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Technical Article

An Engineer's Review of the ADLINK COM Express Type 6 Module and Starter Kit Plus

By Embedded Computing Design

www.adlinktech.com
2018

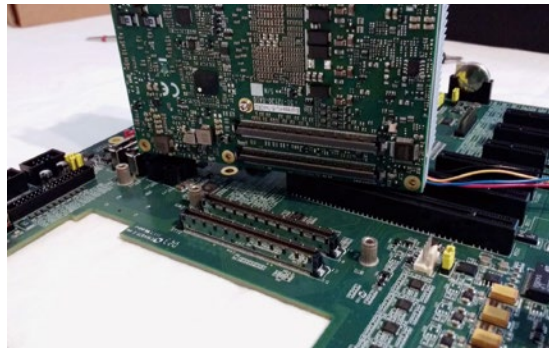
If you're designing for an embedded application that requires a powerful processor and want to maintain a level of confidence that your design won't become obsolete anytime soon, ADLINK's COM Express module Express-KL/KLE and carrier board Express-BASE6 is designed to address this challenge. The module features a 7th generation Intel Core®, Xeon® processors, and a variety of interface options, including the ability to display 4K resolution on up to three monitors. In addition, the COM Express carrier/module design lets you swap out just the computing module, not your application-specific carrier board. This is where the future-proofing comes into play.

The Type 6 Starter Kit Plus I received included a carrier board and reference design document, along with a COM Express-BASE6 module. Memory and thermal solution were also provided, which can be tailored to the customer's needs. Finally, a specialized debug card and the necessary power supply and cabling to get started were included. I had to do the assembly (which you can see in the video) and boot it up with the included flash drive. The drive contained a Yocto Project-based Linux distribution, including ADLINK's Smart Embedded Management agent (SEMA) to monitor system statistics.

This kit is meant to facilitate hardware and software development for embedded systems using the included Express-KL/KLE COM Express Type 6 Basic size Module. The module can handle up to 32 Gbytes of DDR4 RAM, as well as integrated 9th Generation of Intel Iris Low power Graphics. Operating-system support includes Windows 10, Linux, and VxWorks.

Physical Setup

Setting up the system didn't require any more skill than building your own PC from parts, perhaps a little less. Everything came nicely packaged and snapped together as I expected. One exception was assembling the module to the carrier board took, which quite a bit of force to seat properly, and had to be pressed in without its thermal solution. This tight fit is by design, as it's meant to help keep it in place under stress and vibration. I had to remove a few parts to properly connect the debug card later in the process. Neither of these were significant issues and would likely be much easier the next time.

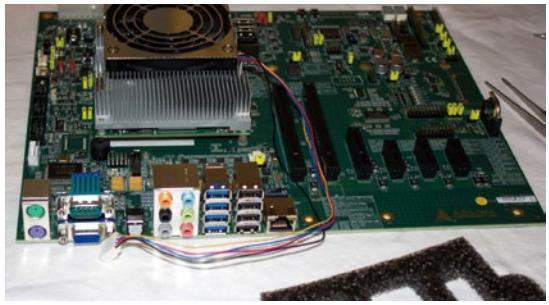


Bootup and Software Capabilities

Once everything was connected and jumpers were properly set on the video adapter card, I booted it up to see it display text on the screen. This is always a good sign, and it worked as expected, going immediately into the Linux distribution included with the system. I could have used a different operating system if necessary, and having the ability to swap out disks simply by plugging in a USB drive can be a real lifesaver—or perhaps a job-saver—if a machine is malfunctioning. This would also be useful to test changes on a local machine before risking production equipment.

While being able to just swap out a flash drive is quite helpful, being comfortable enough in the Linux command line to generate or modify your own boot disks would help you get the most out of this system. This would likely be a trivial concern for a developer tasked with integrating this type of device.

Once things were booted up, I noticed that the SEMA application included tabs for I²C, GPIO, and 1-Wire. After inquiring with ADLINK tech support, I confirmed that the board currently has accommodations for I²C and GPIO functionality, but not 1-Wire. Even without the 1-Wire functionality, these two interface methods give you a wide variety of options for using these boards. GPIO functionality would allow users to interface with lights or other discreet electronics as needed, while the I²C protocol, which has been in use for over 30 years, would allow users to interface with the wide variety of devices that deploy the I²C protocol.



Possible Use Cases

Given the unique carrier-module architecture this type of system is built with, as well as the impressive computational specs, ruggedness, and multi-monitor support, there are a wide variety of applications that would be suitable for this device. In addition, the generic and very capable carrier board that can be used to verify designs can catch costly mistakes early in the design process. Once you know exactly what will be needed in your embedded system, you can then design your own carrier board to implement this functionality, stripping out extra parts to save cost and space as needed.

One specific application that comes to mind would be in computer-controlled manufacturing or Computer Numeric Control (CNC) equipment. These capital assets can exist on a shop floor for decades in extremely hostile environments. While these rugged modules can survive for much longer than conventional computing systems, when it's time for an upgrade or replacement, they can simply be swapped out, forgoing the need to design a new custom carrier board.

Medical applications could also benefit from the Express-KL/KLE COM Express Type 6 Module's graphics and computing capabilities, allowing it to control three independent displays via three DDI and an LVDS port. If a customer has even more demanding needs, the module supports a PEGx16 interface, allowing it to use a high-end graphics card either for enhanced visuals or as a computing co-processor. One could imagine patient vital signs being shown on one display, while a scan is shown on a second, and perhaps drug or other information is shown on a third. If the system needs to be designed to interface with legacy equipment, the carrier board's wide variety of connection options allows engineers to develop solutions quickly without building an entire board from scratch.

As an engineer who has had to deal with the difficult problem of having obsolete technology on the factory floor, I see the carrier/module architecture approach as an exciting development in embedded computing technology. It's likely that engineers will forever have to deal with upgrade cycles, but this module/carrier architecture, along with the board kit that encourages quick development before the final design, could help alleviate much of the struggle involved.

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About ADLINK

ADLINK Technology is leading edge computing with solutions that drive data-to-decision applications across industries. The global company is focused on supporting the transition to connected IIoT systems. ADLINK is a Premier Member of the Intel® Internet of Things Solutions Alliance and is active in several standards organizations and interoperability initiatives.

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