ADLINK
LEADING EDGE COMPUTING

COM-HPC
COM Express
SMARC
OSM
Qseven
ETX

Computer on Modules

Product Brochure

COM-HPC™ COM Express SMARC module OPEN STANDARD MODULE™ Qseven ETX®

May 2024

Innovation Support at Your Fingertips

Powerful Partnerships

ADLINK's unwavering commitment to excellence, rooted in mastering the fundamentals, has made us a trusted name in embedded solutions. With strong partnerships with CPU industry leaders like AMD, Ampere, Intel, MediaTek, NXP, Qualcomm, Texas Instruments, we provide a diverse portfolio of x86 and ARM-based solutions, offering the latest technology and customizable Computer on Module (COM) options.

AMD · AMPERE · intel. · MEDIATEK · NXP · Qualcomm · Texas Instruments

Why ADLINK

As a major contributor to open-source standardization, such as PICMG and SGET, ADLINK is always one step ahead to provide you with the latest technologies, including x86, ARM, sensors, middleware, virtualization, artificial intelligence & IoT integration, wireless, 5G, and more.

Committed to accomplishing your innovations, turning concepts into products, ADLINK helps to reduce your time to market and total costs of ownership significantly by offering:

Expertise in Vertical Knowledge

- Dedicated business units across industries provide specialized expertise, ensuring versatile and reliable solutions for your distinct requirements.

Global Reach, Local Touch

- Access the best, localized R&D resource support in your language across the globe, ensuring timely and effective assistance.
- Benefit from regional Advanced SI (Signal Integrity) labs for convenient, instant on-site validation and certification.

Efficient Connectivity and Code Reusability

- Utilization of off-the-shelf hardware and software components, enabling connections to all relevant vertical ecosystems.
- Hardware modularization and OS abstraction allow for application code reusability.

Tailored Solutions for Your Needs

Our versatile capabilities enable tailored solutions, including:

- standalone modules
- modules with memory and heatsinks
- modules with carrier boards
- comprehensive total solutions

Most Robust, Best Support

Always pioneering to empower you with the latest, cutting-edge technologies

Table of Content

Global Carrier Design Service

Save time and resources by opting for ADLINK's global carrier board design service!

Outsourcing a carrier board design to us is fast and cost-effective compared to a full custom solution. We will help you get your product to market in a minimum amount of time and for a fraction of the cost of a full design. Our local R&D teams in Germany and the US are ready to serve you in your own time zone and in your own language.

How we can support you when designing your own carrier board?

Of course, if you decide to design your own carrier boards, we will support you where possible, this starting with the initial design phase and extending to prototype sample testing.

Carrier Design Phase

Get Our Carrier Reference Schematics!

We provide schematics, layout and mechanical files to our customers for all COM form factors, giving you a head start and providing a reference platform to test your carrier against later.

Schematic Review Service

We are ready to help you review your schematics before going to the layout phase.

Pre or Post Layout Simulation

If you're unsure about any high speed signaling and routing lengths in your design, we can support pre layout simulation that will inform you about optimal placement or post layout simulation that will provide you with a high level of confidence that your design will function as intended.

Carrier Prototype Verification

BIOS Modification Service Signal Integrity Verification

At our headquarters in Taipei, our SI lab is available to help customers with module to carrier signal quality verification. Our SI lab boasts state-of-the-art equipment that enables us to conduct cutting-edge carrier board testing.

Based on SI reports, the customer can easily consult module designer on how potential design-to-application barriers could be resolved.

Power Sequence Verification

Even the most advanced LAB testing of your module/ carrier combination can never really cover how end users are going to operate the systems in the field. Especially unforeseen power on and power off operation can lead to hanging systems that in the worst case is not recoverable. ADLINK provides a power test procedure called "Monkey Testing" that covers testing of any possible power sequence in the field. If still any mismatches between carrier and modules are found, we can simply update the module by firmware at OS time since its power sequence is MCU controlled.

Core Values

Innovation and reliability converge in core values, redefining excellence in edge computing solutions

Security

Driven to safeguard client products and data free of cyberattacks and mitigate vulnerabilities, ADLINK has always been at the forefront of the latest security technologies and best-practice infrastructures, for hardware and software alike. How? ADLINK does so by actively collaborating with a spate of security partners to accomplish its ever-evolving, all-around security mechanisms. These security attributes include, but are not limited to, the following.

Arm	FOUNDRIES
SystemReady compliance Parsec security certification PSA certification	Linux microPlatform Secure for life Deployment, maintenance, OTA

With decades of endeavor in administering foolproof security and assurance measures, ADLINK is well aware of the necessity of a developer's application or product to be easily monitored and managed, especially remotely, for timely responses and immediate actions whenever needed.

In this regard, ADLINK is backed by partnerships with the likes of SEMA and Allxon and continues to add to its growing list of partnerships in bringing full-scale remote management and error logging functions, including:

- Varied means of control across different system levels, both in-band and out-of-band
- Real-time monitoring of CPU/GPU performance, memory usage, user access, power consumption, temperature, etc.
- Remote control and updating of the system's varying components, interfaces, and firmware
- Collecting and retrieving system / error logs for event analysis and troubleshooting

Software

Explore ADLINK's versatile software solutions tailored for various industries, where innovation and reliability converge in comprehensive software suite.

- **Edge Computing:**
  Deploying AI and ML applications like eIQ, OpenVINO, Neuropilot, and Qualcomm Neuron SDK for real-time, low-latency processing at the network edge
- **Internet of Things (IoT):**
  Seamlessly connecting and managing IoT devices using ADLINK software, featuring NXP components and IPMI 2.0 for efficient data collection and analysis
- **Embedded Computing:**
  Elevating embedded systems with ADLINK's tools and libraries, including SEMA and Hardware Acceleration, for streamlined development
- **Industrial Automation:**
  Automating manufacturing processes with ADLINK's industrial automation software, optimizing operations with SEMA, OS tailoring, and adlink-meta-layer
- **Transportation:**
  Improving safety and efficiency in transportation systems using ADLINK's specialized software — Autoware, SOAFEE, TSN, and TCC.
- **Healthcare:**
  Enhancing healthcare delivery quality and efficiency with ADLINK's healthcare software — Slimbootloader, Hardware Acceleration, TSN, and TCC.

Supply Chain Management

SUPPLY LINE SECURED

ADLINK provides the most reliable supply chain management backed by strategic part sourcing and manufacturing redundancy. Right from the design phase, ADLINK undergoes a series of meticulous part selection procedures in ensuring supply chain resilience. Adding on, ADLINK has mirrored manufacturing sites, the Taipei Manufacturing Center (TPMC) based in Taiwan and the Shanghai Operation Center based in China, which add flexibility and responsiveness in further ensuring continued supply.

Certification and Validation

ADLINK places a strong emphasis on industrial-grade reliability for its embedded computing products.

This begins with component selection and is reinforced by in-house certification and validation labs that conduct extensive testing, including ISO- and TUV-certified De-rating, electrical, thermal, HALT, and SI (Signal Integrity) tests, to ensure flawless performance throughout a product's lifetime in the field.

ARM SystemReady

Certified, ensuring generic OSs to ‘just work’ right off the shelf

With uncompromising efforts in delivering a seamless development experience, ADLINK has been an active participant in the Arm SystemReady compliance certification program since its launch in 2020.

By proactively contributing to and meeting Arm SystemReady standards, ADLINK ensures that generic off-the-shelf operating systems ‘just work’ – enabling generic operating systems, and subsequent layers of software, to work out of the box on Arm-based hardware.

ADLINK eliminates the need for custom-engineered firmware, thus significantly reducing both the cost and time to market for Arm-based hardware, including infrastructure edge and embedded IoT systems.

arm SystemReady

Arm SystemReady IR for embedded devices

Find ADLINK products with the Arm SystemReady IR band stamp, which ensures Arm-based embedded devices supported by mainline Linux/BSD suiting both custom and prebuilt operating system images.

- For embedded Linux ecosystem
- Mainline Linux support for SoC
- Suiting custom (Yocto, OpenWRT, buildroot) and prebuilt (Debian, Fedora, SUSE, Ubuntu) system images

Arm SystemReady SR for servers & workstations

Find ADLINK products with the Arm SystemReady SR band stamp, which ensures Arm-based servers or workstations to offer seamless interoperability with standard operation systems, hypervisors, and software, i.e. Windows, VMware, Linux, and BSD.

- For Windows, VMware, Linux, and BSD ecosystem
- Supporting old OSs to run on new hardware and vice versa
- Suiting generic off-the-shelf OSs

Extreme Rugged

Extreme durability, unrivaled reliability

EXTREME RUGGED

Our Extreme Rugged boards are designed for harsh environments from the ground up. To support the extremes of shock, vibration, humidity and temperature, care is given to component selection, circuit design, PCB layout and materials, thermal solutions, enclosure design, and manufacturing process. Robust test methods, including Highly Accelerated Life Testing (HALT), ensure optimal product design phases and meet stringent requirements such as -40°C to 85°C operating temperature range, MIL-STD, shock & vibration, and long-term reliability.

Design stage	Validation stage	Production stage
component selection based on temperature/voltage de-rating and MTBF	HALT, Chamber test, Shock and Vibration resistant (MIL-STD-202G) and EMC Class B	ETT screening process with selected CPU SKUs

I-Pi Development Kits

The 1-stop solution to prototyping your edge, IoT innovations rapidly and conveniently

I-Pi Shop

I-Pi YouTube

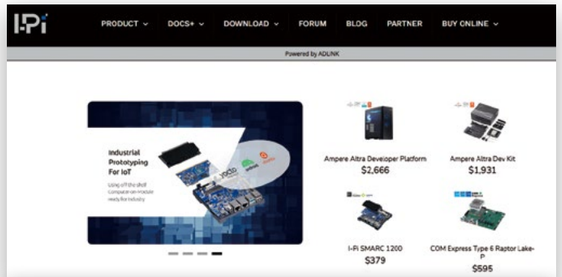
Instantaneous evaluating module capabilities for application prospects

Instant Prototyping of Your Innovative Ideas at I-Pi

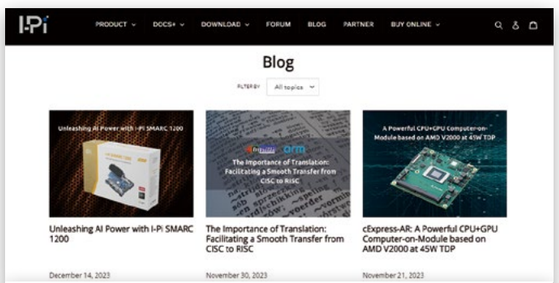
Explicitly for open-source developing, ADLINK has established its I-Pi wiki, a website and 1-stop service for any software developer, novice or professional, to transform their embedded ideas into real-life applications.

From designing to prototyping and evaluating, visit https://www.ipi.wiki/ now to get started with the development kit of your choice delivered right to your doorsteps. Readily-accessible online help and technical support forums are also provided on I-Pi wiki just 1 click away.

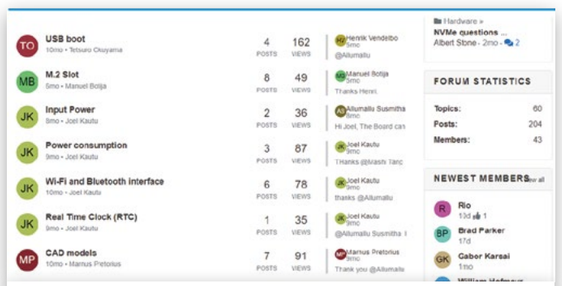
Development kits currently available include I-Pi SMARC 1200, I-Pi SMARC RB5,I-Pi SMARC IMX8M Plus, I-Pi SMARC Elkhart Lake, COM Express Type 6 Raptor Lake-P, COM Express Type 6 Alder Lake-P, COM Express Type 7 Ryzen V3000, COM Express Type 10 Elkhart Lake, Ampere Altra Developer Platform, and more.



Browse for industrial development delivered right to your doorstep



Stay posted with I-Pi blogs for the latest technology trends



Readily accessible online help (DOCS+) and forums for on-the-spot tech support

Starter Kits

As a worldwide leader in Computer-on-Modules, ADLINK understands the developers' needs for affordable and comprehensive development kits.

ADLINK offers an extensive collection of Starter Kits, including for COM-HPC, COM Express, and SMARC, in aiding engineers and system integrators to reduce their products' time to market and accelerate project schedules.

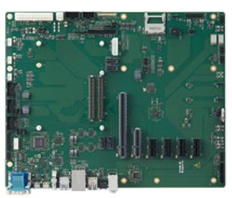
Reference Carrier Boards

In addition to starter kits, ADLINK also offers a wide variety of Reference Carrier Boards.

Using a reference carrier board, developers can emulate the functionalities of their desired end products against the selected COMs for software development and hardware verifications instantly.

COM-HPC Server Base

COM-HPC Client Base



Express Base6 R3.1

I-Pi SMARC Plus carrier board

Form Factor Overview

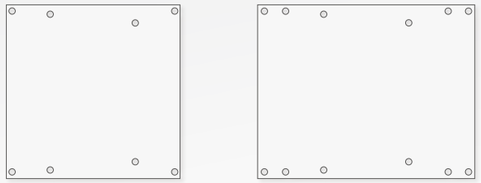
Always one step ahead

COM-HPC™

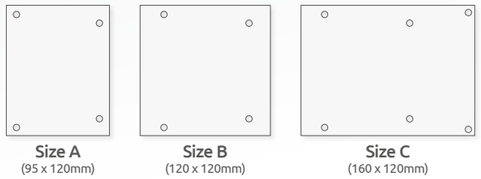
COM-HPC is the latest PICMG standard for high-performance Computer-on-Modules. It aims to drive the newest breed of embedded edge servers with limitless scalability for today and tomorrow.

COM-HPC supports up to 64 general-purpose PCIe Gen4 or Gen5 lanes, eight 25GbE ports, and a maximum of four USB 4 ports. The COM-HPC specification defines six different module sizes. The larger Size D and E (Server Type) serve next-gen headless edge servers and can accommodate up to 8 DIMMs. In contrast, the smaller Size A, B, and C (Client Type) target visually-oriented client platforms utilizing SO-DIMMs or soldered onboard memory and support up to 4 video displays. The smallest size, COM-HPC mini, is crucial for advanced embedded computer logic, serving top-hat rail PCs in building and industrial automation control cabinets, as well as portable test and measurement devices.

Server Type

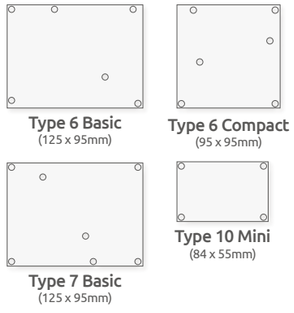


Client Type



COM Express

COM Express, defined by PICMG, is the most widely adopted COM standard and is based on serial interfaces including PCI Express, SATA, USB, LVDS/eDP, and DDI. It allows designers and system integrators to utilize the latest technologies with straight off-the-shelf modules of varied sizes for their edge applications. ADLINK has heavily invested in the development and maintenance of the PICMG® COM Express® specification since its creation.



Revision 3.1

As a chair of the PICMG subcommittee, ADLINK has helped to define the COM Express COM.0 Revision 3.1. This revision upgrades the Type 6 and 7 definitions with several new interface support, such as USB 4, PCIe Gen4 on the Type 6 and 10G CEI-mode Ethernet on the Type 7.

SMARC module

ADLINK leads in SMARC specification development, offering a compact Computer-on-Module ideal for ultra-low power ARM- and x86-based embedded applications. Featuring a versatile 314-pin edge connector, SMARC grants access to standard low-level interfaces like I²C, I²S, UART, CAN, SPI, and GPIO, alongside advanced I/O such as LVDS, HDMI, DP, eDP, GbE, USB 3.x, PCIe, and SATA. With Revision 2.1, SMARC pioneers as the first open specification for AI on Module (AIOM), supporting up to 4 MIPI CSI camera inputs and 4 GbE Ethernet ports via SerDes multiplexing, facilitating seamless integration with NPU-integrated SoCs for diverse video-based and AI-vision applications.

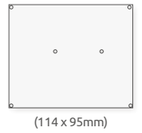
OPEN STANDARD MODULE ™

The OSM form factor represents the first Computer-on-Module designed for solderable BGA mini modules, supporting both ARM and x86 designs. These modules, notably smaller than previous available modules, measure up to 45mm x 45mm, catering to the evolving needs of IoT applications by combining modular embedded computing with cost-effectiveness and compactness. With up to 662 BGA pins, the BGA design enables the implementation of numerous interfaces on a small footprint. Ideal for rugged environments, the power envelope typically stays under 15W.

Qseven

Qseven® is a versatile, small Computer-on-Module standard. With its 230-pin edge connector, it mainly focuses on traditional low-power x86 Intel Atom® designs. Since Qseven is not able to support all modern interfaces and has only partial coverage for ARM features, there has been an eminent, accelerated migration of low-power COM projects from Qseven to SMARC.

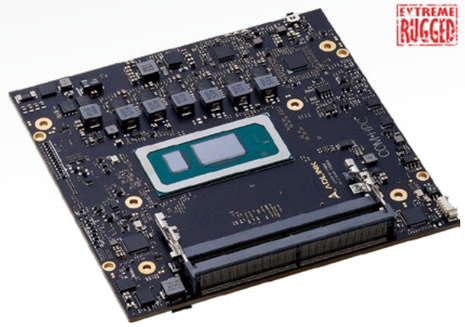
ETX®



ETX®, one of the oldest Computer-on-Module specifications, supports legacy interfaces such as ISA bus, Parallel ATA (IDE), and PS/2 keyboard/mouse. ADLINK is highly committed to this product line and is one of the only vendors that offers customers a migration path for ETX even beyond 2025.

COM-HPC

The next-generation standard for high-performance computing modules



Server Type Pin Definition

Aimed for next-gen headless edge servers, COM-HPC Server Type features up to 64 PCIe Gen4 or Gen5 lanes, eight 25GbE ports, and can accommodate up to 8 DIMM slots. Additionally, it provides the IPMB function for convenient out-of-band monitoring and management. COM-HPC Server Type is suitable for both ARM and x86 architectures.

J1	J2
Power	48x PCIe
16x PCIe PCIe_BMC / IPMB	
4x ETH_KR (max. 25G) 1x ETH_LED_I²C	
8x USB 2.0	
2x USB 3.X	
2x USB 4/3.X	
2x SATA	
1x NBASE-T (max. 10G)	4x ETH_KR (max. 25G)
eSPI	
12x GPIO / BOOT_SPI / GPP_SPI / 2x I²C / SMB / 2x URAT	RSVD

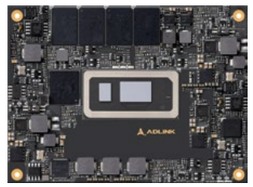
Client Type Pin Definition

Targeting visual-oriented applications, such as medical imaging, gaming, and testing measurement, COM-HPC Client Type provides system integrators with up to four USB4 and four video displays, plus dual Ethernet, all compacted in a modest size utilizing SO-DIMMs or soldered onboard memory.

J1	J2
Power	DDI 3
8x USB 2.0	2x USB 4/3.X
2x USB 4/3.X	32x PCIe
Audio HDA/I²S/Soundwire/DMIC	
DDI 1	
DDI 2	
eDP/DSI	
PCIe_BMC / IPMB	
eSPI	
2x SATA	NBASE-T_1 (max. 10G)
16x PCIe	2x MIPI-CSI
	2x ETH_KR (max.25G)
	PCIe Target
NBASE-T_0 (max. 10G)	RSVD

COM-HPC

COM-HPC is the latest PICMG standard introduced by PICMG to complement COM Express in response to the ever-evolving digital transformation. Providing standards for three module types – Server Type, Client Type and Mini Type– COM-HPC offers substantially higher data bandwidths for delivering superior I/O performance while featuring high-performance computing and high-speed transmission with limitless scalability.



Mini Pin Definition

Using a single connector, reducing signal pins by half but still maintaining PCIe Gen5, USB4, DDI and Ethernet. COM-HPC Mini is vital for high-end embedded computing in applications like industrial control PCs. When combined with soldered memory and storage, it is also well-suited for mission-critical applications.

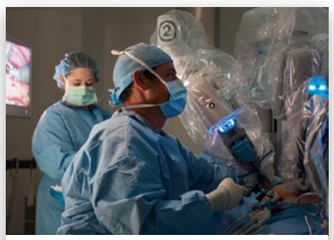
Mini
Power
8x USB 2.0
Audio HDA/I²S/Soundwire/DMIC
2x DDI / 2x USB4/3.X
2x USB4/3.X
eDP/DSI
eSPI
12x PCIe 2x PCIe/SATA, 2x PCIe/SGMII
1x NBASE-T (max. 10G)
12x GPIO / SDIO / BOOT_SPI / GPP_SPI / 2x 12C / SMB / 2x USART

- One-click Buy & Ship
- Easy “How-to’s”
- Online documentation
- Forum support

Ampere Altra Developer Platform

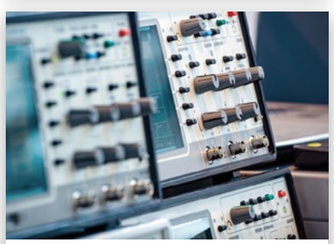
COM-HPC Development Kits

Applications



Robotic Surgery

Rugged Network Communication



Test and Measurement

Task Consolidation

COM-HPC Server Type

Model Name	COM-HPC-ALT	COM-HPC-sIDH
COM-HPC®		New 
CPU	Ampere Altra / Altra Max M128-26 M96-28 Q64-22 Q32-17	Intel® Xeon® D-2700 series (formerly "Ice Lake-D")
Memory	768 GB DDR4 at 3200/2666 MT/s	512 GB DDR4 at 3200/2666 MT/s
BIOS Type	TianoCore EDK II	AMI UEFI
Ethernet KR	Up to 4x 10GBASE-KR	Up to 8x 10GBASE-KR (25/40/100G, opt.)
NBASE-T Ethernet	GbE (Intel i210)	up to 2.5GbE (Intel i225, TSN opt.)
Remote Management	IPMB (via MMC, opt.) Dedicated PCIe_BMC lane	IPMB (via MMC, opt.) Dedicated PCIe_BMC lane
PCI Express	64 PCI Express Lanes : 3x PCI Express x16 Gen4 (x16, x8, x4) 2x PCI Express x8 Gen4 (x8, x4, x2)	48 PCI Express Lanes: 2x PCI Express x16 Gen4 (x16, x8, x4) 2x PCI Express x8 Gen3 (x8, x4, x2)
USB	4x USB 3.X/2.0	4x USB 3.X/2.0
Serial ATA	-	2x at 6Gb/s
TPM	TPM 2.0	TPM 2.0
Management Bus	2x I²C, SMBus	2x I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG	EAPI/SEMA, Debug/JTAG
Power Supply	12 V / 5Vsb ±5% (ATX) 12V ±5% (AT)	12V ±5% (AT)
Operating Temperature	Standard: 0°C to 60°C	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (selected SKUs)
Form Factor & Compatibillity	PICMG COM-HPC: Rev 1.0 Server Type size E: 200 x 160 mm	PICMG COM-HPC: Rev 1.0 Server Type size D: 160 x 160 mm
OS Support	CentOS debian fedora Ubuntu yocto PROJECT	yocto PROJECT

Notes:

- Extreme Rugged products are exclusively offered for specific SKUs.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM-HPC Client Type

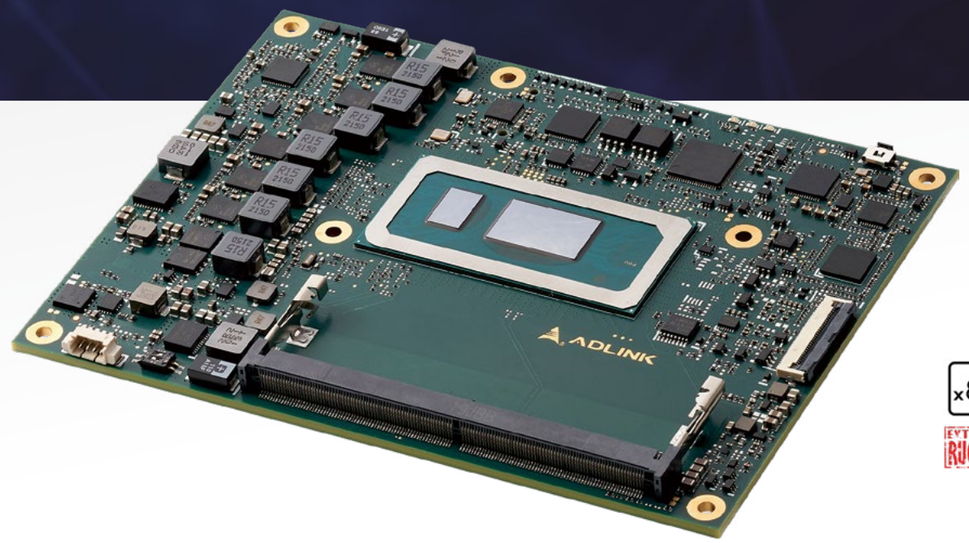
Model Name	COM-HPC-cRLS	COM-HPC-cADP
COM-HPC®	New 	
CPU	13th Gen Intel® Core® i9 / i7 / i5 / i3 series (formerly "Raptor Lake-S")	12th Gen Intel® Core™ i7 / i5 / i3 series (formerly "Alder Lake-P")
Chipset	R680E(ECC), Q670E/H610E(non-ECC)	-
Memory	128 GB DDR5 at 4000 MT/s	64 GB DDR5 at 4800 MT/s
BIOS Type	AMI UEFI	AMI UEFI
Graphics Outputs	4 independent displays 3x DDI (DP/HDMI/DVI) eDP 1.4	4 independent displays 3x DDI (DP/HDMI/DVI) eDP 1.4
Audio	1x HD Audio (1x I²S, opt.)	1x HD Audio or 1x I²S
Camera	-	-
NBASE-T Ethernet	up to 2x 2.5GbE (Intel 226, TSN opt.)	Intel® i225V/IT 2.5GbE (TSN @ IT)
USB	4x USB3.X/2.0, 4x USB2.0	2x USB4/3.X/2.0 2x USB 3.X/2.0 4x USB 2.0
Serial ATA	-	-
PCI Express	38 PCI Express Lanes : PCI Express Graphic x16 Gen5 1x PCI Express Graphic x4 Gen4 6x PCI Express x1 Gen3 3x PCI Express x4 Gen4 (R680E/Q670E)	24 PCI Express Lanes : 1x PCI Express Graphic x8 Gen4 2x PCI Express x4 Gen4 2x PCI Express x4 Gen3
TPM	TPM 2.0	TPM 2.0
Management Bus	2x I²C, SMBus	2x I²C, SMBus
Embedded Features	EAPI/SEMA Debug/JTAG	EAPI/SEMA Debug/JTAG
Power Supply	12V ±5% (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibillity	PICMG COM-HPC: Rev 1.0 Client Type size C: 160 x 120 mm	PICMG COM-HPC: Rev 1.0 Client Type size B: 120 x 120mm
OS Support	yocto PROJECT	yocto PROJECT

Notes:

- VxWorks is supported by project basis.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 6 Basic Size

Transforming your everyday edge computing



x86

EXTREME RUGGED

Pin Definition
Type 6 Rev 3.1 Basic Size Modules

A-B	C-D
8x USB 2.0	4x USB 3.X
LVDS / eDP	2x DDI/**USB4**
4x SATA	
8x USB 2.0	
Gigabit Ethernet	1x DDI
LPC / eSPI	
GPIO / SDIO / SERIAL / CAN / **GP SPI** / I²C / HDA / SNDW	
PCIe Gen4 x24	
Power	

Pin Definition
Type 6 Rev 3.0 Basic Size Modules

A-B	C-D
8x USB 2.0	4x USB 3.X
LVDS / eDP	3x DDI
4x SATA	
8x USB 2.0	
Gigabit Ethernet	
LPC / eSPI	
GPIO / SDIO / SERIAL / CAN / SPI / I²C / HDA	
PCIe x24	
Power	

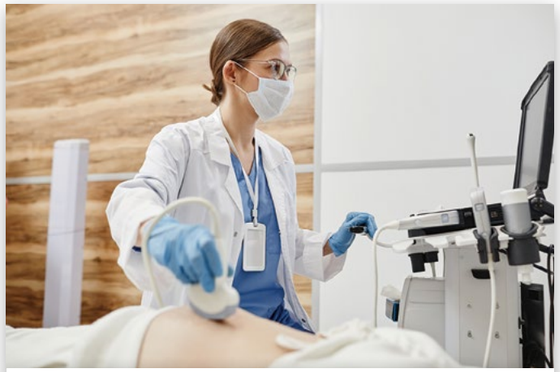
COM Express Type 6 Basic Size

COM Express Type 6 Basic size is the most popular and widely used form factor on the market. With two COM Express connectors and pinouts closely similar to the common x86 based silicon, the Type 6 Basic size yields up to 75 watts, making it well-fitted for various embedded computing applications, including medical, gaming, test & measurement, industrial automation, and more. Topping off, its latest revision – R3.1 – has also added support for several advanced interfaces, such as PCIe Gen4 and USB4.

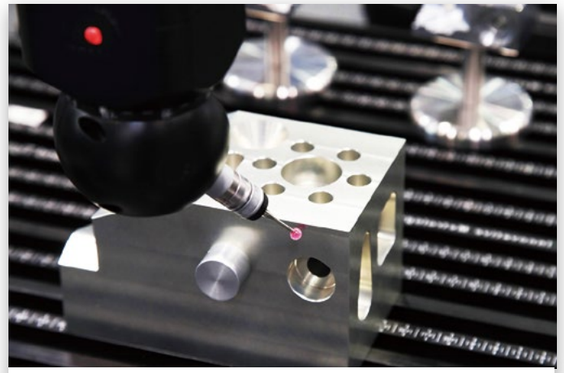
- One-click Buy & Ship
- Easy "How-to's"
- Online documentation
- Forum support

COM Express Type 6 Development Kits

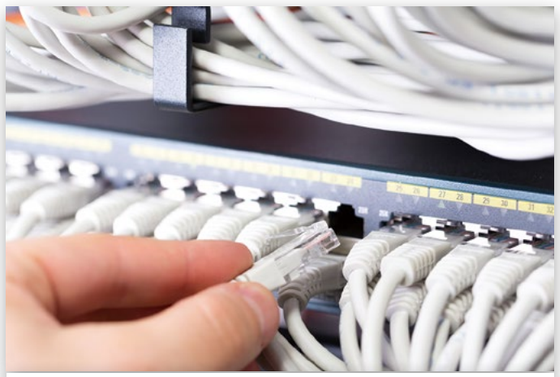
Applications



Medical



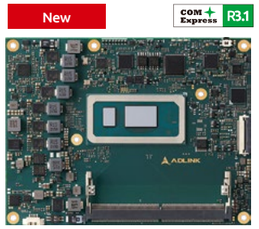
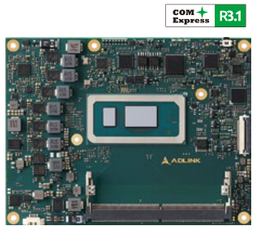
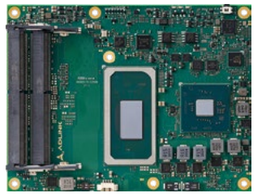
Test and Measurement



Data Communication

Gaming

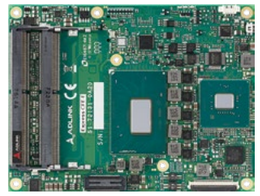
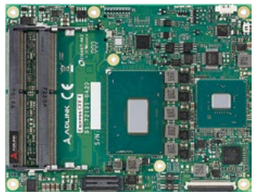
COM Express Type 6 Basic Size

Model Name	Express-RLP	Express-ADP	Express-TL
COM Express	New 		
CPU	13th Gen Intel® Core™ i7 / i5 / i3 series (formerly "Raptor Lake-P")	12th Gen Intel® Core™ i7 / i5 / i3 series (formerly "Alder Lake-P")	11th Gen Intel® Core™ Intel® Xeon® W/Celeron® 6000 (formerly "Tiger Lake-H")
Chipset	-	-	RM590E (ECC), QM580E/HM570E (non-ECC)
Memory	64 GB DDR5 at 4800MT/s	64 GB DDR5 at 4800MT/s	128 GB DDR4 at 3200/2666 MT/s
BIOS Type	AMI UEFI	AMI UEFI	AMI UEFI
Graphics Outputs	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI (or USB4, opt.) 1x DDI (or VGA, opt.)	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI (or USB4, opt.) 1x DDI (or VGA, opt.)	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI 1x DDI (or VGA, opt.)
LAN	up to 2.5GbE (Intel i225, TSN opt.)	up to 2.5GbE (Intel i225, TSN opt.)	up to 2.5GbE (Intel i225, TSN opt.)
USB	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s	4x at 6Gb/s
PCI Express	PCIe Graphic x8 Gen4 (45W SKU) 2x PCIe Graphic x4 Gen4 8x PCIe x1 Gen3 (via switch)	PCIe Graphic x8 Gen4 (45W SKU) 2x PCIe Graphic x4 Gen4 8x PCIe x1 Gen3 (via switch)	PCIe Graphic x16 Gen4 (or 2x8 or 1x8+2x4) 8x PCI Express x1 Gen3
Audio	HDA	HDA	HDA
TPM	TPM 2.0	TPM 2.0	TPM 2.0
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibillity	PICMG COM.0 R3.1, Type 6 Basic size: 95 x 125 mm	PICMG COM.0 R3.1, Type 6 Basic size: 95 x 125 mm	PICMG COM.0 R3.0, Type 6 Basic size: 95 x 125 mm
OS Support	Ubuntu, yocto, Windows	Ubuntu, yocto, Windows	yocto, Windows

Notes:

- VxWorks is supported by project basis.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 6 Basic Size

Model Name	Express-CFR	Express-CF/CFE	Express-KL/KLE
COM Express			
CPU	9th Gen Intel® Xeon®, Core™, Pentium® and Celeron® Processors (formerly "Coffee Lake-H Refresh")	8th Gen Intel Core™ 8000 series and Intel Xeon® Processors (formerly "Coffee Lake-H")	7th Gen Intel® Core™ 7000 series and Intel® Xeon® Processors (formerly "Kaby Lake-H")
Chipset	CM246 (ECC) QM370/HM370 (non-ECC)	CM246 (ECC) QM370/HM370 (non-ECC)	CM238 (ECC) QM175/HM175 (non-ECC)
Memory	96 GB DDR4 at 2400/2133 MT/s	96 GB DDR4 at 2400/2133 MT/s (ECC for Express-CFE)	32 GB DDR4 at 2133/1867 MT/s (ECC for Express-KLE)
BIOS Type	AMI UEFI	AMI UEFI	AMI UEFI
Graphics Outputs	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI 1x DDI (or VGA, opt.)	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI 1x DDI (or VGA, opt.)	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI 1x DDI (or VGA, opt.)
LAN	GbE (Intel i219)	GbE (Intel i219)	GbE (Intel i219)
USB	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0
Serial ATA	4x at 6Gb/s	4x at 6Gb/s	4x at 6Gb/s
PCI Express	PCIe Graphic x16 Gen3 (or 2x8 or 1x8+2x4) 8x PCI Express x1 Gen3	PCIe Graphic x16 Gen3 (or 2x8 or 1x8+2x4) 8x PCI Express x1 Gen3	PCIe Graphic x16 Gen3 (or 2x8 or 1x8+2x4) 8x PCI Express x1 Gen3
Audio	HDA	HDA	HDA
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)	TPM 2.0 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibillity	PICMG COM.0 R3.0, Type 6 Basic size: 95 x 125 mm	PICMG COM.0 R3.0, Type 6 Basic size: 95 x 125 mm	PICMG COM.0 R2.1, Type 6 Basic size: 95 x 125 mm
OS Support	yocto, Windows	yocto, Windows	yocto, Windows

Notes:

- VxWorks is supported by project basis.
- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 6 Compact Size

COM Express

Significantly lowered power envelopes

x86

EXTREME RUGGED

Technical Article

Ideal Small Form Factor Choices Require Consideration of both Technical and Strategic Options

Computer-on-Modules, though small, significantly influence fields like medical imaging and production control.

Designing them demands careful consideration, including factors such as interface specificity, temperature adaptability, and power efficiency. Choosing the ideal small form factor is crucial yet challenging. Our online article provides valuable insights to assist developers in this selection process. Explore our guide now for more.

Pin Definition Type 6 Compact Size Modules

A-B	C-D
8x USB 2.0	4x USB 3.X
LVDS / eDP	2x DDI/**USB4**
4x SATA	
8x USB 2.0	
Gigabit Ethernet	1x DDI
LPC / eSPI	
GPIO / SDIO / SERIAL / CAN / **GP SPI** / I²C / HDA / SNDW	
PCIe Gen4 x24	
Power	

COM Express Type 6 Compact Size

COM Express Type 6 Compact size, shorter in length than the Basic size, is ideally suited for single-chip x86 SoCs, and features proficient performance at significantly lowered power envelopes of 5 to 30 watts. COM Express Type 6 Compact size targets mid- to entry-level applications such as transportation, robotics, edge servers, industrial control, and HMIs in a spate of industries.

- One-click Buy & Ship
- Easy "How-to's"
- Online documentation
- Forum support

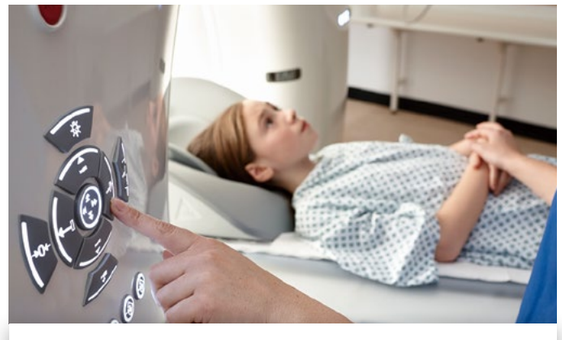
COM Express Type 6 Development Kits

Applications

Industrial Automation

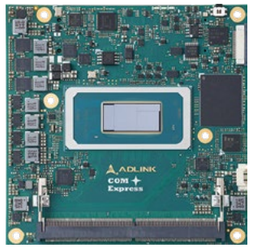
Robotics

Transportation



Medical

COM Express Type 6 Compact Size

Model Name	cExpress-MTL	cExpress-TL
	Preliminary COM Express R3.1 AIOM 	
CPU	Intel® Core™ Ultra Processors (formerly "Meteor Lake-H/U" Ultra 7/5)	11th Gen Intel® Core™ i7 / i5 / i3 series (formerly "Tiger Lake-UP3")
Memory	64 GB DDR4 at 5600 MT/s	64 GB DDR4 at 3200/2666 MT/s (IBECC opt.)
BIOS Type	AMI UEFI	AMI UEFI
Graphics Outputs	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI (or USB4, opt.) 1x DDI (or VGA, opt.)	4 independent displays LVDS (or eDP 1.4, opt.) 2x DDI 1x DDI (or VGA, opt.)
LAN	up to 2.5GbE (Intel i226, TSN, opt.)	up to 2.5GbE (Intel i225, TSN, opt.)
USB	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s
PCI Express	1x PCIe Graphic x8 Gen4 2x PCIe Graphic x4 Gen4 8x PCIe x1 Gen4 (no SATA, opt.)	1x PCIe Graphic x4 Gen4 4x PCIe x1 Gen3 (PCIe switch, opt.)
eMMC (opt.)	64-256GB NVMe SSD	-
SD	-	-
Audio	HDA	HDA
TPM	TPM 2.0	TPM 2.0 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibility	PICMG COM.0 R3.0 Type 6 Compact size: 95 x 95 mm	PICMG COM.0 R3.0 Type 6 Compact size: 95 x 95 mm
OS support	Ubuntu yocto PROJECT	yocto PROJECT

Notes:

- VxWorks is supported by project basis.
- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

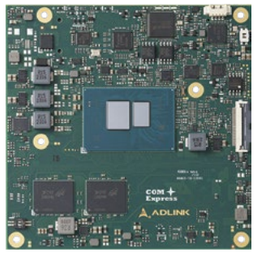
COM Express Type 6 Compact Size

Model Name	cExpress-AR	cExpress-WL
		
CPU	AMD Ryzen™ Embedded V2000 series	8th Gen Intel® Core™ i7 / i5 / i3 series (formerly "Whiskey Lake-U")
Memory	64 GB DDR4 at 3200/2666 MT/s	64 GB DDR4 at 2133/1867 MT/s
BIOS Type	AMI UEFI	AMI UEFI
Graphics Outputs	4 independent displays LVDS (or eDP 1.3, opt.) 2x DDI 1x DDI (or VGA, opt.)	3 independent displays LVDS (or eDP 1.3, opt.) 1x DDI 1x DDI (or VGA, opt.)
LAN	GbE (Intel i225)	GbE (Intel i219)
USB	4x USB 3.X/2.0, 4x USB 2.0	4x USB 3.X/2.0, 4x USB 2.0
Serial ATA	2x at 6Gb/s	3x at 6Gb/s
PCI Express	1x PCIe Graphic x8 Gen3 6x PCIe x1 Gen3	1x PCIe x1 Gen3 at PEG 8x PCIe x1Gen3
eMMC (opt.)	-	32-64GB
SD	-	Yes
Audio	HDA	HDA
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	5-20V / 5Vsb ±5% (ATX), 5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibility	PICMG COM.0 R3.0 Type 6 Compact size: 95 x 95 mm	PICMG COM.0 R3.0 Type 6 Compact size: 95 x 95 mm
OS support	yocto PROJECT	yocto PROJECT

Notes:

- VxWorks is supported by project basis.
- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 6 Compact Size

Model Name	cExpress-SL/KL	cExpressASL/ALN
COM Express		Preliminary COM Express R3.1 
CPU	6th Gen IntelCore. Intel® Core™ i7 / i5 / i3 series (formerly "Skylake-U")	7th Gen Intel® Atom™, Processer N series, and Core™ i3-N305 (formerly "Alder Lake-N") Amston Lake x7835RE/x7433RE/x7213RE/x7211RE (formerly "Amston Lake")
Memory	32 GB DDR4 at 2133/1867 MT/s	Up to 16GB LPDDR5 at 4800MT/s support IBECC
BIOS Type	AMI Aptio V	AMI Aptio V
Graphics Outputs	LVDS(oreDP1.4) 2x DDI (DP/HDMI or VGA)	3 independent displays LVDS (or eDP 1.4, opt.) 1x DDI (or TCSS, opt.) 1x DDI (or VGA, opt.)
LAN	Intel® i219LM/V	up to 2.5GbE (Intel i226, TSN, opt.)
USB	4x USB 3.X/2.0, 4x USB 2.0	Up to 4x USB 3.2 Gen2, 8x USB 2.0
Serial ATA	3x at 6Gb/s	2x at 6Gb/s
PCI Express	5x PCIe x1 Gen3 (3965U supports Gen2) (6 PCIex1 w/o GbE, opt.)	Up to 8 PCIe GEN3 x1 (on-board LAN, SATA[0:1]. Opt.)
eMMC (opt.)	-	32-63 eMMC
SD	-	1x MIPI-CSI camera resolution up to 4K
Audio	HDA	HDA
TPM	TPM 2.0 (opt.)	TPM 2.0
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	5-20V / 5Vsb ±5% (ATX), 5-20V (AT)	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (Amston Lake)
Form Factor & Compatibility	PICMG COM.0 R2.1, Type 6 Compact size: 95 x 95 mm	PICMG COM.0 R3.1 Type 6 Compact size: 95 x 95 mm
OS support	yocto PROJECT, Windows	Ubuntu, yocto PROJECT, Windows

Notes:

- VxWorks is supported by project basis.
- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 6 Compact Size

Model Name	cExpress-EL	cExpress-AL
COM Express		
CPU	Intel Atom® x6000E series (formerly "Elkhart Lake")	Intel Atom E3900 series (formerly "Apollo Lake")
Memory	32GB DDR4 at 3200/2666 MT/s (IBECC opt.)	32 GB DDR4 at 2133/1867 MT/s
BIOS Type	AMI UEFI	AMI UEFI
Graphics Outputs	3 independent displays LVDS (or eDP 1.3, opt.) 1x DDI 1x DDI (or VGA, opt.)	3 independent displays LVDS (or eDP 1.3, opt.) 1x DDI 1x DDI (or VGA, opt.)
LAN	GbE (MaxLinear GPY)	GbE (Intel 219)
USB	2x USB 3.X/2.0, 6x USB 2.0 (USB3 hub opt.)	4x USB 3.X/2.0, 4x USB 2.0
Serial ATA	2x at 6Gb/s	3x at 6Gb/s
PCI Express	6x PCIe x1 Gen3	5x PCIe x1 Gen3 (3965U supports Gen2) (6 PCIex1 w/o GbE, opt.)
eMMC (opt.)	32-64 (by project)	-
SD	Yes	-
Audio	HDA	HDA
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	5-20V / 5Vsb ±5% (ATX), 5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibility	PICMG COM.0 R3.0, Type 6 Compact size: 95 x 95 mm	PICMG COM.0 R2.1, Type 6 Compact size: 95 x 95 mm
OS support	yocto PROJECT, Windows	yocto PROJECT, Windows

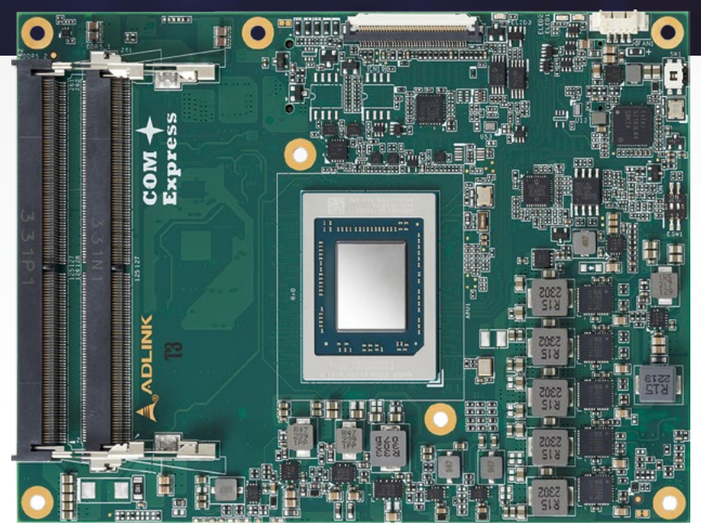
Notes:

- VxWorks is supported by project basis.
- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 7 Basic Size

COM Express

Serving servers with extended operating temperatures



x86

EXTREME RUGGED

COM Express Type 7 Basic Size

COM Express Type 7 Basic size, designed for intermediate- to high-performance headless edge servers, offers up to 32 PCIe lanes and four 10GbE ports with an extended temperature tolerance. As of late, its suitability for a wide range of rugged and embedded industrial applications has been widened further with Revision 3.1, which adds a second PCIe clock for PCIe Gen4. The range of applications for Type 7 modules is very broad, including general-purpose rugged embedded computers, mission-critical servers, SDN appliances, signal processing & data acquisition appliances, network test equipment, satellite gateways, inflight entertainment systems, and more.

- One-click Buy & Ship
- Easy "How-to's"
- Online documentation
- Forum support

COM Express Type 7 Development Kits

Pin Definition Type 7 Rev 3.1 Basic Size Modules

A-B	C-D
4x USB 2.0	4x USB 3.X
2x SATA	4x 10G KR **CEI mode**
Gigabit Ethernet	
NC-SI	
LPC / eSPI	
GPIO / SDIO / SERIAL / CAN / SPI / I²C / HDA / PCIe clock & **2nd PCIe clock** / IPMB	
PCIe Gen4 x32	
Power	

Pin Definition Type 7 Rev 3.0 Basic Size Modules

A-B	C-D
4x USB 2.0	4x USB 3.X
2x SATA	4x 10G KR
Gigabit Ethernet	
NC-SI	
LPC / eSPI	
GPIO / SDIO / SERIAL / CAN / SPI / I²C / HDA / PCIe clock & RSVD	
PCIe x32	
Power	

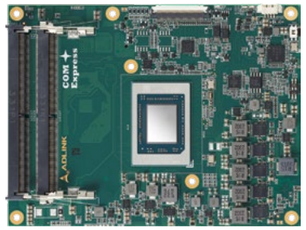
Applications

Satellite Gateway

Defense

Data Communication

COM Express Type 7 Basic Size

Model Name	Express-VR7	Express-ID7
	New COM Express R3.1 	New COM Express R3.1 
CPU	AMD Ryzen™ Embedded V3000 series	Intel® Xeon® D-1700 series (formerly "Ice Lake-D")
Memory	64GB DDR5 at 4800 MT/s (ECC/non-ECC)	128 GB DDR4 at 3200/2666 MT/s (ECC / non-ECC)
BIOS Type	AMI UEFI	AMI UEFI
Ethernet KR	2x 10GBASE-KR	4x 10GBASE-KR
LAN	up to 2.5GbE (Intel i226)	GbE (Intel i210, TSN opt.)
USB	4x USB3.X/2.0	4x USB 3.X/2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s
PCI Express	8 PCI Express Gen4 (1 x8, 2 x4), 4 PCI Express Gen4 (4 x1, 2 x2, 1 x4), 2 PCI Express Gen4 (1 x1, 1 x2)	PCI Express x16 Gen4 (or 2 x8 or 4 x4) PCI Express x8 Gen3 (x8, x4, x2) PCI Express x8 Gen3 (x8, x4, x2)
eMMC (opt.)	-	-
TPM	TPM 2.0	TPM 2.0
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20V/5Vsb±5%(ATX)8.5-20V(AT)	12 V / 5Vsb ±5% (ATX) 12 V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibillity	PICMG COM.0: Rev 3.1 Type 7 Type 7 Basic size: 95 x 125 mm	PICMG COM.0 R3.1, Type 7 Basic size: 95 x 125 mm
OS Support	Ubuntu yocto PROJECT	yocto PROJECT

Notes:

- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 7 Basic Size

Model Name	Express-BD7/BD74	Express-DN7
		
CPU	Intel® Xeon® D-1500 series (formerly "Broadwell-DE")	Intel® Atom® C3000 series (formerly "Denverton-NS")
Memory	64 GB DDR4 at 2400/2133MT/s (ECC/non-ECC)	96 GB DDR4 at 2400/2133 MT/s (ECC/non-ECC)
BIOS Type	AMI UEFI	AMI UEFI
Ethernet KR	2x 10GBASE-KR	4x 10GBASE-KR (max. 20G)
LAN	GbE (Intel i210)	GbE (Intel i210)
USB	4x USB 3.X/2.0	2x USB 3.X/2.0, 2x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s
PCI Express	PCI Express x16 Gen3(or 2 x8 or 4 x4) PCI Express x8 Gen3 (x8, x4, x2) PCI Express x8Gen2(x8, x4, x2), w/o GbE	PCI Express x8 Gen3 (or 2x8 or 1x8 plus 2x4) PCI Express x8 Gen3 (x8, x4, x2), w/o GbE
eMMC (opt.)	-	32-64 GB (opt.)
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	8.5-20V/5Vsb±5%(ATX)8.5-20V(AT)	8.5-20 V / 5Vsb ±5% (ATX) 8.5-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibillity	PICMG COM.0 R3.0, Type 7 Basic size: 95 x 125 mm	PICMG COM.0 R3.0, Type 7 Basic size: 95 x 125 mm
OS Support	yocto PROJECT	yocto PROJECT

Notes:

- TPM is supported by BOM option.
- Extreme Rugged products are exclusively offered for specific SKUs.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 10 Mini Size

Ultra-low power with soldered onboard memory

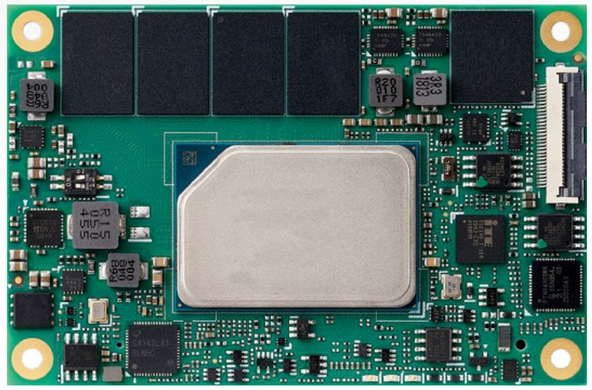
COM Express

COM Express Type 10 Mini Size

COM Express Type 10 Mini size features power envelopes of TDP 12W and lower and soldered onboard memory, yet still offering graphics display and optimized I/O capabilities needed for various technologically-advanced mobile solutions, such as handheld devices and controllers for industrial, medical, and transportation applications.

- One-click Buy & Ship
- Easy "How-to's"
- Online documentation
- Forum support

COM Express Type 10 Development Kits



x86

EXTREME RUGGED

Solution Brief

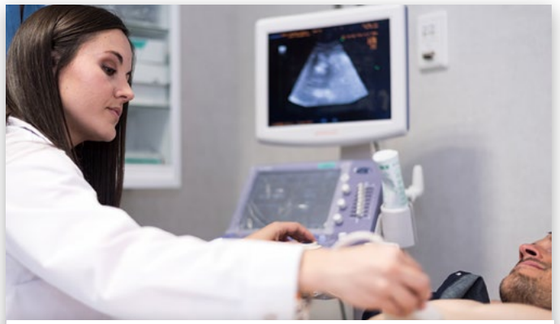
Computer-on-Modules Boost Improvements in Ultrasound Technology

ADLINK's COM Express modules empower portable workstations by integrating various data entry interfaces and remote diagnosis capabilities. Explore how these modules enhance ultrasound technology in our online solution brief for more details!

Pin Definition for Type 10 Mini Size Modules

A-B
8x USB 2.0 v2x USB 3.X
DDI
LVDS / eDP
4x SATA
Gigabit Ethernet
LPC / eSPI
GPIO / SDIO / UART / CAN / SPI / I²C / SMB / **GP_SPI** / HDA
4x PCIe Gen4
Power

Applications



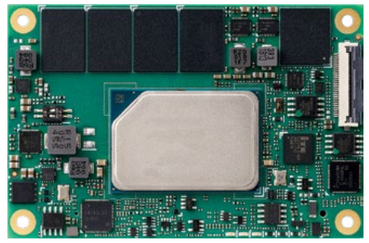
Medical Portable Ultrasound

In-Vehicle / In-Flight Entertainment

Panel Control

Industrial Automation (Portable Devices)

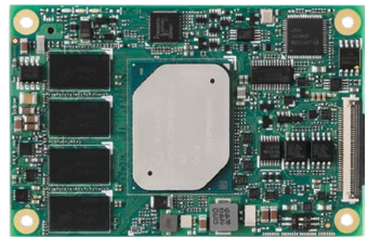
COM Express Type 10 Mini Size

Model Name	nanoX-EL
COM Express	
CPU	Intel Atom® x6000E series (formerly “Elkhart Lake")
Memory (soldered)	16GB LPDDR4 at 4267/3200 MT/s (IBECC opt.)
BIOS Type	AMI UEFI
Graphics Outputs	2 independent displays LVDS (or eDP 1.4, opt.) 1x DDI
LAN	GbE (MaxLinear GPY)
USB	2x USB 3.X/2.0, 6x USB 2.0
Serial ATA	2x at 6Gb/s
PCI Express	4x PCIe x1 Gen3 (x4, x2, x1)
eMMC (opt.)	32-64GB
SD (opt.)	Yes
Audio	HDA
TPM	TPM 2.0 (opt.)
Management Bus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	4.75-20V / 5Vsb ±5% (ATX), 4.75-20V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibility	PICMG COM.0 R3.0 Type 10 Mini size: 84 x 55 mm
OS support	yocto PROJECT, Windows

Notes:

- VxWorks is supported by project basis.
- TPM, eMMC are supported by BOM option.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

COM Express Type 10 Mini Size

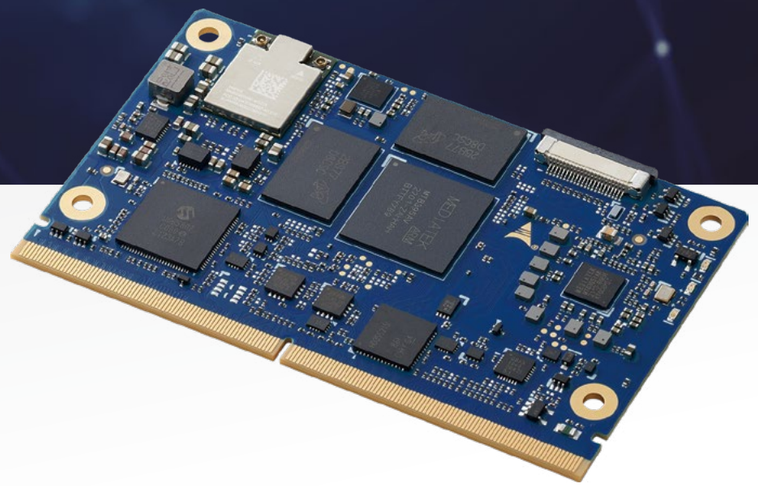
Model Name	nanoX-AL	nanoX-BT
COM Express		
CPU	Intel Atom® E3900 series (formerly "Apollo Lake")	Intel Atom® E3800 series (formerly “Bay Trail")
Memory (soldered)	8 GB DDR3L at 1867/1600 MT/s	4 GB DDR3L at 1333 MT/s
BIOS Type	AMI UEFI	AMI UEFI
Graphics Outputs	2 independent displays LVDS (or eDP 1.4, opt.) 1x DDI	2 independent displays LVDS (or eDP 1.2, opt.) 1x DDI
LAN	GbE (Intel i210)	GbE (Intel i210)
USB	2x USB 3.X/2.0, 6x USB 2.0	1x USB 3.X/2.0, 3x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 3Gb/s
PCI Express	3x PCIe x1 Gen2 (x2, x1)	3x PCIe x1 Gen2 (4x PCIe x1, w/o GbE, opt.)
eMMC (opt.)	32 GB	32GB
SD (opt.)	Yes	Yes
Audio	HDA	HDA
TPM	TPM 2.0 (opt.)	TPM 1.2 (opt.)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)	EAPI/SEMA, Debug/JTAG Failsafe BIOS (opt.)
Power Supply	4.75-20V / 5Vsb ±5% (ATX), 4.75-20V (AT)	5-14V / 5Vsb ±5% (ATX), 5-14V (AT)
Operating Temperature	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)	Standard: 0°C to 60°C Extreme Rugged: -40°C to 85°C (standard 12V input only)
Form Factor & Compatibility	PICMG COM.0 R3.0 Type 10 Mini size: 84 x 55 mm	PICMG COM.0 R2.1 Type 10 Mini size: 84 x 55 mm
OS support	yocto PROJECT, Windows	yocto PROJECT, Windows

Notes:

- VxWorks is supported by project basis.
- TPM, eMMC are supported by BOM option.
- Optional -40°C to 85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

SMARC

Covering ARM / x86 ecosystems



x86

ARM

EXTREME RUGGED

AIoM (AI on Module)

AIOM

With the latest Revision 2.1, SMARC has positioned itself as the ideal standard for scalable, low-power, silicon-independent AIoM solutions in the industrial embedded market. Over the revision, SMARC adds the support for up to 4 MIPI CSI camera inputs specifically for SoCs with integrated NPUs (Neural Processing Units) used for video-based AI solutions, such as robotic vehicles and autonomous driving. Additionally, it also allows multiplexing SerDes signals over two PCIe x1 interfaces for a total of four GbE Ethernet ports to support up to 4 GigE Vision cameras for AI vision applications.

Pin Definition for SMARC

2x LVDS / DSI / eDP
HDMI / DP++
DP++
2x MIPI CSI
HDA / I²S
1x SATA
2x GbE
2x USB 3.X/2.0 (1x OTG) 4x USB 2.0 (1x OTG)
4x PCIe
SDIO / SPI /eSPI / 5x I²C 4x UART / 2x CAN / 12x GPIO
Power

SMARC

Short for Smart Mobility ARChitecture, the SMARC form factor is the only standard natively built for both ARM- and x86-based SoCs, allowing it to leverage the wide-ranging smart phone and tablet computer ecosystems. With 314-pins on a high-speed MXM3 connector, SMARC delivers a combination of high-performance computing, low power envelopes typically under 6W and no more than 15W, low cost, and the ability to withstand extreme environmental conditions, making it the ideal building blocks for portable and stationary embedded systems.

I-Pi SMARC Development Kits

- One-click Buy & Ship
- Easy “How-to’s”
- Online documentation
- Forum support

Applications

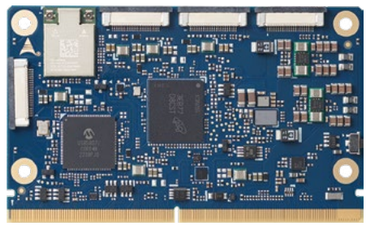
Drone

Robotics

Smart City (Transportation)

Portable Medical Devices

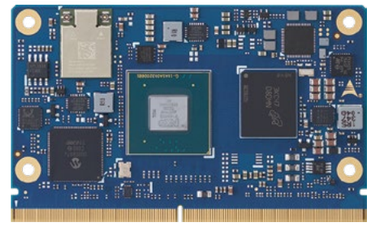
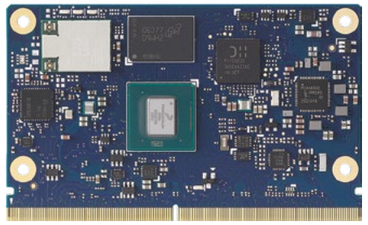
SMARC

Model Name	LEC-MTK-I1200	LEC-RB5
SMARC module	New AIOM 	New AIOM 
CPU	MediaTek® Genio 1200 Octa-core CPU 4x Cortex-A78 4x Cortex-A55	Qualcomm® QRB5165 SoC Qualcomm® Kryo™ 585 Octa-core CPU 8x Cortex-A77 cores
Memory/Storage	Up to 16 GB LPDDR4X UFS: 64/128/256GB	Up to 16 GB LPDDR5 UFS: 64/128/256GB
Cache	L2: 256KB per core	128KB / 256KB / 512KB
Boot Loader	U-Boot	U-Boot
Graphics Outputs	1x HDMI 1x eDP 4 lanes 2x MIPI-DSI 4 lanes	1x HDMI 1x MIPI-DSI 4 lanes
Camera	2x MIPI-CSI 4 lanes 1x MIPI-CSI 2 lanes	5x MIPI-CSI 4 lanes 1x MIPI-CSI 2 lanes
LAN	Up to 2x GbE	Up to 2x GbE
USB	2x USB 3.X, 4x USB 2.0	2x USB 3.X, 4x USB 2.0
Extension ports	4x UART 2x SPI 14x GPIO 1x SDIO	3x UART 2x SPI 14x GPIO 1x SDIO
Audio	1x I²S	1x I²S
PCI Express	1x PCIe x1 Gen2	2x PCIe x2 Gen3
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)
SEMA Support	Yes	Yes
Power Supply	5.0 V DC±5%	5.0 V DC±5%
Operating Temperature	0°C to 60°C -40°C to 85°C (opt.)	0°C to 60°C -20°C to 85°C (opt.)
Form Factor & Compatibility	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1
OS Support	android Ubuntu yocto PROJECT	Ubuntu yocto PROJECT

Notes:

- TPM is supported by BOM option.
- All specifications are subject to change without further notice.

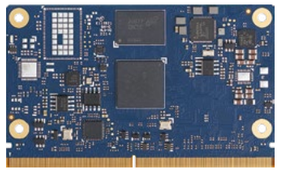
SMARC

Model Name	LEC-IMX95	LEC-IMX8MP
SMARC module	Preliminary AIOM 	AIOM 
CPU	NXP i.MX95 six core Cortex-A55, 1x Cortex-M7, 1x Cortex-M33	NXP i.MX 8M Plus Quad, QuadLite 4x Cortex-A53 cores, 1x M7 core
Memory/Storage	up to 16GB LPDDR5, up to 128GB eMMC, optional QSPI boot flash	Up to 8 GB LPDDR4 at 4266 MT/s eMMC: 32/64GB
Cache	32KB I-cache / 32KB D-cache / 64KB L2 Cache / 512KB L3 Cache	L2: 512KB ECC
Boot Loader	U-boot + device tree	U-Boot
Graphics Outputs	HDMI / LVDS / CSI	1x HDMI 2x LVDS 1x MIPI-DSI 4 lanes
Camera	1x MIPI-CSI (+1x optional)	1x MIPI-CSI 4 lanes 1x MIPI-CSI 2 lanes
LAN	2x Gbit ethernet with TSN	2x GbE (LAN0 with TSN)
USB	2x USB 3.0, 4x USB 2.0	2x USB 3.X, 4x USB 2.0 (one shared with USB OTG on port 0)
Extension ports	2x SPI 4x I²C 1x SDIO 2x CAN 14x GPIO	4x UART 2x SPI 14x GPIO 1x SDIO
Audio	1x I²S	1x I²S
PCI Express	2x 1L PCIe 3.0	2x PCIe x1 Gen 2 or 1x PCIe x1 Gen 3
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)
SEMA Support	Yes	Yes
Power Supply	5.0 V DC±5%	5.0 V DC±5%
Operating Temperature	-40°C to 85°C	0°C to 60°C -40°C to 85°C (opt.)
Form Factor & Compatibility	SMARC short size, 82 x 50 mm, SMARC specification v2.1	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1
OS Support	Ubuntu	android yocto PROJECT

Notes:

- TPM is supported by BOM option.
- All specifications are subject to change without further notice.

SMARC

Model Name	LEC-IMX8MM	LEC-ASL	LEC-ALN
SMARC module		Preliminary 	Preliminary 
CPU	NXP i.MX 8M Mini, 4x Cortex-A53 cores, 1x M4 core	Intel® Atom® x7000RE / x7000C series (formerly "Amston Lake")	Intel® Core™ i3 Processor N-series Intel® Atom® x7000 series (formerly "Alder Lake-N")
Memory/Storage	Up to 4 GB DDR4 at 4266 MT/s eMMC: 32/64/128GB	Up to 16 GB LPDDR5 Up to 128 GB eMMC	Up to 16 GB LPDDR5 Up to 128 GB eMMC
Cache	L2: 512KB	6MB	6MB
Boot Loader	U-Boot	AMI UEFI BIOS	AMI UEFI BIOS
Graphics Outputs	1x MIPI-DSI 4 lanes (or 2x LVDS via bridge)	Dual Channel LVDS, HDMI/DP++, DP++	Dual Channel LVDS, HDMI/DP++, DP++
Camera	1x MIPI-CSI 4 lanes	2x MIPI CSI Camera	2x MIPI CSI Camera
LAN	2x GbE	Dual 10/100/100/ 2.5 Gbit Ethernet with TSN	Dual 10/100/100/ 2.5 Gbit Ethernet with TSN
USB	5x USB 2.0 (one shared with USB OTG on port 0)	2x USB 3.2 6x USB 2.1	2x USB 3.2 6x USB 2.0
Extension ports	4x UART 2x SPI 14x GPIO 1x SDIO	1x SATA 6Gb/s 4xUART 2x SPI 14x GPIO	1x SATA 6Gb/s 4xUART 2x SPI 14x GPIO
Audio	1x I²S	1x HDA	1x HDA
PCI Express	1x PCIe Gen2	4x PCIe x1 Gen3 (x4, x2, x1)	4x PCIe x1 Gen3 (x4, x2, x1)
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)	TPM 2.0 (opt.)
SEMA Support	Yes	Yes	Yes
Power Supply	5.0 V DC±5%	5.0 V DC±5%	5.0 V DC±5%
Operating Temperature	0°C to 60°C -40°C to 85°C (opt.)	-40°C to 85°C	0°C to 60°C
Form Factor & Compatibility	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1
OS Support	yocto PROJECT	Ubuntu yocto PROJECT	Ubuntu yocto PROJECT

Notes:

- TPM is supported by BOM option.
- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

SMARC

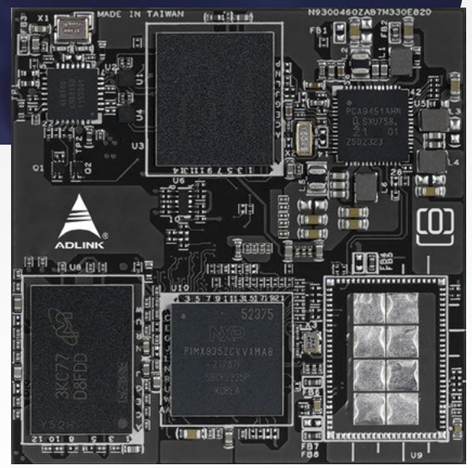
Model Name	LEC-EL	LEC-AL	LEC-PX30
SMARC module			
CPU	Intel Atom® x6000E series (formerly "Elkhart Lake")	Intel Atom® E3900 series, Intel® Pentium® N4200, Intel® Celeron® N3350 (formerly "Apollo Lake")	Rockchip PX30 Quad-core 4x Cortex-A35 cores
Memory/Storage	Up to 16 GB LPDDR4 at 4266 MT/s Up to 128 GB eMMC	Up to 8 GB DDR3L at 1867 MHz Up to 64 GB eMMC	Up to 4 GB DDR3L at 1066MHz eMMC: 32/64GB
Cache	1.5 MB system L2 cache 4MB LLC	L2: 2 MB	L2: 256KB
Boot Loader	AMI UEFI BIOS	AMI UEFI BIOS	U-Boot
Graphics Outputs	Dual channel LVDS 18/24-bit) HDMI/ DP++, DP++	Dual channel LVDS (18/24-bit) HDMI/ DP++, DP++	LVDS (or MIPI-DSI, 4-lane)
Camera	-	2x MIPI CSI camera	-
LAN	Dual 10/100/1000/ 2.5 Gbit Ethernet with TSN	Intel® i210IT MAC/PHY 1x GbE IEEE 1588	Up to 2x 10/100Mbps
USB	2x USB 3.X host 6x USB 2.0 host	1x USB 3.X OTG 1x USB 3.X host 1x USB 2.0 OTG 1x USB 2.0 host	3x USB 2.0 (one shared with USB OTG on port 0)
Extension ports	1x SATA 6Gb/s 4x UART 2x SPI 14x GPIO 1x SDIO	1x SATA 6Gb/s 4x UART 2x SPI 12x GPIO 1x SDIO	2x UART 2x SPI 12x GPIO 1x SDIO
Audio	1x I²S, 1x HDA	1x HDA	1x I²S
PCI Express	4x PCIe x1 Gen3 (x4, x2, x1)	4x PCIe x1 Gen2 (x4, x2, x1)	-
TPM	TPM 2.0 (opt.)	TPM 2.0 (opt.)	TPM 2.0 (opt.)
SEMA Support	Yes	Yes	Yes
Power Supply	5.0 V DC±5%	5.0 V DC±5%	3.0 V - 5.0 V DC±5%
Operating Temperature	0°C to 60°C -40°C to 85°C (opt.)	0°C to 60°C -40°C to 85°C (opt.)	0°C to 60°C -40°C to 85°C (opt.)
Form Factor & Compatibility	SMARC short size, 82 x 50 mm, SMARC specification v2.1	SMARC short size, 82 x 50 mm, SMARC specification v2.0	SMARC short size, 82 x 50 mm, SMARC specification v2.1
OS Support	Ubuntu yocto PROJECT	yocto PROJECT	android

Notes:

- TPM is supported by BOM option.
- All specifications are subject to change without further notice.

OSM

Compact power, limitless potential



x86 ARM EXTREME RUGGED

Pin Definition for OSM

HDMI/DP++
LVDS/eDP
MIPI-DSI
MIPI-CSI
2x I²S
1x UFS
5x LAN
4x USB 3.x/2.0
10x PCIe
2x SDIO/3x SPI/ 2x I²C/ 4x UART/2x CAN/ 40x GPIO/ 4x PWM/2x ADC
Power

OPEN STANDARD MODULE ™

OSM

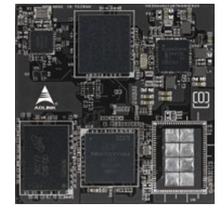
OSM (Open Standard Module) is the first Computer-on-Module for solderable BGA mini modules, accommodating ARM and x86 designs within a compact 45mm x 45mm size. With up to 662 BGA pins, it allows for multiple interfaces in a confined space, ideal for IoT applications. Maintaining a power envelope under 15W, they ensure reliable performance in rugged conditions.

The OSM specification, smaller than previous standards like Qseven and SMARC, enhances existing solutions and offers greater miniaturization and interface flexibility. OSM modules are completely machine processible during soldering, assembly and testing.

Applications

Robotics

OSM

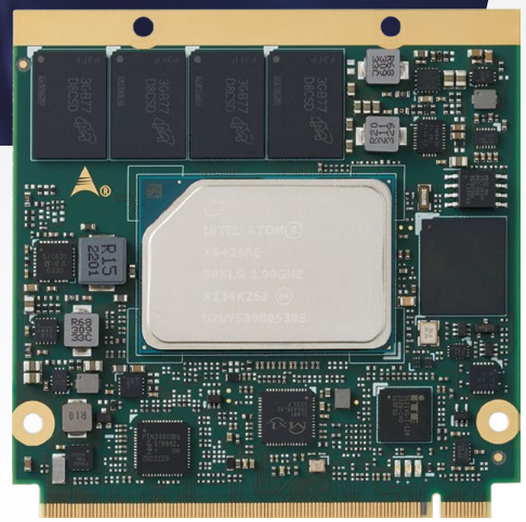
Model Name	OSM-IMX93	OSM-IMX8MP
OPEN STANDARD MODULE ™	Preliminary AIOM 	Preliminary AIOM 
CPU	NXP i.MX93 series Dual core Cortex-A55 1x Cortex-M33	NXP i.MX8M Plus series Quad core Cortex A53 with machine learning, 2.3 TOPS NPU
Memory/Storage	Up to 2GB LPDDR4, up to 128 GB eMMC	Up to 8GB LPDDR4, up to 128 GB eMMC
Cache	512KB system L2 cache	33 KB I-cache 32 KB D-cache 512 KB L2 Cache
Boot Loader	Uboot + device tree	Uboot + device tree
Graphics Outputs	LVDS 4L / DSI 4L	LVDS 8L /HDMI/DSI
Camera	1x MIPI CSI	1x MIPI CSI
LAN	2x RGMII with TSN	2x RGMII 1x TSN
USB	2x USB 2.0, 1x OTG	3x USB 2.0, 1x USB 3.0
Extension Ports	3x UART 2x SPI 2x I²C 1x SDIO 2x CAN 10x GPIO	4x UART 2x SPI 2x I²C 1x SDIO 2x CAN 8x GPIO
Audio	I²S audio interface	I²S audio interface
PCI Express	-	1 lane GEN 3.0
SEMA Support	-	-
Power Supply	5.0 V DC±5%	5.0 V DC±5%
Operating Temperature	-40°C to 85°C	-40°C to 85°C
Form Factor & Compatibility	OSM Size-L, 45 x 45 mm	OSM Size-L, 45 x 45 mm
OS support	yocto PROJECT	android yocto PROJECT

Notes:

- You may add / delete some specs if necessary

Qseven

Where performance meets simplicity



x86 | EXTREME RUGGED

Pin Definition for Q7

2x LVDS / DSI / eDP
HDMI / DP++
2x MIPI CSI
HDA / I²S
2x SATA
GbE
2x USB 3.X/2.0 (1x OTG) 4x USB 2.0 (1x OTG)
4x PCIe
SDIO / SPI / LPC or GPIO 5x I²C / 2x UART or CAN
Power

Qseven

Qseven® is an off-the-shelf, multi-vendor, Computer-on-Module that integrates all the core components of a typical PC packed in a slim design, to be mounted onto an application-specific carrier board. Its single ruggedized 230-pin MXM2 connector offers all the I/O interfaces necessary for mobile / ultra-mobile embedded applications, such as graphics, sound, mass storage, and networking, at power envelopes usually between 6 and 12 watts. Since its pinouts are mostly x86 x86-oriented, Qseven® is commonly built around "Atom level" x86 silicon.

Applications

Industrial Automation (Monitoring)

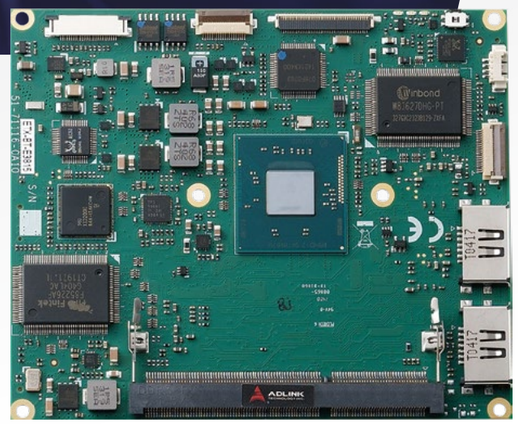
Model Name	Q7-EL	Q7-AL	Q7-BT
	New 		
SoC	Intel Atom® x6000 series (formerly "Elkhart Lake")	Intel Atom® E3900 series, Pentium® N4200 or Celeron® N3350 (formerly "Apollo Lake")	Intel Atom® E3800 series (formerly codename: BayTrail)
Memory	Up to 16 GB LPDDR4 at 4266 MHz	Up to 8 GB LPDDR4 at 2400 MHz	Up to 4 GB DDR3L at 1066/1333 MHz
Cache	1.5MB system L2 cache 4MB LLC	L2: 2 MB	512 kB to 2 MB L2 cache
BIOS Type	AMI UEFI BIOS	AMI UEFI BIOS	AMI UEFI BIOS
Integrated Graphics	Intel® UHD Graphics for 10th Gen Intel® Processors, supports three independent displays, 4k video (up to 4096 x 2160@60fps)	9th Gen Intel® graphics core architecture with up to 18 execution units, supports three independent displays, 4k video (up to 4096 x 2160 @60fps)	7th Gen Intel® graphics supporting two independent displays
Graphics Features	DirectX 12, OpenGL 4.5, OpenCL 2.0, ES 3.2	DirectX 12, OpenGL 4.2, OpenCL	DirectX 11.1, OpenGL 2,0, ES 3.2
Camera	-	2x MIPI CSI 2L/4L	-
LAN	MaxLinear® 2.5Gbit Ethernet with TSN	Intel® i210IT MAC/PHY, 1x GbE, IEEE 1588	Intel® E3800 i210-IT 1GbE
USB	2x USB 3.X 6x USB 2.0	2x USB 3.X 6x USB 2.0	1x USB3.0 6x USB 2.0
Serial ATA	2x SATA3 6Gb/s	2x SATA 6Gb/s to carrier or 1x SATA 6Gb/s to carrier and 1x onboard SATA SSD	2x SATA3 3 Gb/s
PCI Express	4x PCIex1 Gen.3	3x PCIe x1	3x PCIe x1 Gen2
eMMC (opt.)	Onboard eMMC 5.1 (16-128 GB)	Onboard eMMC 5.0 (4-64 GB)	Onboard eMMC 5.1 (4-64 GB)
Audio	HDA	HDA	HDA
SEMA	Yes	Yes	Yes
Power Supply	Module Input Voltage: 5.0V Power Pins:12 pins, 6A at 5V Typical IO Voltage: 3.3V	Module Input Voltage: 5.0V Power Pins: 12 pins, 6A at 5V Typical IO Voltage: 3.3V	Module Input Voltage: 5.0V Power Pins: 12 pins, 6A at 5V Typical IO Voltage: 3.3V
Operating Temperature	0°C to 60°C -40°C to 85°C (opt.)	0°C to 60°C -40°C to 85°C (opt.)	0°C to 60°C -40°C to 85°C (opt.)
Form Factor & Compatibility	Qseven 2.1, Size: 70 x 70 mm	Qseven 2.1, Size: 70 x 70 mm	Qseven 2.0, Size: 70 x 70 mm
OS support	yocto PROJECT, Windows	yocto PROJECT, Windows	yocto PROJECT, Windows

Notes:

- For more CPU options please refer to online data sheet or user manual.
- All specifications are subject to change without further notice.

ETX

Legacy beyond 2025



x86

EXTREME RUGGED

Pin Definition for ETX

X1	X2
4x USB 2.0/1.1	8/16-bit ISA
32-bit PCI-bus	
HD Audio	

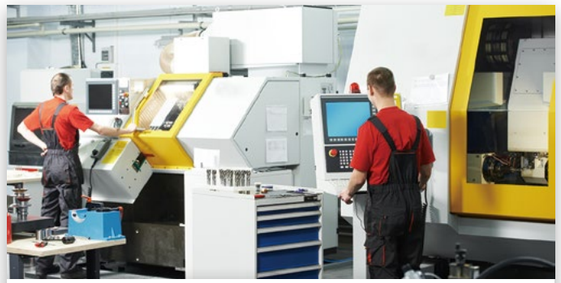
X1	X2
Analog VGA	2x PATA
Dual LVDS	2x SATA
PS2 MS / KB 2x UART, LPT1	I²C / SMbus
	10/100 Mbps Ethernet

ETX®

ETX

ETX® is one of the earliest successful Computer-on-Module form factors. Today it is still widely used in applications such as industrial automation, transportation and medium and low level medical appliances. While high-end Intel® Core™ applications have mostly migrated to COM Express, ETX® is still prominent in the lower power segment, mostly notably using Intel® Atom® SoCs. Specifically, customers who have heavily invested in ISA and PCI controllers or peripheral technologies still pose great demand for ETX® through the years. To this extent, ADLINK is providing long-term support for ETX® well beyond 2025.

Applications



CNC controller

Transportation (Monitoring)

Model Name	ETX-BT
ETX®	
SoC	Intel Atom® E3800 series Celeron® N2930/J1900 (formerly "Bay Trail")
Memory	Up to 8GB DDR3L at 1333/1066MHz
Cache	L2: 512 kB to 2MB
BIOS Type	AMI Aptio EFI
TPM	Atmel AT97SC3204
Graphics Features	LVDS, DisplayPort, VGA Decode: H.264, MPEG2, MVC, VC-1, WMV9 and VP8 Encode: H.264, MPEG2 and MVC DirectX 11, OCL 1.1, OGL ES Halt/2.0/1.1, OGL 3.2
LAN	Intel® i211 MAC/PHY, supporting 10/100 Mbps (GbE via onboard connector)
USB	4x USB 2.0
PATA (IDE)	2x
SATA	2x SATA 3Gb/s
Audio	Integrated on E3800 SoC, Realtek ALC 262
SEMA Support	Yes
Power Supply	5V±5% / 5Vsb ±5% (ATX) 5V±5% (AT)
Operating Temperature	0°C to 60°C -40°C to 85°C (opt.)
Form Factor & Compatibility	ETX 3.02 Size: 95 x 114 mm
OS Support	

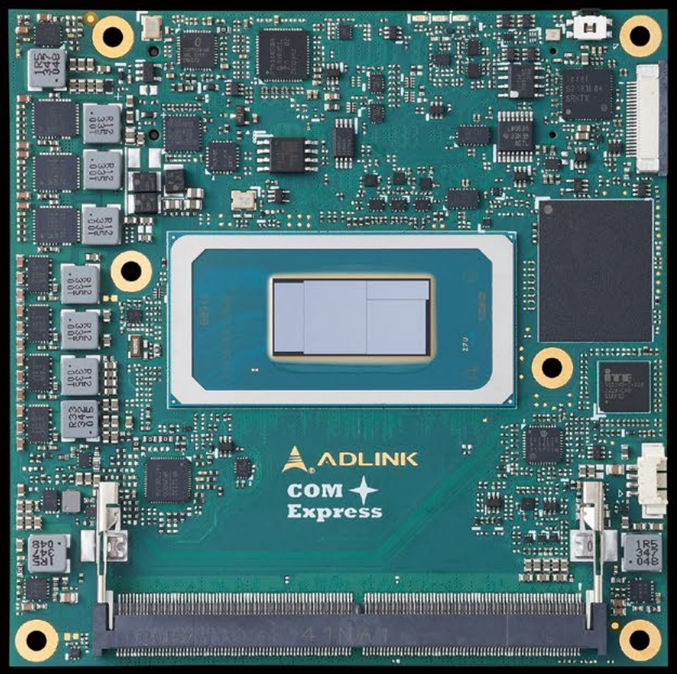
Notes:

- VxWorks is supported by project basis.
- All specifications are subject to change without further notice.

COM Express

COM Express Rev.3.1 Type 6 Compact Module

with Intel® Core™ Ultra 5 / 7

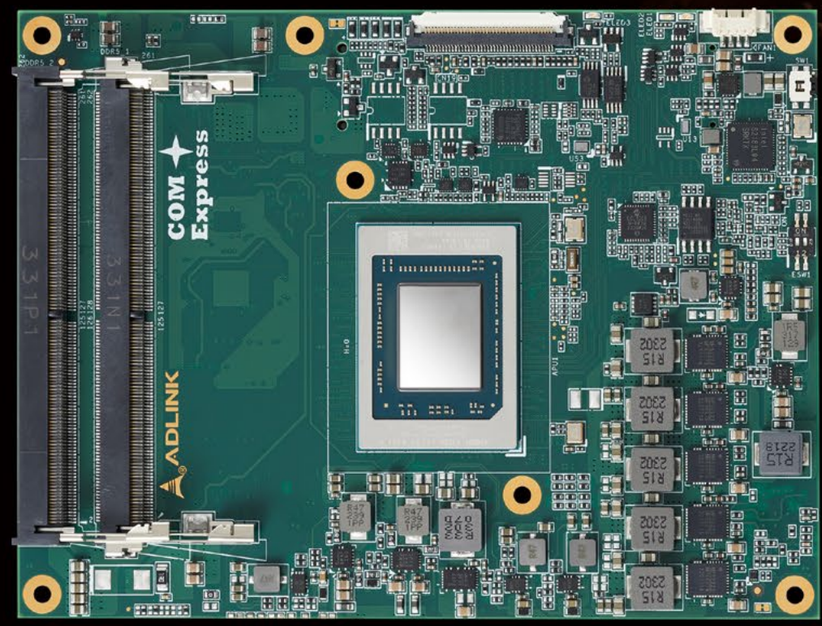


- Intel XeLPG GFX integration and up to 8 Xe -Cores
- All PCIe signals upgraded to Gen4
- Up to 64GB DDR5 at 5600MT/s
- 2.5GbE Ethernet, with optional TSN
- New integrated NPU for dedicated AI acceleration

COM Express

COM Express Rev. 3.1 Basic Size Type 7 Module

with AMD Embedded Ryzen™ V3000



8 Cores at 15W/45W | 14x PCIe Gen4 lanes | 64GB DDR5 SO-DIMM | Stability | Extreme Rugged

Your Key to a Performance-efficient, Greener Future

An Unmatched Performer and Your Go-to Solution

Extreme Rugged Temperature and Industrial-grade Stability

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