LeWiz COMMUNICATIONS

LE2020™ multi-port chip:
low power, 2 Gbps Ethernet ports,
4 Gbps, 256K concurrent sessions,
PCI interface

LeWiz's TCP/IP Offload Engine chip (LE2020™) 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. This takes the main processor(s) out of the TCP/IP loop, so that it no longer performs the major TCP/IP tasks in software. This balanced approach allows the main processor to utilize most of its bandwidth to run applications. The LE2020™ connects directly to network interface devices such as MACs and supports 2 Gigabit Ethernet ports. The LE2020™ 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 up to 256 thousand 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 overhead associated with transferring data at 1 Kbit/sec. With the advent of gigabit 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. So the host processor handling two ports has to run at 4GHz just to process the TCP/IP protocol. When this happens, the application that is being used, comes to a complete stop. The obvious solution is a TCP/IP Offload Engine (TOE) like the LE2020™. 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 LE2020™ is ideal for network intensive environments such as file serving, network attached storage (NAS), high performance technical computing, high-end backup and restore, IP storage, and video serving.

Using LeWiz's advanced layer-processing architecture, the LE2020™ offers the highest performance, lowest power 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
  - 2 bi-directional ports (4Gbps)
  - Increases throughput and load on system
  - Delay new purchase of hardware and software
  - Reduced heat, better reliability, less downtime
• Enhances and balances system performance
  - 256K concurrent connections
  - 4Gbps speed
  - Allows processor to run applications efficiently
• Optimize the network efficiency
  - Achieve wire speed, full duplex
• Enhances system security
• Reduces network maintanence and service cost
• Non-intrusive to system hardware and software

Features

• Performs TCP/IP functions in hardware, not software, for lowest latency and overhead
• Line rate performance at multi Gigabit speeds scalable to 10Gbps
• Multi-ports and capable of maintaining millions of concurrent TCP sessions
• Requires minimal host CPU performance while utilizing minimum power with no heat sink
• 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
• Handles MACs directly without CPU intervention
• On chip DMA engine for high speed data movement and throughput
• Contains a 64-bit PCI bridge on chip for interfacing to multi-port MACs & the host system bus
• Interfaces directly to many popular Gigabit MACs
• Interfaces directly with external CPU (optional)
• Compatible with off-the-shelf host bridge chips for optimum system performance
• Fits in standard system buses – a drop-in for many systems
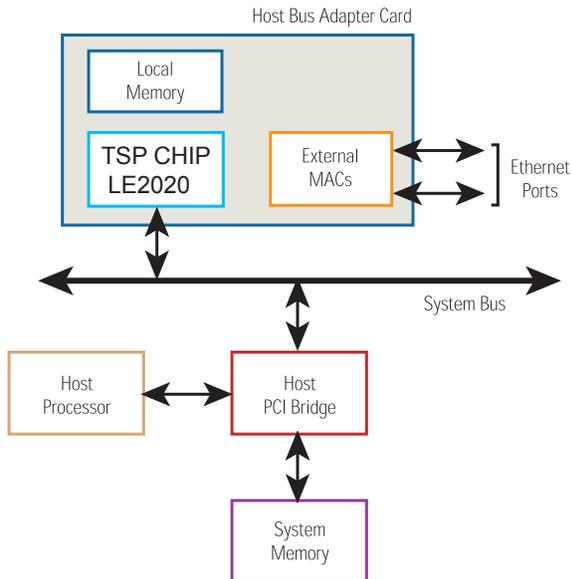• Supports Linux, Windows, and Solaris

LE2020™

Product Specification

TSP Chip
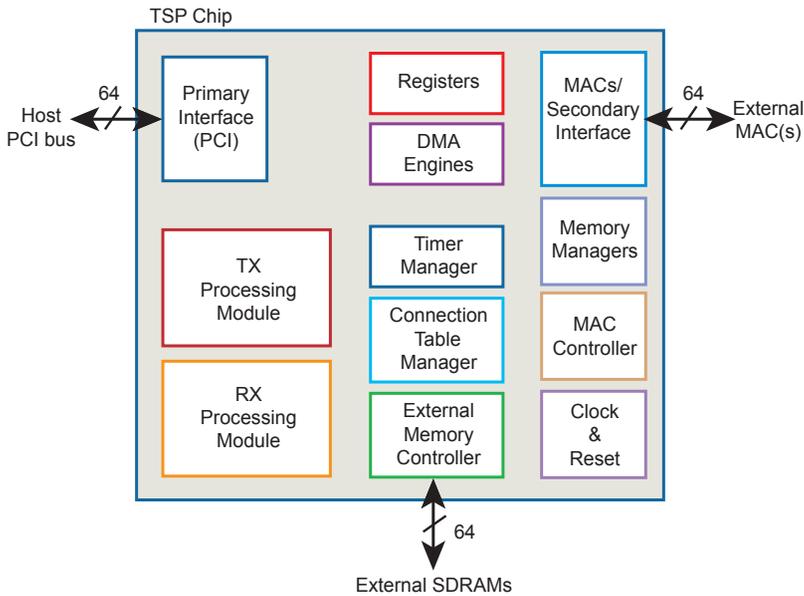
TCP/IP Offload Engine Chip LE2020™

Applications

**Dual Gigabit HBA Card with
LE2020™ TCP/IP Offload Engine**

Product Functionality

- Compatible with PCI 2.2 standard
- 64-bit, 66/33MHz, 3.3V PCI bus interface
- Low cost, low power external SDRAMs
- Concurrent operation on primary and secondary bus interfaces
- Concurrent transmit and receive operations
- 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.
- TCP timer handling
- Connection set up and tear down
- Hardware checksum processing
- Window scaling, updating, and sizing

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