M1E210G2BPi40-T

Dual port Copper 10 Gigabit Ethernet Express Module Bypass Server

Product Description

Silicom's dual port Copper 10 Gigabit Ethernet Bypass server adapter is a PCI-Express X8 network interface card that contains two Copper 10 Gigabit Ethernet (10GBase-T) ports on a PCI-E adapter.

The Silicom's dual port Copper 10 Gigabit Ethernet Bypass server adapter is targeted to inline network system that maintains network connectivity when system fails.

Silicom's dual port Copper 10Gigabit 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 10Gigabit 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.

Silicom's dual port Copper 10Gigabit 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 10Gigabit Ethernet Bypass server adapters is based on Intel x540 Dual port 10GBase-T Ethernet controller.

Key Features

Bypass:

- 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

- Independent Bypass operation in every two ports

- Emulates standard NIC

Copper 10 Gigabit Ethernet 10GBASE-T :

- Integrated 10 Gigabit Copper PHY supports 10GBASE-T, 1000 BASE- T and 100BASE- TX

- Triple speed 10Gbps (10GBase-T), 1000Mbps (1000Base-T) and 100 Mbps (100Base-Tx)

- RJ-45 connector supports CAT 6A cable

Performance Features:

- Support for jumbo frame up to 15.5KB

- Flow control support

- Statistics management and RMON

- 802.1q VLAN support

- TCP segmentation offload: up to 256KB

- IPV6 Supports for IP/ TCP and IP/UDP Receive Checksum offload

- Fragmented UDP checksum offload for Packet Reassembly

- Message Signal interrupts (MSI)

- Message Signal interrupts (MSI-X)

- Interrupt throttling control to limit maximum interrupt rate and improve CPU usage

- Multiple Receive Queues (RSS) 8×8 & 16×4

- 128 Transmit queues per port

- Support for 64 Virtual Device Queues (VMDq) per port

- Support Direct Cache Access (DCA)

- Large on chip receive packet buffer (384 KB)

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- Large on chip transmit packet buffer (160KB)

- Advanced memory architecture reduces latency by preceding TSO packets. A TSO packet may be interleaved with other packets going to the wire

- Time sync- IEEE1588- Precision Time Protocol (PTP)

- Supports the BCN (Backward Congestion Notification) protocol in addition to the EEDC functionality

- DDP Offload

- IEEE 802.1p layer 2 priority encoding

- LEDs indicators for link/Activity and speed/ Bypass/ Disconnect

Host Interface:

- PCI Express X8 lanes

- Support PCI Express Base Specification 2.1 (5GT/s)

- PCI ExpressModule Specification revision 1.0

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}
10GBASE-T Copper Ethernet Adapters Technical Specifications:	
IEEE Standard / Network topology:	Copper 10Gigabit Ethernet, 10GBASE-T, IEEE 802.3an Gigabit Ethernet, 1000Base-T 100 Mb Ethernet: 100BASE- TX
Data Transfer Rate:	20 Gb/s, 2000Mb/s and 200 Mb/s in full duplex mode per port
Cables and Operating distance:	100Base-Tx Category 5 maximum 50m * 1000Base-T Category 5E maximum 50m * 10GBase-T Category 6A maximum 50m ** *Theoretical Distance – Defined as half a distance as stated by the IEEE 802.3-2005 standard **Theoretical Distance – Defined as half a distance as stated by the IEEE 802.3an standard
Operating Systems Support	
Operating system support:	Linux

General Technical Specifications	
Interface Standard:	PCI ExpressModule Specification revision 1.0 Silicom SETAC PCI-Express Base Specification Revision 2.1 (5GT/s)
Board Size:	168.2mm x 98mm (6.62"X3.858")
PCI Express Card Type:	X8 Lane
PCI Express Voltage:	+12V ± 8%
PCI Express Connector:	Gold Finger: X8 Lane
Controller:	Intel x540
Holder:	Not included.
I/O:	RJ45
Weight:	190g
Power Consumption:	12.72 W, 1.06A at 12V: Typical all ports operate at 10Gb/s, (Normal Mode). 7.44 W, 0.62 A at 12V: Typical all ports operate at 1Gb/s, (Normal Mode). 4.92 W, 0.41 A at 12V: Typical all ports operate at 100Mb/s, (Normal Mode). 7.08 W, 0.59 A at 12V: Typical Bypass Mode. 6.84 W, 0.57 A at 12V: Typical Disconnect Mode. 6.12 W, 0.51 A at 12V: Typical No link at all ports
Operating Humidity:	0%–90%, non-condensing
Operating Temperature:	-5°C – 40°C (23°F – 104°F)
Storage:	-40°C–65°C (-40°F–149°F)
EMC Certifications:	FCC Part 15, Subpart B Class A 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
MTBF:	147 (Years)
	* According to Telcordia SR-332 Issue 2. Environmental condition – GB (Ground, Fixed, and Controlled). Ambient temperature 40°C

LEDs

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LEDs:	(2) LED per port
	Right LED: Speed / Bypass / Disconnect
	Link of 1Gb/s: Turns on link (Orange)
	Link of 10Gb/s: Turns on link (Green)
	Bypass: Blink (Green)
	Disconnect: Blink (Orange)
	Left LED: Link /ACT :
	Turns on link , blinks on activity (Green)
LEDs location:	LEDs are located in the RJ45 connector port.
Connectors:	(2) Shielded RJ-45

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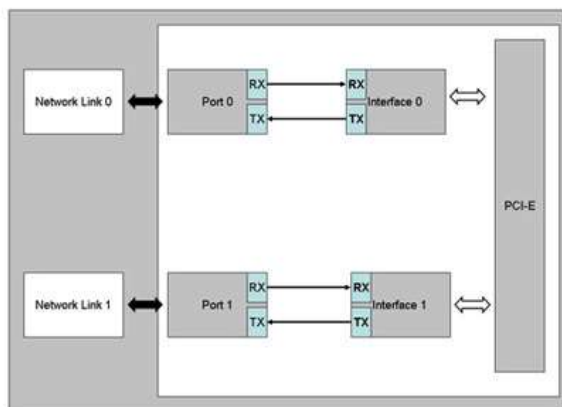
In Bypass mode, the connections of the Ethernet network ports are Disconnected from the interfaces and switched over to the other port to create a crossed connection loop-back between the Ethernet ports. The connections of the interfaces are left not connected. (See Figure 2: one Bypass pair illustrated)

Figure 2: Bypass Mode Functional Block Diagram
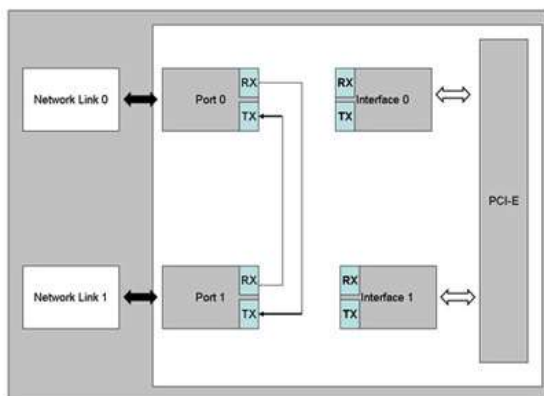
In Disconnect mode, the transmit connections of the Ethernet network ports are Disconnected from the interfaces. (See Figure 3: one Bypass pair illustrated)

Figure 3: Disconnect Mode Functional Block Diagram

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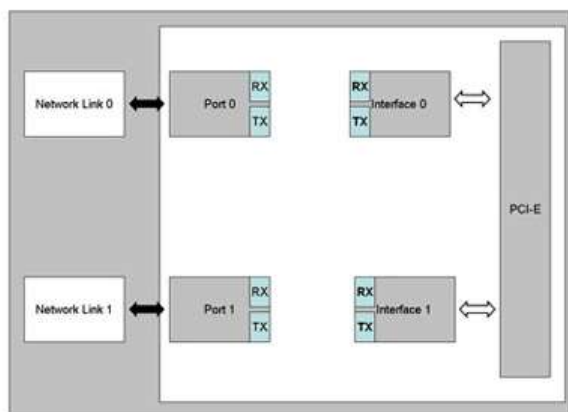
Silicom Bypass server adapters include an on board Controller that can Bypass the Ethernet ports on host system failure like Power Off, System hangs or software application hangs. The software programmable Watch Dog Timer (WDT) Controller detects a host system fails and it will Bypass automatically the 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 dual 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
M1E210G2BPI40-T	Dual Port Copper 10 Gigabit Ethernet Express Module Bypass Server Adapter	X8 Gen 2.1, Based on Intel X540, RoHS compliant, short, low-profile

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