

Switchtec™ PAX Gen 4 Advanced Fabric PCIe® Switch Family

PM42100, PM42068, PM42052, PM42036 and PM42028

Summary

The Switchtec PAX Gen 4 Advanced Fabric PCIe Switch family comprises programmable and high-reliability Gen 4 PCIe switches supporting high-performance PCIe fabric connectivity to a shared pool of GPUs, NVMe SSDs and other endpoints, multi-host sharing of single-root input/output virtualization (SR-IOV) endpoints, up to 100 lanes, 52 ports and hot- and surprise-plug controllers for each port. The switch family also features advanced error containment, comprehensive diagnostics and debug capabilities, a wide breadth of I/O interfaces and an integrated MIPS processor. PAX switches utilize a system-on-chip architecture that optionally enables customer-differentiated solutions through firmware customization and enhancements.

Applications for the PAX family include scalable multi-host systems, SR-IOV-enabled JBOFs, composable GP-GPU fabrics, disaggregated systems and rack scale architectures.



Features

PCIe Fabrics and Multi-Host SR-IOV Sharing

- High-performance PCIe fabric connectivity to a pool of GPUs, NVMe SSDs and other endpoints, that overcomes the limitations of PCIe tree-based topologies for rack scale multi-host systems
- Multi-host sharing of SR-IOV and multifunction endpoints
- Virtualization of entire PCIe domains and endpoints with physical and virtual functions (for example, SR-IOV NVMe SSDs)

High-Performance Non-Blocking Switching

- Up to 174 GBps switching capacity
- 100-lane, 84-lane, 68-lane, 52-lane, 36-lane and 28-lane variants
- Ports bifurcate to $\times 1^*/\times 2/\times 4/\times 8/\times 16$ lanes

Error Containment

- Advanced Error Reporting (AER) on all ports
- Downstream Port Containment (DPC) on all downstream ports
- Poisoned TLP blocking
- Completion Timeout Synthesis (CTS) to prevent an error state in an upstream host due to incomplete non-posted transactions
- Hot- and surprise-plug controllers per port
- GPIOs configurable for different cable/connector standards

PCIe Interfaces

- Passive, managed and optical cables
- SFF-8644, SFF-8643, SFF-8639, OcuLink and other connectors

Diagnostics and Debug

- Real-time eye capture
- External loopback
- Errors, statistics and performance counters

¹ $\times 1$ natively on four lanes

Highlights

- Integrated peripheral I/O Interfaces
- High-reliability PCIe: robust error containment, hot- and surprise-plug controllers per port, end-to-end data integrity protection, high-quality, low-power SerDes
- PAX Software Development Kit (SDK)
- Integrated processor, I/O interfaces, and SDK for enclosure management firmware development
- Comprehensive diagnostics and debugging: PCIe generator and analyzer, per-port performance and error counters, multiple loopback modes and real-time eye capture
- Significant power, cost and board space savings with support for:
 - Up to 52 ports
 - Flexible $\times 1^*$, $\times 2$, $\times 4$, $\times 8$, and $\times 16$ port bifurcation with no restrictions on configuring ports as either upstream or downstream

High-Speed I/O

- PCIe Gen 4 16 GT/s
- Supports OCuLink cabling, CEM $\times 16$ slots and other interfaces

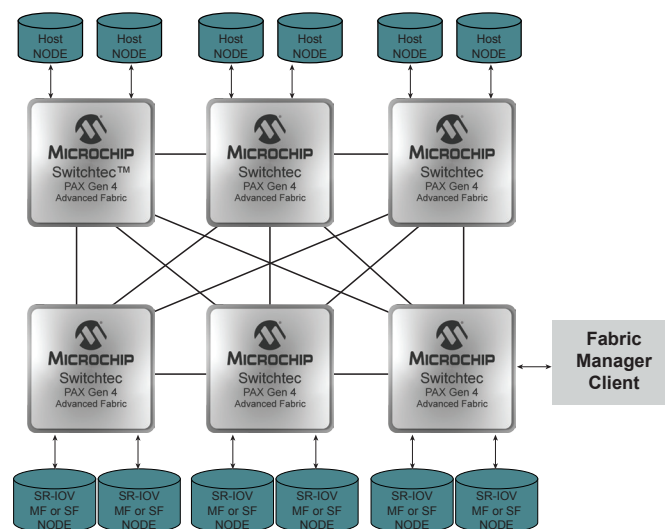
ChipLink Diagnostic Tools

- Extensive debug, diagnostics, configuration and analysis tools with an intuitive GUI
- Access to configuration data, management capabilities and signal integrity analysis tools (such as real-time eye capture)

Evaluation Kits

The PM42100-KIT Switchtec Gen 4 PCIe Switch Evaluation Kit is a device evaluation environment that supports multiple interfaces including optical PCIe-compliant link training and manual PHY configuration.

Example Application



Ordering Information

Product	Part Number	Lanes	Ports	Hot-Plug Controllers
PAX 100xG4 Gen 4 Advanced Fabric PCIe® Switch	PM42100B-FEIP	100	52	52
PAX 84xG4 Gen 4 Advanced Fabric PCIe Switch	PM42084B-FEIP	84	44	44
PAX 68xG4 Gen 4 Advanced Fabric PCIe Switch	PM42068B-FEIP	68	36	36
PAX 52xG4 Gen 4 Advanced Fabric PCIe Switch	PM42052B-F3EIP	52	28	28
PAX 36xG4 Gen 4 Advanced Fabric PCIe Switch	PM42036B-F3EIP	36	20	20
PAX 28xG4 Gen 4 Advanced Fabric PCIe Switch	PM42028B-F3EIP	28	16	16

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