Silicom Ltd.
Connectivity Solutions

PEG2BPi6
Dual Port Copper Gigabit Ethernet PCI Express Bypass Server Adapter Intel® based

Description

Silicom's dual port copper Gigabit Ethernet Bypass server adapter is a PCI-Express X4 network interface card that contains two Gigabit Ethernet ports on a PCI-E adapter. The Silicom's dual port copper Gigabit Ethernet Bypass server adapter is targeted to inline network system that maintains network connectivity when system fails.

Silicom's dual port copper Gigabit Ethernet Bypass server adapter supports Normal, Bypass and Disconnect modes. In Normal mode, the ports are independent interfaces. In Bypass mode, all packets received from one port are transmitted to the adjacent port. In Disconnect mode, the adapter simulates switch / rout cable disconnection.

Silicom's dual port copper Gigabit Ethernet Bypass server adapter can Bypass or disconnect its Ethernet ports on a host system failure, power off, or upon software request.

In Bypass mode, the connections of the Ethernet ports are disconnected from the system and switched over to the other port to create a crossed connection loop-back between the Ethernet ports. Hence, in bypass mode all packets received from one port are transmitted to the adjacent port and vice versa. This feature enables to bypass a failed system and provides maximum up time for the network.

In Disconnect mode, the adapter simulates switch / router cable disconnection. In Disconnect mode, the switch / router does not detect link partner of the adapter.

Silicom's dual port copper Gigabit Ethernet Bypass server adapter includes an on board WDT (Watch Dog Timer) controller. The adapter's software drivers or software application can write commands to the on board WDT controller. The adapter's software drivers, WDT controller and the Bypass circuitry provide an interface that control and manage the mode of the adapter.

Silicom's dual port copper Gigabit Ethernet Bypass server adapter is based on Intel 82576 Dual port Gigabit Ethernet MAC+PHY of Intel Controller.

Key Features

Bypass /Disconnect:

- Bypass Ethernet ports on Power Fail, System Hangs or Software Application Hangs
- Disconnect ports on Power Fail, System Hangs or Software Application Hangs
- Software programmable Bypass or Normal or Disconnect Mode
- On Board Watch Dog Timer (WDT) Controller
- Software programmable time out interval
- Software Programmable WDT Enable / Disable counter
- Software programmable Bypass Capability Enable / Disable
- Software programmable Disconnect Capability Enable / Disable
- Programmable state (Bypass mode or Normal mode or Disconnect mode) at Power up
- Programmable state (Bypass or Normal mode) at Power off
- Emulates standard NIC

Performance Features:

- 16 Transmit and Receive queues per port
- Up to 16 queues of Receive Side Scaling (RSS) minimize CPU utilization across multiple processor systems
- Support for 8 pools of virtual machine Device Queues (VMDq) per port
- Support Direct Cache Access (DCA)
- Support Intel I/O AT 2.0
- TSO interleaving for reduced latency
- UDP TSO
- Minimized device I/O interrupts using MSI and MSI-X
- Offload of TCP / IP / UDP checksum calculation and TCP segmentation
- SCTP receive and transmit checksum offload
- Packet interrupt coalescing timers (packet timers) and absolute- delay interrupt timers for both transmit and receive operation

Copper Gigabit Ethernet 1000Base-T:

- Independently copper Gigabit Ethernet channels support six, four, two and one Gigabit Ethernet (1000Base-T), Fast Ethernet (100Base-Tx) and Ethernet (10Base-T)
- Triple speed 1000Mbps (1000Base-T), 100 Mbps (100Base-Tx) and 10 Mbps (100Base-T) operation
- Nway auto negotiation automatic sensing and switching between 1Gbps full duplex and 100 / 10 Mbps operations Simplex or Full Duplex
- RJ-45 female connectors

Common Key features:

- Host Interface PCI-Express 4X Lane (Version 1.1).
- High performance, reliability, and low power use in Intel 82576 dual integrated MAC + PHY and SERDES chip controller
- Ultra deep packet buffer per channel lowers CPU utilization
- Hardware acceleration that can offload tasks from the host processor. The controllers can offload TCP/UDP/IP checksum calculations and TCP segmentation
- Priority queuing – 802.1p layer 2 priority encoding
- Virtual LANs –802.1q VLAN tagging
- Jumbo Frame (9.5KB)
- 802.x flow control
- PCI-SIG SR IOV (8 VF)
- Multicast/ broadcast Packet replication
- Statistics for SNMP
- Supports Vital Product Data (VPD)
- Integrated LinkSec security engines
- Supports IEEE 1588
- LEDs indicators for link/Activity/Bypass/ Disconnect Mode status

Technical Specifications

Bypass Specification:	
WDT Interval (Software Programmable):	3,276,800 mSec (3,276.8 Sec): Maximum 100 mSec (0.1 Sec) : Minimum WDT Interval = (2^**wdt_interval_parameter)*(**0.1) sec. **wdt_interval_parameter**: { Valid Range: 0-15}
Copper Gigabit Ethernet Technical Specifications - (1000Base-T) Adapters:	
IEEE Standard / Network topology:	Gigabit Ethernet, 1000Base-T Fast Ethernet, 100Base-TX Ethernet, 10Base-T
Full duplex / Simplex:	Support both Simplex & Full duplex operation in all operating speeds
Auto negotiation:	Auto-negotiation between Full duplex and simplex operations and between 10Mb/s 100Mb/s speeds and duplex 1000Mb/s
Data Transfer Rate:	1000 Mbit/s, 100 Mbit/s and 10 Mbits/sec in simplex mode per port 2000Mbit/s 200 and 20 Mbit/s in full duplex mode per port
Cables and Operating distance:	10Base-T Category 3, 4, or 5 maximum 50m * 100Base-Tx Category 5 maximum 50m * 1000Base-T Category 5E maximum 50m * *Theoretical Distance – Defined as half a distance as stated by the IEEE 802.3 standard
Operating Systems Support	
Operating system support:	Windows Linux FreeBSD VMware
General Technical Specifications	
Interface Standard:	PCI-Express Base Specification Revision 1.1
Board Size:	PCI Short add in card: 167.64mm x 68.91mm 6.6”X 2.713”
PCI Express Card Type:	X4
PCI Express Voltage:	+3.3V +- 9%, +12V +- 8%
PCI Connector:	Gold Finger: X4
Controller: :	Intel 82576EB
Holder:	Metal Bracket: Full Height and low profile, detailed description Appendix B
Weight:	110 gram (3.527oz)
Power Consumption:	3.684W: 0.01A at 12V, 1.08A at 3.3V: Typical all ports operate at 1000Mbit/s. 1.803W, 0.01A at 12V, 0.51A at 3.3V: Typical all ports operate at 100Mbit/s. 1.77W, 0.01A at 12V, 0.5A at 3.3V: Typical all ports operate at 10Mbit/s. 1.242W, 0.01A at 12V, 0.34A at 3.3V: Typical No link at all ports 1.275W, 0.01A at 12V, 0.34A at 3.3V: Typical Bypass state at all ports 1.275W, 0.01A at 12V, 0.34A at 3.3V: Typical disconnect at all ports
Operating Temperature:	0℃ – 50℃ (32℉ - 122℉)

Storage:	-20℃–65℃ (-4℉–149℉)
EMC Certifications:	FCC Part 15, Subpart B Class B Conducted Emissions Radiated Emissions CE EN 55022: 1998 Class B: Amendment A1 2000, A2 2003 Conducted Emissions Radiated Emissions CE EN 55024: 1998 Amendment A1: 2001, Amendment A2: 2003 Immunity for ITE CE EN 61000-3-2 2000, Class A Harmonic Current Emissions CE EN 61000 3-3 1995, Amendment A1: 2001 Voltage Fluctuations and Flicker CE IEC 6100-4-2: 1995 ESD Air Discharge 8kV. Contact Discharge 4kV. CE IEC 6100-4-3:1995 Radiated Immunity (80-1000Mhz), 3V/m 80% A.M. by 1kHz CE IEC 6100-4-4:1995 EFT/B: Immunity to electrical fast transients 1kV Power Leads, 0.5Kv Signals Leads CE IEC 6100-4-5:1995 Immunity to conductive surges COM Mode; 2kV, Dif. Mode 1kV CE IEC 6100-4-6:1996 Conducted immunity (0.15-80 MHz) 3VRMS 80% A.M. By 1kHz CE IEC 6100-4-11:1994 Voltage Dips and Short Interruptions V reduc >95%, 30% >95% Duration 0.5per, 25per,250per
MTBF:	156 (Years) *According to Telcordia SR-332 Issue 1 Environmental condition – GB (Ground, Fixed, Controlled). Ambient temperature - 25℃. Temperature rise of 15℃ above the system ambient temperature was assumed for the cards components

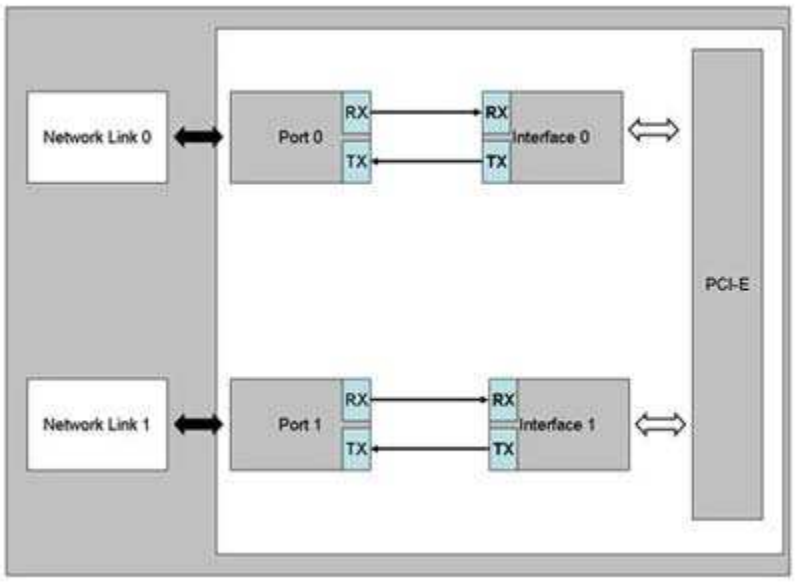
LEDs

LEDs:	(3) LEDs per port Link/Activity: Turns on any link speed, blinks on activity (green). 100: Turns on 100 Mbit/s link (green). 1000: Turn on 1000 Mbit/s link (green) Bypass: LED 1000 and LED 100 of port 0 are turn on.. Disconnect: LED 1000 and LED 100 of port 1 are turn on
LEDs location:	LEDs are located on the PCB, visible via holes in the metal bracket holder
Connectors:	(2) Shielded RJ-45

Functional Description

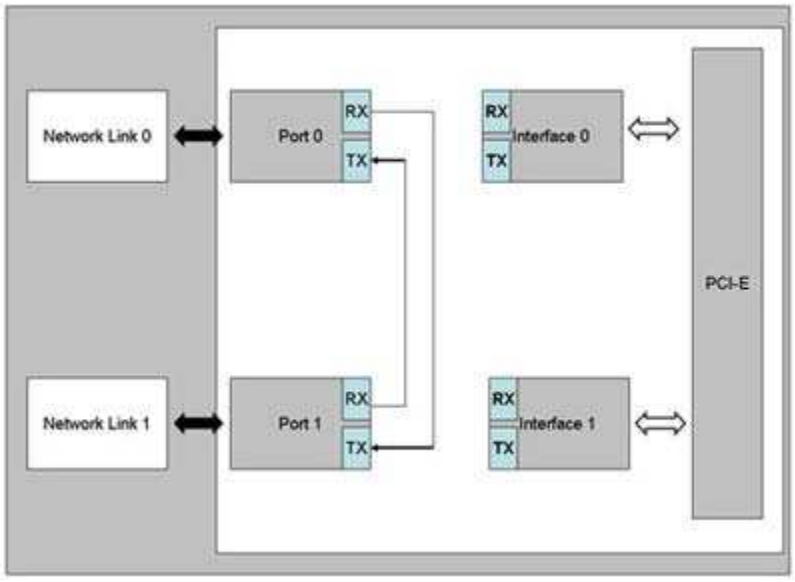
Silicom's Dual Port Copper Gigabit Ethernet Bypass Server adapter supports Normal, Bypass and Disconnect modes. In Normal mode, the ports are independent interfaces (see Figure 1: Normal mode, one Bypass pair is illustrated).

Figure 1: Normal Mode Functional Block Diagram



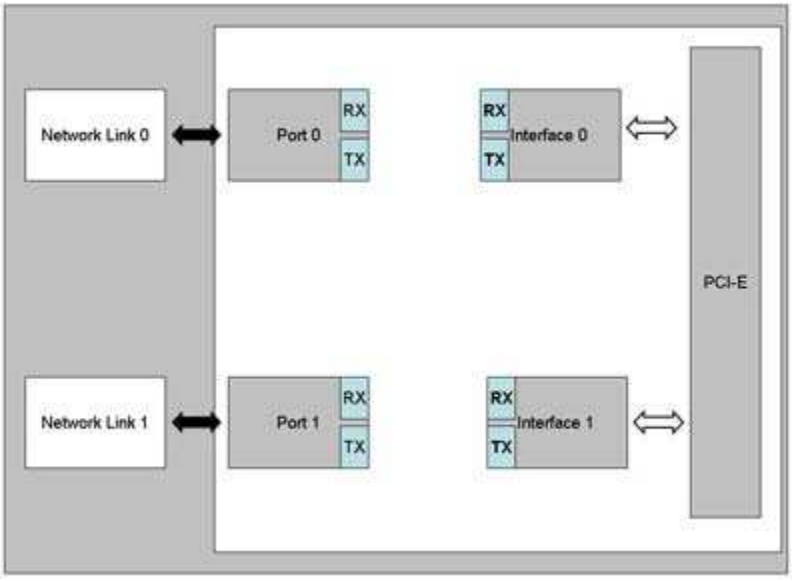
In Bypass mode, the connections of the Ethernet network ports are disconnected from the interfaces and switched over to the other port to create a crossed connection loop-back between the Ethernet ports. The connections of the interfaces are left unconnected. (See Figure 2: one Bypass pair illustrated)

Figure 2: Bypass Mode Functional Block Diagram



In Disconnect mode, the connections of the Ethernet network ports are disconnected from the interfaces. (See Figure 3: one Bypass pair illustrated

Figure 3: Disconnect Mode Functional Block Diagram



Silicom's dual port copper Gigabit Ethernet Bypass server adapter supports software programmable to select Normal, Bypass or Disconnect modes. Silicom's dual port copper Gigabit Ethernet Bypass server adapter supports Disable Bypass, Disable Disconnected capabilities; hence, if those adapters receive Disable Bypass capability / Disable Disconnect commands, the adapter does not Bypass / does not Disconnect its Ethernet ports, The Disable Bypass Capabilities are reserved also after power off. This feature enables to emulate a standard NIC. Silicom's dual port copper Gigabit Ethernet Bypass server adapter supports Disable supports setting the default mode at power up and power off. Those setting are reserved also after power off.

Order Information

P/N	Description	Notes
PEG2BPi6-SD-ROHS	Dual Port Copper Gigabit Ethernet PCI Express Bypass Server Adapter	RoHS Compliant, 82576EB, X4, Low profile w/ Disconnect

Note: -LP: Assembled Low Profile Metal Bracket

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