Multi-port TOE chip

low power, up to 6 Gbps Ethernet ports, or 2 x 10Gbps, 2M TCP sessions, optional external memory, PCI-X interface

LeWiz's TCP/IP Offload Engine (TOE) chip (LE2028™) is designed to off-load TCP/IP processing from the host processor(s). It solves bottlenecks in high-performance networked systems such as servers, storage, and networked appliances where multiple ports, real-estate, and heat dissipation are at a premium. The LE2028™ connects directly to network interface devices such as Gbps and dual MACs, 10Gbps MACs, and supports up to 6 Gbps ethernet ports. The LE2028™ accelerates the TCP/IP processing at lightning speed thus reducing network latency and overhead in network attached systems. It has the capability of handling a load of 256K concurrent connections without external memory. The optional addition of external SDRAM allows up to 2 million concurrent connections.

TCP/IP is the protocol used to communicate server to server, server to PC, server to storage, server to network appliance, and the list of applications continues to expand. Unfortunately, TCP/IP places a very heavy burden on host CPUs. At ethernet speeds of 10/100, most CPUs can handle the TCP/IP processing overhead. It is a standard rule of thumb that a CPU of 1 KHz is required to process TCP/IP overhead associated with transferring data at 1 Kbit/sec. With the advent of Gbps ethernet, server CPUs have begun to choke while processing the TCP/IP overhead associated with transferring data. Since every ethernet port is bi-directional that means that each port consumes 1Gbps in and 1Gbps out. The host processor handling five ports has to run at 10GHz just to process the TCP/IP protocol. If the host processor were capable of running at 10GHz, the application that is being used, comes to a complete stop. The obvious solution is a TOE like the multi-port LE2028™. This chip offloads the TCP/IP processing from the host CPUs, freeing up valuable CPU cycles for application processing while maintaining the programmability, configurability, and flexibility via the host interface. It also supports fail-over protection/alternate pathing and load balancing/trunking capabilities required in high-performance server and storage systems. The result is faster servers, an accelerated network, and superior application performance, saving cost and improve reliability for the enterprise network. The LE2028™ is ideal for network intensive environments such as servers, file serving, network attached storage (NAS), high performance technical computing, high-end backup and restore, IP storage, video serving, and security appliances.

Using LeWiz's advanced layer-processing architecture, the LE2028™ chip offers the highest performance, lowest power, smallest footprint, and most cost effective way of addressing the performance bottlenecks found in many IP network attached equipment.

Benefits

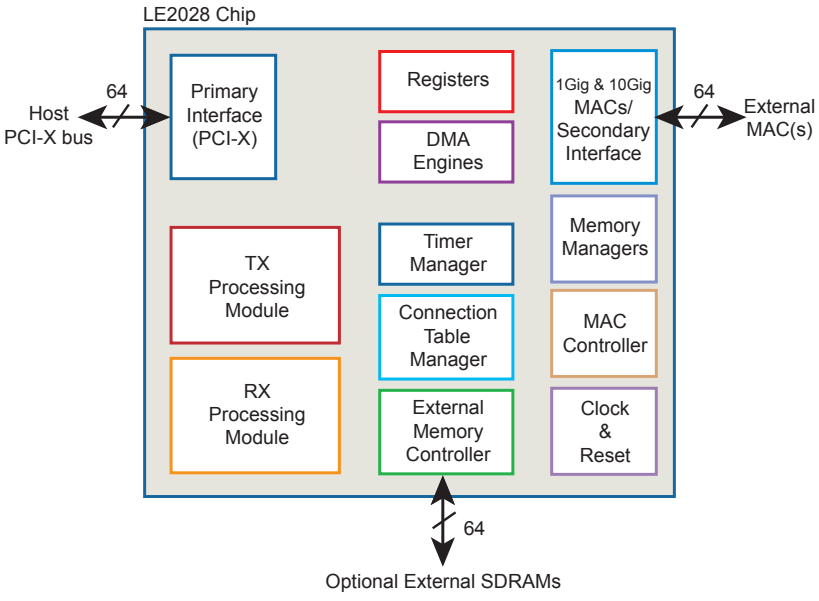
- Low power, NO heatsinks
- Lowers overall network cost
  - Up to 6 bi-directional
  - Up to 2 x 10Gbps
  - Increase throughput and load handling for systems
  - Delay new purchase of hardware and software
  - Reduced heat, better reliability, less downtime
- Enhances and balances system performance
  - 2M concurrent connections
  - 10Gbps speed
  - Allows processor to run applications efficiently
- Optimizes the network efficiency
  - Achieve wire speed, full duplex
- Enhances system security
- Reduce network maintenance and service cost
- Non-intrusive to system Hardware and Software
- Scalable from 1Gbps to 10Gbps without any software changes

Features

- Performs TCP/IP functions in hardware, not software, for lowest latency and overhead
- Line rate performance at multi Gbps speeds
- Multi-ports and capable of maintaining millions of concurrent TCP sessions
- Requires minimal host CPU performance while utilizing minimum power
- Includes security protection
- Supports zero buffer copy mode
- Full TCP/IP Session termination for maximum host CPU off-load
- Supports RDMA, iSCSI
- Full debug/diagnostic capability
- Handle MACs directly without CPU intervention
- On chip DMA engine for high speed data movement and throughput
- Contains a PCI-X bridge on chip for interfacing to multi-port MACs & the host system bus
- Interfaces directly to many popular single and multiple Gigabit MACs
- Interfaces directly with optional external CPUs
- Compatible with off-the-shelf host bridge chips for optimum system performance
- Supports Linux, Windows, and Solaris

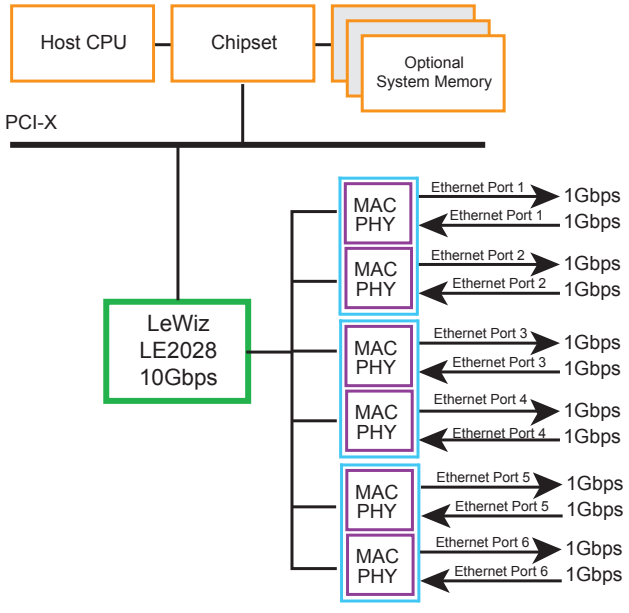
LE2028™

Product Specification



TCP/IP Offload Engine LE2028™

Applications



10Gbps Multi-Port TCP/IP Offload Engine

Product Functionality

- Compatible with PCI-X 1.0b and PCI 2.2 Standards
- 64-bit/133/100/66MHz, 3.3V PCI-X bus interface
- Compatible with IPv6 and IPv4
- 256K concurrent connections
- External SDRAMs extend up to 2M concurrent connections
- Concurrent operation on primary and secondary bus interfaces
- Concurrent transmit and receive operations across all ports
- Buffers optimized for fast packet & stream transfers
- On-chip phase lock loops for low external clock skew
- Full software support with device drivers, utilities and reference design

TCP/IP Features Supported

- Full TCP/IP offload
- Non-intrusive to existing TCP/IP stack
- Reassembly of incoming data
- Segmentation of outgoing data
- Sequence ordering - handling out of order segments
- Overlap elimination - handling duplicate segments
- Re-transmission, Flow control, etc.
- On-chip TCP/IP timer handling
- Connection set up and tear down
- Hardware checksum processing
- Window scaling, updating, and sizing

Ordering Part #: LE2028

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