Summary
The Switchtec PFX/PFX-I PCIe Gen3 fanout switch families comprise high reliability PCIe Base Specification 3.1-compliant switches supporting up to 96 lanes, 24 virtual switch partitions, 48 Non-Transparent Bridges (NTBs), hot- and surprise-plug controllers for each port, advanced error containment and comprehensive diagnostics and debug capabilities. The PFX-I Gen3 PCIe Switch supports the full feature set available on the PFX* and operates over an extended industrial temperature range of –40°C ambient to 105°C junction.

Typical applications include data center equipment, defense, industrial servers, workstations, test equipment, video production and broadcasting equipment, cellular infrastructure, access networks, metro networks and core networking.

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 (up to 256 masters)
- NT address translation using direct windows and multiple sub-windows per BAR
- Supports multicast groups per port
- PFX-I supports an extended industrial temperature range \( T_A: -40°C \) to \( T_J: 105°C \)

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

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

Diagnostics and Debug
- Transaction Layer Packet (TLP) generator for testing and debugging of links and error handling
- Real-time eye capture
- Any-to-any port mirroring for debug purposes
- External loopback at PHY and TLP layers
- Errors, statistics, performance, and TLP latency counters

*Except for Adaptive Voltage Scaling (AVS)
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
• 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

Peripheral I/O Interfaces
• Up to 11 Two-Wire Interfaces (TWIs) with SMBus support
• Up to 2 SFF-8485-compliant SGPIO ports
• Up to 109 parallel GPIO pins
• 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

Power Management
• Active State Power Management (ASPM)
• Software controlled power management

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, TWI and EJTAG)

Evaluation Kit
The evaluation kit is a device evaluation environment supporting multiple host and SSD interfaces. These kits can be used for evaluation of the Switchtec PCIe Fanout switches. Note that a 96-lane PCIe switch is populated on the evaluation kit. The following kit is available:
• PM5461-KIT - PAX/PSX/PFX-I/PFX-L 96/80/64×G3 PCIe Switch HD Evaluation Kit (PMC-2151996)

Example Application
![Example Application Diagram]

Ordering Information

<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>PFX Ordering No.</th>
<th>PFX-I Ordering No.</th>
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<tbody>
<tr>
<td>96xG3 PCIe Fanout Switch</td>
<td>96</td>
<td>48</td>
<td>24</td>
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<td>PM8574B-FEI</td>
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<td>PM8531B-F3EI</td>
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