

# Switchtec™ PFX/PFX-I PCIe® Gen3 Fanout Switch Families

PM853x PFX and PM857x PFX-I 96/80/64/48/32/24xG3 PCIe Gen3 Fanout Switches

## 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)
- 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
- PFX-I supports an extended industrial temperature range  
T<sub>A</sub>: –40°C to T<sub>J</sub>: 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

### PCIe 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

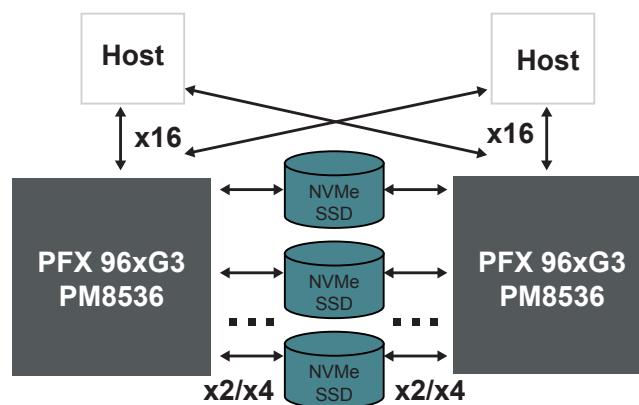
- Extensive debug, diagnostics, configuration and analysis tools with an intuitive GUI
- Access to configuration data, management capabilities and signal integrity analysis tools (such as real-time eye capture)
- Connects to device over in-band PCIe or sideband signals (UART, TWI and EJTAG)

## 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 - PSX/PFX/PFX-I/PFX-L 96/80/64xG3 PCIe Switch HD Evaluation Kit (PMC-2151996)

## Example Application



## Ordering Information

| Product                  | Lanes | Ports/NTBs | Partitions | Hot-plug Controllers | Package           | PFX Ordering No. | PFX-I Ordering No. |
|--------------------------|-------|------------|------------|----------------------|-------------------|------------------|--------------------|
| 96xG3 PCIe Fanout Switch | 96    | 48         | 24         | 48                   | 37.5 mm x 37.5 mm | PM8536B-FEI      | PM8576B-FEI        |
| 80xG3 PCIe Fanout Switch | 80    | 40         | 20         | 40                   | 37.5 mm x 37.5 mm | PM8535B-FEI      | PM8575B-FEI        |
| 64xG3 PCIe Fanout Switch | 64    | 32         | 16         | 32                   | 37.5 mm x 37.5 mm | PM8534B-FEI      | PM8574B-FEI        |
| 48xG3 PCIe Fanout Switch | 48    | 24         | 12         | 24                   | 27.0 mm x 27.0 mm | PM8533B-F3EI     | PM8573B-F3EI       |
| 32xG3 PCIe Fanout Switch | 32    | 16         | 8          | 16                   | 27.0 mm x 27.0 mm | PM8532B-F3EI     | PM8572B-F3EI       |
| 24xG3 PCIe Fanout Switch | 24    | 12         | 6          | 12                   | 27.0 mm x 27.0 mm | PM8531B-F3EI     | PM8571B-F3EI       |