

## Special Edition ADLINK Technology



### High Performance HEVC Codec

Technical Article:

High Performance HEVC Codec Opens a New Chapter for the 4K UHD Era



### ADLINK Open Compute Project Specification Approved for Carrier Grade CG-OpenRack-19

- Open architecture for multi-silicon, multi-use sleds
- DataCenter/MediaCenter



### Intelligent Traffic Control Center

ADLINK Application Story:

Partnering with Vivotek to construct an intelligent traffic control center



### IIoT-ready platform supports e-car infrastructure

Compact IoT Gateway/Controller delivers a secure and robust platform with minimal footprint



### Standard Architecture Boards

Qseven, SMARC, COM Express, PC/104  
PCIe, Mini-ITX, Industrial Motherboards,  
CompactPCI, VPX,  
ATCA, PXI



**ADLINK**  
TECHNOLOGY INC.

# About ADLINK

*Global Technology-leading Platform Provider in the Embedded Computing Industry*

## Global Presence, Local Touch

Headquartered in Taiwan, ADLINK has operations in the United States, Singapore, China (Beijing, Shanghai, Shenzhen), Japan, Korea and Germany. ADLINK products are currently available in over 40 countries across five continents, with worldwide distribution networks and more than 1,800 employees. ADLINK is proud to be associated with many major technology leaders and Fortune 500 companies. With design and technology centers in the U.S., the Pacific Rim regions and Germany, ADLINK is a technology-leading platform provider in the embedded computing industry.

## Corporate Mission

Leading Edge Computing: ADLINK's goal is to provide robust and reliable hardware platforms, data connectivity and complete Industrial Internet of Things (IIoT) solutions that drive data-to-decision applications across industries.

## Corporate Vision

Be a leading enabler of Edge Computing. Reduce the complexity of building IIoT systems. Connect the unconnected.

## Dedication to Standards

ADLINK believes that industry standards enable our customers to focus on their core competencies, accelerate time-to-market, and lower costs. We lead and actively participate in standards committees to drive innovation and ensure that the standards continue to meet our customers' needs.

## Major Market Segments served

- Industrial Automation & Measurement
- Networking / Telecom
- Transportation
- Medical
- Defense
- Infotainment

MORE: [CLICK HERE](#)

## Last minute sad news



## RTOS pioneer James F. Ready passes away

A few days ago, I heard of the death, just before Christmas, of my old business relation, Jim Ready.

Jim invented the commercial real-time operating system (RTOS).

In 1980, Jim was co-founder of Hunter & Ready (Colin Hunter & James Ready), the developers of VRTX - the first commercially available RTOS.

« Beginning of the 1980s I visited them in California to negotiate the distribution contract, I was at that time Managing Director of a Technical Distributor in Europe (DIODE/ARROW till 2000) specialized in Semiconductors and Embedded Computers including VME from Motorola ».

In 1999 Jim found Montavista, which pioneered embedded Linux.

My last contact with Jim is an e-mail from September 7, 2013

RIP Jim. \_ Daniel Dierickx, e2mos

**MORE about Jim:** see page 12, an excellent article written by Colin Walls Jim's old friend and colleague. Colin is now an embedded software technologist in the Mentor Graphics Embedded Software Division and is based in the UK.

Daniel Dierickx  
CEO & co-Founder  
at e2mos  
Acting Chief Editor



## Dear Reader,

Here is your free copy of Embedded Systems World, one of our five magazines published by e2mos.

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WEB: [www.e2mos.com](http://www.e2mos.com)

Contact: [mgt@e2mos.com](mailto:mgt@e2mos.com)

# High Performance HEVC Codec Opens a New Chapter for the 4K UHD Era



We are currently entering the Ultra High Definition (UHD) era with ubiquitous 4K resolution and HEVC encoding. This article will explain why 4K/HEVC will become a stringent requirement for video-related industries & how ADLINK's MCS-2080 video management system uses the highly efficient HEVC codec to allow video service providers to address the challenges of providing 4K video to their customers.

## ADLINK Launches Industrial-Grade Intelligent Video Management Server for 4K H.265 Video Processing Applications

With integrated high performance GPUs, the MCS-2080 2U high-density platform offers improved graphics and video processing performance for surveillance, broadcasting and conferencing

ADLINK Technology, a global provider of leading edge computing solutions that drive data-to-decision applications across industries, today introduced the MCS-2080 Intelligent Video Management Server, a dedicated, high-density platform featuring up to sixteen Intel® Xeon® processors E3-1585 v5. ADLINK's MCS-2080 is an application-ready intelligent platform offering a high-performance and high availability design to meet the critical challenges of 4K & H.265 video applications in surveillance with video analytics, broadcasting, and video conferencing used in remote education and healthcare environments.

Today's ubiquitous use of video means that cloud-based service providers are required to perform extensive data processing. In surveillance, IP cameras record large-volume video files with at resolutions up to 4K. In broadcasting, high-performance hardware transcoding capability saves valuable time for video editors. In video conferencing, real-time and high-resolution video streaming consumes significant computing power. Previously, these applications used less efficient off-the-shelf commercial servers or dedicated digital signal processing (DSP) devices that require long development cycles for upgrades. ADLINK's MCS-2080 with high density and computing performance meets the challenge of cloud-based data processing with an improved cost-per-channel commercial-off-the-shelf (COTS) solution based on Intel x86 processors.

### MCS-2080 -- 2U 19" Media Cloud Server with Modular Compute and Switch Nodes



- 16 systems (MCN-1500 compute node)
- Supports Intel® Quick Sync Video (Intel® Iris Pro Graphics P580) with hardware assisted H.265/VP9 transcoding
- Dual redundant switch nodes, each providing 16x 1G internal links to compute nodes and 4x 10G uplinks
- 8x PCIe x8 slots to meet expansion requirements
- ADLINK MediaManager provides end-to-end video server prototype solution to speed up product development
- IPMI 2.0 with SOL and web-based management interface
- Adaptive fan speed and intelligent power supply monitoring

"The MCS-2080 offers a cloud-friendly architecture and an application-ready intelligent platform to solution providers for video services," said Yong Lo, general manager of ADLINK's Networking, Communication and Public Business Unit. "The MCS series with Intel® Xeon® processor E3-1585 provides the best cost per channel ratio by using an integrated Intel® GT4e GPU and Intel® Media Server Studio middleware to improve video processing performance without the need for an extra GPU card. Instead, the integrated GPU handles video processing tasks, leaving CPU resources available to process analytics."

The MCS-2080's 2U, 19" industrial-grade design provides high availability with redundant and hot-swappable modules. Supporting sixteen independent systems, solution providers have the flexibility to arrange several different functions into one platform. Taking surveillance as an example, a Video Management System (VMS), Central Management System (CMS), and Video Surveillance System (IVS) can all be integrated together in one MCS-2080 server, easing management requirements and saving space in the server room.

ADLINK's MCS-2080 is especially designed to support medium- to large-scale intelligent video management applications. The MCS-2080 leverages Intel® Quick Sync Video (GT4e GPU) and a middleware layer with the Intel® Media Server Studio (MSS) to implement hardware-assisted HEVC/H.265 video processing. The platform offers dual-redundant switches with sixteen 1G internal links and four 10G uplinks, as well as dual-redundant power supplies to meet industrial-grade design requirements. Eight PCIe x8 slots provide for scalable expansion of functionality. The MCS-2080 also supports the Intelligent Platform Management Interface (IPMI) 2.0 with Serial Over LAN (SOL) redirection and web-based management, and offers adaptive fan speed and intelligent power supply monitoring. Onboard storage is provided by mSATA slots supporting SSD modules up to 512GB.

For more information about ADLINK MCS-2080 Intelligent Video Management Server, please [CLICK HERE](#)



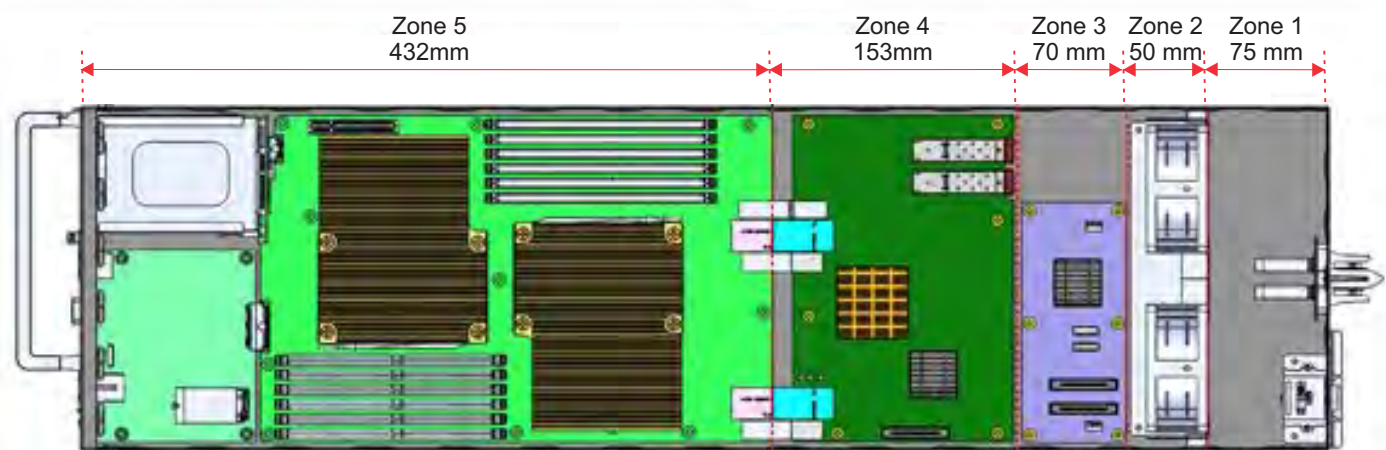
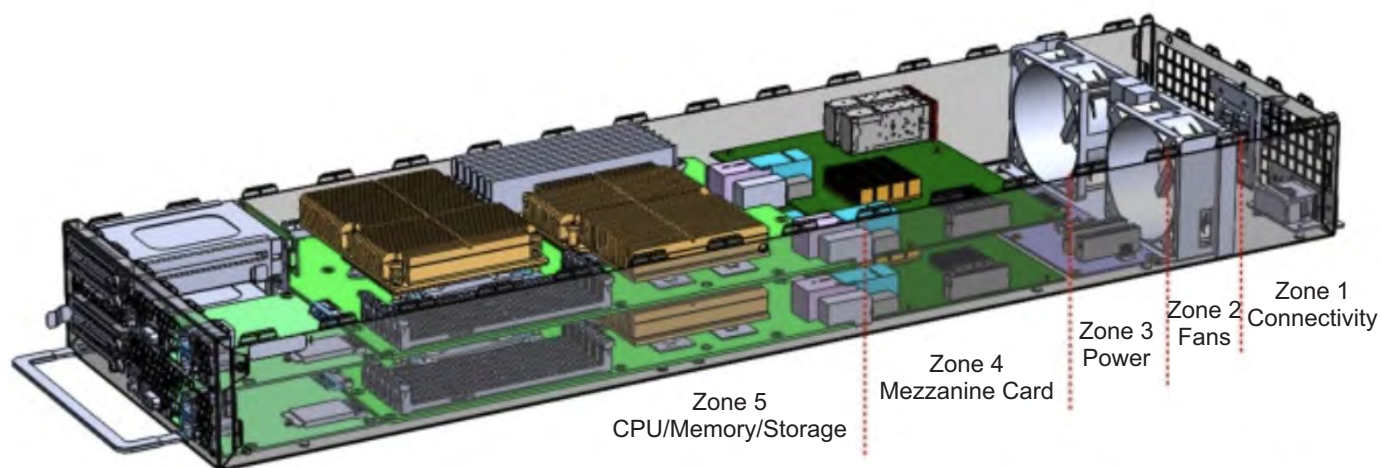
# ADLINK Open Compute Project Specification Approved for Carrier Grade CG-OpenRack-19



OCP approves Open Sled Zone specification based on ADLINK's Open Compute Carrier-grade Edge Reference Architecture and Plan of Intent through 2020

## Driving the OCP CG-OpenRack-19 Open Sled spec as a specialized telecom sled enabling a multitude of options for custom, specialized solutions:

- Enables HW acceleration, additional silicon options, pre-integrated software, and the ability to reuse common sleds for a multitude of types of systems
- Focuses on key differentiations for Network deployed products for Telecom specific applications (DPI, Security, Policy, Media and Transcoding)



### Definitions for half-width and full-width OpenSleds:

- Zone 1 - Open air for environmental area
- Zone 2 - Cooling and air flow definitions/requirements
- Zone 3 - Power module specifications and board layout
- Zone 4 - Mezzanine for NIC to ToR, provides additional options for acceleration and custom
- Zone 5 - Server/Memory/Storage and optional front panel definitions. 4 CPU's (2 sockets each)

... to next page

# ADLINK Open Compute Project Specification Approved for Carrier Grade CG-OpenRack-19 ... from previous page



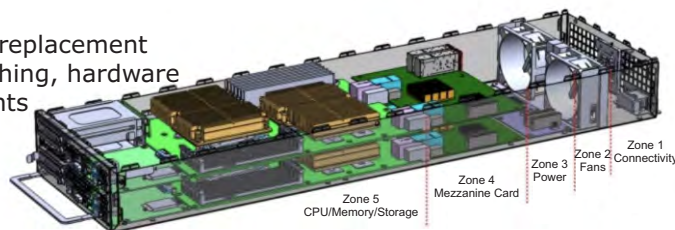
## OCP approves Open Sled Zone specification based on ADLINK's Open Compute Carrier-grade Edge Reference Architecture and Plan of Intent through 2020

ADLINK Technology, Inc., a global provider of leading edge computing solutions that drive data-to-decision applications across industries, has successfully introduced its OpenSled specification, contributing to the evolution of the next generation of appliances that fit into the Open Compute Project (OCP) CG-OpenRack-19 specification.

Standards development around networking and communications frameworks has become increasingly important with the growing utilization of edge, cloud and fog computing architectures that support the OT/IT/CT convergence critical to driving business value. OCP's CG-OpenRack-19 specification is used as a guideline for OCP suppliers and carriers to implement a standards-based computer system within central office environments utilizing an OCP-based infrastructure. This latest OCP- approved OpenSled spec is based on ADLINK's OCCERA(Open Compute Carrier-grade Edge Reference Architecture), which provides the definitions for the internal configuration options of the CG OpenRack Sled, including options for key appliances to utilize additional components inside the sled. These options could include, but are not limited to, multi-host controllers, PCIe switching, software and hardware accelerators & storage solutions.

ADLINK's OCP OpenSled specification enhances the OCP-Accepted™ CG-OpenRack-19 specification submitted by Radisys in December 2016. Radisys laid the foundation for defining the frame, power, interconnect and sled dimensions. ADLINK's OCP OpenSled specification provides:

- A common architecture for OCP CG-OpenRack-19 allowing suppliers to build a standard central office product.
- A one-half width sled for a multitude of options & high component density, with a full width spec to be defined soon
- Zone definitions to give operators confidence that the sled is an open standard, while also providing many options for sled use cases
- An optional removable or hinged front panel for internal board replacement
- A mezzanine zone for Network Interface Modules (NIMs), switching, hardware acceleration, and PCIe expansion slots for off the shelf components
- Zones for server, memory, storage, etc
- Ability to add multi-host controllers, MR-IOV functionality, switching and hardware acceleration for additional capabilities



"ADLINK's their business strategy, aligns perfectly with the mission of the Open Compute Project to extend our open hardware collaboration to our carrier and communications service provider members," said Bill Carter, Chief Technology Officer at the OCP Foundation. "We were excited when ADLINK began working with OCP's Telco project community last year to author and validate the OpenSled specification that builds upon the CG-OpenRack-19 mechanical, power, and interconnect specification contributed by Radisys in 2016. This week, the foundation's incubation committee formally accepts that work effort. Both Radisys and ADLINK, working with many service providers around the globe, have defined and contributed an open rack architecture that shares the efficiency, openness, and scale of our OpenRack specification, with adjustments for central office environments. The shared effort by ADLINK is a testament to how open collaboration is enabling the transformation of the telecom market."

ADLINK's focus on edge computing is a natural evolution from embedded systems to connected embedded computing that facilitates data acquisition and analysis to improve business operations. ADLINK is actively involved in several networking and communications standards organizations, including OpenFog Consortium, Network Intelligence (NI) Alliance, European Telecommunications Standards Institute (ETSI) for NFV and MEC, OpenNFV, OpenEdge Computing, Telecom Infra Project, Edge Computing Consortium and Central Office Re-architected as a Datacenter (CORD). In addition, ADLINK is a part of the Wind River Titanium Cloud Partner Ecosystem, a program dedicated to accelerating the deployment of solutions for NFV, and provides Wind River's Titanium Server software as an integrated solution on ADLINK's OCCERA(Open Compute Carrier-grade Edge Reference Architecture) and SETO-1000 extreme outdoor server; the integrated solution targets NFV/ software defined networks (SDN), MEC and IIoT deployments.

"Over the past several years, ADLINK has moved toward developing networking and communications platforms that enable the current requirements for edge and cloud computing architectures for telecom operators and data centers," said Yong Luo, General Manager of ADLINK's Networking, Communication and Public Business Unit. "We are very excited to work with OCP to drive innovation, customization and choices that enhance and simplify networking and communications infrastructure."

Founded in 2011, the OCP is a collaborative community geared toward reimagining the design of server, storage, networking and other data center hardware with the goal of driving scalable computing through sharing of information and technical specifications. ADLINK has been a Gold Member since May 2016.

To download ADLINK's OCP OpenSled specification, please visit the OCP website [www.opencompute.org/wiki/Telcos#Approved](http://www.opencompute.org/wiki/Telcos#Approved)

For more information on ADLINK's OCCERA, please visit [www.adlinktech.com/OCCERA/](http://www.adlinktech.com/OCCERA/)



# H.265

## Intelligent Traffic Surveillance Platform based on Media Cloud Server MCS-2080

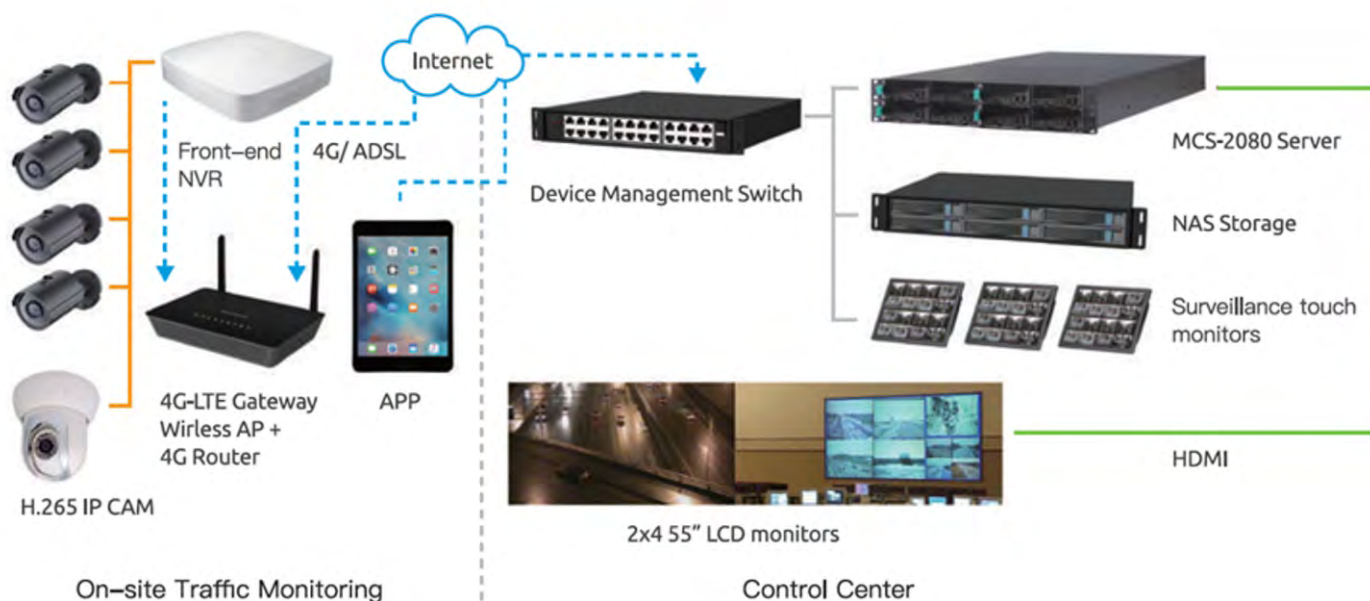


### Introduction

2017 can be considered the dawn of the adoption of video surveillance equipment based on the H.265 video codec. At the Security China 2016 exhibition held in Beijing, the top three Chinese surveillance vendors, **Hikvision**, **Dahua**, and **Uniview**, unveiled a series of H.265 based IP cameras and NVR products. **VIVOTEK**, Taiwan's top vendor of surveillance products, had already launched its H.265 solution including IP cameras, digital video storage and surveillance system, as well as video management software at the end of 2015. For the traffic surveillance market where IP cameras are in great demand and superior video quality are required, 2017 is the year that worldwide users are replacing or upgrading their H.264 cameras and NVR/DVR equipment.

Traffic surveillance systems in developed countries must meet basic requirements such as high resolution video (minimum 1440p, ideally 4K), high image quality (starlight level low-light, super wide dynamic range, dynamic video optimization), high efficiency compression (H.265), but must also include video analytics and smart image recognition functions. Traffic surveillance systems that incorporate intelligent video analytics and recognition now represent a brand new challenge for all server platforms on the market.

New Intelligent Video Analytics (IVA) technology not only provides basic realtime video analysis functionality for traffic condition, traffic volume and pedestrian flow, such as detecting traffic accidents and abnormal congestion, but also enables intelligent searches after a crime, or the ability to detect and prevent crimes before they happen. Basic traffic surveillance video analytics functions include logging pedestrian and traffic flow, face detection, and vehicle color and model detection from each camera. Advanced functions include preliminary analysis to obtain critical frames for image recognition which can be used to search for stolen vehicles, wanted criminals, as well as the presence of suspicious persons or vehicles near a crime scene.



Full Application Story: <https://emb.adlinktech.com/en/index.aspx>  
or request your copy to: [mgt@e2mos.com](mailto:mgt@e2mos.com)

# Robust and Reliable IIoT-Ready Platform with Maximum Functionality



**MXE-210 Series**



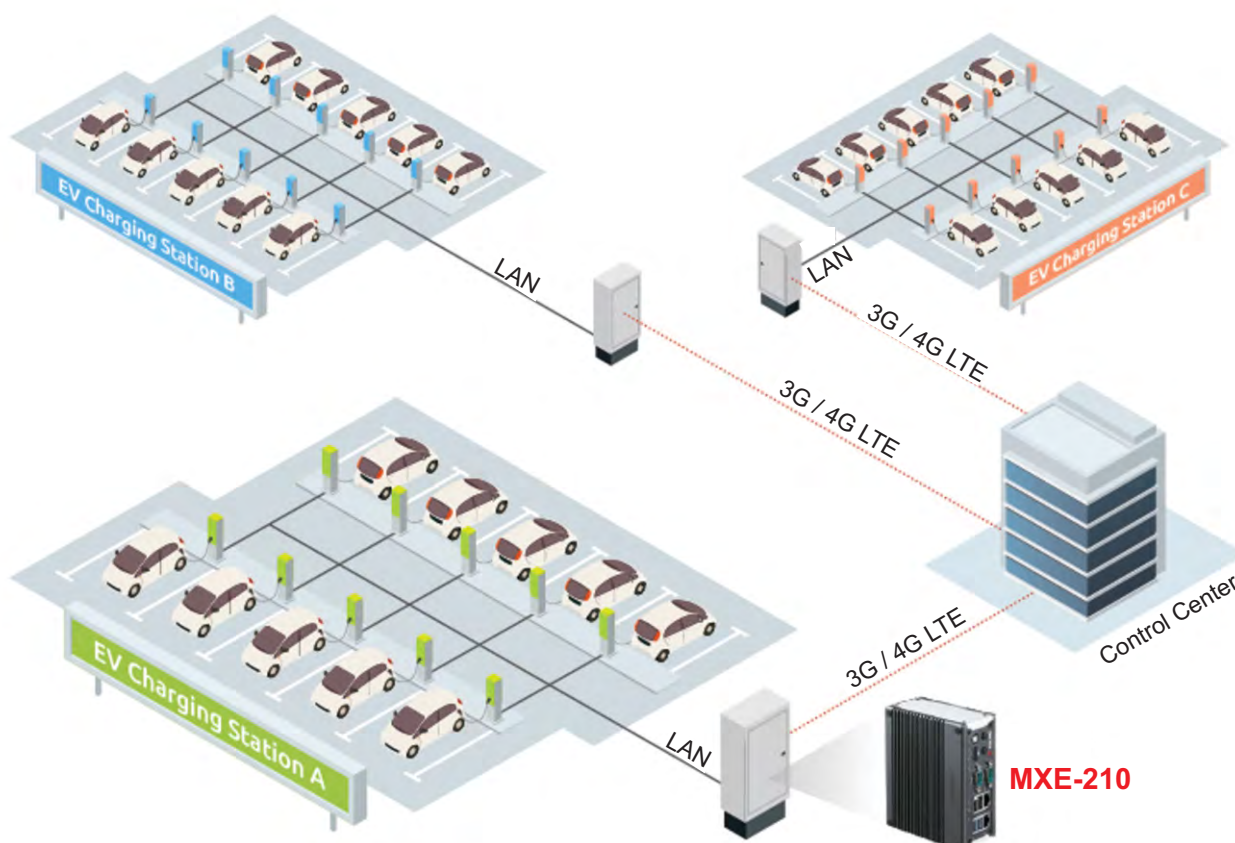
## IIoT-ready platform supports e-car infrastructure



**ADLINK**  
TECHNOLOGY INC.

The MXE-210 Compact IoT Gateway/Controller delivers a secure and robust platform with minimal footprint

Functioning as both a gateway and embedded controller, the MXE-210 bridges the gap between Operations Technology (OT) and Information Technology (IT) data interchanges, with support for third party manufacturers via its wide range of industry standard compliances; support is included for Modbus, EtherCAT, DDS, MQTT, and CANOpen by Vortex Edge Connect, as well as Wi-Fi, BT, LoRa, 3G, and 4G LTE for data communication and wireless connectivity. As a controller, the MXE-210 leverages the same protocols to directly communicate with and manage any standard industrial device.



MORE: [CLICK HERE](#)



# Embedded Computing Boards Overview

[Direct Link Click on the Pictures](#)



## Qseven



Intel-based: several CPU 's  
Standard Size (70 mm x 70 mm)

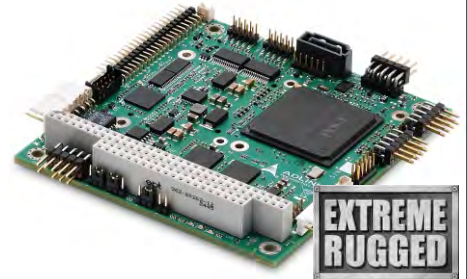
## SMARC

Smart **M**obility **AR**chitecture



Intel-based: several CPU 's  
Short Size (82 mm x 50 mm)  
Full Size (82 mm x 80 mm)

## PC/104 PCI/104 Express



Intel-based: several CPU 's  
PCI/104-Express (V3.0)  
Size (117.4 mm x 96 mm)

## COM Express



Intel-based: several CPU 's

### Type 6

Basic Size (125 x 95 mm)  
Compact (95 x 95 mm)

### Type 7 - Intel Xeon-based

Basic Size (125 x 95 mm)

### Type 10

Mini Size (84 x 55 mm)

### Type 2

Basic Size (125 x 95 mm)  
Compact (95 x 95 mm)

## 3U-6U VPX Conduction & Air-cooled



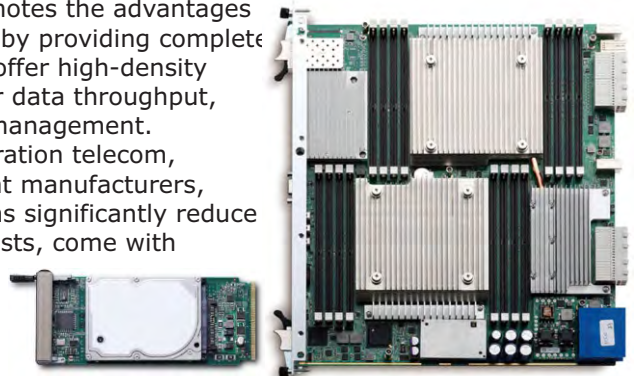
## 3U-6U CompacPCI, Plus & Serial



Conduction & Air-cooled

## AdvancedTCA - ATCA -AMC - MicroTCA

ADLINK vigorously promotes the advantages of the ATCA technology by providing complete platform solutions that offer high-density processing power, faster data throughput, and intelligent system management. Designed for next-generation telecom, datacom, and equipment manufacturers, ADLINK's ATCA platforms significantly reduce over-all development costs, come with extended operating lifecycles, and speed up critical time-to-market.



## Ind. Motherboards Mini-ITX



## PCIe



Frame Grabbers  
Video Capture Cards

## PXI - PXIe





# Industrial PCs Fanless Embedded PCs



ADLINK's revolutionary series of Matrix fanless embedded computers provide an optimal computing platform with expandable options to customers. These platforms are the result of combining ADLINK's expertise in x86 platform design, versatile I/O function development, and thermal design to push fanless systems to a higher standard, including a wide operating temperature, 5 Grms vibration, and cable-free durable structure.

With a sturdy hardware design, the Matrix MXC and MXE series are ideal for developing reliable embedded systems effortlessly and offering time-to-market solutions to mission-oriented industries. ADLINK takes the advantage of flexibility to offer diverse comprehensive I/O interfaces to meet requirements for a variety of industrial applications.



## Expandable Fanless Embedded Computers MXC-6400 Series

High-Performance 6th Generation Intel® Core™ i7/i5/i3 Processor-Based Fanless Embedded Computer (Code name: Skylake)

### Leading Performance

The MXC-6400 Series' 6th generation Intel® Core™ i7-6820EQ/ i5-6440EQ/ i3-6100E processors boost computing power by up to 70%, delivering 100% faster graphics performance than previous Matrix generations, up to 3 independent displays are supported, accelerated HW media codecs enable Ultra HD 4K, dual-channel DDR4 2133MHz SO-DIMM sockets accommodate up to 32GB of memory, and PCI and 2 PCIe Gen3 x8 (or 1 PCIe Gen3 x16) slots fully optimize expansion.



## 6th Generation Intel® Core™ i7/i5/i3 Processor-Based Fanless Embedded Computer (Code name: Skylake) MXE-5500 Series

ADLINK's MXE product line provides fanless, cable-free, robust mechanisms in a compact form factor. The rugged design provides reliable performance in mission-critical harsh environments. Outstanding wireless optimization capability easily meets and exceeds customer needs, make it an ideal match for **Intelligent Transportation** and **Factory Automation**.



## Industrial Computer Chassis - RK-608MB-C Wallmount Industrial Chassis for ATX Industrial Motherboard

- ☐ Supports Mini-ITX, microATX, FlexATX, ATX industrial motherboards
- ☐ One 5.25", two 3.5" external drive bays & three internal 3.5" drive bays
- ☐ Drive bay with shock and vibration resistant design
- ☐ Two USB and one PS/2 keyboard connectors on front panel
- ☐ 12cm cooling fan (85 CFM)
- ☐ PS2 ATX power supply



## Industrial Computer Chassis - RK-440 4U Rackmount Industrial Chassis supports 19-slot Backplane & Redundant Power Supply

- ☐ EIA RS-310C 19" rackmount standard
- ☐ Supports 19-slot backplane and mini redundant power supply
- ☐ Three 5.25" and one 3.5" shock-resistant drive bays
- ☐ Adjustable hold down bar for cards

See the complete [Product Range and Datasheets](#)  
[CLICK HERE](#)

# CompactPCI/PlusIO/Serial 3U - 6U Boards & Systems



ADLINK provides a complete line of 3U and 6U CompactPCI platform and along with a diverse line of plug in boards and these CompactPCI products provide the most cost-effective high performance platforms for Telecommunications, Military , Industrial Automation.

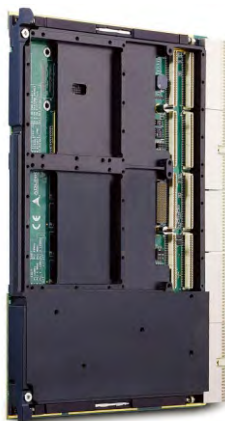


## 3U CompactPCI 2.0 Blades

### cPCI-A3515 Series

### 3U CompactPCI Serial 4th/5th Generation Intel® Core™ Processor Blade with ECC

- ☐ PICMG® cPCI-S.0 CompactPCI® Serial Processor Blade
- ☐ Quad-core 4th/5th Generation Intel® Core™ i7 processor
- ☐ Up to 16GB DDR3L ECC soldered memory
- ☐ Up to three independent displays
- ☐ Optional extended operating temperature -40°C to +85°C (with Intel® cTDP)
- ☐ Optional PICMG® 2.0 (CompactPCI®) support
- ☐ Smart Embedded Management Agent (SEMA) for system health monitoring



## 6U CompactPCI 2.0 Blades- cPCI-6630

### 6U CompactPCI 6th Gen Intel® Core™ i7/Celeron® Processor Blade

- ☐ Quad-core 6th Gen Intel® Core™ i7/Celeron® processor
- ☐ Up to 32GB DDR4-2133 memory via two SO-DIMMs
- ☐ 5V single power rail
- ☐ Legacy IO supported: PS/2, PMC, CompactFlash
- ☐ Optional SEMA 3.0 support

## 6U CompactPCI 2.0 Blades - CT-61

### Rugged Conduction Cooled 6U CompactPCI® Intel® Core™ i7 Universal Blade with two PMC sites

- ☐ 32nm Intel® Core™ i7 processors with ECC
- ☐ Up to 8GB DDR3-1066 ECC soldered memory
- ☐ Two 64-bit/133MHz PMC sites with rear I/O
- ☐ One PCI-Express x8 XMC site
- ☐ PICMG 2.16 compliant

## Enclosures & Systems



3U -cPCIS-2633 Series



6U - cPCIS-6418U



6U - cPCIS-3320/AC

See the complete cPCI Product Range [CLICK HERE](#)



# Sealed Extreme Rugged™ COTS VITA-75 Military Computer ADLINK HPERC series



**Extreme Rugged™ Coldplate Mount**  
**-40°C to +85°C**



**Rugged Finned-convection**  
**-40°C to +70°C**

Sealed Extreme Rugged™ COTS computing platform in a tiny VITA-75 footprint, ideal for **GROUND, AIR & SEA** deployments. Based on 3rd generation Intel® Core™ i7 CPU and optional GPGPU parallel processing engine. Easily configured application-ready platform for fast integration of custom rugged embedded applications. A wide array of fast IO provided on uniquely-keyed MIL-DTL-38999 high speed connectors.

## **General Features**

- High speed eSATA, USB 3.0
- VITA 75 mount with passive cooling (see pictures above)
- Intel® Core™ i7 dual or quad core Processor
- Soldered DDR3L 8GB, up to 16GB RAM
- Quad Gigabit Ethernet
- Available GPGPU on 16-lane 3rd Generation PCI Express
- Dual independent displays (HDMI/DVI/VGA)
- Simple user expansion and configuration
- Tested to MIL-STD-810G and MIL-STD-461F standards

## **Direct Links by Type**

Please [CLICK](#) on Technical Overview & Datasheet below



**HPERC-IBR-HC**  
Coldplate Mount  
High Speed Connectors

[Technical Overview](#)

[Datasheet](#)



**HPERC-IBR-HH**  
Finned-Convection  
High Speed Connectors

[Technical Overview](#)

[Datasheet](#)



**HPERC-IBR-MC**  
Coldplate Mount

[Technical Overview](#)

[Datasheet](#)



**HPERC-IBR-MH**  
Finned-Convection

[Technical Overview](#)

[Datasheet](#)

# PrismTech Now ADLINK's IoT Solutions and Technology Group



2017/11/07 - With both companies' IoT domain expertise fully integrated, ADLINK IST drives innovation and new business value through high-performance distributed systems

PrismTech™, a global leader in software platforms for distributed systems, is now ADLINK's IoT Solutions and Technology (IST) group. Built on the strengths of PrismTech's industry-leading data connectivity platforms and ADLINK's first-in-class infrastructure product lines, ADLINK IST combines a full range of IoT domain expertise to drive business value through high-performance distributed systems.

"We had envisioned this integration of domain expertise from the start and are now in a position to define new business models and drive new business value for our customers," said Rob Risany, Executive Vice President, IoT Solutions and Technology, ADLINK Technology. "The industry is continuing to implement and rely on high-performance distributed systems to achieve new levels of performance, cost avoidance and revenue generation—and that's where ADLINK IST excels."

The integration provides customers with new access to complete infrastructure-to-data connectivity solutions, a global talent pool, leading edge computing, innovation and the depth of resources available only through an international, successful and well-respected company.

Vortex™ Edge PMQ smart gateway is an example of the type of fully integrated Industrial IoT hardware, data connectivity and predictive analytics solution ADLINK IST offers: a small footprint, ruggedized computer for deployment in harsh environments, preconfigured to support asset data capture and PMQ results deployment at the edge. **For more information**, visit [ist.adlinktech.com](http://ist.adlinktech.com)

## RTOS pioneer James F. Ready passes away ... from Page 2

*By Colin Walls, Jim's old friend and colleague (Colin is now embedded software technologist in the Mentor Graphics)*

I always aim to start a new year in a positive way – looking forward, not back. Sadly, this year will be an exception, as, a few days ago, I heard of the death, just before Christmas, of my old friend and colleague, Jim Ready. It is fair to say the Jim essentially invented the commercial real-time operating system (RTOS). This technology has been a cornerstone of my career, so his death, apart from being a cause of sadness, also marks the end of an era in embedded systems.

In the 1980s, Jim was co-founder of Hunter & Ready, the developers of VRTX - the first commercially available RTOS. This was initially available for 8-bit processors, but was quickly implemented on 16- and 32-bit devices, as they became more popular. VRTX32 was available just as high-end microprocessors were becoming mainstream. In due course, the structure of the product changed and, instead of being distributed on a ROM chip, the software was supplied in a more conventional form as a library. This was VRTXsa. Other variants, like VRTXmc and VRTXoc, were developed subsequently. Unsurprisingly, it took me just a few moments to put my finger of a VRTX manual in my archive. In due course, Hunter & Ready became Ready Systems, with Jim as CEO.

I heard the sad news of Jim's death from another old friend, **Bob Monkman**, who reminded me about another aspect of Jim's influence on the world of embedded software: "In the late 80's, a small consulting concern, called Wind River, wrapped a BSD TCP/IP stack and some tools around VRTX and called it VxWorks (i.e. VRTX Works). There was a thin shim layer of APIs on top of VRTX. Due to a business disagreement at a technology crossroads, Wind River designed out VRTX with their own wind kernel, written by John Fogelin, and the suite evolved into Tornado. So, you could say that Jim inspired VxWorks and Tornado in this way."

Another significant RTOS of the 1990s was pSOS. There were rumors that this OS has some technical "relationship" with VRTX. However, rumors are rumors and this was 20+ years ago, but, again, we see Jim's influence is manifest.

In the early 1990s, Ready Systems was acquired by Microtec Research, where I worked, which is how I got to know Jim. We were acquired a couple of years later by Mentor Graphics, which leads to where I am right now. I always found Jim to be interesting and, often, inspirational company. I clearly recall sitting in his office as he explained that Linux was the future for embedded systems. Not so long after that, he left to found Montavista, which pioneered embedded Linux.

Jim moved on eventually to become a senior technical advisor on embedded software at Cadence. The last time I met him was in his office there, where he was excitedly talking about new technologies that would change the world.

The world of embedded software - or actually the world as a whole - needs more innovators like Jim Ready. I think that they broke the mold when they made him. RIP Jim.

NOTE: **Bob Monkman** is now at ARM as Director, Software Strategy and Ecosystem Programs, I worked with Bob as Business Development Consultant for Large Telecom Companies (ENEA 2007-2011) but I was not aware of the relationship between Jim and Bob. Small world but full of surprises \_ Daniel Dierickx