Building Forward Together | ADLINK

Technical Forum

Computer-on-modules deliver an ideal solution for Industry 4.0 automation

COM Express®
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Introduction

With rising global competition, shortened product lifecycles and increasing demand for small-quantity mixed-model production, businesses around the world are endeavoring to accelerate Industry 4.0 development and the top priority is to upgrade traditional robots and machines with intelligent systems. Computer-on-modules (COM) that are at the heart of robot or machine controllers provide the quickest shortcut to an intelligence upgrade.

Industry 4.0 is the dominant trend that has spurred the popularity of intelligent automation and smart factories based on intelligent machines (IM) and intelligent robots (IR). The critical challenge for manufacturers is turning legacy non-intelligent machines and robotic arms into IM and IR that enable computing, measurement, motion control and machine vision to enable customization of products and flexible mass production on the factory floor.

Traditionally, leading machine and robot manufacturers used to develop their own controller boards. However, with new generations of CPUs being launched at accelerated speeds and machine equipment needing to incorporate the latest functions to meet Industry 4.0 demands, manufacturers have had to frequently change their controller board designs. Time delays required for designs to pass certifications also result in increased time-to-market. To circumvent these problems, manufacturers are starting to evaluate the use of embedded COMs as the computing core of customized carrier boards for their control boards. Machine equipment can therefore be upgraded with a simple replacement of the COM with the latest CPU and no need to redesign the entire control board, significantly accelerating the product development cycle.

COM improves development efficiency but also introduces challenges

The COM design model combining the core module and carrier board has the advantage of boosted flexibility but there are still challenges to overcome. First of all, a COM is not a complete single board computer but is the system's core and controls peripheral applications through connections and specialized functionality on the carrier board. In the case of equipment malfunction, the added complexity may make it more difficult to identify the source of the problem from the carrier board, COM or peripheral cards. Therefore, without help of a professional team, locating the root cause can be time consuming.

In addition, manufacturers with ambitions to develop IM or IR solutions tend to engage in projects that are diverse and often involve complex requirements such as firmware changes and BIOS customizations. Support for multiple operating systems including Windows, Linux and RTOS is also required so specific development kits are needed to ensure smooth development of both the carrier board and software. However, as many suppliers are outsourcing a large part of their development work to third-party vendors and have no plan to train their own software engineers, they lack the ability to solve problems independently and to promptly provide the necessary technical support.

ADLINK technical team provides on-site support for troubleshooting

A leading international robotic arm manufacturer faced the challenges described above during its transition from internally designed controller boards to the adoption of the COM concept. ADLINK's COM Starter Kits complete with reference designs were able to eliminate most of the customer's problems.

When customers encounter difficulties during development, ADLINK's technical team responds quickly and effectively to assist in addressing system integration issues, whether or not they are directly related to the COM. When necessary, our highly trained staff will visit the customer's on-site location to find the root cause of the problem. ADLINK is always ready to provide professional support to customers during the entire development process.

With regards to R&D, ADLINK has made a significant investment in the establishment of a signal measurement laboratory. All computer input and output signal waveforms can be measured to ensure the COM design and manufacturing comply with the strictest standards. Moreover, complete design for manufacturing (DFM) verification principles are also introduced in the product design stage. All efforts are aimed at guaranteeing the utmost in product compatibility and reliability. ADLINK is also a step ahead of the competition in launching products with a wide operating temperature range to meet a variety of challenging customer requirements.

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ADLINK provides complete solution with one-stop design and manufacturing

With the exception of printed circuit boards, ADLINK develops its COM products independently from scratch, from design to manufacturing, and therefore has the ability to meet a wide range of customer requirements, including firmware changes and BIOS customizations. Comprehensive support is provided for Windows, Linux, VxWorks and QNX operating systems, drivers and board support packages (BSP). Also available are reference carrier boards and a wide range of interface conversion kits to speed up the development process for customers.

ADLINK is among the world's four Premier Members of Intel® Internet of Things Solutions Alliance. . From modular components to market-ready systems, Intel and the 500+ global member companies of the Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics. Close collaboration with Intel and each other enables Alliance members to innovate with the latest technologies, helping developers deliver first-in-market solutions. As a Premier Member of the Alliance, ADLINK has the advantage of being able to deliver early sampling, leading competitors by over two months. ADLINK is also able to launch new COM products that keep up with every new generation of Intel processor, allowing customers to integrate the latest technologies into their control systems.



Product	Express-BD7	Express-SL/SLE	Express-BL	cExpress-AL	nanoX-AL
Form factor	COM Express R3.0 Type 7	COM Express R2.0 Type 6			COM Express R2.0 Type 10
CPU	Intel® Xeon® D-1548/D-1537/ D-1528/D-1527	Intel® Xeon® E3-1515M/ E3-1505M/ E3-1505L Intel® Core™ i7-6820EQ/6822EQ i5-6440EQ/6442EQ i3-6100E/6102E Intel® Celeron® G3900E/G3902E	Intel® Xeon® E3-1278L/ E3-1258L Intel® Core™ i7-5850EQ/5700EQ	Next generation Intel® Atom® Processors	Next generation Intel® Atom® Processors

About ADLINK

ADLINK Technology is enabling the Internet of Things (IoT) with innovative embedded computingsolutions foredge devices, intelligent gateways and cloud services. ADLINK's products are application-ready for industrial automation, communications, medical, defense, tansportation, and infotainment industries. Our product rangeincludes motherboards, blades, chassis, modules, and systems based on industry standard form factors, as well as an extensive line of test & measurement products, smart touch computers, displays and handhelds that support the global transition to always connected systems. Many products are Extreme Rugged™, supporting extended operating temperature ranges, and MIL-STD levels of shock and vibration.

ADLINK is a premier member of the Intel® Internet of Things Solutions Alliance and is active in several standards organizations, including the PCI Industrial Computer Manufacturs Group (PICMG), the PXI Systems Alliance (PXISA), and the Standardization Group for Embedded Technologies (SGET).

ADLINK is a global company with headquarters in Taiwan and manufacturing in Taiwan and China; R&D and integration in Taiwan, China, the US, and Germany; and an extensive network of worldwide sales and support offices. ADLINK is ISO-9001, ISO-14001, ISO-13485 and TL9000 certified and is publicly traded on the TAIEX Taiwan Stock Exchange (stock code: 6166).

For more information on ADLINK, please visit www.adlinktech.com.

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