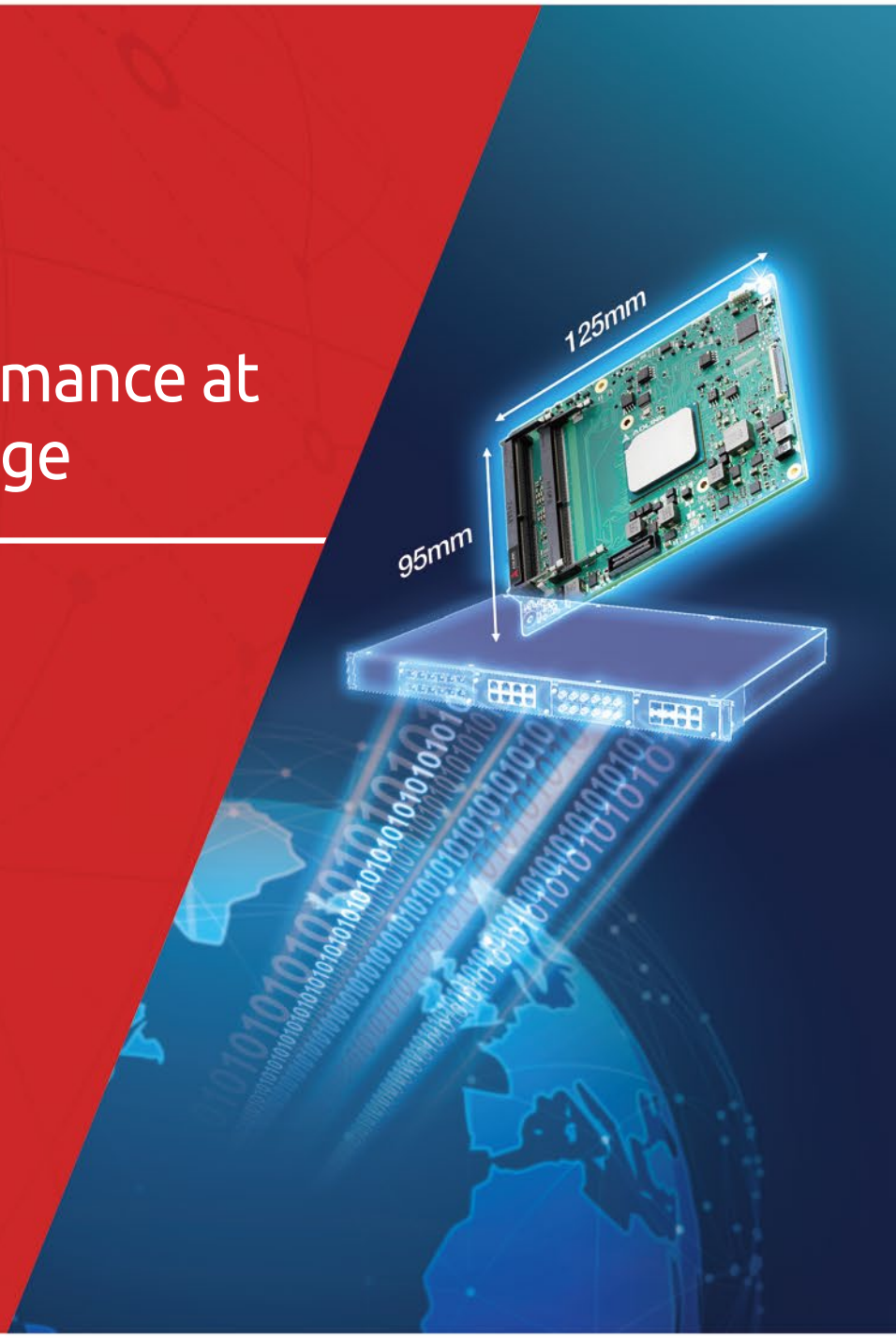
ADLINK
Leading EDGE COMPUTING

Technical Article

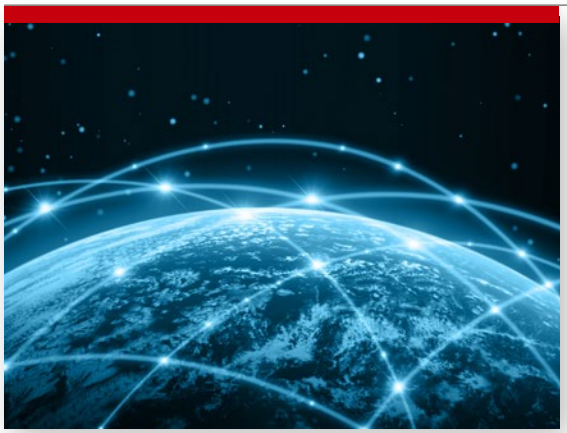
Ultimate Performance at the Network Edge

How a 1U enclosure delivers
160 cores and 40 10GbE-KR ports at
an entry-level price point



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Introduction

As more devices connect to the IoT, networks are being flooded with data, straining capacity and driving up communications costs. In response, companies around the globe are looking for ways to process data as close to the source as possible — and this means moving server technology out of the data center and toward the network edge.

Migrating servers outward has two major benefits. First, it dramatically reduces bandwidth requirements by processing data locally. Second, it enables low-latency responses to time-sensitive events by allowing servers to act as part of a real-time control loop.

The challenge posed by edge environments is that they are nothing like server rooms. IoT applications are typically deployed in locations such as factories, oil rigs, and transportation hubs, where extreme temperatures and other hazards can wreak havoc on electronics. Space is often at a premium as well, so it can be hard to find a location suitable for a server.

Edge environments are also far removed from IT staff. That means any equipment deployed in the field must be extremely reliable to minimize service calls. Plus, the replacement cycle for field equipment is much longer than it is for the data center, so edge servers must remain operational for many years.

Clearly, standard data-center equipment is not fit for edge environments. Embedded computers are an obvious alternative, but most embedded hardware lacks key capabilities such as high-bandwidth I/O. What's needed is a "best of both worlds" approach that puts server features into an embedded-friendly platform.

A New Approach to Edge Computing

The ADLINK Express-DN7 was created with these requirements in mind. This COM Express Basic Size Type 7 module is based on the latest Intel Atom® C3000 processor (formerly Denverton). With up 16 cores at a thermal design power (TDP) of only 31W, this cutting-edge processor enables the Express-DN7 to deliver high-density computing in a low-power, long-life solution.

Due to the Express-DN7's compact size, up to 10 modules can be deployed in a 1U chassis for high-density computing. With up to 16 cores per module, this means system engineers can deploy an impressive 160 cores in a 1U enclosure.



Figure 1: ADLINK COM Express Type 7 module with Intel Atom® 3000 processor

Unlike earlier modules based on the Intel Atom® processor, the Express-DN7 offers multiple PCIe and 10 GbE ports at an entry-level price point. This range of I/O is made possible by the new COM Express COM.0, Rev 3.0 Type 7 specification. Created for headless designs that lack a display, this new variant of COM Express® removes video outputs in favor of more high-speed I/O.

Specifically, the Type 7 standard adds up to four 10GbE-KR ports and up to eight additional PCIe lanes, making it ideal for edge servers. The existing I/O channels also get major enhancements. For example, the USB ports are upgraded to USB 3.0, while the standard GbE port now supports IEEE 1588 Precision Time Protocol (PTP) for real-time applications.



Figure 2: ADLINK COM Express Type 7 module pinout definition

The combination of high performance and upgraded I/O makes the Express-DN7 an ideal choice for applications such as:

Microservers

In addition to its massive core count, the Express-DN7 offers full support for Intel® Virtualization Technology (Intel® VT) and Intel® Xeon® processor instruction sets. What's more, the module offers a massive memory capacity of 48GB DDR4 at 2400MHz. As a result, performance-intensive applications and highly virtualized environments are easily supported.

Storage area networks (SANs) and network attached storage (NAS)

The Express-DN7 comes with two PCIe x8 Gen3 ports, giving developers flexible options for implementing high-performance storage, including RAID configurations. To ensure reliability, the module is available in build options supporting an Extreme rugged operating temperature range of -40°C to +85°C, and versions come with the Smart Embedded Management Agent (SEMA) for advanced device monitoring and control.

Software-defined networking (SDN) and network function virtualization (NFV)

The inclusion of four 10GBASE-KR ports and the Intel® QuickAssist Technology (Intel® QAT) cryptography and compression accelerator help the Express-DN7 takes on demanding packet-processing applications. In addition, the module's high core count makes it ideal for implementing flexible networking platforms.

Together, these features add up to a platform that can handle heavy network and storage loads in a low TDP, compact package. Compatibility with the Intel® Xeon® processor instruction set means that developers can easily scale down data-center-oriented designs into an embedded-friendly platform — a task made even easier by the module's support for Windows Server 2012/2016 64-bit and Yocto Linux 64-bit.

Deploying Servers at the Edge

To ensure that all these functions continue running smoothly over long deployments in harsh environments, the Express-DN7 has undergone stringent Highly Accelerated Life Testing (HALT). To ensure lifetime stability of your products, ADLINK EOL management provides long production service durations.



To further ensure the success of your design, ADLINK offers carrier board design services or carrier board design verification as needed. We also provide software, firmware, and BIOS adaptation services to suit your specific requirements. Quality technical support is critical to product development, so ADLINK has created a global network of support centers in all major regions to provide local assistance in the design of innovative edge servers.

With multiple build options, ADLINK can help you create the right embedded server for your needs. ADLINK strives to be a trusted partner to customers around the globe, and our service and support can help you get to market faster. The company has a long history of providing custom services and providing prompt support to resolve compatibility problems that may arise during software and hardware integration.

About ADLINK

ADLINK Technology is a global leader in Edge Computing. We provide robust boards, platforms and user interfaces; real-time data connectivity solutions; and application enablement for state-of-the-art industrial computing (e.g., AI-at-the-Edge). Together, these also enable innovative end-to-end IoT solutions in support of operational excellence or new revenue streams. ADLINK serves customers in many vertical markets and has an excellent eco-system of technology partners. ADLINK is a valued thought-leader and contributor to many standards and interoperability initiatives, with products available in more than 40 countries. ADLINK is publicly-traded on TAIEX (Stock Code: 6166).

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