Overview

Mobiveil’s PCI Transparent Switch is a highly flexible and configurable design targeted for implementations in desktop, server, mobile, networking and telecom applications. The controller architecture is carefully tailored to optimize link utilization, latency, reliability, power consumption and silicon footprint.

GPEX-SWITCH is part of Mobiveil’s PCI Express® (GPEX) family of IP solutions which includes End Point (GPEX-EP), Root Complex (GPEX-RC), Hybrid (GPEX-HY), Switch port Controller (GPEX-SW), GPEX-AXI Bridge (GPEX-AXI) and GPEX-AHB Bridge (GPEX-AHB) designs.

The controller’s simple, configurable and layered architecture is independent of application logic, PHY designs, implementation tools and most importantly, the target technology. Mobiveil solution allows the licensees to easily migrate among FPGA, Gate array and Standard cell technologies optimally. Its flexible backend interface makes it easy to be integrated into a wide range of applications. Mobiveil solution provides highly scalable bandwidth through configurable lanes, widths and frequencies.

GPEX-SWITCH leverages Mobiveil’s years of experience in PCI, PCI-X and HyperTransport technologies and the expertise in creating system validated IP solutions with RTL, synthesis, simulation, board and software elements to offer lowest risk in terms of compliance and inter operability.

Features

- Built to support PCIe® base specification 5.0 (32 Gbps per lane) and backward compatible with PCIe® versions 4.0, 3.1, 2.0 and 1.1
- Compliant with PCI-to-PCI Bridge Architecture Specification Revision 1.2
- Architected for high link utilization and low latency
- Non-blocking architecture.
- 32/64/128/256/512 bit Datapath
- Each port can support a unique feature set
- Completely handles PCI Express® ordering rules
- Implements flow control logic for both directions
- Optional AMBA Master and Slave Interface to the Application logic
- 8bit/16/32/64-bit Pipe interface for external ports on link side that Supports PIPE 5 Compliant PHYs
- Support for link re-configuration, programmable link width on multi-lane ports
- Supports parallel address decoding at each ingress port
- Advanced Error reporting for all switch ports and embedded endpoints
- Full PCI-PM and ASPM Support for L0s, L1 and L1 PM Substate Support
- Configuration access to internal ports and type-1/type-0 conversion for configuration transactions targeted to downstream devices
- Unsupported request and unexpected completion handling for both upstream and downstream traffic
- Round Robin and Strict Priority arbitration with starvation detection options for Port Arbitration
**Specification**

**Configurable Options**
- Maximum Link Width (x1, x2, x4, x8, x16)
- Maximum TLP data payload size supported (128B to 4KB)
- Data Path Widths (32, 64, 128, 256 and 512 bit)
- 8-bit/16-bit/32-bit/64-bit PIPE interface
- Transmit Retry/Receive Buffer size
- Number of Virtual Channels
- Upstream port / downstream port
- Inclusion of specific sublayers etc.
- ASPM L1 / Wake support, Auxiliary power support
- L1 PM Substate Support
- Hot plug support

**Design Attributes**
- Highly modular and configurable design
- Layered architecture
- Fully synchronous design
- Supports both sync and async reset
- Clearly demarked clock domains
- Software control for key features
- Multiple loop backs for debug

**Product Package**
- Verilog RTL Code
- UVM based test bench and behavioral models
- Test cases
- Protocol checkers, bus watchers and performance monitors
- Configurable synthesis shell

**About Mobiveil**

Mobiveil is a fast-growing technology company that specializes in development of Silicon Intellectual Property (SIP), platforms and solutions for AI/ML, Flash Storage, Data Center, 5G Telecom, Automotive and Industrial IOT applications. The Mobiveil team leverages decades of experience to deliver high-quality, production-proven, high-speed serial interconnect SIP cores, and custom and standard form factor embedded platforms to leading companies worldwide. With a highly motivated engineering team, dedicated integration support, a flexible business model, strong industry presence through strategic alliances and key partnerships, Mobiveil solutions add value to users by matching their product goals on time and within budget. Mobiveil is headquartered in Silicon Valley with engineering development centers located in Milpitas, CA, Chennai, Bangalore and Hyderabad, in India, and sales offices and representatives located in the U.S., Europe, Israel, Japan, Taiwan and the People’s Republic of China.

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Patents and Patents pending.