Summary
The Switchtec™ PSX PCIe® Gen3 Storage Switch Family comprises programmable and high-reliability PCIe Base Specification 3.1-compliant switches supporting up to 96 lanes, 48 ports, 24 virtual switch partitions, 48 Non-Transparent Bridges (NTBs) 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. PSX switches utilize a system-on-chip architecture that optionally enables customer-differentiated solutions through firmware customization and enhancements.

Applications for the PSX family include PCIe SSD enclosures, Flash arrays, multi-host architectures, high-density servers, blade servers, pooled storage/compute and applications that require customized, high-reliability PCIe switching.

Features
High-Performance Non-Blocking Switches
- Up to 174 GB/s switching capacity
- 96-lane, 80-lane, 64-lane, 48-lane, 32-lane and 24-lane variants
- Ports bifurcate from x2 to x16 lanes
- Up to 48 NTBs assignable to any port
- Logical Non-Transparent (NT) interconnect allows for larger topologies
- Supports 1+1 and N+1 failover mechanisms
- NT address translation using direct windows and multiple sub-windows per BAR
- Supports multicast groups per port

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

- Upstream Error Containment (UEC), a programmable feature protecting errors from propagating upstream
- Hot- and surprise-plug controllers per port
- GPIOs configurable for different cable/connector standards

PCle Interfaces
- Passive, managed and optical cables
- SFF-8644, SFF-8643, SFF-8639, OCuLink and other connectors

Diagnostics and Debug
- Transaction Layer Packet (TLP) generator for testing and debugging of links and error handling
- Built-in PCIe analyzer with flexible triggering
- Real-time eye capture
- Any-to-any port mirroring for debug purposes
Highlights
• High-reliability PCIe: robust error containment, hot- and surprise-plug controllers per port, end-to-end data integrity protection, ECC protection on RAMs, high-quality, low-power SERDES
• PSX Software Development Kit (SDK): enables customer-differentiated solutions in areas such as error containment and surprise-plug
• Integrated enclosure management processor and I/O interfaces, SDK and a turn-key enclosure management solution
• 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 48 ports, 48 NTBs and 24 virtual switch partitions
• Flexible x2, x4, x8 and x16 port bifurcation with no restrictions on configuring ports as either upstream or downstream, or on mapping ports to NTBs

Diagnostics and Debug
• External loopback at PHY and TLP layers
• Errors, statistics, performance and TLP latency counters

Peripheral I/O Interfaces
• Up to 11 Two-Wire Interfaces (TWIs) with SMBus support
• Up to 4 SFF-8485-compliant SGPIO ports
• Up to 106 parallel GPIO pins
• 10/100 Ethernet MAC port (MII/RMII) (PSX 96x/80x/64xG3)
• 16-bit local bus interface with ECC protection
• Up to 4 UARTs
• JTAG and EJTAG interface

High-Speed I/O
• PCIe Gen3 8 GT/s
• Supports PCIe-compliant link training and manual PHY configuration

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)
• Connects to device over in-band PCIe or sideband signals (UART and EJTAG)

Evaluation Kits
The evaluation kits are used to evaluate and test device functionality, measure signal integrity and customize and develop PSX firmware. The following kit is available:
• PM5461-KIT - PAX/PSX/PFX/PFX-I/PFX-L 96/80/64×G3 PCIe Switch HD Evaluation Kit (PMC-2151996)

Example Application

<table>
<thead>
<tr>
<th>Product</th>
<th>Lanes</th>
<th>Ports/NTBs</th>
<th>Partitions</th>
<th>Hot-plug Controllers</th>
<th>Package</th>
<th>Ordering No.</th>
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