

# MXH930 PCIe NTB Adapter

## NTB x16 Gen4 SFF-8644 Adapter



The MXH930 Gen4 PCI Express NTB Host Adapter is our high-performance clustering product. Based on Microchip PFX Switchtec™ Gen4 PCI Express switching architecture, the MXH930 host adapter includes advanced features for non-transparent bridging (NTB) and clock isolation.

For high performance application developers, the MXH930 host adapter combines up to 256 GT/s performance with an application to application latency starting just above 500 nanoseconds. The MXH930 can be used to connect processors, GPUs, and FPGAs into an intelligent cluster that benefits from the high throughput and low latency of Gen4 PCIe. Using Dolphin's SmartIO technology software, GPU / Cuda applications can now stream data to remote GPUs at the same speed as to local GPUs. It also support hot add of transparent devices to system using software enumeration.

The card implements a quad SFF-8644 connector which is compliant with the latest PCI SIG External cable specification 4.0 rev 3.0. Cable distances are qualified up to 4 meters with copper cables (5m under qualification) and 100

meters with fiber cables. Each connection is a x4 port that can connect as a single x4 port, x8, 2-x8 or a x16 by aggregating the 4 ports. The resulting x16 port delivers performance at 256 GT/s. The MXH930 is carefully designed for maximum cable lengths.

The MXH930 includes an eXpressWare™ software suite license. eXpressWare provides a software infrastructure for developing PCIe applications. This software suite takes advantage DMA and PIO data transfer schemes to create a complete environment for customized and standardized applications. Go to [http://www.dolphinics.com/products/dolphin\\_pci\\_express\\_software.html](http://www.dolphinics.com/products/dolphin_pci_express_software.html).

The MXH930 support both switchless and switched configurations. For scaling out beyond five nodes, the MXH930 is combined with Dolphin's MXS924 switch. The MXS924 is a 24 port 1U PCIe switch that can be configured a twenty-four x4 ports, twelve x8 ports, or six x16 ports. This switch can also be cascaded to create large topology that can expand up to 64 or 128 nodes.

## Features

- PCI Express Gen4 - 16.0 GT/s per lane
- Microchip PM40036- PFX Gen4 chipset
- Link compliant with Gen1, Gen2, and Gen3, Gen4 PCIe
- Quad SFF-8644 connector
  - » PCIe4.0 cables with CMI
  - » PCIe non-CMI cables
- RDMA support through PIO and DMA (DMA under development)
- Copper and fiber-optic cable support
- Full host Clock isolation support. Automatic support for host running CFC or SSC.
- Low Profile PCIe form factor
- EEPROM for custom system configuration
- Link status LEDs through face plate
- <100ns - Cut Through latency
- MXH930 supports the following port configurations
  - » One - x16 PCIe port
  - » Two - x8 PCIe ports
  - » Four - x4 PCIe ports
- MXH830 can be configured into a 5 node cluster using 4 x4 ports to each host or a 3 node cluster using x8 connections, or a two node x16 connection
- Combined with the MXS924 can scale to up to 64 or 128 nodes



### eXpressWare PCIe Software

The MXH930 card comes with a full license to the Dolphin's eXpressWare clustering software. This includes

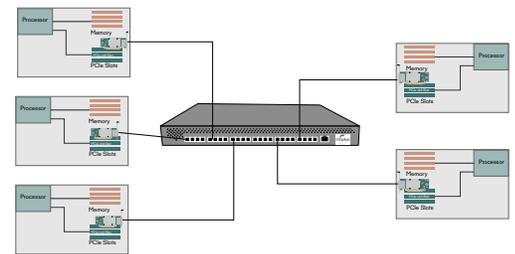
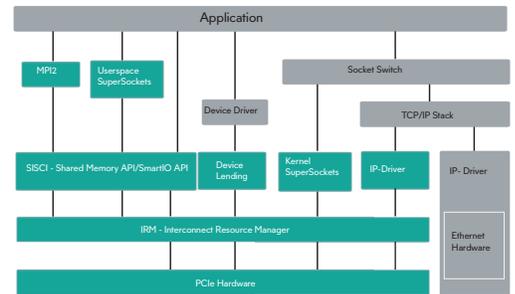
- » SISCI API - a robust and powerful shared memory programming environment for PCIe
- » Standard TCP/IP drivers
- » SuperSockets socket accelerator software
- » SmartIO - access to remote PCIe devices over PCIe
- » Board management software

Dolphin's software suite takes advantage of DMA and PIO data transfer scheme to effectively supporting both large and small data transfers. PIO transfers optimize small packet transfers at the lowest latency. DMA moves data with virtually no CPU consumption. The eXpressWare software is currently available for Linux, Windows and VxWorks. The overall software framework is designed for rapid development and deployment of inter-processor communication systems. More information about Dolphin eXpressWare clustering software.

### Configurations

The MXH930 can be used to create several types of PCIe networks:\*

- » A two node network can be realized using 4 cables (x16). Full PCIe Gen4 x16 performance between the two systems.
- » A three node network can be realized using 2 cables (x8) between each system. Full PCIe Gen 4 x8 performance between the three systems.
- » A five node network can be realized using 1 cable (x4) between each system. Full PCIe Gen 4 x4 performance between the five systems
- » Larger configurations can be realized with one or more of the MXS924 24 port PCIe Gen4 switch.



Five node MXH930 Switch cluster

## Specifications

Link Speeds	64GT/s per port / 256 GT/s total
Application Performance	~500ns latency (application to application) Above 22 Gbytes/s throughput
Active Components	Microchip Switchtec® Gen4 PFX Switch
PCI Express	Base Specification 4.0 External Cabling Specification 4.0 (draft) Card Electromechanical Specification 4.0
Topologies	Two nodes direct cable Three to five nodes mesh topology Switched Topology with MXS924
Cut-Through Latency	<100ns
Cable Connections	SFF-8644 connector for copper / fiber cables Supports 4 - x4/ 2 - x8 or 1 - x16 connections PCIe 4.0 copper and PCIe 4.0 fiber copper - up to 4m (5m under review, 100m with fiber)
Maximum power rating	12 Volt: max 1.66A (no port power) 2.66 A (max port power) +3.3 Volt: Not connected +3.3 Volt AUX: max 100ma
Typical power rating	12 Volt: 1.5 A ( no port power) +3.3 Volt: Not connected +3.3 Vaux: 100 mA
Port power supply ( per cable port)	VPWR: 3.2V - 3.4 V, 0.86 A VMGTPWR: 3.2V -3.4, 89 mA
Mechanical Dimensions	Low profile, half length, 68.90 mm ( 2.731 inches) x 167.65 mm (6.6 inches)
Storage Environment	Storage Temperature: -40°C - 70°C (-40°F - 158°F) Relative Humidity 95% (non-condensing) at 35°C

Operating Environment	Operating Temperature: 0°C - 55°C (32°F - 131°F) with AOC (TBD) AirFlow: 350 LFM Relative Humidity: 5% -95% non-condensing
Dolphin Software	SuperSockets Berkley Sockets API Microsoft WinSock2/LSP support IPoPCle driver SISCI API
Usage Modes	Non-transparent bridging Hot Add Transparent
Regulatory	CE Mark FCC Class B UL94V-0 compliant RoHS Compliant
Regulatory Approvals	EN 55032:2012 EN 55035:2017 EN 61000-3-2:2014 EN 61000-3-3:2013 47 CFR Part 15, Subpart B (Clause 15.107 and 15.109) in conjunction with ANSI C63.4:2014 CISPR 35:2016 Edition 1.0 (CISPR/I/412/CDV) Korean Harmonized standard, KN 35
Configuration	DIP-switch x4,x8,x16 link / Safe Boot
Mounting Plates	Full height plate installed Half height plate included with board
Operating Systems supported	Windows, Linux, VxWorks*
Product Codes	MXH930 - Host NTB Adapter

\*Consult software release notes for current status on topology and operating system support