ADLINK
Leading EDGE COMPUTING

Application Story

Enabling Easy-to-Upgrade Onboard Video Surveillance Systems with Flexible COM Express® Modules

www.adlinktech.com

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Introduction

Reliable, safe, high-capacity rail transport has played an essential role in the history of modern human civilization, and its importance continues to grow with technological advances. Although current market attention mainly focuses on rail transport applications such as automatic train control (ATC), onboard passenger Wi-Fi services and passenger information systems (PIS), railway operators still attach great importance to video surveillance in both passenger and control cars for safety reasons. As such, system integrators (SIs) are keen to help railway operators design and build onboard video surveillance systems.

An onboard video surveillance system generally includes three major elements: IP cameras, power over Ethernet switches and network video recorders (NVR). SIs consider NVRs the core of the system as they carry out the recording, storage, management and transmission of video images. In view of the special characteristics of rail transport, SIs have to pay attention to system reliability while keeping an eye on development costs and delivery timeframe. They also need to prepare the system for future upgrades and expansion to accommodate new technological advances. For all these reasons, SIs often have difficulty choosing a suitable NVR system architecture.

Highly flexible COM Express® module helps shorten development cycle and reduce costs

Box PCs are the most widely used NVR system architecture at present. Although a box PC has the advantages of low costs and easy deployment, when functional requirements change, it has to be replaced and the new box PC has to be re-validated for reliability and compatibility with the whole system. As an alternative, more and more customers are opting for CompactPCI systems with modular design to flexibly accommodate expansion needs. However, the process of design, development and validation of a CompactPCI processor blade generally takes 9 months on average. Not only is this cost-ineffective but it will also affect project schedules. On the other hand, using a COM Express module and carrier board in CompactPCI form factor to design and develop the processor blade extends the system lifecycle, shortens customer's development cycle and speeds up time-to-market. An even bigger advantage is that customers will be able to upgrade the system without having to change the board design. All that is necessary is selecting a COM Express module equipped with a processor delivering a suitable performance level based on requirements and swapping it in.

Compared to traditional CompactPCI systems or box PCs, CompactPCI systems based on COM Express modules cut the development cycle by half, enable flexibility for future upgrades and save material costs by at least 30%. This has made them the final choice for many SIs.

Vibration resistance, wide operating temperature range and reliable system performance

To handle challenging operating conditions, the cExpress-HL is designed with a rugged PCB and careful considerations are made with respect to component selection, circuit layout, PCB configuration, heat dissipation and manufacturing processes to allow it to cope with extreme environments. In this example, the NVR is used in a more challenging environment than most common industrial applications. In the design stage, the customer required that the cExpress-HL pass stringent environmental tests, such as a wide operating temperature range of -40°C to 85°C, as well as compliance with MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D military standards, IEC 60068-2-64 and IEC-60068-2-27 vibration and shock resistance and HALT to guarantee the NVR be able to maintain reliable operation when storing, managing and transmitting video images.

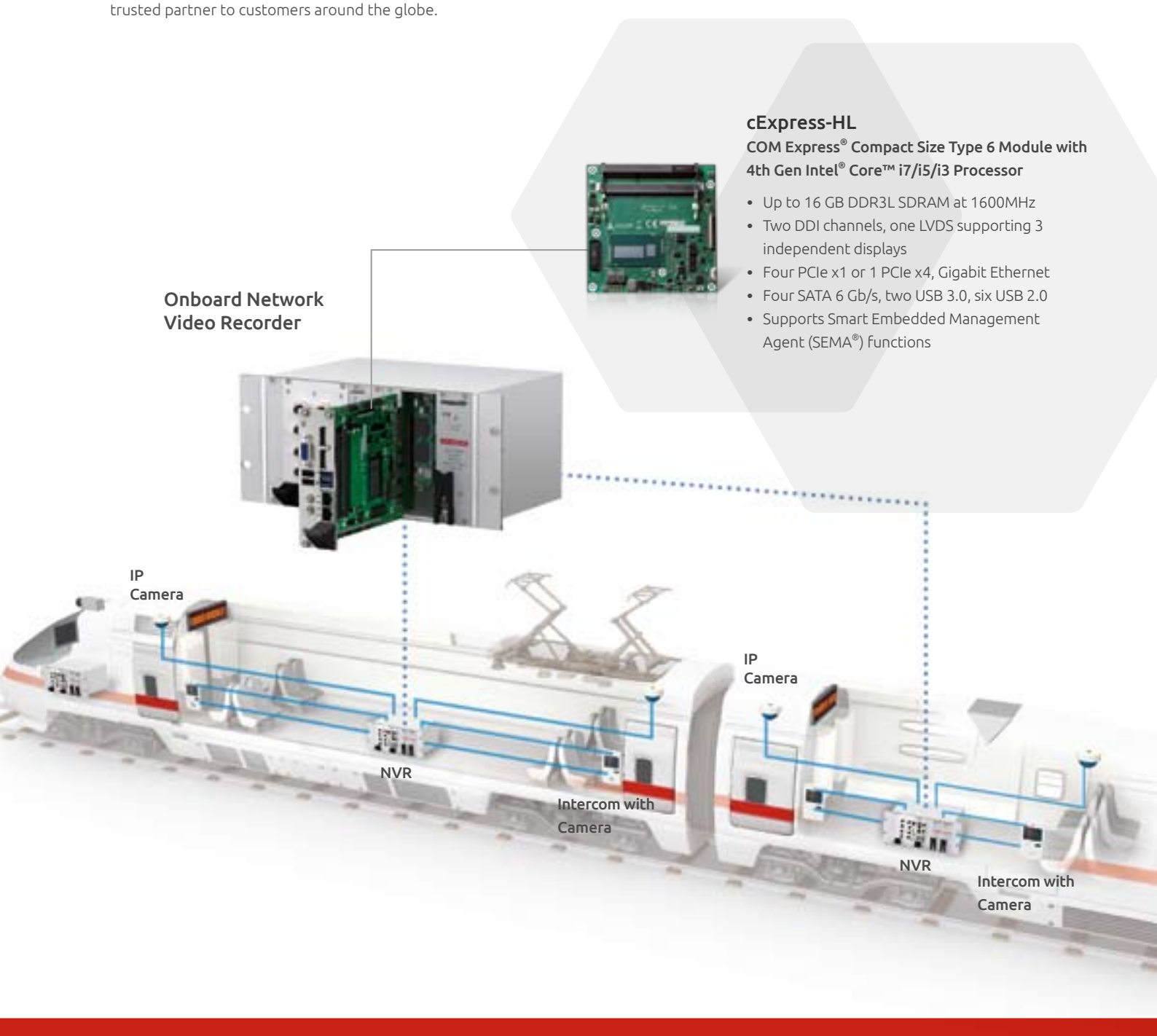
With ample SATA interface ports, video data storage is no longer an issue

A Spanish SI has been using COM Express module-based CompactPCI systems for years. When its COM Express modules reached end-of-life (EOL), it had to deal with the upgrade to newer generation processors. Additionally, there was an urgent need to expand video storage space as their legacy image data transfer interface had become outdated. After careful consideration, the decision was made to migrate to ADLINK's cExpress-HL, a COM Express Type 6 module with 4th generation Intel® Core™ processors and four SATA 6Gb/s ports, providing enough I/O capacity to enable storage of more than one to two weeks of video from four to eight IP cameras in one train car. This massive storage capacity reduces the required frequency of surveillance video backups, thereby saving labor costs for railway operators.

Guaranteeing system reliability, ADLINK provides strong support to customers

For system stability considerations, railway operators are generally reluctant to upgrade or change their system software. The SI in this use case wanted to continue using the legacy BIOS that had been validated. Willing to fully support the customer, ADLINK pre-programmed the validated BIOS into the cExpress-HL modules used for this application, including the card manufacturing date, BIOS version number, UUID and serial number, in order to streamline production and future maintenance, thus saving a great deal of time and speeding up the project schedule. In addition to this custom BIOS service, ADLINK was able to provide prompt support to resolve compatibility problems during software and hardware integration.

In response to vertical market demands such as those of the railway sector, ADLINK will continue to provide reliable and rugged products with optimal expansion flexibility while also offering high-quality technical support to resolve customer's pain points. ADLINK strives to be a trusted partner to customers around the globe.



Related Products

Model	cExpress-BL	Express-CF/Express-CFE
Processor	5th Gen. Intel® Core™ i7-5650U/i5-5350U/ i3-5010U/3765U processors (formerly "Broadwell-U") and Celeron® 3765U processors	8th Gen. Intel® Core™ i7-8850H (Hexa-core), i5-8400H (formerly "Coffeelake-H") and Xeon® E-2176M processors
Chipset	-	CM246 (ECC) QM370/HM370 (non-ECC)
Memory	32 GB DDR3L at 1600/1333 MHz	48 GB DDR4 at 2400/2133 MHz (ECC for Express-CFE)
BIOS	AMI Aptio V	AMI Aptio V
Integrated Graphics	supporting 3 independent and simultaneous displays Combinations of DisplayPort/HDMI/ LVDS or eDP outputs	supporting 3 independent and simultaneous display combinations of DisplayPort/ HDMI (or VGA), LVDSor eDP outputs
Graphics Features	DX 11.1, OpenGL 4.2/4.0	DX 12, OpenGL 5.0 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec / VP9 10-bit decode
LAN	Intel® i218LM/V	Intel® i219LM/V
USB	2x USB 3.0, 6x USB 2.0	4x USB 3.0, 4x USB 2.0
Serial ATA	4x at 6Gb/s	4x at 6Gb/s
PCI Express	4x PCIe x1 (Gen2) (5 PCIe x1 w/o GbE, opt.)	1x PCI Express x16 (Gen3) 8x PCI Express x1 (Gen3)
TPM (opt.)	Yes (TPM 1.2)	Yes (TPM 2.0)
Power supply	5-20 V / 5Vsb ±5% (ATX) 5-20V (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)
Operating temperature	Standard: 0°C to +60°C Extreme Rugged: -40°C to +85°C (standard 12V input only)	Standard: 0°C to +60°C
Dimension	PICMG COM.0 R2.1, Type6, Compact 95mm x 95mm	PICMG COM.0 R2.1, Type6, Basic 125mm x 95mm
Operation systems	Windows 7/8.1, WES 7, WE8 Std, Linux , VxWorks (32/64-bit)	Windows 10 64-bit, Yocto Linux 64-bit, VxWork 64-bit

*All specifications are subject to change without further notice.

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