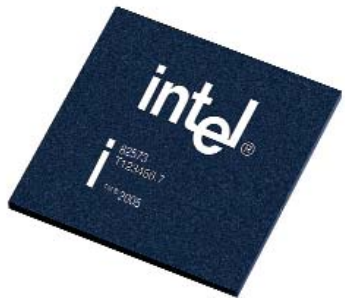
Intel® 82573E/V/L Gigabit Ethernet Controllers

High-performance Gigabit Network Connectivity with Intel® Active Management Technology

- High-performing, PCI Express*-based 10/100/1000 Ethernet connection
- Supports Intel® Active Management Technology[Δ] (Intel® AMT) to help IT discover, heal, and protect their computing assets (Intel® 82573E Gigabit Ethernet Controller)
- Simple installation and maintenance with Intel® SingleDriver™ technology
- Single-component design for compact LAN on motherboard (LOM) implementation with reduced bill of materials (BOM)
- Available with Intel® lead-free[1] technology



The Intel® 82573E/V/L Gigabit Ethernet Controllers are compact single-port integrated 10/100/1000 Mbps copper network-connection components for desktop, workstation, and value-server designs with critical space constraints. The 82573E supports Intel AMT, which allows IT to remotely discover, heal, and protect their computing assets. The 82573V supports ASF 2.0 and Advanced Pass Through modes for legacy manageability applications. The 82573L offers lower power consumption for non-managed platforms.

- **Intel Active Management Technology:** The Intel 82573E controller is a key platform ingredient for enabling Intel AMT by providing always-available network connectivity and an integrated management engine. Intel AMT allows IT to discover, heal, and protect all the computing assets on their corporate network. With Intel AMT, IT managers can discover all their hardware and software computing assets. Because asset information is stored in non-volatile memory, IT can read it even if the PC is off or the operating system (OS) is inoperable. IT managers can heal systems remotely through Intel AMT's out-of-band management capabilities, which allow remote diagnosis and repair of PCs after software, OS, or hardware failures. Intel AMT stores software and virus-protection version information that is consistent and up-to-date across the enterprise, helping protect systems against malicious software attacks. The 82573E is recommended for use on the Intel® Professional Business Platform based on the Intel® 945 Express Chipset family, which supports Intel AMT.
- **Small-footprint Gigabit Ethernet implementation with integrated PCI Express (PCIe*) support:** All three controllers allow original equipment manufacturers (OEMs) to implement Gigabit Ethernet on their platforms in a compact board area with reduced BOM. Each has fully integrated Gigabit Ethernet Media Access Control (MAC) and Physical-Layer (PHY) functions, and each provides a standard IEEE 802.3* Ethernet interface for 1000BASE-T, 100BASE-TX, and 10BASE-T applications. The controller's host bus utilizes the PCIe architecture (Revision 1.0a) designed for high-performance and low-memory latency. The Intel 82573E/V/L

Intel® PRO Network Connections

controllers offer reduced system BOM opportunities by providing integrated voltage regulators and the ability to share the system BIOS Flash instead of requiring a separate EEPROM for local area network (LAN) configuration data.

- **Performance-enhancing features:** Each of the Intel 82573E/V/L controllers includes advanced interrupt-handling features and uses efficient ring-buffer descriptor data structures with on-chip caching for up to 64 packet descriptors per queue. Other performance-enhancing features include offloading tasks from the host via Transmission Control Protocol/User Datagram Protocol/Internet Protocol (TCP/UDP/IP) checksum calculations and TCP segmentation.
- **Simplified installation and maintenance with Intel® SingleDriver™ technology:** These controllers are supported by Intel SingleDriver technology, which allows one driver to work for all Intel® PRO/1000 Gigabit Ethernet connections. Intel SingleDriver technology simplifies network connection installation, management, and maintenance.
- **Available with lead-free[1] technology:** These Intel® controllers are packaged in a lead-free, 15x15 mm, 196-ball grid array for space-saving installation. Built on Intel lead-free technology, these controllers conform to the European Union's Restrictions on the use of Hazardous Substances (RoHS)[2] and Japan's White Goods Recycling Act.

Controller Overview

Controller	Distinguishing Feature	Order Code
82573E	Intel® AMT[Δ]	RC82573E
82573E	Lead-free[1] and Intel AMT	PC82573E
82573V	ASF 2.0 and APT	RC82573V
82573V	Lead-free, ASF 2.0, and APT	PC82573V
82573L	Low power	RC82573L
82573L	Lead-free and low power	PC82573L

Specifications: Intel® 82573E/V/L Gigabit Ethernet Controllers

Electrical	
Power supply	• 3.3 V, 2.5 V, 1.2 V
Typical targeted power dissipation (82573E and 82573V only)	• 1370 mW at 1000 Mbps active • 535 mW at 100 Mbps active • 592 mW at 10 Mbps active • 177 mW at no link and no wake
Typical targeted power dissipation (82573L only)	• 1217 mW at 1000 Mbps active • 483 mW at 100 Mbps active • 504 mW at 10 Mbps active • 53 mW at no link and no wake

Packaging	
Operating temperature	• 0° C to 70° C (maximum); simplified thermal design
Storage temperature	• -40° C to 125° C
Package type	• Lead-free[1] 196-pin TF-BGA, 1.0 mm ball pitch, 15x15 mm (simplifies LOM board designs)

Features	Benefits
PCI Express* Features	
X1 PCIe* interface on Intel® I/O Controller Hub 7 (ICH7) or Memory Control Hub (Intel® 945/955 chipset) devices	• Bus sharing not required • Low-latency path to memory
2 Gbps peak bandwidth per direction	• Supports Gigabit Ethernet at wire speed
PCI Express Rev 1.0a specification	• Standards interoperability • Provides PCIe power-management capabilities for PC and embedded applications
High bandwidth density per pin	• Less-congested board routing
Gigabit MAC/PHY Advanced Features	
Wide, pipelined internal data path architecture	• Low-latency data handling • Superior direct memory access (DMA) transfer rate performance
Optimized transmit (Tx) and receive (Rx) queues	• Network packet handling without waiting or buffer overflow
32 KB configurable Rx and Tx first-in/first-out (FIFO)	• FIFO size adjustable to application
IEEE 802.3x*-compliant flow-control support with software controllable pause times and threshold values	• Reduce frame loss from Rx FIFO overruns • Hardware or software control over Tx of pause frames
Programmable host memory Rx buffers (256 B-16 KB)	• Efficient use of system memory and PCIe bus
Descriptor ring management hardware for Tx and Rx	• Simple software programming model
Mechanism for reducing interrupts from Tx/Rx operations	• Maximizes system performance and throughput
Integrated PHY for 10/100/1000 Mbps (full- and half-duplex)	• Smaller footprint, lower power dissipation compared to multichip MAC and PHY solutions
IEEE 802.3ab* auto-negotiation support	• Automatic link configuration for speed, duplex, flow control
IEEE 802.3ab PHY compliance and compatibility	• Robust operation over installed base of Category-5 twisted-pair cabling
Host Offloading Features	
Tx/Rx IP, TCP, and UDP checksum offloading	• Lower CPU utilization
Tx TCP segmentation	• Increased throughput and lower CPU utilization • Compatible with large send offload (in Microsoft Windows* 2000)
IPv6 offloading	• Checksum and segmentation capability extended to new standard packet type
Advanced packet filtering	• 16 exact-matched packets (unicast or multicast) • 4096-bit hash filter for multicast frames • Promiscuous (unicast and multicast) transfer mode support • Optional filtering of invalid frames
IEEE 802.1q* Virtual Local Area Network (VLAN) support with VLAN tag insertion, stripping, and packet filtering for up to 4096 VLAN tags	• Ability to create multiple VLAN segments
Descriptor ring management hardware for Tx and Rx	• Optimized fetch and write-back mechanisms for efficient system memory and PCIe bandwidth usage
Manageability Features	
Intel® Active Management Technology[^] (82573E only)	• Out of Band (OOB) access allows remote management of PCs regardless of system power or OS state • Remote troubleshooting and recovery significantly reduces desk-side visits and increases IT efficiency • Proactive alerting and event logging decreases downtime and minimizes time to repair • Third-party non-volatile storage prevents users from removing critical inventory, remote control, or virus protection agents • Remote HW and SW asset tracking eliminates time-consuming manual inventory tracking an reduces asset accounting costs
Intel® SingleDriver™ technology	• One driver supports all Intel® PRO/1000 connections, simplifying installation and maintenance
Alerting Standards Format 2.0 (82573V only)	• Standard alerting capability to notify IT of system events
Advanced Pass Through (82573V only)	• Filtering and redirection for external server Board Management Controller (BMC) data
Boot ROM Preboot eXecution Environment (PXE) Flash interface support	• Support for PXE ROMs integrated into the system BIOS
SDG 3.0, WfM 3.0 and PC2001 compliant	• Remote network management through Desktop Management Interface (DMI) 2.0 and SNMP
Wake on LAN support	• Packet recognition and wake-up for LOM applications without software configuration
Additional Device Features Features	
Three LED outputs	• Provides the ability to display the various link, speed, and activity states of the LAN
Programmable LED functionality	• Software definable function (speed, link, activity) and blinking allow flexible LED signaling implementations
Internal phase-locked loop (PLL) for clock generation can use 25-MHz crystal	• Lower component count and reduced system cost
JTAG (IEEE 1149.1*) Test Access Port built in silicon	• Simplified testing using boundary scan
On-chip power control circuitry	• Reduced number of on-board power supply regulators • Simplified power supply design for less power-critical applications
Loop-back capabilities	• Allows OEMs to quickly check silicon integrity on their manufacturing line
SPI Flash or EEPROM support	• Flexibility for external EEPROM or SPI Flash device to store LAN configuration data. SPI Flash may be shared with system BIOS for reduced BOM cost.
Optional on-die voltage regulator	• Flexibility for an internal 2.5 V regulator for reduced BOM cost

For more information, contact your Intel sales representative.

[1]Lead has not been intentionally added, but lead may still exist as an impurity below 1000 ppm.

[2]Lead and other materials banned in the RoHS Directive are either (1) below all applicable substance thresholds as proposed by the EU or (2) an approved/pending exemption applies.

[4]Intel® Active Management Technology requires a system with an Intel® 945G Express Chipset, Intel® PRO/1000 PM network connection, and appropriate third-party software.

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