

Marvell® E1781

Integrated Octal 10/100/1000 Mbps Energy Efficient Ethernet Transceiver with Time-Sensitive Networking Support

Overview

The latest generation Alaska family of single-chip devices contains eight independent Gigabit Ethernet transceivers on a single monolithic IC. Each transceiver performs all the physical layer functions for 1000BASE-T and 100BASE-TX full or half-duplex Ethernet on CAT 5 twisted pair cable, and 10BASE-T full or half-duplex Ethernet on CAT 3, 4, and 5 cable.

The Alaska E1781 device supports the Universal Serial Gigabit Media Independent Interface (USGMII) for direct connection to a MAC/Switch port. The USGMII combines eight ports of SGMII running at 1.25 Gbps onto a single differential pair of signals operating at 10 Gbps. USGMII primarily decreases the number of I/O pins on the MAC interface compared to the SGMII and lowers the overall power consumption. The device supports one USGMII port to connect the eight copper ports to the MAC device.

The device supports IEEE 802.3az Energy Efficient Ethernet (EEE) and is IEEE 802.3az compliant.

The device integrates MDI interface termination resistors and capacitors into the PHY. This resistor integration simplifies board layout and lowers board cost by reducing the number of external components. The new Marvell® calibrated resistor scheme will achieve and exceed the accuracy requirements of the IEEE 802.3 return loss specifications. The device exhibits ultra-low power consumption. This reduces the overall system cost by reducing or eliminating heat-sink and air-flow requirements.

The device is fully compliant with the IEEE 802.3 standard. It includes the PMD, PMA, and PCS sublayers. The device performs PAM5, 8B/10B, 4B/5B, MLT-3, NRZI, and Manchester encoding/decoding; digital clock/data recovery; stream cipher scrambling/descrambling; digital adaptive equalization for the receiver data path as well as digital filtering for pulse-shaping for the line transmitter; and Auto-Negotiation and management functions.

The device supports Auto-MDI/MDIX at all three speeds to enable easier installation and reduced installation costs.

The device uses advanced mixed-signal processing to perform equalization, echo and crosstalk cancellation, data recovery, and error correction at a gigabit per second data rate. The device dissipates very low power while achieving robust performance in noisy environments.

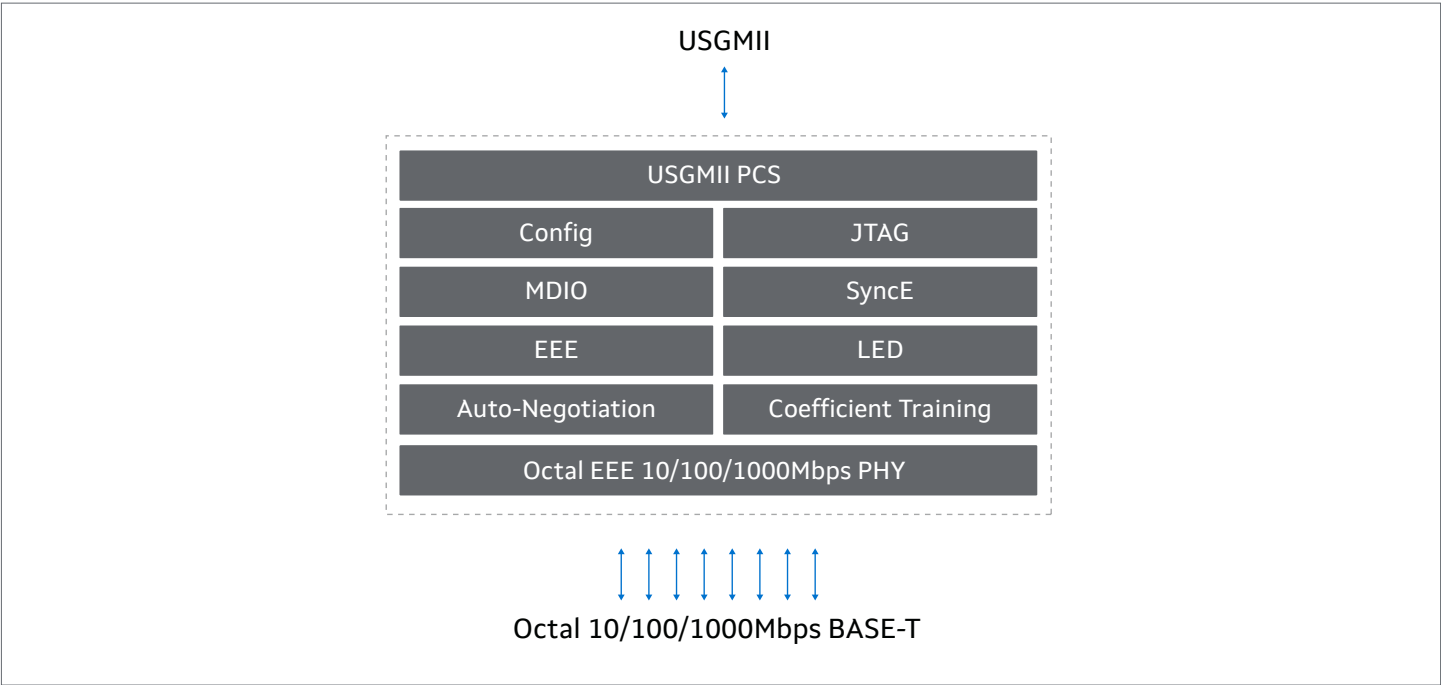
The E1781 device supports Synchronous Ethernet (SyncE) and Precise Timing Protocol (PTP) Time Stamping with enhanced resolution, through a Packet Control Header (PCH), which complies with the USGMII specification.

The E1781 device also supports an integrated Advanced Virtual Cable Tester® (VCT™) enabling fault detection and advanced cable performance monitoring.

The E1781 is available in two different package options

- 128-pin wire-bond LQFP 22mm x 16mm
- 289-pin FCBGA 14mm x 14mm optimized for thermal performance.

Block Diagram



Key Features

Features	Benefits
Eight ports of copper to one port of USGMII	• Enables high density 1G port configuration (8/16/24/48)
Energy Efficient Ethernet (EEE) - IEEE 802.3az compliant	• Optimized power consumption in idle mode
Clock cascading	• BOM cost reduction
Supports Interspersed Express Traffic (IET) and Preemption frame format	• Aligned with Time Sensitive Network requirements
Accurate time stamping via PCH with 2 ns resolution and Synchronous Ethernet support	
Temperature sensor	• Helps to manage system thermal behavioral
Ultra-low power consumption	• Reduced BOM cost, robust thermal performance
Supports commercial and industrial temperature ranges	• Dedicated P/N for different temperature range needs
Manufactured in a: • 14 x 20 mm 128-Pin LQFP with EPAD package, and • 14 x 14 mm 289-Pin FCBGA package	• FCBGA package is optimized to harsh Industrial environment requirements



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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