Level One’s NetCelerator™ network accelerator chips integrate network interface functions with protocol level processing. The JT1001 is targeted for server and workstation applications. It is the first Ethernet network accelerator to offer 10/100/1000Mbps IEEE 802.3 operation and integrated TCP/IP and VLAN processing functions in a processor-less design.

GENERAL DESCRIPTION

Like all NetCelerator chips, JT1001’s highly optimized architecture implements host offloading, bus acceleration, and high-speed data transfer engines in a single chip. These features increase functionality, reduce OEMs’ time to market, and lower the overall cost of the network interface. Features include 10/100/1000Mbps Ethernet operation, large buffers, and optimized data transfer methods.

FEATURE DESCRIPTION

10/100/1000Mbps Ethernet Implementation for a Cost Effective Migration Path
• Full and half-duplex operation
  – Packet Burst in half-duplex; Symmetric/asymmetric full-duplex flow control
• Physical Layer Device (PHY) Interface
  – Gigabit Media Independent Interface (GMII) for 1000BASE-T
  – Media Independent Interface (MII) for 10/100BASE
  – Ten-Bit Interface (TBI) for 1000BASE-X fiber
• 96KB embedded FIFO
  – 32KB transmit (TX), 64KB receive (RX)
  – Eliminates need for external FIFO

Host Offloading via Chip-Level Internet Protocol (CLIP™) and Policy-Based Behavior
• IPv4 checksum calculation on chip
  – IP, TCP and UDP checksums supported
  – Packet filtering based on checksum errors
• 802.3ac and VLAN tag support
  – Programmable 16 entry table; Filtering based on recognized VLANs; VLAN tag stripping on receive; Global and/or per packet VLAN tag insertion on transmit

Optimized Bus Transfer Operation
• High-Speed PCI Interface
  – PCI 2.1 compliant
  – Efficient PCI master operation
  – 33MHz, 32/64 bit operation
  – 64 bit addressing
  – Supports dual address cycles
• Supports three I/O methods
  – Programmed I/O
  – Traditional scatter-gather “bus master” DMA
  – Propulsion™ technology - packet bursting across PCI bus increases the throughput for small packets
• Propulsion features
  – Packet bursting across PCI bus
  – Minimizes bus arbitrations
  – Eliminates logical to physical address translation
  – Scales to wider bus widths and faster clock rates
  – Minimizes interrupts by coalescing transfers across the PCI bus

Additional Performance Features
• Independent TX and RX engines
• Intelligent interrupt management
  – No interrupt on TX
  – Scheduled interrupts for data streaming
  – Programmable high/low watermark interrupts for RX and TX FIFOs

NetCelerator Architecture Block Diagram
Robust Drivers and Management
• Supporting software includes certified device drivers and end user diagnostics
  – Windows® NT 3.51, 4.0 and 5.0; Windows® 95 OSR2; Windows ® 98; NetWare™ 4.11 and 5.0
  – Support for the OnNow Initiative and PCI Power Management
    • Wake-on-LAN™, Magic Packet™
    • PCI PME Signal
  – Required elements of the 802.3 MIB

Additional NetCelerator Features
• EEPROM Interface
  – Single word read/writes or reads entire contents
  – Checksum after read, auto-detection
• Expansion ROM Interface
  – Supports ROM, EPROM, and flash memory
  – Internally supports up to 4K expansion ROM
  – Up to one megabyte can be supported using external logic
• Supports up to four individually programmable LEDs
• IEEE 1149.1a-1993 (JTAG) standard compliant boundary scan

Technology Features
• State machine design
• .35 micron process
• Plastic ball grid array (PBGA) package
• 3.3 volt/5 volt tolerant I/Os
• Targeted power consumption of less than 1.5W (typical)

Product Availability
• Samples available now
• Production volume available 4Q98

About Level One
Level One Communications (Nasdaq: LEVL) provides silicon connectivity, LAN switching and WAN access solutions for high-speed telecom and networking applications. Level One combines its strengths in analog and digital circuit design, with its communications systems expertise, to produce digital and mixed-signal solutions with increased functionality and greater reliability, resulting in lower total systems cost.

Example 1000Mbps Ethernet Board

For additional information call (512) 407-2100 or visit Level One’s website at www.level1.com
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