ADLINK
® LEADING EDGE COMPUTING

COMPUTER ON MODULES
Most Robust, Best Support

COM-HPC
COM Express
SMARC
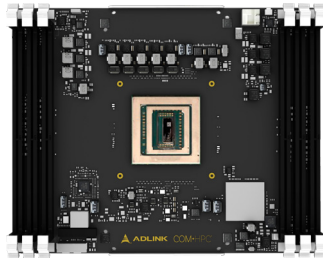**Qseven**
ETX

COM·HPC™
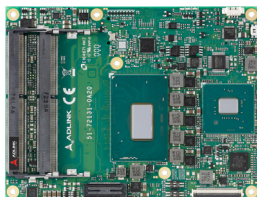
COM Express

SMARC module

ETX®

QSEVEN

2021

COM·HPC™

COM-HPC is the new PICMG standard for high-performance Computer-on-Modules to complement COM Express that can serve the new class of embedded edge servers.

COM-HPC supports up to 64 general purpose PCIe Gen4 or Gen5 lanes and a maximum of four USB 4 ports to provide 20Gbit data transmission. Furthermore, Ethernet connectivity is provided by up to eight 10GbE ports or the equivalent of two 100GbE ports. Five module sizes are defined in the COM-HPC specification. The largest is Size E, and is 200mm x160mm with room to accommodate 8 DIMMs. In contrast, the smaller board sizes are intended for use as client platforms utilizing SO-DIMMs or soldered onboard memory. Integrators can choose the size of module that best meets their application requirements.

COM Express

The COM Express standard (PICMG COM.0) is based on serial interfaces including PCI Express, SATA, USB, LVDS/eDP and DDI, allowing designers to utilize the latest technologies for future applications. ADLINK has heavily invested in the development and maintenance of the PICMG® COM Express® specification since its creation.

ADLINK was chair of the PICMG subcommittee that was tasked with defining the COM Express COM.0 Revision 3.0 specification update. This revision includes the Type 7 definition that brings server class platform capabilities to COM Express modules and upgrades the Type 6, 10 definitions to align with recent market trends, such as IEEE 1588 support.

SMARC module

ADLINK has been a pioneer in the development of the SMARC specification. SMARC is a business card size computer-on-module targeting ultra-low power applications. The SMARC 314-pin edge connector provides access to the full capabilities of ARM and x86 based SoCs. In addition to commonly found low level interfaces such as I^2C, I2S, UART, CAN, SPI, GPIO, the SMARC pinout also fully supports more complex I/O including LVDS, HDMI, DP, eDP, GbE, USB 3.x, PCIe and SATA. SMARC is the fastest growing product line on the embedded COM market today!

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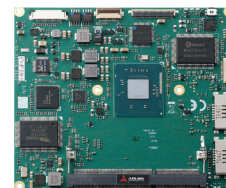
ETX® one of the oldest computer-on-module specifications and supports legacy interfaces such as ISA bus, Parallel ATA (IDE) and PS/2 keyboard/mouse. ADLINK is highly committed to this product line and is one of the only vendors that offers customers a migration path for ETX beyond 2025.

QSEVEN
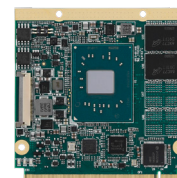
Qseven® is a versatile and small (70x70 mm) computer-on-module standard. With its 230-pin edge connector it mainly focuses on traditional low power x86 Intel Atom® designs. Since Q7 is not able to support all modern interfaces and has only partial coverage for ARM features, traditional low power COM projects are now increasingly choosing SMARC over Q7.

Leading Quality

- Standard designed for Extreme Conditions
- Mandatory HALT testing during design phase
- MIL-STD-202 compliant testing
- Highest MTBF in the market

Leading Production and Logistics

- Supply line security
- Dual factory (Shanghai/Taipei)
- Logistics, operations and quality support centers in all major regions (Europe, US, Japan, China)

Leading Product Longevity

- Fixed BOM offered to end users
- Up to 10 years standard product life
- Drop-in replacements

Leading Product Innovation

- Embedded Added Value
- Support Predictive maintenance
- Real-time optimization
- IoT API extensions
- AI Ready

Leading Support

- Intel® Alliance Premier Member
- Pre-sales technical consultation
- Global coverage, local approach
- FAE and R&D on location
- Local carrier board design service

Leading Standardization

- PICMG® COM-HPC
- PICMG® COM Express
- SGET® SMARC
- SGET® Q7

Leading Computer-on-Modules

Global Presence, Local Touch

Headquartered in Taiwan, ADLINK has operations in the United States, Singapore, Beijing, Shanghai, Shenzhen, Japan, Korea and Germany. ADLINK products are currently available in over 40 countries across five continents, with worldwide distribution networks and more than1,800 employees. ADLINK is proud to be associated with many major technology leaders and Fortune 500 companies. With design and technology centers in the U.S., the Pacific Rim region and Germany, ADLINK is a technology-leading platform provider in the embedded computing industry.

▼ **Research & Development Centers**   ▼ **Sales / Support Offices**   ▼ **Manufacturing Site**
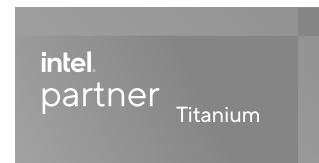
Dedication to Standards

ADLINK believes that industry standards enable our customers to focus on their core competencies, accelerate time-to-market, and lower costs. We lead and actively participate in standards committees to drive innovation and ensure that the standards continue to meet our customers' needs. ADLINK has been a leading contributor to standard organizations such as PICMG® (COM Express) for over a decade, and more recently SGET® (SMARC & Q7).

Intel® Partner Alliance

ADLINK is a Titanium member, a select group of only four companies, of the Intel® Partner Alliance. From modular components to market-ready systems, Intel and the more than 1000 global member companies of the Intel® Partner Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics.

Global Carrier Design Service

Don't want to spend time and resources on developing your own carrier boards?

No problem! With ADLINK's global carrier board design service, we can take care of this job for you. 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 / carrier signal quality verification. We invite your carrier board engineer to take his bard and visit us.

  Based on SI reports he can directly talk to the module designer how any possible issues can 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 no 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 simple update the module by firmware at OS time because it's power sequence is MCU controlled.

COM·HPC™

High Performance Computing

COM-HPC is the new PICMG standard for high-performance Computer-on-Modules to complement COM Express that can serve the new class of embedded edge servers.

COM-HPC supports up to 64 general purpose PCIe Gen4 or Gen5 lanes and a maximum of four USB 4 ports to provide 20Gbit data transmission. Furthermore, Ethernet connectivity is provided by up to eight 10GbE ports or the equivalent of two 100GbE ports. Five module sizes are defined in the COM-HPC specification. The largest is Size E, and is 200mm x160mm with room to accommodate 8 DIMMs. In contrast, the smaller board sizes are intended for use as client platforms utilizing SO-DIMMs or soldered onboard memory. Integrators can choose the size of module that best meets their application requirements.
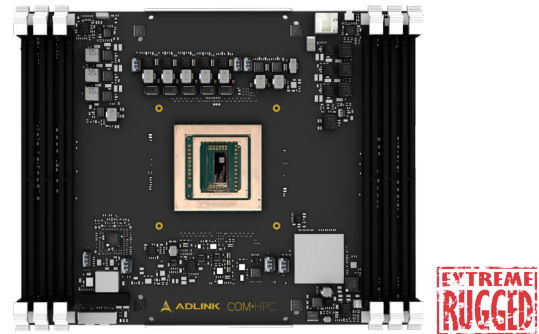
Applications

Rugged Communication Devices

Robotic Surgery

Unmanned Aerial Vehicles

Task Consolidation

Server Type

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

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.

COM·HPC

ADLINK

Server Type

	COM-HPC-EP **New**	Next generation COM-HPC Server Module **Preliminary**
SoC	AMD EPYC™ Embedded 3001 Series processor EPYC™ 3451, EPYC™ 3351	new generation ultra performance platform
Memory	384 GB DDR4 at 2666 MT/s	512 GB DDR4 at 3200/2666 MT/s
BIOS Type	AMI Aptio V	AMI Aptio V
Ethernet KR	Up to 4x 10GBASE-KR	Up to 8x 10GBASE-KR (25G, 40G, 100G, TBC)
NBASE-T Ethernet	Intel® i210 Up to GbE	Intel® i225 Up to 2.5GbE
Remote Mgmt	Dedicated interfaces PCIe_BMC IPMB (via MMC) (opt.)	Dedicated interfaces PCIe_BMC IPMB (via MMC) (opt.)
PCI Express	56 PCI Express Lanes 3x PCI Express x16 configurable	48 PCI Express Lanes 2x PCI Express x16 Gen4 (x16, x8, x4) 2x PCI Express x8 Gen3 (x8, x4, x2)
USB	4x USB 3.0/2.0	4x USB 3.0/2.0
Serial ATA	-	TBC
TPM	Yes (TPM 2.0)	Yes (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)	12 V / 5Vsb ±5% (ATX) 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)
OS Support	Windows® 10 64-bit, Windows Server 2016 64-bit Yocto Linux 64-bit, Ubuntu 64-bit (TBC)	Windows® 10 IOT Enterprise LTSC 64-bit, Windows Server 20H1 64-bit Yocto Linux 64-bit, Ubuntu 64-bit (TBC) VxWorks 64-bit (TBC)
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 E: 200 x 160 mm

Client Type

	New generation COM-HPC Client Module **Preliminary**
CPU	New Generation Ultra performance platform
Chipset	next generation PCH
Memory	128 GB DDR4 at 3200/2666 MT/s
BIOS Type	AMI Aptio V
Graphics Outputs	eDP 1.4 (or MIPI-DSI) 2x DDI (DP/HDMI) 2x DP (through USB4) 4 independent displays 8K at DP/eDP
Audio	1x I2S 2x Soundwire (TBC)
Camera	2x MIPI-CSI 4lanes (TBC)
LAN	Intel® i225V/IT 2.5GbE (TSN @ IT)
USB	2x USB4 2x USB 3.2/2.0 4x USB 2.0
Serial ATA	TBC
PCI Express	PCI Express x16 Gen4 (or 2x8 or 1x8 plus 2x4) 20x PCI Express Gen3 Lanes
TPM	Yes (TPM 2.0)
Management Bus	2x I2C, SMBus
Embedded Features	EAPI/SEMA Debug/JTAG
Power Supply	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)
OS Support	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC)
Form Factor & Compatibillity	PICMG COM-HPC: Rev 1.0 Client Type size C: 160 x 120 mm

COM Express

Type 6 Basic Size

Visual Oriented Applications

COM Express® Basic size Type 6 is the most popular and widely used computer-on-module form factor on the market. With pinouts closely matching the feature set of common x86 based silicon, two COM Express connectors allow for designs of up to 75 watts. The Type 6 pinout has a strong focus on multiple modern display outputs targeting applications such as medical, gaming, test and measurement and industrial automation.

Applications

Data Communication


Test and Measurement

Medical

Gaming

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.
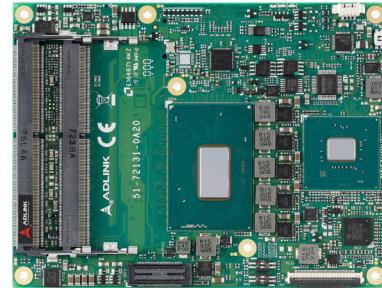
Pin Definition for Both Type 6 Basic and Compact Size Modules

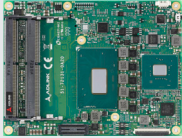| A-B	C-D
8x USB 2.0	4x USB 3.x (upgrade)
LVDS / eDP	
4x SATA	
Audio HDA	3x DDI
8x USB 2.0	
Gigabit Ethernet	
LPC / eSPI	
GPIO / SDIO / 2x UART / CAN / SPI / I²C	
24x PCIe	
Power	

Starter Kit order process

Select a COM Express module, memory and thermal solution

Contact an ADLINK sales epresentative in your region
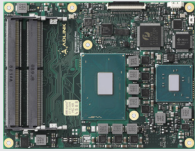
Get the specific part number for your starter kit

Preliminary

	New Express Type 6	Express-CFR	Express-CF/CFE
CPU	New Gen Ultra performance platform	9th Gen Intel® Xeon® E-2276ME (6 cores) Intel® Xeon® E-2254ME (4 cores) Intel® Core™ i7-9850HE (6 cores) Intel® Celeron® G5600E/G4930E (formerly "Coffee exit Lake-Refresh") Additional low TDP SKUs for Xeon®, Core™ i7/i5/i3, Celeron®	8th Gen Intel® Xeon® E-2176M (6 cores) Intel® Core™ i7-8850H (6 cores) i5-8400H, i3-8100H (4 cores) (formerly "Coffee Lake-H")
Chipset	next gen. PCH.	CM246 (ECC) QM370/HM370 (non-ECC)	CM246 (ECC) QM370/HM370 (non-ECC)
Memory	128 GB DDR4 at 3200/2666 MT/s	96 GB DDR4 at 2400/2133 MT/s	96 GB DDR4 at 2400/2133 MT/s (ECC for Express-CFE)
BIOS Type	AMI Aptio V	AMI Aptio V	AMI Aptio V
Graphics Outputs	LVDS (or eDP 1.4) 3x DDI (DP/HDMI or VGA) 4 independent displays 8K at DP/eDP	LVDS (or eDP 1.4) 3x DDI (DP/HDMI or VGA)	LVDS (or eDP 1.4) 3x DDI (DP/HDMI or VGA)
Graphics Features	TBC	DX 12, OpenGL 4.5 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec / VP9 10-bit decodes	DX 12, OpenGL 4.5 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec / VP9 10-bit decode
LAN	Intel® i225V/IT 2.5GbE (TSN @ IT)	Intel® i219LM/V	Intel® i219LM/V
USB	4x USB 3.2/2.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0
Serial ATA	4x at 6Gb/s	4x at 6Gb/s	4x at 6Gb/s
PCI Express	PCI Express x16 Gen4 (or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 Gen3	PCI Express x16 Gen3 (or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 Gen3	PCI Express x16 Gen3 (or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 Gen3
Audio	ALC886 (carrier board)	ALC886 (carrier board)	ALC886 (carrier board)
TPM	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 2.0)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG
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℃ to +60℃ Extreme Rugged: -40℃ to +85℃ (standard 12V input only)	Standard: 0℃ to +60℃ Extreme Rugged: -40℃ to +85℃ (standard 12V input only)	Standard: 0℃ to +60℃
OS Support	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC)	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit
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 R3.0, Type 6 Basic size: 95 x 125 mm

Notes:
- Optional -40℃ to +85℃ support: Standard product with 100% ETT screening available for selected CPU SKUs
  and std. 12V power supply only
- All specifications are subject to change without further notice.

|	Express-KL/KLE	Express-SL/SLE
CPU	7th Gen Intel® Xeon® E3-1505M/E3-1505L Intel® Core™ i7-7820EQ, i5-7440EQ/7442EQ, i3-7100E/7102E (formerly "Kaby Lake-H")	6th Gen Intel® Xeon® E3-1515M (GT4e), E3-1505M/1505L, Intel® Core™ i7-6820EQ/6822EQ, i5-6440EQ/6442EQ, i3-6100E/6102E, Intel® Celeron® G3900E/3902E (formerly "SkyLake")
Chipset	CM238 (ECC) QM175/HM175 (non-ECC)	CM236 (ECC) QM170/HM170 (non-ECC)
Memory	32 GB DDR4 at 2133/1867 MT/s (ECC for Express-KLE)	32 GB DDR4 at 2133/1867 MT/s (ECC for Express-SLE)
BIOS Type	AMI Aptio V	AMI Aptio V
Graphics Outputs	LVDS (or eDP 1.4) 3x DDI (DP/HDMI or VGA)	LVDS (or eDP 1.3) 3x DDI (DP/HDMI or VGA)
Graphics Features	DX 12, OpenGL 4.4 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec / VP9 10-bit decode	DX 12, OpenGL 4.4 and ES 2.0, OpenCL 2.1 H.265(HEVC) & VP8 8-bit codec
LAN	Intel® i219LM/V	Intel® i219LM/V
USB	4x USB 3.0/2.0, 4x USB 2.0	4x USB 3.0/2.0, 4x USB 2.0
Serial ATA	4x at 6Gb/s	4x at 6Gb/s
PCI Express	PCI Express x16 Gen3 (or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 Gen3	PCI Express x16 Gen3 (or 2x8 or 1x8 plus 2x4) 8x PCI Express x1 Gen3
Audio	ALC886 (carrier board)	ALC886 (carrier board)
TPM	Yes (TPM 2.0)	Yes (TPM 1.2)
Management Bus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG
Power Supply	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)
OS Support	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit	Windows® 10/8.1 64-bit, Windows® 7 32/64-bit, WES 7 32/64-bit, Yocto Linux 64-bit, VxWorks 64-bit
Form Factor & Compatibillity	PICMG COM.0 R2.1, Type 6 Basic size: 95 x 125 mm	PICMG COM.0 R2.1, Type 6 Basic size: 95 x 125 mm

Notes:
- Optional -40°C to +85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only
- All specifications are subject to change without further notice.

COM Express

Type 6 Compact Size

Mid and Entry Level Applications

The COM Express® Compact Type 6 form factor is ideally suited to single chip x86 solutions (SoCs) with a power range between 5 to 20 watts. To reach these kind of low power envelopes peak performance and feature sets have been reduced compared to silicon used on the Basic size modules. Utilizing typically targeted at mid- and entry level applications such as transportation, robotics, edge servers, industrial control, and HMIs in the industrial and medical fields.
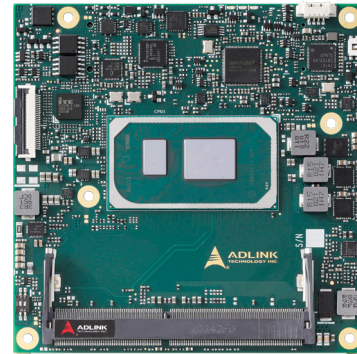
Applications

Industrial Automation
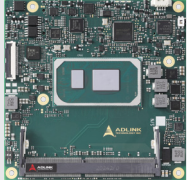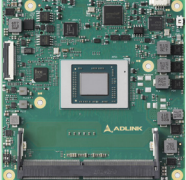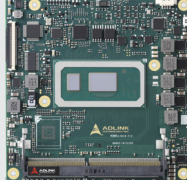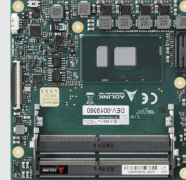
Transportation

Robotics

Starter Kit order process

Select a COM Express module, memory and thermal solution

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Get the specific part number for your starter kit

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.

	cExpress-TL Preliminary	**cExpress-AR** New	**cExpress-WL**	**cExpress-KL**
SoC	11th Gen Intel® Core™ i7-1185G7E/ i5-1145G7E/i3-1115G4E Intel® Celeron® 6305E (formerly "Tiger Lake-UP3") Additional IBECC SKUs for Core™ i7/i5/i3	AMD Ryzen™ Embedded V2748/ V2546/ V2718/V2516 APU	8th Gen Intel® Core™ i7-8665UE/ i5-8365UE/i3-8145UE Intel® Celeron® 4305UE (formerly "Whiskey Lake-U")	7th Gen Intel® Core™ i7-7600U/i5-7300U/i3-7100U Intel® Celeron® 3965U (formerly "Kaby Lake-U")
Memory	64 GB DDR4 IBECC at 3200/2666 MT/s	64 GB DDR4 at 3200/2666 MT/s	64 GB DDR4 at 2133/1867 MT/s	32 GB DDR4 at 2133/1867 MT/s
BIOS Type	AMI Aptio V	AMI Aptio V	AMI Aptio V	AMI Aptio V
Bootloader	-	-	Slim Bootloader	-
Graphics Outputs	LVDS (or eDP1.4) 3x DDI (DP/HDMI or VGA) 4 independent displays 8K at DP/eDP	LVDS (or eDP1.3) 3x DDI (DP/HDMI or VGA) 4 independent displays	LVDS (or eDP1.4) 2x DDI (DP/HDMI or VGA)	LVDS(oreDP1.4) 2x DDI (DP/HDMI or VGA)
Graphics Features	DX 12, OpenGL 4.5 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec, VP9 10-bit decode	DX 12, OpenGL 4.6 and ES 3.0, OpenCL 2.1 H.265(HEVC) 10-bit codec, VP9 10-bit decode	DX 12, OpenGL 4.5 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec, VP9 10-bit decode	DX 12, OpenGL 4.4 and ES 2.0, OpenCL 2.1 H.265(HEVC) 10-bit codec, VP9 10-bit decode
LAN	Intel® i225V/IT 2.5GbE (TSN @ IT)	Intel® i225V/IT 2.5GbE (TSN @ IT)	Intel® i219LM/V	Intel® i219LM/V
USB	4x USB 3.2/2.0, 4x USB 2.0	4x USB 3.2/2.0, 4x USB 2.0	4x USB 3.0/2.0, 4x USB 2.0	4x USB 3.0/2.0, 4x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s	3x at 6Gb/s	3x at 6Gb/s
PCI Express	1x PCIe x4 Gen4 at PEG 5x PCIe x1 Gen3 (PCIe switch for more x1 by project)	1x PCIe x8 Gen2 at PEG 6x PCIe x1Gen3 (PCIe switch for more x1 by project)	1x PCIe x1 Gen3 at PEG 8x PCIe x1Gen3	5x PCIe x1 Gen3 (3965U supports Gen2) (6 PCIex1 w/o GbE, opt.)
eMMC (opt.)	-	-	16-64 GB (by project)	-
SD	-	-	Yes	-
Audio	ALC886 (carrier board)	ALC886 (carrier board)	ALC886 (carrier board)	ALC886 (carrier board)
TPM (opt.)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 2.0)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/ JTAG	EAPI/SEMA, Backup BIOS, Debug/ JTAG	EAPI/SEMA, Backup BIOS, Debug/ JTAG	EAPI/SEMA, Backup BIOS, Debug/ JTAG
Power Supply	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	5-20V / 5Vsb ±5% (ATX), 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)	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)
OS support	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC)	Windows® 10 64-bit, Yocto Linux 64-bit,	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit
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	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

Notes:
- Optional -40°C to +85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only
- All specifications are subject to change without further notice.

	cExpress-SL	cExpress-EL **New**	cExpress-AL	cExpress-BT
SoC	6th Gen Intel® Core™ i7-6600U/i5-6300U/i3-6100U Intel® Celeron® 3955U (formerly "Sky lake")	Intel Atom® x6000 x6425E/x6413E/x6211E/x6200FE and x6425RE/x6414RE/x6412RE (formerly "Elkhart Lake") Additional Pentium® and Celeron® SKUs	Intel Atom® x7-E3950/x5-E3940/x5-E3930 (formerly "Apollo Lake") Additional Pentium® and Celeron® SKUs	Intel Atom® E3845/3827/3826/3825/3815/3805 Intel® Pentium® N2930, Intel® Celeron®J1900 (formerly "Bay Trail")
Memory	32 GB DDR4 at 2133/1867 MHz	32 GB DDR4 IBECC at 3200/2666 MT/s	16 GB DDR3L at 1867/1600 MT/s	8 GB DDR3L at 1333/1066 MHz
BIOS Type	AMI Aptio V	AMI Aptio V	AMI Aptio V	AMI Aptio V
Bootloader	-	-	Coreboot	Coreboot
Graphics Outputs	LVDS (or eDP 1.3) 2x DDI (DP/HDMI)	LVDS (oreDP1.4) 2x DDI (DP/HDMI or VGA)	LVDS (oreDP1.4) 2x DDI (DP/HDMI or VGA)	2x DDI (DP/HDMI or LVDS), VGA
Graphics Features	DX 12, OpenGL 4.4 and ES 2.0, OpenCL 2.1 H.265(HEVC) 8-bit codec, VP8 8-bit codec	DX12, OpenGL4.5, ES3.2, OpenCL 2.0 H.265 (HEVC) 8-bit codec, VP9 8-bit decode	DX12, OpenGL4.3, ES3.0, OpenCL 2.0, H.265 (HEVC) 8-bit codec, VP9 8-bit decode	DirectX 11, OpenGL 3.2, ES 2.0, OpenCL 1.1
LAN	Intel® i219LM/V	MaxLinear® GPY 2.5GbE (TSN @ GPY215)	Intel® i210/i211 (IEEE1588)	Intel® i210/i211
USB	4x USB 3.0, 4x USB 2.0	2x USB 3.2/2.0, 6x USB 2.0 (USB 3 hub by project)	3x USB 3.0/2.0, 5x USB 2.0 (USB OTG at 0, OS depend)	1x USB 3.0, 6x USB 2.0
Serial ATA	3x at 6Gb/s (i7/i5/i3) 2x at 6Gb/s (3955U)	2x at 6Gb/s	2x at 6Gb/s	2x SATA 3Gb/s
PCI Express	5 PCIe x1 Gen3 (3955U supports Gen2) (6 PCIex1 w/o GbE, opt.)	6x PCIe x1 Gen3	3x PCIe x1 Gen2 (PCIe switch by project)	3 PCIe x1 (Gen2) (4 PCIe x1 without GbE, opt.)
eMMC (opt.)	-	16-64 GB (by project)	8-32 GB (by project)	8/16/32 GB
SD	-	Yes	Yes	Yes (mini SD slot on module)
Audio	ALC886 (carrier board)	ALC886 (carrier board)	ALC886 (carrier board)	ALC886 (carrier board)
TPM (opt.)	Yes (TPM 1.2)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 1.2)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG
Power Supply	5-20V / 5Vsb ±5% (ATX), 5-20V (AT)	8.5-20V / 5Vsb ±5% (ATX), 8.5-20V (AT)	4.75-20V / 5Vsb ±5% (ATX), 4.75-20V (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)	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)
OS support	Windows® 10/8.1 64-bit, Windows® 7 32/64-bit, WES 7 32/64-bit, Yocto Linux 64-bit, VxWorks 64-bit	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC)	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit	Win 7/8, Linux, WES 7, WE8 Std., VxWorks, QNX
Form Factor & Compatibility	PICMG COM.0 R2.1, Type 6 Compact size: 95 x 95 mm	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	PICMG COM.0 R2.1, Type 6 Compact size: 95 x 95 mm

Notes:

• Optional -40°C to +85°C support: Standard product with 100% ETT screening available for selected CPU SKUs and std. 12V power supply only
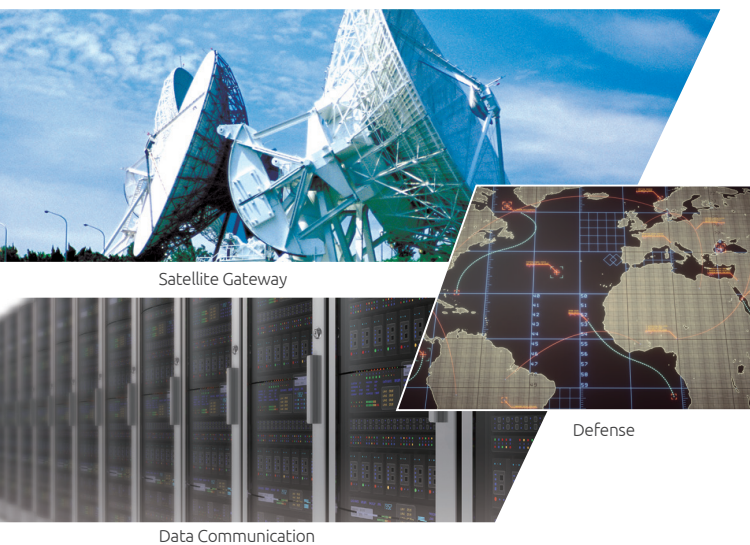• All specifications are subject to change without further notice.

COM Express

Server Level COM Express

One of the most fundamental innovations of the COM interfaces, essential for the next generation of edge node appliances. Type 7 modules are headless (no graphics), which is why they are also referred to as "Server Level COM Express".

Since LAN PHY is are located on the carrier board, end users can choose between 10GbE Copper or Fiber solutions. Type 7 further supports up to 32 lanes of PCIe as well as NC-SI management interface. SoCs range from entry level Intel extended operating temperature range of -40°C to +85°C The range of applications for Type 7 modules is very broad : general purpose rugged embedded computer, mission critical server, SDN appliance, signal processing & data acquisition appliance, network test equipment, satellite gateway, in-flight entertainment system.

Applications

Satellite Gateway

Defense

Data Communication

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.
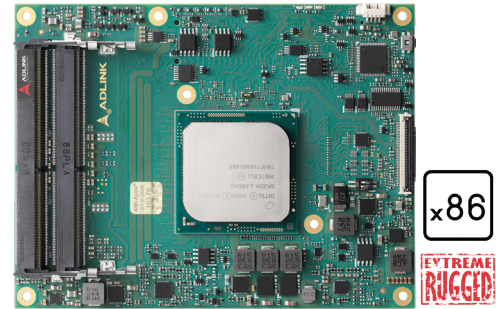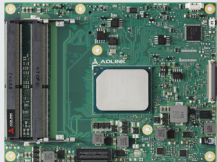
Type 7

A-B	C-D
4x USB 2.0	4x USB 3.x (upgrade)
2x SATA	4x 10GBASE-KR
Gigabit Ethernet	
NC-SI	
LPC / eSPI	
GPIO / SDIO / 2x UART / CAN / SPI / I2C / HDA	
32x PCIe	
Power	

The Type 7 Starter Kit Plus consists of a COM Express® Type 7 module with ATX size Type 7 reference carrier board that offers one PCIExpress x16 slot with proprietary pinout for a 10GbE adapter card that convert a 10GBASE-KR to 10GbE Optical Fiber or 10GbE Copper signal, one PCIExpress x16 slot, two PCIExpress x8 slots, Serial ATA, USB 3.0/2.0, GbE and Super I/O. In addition, an IPMI board management controller (miniBMC) located on the carrier board connects to the COM Express Type 7 module by NC-SI interface to support out-of-band management features. All necessary cables are included.

COM Express

ADLINK

	Preliminary **New Express Type 7**	**New** **Express-BD74**	**Express-BD7**	**Express-DN7**
SoC	new generation ultra performance platform	Intel® Xeon® D D-1559/D-1539/D-1577/D-1548 (formerly "Broadwell-DE") Other SKUs by project	Intel® Xeon® D D-1559/D-1539/D-1519/D-1577/ D-1548/D-1527 Pentium® D-1508 (formerly "Broadwell-DE")	Intel® Atom® C3000 C3808/C3708/C3508/C3308/ C3958/C3858/C3758/C3558/ C3538/C3338 (formerly "Denverton-NS")
Memory	128 GB DDR4 at 3200/2666 MT/s (ECC / non-ECC)	128 GB DDR4 at 2400/2133 MT/s	64 GB DDR4 at 2400/2133 MT/s (ECC for Express-KLE)	96 GB DDR4 at 2400/2133 MT/s (ECC for Express-SLE)
BIOS Type	AMI Aptio V	AMI Aptio V	AMI Aptio V	AMI Aptio V
LAN	4x 10GBASE-KR Intel® i210/i211 (GbE, IEEE1588, NC-SI)	2x 10GBASE-KR Intel® i210/i211 (GbE, IEEE1588, NC-SI)	2x 10GBASE-KR Intel® i210/i211 (GbE, IEEE1588, NC-SI)	4x 10GBASE-KR (max. 20G) Intel® i210/i211 (GbE, IEEE1588, NC-SI)
USB	4x USB 3.x/2.0	4x USB 3.0/2.0	4x USB 3.0/2.0	2x USB 3.0/2.0, 2x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s	2x at 6Gb/s	2x at 6Gb/s
PCI Express	PCI Express x16 Gen4 (or 2 x8 or 4 x4) PCI Express x8 Gen3 (x8, x4, x2) PCI Express x8 Gen3 (x8, x4, x2)	PCI Express x16 Gen3 (or 2 x8 or 4 x4) PCI Express x8 Gen3 (x8, x4, x2) PCI Express x8 Gen2 (x8, x4, x2), w/o GbE	PCI Express x16 Gen3 (or 2 x8 or 4 x4) PCI Express x8 Gen3 (x8, x4, x2) PCI Express x8 Gen2 (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.)	-	-	-	8-32 GB (by project)
TPM (opt.)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 2.0) (opt.)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG
Power Supply	12 V / 5Vsb ±5% (ATX) 12 V (AT)	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)	Standard: 0°C to +60°C Extreme Rugged: -40°C to +85°C (standard 12V input only)
OS support	Windows® Server 64-bit Yocto Linux 64-bit	Windows® Server 2012 64-bit, Yocto Linux 64-bit	Windows® Server 2012 64-bit, Yocto Linux 64-bit	Windows® Server 2016/2012 64-bit, Yocto Linux 64-bit
Form Factor & Compatibility	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	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

Notes:
- TPM, eMMC support 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
- 10G, I/O and memory support dependent on SKUs for Express-DN7
- All specifications are subject to change without further notice.

COM Express

Type 10 Mini Size

Best Mobility

The COM Express® Type 10 Mini (84 x 55 mm, credit card size) module is intended for low power platforms (TDP 12W and below), capable of entry level processing with ultra-low power consumption, while supporting graphics and optimized I/O count for mobile applications. Type 10 modules are targeted at handheld devices (smart battery) for industrial, medical, transportation, and controllers for outdoor applications.

Applications

In-Vehicle / In-Flight Entertainment

Panel Control

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.
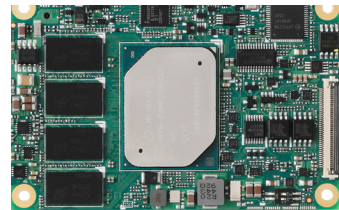
Type 10
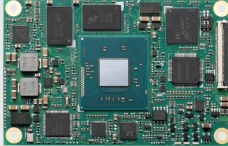
A-B

8x USB 2.0 2x USB 3.x (upgrade)
DDI
LVDS / eDP
4x SATA
Gigabit Ethernet
Audio HDA
LPC / eSPI
GPIO / SDIO / 2x UART / CAN / SPI / I²C
4x PCIe
Power

The nanoX Starter Kit Plus consists of a COM Express® Type 10 reference carrier board that provides two PCIe Mini Card slots, 2 RJ-45 LAN ports, 2x USB 3.0, 2x USB 2.0, 1x USB client, 2x DB-9 COM, 1x SD card socket, and Mic/Line-in/Line-out. ADLINK also provides additional development tools including a verified 10.1" LVDS panel, smart battery, power supply, thermal solution and cabling accessories.

	nanoX-EL `Preliminary`	**nanoX-AL**	**nanoX-BT**
SoC	Intel Atom® x6000 x6425E/x6413E/x6211E/x6200FE and x6425RE/x6414RE/x6412RE (formerly "Elkhart Lake") Additional Pentium® and Celeron® SKUs	Intel Atom® x7-E3950/x5-E3940/ x5-E3930 (formerly "Apollo Lake") Additional Pentium® and Celeron® SKUs	Intel Atom® E3845/E3827/E3826/E3825/ E3815/E3805 Intel Celeron® N2930/J1900 (formerly "Bay Trail")
Memory (soldered)	16 GB LPDDR4 IBECC at 4267/3200 MT/s	8 GB DDR3L at 1867/1600 MT/s	4 GB DDR3L at 1333 MT/s
BIOS Type	AMI Aptio V	AMI Aptio V	AMI Aptio IV
Boot Loader	-	Coreboot	Coreboot
Graphics Outputs	LVDS (or eDP1.4) 1x DDI (DP/HDMI)	LVDS (or eDP1.4) 1x DDI (DP/HDMI)	LVDS (oreDP1.2) 1x DDI (DP/HDMI)
Graphics Features	DX12, OpenGL4.5, ES3.2, OpenCL 2.0	DX 11, OpenGL 4.3 and ES 3.0, OpenCL 2.0	DX 11, OpenGL 3.2 and ES 2.0, OpenCL 1.1
LAN	MaxLinear® GPY 2.5GbE (TSN @ GPY215)	Intel® i210/i211 (IEEE 1588)	Intel® i210/i211 (IEEE 1588)
USB	2x USB 3.2/2.0, 6x USB 2.0	2x USB 3.0/2.0, 6x USB 2.0	1x USB 3.0/2.0, 3x USB 2.0
Serial ATA	2x at 6Gb/s	2x at 6Gb/s	2x at 3Gb/s
PCI Express	4x PCIe x1 Gen3 (x4, x2, x1)	3x PCIe x1 Gen2 (x2, x1) (others by project)	3x PCIe x1 Gen2 (4x PCIe x1, w/o GbE, opt.)
eMMC (opt.)	16-64GB (by project)	8-32 GB (by project)	8-32 GB (by project)
SD (opt.)	Yes	Yes	Yes
Audio	ALC262 (carrier board)	ALC262 (carrier board)	ALC262 (carrier board)
TPM (opt.)	Yes (TPM 2.0)	Yes (TPM 2.0)	Yes (TPM 1.2)
Management Bus	I²C, SMBus	I²C, SMBus	I²C, SMBus
Embedded Features	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG	EAPI/SEMA, Backup BIOS, Debug/JTAG
Power Supply	4.75-20V / 5Vsb ±5% (ATX), 4.75-20V (AT)	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)	Standard: 0°C to +60°C Extreme Rugged: -40°C to +85°C (standard 12V input only)
OS Support	Windows® 10 64-bit, Yocto Linux 64-bit, VxWorks 64-bit (TBC)	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
Form Factor & Compatibility	PICMG COM.0 R3.0 Type 10 Mini size: 84 x 55 mm	PICMG COM.0 R2.1 R3.0, Type 10 Mini size: 84 x 55 mm	PICMG COM.0 R2.1, Type 10 Mini size: 84 x 55 mm

Notes:
- TPM, eMMC support 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
- All specifications are subject to change without further notice.

ARM/x86 Lowest Power

SMARC® formfactor is the only computer-on-module form factor that truly is capable of supporting both ARM and x86 designs. With 314-pins on a high speed MXM3 connector, SMARC can fully cover both typical x86 interfaces as well as typical ARM type low level signals.

Using ARM SoCs opens the possibility to leverage the product ecosystem of familiar devices such as tablet computers and smart phones. Alternative low power SoCs and CPUs, such as tablet oriented x86 devices and other RISC CPUs may be used as well.

The module power envelope is limited to max. 15W and the form factor is ideal for applications that mandate designs able to with stand extreme environmental conditions.

SMARC

2x LVDS / DSI / eDP
HDMI / DP++
DP++
4x MIPI CSI
HDA / I2S
1x SATA
2x GbE
2x USB 3.0/2.0 (1x OTG) 4x USB 2.0 (1x OTG)
4x PCIe
SDIO / SPI / eSPI / 5x I2C 4x UART / 2x CAN / 14x GPIO
Power

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.
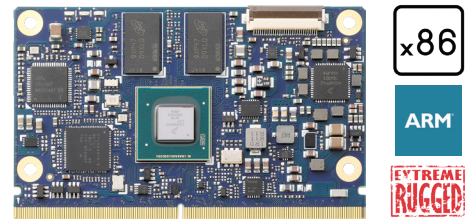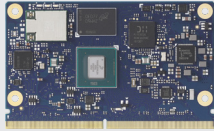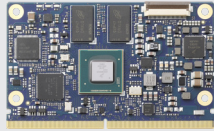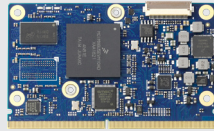
Development Kits

Buy Online at: https://www.ipi.wiki/

Specifications

- ARM or x86 Atom level based
- 314-pin MXM3 board-to-board connector supporting speeds up to PCIe Gen3
- Up to 3 display interfaces: Dual LVDS, eDP, DP, HDMI or MIPI DSI
- Camera support: 4x MIPI CSI
- PCIe, USB 3.0/2.0, SATA, 2x GbE, 4x UART, 5x I2C, 2x CAN, SPI/eSPI, 14x GPIO
- Uboot and Coreboot supported
- SEMA/EAPI Embedded Library supported
- 3.3 to 5V power input, with VDIO of 1.8V
- Extreme Rugged versions supporting operation from -40°C to +85°C

|	**ARM-based**		
	Preliminary **LEC-IMX8MP** AIOM 	**LEC-iMX8M** 	**LEC-iMX6 R2.0**
CPU	NXP i.MX 8M Plus Quad, QuadLite, 4x Cortex-A53 cores, 1x M7 core	NXP i.MX 8M Quad, QuadLite, Dual, up to 4x Cortex-A53 cores, 1x M4 core	NXP i.MX6 Quad, Dual, DualLite and Solo, up to 4x Cortex-A9 cores
Memory	Up to 8GB LPDDR4 at 4266 MT/s eMMC: 16/32/64GB	Up to 4GB DDR3L at 1600 MHz eMMC: 16/32/64GB	Up to 4GB DDR3L at 1066 MHz eMMC: 16/32/64GB
Cache	L2: 512KB ECC	L2: 1MB	L2: 1 MB
Boot Loader	U-Boot	U-Boot	U-Boot
Graphics Outputs	1x HDMI 2x LVDS 1x MIPI-DSI 4 lanes	1x HDMI 1x MIPI-DSI, 4-lane (or LVDS)	1x HDMI 1x LVDS
LAN	2x GBE (LAN0 with TSN)	Up to 2x GbE	1x GbE 1x 10/100Mbps LAN
USB	2x USB 3.0, 4x USB 2.0 (one shared with USB OTG on port 0)	2x USB 3.0 3x USB 2.0 (one shared with USB OTG on port 0)	5x USB 2.0 (one shared with USB OTG on port 0)
Extension ports	4x UART 2x SPI 14x GPIO 1x SDIO	3x UART 2x eCSPI 12x GPIO 1x SDIO	1x SATA 3Gb/s (Quad and Dual only) 4x UART 2x SPI 12x GPIO 1x SDIO
Audio	1x I²S	1x I²S	1x I²S
PCI Express	2x PCIe x1 Gen 2	Up to 2x PCIe Gen2 (one shared with GbE)	1x PCIe x1 Gen 2
SEMA Support	Yes	Yes	Yes
Power Supply	5.0 V - 5.25 V DC ±5%	5.0 V - 5.25 V DC ±5%	5.0 V - 5.25 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.)
OS Support	Linux, Android	Linux, Android	Linux, Android, WEC7, QNX
Form Factor & Compatibility	SMARC short size, 82 x 50 mm, SMARC specification v2.1.1	SMARC short size, 82 x 50 mm, SMARC specification v2.0	SMARC short size, 82 x 50 mm, SMARC specification v2.0

Notes:
- All specifications are subject to change without further notice.

SMARC module

ADLINK

	LEC-EL Preliminary	**LEC-AL**	**LEC-KMB** ARM-based Preliminary AIOM	**LEC-PX30**
CPU	Intel Atom® X6425E Intel Atom® X6413 Intel Atom® X6211E Intel Atom® X6200FE (formerly "Elkhart Lake")	Intel Atom® E3900 Series, Intel® Pentium® N4200, Intel® Celeron® N3350 (formerly "Apollo Lake")	Quad-core ARM Cortex A53 CPU @ 1.5 GHz Gen 3 Intel® Movidius™ VPU	Rockchip PX30 Quad-core 4x Cortex-A35 cores
Memory	Up to 16GB LPDDR4 at 4266 MT/s eMMC 16/32/64/128GB	Up to 8 GB DDR3L at 1867 MHz	up to 4GB LPDDR4 at 4266 MT/s eMMC 16/32/64/128GB	Up to 4 GB DDR3L at 1066MHz (1/2/4GB) eMMC: 8/16/32GB
Cache	1.5 MB system L2 cache 4MB LLC	L2: 2 MB	L1: 32KB per core, L2 1MB shared cache	L2: 256KB
Boot Loader	AMI UEFI BIOS	AMI UEFI BIOS	U-Boot	U-Boot
Graphics Outputs	Dual channel LVDS 18/24-bit) HDMI/DP++, DP++	H.265 (HEVC) 10-bit codec, VP9 10-bit decode Dual channel LVDS (18/24-bit) HDMI/DP++, DP++ 2x MIPI CSI camera	4 lane DSI HDMI 4x MIPI CSI camera	LVDS (or MIPI-DSI, 4-lane)
LAN	Dual 10/100/1000/ 2.5 Gbit Ethernet with TSN	Intel® i210IT MAC/PHY 1x GbE IEEE 1588	2x GbE	Up to 2x 10/100Mbps
USB	2x USB 3.0 host 6x USB 2.0 host	1x USB 3.0 OTG 1x USB 3.0 host 1x USB 2.0 OTG 1x USB 2.0 host	1x USB 2.0 OTG 2x USB 3.0 host 4x 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 14x GPIO 1x SDIO	2x UART 2x SPI 12x GPIO 1x SDIO
Audio	1x I²S, 1x HDA	HDA	1x I²S	1x I²S, HDA
PCI Express	4x PCIe x1 Gen3	4x PCIe x1	2x PCIe x1 Gen2	-
SEMA Support	Yes	Yes	Yes	Yes
Power Supply	5.0 V - 5.25 V DC ±5%	5.0 V - 5.25 V DC ±5%	5.0 V - 5.25 V DC ±5%	3.0 V - 5.25 V DC ±5%
Operating Temperature	0℃ to +60℃ -40℃ to +85℃ (opt.)	0℃ to +60℃ -40℃ to +85℃ (opt.)	0℃ to +60℃ -40℃ to +85℃ (opt.)	0℃ to +60℃ -20℃ to +85℃ (opt.)
OS Support	Windows® 10 IoT Core, 64 bit Yocto Linux, 64 bit	Windows® 10 IoT Enterprise, Windows® 10 IoT Core, Yocto Linux	Yocto Linux	Linux, Android
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	SMARC short size, 82 x 50 mm, SMARC specification v2.0

Notes:
• All specifications are subject to change without further notice.

ETX®
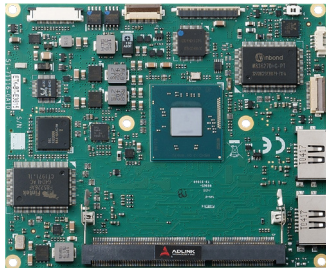
ETX® is one of the earliest successful computer-on-module form factors. Today it is still widely used in applications such as industrial automation, transportation and medium and low level medical appliances. While high-end Intel® Core™ applications have mostly migrated to COM Express , ETX® is still very much alive in the lower power segment, mostly notably using Intel Atom® SoCs. Specifically, for customers who are still heavily invested in ISA and PCI controllers or peripheral technology, the ETX form factor has stayed in demand through the years. ADLINK's current product planning will provide long term support for ETX well beyond 2025.

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

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.

ETX-BT

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 (opt.)	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.)
OS Support	Windows 7/8 Linux (WES7, WE8 Std., WEC7; Linux, VxWorks)
Form Factor & Compatibility	ETX 3.02 Size: 95 x 114 mm

Notes:

• All specifications are subject to change without further notice.
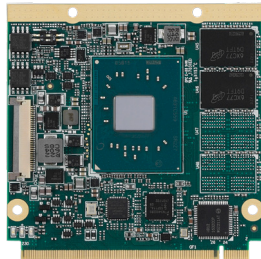
Qseven® is an off-the-shelf, multi-vendor, computer-on-module that integrates all the core components of a common x86 PC and is mounted onto an application specific carrier board. A single ruggedized 230-pin MXM connector provides the carrier board interface to carry all the I/O signals to and from the Qseven module.

The Qseven® module provides all functiona requirements for an embedded application. Such as graphics, sound, mass storage, PCIe, networking and multiple USB ports. Since its pinout is mostly x86 oriented, Qseven® is commonly built around "Atom level" x86 silicon. The Qseven® power envelope is typically between 6 and 12 watts.

Q7

2x LVDS / DSI / eDP
HDMI / DP++
2x MIPI CSI
HDA / I2S
2x SATA
GbE
2x USB 3.0/2.0 (1x OTG) 4x USB 2.0 (1x OTG)
4x PCIe
SDIO / SPI / LPC or GPIO 5x I2C / 2x UART or CAN
Power

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.

Q7-AL
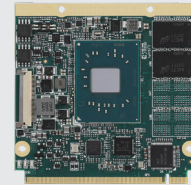
SoC	Intel Atom® E3900 Series, Pentium® N4200 or Celeron® N3350 (formerly "Apollo Lake")
Memory	Up to 8 GB LPDDR4 at 2400 MHz
Cache	L2: 2 MB
BIOS Type	AMI UEFI BIOS
Integrated Graphics	9th Gen Intel® graphics core architecture with up to 18 execution units, supports three independent displays, 4k video (up to 4096 x 2160 @60fps)
Graphics Features	DirectX 12, OpenGL 4.2, OpenCL
Camera	2x MIPI CSI 2L/4L
LAN	Intel® i210IT MAC/PHY, 1x GbE, IEEE 1588
USB	2x USB 3.0 6x USB 2.0
Serial ATA	2x SATA 6Gb/s to carrier or 1x SATA 6Gb/s to carrier and 1x onboard SATA SSD
PCI Express	3x PCIe x1
eMMC (opt.)	Onboard eMMC 5.0 (4-64 GB)
Audio	HDA
SEMA	Yes
Power Supply	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
OS Support	Windows 10 IOT Enterprise, Windows 10 IOT Core, Yocto Linux
Form Factor & Compatibility	Qseven 2.1, Size: 70 x 70 mm

Notes:

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Leading Computer-on-Modules
Most Robust, Best Support

ADLINK's computer-on-module products are not only leading edge when it comes to quality and standardization, they're packed with design innovations and backed up by top-class production and manufacturing logistics that ensure timely delivery and distribution to you, as ordered, when needed. To ensure lifetime stability of your products, we provide EOL management that provides long production service durations.

| Leading Innovation | Expert Solutions | Robust Product | Comprehensive Support |

We play a major role in the PICMG consortium and SGeT, and have made significant contributions in defining COM Express®, SMARC® and Qseven® standards. With ADLINK as your partner in computer-on-module products, our commitment to lead the industry and produce the most robust products is backed by our comprehensive support network. Choose ADLINK computer-on-module products to ensure the success of your venture from start to finish.

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