

## Overview of the MAX Express Expansion System

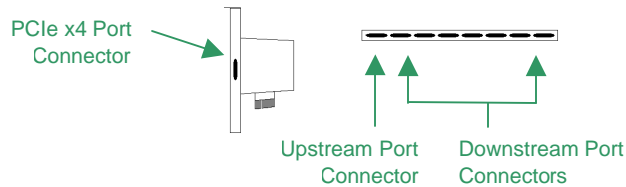
The MAX Express product line from One Stop Systems includes a complete range of PCI Express (PCIe) computer products for the industrial computer market. MAX Express x4 products have a current maximum throughput of 10 Gigabits per second, far outpacing any industrial bus speed to date.

The expansion system extends the PCIe bus of a host system to additional PCIe, PCI, PCI-X, MicroTCA, PXI or CompactPCI Express (CPCIe) expansion enclosures. The connection between the host and the expansion enclosure is four times the bandwidth of traditional expansion systems and up to eight times the bandwidth of other custom PCI expansion systems. Using the 1U 8-port PCIe Switch, the expansion capability of a single host can be increased to over 100 add-in boards with no additional drivers or software are required.

Host interfaces provide compatibility with any expansion enclosure, allowing the user to mix and match components to meet the requirements of the application.

## PCIe Expansion System Using System Host Board Architecture

Extend PCIe from a System Host Board (SHB) enclosure to an expansion enclosure by connecting a x4 cable from the port connector on the HIB to the upstream port connector on an ELB. On the ELB, the upstream port connector is the upper connector and downstream port connector is the lower connector. On the 1U 8-port PCIe Switch, the upstream port connector is the leftmost connector and the downstream port connectors are the 7 connectors to the right. Refer to Figures ii, iii and iv for information on connecting additional expansion enclosures.



Components:

- SHB Express Enclosure
- System Host Board (SHB)
- Host Interface Board (HIB)
- Expansion Enclosure with PCIe Backplane
- Expansion Link Board (ELB)
- x4 Cable

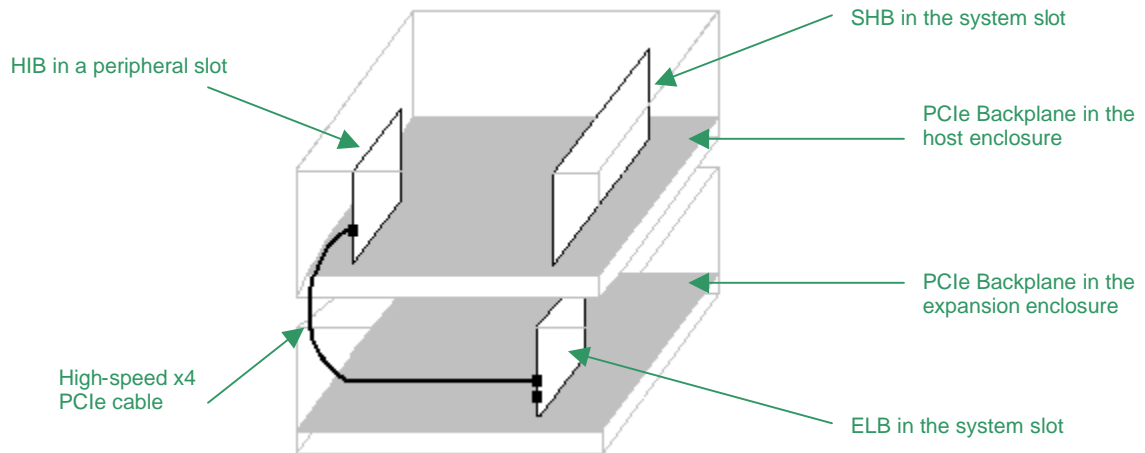


Figure i: SHB Architecture – HIB (Host Enclosure) to ELB (Expansion Enclosure)

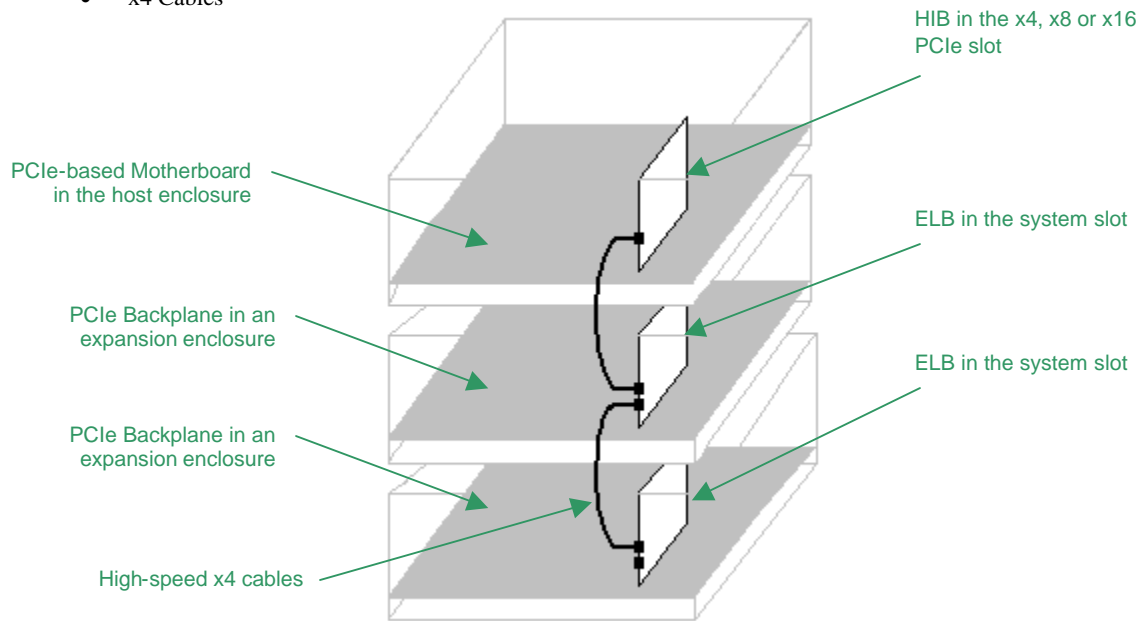
## PCIe Expansion System Using Motherboard Architecture

### Scenario 1 – One or Two Expansion Enclosures

Extend the PCIe bus to an expansion enclosure by connecting the cable from the port connector on the HIB to the upstream port connector on the ELB. Attach a second expansion enclosure by connecting a second cable from the downstream port connector on the first ELB to the upstream port connector on a second ELB.

Components:

- Motherboard Enclosure
- PCIe-based Motherboard
- Host Interface Board (HIB)
- Expansion Enclosure with PCIe Backplane
- Expansion Link Boards (ELBs)
- x4 Cables



**Figure ii: PCIe Motherboard Architecture – HIB (Host Enclosure) to ELB (Expansion Enclosure) to ELB (Second Expansion Enclosure)**

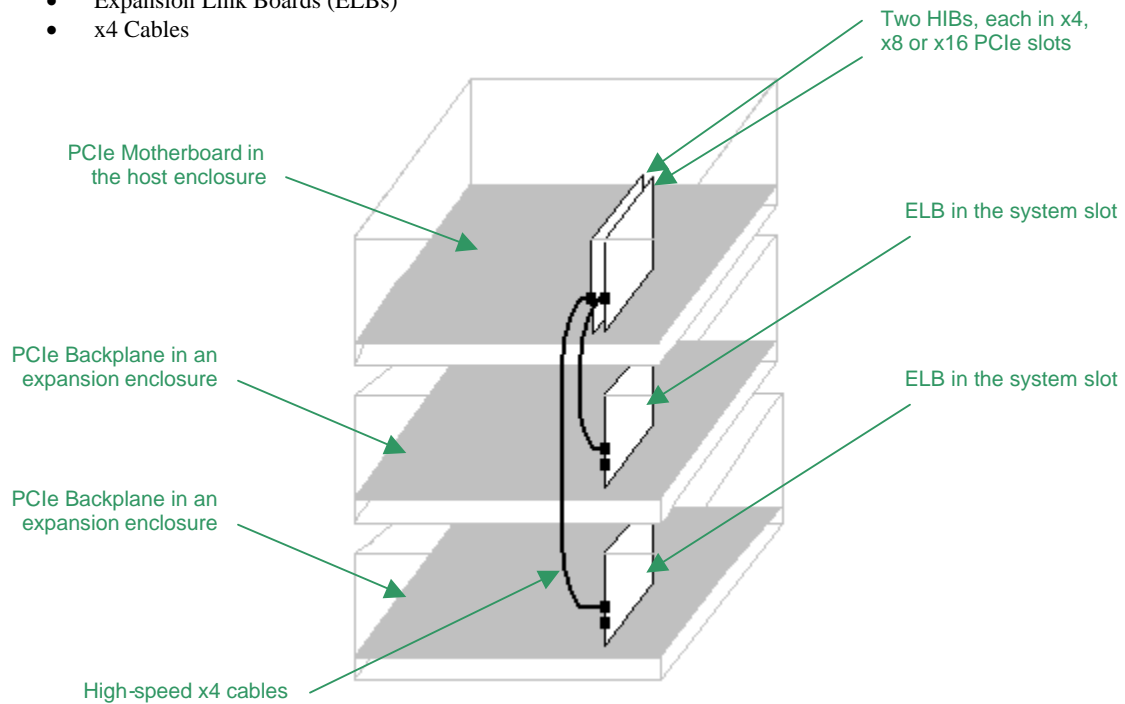
## Scenario 2 – Two Expansion Enclosures (Alternate Setup)

Extend the PCIe bus to two expansion enclosures using two HIBs in the host enclosure. Connect the cable from the port connector on the HIB to the upstream port connector on the ELB. Attach a second expansion enclosure by connecting a second cable from the port connector on the second HIB to the upstream port connector on the second ELB.

Two HIBs may also be used to connect to two separate 1U 8-port PCIe switches to double the expansion capability shown in Figure iv on the next page.

Components:

- Motherboard Enclosure
- PCIe-based Motherboard
- Host Interface Boards (HIBs)
- Expansion Enclosures with PCIe Backplane
- Expansion Link Boards (ELBs)
- x4 Cables



**Figure iii: PCIe Motherboard Architecture – Two HIBs (Host Enclosure) to Two ELBs (Each in a Separate Expansion Enclosure)**

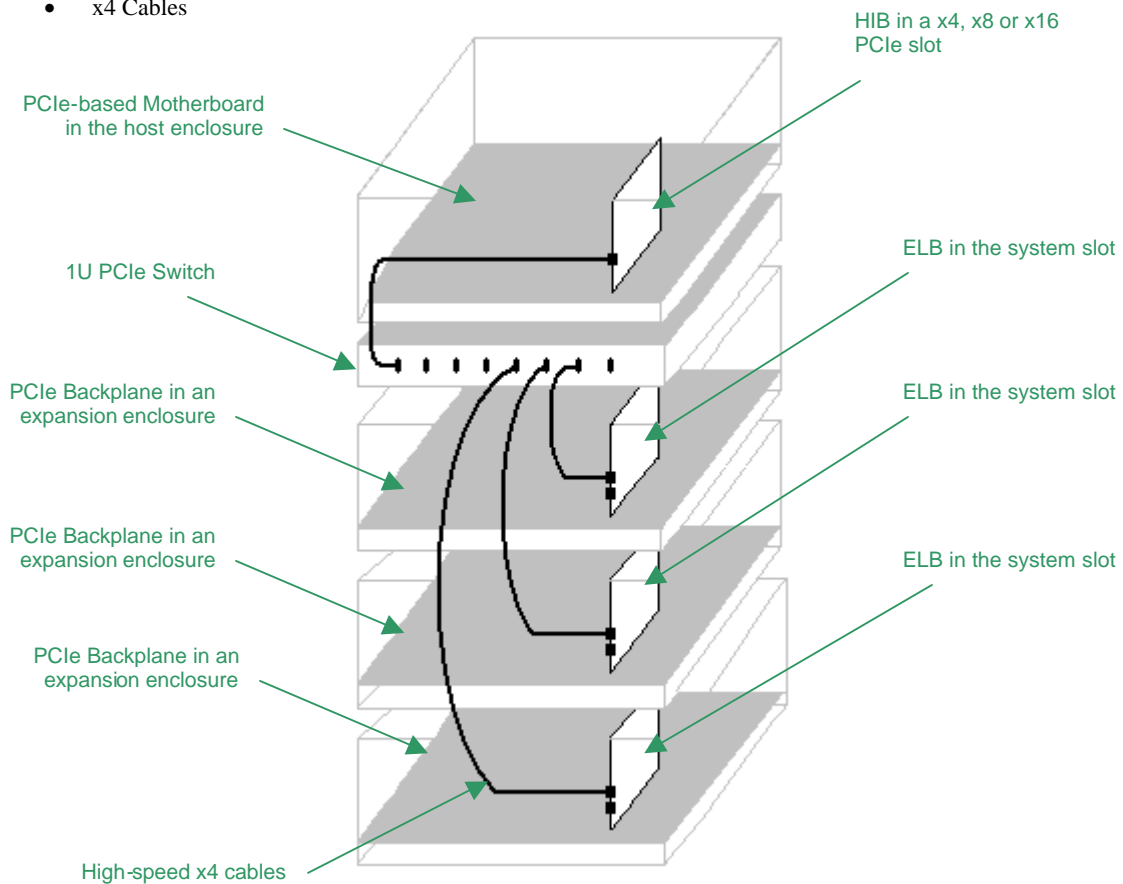
### Scenario 3 – Three or More Expansion Enclosures

Extend the PCIe bus to three or more expansion enclosures by connecting the cable from the port connector on the HIB to the upstream port connector on the 8-port switch (the leftmost connector). The switch is used to reduce latency when linking multiple expansion chassis.

To extend the host bus to each expansion enclosure, connect an additional x4 cable from the switch, using any of the seven downstream port connectors on the right, to the upstream port connector on the ELB.

Components:

- Motherboard Enclosure
- PCIe-based Motherboard
- Host Interface Board (HIB)
- Expansion Enclosures with PCIe Backplane
- Expansion Link Boards (ELBs)
- 1U PCIe Switch
- x4 Cables



**Figure iv: PCIe Motherboard Architecture – HIB (Host Enclosure) to Multiple ELBs (Each in a Separate Expansion Enclosure) using a 1U 8-port PCIe Switch**