# RENESAS

# Design Tip: New IDT® PCI Express® Switch Features

## Description

With Non-Transparent Bridging (NTB) functionality and innovative switch partitioning feature, the new IDT PES32NT24G2 allows true multi-host or multi-processor communications in a single device. Integrated DMA controllers enable high-performance system design by off-loading data transfer operations across memories from the processors. The PES32NT24G2 supports the PCIe® optional features of Access Control Services (ACS) and Alternative Routing ID (ARI). This design tip provides a high level introduction to the innovative and unique features of the PES32NT24G2 and provides some application

## Innovative Features

The PES32NT24G2 provides many unique and innovative features to support a wide variety of applications such as servers, storage, communications, and embedded systems. The switch ports are highly configurable, allowing the PES32NT24G2 to be quickly designed into multiple system configurations for different applications, thereby reducing overall development time and cost. The switch partitioning feature allows multiple logical virtual switches to be created. A single PES32NT24G2 switch can replace multiple physical PCIe switches. The total cost of ownership is reduced by lower power consumption, less board space requirements and lower system interconnect cost.

Up to eight NTB ports are supported to allow multi-host systems to be built. The NTB function on a port can be enabled or disabled dynamically to support a highly redundant system. The integrated DMA engine moves data in the PCIe address space, offloading the CPU from moving data and improving system performance.

The multicast feature provides the ability to replicate data from a sender to multiple destinations simultaneously, off-loading CPU cycles and creating better link utilization. The failover feature allows a dual-host active/standby system to be built, ensuring reliability and availability in case of a host failure. In a multi-host system, each host can use event signaling to monitor the status of any port in the switch and initiate error recovery procedures.

Request metering may be used to reduce congestion, thereby improving overall system performance.

Each host in a multi-host system may run from its own local clock with spread spectrum clocking (SSC) enabled. Multiple clock domains support is important in such systems. The PES32NT24G2 supports very flexible clocking modes. Ports may operate with an independent SSC, providing greater in-board design and system-level configuration across backplanes or cable. The on-chip temperature sensor allows the device temperature to be monitored in real time. The system may be shut down gracefully when the temperature exceeds the upper operating temperature of the device to avoid permanent damage to the system or device.

## Conclusion

In addition to having the standard PCIe Base Specification 2.1 features, the PES32NT24G2 supports many innovative and unique IDT features to allow high performance, redundant and lower cost systems to be built. This device is a must-have in every system designer's tool box.

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