82551QM Fast Ethernet Multifunction PCI/CardBus Controller

Product Brief

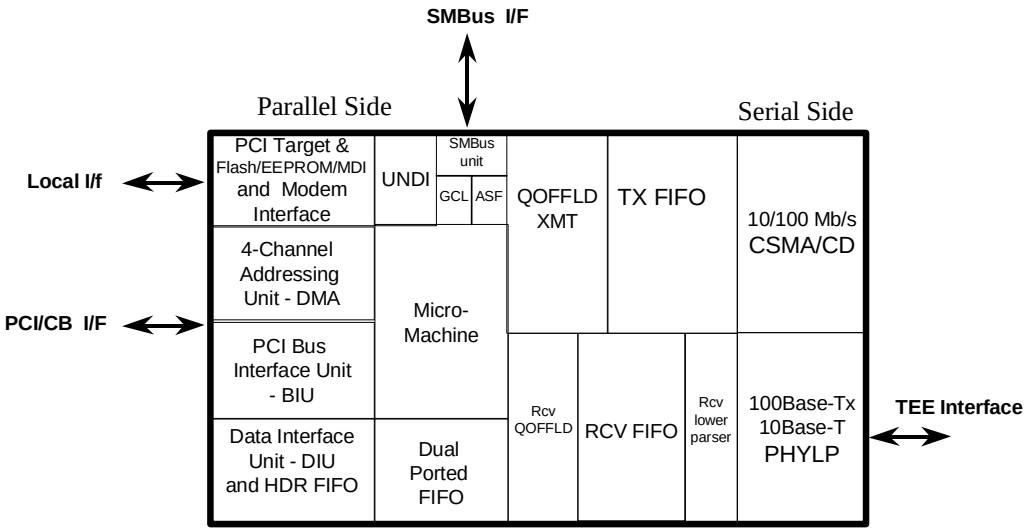
Product Description

The Intel® 82551QM Fast Ethernet Multifunction PCI/Cardbus Controller is an evolutionary addition to Intel's family of 8255x controllers. It provides excellent performance by offloading TCP, UDP and IP checksums and supports TCP segmentation offload for operations such as Large Send.

Its optimized 32-bit interface and efficient scatter-gather bus mastering capabilities enable the 82551QM to perform high-speed data transfers over the PCI bus or CardBus. This capability accelerates the processing of high level commands and operations, lowering CPU utilization. Its architecture enables efficient data flow from the bus interface unit to the 3 Kbyte transmit and receive FIFOs, providing the perfect balance between the wire and system bus. In addition, multiple priority queues are provided to augment Quality of Service (QoS) performance.

The 82551QM also integrates advanced manageability features into one component. It includes support for Alert on LAN* 2 and the Alerting Standards Format (ASF) bi-directional alerting and provides a Total Cost of Ownership (TCO) interface that can be used with bus management controllers. Both legacy and ASF sensor polling are supported, as well as remote control capabilities. The 82551QM embeds the Universal NIC Driver Interface (UNDI) code, allowing it to support Preboot eXecutable Environment (PXE) without the use of additional external ROM.

The 82551QM is pin compatible with the Intel 82550® and Intel® 82559 Fast Ethernet controllers and layout compatible with Intel® 82540 Gigabit Ethernet controller.



Applications

The 82551QM is designed for use in the following applications:

- LAN on Motherboard (LOM) implementations
- Network Interface Card (NIC) adapters
- Embedded applications
- Networking systems

Product Features

- **82551QM Enhancements**
  - Improved Bit Error Rate performance
  - Footprint compatible with the 82540 Gigabit Ethernet controller
  - Reduced power consumption in deep power-down state
- **Optimum integration for lowest cost solution**
  - Integrated IEEE 802.3 10BASE-T and 100BASE-TX compatible PHY
  - 32-bit PCI/CardBus master interface
  - Modem interface for combination solutions
  - Integrated power management functions
  - UNDI ROM integration
  - Thin BGA 15 mm^2 package
- **Wired for Management and reduced Total Cost of Ownership**
  - Wired for Management support
  - Integrated Alert on LAN 2 support
  - Advanced Configuration and Power Interface and PCI power management specifications compliance
  - Wake on “interesting” packets and link status change support
  - Magic Packet* support
  - Remote power-up support
- **Quality of Service (QoS)**
  - Multiple priority transmit queues
- **Enhanced IP support**
  - TCP, UDP, IPv4 checksum offload
  - Received checksum verification
- **High-performance networking functions**
  - Early release
  - Chained memory structure similar to the 82550, 82559, 82558, and 82557
  - Improved dynamic transmit chaining with multiple priorities transmit queues
  - Backward compatible software to the 82550, 82559, 82558 and 82557
  - Full duplex support at both 10 and 100 Mbps operation
  - IEEE 802.3u Auto-Negotiation support
  - 3 Kbyte transmit and 3 Kbyte receive FIFOs
  - Fast back-to-back transmission support with minimum interframe spacing
  - IEEE 802.3x 100BASE-TX Flow Control support
  - Adaptive Technology
- **Low power features**
  - Advanced Power Management (APM) capabilities
  - Low power +3.3 V device
  - Efficient dynamic standby mode
  - Deep power down support
  - Clockrun protocol support

Feature Matrix

Features	Benefits	82551	82550	82559
ASF 1.0 support	• Supports standards based alerting functionality	X		
Footprint compatible with the Intel® 82540 Gigabit Ethernet controller	• Enables single board design accommodating either 1000 Mbps or 10/100 Mbps Ethernet	X		
Reduced D3 power consumption	• Improves battery life in mobile applications	X		
Integrated IPSec encryption offload performance	• Improves encryption/decryption response times • Has a target of 135 Mbps throughput		X	
Integrated IPSec encryption engine	• Provides increased encryption performance versus software encryption only • Eliminates need for a separate crypto component		X	
Integrated Alert on LAN 2 support	• Increases Alert on LAN functionality • Eliminates need for a separate Alert on LAN 2 device	X	X	
Integrated UNDI ROM support	• Minimizes requirement for external ROM	X	X	
MDI/MDI-X and Hardware Integrity (HWI) alerting	• Indicates cabling problems which may impact link performance	X	X	
Combination 10/100 Mbps Fast Ethernet controller and physical layer interface with glueless 32-bit PCI bus master interface	• Provides low-cost network connectivity for LOM or PCI adapters • Reduces board space requirements and external support circuitry	X	X	X
• Wired for Management (WfM) and Net PC Specifications compliant • Advanced Configuration and Power Interface (ACPI) Specifications compliant • Magic Packet filtering for Wake on LAN • ARP and flexible frame filtering	• Enables PCs to be remotely managed for lower total cost of ownership • Complies with standards for LOM or NIC designs for next generation Fast Ethernet connected systems • Provides various power down states and the ability to “wake-up” on a unique packet addressed to the system • Permits development of virtually connected systems that will exit from a low power state upon receipt of directed packets • Allows virtually connected IPv6, IPv4, Windows* NT*, or next generation systems	X	X	X
Backwards compatible software drivers	• Allows systems developed with the 82550 or 82559 to use the same device drivers • Supports robust, well tested, high-performance drivers	X	X	X
Improved dynamic transmit chaining	• Enhances performance	X	X	X
Enhanced power management	• Minimizes power requirements	X	X	X
Thin BGA 15 mm2 package	• Minimizes board spacing requirements	X	X	X
Low power 3.3 V device	• Improves battery life for mobile platforms	X	X	X

Characteristics

Electrical	
Power Supply	3.3 V ± 5%
Environmental	
Operating temperature	0 C to 85 C (maximum)
Storage temperature	-65 C to 140 C
Physical	
Package	196-pin BGA