

### PEX 8604 Highlights

- **PEX 8604 Vitals**
  - 4-lane, 4-port PCIe Gen 2 switch
    - Integrated 5.0 GT/s SerDes
  - 15 x 15mm<sup>2</sup>, 196-ball PBGA package
  - Typical Power: 1.29 Watts
  
- **PEX 8604 Key Features**
  - **Standards Compliant**
    - PCI Express Base Specification, r2.0 (backwards compatible w/ PCIe r1.0a/1.1)
    - PCI Power Management Spec, r1.2
    - Microsoft Vista Compliant
    - Supports Access Control Services
    - Dynamic link-width control
    - Dynamic SerDes speed control
  - **High Performance**
    - ◆ **performancePAK**
      - ✓ Read Pacing (bandwidth throttling)
      - ✓ Dynamic Buffer/FC Credit Pool
    - Non-blocking switch fabric
    - Full line rate on all ports
    - Packet Cut-Thru w/ 190ns max packet latency (x1 to x1)
  - **Flexible Configuration**
    - Ports configurable as x1, x2
    - Registers configurable with strapping pins, EEPROM, I<sup>2</sup>C, or host software
    - Lane and polarity reversal
    - Compatible with PCIe 1.0a PM
  - **Multi-Host & Fail-Over Support**
    - Configurable Non-Transparent (NT) port
    - Failover with NT port
  - **Quality of Service (QoS)**
    - Eight traffic classes per port
    - Two Virtual Channels (VCs)
    - Weighted round-robin source port arbitration
  - **Reliability, Availability, Serviceability**
    - ◆ **visionPAK**
      - ✓ Per Port Performance Monitoring
        - Per port payload & header counters
      - ✓ SerDes Eye Capture
      - ✓ Error Injection and Loopback
    - All ports hot-plug capable thru I<sup>2</sup>C (Hot-Plug Controller on every port)
    - ECRC and Poison bit support
    - Data Path parity
    - Memory (RAM) Error Correction
    - INTA# and FATAL\_ERR# signals
    - Advanced Error Reporting
    - Port Status bits and GPIO available
    - Per port error diagnostics
    - JTAG AC/DC boundary scan

### Application:

**Basic fan-out in consumer applications**

### PLX Products:

**PEX 8604 – 4-lane, 4-port PCIe Gen 2 Switch**

### Key Benefit:

**Low power; small package, Fan-Out**

### Consumer Applications

For several years now, PCI has been a key interconnect in the embedded CPUs and SoCs used in consumer applications. It is not until recently that these embedded CPU and SoCs are migrating the IO interface from a parallel PCI bus to a serial PCIe implementation. Because PCIe is a high-speed serial interconnect, it is not uncommon to see a PCIe interface with only a single lane (x1) at 2.5Gbps speeds being implemented. A x1 PCIe connection at 2.5Gbps provides 250MB/s of throughput in each direction; enough for these consumer applications.

### TI TMS320DM8168 DaVinci Video Processor

Embedded CPU vendors such as Cavium, Freescale and Marvell are some of the first vendors with integrated PCIe in their product offerings. All three vendors have several products with PCIe interfaces. TI however, has been slow in implementing PCIe in their consumer product offering. But TI has recently announced its first Video Processor SoC with integrated PCIe. Along with many other interfaces for video capture applications, the TI TMS320DM8168 video processor implements a x1 PCIe interface for IO connectivity.

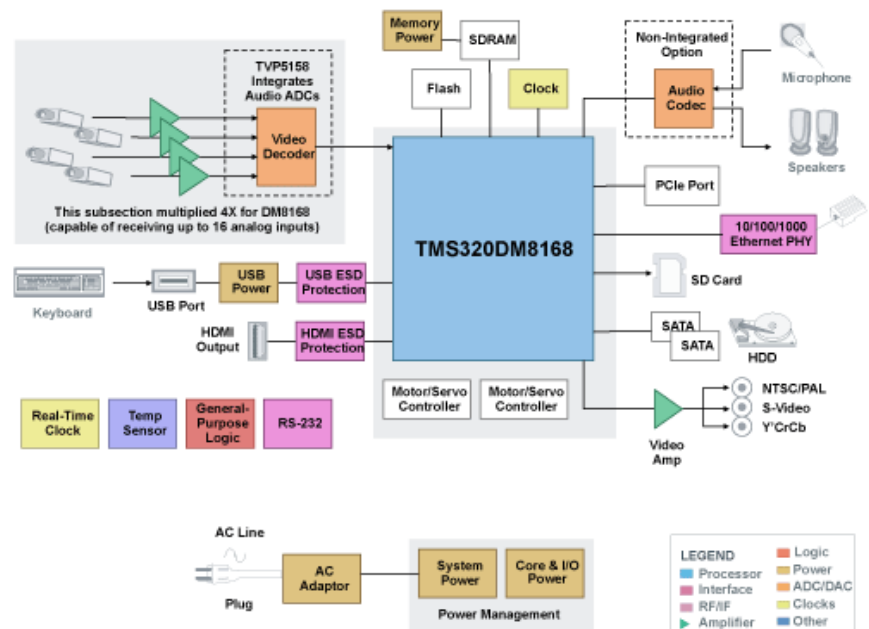


Figure 1. Simple DVR Block Diagram

### DVR Block diagram using the TMS320DM8168

From Figure 1, it is clear that the TI SoC has a high level of integration. The figure shows the video processor in a DVR application. The block diagram shows that there are analog and digital video inputs, SATA connections for the video storage, HDMI output and USB ports for user interface devices.

Another example for the TMS320DM8168 is that of a video communications application as shown in Figure 2 below.

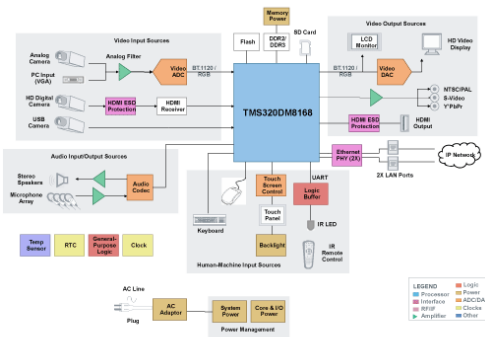


Figure 2

### Increasing the connectivity

We have seen that the TI video processor provides many IO interfaces. Although a x1 PCIe connection provides 250MB/s at 2.5Gbps, the PCIe protocol is a point-to-point protocol. That is, only a single device can be connected to one port. In the case of the video processor, that means that only one endpoint can be attached directly to the PCIe interface.

### DVR with Wireless and USB 3.0 functions

A PCIe switch can be used to provide additional connectivity on the PCIe interface. Figure 3 shows the block diagram of a PCIe switch.

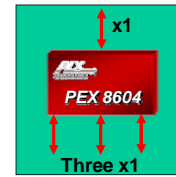


Figure 3

The PEX8604 consists of four ports each with x1 link widths and 5.0 GT/s SerDes (can work at 2.5Gbps as well). Figure 4 shows the PEX8604 being used provide wireless and USB 3.0 functionality to the DVR application. The PEX8604 is used to increase the number of PCIe ports available from one to three without burdening the video processor.

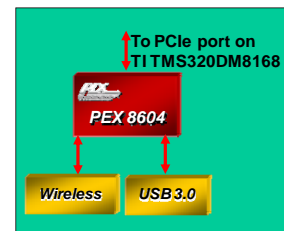


Figure 4

Similarly, Figure 5 shows the PEX 8604 being used in the video communications application to add storage and wireless capability. In this case, one of the gigabit interfaces on the video processor is disabled and the PCIe interface is enabled. The PEX 8604 provides additional PCIe connections to which SATA and Wireless controllers can be attached.

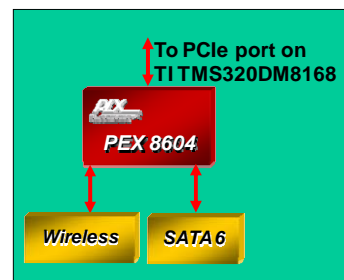


Figure 5

### Additional PLX Advantages

visionPAK Software Tools

- SerDes Eye Width/Height Capture
- Per Port Performance Monitoring
- Error Injection & Loopback

Available on PLX Website:

[www.plxtech.com/8604](http://www.plxtech.com/8604)

- Product Brief, Databook, Application Notes, Technical Support