ADLINK COM Express modules with 6th Gen Intel Core processors





Product Number	Express-SL/Express-SLE	cExpress-SL
CPU	6th Gen. Intel® Xeon® E3 family E3-GT4e (TBC), E3-1505M/E3-1505L Intel® Core™ i7-6822EQ/6822EQ i5-6440EQ/6442E Q, i3-6100E/6102E Intel® Celeron® (TBC) (cTDP support on specific SKUs)	6th Gen. Intel® Core™ i7-6600U/i5-6300U/i3-6100U Intel® Celeron® 3955U (cTDP support on specific SKUs)
Chipset	Intel® QM170/HM170 (for non-ECC)/CM236 (for ECC)	-
Memory	Up to 32 GB ECC/non-ECC Dual Channel DDR4 at 2133/1867 MHz (ECC support dependent on CPU/PCH SKU)	Up to 32 GB non-ECC Dual Channel DDR4 at 2133/1867 MHz
BIOS Type	AMI EFI with Intel® AMT 11.0 support (No AMT support with HM170)	AMI EFI with Intel® AMT 11.0 support
TPM Support (opt)	Atmel AT97SC3204	
Integrate Graphics	18/24-bit sing/dual LVDS, eDP (opt.) 3x DDI ports supporting DP/HDMI/DVI	18/24-bit sing/dual LVDS, eDP (opt.) 2x DDI ports supporting DP/HDMI/DVI
Graphics Features	DirectX 12/11.2/11.1/11/10.1/10/9, OpenGL 4.4/4.3 and ES 2.0, OpenCL 2.1, 2.0/1.2 Note: support H.265/HEVC	
LAN	Intel® I219LM, GbE	
USB	4x USB 1.1/2.0/3.0, 4x USB 1.1/2.0	
Seria ATA	4x SATA 6Gb/s	Core™ i7/i5: 3x SATA 6Gb/s Core™ i3/Celeron®: 2x SATA 6Gb/s
PCI Express	PCI Express x16 (Gen3) (1x16 or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 (Gen3) (x4, x2, x1 available)	5 PCIe x1 (Gen2) (x4, x2, x1 available) Note: Up to 6 PCIe x1 without GbE support (opt.)
Audio	HDA integrated in PCH supporting ALC886	
Management Bus	I²C, SMBus	
SEMA Support	Yes	
Power Supply	Std: 12V±5% / 5Vsb ±5% (ATX) / 12V±5% (AT) Wide: 8.5-20 V / 5Vsb ±5% (ATX) 8.5 ~20V (AT)	Std:12V±5% / 5Vsb ±5% (ATX), 12V±5% (AT) Wide: 5~20 V / 5Vsb ±5% (ATX), 5 ~20V (AT)
Operating Temperature	0°C to +60°C -40°C to +85°C (opt.)	
OS support	Windows 10/8.1 64-bit, Windows 7 32/64-bit, Linux 64-bit, VxWork (TBD)	Win10/Win 8.1/7, WES 7, Linux, VxWorks
FormFactor & Compatibility	PICMG COM.0 R2.1, Type 6 Basic size: 95 x 125 mm (L x W)	PICMG COM.0 R2.1, Type 6 Compact size: 95 x 95 mm (L x W)

Note: All specifications are subject to change without further notice.



About ADLINK

ADLINK Technology is enabling the Internet of Things (IoT) with innovative embedded computing solutions for edge devices,intelligent gateways and cloud services. ADLINK's products are application-ready for industrial automation, communications, medical, defense, transportation, and infotainment industries. Our product range includes 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 Manufacturers 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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Building Forward Together

ADLINK

~~White Paper~~

Lifting Skylake into the Cloud

COM Express modules with 6th Gen Intel® Core™ Processors Offer 30% Up Computing Performance



ADLINK

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Lifting Skylake into the Cloud

Omnipresent Internet of Things (IoT) and Industry 4.0 trends are creating increasing demand among engineers for cloud-based services. ADLINK Technology's new 6th generation Intel® Core™ COM Express Computer-on-Modules come with exactly the right features to fulfill these demands.

Introduction

The launch of the new 6th generation Intel® Core™ processors (formerly Skylake) comes at a time when IoT and Industry 4.0 trends are dramatically changing the way we design embedded and industrial-grade devices. No longer is it just the device that is in the users' focus, but also – and sometimes even more importantly– the services that are provided along with the device. Consequently, the race is on for engineers to implement services into their offerings.

Intelligent services often require connection to a back end server or a cloud environment. And a back end server or a cloud for distributed devices needs local gateway technologies to connect the devices. In turn these gateway technologies call for local connectivity, communication and security features that have to be handled by the gateway and/or the device processor. Thus, more local intelligence and bandwidth is required. How do the new 6th generation Intel® Core™ processors cater for this new era of connected applications?

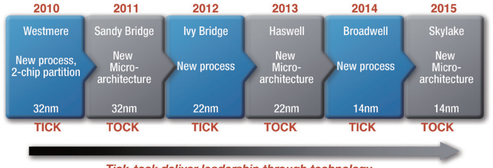
Core benefits of the 6th generation

It is not only the increased CPU speed and up to 3x video performance for up to three Ultra HD displays that set 6th generation Intel® Core™ technology apart. Major improvements are also secured by DDR4 support — compared to DDR3 memory, DDR4 reduces overall power consumption and enhances overall performance with two major improvements. Firstly, it offers higher memory frequencies for faster data transfers. Secondly, the memory capacity has been doubled: using DDR4 modules, COM

Express modules with two SODIMM memory slots can now officially support 32 gigabytes of memory— an important feature for both virtualized operating systems with the need for more memory and space-restricted systems with increased density as well as limited power consumption. Furthermore, the new processors feature more high-speed I/Os to cater for the heavy big data demands common to complex IoT and Industry 4.0 applications.

Additionally, hardware-accelerated CPU offloading AES encryption technologies and other security features, which are crucial to IoT-connected devices, have been enhanced. Processor-integrated technologies such as Intel® Boot Guard, Intel® Secure Guard Extensions and Intel® Memory Protection Extensions, for example, help prevent system threats from malware, protect sensitive data from rogue software and prevent malicious attacks using buffer overflows.

Intel Tick-Tock Model



Intel® Tick-Tock spectrum
Resource: Intel® Corporation

Tick-tock deliver leadership through technology innovation on a reliable and predictable timeline

Lower Power Consumption

The configurable Thermal Design Power (cTDP) is also new. This enables enhanced control of embedded device thermal behavior. Previously, designers had to adjust the physical design and/or application to the thermal design characteristics of the chosen CPU. With cTDP they now have a method to reduce the TDP of the processor to better fit the design constraints. This is a key feature, especially for passively cooled fanless designs. Depending on the CPU it is now possible to leverage processors of the Intel® Core™ i7/i5/i3 processor family with 10W or 7.5W cTDP. At the same time, designers can now access the maximum processor performance by carefully configuring the processor's heat dissipation to the capabilities of the system design.

Embedded designers will also appreciate JTAG support over USB 3.0, which allows chip-level debugging without the need for direct access to the processor. All these features make 6th generation Intel® Core™ processors the right choice for a whole range of new embedded and IoT-connected devices in vertical markets such as medical, industrial, transportation, digital signage and professional gaming machines.

Convincing COM Express

For designing space- and TDP-restricted, fanless small form factor systems requiring high performance Intel® Core™ i3/ i5/i7 processors with dedicated interfaces, COM Express Computer-on-Modules offer the right technology platform. They are standardized, small and scalable and are available in various versions from a wide range of embedded computing vendors. ADLINK Technology, for example, offers form-fit-function compatible COM Express designs for increased scalability and flexibility. COM Express Type 6 Basic (125 x 95 mm) and Compact (95 x 95 mm) size modules are compatible with all current carrier boards as well as backwards compatible with earlier designs. This helps OEMs secure their investments in existing designs requiring a performance and/or connectivity upgrade. With its board integrated SEMA (Smart Embedded Management Agent) functionality and the SEMA Cloud connectivity for IoT-based monitoring, managing and maintenance services, ADLINK Technology also helps engineers easily bring their new Intel® Core™ processor-based designs to the cloud to create a better end-user experience, reduce costs, build revenue, and enable new applications in various industries such as medical, gaming or industrial automation.

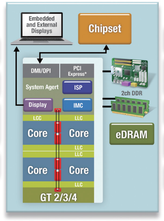
INTEL'S SKYLAKE MICROARCHITECTURE

Increased Chipset I/O throughput
Tablet I/Os, Audio DSP Upgrade

Camera ISP integration

Breakthrough GFX GT3 + eDRAM, GT4 + eDRAM;
OpenCL™ 2.x API,
DirectX 12, OpenGL* 4.x

Smaller/Denser Intel® Core™ M processor package



Bigger/Wider Core

Security Enhancements:
Intel® Software Guard Extensions,
Intel® Memory Protection Extensions

40%-60% less SOC power on video,
XMM, win-idle

Enhanced ring/LLC for
improved throughput

Enhanced overclocking with BCLK and DDR4 overclocking

Intel® Skylake Microarchitecture
Resource: Intel® Corporation

Cloud connectivity counts

In the medical arena, embedded designs are important elements of medical devices and instruments and in all circumstances, reliable operation has to be guaranteed. With SEMA Cloud, space-restricted fanless medical designs with a tight thermal envelope benefit from alerts about abnormal power consumption and corresponding heat dissipation before a system fails. This enables countermeasures – like scheduling maintenance or reducing CPU power usage to allow continued operation – to be taken in advance, thus preventing potential system failures.

Ticketing systems and other self service terminals focus on sophisticated embedded security features including intrusion prevention. With SEMA Cloud, all relevant information such as memory condition, networking status, board ID and intrusion detection can now be monitored remotely via the cloud. This helps operators - even with tight budgets - to add additional monitoring features to improve operation.

In Industrial 4.0 applications, any unscheduled downtime can result in massive production losses. Remote monitoring of the application via SEMA Cloud can help to prevent downtime through real time updates of the environmental conditions via the onboard SEMA BMC, peripherals such as S.M.A.R.T data of storage media, as well as system temperature and power alerts, enabling continuous 24/7 system operation.

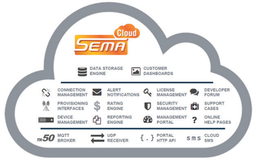
Pushing data to the user's cloud

By pushing system conditions as well as operational and environmental data to the user's cloud server via any kind of TCP/IP connection — such as 3G/4G, LAN or wireless LAN — system operators have easy access to data and analytics through web browsers or a web application programming interface (Web API), using devices such as a desktop PC, tablet or smartphone, or using data analytics systems.

SEMA Cloud not only manages device data but also allows users to throttle CPUs, access I2C bus connected sensors, upload and download files for software updates or download device data for analysis. A special feature is the ability to securely perform remote firmware updates. By means of so-called 'campaigns', such actions can be performed remotely on many devices simultaneously, significantly reducing field maintenance costs. Operators can verify, monitor and manage system performance at any time from a single, central location, improving reliability and reducing management costs.

To enable communication between SEMA Cloud and devices in the field, all new ADLINK Technology Computer-on-Modules have SEMA functionality. Consisting of a dedicated hardware-based board management controller for local data management and encrypted communication with the cloud as well as corresponding middleware, the SEMA management controller provides all relevant status information; as well as allowing remote management of the board and application-specific peripherals, such as power states or watchdog setting. The middleware provides a large set of deeply embedded tools enabling remote device and system management via the SEMA Cloud platform and management portal or customized clouds and services.

ADLINK Technology offers its customers SEMA Cloud Evaluation Packages, which include licenses to use the SEMA Cloud for one year and cover connections of up to either 10 or 50 devices for test and development purposes. Customers can easily enter the new exciting world of IoT and test and develop their own IoT solution with reduced time-to-market (TTM) and without the need for large investments in new IT infrastructure. SEMA Cloud enables customers to reduce maintenance costs of their embedded systems and to monetize their data in a short period of time.



A+ Services for computer-on-modules

With its A+ Services, ADLINK Technology offers customers the complete development of carrier boards for its COM Express Computer-on-Modules. This includes system integration from concept to volume production, reducing development costs and shortening time-to-market.

ADLINK Technology's many years of development experience and extensive expertise in the area of Computer-on-Modules and carrier board development are the guarantee for delivering the highest quality in the shortest time. Equipped with the latest technical equipment, the ADLINK's test labs carry out design verification to ensure conformity with form factor specifications and relevant interface standards using the appropriate compliance tests, including power integrity, signal integrity, thermal simulation and mechanical stress tests.

To streamline the processes from development to mass production and to ensure highest quality levels, ADLINK Technology follows a well-established process. Six process steps transform a customer order into a volume-ready product assembled on in-house production lines.

A real end-to-end service for OEMs

For OEMs, it is important to be able to rely on open standard building blocks to build system platforms that are tailored to the dedicated needs of customers and quickly bring new applications to market. With 6th generation Intel® Core™ processors on ADLINK COM Express Computer-on-Modules they have the right solution to cover nearly all x86 performance classes. ADLINK A+ Services include the design and production of the entire solution and the convenience of a single point of contact for the customer. With A+ Services, ADLINK bridges the gap from being just an embedded platform vendor into a true end-to-end service for OEMs.

Get your new Carrier design in less then 6 months



A+ Services for Computer-on-Modules transform ADLINK Technology into a true ODM service provider for OEMs by offering full custom design services on board and system level.