RTL8111DP

Integrated Gigabit Ethernet Controller for PCI Express

General Description

This product is covered by one or more of the following patents:
US5,307,459, US5,434,872, US5,732,094, US6,570,884, US6,115,776, and US6,327,625.

The Realtek RTL8111DP-GR Gigabit Ethernet controller combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, PCI Express bus controller, and embedded memory. With state-of-the-art DSP technology and mixed-mode signal technology, the RTL8111DP offers high-speed transmission over CAT 5 UTP cable or CAT 3 UTP (10Mbps only) cable. Functions such as Crossover Detection and Auto-Correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented to provide robust transmission and reception capability at high speeds.

The RTL8111DP is compliant with the IEEE 802.3u specification for 10/100Mbps Ethernet and the IEEE 802.3ab specification for 1000Mbps Ethernet. It also supports an auxiliary power auto-detect function, and will auto-configure related bits of the PCI power management registers in PCI configuration space.

Advanced Configuration Power management Interface (ACPI)—power management for modern operating systems that are capable of Operating System-directed Power Management (OSPM)—is supported to achieve the most efficient power management possible. PCI MSI (Message Signaled Interrupt) and MSI-X are also supported.

In addition to the ACPI feature, remote wake-up (including AMD Magic Packet™ and Microsoft® Wake-up frame) is supported in both ACPI and APM (Advanced Power Management) environments. To support WOL from a deep power down state (e.g., D3cold, i.e., main power is off and only auxiliary exists), the auxiliary power source must be able to provide the needed power for the RTL8111DP.

The RTL8111DP is fully compliant with Microsoft® NDIS5, NDIS6 (IPv4, IPv6, TCP, UDP) Checksum and Segmentation Task-offload (Large send and Giant send) features, and supports IEEE 802 IP Layer 2 priority encoding and IEEE 802.1Q Virtual bridged Local Area Network (VLAN). The above features contribute to lowering CPU utilization, especially benefiting performance when in operation on a network server.

The RTL8111DP supports four Receive Side Scaling (RSS) queues to hash incoming TCP connections and load-balance received data processing across multiple CPUs. RSS improves the number of transactions/connections per second, for increased network throughput.

Alert Specification Format (ASF 2.0) is also supported to provide system manageability in OS-absent environments. The ASF defines remote control and alerting interfaces that serve managed PCs in OS-absent states. With the ASF capability, we are able to minimize on-site I/T maintenance, to improve system availability, and also to control power management remotely.

The Desktop and mobile Architecture for System Hardware (DASH) Initiative is a suite of specifications that takes full advantage of the DMTF's Web Services for Management (WS-Management) specification – delivering standards-based Web services management for desktop and mobile client systems. Through the DASH Initiative, the RTL8111DP provides the next generation of standards for secure out-of-band and remote management of desktop and mobile systems.

The RTL8111DP supports Internet Protocol security (IPSEC). The IPSec protocol suite is based on powerful encryption technologies, and adds security services to the IP layer that are compatible with both IPv4 and IPv6. With IPSec, users can create a secure VPN on demand.

The RTL8111DP also features inter-connect PCI Express technology. PCI Express is a high-bandwidth, low-pin-count, serial, interconnect technology that offers significant improvements in performance over conventional PCI and also maintains software compatibility with existing PCI infrastructure. The device embeds an adaptive equalizer in the PCI-E PHY for ease of system integration and excellent link quality. The equalizer enables the length of the PCB traces to reach 40 inches.

The RTL8111DP is suitable for multiple market segments and emerging applications, such as desktop, mobile, workstation, server, communications platforms, and embedded applications.

Features

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI Express 1.1
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-Correction
- Wake-On-LAN and remote wake-up support
- Microsoft® NDIS5, NDIS6 Checksum Offload (IPv4, IPv6, TCP, UDP) and Segmentation Task-offload (Large send and Giant send) support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IP Security Offload
- Supports IEEE 802.1P Layer 2 Priority Encoding
- Supports IEEE 802.1Q VLAN tagging
- Embedded OTP memory can replace an external EEPROM
- Serial EEPROM
- Transmit/Receive on-chip buffer support
- Supports power down/link down power saving
- Built-in switching regulator
- Supports PCI MSI (Message Signaled Interrupt) and MSI-X
- Supports Alert Specification Format 2.0 (ASF2.0)
- Supports Desktop and mobile Architecture for System Hardware (DASH)
- Supports Receive-Side Scaling (RSS)
- 64-pin QFN package (Green package)
- Embeds an adaptive equalizer in PCI Express PHY (PCB traces can reach up to 40 inches)
- Supports Four Customizable LEDs

Applications

- PCI Express Gigabit Ethernet on Motherboard, Notebook, or Embedded system