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

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_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

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

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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

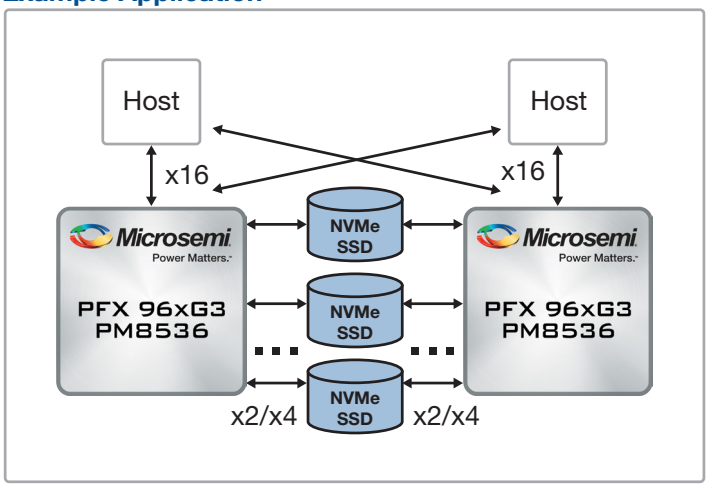
- Extensive debug, diagnostics, configuration, and analysis tools with an intuitive GUI
- Access to configuration data, management capabilities, and signal integrity analysis tools (such as real-time eye capture)
- Connects to device over in-band PCIe or sideband signals (UART, TWI, and EJTAG)

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—PFX/PFX-L/PSX/PAX 96/80/64xG3, 1-Slot, 16 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

Note: PFX $T_{Junction}$: 0 °C to 105 °C. PFX-I $T_{Ambient}$: –40 °C to $T_{Junction}$: 105 °C. PFX-I doesn't support Adaptive Voltage Scaling (AVS).

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