

# Marvell Alaska 88E1121R

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Dual-Port Gigabit Ethernet Transceiver with Integrated Passives



## ▶ PRODUCT OVERVIEW

The Marvell® Alaska® 88E1121R dual-port Gigabit Ethernet (GbE) transceiver is a physical layer (PHY) device containing two independent GbE transceivers on a single monolithic IC. The transceivers implement the Ethernet PHY portion of the 1000BASE-T, 100BASE-TX, and 10BASE-T standards and are compliant with IEEE 802.3u Auto-Negotiation. It is manufactured using standard digital CMOS process and contains all the active circuitry required to implement the physical layer functions to transmit and receive data on standard CAT 5 unshielded twisted pair.

The 88E1121R device supports the Reduced Gigabit Media Independent Interface (RGMI) for direct connection to a Media Access Controller (MAC)/switch port. The device also integrates Media Dependent Interface (MDI) termination resistors and capacitors into the PHY. The integration of the passives simplifies board layout and significantly reduces board cost and space by eliminating up to 24 external components. The Marvell calibrated resistor scheme will achieve and exceed the accuracy requirements of the IEEE 802.3 return loss specifications.

The 88E1121R can operate with just two voltages, 1.2V for the core and 1.8V/2.5V/3.3V for I/O. It consumes only 700 mW per port and features energy detect and energy detect+™ low-power modes. It supports data terminal equipment (DTE) power function for Power over Ethernet (PoE) applications. The device also incorporates the advanced Marvell Virtual Cable Tester® (advanced Marvell VCT™) feature for remote identification of potential cable malfunctions, thus reducing equipment returns and service calls. Housed in a 100-pin TQFP package and measuring only 16mm x 16mm on each side, the 88E1121R is the smallest dual-port Gigabit Ethernet PHY on the market.



Example Application: IP Phone



Example Application: DVR

## ▶ APPLICATIONS

The 88E1121R is ideal for IP phones and other applications requiring low power and a small footprint. In an IP phone, where board space is constrained, the integrated resistor scheme on the 88E1121R allows for shorter MDI traces and thus improved IEEE template performance. Other benefits of the integrated passives on the 88E1121R include: higher reliability with fewer components on the board, reduced board assembly time and cost, better ICT yield from the elimination of board soldering issues, and improved signal integrity and potential reduction in EMI with terminations located at the very end of the signal path.

Additional applications include DVRs, game consoles, NAS appliances, and workstation or desktop PCs. The 88E1121R is a drop-in replacement for the 88E1121 PHY and can be used to upgrade existing designs without the need to re-spin the board.

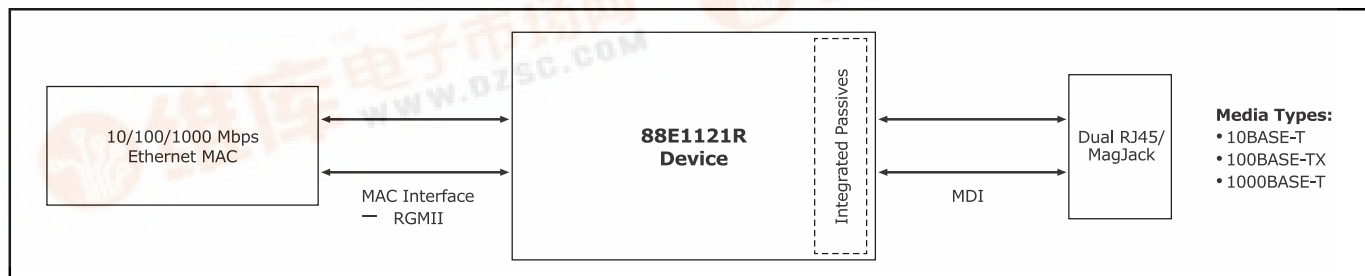


Fig 1. 88E1121R Application Diagram

SPECIAL FEATURES	BENEFITS
<ul style="list-style-type: none"> <li>• Supports RGMII interface</li> <li>• Four RGMII timing modes</li> <li>• Integrated MDI interface termination resistors and capacitors</li> <li>• Energy detect and energy detect+ low-power modes</li> <li>• Coma mode support</li> <li>• "Downshift" mode for two-pair cable installations</li> </ul>	<ul style="list-style-type: none"> <li>• Significantly reduces pin count on board design</li> <li>• Eliminates the need for on-board delay lines</li> <li>• Reduces board space and BOM cost, improves signal integrity, improves reliability resulting in overall system cost</li> <li>• Reduces power consumption and extends battery life</li> <li>• Flexible power-down functionality</li> <li>• Compatible with legacy cables/applications. Preserves the Ethernet link should the quality deteriorate in four-pair cables</li> </ul>
<ul style="list-style-type: none"> <li>• Automatic MDI/MDIX crossover at all speeds of operation</li> <li>• Automatic polarity correction</li> <li>• Line and system loopback modes and packet generator</li> <li>• IEEE 802.3u compliant Auto-Negotiation</li> <li>• Software programmable LED modes including LED testing</li> <li>• Supports IEEE 1149.1 JTAG</li> <li>• MDC/MDIO management interface</li> <li>• Advanced Marvell Virtual Cable Tester (advanced Marvell VCT™)</li> </ul>	<ul style="list-style-type: none"> <li>• Eases installation and reduces costs by working with both straight and cross-over cables</li> <li>• Compensates for wiring problems</li> <li>• Enables testing and debugging in stand-alone mode</li> <li>• Automatically configures to 10, 100, or 1000 Mbps operation</li> <li>• Allows for a user-defined LED configuration</li> <li>• Simplifies board level testing/debugging</li> <li>• Provides flexible management options</li> <li>• Identifies and isolates cable faults</li> </ul>

**BLOCK DIAGRAM**

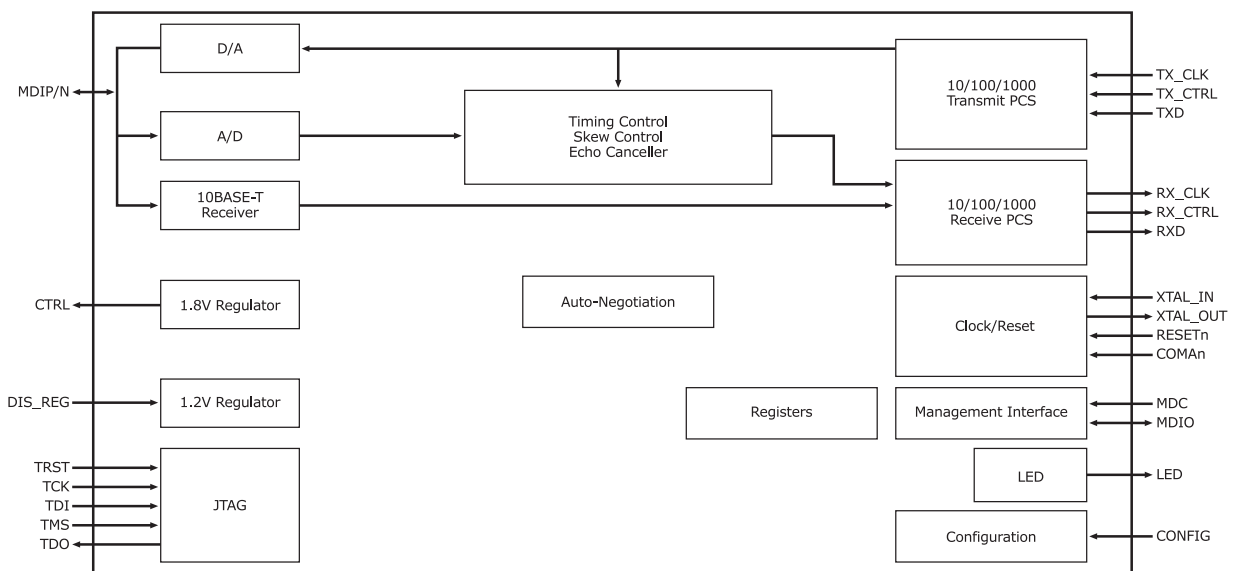


Fig 2. 88E1121R Functional Block Diagram of Single Port

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