



Intel® 82541EI Gigabit Ethernet Controller

High-performance, power-optimized Gigabit connection for PCI-based designs

The Intelligent Way to Connect

- System health monitoring and authenticated remote power control with ASF 2.0
- Design flexibility with Intel® SingleDriver™ technology and footprint compatibility with Intel® PRO 10/100 and 10/100/1000 Connections
- Enhanced power management for reduced power usage

The Intel® 82541EI Gigabit Ethernet Controller provides optimized Gigabit networking for PCI designs. This highly efficient controller, with enhanced power management, consumes less than 1.0W of power at Gigabit speeds. When no signal is detected on the wire, the controller reduces power consumption by switching to 100 or 10 and powering down the physical-layer circuitry (PHY). When a signal is detected, the controller automatically negotiates the connection to Gigabit, if available.

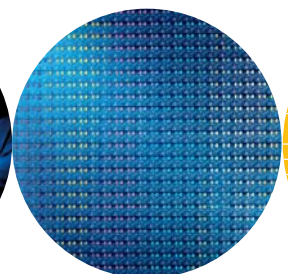
The Intel 82541EI Gigabit Ethernet Controller enhances secure manageability and system health monitoring over the LAN with support for IPMI 1.5, ASF 2.0 and Advanced Pass Through. For IPMI designs, the on-board SMBus port can pass management traffic through the controller to a management device, such as a Baseboard Management Controller (BMC). Alternatively, ASF 2.0 provides manageability without



the cost burden of external hardware via standardized interfaces. ASF 2.0 circuitry provides advanced system health and security alerting plus authenticated remote power control capabilities.

The Intel 82541EI combines Intel's fifth-generation Gigabit MAC design with fully integrated PHY to provide a standard IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX and 10BASE-T applications. In addition, the controller provides a direct Peripheral Component (PCI) Interconnect designed to be compliant with the PCI 2.3 bus up to 66MHz. Packaged in a 15x15mm PBGA, the Intel 82541EI Gigabit Ethernet Controller is footprint-compatible with the Intel® 82551QM Fast Ethernet Controller and Intel® 82562EX and 82562EZ devices. Footprint-compatibility, plus Intel SingleDriver technology allow for a flexible Gigabit Ethernet or Fast Ethernet implementation on the same motherboard layout.

Intel in
Communications



Features

Benefits

| PCI Bus Features | |
|--|---|
| PCI revision 2.3, 32-bit, 33/66MHz | ▪ Application flexibility in LOM or embedded use |
| CLKRUN# Signal | ▪ PCI clock suspension for low-power mobile design |
| Gigabit MAC/PHY Advanced Features | |
| 64KB configurable RX and TX packet FIFO | ▪ FIFO size tunable to the application |
| IEEE 802.3x-compliant flow-control support with software-controllable thresholds | ▪ Reduced frame loss due to receive FIFO overrun |
| Programmable host memory receive buffers (256B to 16KB) | ▪ Efficient usage of system resources |
| IEEE 802.3ab Auto-Negotiation | ▪ Automatic link configuration including speed, duplex, and flow control |
| State-of-the-art DSP/analog architecture | ▪ Implements digital adaptive equalization, echo, cross-talk and baseline wander cancellation |
| IPHY detects polarity, 2 pair vs. 4 pair cables | ▪ Easier network installation and maintenance |
| Host Offloading Features | |
| Transmit TCP segmentation IP, TCP, and UDP checksum off-loading on RX and TX | ▪ Increased throughput and lower CPU utilization. Compatible with large send offload feature found in Windows® 2000 and Windows® XP |
| IEEE 802.1Q VLAN support with VLAN tag insertion and stripping and packet filtering for up to 4096 VLAN tags | ▪ Enables IT staff to easily create multiple virtual LAN segments |
| Jumbo frame support up to 16KB | ▪ High throughput for large data transfers on networks supporting jumbo frames |
| Interrupt moderation controls | ▪ Reduces the number of interrupts generated by receive and transmit operations |
| Manageability Features | |
| On-chip SMBus 2.0 port | ▪ Enables IPMI and ASF implementations |
| ASF 1.0 and 2.0 | ▪ Provides advanced alerting and remote-control capabilities with industry-standard interfaces |
| Compliance with PCI Power Management v1.1/ACPI v2.0 | ▪ PCI power management capability requirements for PC and embedded applications |
| Wake on LAN* (WoL) support | ▪ Packet recognition and wakeup for network adapter and LOM applications without software configuration |
| Automatic link speed switching from 1000Mb/s down to 10 or 100Mb/s in standby | ▪ Low power in standby states ▪ Supports power-down states without software assistance |
| Smart Power Down mode when no signal is detected on the wire | ▪ Enables very low-power mobile or battery-powered implementations |
| Power Save mode switches link speed from 1000Mb/s down to 10 or 100Mb/s when on battery power | ▪ Manages power consumption based on power source ▪ Longer battery life for battery-powered implementations |
| Additional Device Features | |
| Four programmable LED outputs | ▪ Customizable indications for link speed, activity, duplex, collisions, and port ID on each port |
| On-chip power regulator control circuitry | ▪ Simplified low-cost power supply design |
| BIOS LAN Disable Pin | ▪ Enables low-power LAN disable for LOM applications |

Characteristics

| Electrical | |
|---|---|
| PCI Signaling | ▪ 3.3V and 5V |
| Typical targeted power dissipation | ▪ 1.0W at D0 1000Mbps ▪ 100 mW at D3 100Mbps ▪ 50 mW at D3 wake up disabled |
| Environmental | |
| Operating temperature | ▪ 0°C to 70°C (maximum); Does not require a heat sink or forced airflow. |
| Storage temperature | ▪ -65°C to 140°C |
| Physical | |
| Package | ▪ 196-pin PBGA, 1mm ball pitch, 15 X 15mm (Simplifies LOM board designs). |
| Footprint-compatible with Intel® 82540EM and 82540EP Gigabit Ethernet Controller | ▪ Enables easy migration |
| Footprint-compatible with Intel® 82551QM, 82562EZ and 82562EX Fast Ethernet Controllers | ▪ Enables a Gigabit Ethernet or 10/100 LOM implementation on the same board. |

Order Code

▪ GD82541EI

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