PE10G2BPT

Dual Port Fiber 10 Gigabit Ethernet PCI Express Bypass Server Adapter Broadcom® BCM57710 Based

Product Description

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is a PCI-Express X8 network interface card that contains two fiber 10 Gigabit Ethernet ports on a PCI-E adapter.

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is targeted to inline network system that maintains network connectivity when system fails.

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express 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 fiber 10 Gigabit Ethernet PCI Express 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.

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express 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 fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is network interface cards that contain Dual independent 10Gigabit Ethernet ports. Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter provide a fully integrated up to Layer 5 solution along with a complete Gigabit Ethernet port/s.

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is Silicom's forth -generation solution for high performance server network application. Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is based on Broadcom 10Gigabit Ethernet TOE controller features an industry first support for single chip TOE 10Gigabit Ethernet NIC with TCP / IP offload Engine, RDMA NIC (RNIC)*, iSCSI 1.0* /iSER HBA*.

TCP Offload Engine

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter include dedicated hardware and processors to process the frame that traverse it functionality. On the transmit path, the TOE controller Copied the data directly from the highest hierarchy of buffers available, execute the TCP/IP, adds lower level headers. On the receive, path, the TOE controller process frame up to the highest layer supported present in the frame, removes lower level headers, posts the data directly to application to application buffers. The transmit and the receive TOE functionality relieves the host CPI from these time consuming operations.

Convergence NIC

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter enable convergence of all networked communication possible in a server, such as data network (LAN), storage network, or file (CIFS / NFS), clustering for high performance commuting or inter process communication by support of RDMA* over TCP. The Silicom TOE server adapter is a convergence networking interface card and allows one network connection to provide access to all information types. Silicom TOE Gigabit Ethernet server adapters can simultaneously support the following functions: • TOE Chimney- enabled network accelerator • RDMA Network Interface Controller (RNIC)* • iSCSI or iSER Host Bus Adapter (HBA) *

Reliability, Availability, Serviceability

Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter enables fault-tolerant via teaming. Traffic from the failed port is routed through up to seven other members of the team. Silicom's dual port fiber 10 Gigabit Ethernet PCI Express Bypass Server adapter is the ideal solution for implementing multiple network segments, mission-critical high-powered networking applications and environments within high performance servers.

Key Features

Bypass / Disconnect:

- Bypass / Disconnect Ethernet ports on Power Fail, System Hangs or Software Application Hangs.
- Software programmable Bypass, Disconnect or Normal 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.
- Software Programmable mode (Bypass, Normal or Disconnect mode) at Power up.
- Software Programmable mode (Bypass, Normal mode) at Power off.
- Emulates standard NIC

Fiber 10Gigabit Ethernet 10GBase-SR:

- Short Range Fiber 10Gigabit Ethernet channels support 10GBase-SR.
- LC connectors

Fiber 10 Gigabit Ethernet 10GBASE-LR:

- Long Range 10 Gigabit Fiber Ethernet port supports 10GBASE-LR (1310nM LAN PHY)
- LC Duplex connector

TCP offload Engine:

- Full fast path TCP offload for IPV4 and IPV6
- Zero Copy capable hardware

iSCASI Controller:

- iSCSI initirator
- iSER (iSCSI over RDMA)

RDMA Controller (RNIC)*:

- RDMA over TCP (iWARP) – RDMAC 1.0 compliant
- Hardware-based data placement in application buffers without CPU intervention (user and kernel modes

Performance Features:

- Full fast path TCP offload Extremely Low CPU utilization for TCP/IP applications – Host CPU is free to run application code
- Microsoft TCP Chimney compliant*
- Accelerated IP based storage*
- Lower CPU utilization for file level storage protocol such as CIFS and NFS
- iSCSI functionality with low CPU utilization
- RDMA support for data placement in application buffers reduces CPU utilization and lower data transits latencies.*
- Receive Side Scaling (RSS)
- TCP, IP checksum
- TCP segmentation
- Adaptive Interrupts
- Message Signal Interrupts (MSI)
- Host Interface standard support PCI Express 1.1.
- High performance, reliability, and low power use in Broadcom BCM57710 TOE controller
- Server class reliability, availability and performance features:
    - Link Aggregation and Load Balancing:
    - Switch dependent: 802.3ad (LACP), Generic Trunking (GEC / FEC)
    - Switch and NIC Independent
    - Failover
- Ultra deep packet buffer per channel lowers CPU utilization
- Virtual LANs –802.1q VLAN tagging
- Jumbo Frame (9KB)
- 802.x flow control

- Boot ROM embedded or optional can be used for Boot ROM applications
- PCI Power Management Interface. (v1.1)
- Statistics for SNMP MIB II, Ethernet like MIB, and Ethernet MIB (802.3z, Clause 30)
- LEDs indicators for link/Activity/Speed status

Technical Specifications

Bypass Specifications:	
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}
Fiber 10Gigabit Ethernet Technical Specifications – (10GBase-SR) Adapters:	
IEEE Standard / Network topology:	Fiber 10Gigabit Ethernet, 10GBASE-SR (850nM LAN PHY)
Data Transfer Rate:	10.3125GBd
Cables and Operating distance: **Up to:**	62.5um, 160MHz/Km 13m* 62.5um, (OM1)200MHz/Km 16m* 50um, 400MHz/Km 33m* 50um, (OM2)500 MHz/Km 41m* 50um, (OM3)2000MHz/Km 150m* Defined as half a distance as stated by the IEEE 802.3 standard
Output Transmit Power:	Typical: -2.6 dBm Minimum: -3 dBm
Optical Receive Sensitivity:	Typical: -14.6 dBm Maximum: -11.1 dBm
Maximum Input Power:	Maximum: +0.5dBm
Insertion Loss:	Bypass Mode: Insertion loss (Optical Power attenuation between TX to RX) Typical: 1.0 dB (From RX to TX) Maximum 1.9 dB

Fiber 10 Gigabit Ethernet Technical Specifications – (10Base-LR) Adapters:	
IEEE Standard / Network topology:	Long Range Fiber 10Gigabit Ethernet, 10GBASE-LR (1310nM LAN PHY)
Data Transfer Rate:	10.3125GBd
Cables and Operating distance: **Up to:**	Single-Mode: 5000m at 9um* Defined as half a distance as stated by the IEEE 802.3 standard
Output Transmit Power:	Typical: -2.25 dBm Minimum: +0.5dBm
Optical Receive Sensitivity: (Stressed Received Sensitivity in Optical Modulated Amplitude)	Typical: -19.5 dBm Maximum: -12.6 dBm
Average Receive Power	Minimum: -14.4 dBm (A receiver power below this value cannot be compliant; however, a value above this doesn't ensure compliance)
Maximum Input Power:	Maximum: +0.5dBm
Operating Systems Support	
Operating system support:	Linux
General Technical Specifications	
Interface Standard:	PCI-Express Base Specification Revision 1.1
Board Size:	Standard height short PCI add in card: 167.64mm X 111.15mm (6.60″X 4.376″)
PCI Express Card Type:	X8 Lane
PCI Express Voltage:	+3.3V +-9%, +12V +- 8%
PCI Connector:	X8 Lane
Controller:	Broadcom: BCM57710

Holder:	Metal Bracket: Full Height and low profile
Weight:	190 gr (6.7 oz)
Power Consumption:	PE10G2BPT-SR Normal: 11.80 W, 0.62A at 12V and 1.32A at 3.3V: Typical, all ports operate at 10Gb/s. 11.49W, 0.60A at 12V and 1.30A at 3.3V: Typical, No link at all ports. Bypass: 11.61W, 0.61A at 12V and 1.30A at 3.3V: Typical PE10G2BPT-LR Normal: 12.56 W, 0.64A at 12V and 1.48A at 3.3V: Typical, all ports operate at 10Gb/s. 12.41W, 0.63A at 12V and 1.47A at 3.3V: Typical, No link at all ports. Bypass: 11.92W, 0.63A at 12V and 1.32A at 3.3V: Typical Disconnect: 12.10W, 0.64A at 12V and 1.34A at 3.3V: Typical
Operating Humidity:	0%–90%, non-condensing
Operating Temperature:	0°C – 50°C (32°F – 122°F)
Storage:	-20°C–65°C (-4°F–149°F)
EMC Certifications:	FCC Part 15, Subpart B Class B Conducted Emissions Radiated Emissions CE EN 55022: 1998 Class B Amendments A1: 2000; A2: 2003 Conducted Emissions Radiated Emissions CE EN 55024: 1998 Amendments A1: 2000; A2: 2003 Immunity for ITE Amendment A1: 2001 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

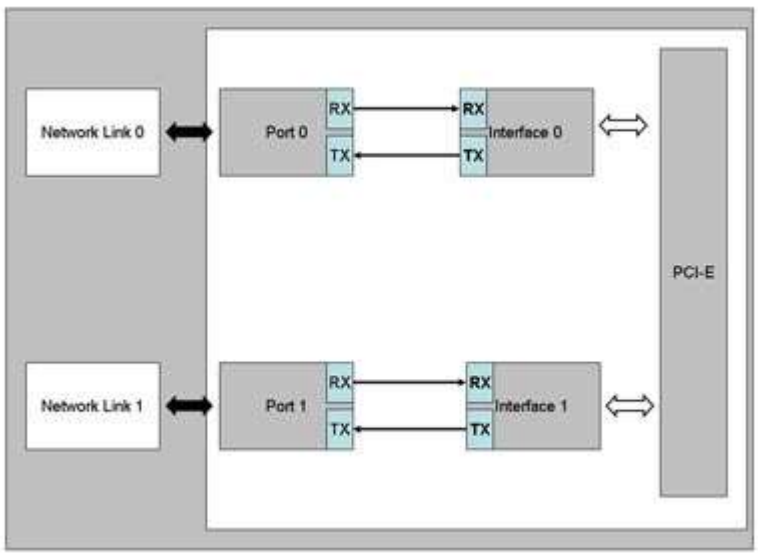
	CE IEC 6100-4-5:1995 Immunity to conductive surges COM Mode; 2kV, Dif. Mode 1kV CE IEC 6100-4-6:1996 Conducted immunity (0.15-80 MHz) 3VRMS 80% A.M. By 1kHz CE IEC 6100-4-11:1994 Voltage Dips and Short Interruptions V reduc >95%, 30% >95% Duration 0.5per, 25per, 250per
LEDs	
LEDs:	(2) LED per port Link: Turns on link (green). ACT: Blinks on activity (green). Bi-color LED per Bypass pair: BYPASS: Turns on Bypass (green) Disconnect : Turns on Disconnect (yellow) Normal: Off
LEDs location:	LED is located on the PCB, visible via holes in the metal bracket holder
Connectors:	LC

Functional Description

Silicom's Bypass Server adapters support Normal, Bypass and Disconnect modes.

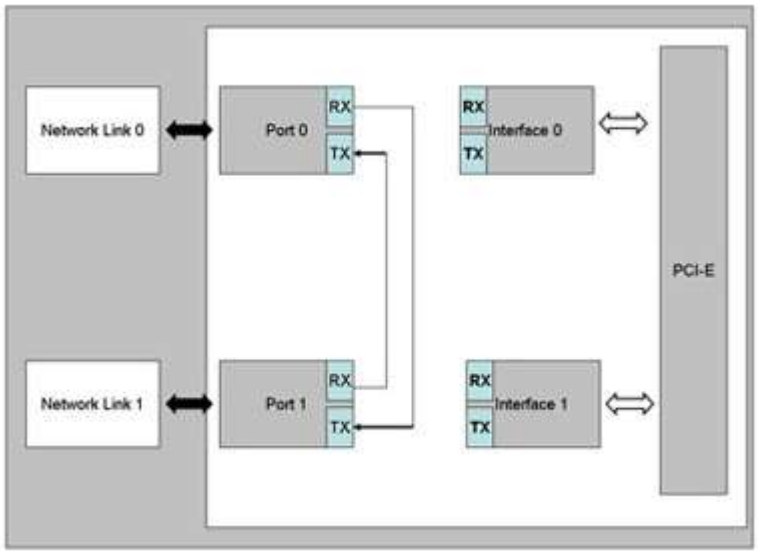
In Normal mode, the ports are independent interfaces (see Figure 1: Normal mode, one Bypass pair is illustrated).

Figure 1: Normal Mode Functional Block Diagram



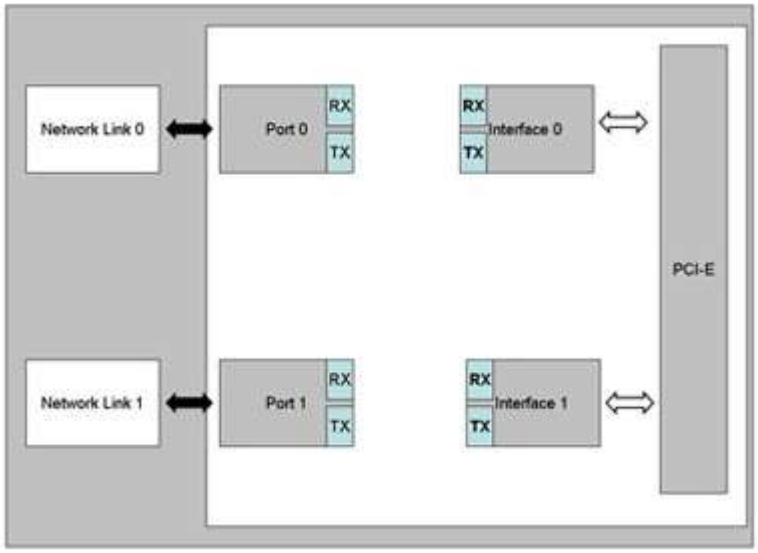
In Bypass mode, the connections of the Ethernet network ports are Disconnected from the interfaces and switched over to the other port to create a crossed connection loop-back between the Ethernet ports. The connections of the interfaces are left not connected. (See Figure 2: one Bypass pair illustrated)

Figure 2: Bypass Mode Functional Block Diagram



In Disconnect mode, the transmit 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 Bypass server adapters include an on board Controller that can Bypass the Ethernet ports on host system failure like Power Off, System hangs or software application hangs. The software programmable Watch Dog Timer (WDT) Controller detects a host system fails and it will Bypass automatically the Ethernet ports after programmable time out interval. The WDT Controller can be software programmable enabled or disabled.

Silicom Bypass server adapters support software programmable to select Bypass or Normal mode. In Normal mode, the ports of the adapters remain independently operational.

The drivers of the adapters and the Bypass circuitry provides an interface that control and management the mode of the adapter. The adapter software driver or software application can writes commands to the on board controller. The on board controller processes the commands and activates the bypass circuitry accordingly.

After power up the default mode of the adapter is to be in Bypass mode. After driver is loaded, the adapter software driver or application can set the card to a Normal mode. After the Host system issues reset, setting of Bypass controller and circuitry are reserved.

Silicom Bypass server adapters support Disable Bypass Capability; hence, if those adapters receive Disable Bypass Capability command, the adapter does not Bypass its Ethernet ports, in this state the four Ethernet ports are independent. The Disable Bypass Capability state is reserved also after power off. This feature enables to emulate a standard NIC.

Silicom Bypass server adapters can be set to Bypass or Normal mode at power up. This setting programmable and is reserved also after power off.

Order Information

P/N	Description	Notes
PE10G2BPT-SR	Dual Port Fiber (SR) 10 Gigabit Ethernet TOE PCI Express Bypass Server Adapter *	X8, Based on Broadcom BCM57710, Low-profile, RoHS compliant
PE10G2BPT-LR	Dual Port Fiber (LR) 10 Gigabit Ethernet TOE PCI Express Bypass Server Adapter *	X8, Based on Broadcom BCM57710, Low-profile, RoHS compliant

Note: Model P/N /S/-LP /

S: Solaris:

-LP: Assemble Low Profile Metal Bracket: Available only with Dual and Single ports adapters.

*iSCSI, iSER and RDMA are not released. TOE is not released. When TOE will be released it will support it will support Windows Chimeny only. Initial release will be L2 legacy drivers.

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