Marvell® Alaska® 88E1510P/Q Low Latency PHY

Integrated 10/100/1000 Mbps Transceiver for Low Latency Applications

Overview

Marvell® Alaska® 88E1510P and 88E1510Q Gigabit Ethernet Transceivers are physical layer devices containing a single Gigabit Ethernet transceiver. The transceiver implements the Ethernet physical layer portion of the 1000BASE-T, 100BASE-TX, and 10BASE-T standards.

The transceiver was designed for industrial applications where low and deterministic latency through the PHY enables real-time applications. Higher layer protocols such as EtherCAT/Profinet can utilize this low latency device to guarantee quality of service in real-time automation systems.
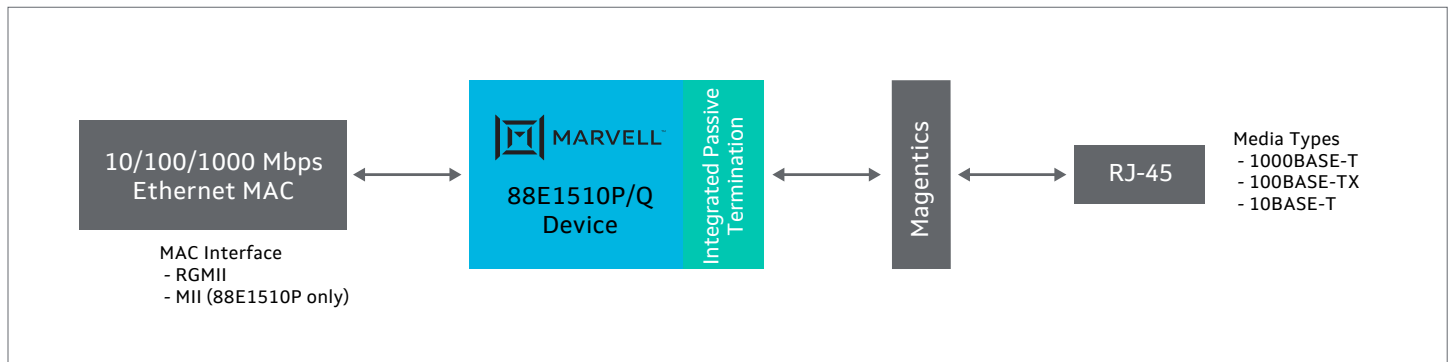
In addition to supporting Energy Efficient Ethernet (EEE) on the new generation of enabled MACs, these products are also capable of implementing EEE with legacy or non-EEE devices by incorporating EEE buffering. The 88E1510P device supports RGMII (Reduced pin count GMII for direct connection) to Copper, and MII to Copper. The 88E1510Q device supports RGMII to Copper only.

The device also integrates MDI interface termination resistors into the PHY. This resistor integration simplifies board layout and reduces 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 88E1510P and 88E1510Q devices have an integrated switching voltage regulator to generate all required voltages and can run off a single 3.3V supply; the device supports 1.8V, 2.5V, and 3.3V LVCMOS I/O Standards. This 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 88E1510P and 88E1510Q achieve robust performance in nois environments with very low power dissipation.

The Alaska family of transceiver products provides the ideal solution for rapid development and deployment of gigabit standalone and switching systems for the Enterprise, Industrial, embedded, and Metro/service provider market segments.

Block Diagram

Marvell Alaska 88E1510P/Q Transceiver

Key Features

Features	Benefits
Low Latency	• Reduces the PHY latency (transmit and receive) by up to 40 percent compared to non-optimized designs • Total (RX+TX) latency < 400 ns (for both 100BASE-TX and 1000BASE-T modes with 1518 byte frames)
Quick Linkup using hardware configuration strap options for unmanaged applications (For 88E1510Q only)	• The 88E1510Q offers forced speed modes, forced cross over modes, and programmable options that are enabled automatically after hardware configuration. These modes can reduce the link-up and Autonegotiation time significantly
EEE Support (IEEE 802.3az): Implements EEE with legacy or non-EEE MAC	• Extended energy savings through incorporation of the IEEE 802.3az standard
Synchronous Ethernet	• Accurate and low-cost clock recovery for Time-aware applications
IEEE 1588v2 support with hardware acceleration	• Enables applications such as industrial automation and wireless-backhaul with highly accurate Precision Time Protocol • Supports hardware accelerated 2-Step PTP and 1-Step PTP
Integrated Switching Voltage Regulator	• Allows devices to run off single 3.3V supply
Wake on LAN (WoL)	• Power savings through programmable lower power (S5) event/pattern and link change detection
Advanced Virtual Cable Tester® (VCT™)	• Detects and reports potential cabling issues to within one meter of the distance to the fault
Expanded PHY addresses	• Offers 16 PHY addresses for easier programming
Extended Temperature Range	• Industrial Grade enables operation in harsh environments with ambient operating range (-40 to +85C) and maximum junction temperature (+125C)
48-pin QFN 8mm x 8mm Green package	• Environmentally friendly, small form factor for minimal real estate requirements

Target Applications

- Wireless Backhaul applications
- Industrial Automation
- Internet of Things (IoT) Gateways
- General Purpose Embedded Controller

MARVELL™