionality enables aggregation of 10 independent streams of 10 Gbps Ethernet or two independent streams of 40 Gbs Ethernet onto a 4x25 Gbps stream. The 88X5111 connects to a MAC or switch on its host interface over a 10x10 Gbps CAUI-10 link. The transmit drive and receiver equalization capabilities of the host interface meet the requirements of to 10GBase-KR specifications, significantly exceeding CAUI-10 requirements.

On the line side, the device has a 4x25 Gbps interface and supports a variety of media types including single mode and multimode optical modules, passive and active copper direct attach cables, and copper backplanes. The line interface of the 88X5111 is fully compliant to the IEEE 802.3BJ standard that defines the physical layer specifications for 100 Gbps operation over backplanes and copper cables. The device supports the RS- FEC feature, as well as auto-negotiation and coefficient training protocol required by the 802.3BJ. Standard Internal registers can be accessed via an MDIO/MDC serial management interface which is compliant with the IEEE 802.3 specification (Clause 45). An MDC frequency of up to 25 MHz supported. The device includes internal PRBS generators and Ethernet packet generators and loopbacks to assist with test and debug. In addition, non-destructive eye monitoring is supported on all high speed I/Os. The 88X5111 is housed in a 17 mm x 17mm 256 pin FCBGA package, and supports an operating temperature range from 0 to 105°C.

Block Diagram



Key Features

Features	Benefits
Single port 100GbE Gearbox Multilink Gearbox (MLG) compliant to OIF MLG 2.0 specifications	• Support for IEEE 802.3BJ Reed- Solomon Forward Error Correction (R-S FEC) functionality required for driving 100GCR4 passive copper cables, 100G-KR4 backplanes and 100GSR4 MMF modules
Line interface SerDes that exceeds the equalization requirements for 100G-CR4 passive copper cables and 100GKR4 backplanes	• Recovered clock outputs for SyncE applications • Ethernet packet and programmable packet generation and checking capabilities
Long reach host interface SerDes that exceeds IEEE CAUI requirements	• Hardware interrupt pins for per port hardware interrupt generation capability
Fully autonomous adaptive equalization on line and host receiver	• Non-destructive Eye monitoring capability on all high speed lanes
Support for auto-negotiation and transmitter coefficient training protocol	• Clause 45 MDC/MDIO management interface • Junction temperature range of 0 to 105° • Small 17mm x 17mm FCBGA package

Special Key Features

Features	Benefits
Long reach line SerDes	• Capable of compensating an IL of up to 30dB without FEC
Integrated Reed-Solomon FEC	• Capable of driving 100G-CR4 cables, 100G-KR4 backplanes and 100GSR4 optical modules
MLG 2.0 Gearboxing functionality	• Enables aggregation of 10 independent 10GbE streams or 2 independent 40GbE streams to a 4x25G pipe
Integrated IEEE auto-negotiation and training protocol	• Seamless interoperability with IEEE-compliant devices from other vendors
Fully autonomous equalizer adaptation	• Fully autonomous equalizer adaptation

Target Applications

- 100GbE Data center switches
- 100G-KR4 backplanes
- 10GbE/40GbE port expanders

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To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies for 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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