



Intel® Digital Security Surveillance with PCI Express* Technology

Build cost-effective PCI Express devices using Intel's reference design for streamlined development

Overview

This application brief describes the use of PCI Express* technology in combination with Intel® Digital Security Surveillance (Intel® DSS) building blocks. Intel has created the first reference design for a PCI Express video-capture card that contains on-board decoder chips with a PCI Express to PCI bridge, fully engaging interconnect bottlenecks and increasing the overall efficiency of Intel DSS systems. This PCI Express interface reference design offers developers a shorter time-to-market with products that can satisfy the enormous video-data management demands of security customers, while enabling lower development cost.

Product Highlights

PCI Express Interface Capture Card

- 16 or more cameras can be connected to the card
- Intel® 41210 Serial to Parallel PCI Bridge enables rapid and relatively simple time-to-market migrations with the reference design for PCI Express x8 or x4 PCI Express link
- Hot-plug/hot-swap capability enabled
- Fully compatible with legacy PCI software; no changes needed for drivers or BIOS
- Low pin-count, offering simple motherboard layout, reduced board space and fewer PCB layers than parallel technologies

Intel® DSS Building Blocks

- Scalable platform designs ready to help you meet the future demands of video-processing applications
- High performance for flexible software-based digital video encoding

- Virtually limitless digital storage capacity
- Remote central administration
- Support for cameras networked on wireless (802.11b), Ethernet LAN, conventional CCTV cameras
- System redundancy
- Off-site backup and disaster recovery
- DDR memory support with ECC

The Challenge

The demand for heightened security is motivating government agencies, facility managers and businesses to assess the capabilities of their security surveillance systems. A critical bottleneck has been identified at the level of interconnects with camera inputs. PCI-bus interconnects are the core issue when the design scale increases to support more cameras. PCI-based systems have known scalability issues, and yet most organizations can't afford to sacrifice legacy infrastructure and prior investments in PCI software.

Dependence on PCI devices is a widespread problem; the technology has been deployed at the local interconnect level for over a decade. But today's applications are demanding higher bandwidths that exceed the limits of parallel-bus architecture.

The Solution

Intel offers a high-performance solution in response to these conditions, making use of PCI Express technology. PCI Express is the logical choice for interconnect products being developed today, because it provides high-bandwidth, low pin-count, and serial interconnect technology, while remaining compatible with existing PCI infrastructure.

The new Intel reference design for a video-capture card integrates on-board decoder chips with a PCI Express to PCI bridge, thus eliminating the interconnect bottleneck. For customers, this technology represents a comfortable extension of existing surveillance systems, promising a smooth migration towards highly scalable next-generation solutions.

Eliminating the Bottleneck

A bandwidth bottleneck occurs in PCI interconnects whenever eight or more cameras are feeding simultaneous input at full D1 resolution. With the current chipset, the maximum available bandwidth is 133 MBps. Yet at D1 resolution, a single PCI composite input uses a bandwidth of more than 147 Mbps (30 fps x 16-bit x (640 x 480 pixels)).

However, using PCI Express technology, the PCI Express x8 link bandwidth can go up to 40 GBps. With increased bandwidth removing the bottleneck at the interconnect, more cameras can be connected to the platform. This also frees the CPU to handle the system's more complex tasks, such as object tracking.

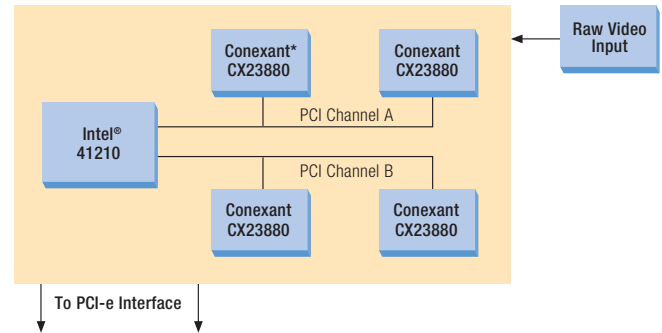
Reference Design Elements

The Intel PCI Express interface reference design utilizes the Intel 41210 Serial-to-Parallel PCI Bridge and Conexant* CX23880 multifunction capture chips.

The Intel 41210 Bridge delivers a distinct time-to-market advantage when adapting existing PCI/PCI-X card designs for connection to PCI Express host systems and embedded platforms. The 41210 is also the logical choice for migrating complex, multifunction device cards with mixed PCI and PCI-X devices to PCI Express platforms. The 41210 enables multichannel, high-density board designs with dual PCI/PCI-X bus segments and 6 bus masters per segment, ideal for high-bandwidth, transfer-intensive applications and server configurations (e.g., Fibre Channel, SCSI, iSCSI, and Ethernet).

The Conexant CX23880, a third-party multifunction capture chip with MPEG II interface, provides external data compression, freeing the CPU for other tasks. The chip provides audio and video capture,

PCI Express* Interface Capture Card Reference Design



video display, audio playback, or storage for later playback. The audio and video decoders support all analog broadcast formats in use worldwide, as well as streaming digital data and broadband data over terrestrial, satellite or cable links.

Conclusion

Intel reference designs include reference schematics and proof-of-concept, stimulating the development of value-added designs for the security marketplace in a relatively rapid timeframe. These scalable platform designs can help you meet the demands of future video-processing applications. Use Intel DSS building blocks and reference designs to accelerate your innovation cycle.

For More Information

As a leading silicon provider for both the communications and computing industries, Intel is committed to aligning all of its compute and communications silicon, platforms, solutions and ecosystem-enabling with PCI Express. Intel supports PCI Express architecture with many programs for device manufacturers and equipment vendors that help them realize the benefits of this technology.

For more information, please see:

<http://developer.intel.com/info/dss>

<http://www.intel.com/design/storage>

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