V. 11/20

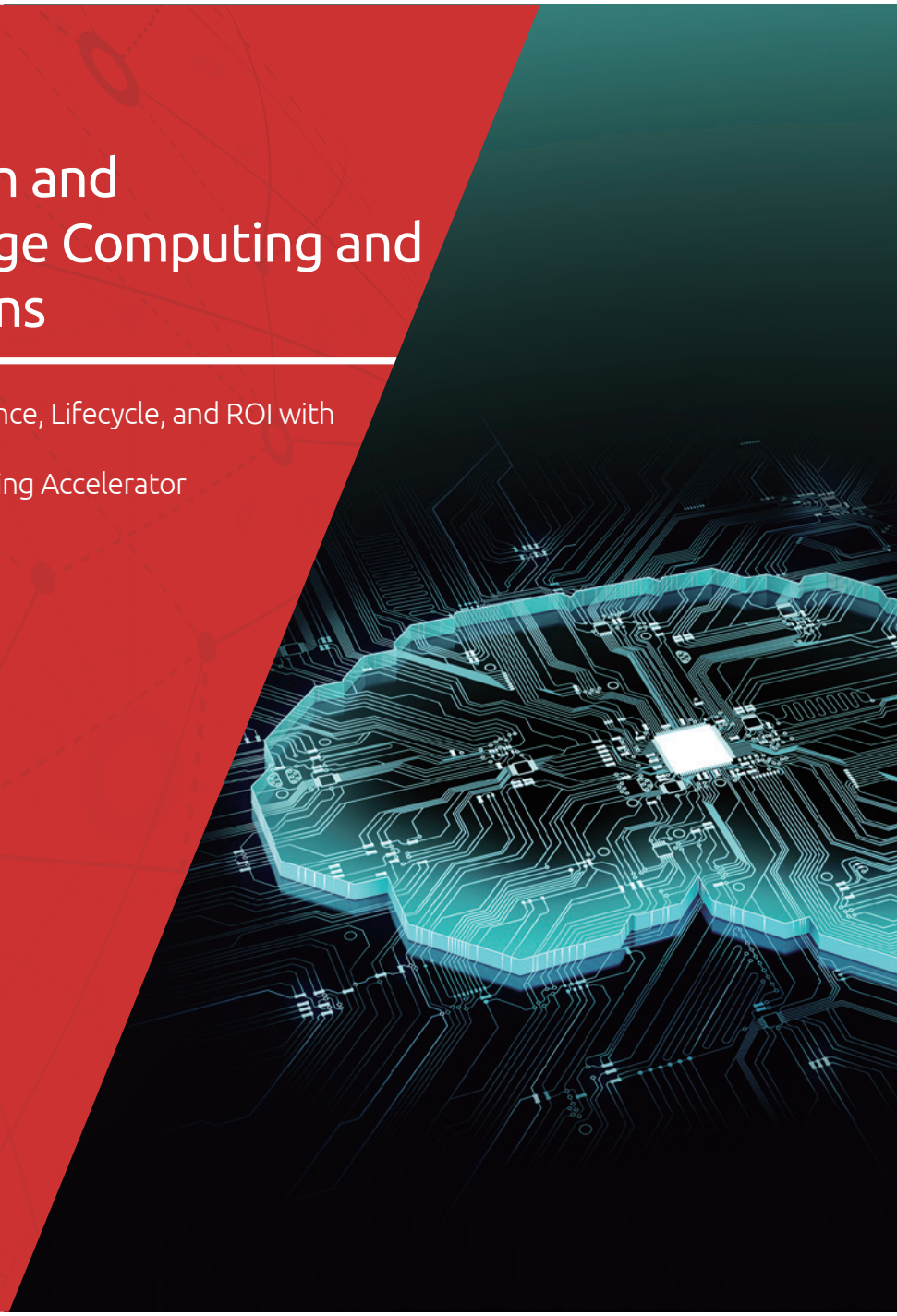
ADLINK
Leading EDGE COMPUTING

ADLINK GPU Solutions

Simplify the Design and Deployment of Edge Computing and Edge AI Applications

ADLINK Extends System Performance, Lifecycle, and ROI with Hardware Optimization

- Embedded Graphics/Deep Learning Accelerator
- GPU Computing Platform
- Edge AI Platform
- Customization Services



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About ADLINK

ADLINK Technology, a global provider of leading edge computing solutions, is an NVIDIA® Quadro® Embedded Partner, Jetson™ Elite Partner, and OEM Preferred Partner. With deep industry experience in embedded systems and edge applications, ADLINK has formulated a hardware optimization strategy to enable edge computing and edge artificial intelligence (AI) deployment with GPU-accelerated, heterogeneous computing platforms.

Quadro Embedded Partner

Jetson Elite Partner

OEM Preferred Partner

ADLINK is a global company with a local touch. Headquartered in Taiwan, ADLINK offers manufacturing in Taiwan and China; R&D and integration in the US, Germany, Taiwan, and China (Figure 1); an extensive network of worldwide sales and support offices; and a continually expanding partner ecosystem. ADLINK is ISO-9001, ISO-14001, ISO-13485, and TL9000 certified and is publicly traded on the TAIEX Taiwan Stock Exchange (stock code: 6166). Our products are currently available in over 40 countries across five continents and are supported by worldwide distribution networks and offices and more than 1,600 employees.

Figure 1. ADLINK R&D and integration sites

Simplify the Design and Deployment of Edge Computing and Edge AI Applications

Executive Summary

Embedded graphics enable system developers to boost the performance of a wide range of workloads, including medical imaging, image analysis, compute acceleration, and AI. Graphics solutions typically use graphics processing units (GPUs) to increase application speed and accuracy, as well as decrease latency. Many embedded system developers are using embedded graphics solutions in real-world applications, such as medical, manufacturing, and traffic management (Figure 2), along with other embedded segments.

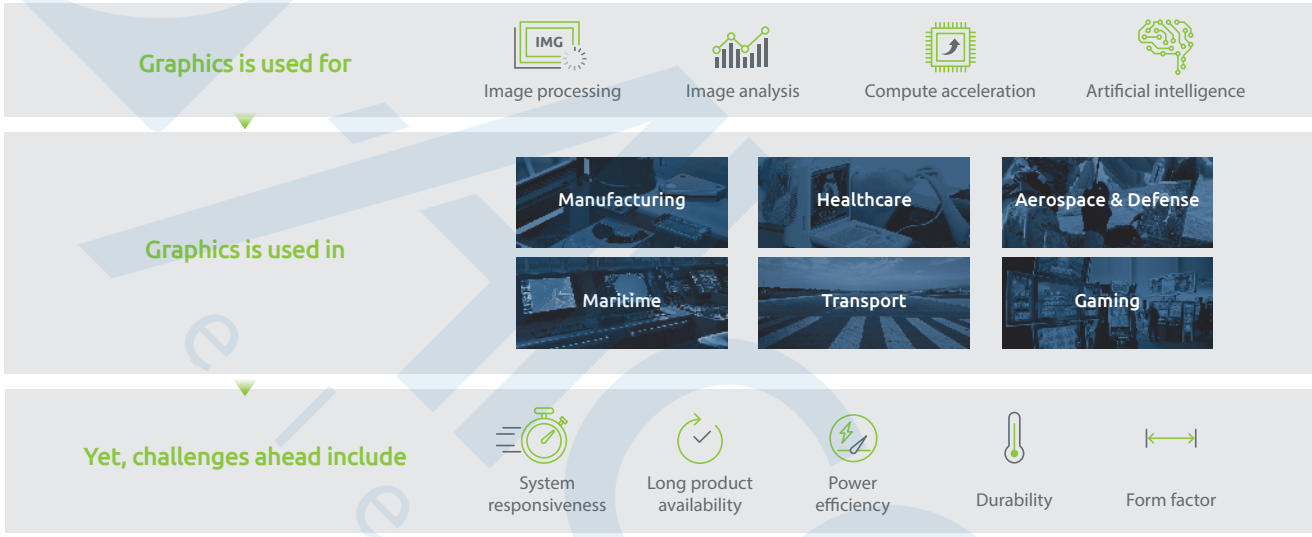


Figure 2. Graphics is widely used in embedded applications

Still, adding a GPU to an embedded system can be a complex task. One approach is to use graphics cards developed for the gaming application segment, which accounts for about a third of all GPUs[1]; however, these cards often do not satisfy key embedded system requirements, such as low system latency, long product availability, and power efficiency.

Addressing these issues, ADLINK products greatly simplify the process of adding GPUs to embedded designs. These products can satisfy a wide range of embedded requirements around performance, long lifecycle, power consumption, and form factor. The following section describes how ADLINK GPU solutions are being used in edge computing and edge AI applications, and the way ADLINK products can simplify the design process for system developers, OEMs, and systems integrators.

[1] "GPU Market to cross $80bn by 2024: Global Market Insights, Inc.," January 29, 2019, https://www.globenewswire.com/news-release/2019/01/29/1706699/0/en/Graphic-Processing-Unit-GPU-Market-to-cross-80bn-by-2024-Global-Market-Insights-Inc.html.

Key Design Objectives

The deployment of edge computing and edge AI applications satisfies many business objectives, including:

Improve Signal and Image Processing Performance

Embedded graphics solutions enable system developers, OEMs, and systems integrators to significantly improve signal and image processing performance in various application areas, including aerospace, maritime, medical, and industrial automation.

Optimize Investment, Maximize Productivity

Companies seeking to maximize the innovation and productivity gains from deep learning and AI should consider using a computing platform optimized for the associated algorithms.

Key Business Challenges

Solution providers implementing GPU-based solutions face various business considerations, such as:

Extending Product Lifecycle

Many commercial graphics solutions, such as those developed for gaming applications, have a relatively short lifecycle due to users' desires for the latest and greatest graphics technology. When embedded solution providers implement these commercial graphics solutions, they may be forced to conduct frequent product certifications, which can be time consuming and expensive. This situation is made more difficult by the relatively few vendors that offer embedded GPU-based computing solutions compared to general-purpose, CPU-based solutions.

Balancing Cost and Efficiency

Many AI workloads require large amounts of memory, parallel computing, and low-precision computation.[2] The challenge for system architects is to define an optimized AI platform that cost-effectively delivers these computing resources in ways that satisfy their speed and accuracy requirements. For platforms deployed at the edge, system architects must address additional requirements, such as environmental hardening and stringent SWaP constraints.

Solving Design Challenges

ADLINK products and services enable developers to improve their system designs, such as:

Increasing Embedded Graphics Performance

A common theme in the embedded application examples is the need to quickly move external data from sensors and other sources to the GPU for processing. ADLINK achieves this by implementing remote direct memory access (RDMA), a feature of NVIDIA GPUDirect™ technology in NVIDIA® Quadro® GPUs that can boost data throughput by approximately 80 percent (3.6 to 6.5 gigabytes per second). RDMA gives external data sources direct access to the GPU's external memory, as shown on the left side of Figure 3. Without this feature, data would be copied into a CPU's memory (red line on right side of Figure 3) before reaching the GPU, which needlessly increases data transmission delay and latency.

As an NVIDIA Quadro Embedded Partner with extensive experience in embedded applications, ADLINK is uniquely qualified to provide system developers with solutions using GPUDirect, enabling them to tap into the power of embedded graphics and AI.

[2] Sundeep Bajikar, "Why AI Workloads Require New Computing Architectures,"

Figure 4. Developers need to evaluate many areas to attain an optimized computing platform for AI solutions

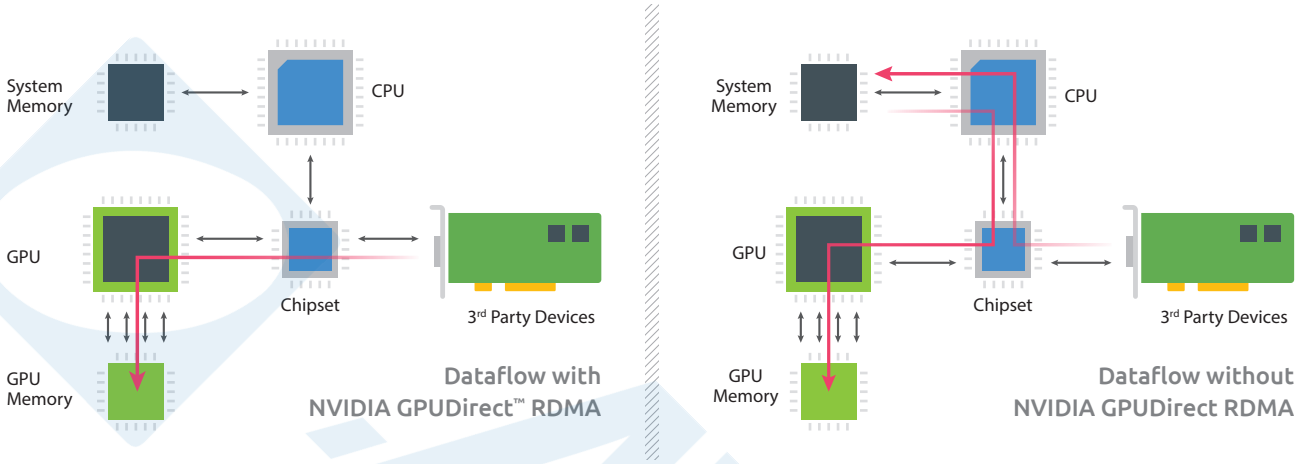


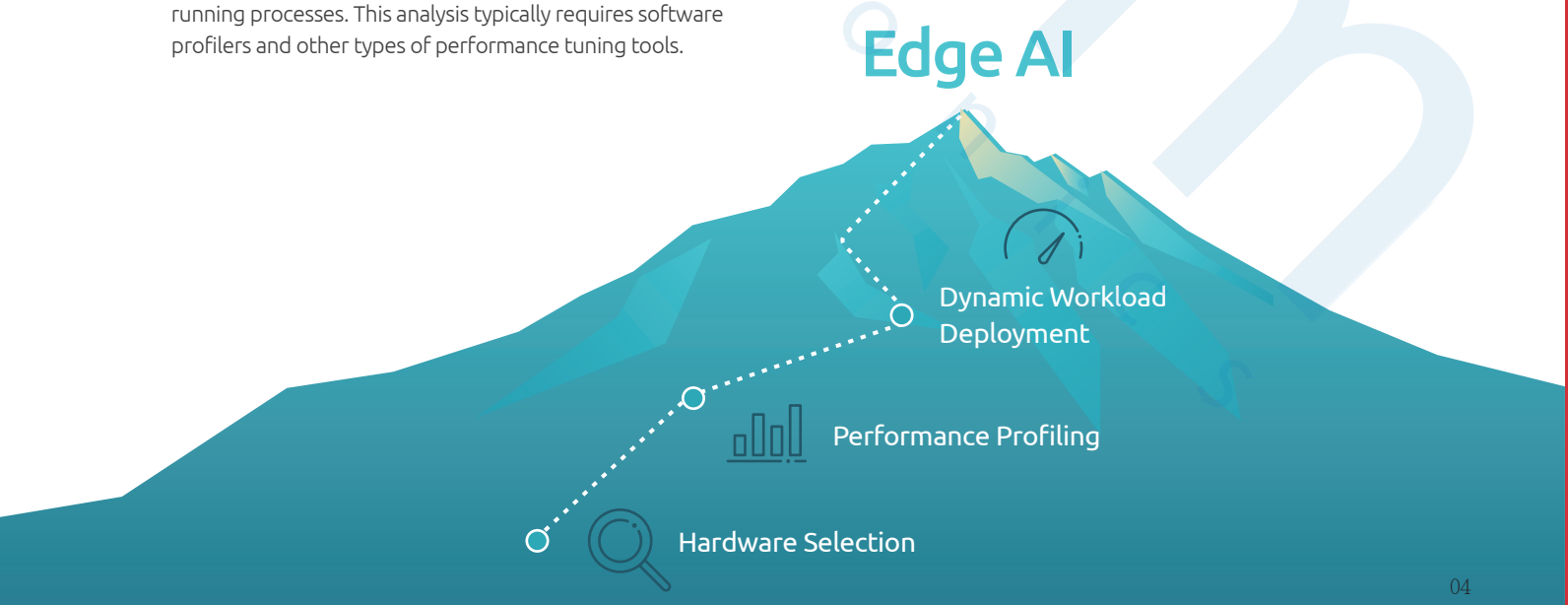
Figure 3. NVIDIA GPUDirect™ example[3]

Optimizing the Execution of AI Workloads

In order to attain an optimized computing platform for deep learning and AI solutions, developers may need to evaluate many areas (Figure 4), including:

- **Selecting Hardware:** Determine which computing cores and performance level are best suited to run the required AI algorithms and how much computing power and I/O bandwidth are needed. Hardware selection should also consider SWaP and cost constraints, particularly when deploying AI at the edge of the network.
- **Tuning AI Performance:** Identify bottlenecks in the software or hardware due to insufficient platform resources (e.g., memory, I/O, computing cores, and cache), inefficient scheduling of software threads, or contention between various running processes. This analysis typically requires software profilers and other types of performance tuning tools.
- **Deploying Dynamic Workloads across the Network:** Develop the ability to deploy and provision dynamic workloads across the network in order to improve inference results with refined AI models and tackle new challenges. Dynamic workloads require a flexible and adaptable computing architecture that enables a scalable, real-time, and reliable deployment environment.

[3] NVIDIA GPUDirect™ Technology, http://developer.download.nvidia.com/devzone/devcenter/cuda/docs/GPUDirect_Technology_Overview.pdf.



Design with ADLINK GPU-Powered Solutions

Addressing the requirements of high-mix, low-volume applications, ADLINK offers a lineup of embedded graphics products that are powered by NVIDIA Quadro-embedded GPUs. This extensive product portfolio includes NVIDIA Jetson-based platforms and GPU computing platforms to address specific performance and SWaP requirements for edge computing and edge AI applications. Specification customization is also available to accommodate the application-specific needs of our embedded customers.

System developers, OEMs, and systems integrators can more easily add embedded graphics and AI to their applications by using ADLINK's GPU Solutions portfolio, shown in Figure 5. The portfolio includes embedded graphics products, GPU computing platforms, edge AI platforms, deep-learning consultancy and optimization services, and customization services.

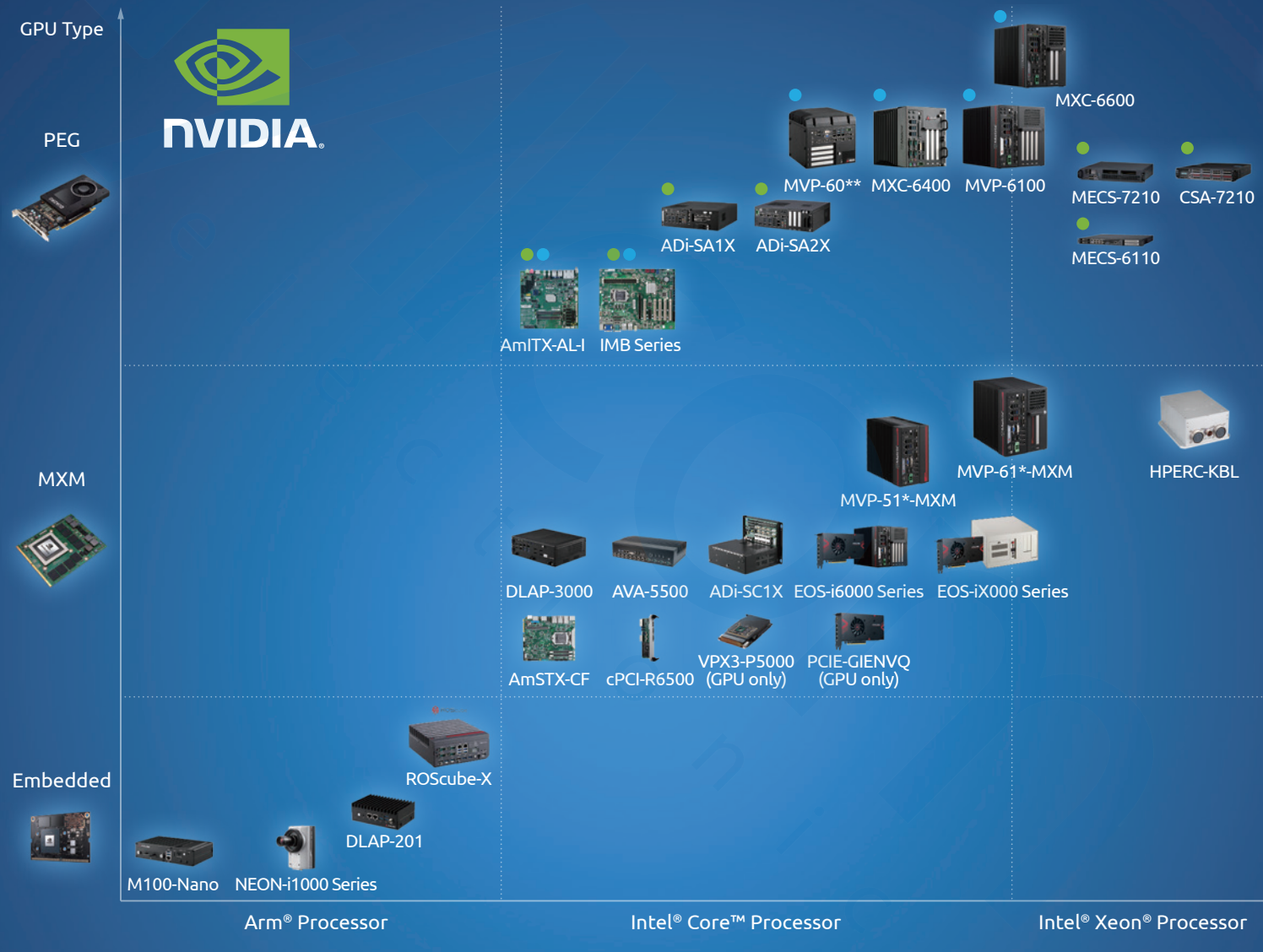


Figure 5. ADLINK solutions portfolio


ALPS-4800
FHFL
P2200
(FHHL)
HHHL
P1000
P620
Type B
P5000
P3000
Type A
P2000
P1000
Jetson
Xavier
TX2
Nano
CPU Type

Embedded Graphics/Deep-Learning Accelerators

ADLINK offers two families of embedded graphics products that are an ideal fit for image processing and analysis, compute acceleration, and AI.

- Mobile PCI Express Module (MXM) modules (Figure 6) are well-suited for SWaP-constrained applications, like portable ultrasound, airborne radar, and aerial infrared imaging.
- PCI Express graphic (PEG) cards connect via a common interface and are easy to integrate and use in many embedded market segments, such as healthcare (magnetic resonance imaging (MRI) and computed tomography (CT)), industrial automation (AOI inspection), and telecom (multi-access edge computing).

NVIDIA® QUADRO® CERTIFIED
- EMBEDDED

ADLINK provides custom firmware, long lifecycle support, and MXM-and PEG-compatible boards and systems to embedded customers.

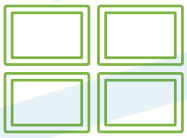


Image processing and analysis

Compute acceleration

AI engines

EGX-MXM-P1000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P1000 GPU

EGX-MXM-P3000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P3000 GPU

Quadro-E PEG P620

PCI Express Graphic Card with NVIDIA® Quadro® Embedded P620

Quadro-E PEG P2200

PCI Express Graphic Card with NVIDIA® Quadro® P2200

EGX-MXM-P2000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P2000 GPU

EGX-MXM-P5000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P5000 GPU

Quadro-E PEG P1000

PCI Express Graphic Card with NVIDIA® Quadro® Embedded P1000

Quadro-E PEG P4000

PCI Express Graphic Card with NVIDIA® Quadro® P4000

Figure 6. ADLINK embedded graphics products feature longevity support, NVIDIA GPUDirect™ RDMA, and NVIDIA Video Codec SDK.

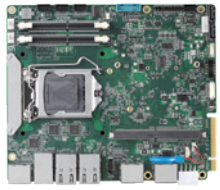
GPU Computing Platforms

For SWaP-constrained applications, ADLINK's Matrix compact fanless embedded computers offer the best performance-per-watt and high availability with expandability options, including the previously discussed MXM cards. Actively-cooled deep learning acceleration platforms (DLAPs) support applications in less thermally-challenged settings.

For mission-critical applications, ADLINK's configurable embedded computers provide an expandable building block to host multiple accelerators, enabling the consolidation of workloads, including highly-parallel graphics computing, motion control, and data acquisition, onto one system. For applications demanding even greater scalability, ADLINK offers highly configurable motherboards and rackmount industrial chassis that provide an enclosure for ADLINK's large family of industrial ATX motherboards. The boards feature multiple PCIe/PCI/LAN/USB 3.0, enable immediate multi-tasking deployment, and balance performance and expandability.

DLAP-3000-CFL: The most compact system with scalable GPU performance ideal for heterogeneous computing at the edge.

MVP-6100-MXM: Expandable GPU workstation supporting MXM GPU modules, frame grabber, data acquisition & motion control.



AMSTX-CF: The only GPU parallel computing enabled Micro-STX Platform ideal for compute-intensive image processing.

Edge AI Platforms

ADLINK has already developed many edge AI platforms based on the full spectrum of NVIDIA Jetson modules, including NVIDIA® Jetson Nano™, NVIDIA® Jetson™ TX2, and NVIDIA® Jetson AGX Xavier™. The following lists our latest edge AI offerings:

M100-Nano-AINVR: a compact multi-channel AI-enabled network video recorder (NVR), offering identity detection and autonomous tracking in public transport and checkpoint access control applications.

DLAP-201-JT2: a deep learning acceleration platform, enabling real-time traffic flow analysis at intersections for traffic management.

Deep-Learning Consultancy and Optimization Services

Deep-Learning Consultancy Service

ADLINK offers consultancy services via deep learning profiling to help users determine the right hardware platform to cost-effectively fulfill their application needs, as shown in Figure 7. ADLINK developed a profiling tool that models computing platform performance based on the elements of AI algorithms, such as:

- Types of neural networks, like AlexNet, MobileNet, ResNet.
- Number of neural network layers.

The profiling tool runs these and other inputs against a large database of AI and deep learning accelerators and generates statistics, such as inferences per second; performance per watt; and performance per dollar, for popular neural networks. Additionally, the tool helps developers by determining which accelerator may offer the best performance for the neural networks used by their application.

Performance Profiling Service

For in-depth performance tuning, developers can have ADLINK run x86 and GPU performance analyzers on their software. These analyzers help identify hardware and software bottlenecks that, when remedied, can greatly increase throughput and inference per second, performance per dollar, and SWaP.

ADLINK is also working with research bodies and academic institutions to find bottlenecks on AI platforms to profile system issues that can be addressed for performance improvement. For example, it is possible to determine if the system is making too many memory copies or if increasing resources (e.g., memory size) will boost performance.

Dynamic Workload Deployment

ADLINK's Data River™ is an underlying technology for deploying dynamic workloads and enabling data to move freely. It solves a key challenge when developing AI solutions, which is allowing data exchange and workload provisioning across the entire network. The solution helps communicate data among computing nodes and devices.

ADLINK's solution can scale acceleration engines over a distributed data service (DDS), which is a type of message-oriented middleware supporting a data-centric publish and subscribe style of communication. This distributed architecture allows a massive number of computing nodes to be attached to the network. In other words, users can add additional hardware accelerators that best fit their application needs based on profiling results, even after AI is deployed.

Customization Services

Specification customization is often needed to deliver optimized solutions for different embedded market segments. With our long-term success in designing embedded modules, carrier boards, and systems, ADLINK, as an NVIDIA® Quadro® Embedded Partner, can quickly develop edge AI platforms based on NVIDIA Quadro Embedded GPUs and Jetson modules, catered to individual project needs. This is what enables our customers to rapidly harness the power of AI at the edge.

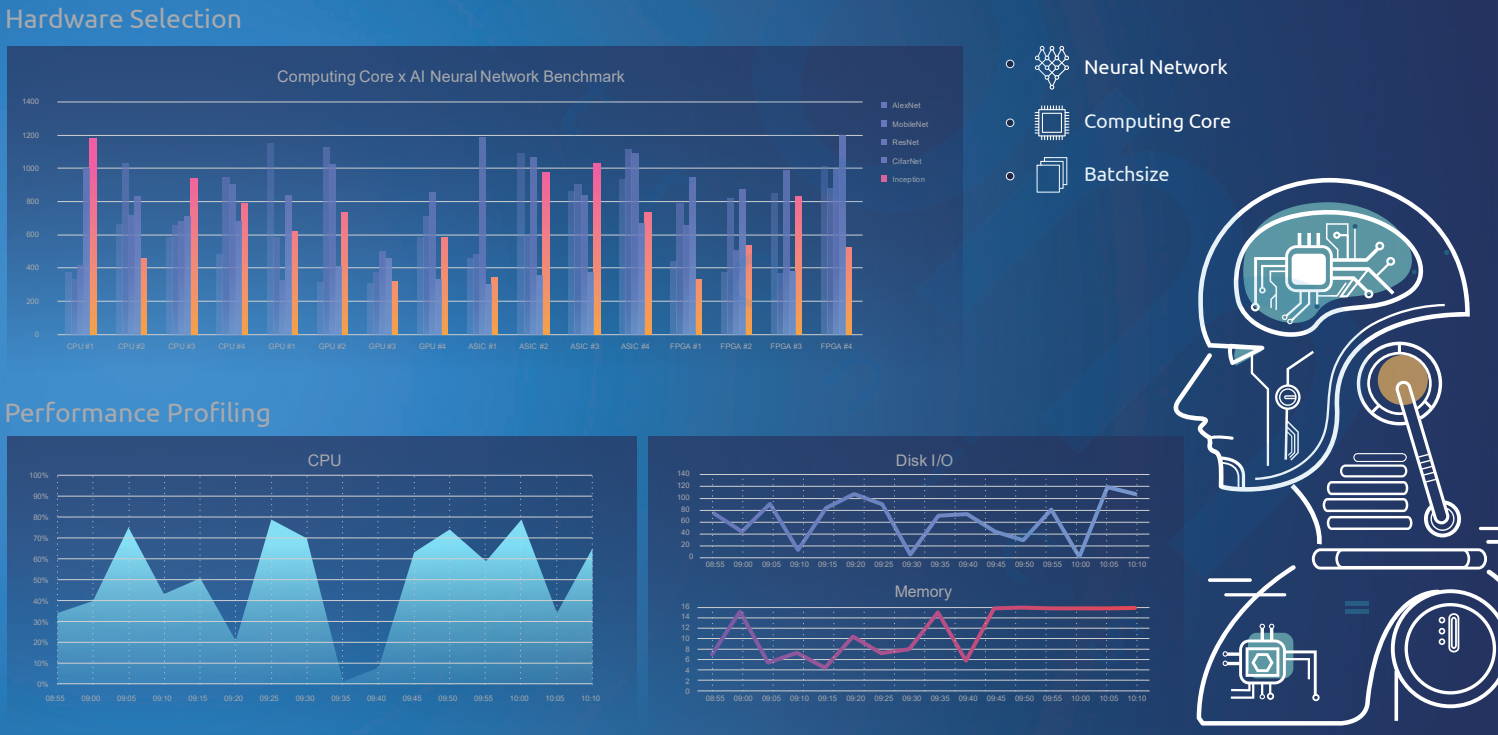


Figure 7. ADLINK offers consultancy services to help users determine the right hardware platforms

Reduce Your Design Efforts

System developers, OEMs, and systems integrators can more easily deploy embedded graphics and AI with help from ADLINK's large portfolio of computing products and services that can be designed into a wide range of form factors. Combining its strong expertise serving embedded developers and its close partner relationship with NVIDIA, ADLINK is delivering high-performance, long lifecycle, embedded graphics solutions to many market segments. By working with ADLINK, it is possible to more easily:

- Lower solution cost: Select the right hardware platform for the target workload.
- Increase system performance: Eliminate platform bottlenecks that slow down embedded graphics and AI algorithms.
- Simplify deployment: Leverage ADLINK's deep-learning consultancy, optimization services, and Data River™ to more easily integrate systems, and share data and distribute computing processing across the network.

FAQs

Q1 Where are the business opportunities for embedded graphics?

A

GPUs are used in embedded applications demanding high-resolution, multi-display capability, parallel computing, and AI enablement. ADLINK sees applications such as clinical diagnostic imaging devices, rugged military laptops and imaging radar for aerospace and defense, and gaming slot machinesas presenting considerable potential to benefit from embedded graphics.

Top-down applications that can benefit from embedded graphics further include

- High-resolution, multi-display setup: Applications include air traffic control, electronic chart displays and information systems (ECDIS), video walls, digital signage, gaming, and healthcare environments
- Parallel computing: High-performance application processing including radar/ sonar systems in aerospace and defense, ultrasound imaging in healthcare, and accelerated multi-access edge computing (AMEC) in telecoms
- AI engines: System training and inferencing in smart manufacturing, smart city, telecom, aerospace and defense, and transportation

Q2 Why should customers choose ADLINK Embedded Graphics products powered by NVIDIA Quadro Embedded GPUs?

A

- **Longevity support:** Product availability is 18 months for consumer-grade NVIDIA® GeForce® GPUs and 3 years for NVIDIA Quadro GPUs while NVIDIA Quadro Embedded GPUs support 5+ year availability in line with embedded application requirements. ADLINK MXMs support 5-year availability. PEG cards support 3-year availability which can be extended to additional 5 years under an extended life program.

Model	Longevity Support
MXMs	5 years
PEG Cards	3 (+5)* years

* Special conditions apply

- **Lower development costs:** Long lifecycle support translates into reduced development time, effort, and costs associated with graphics entering end-of-life (EOL). Development costs can reach six figures[4] for safety-critical applications that undergo time-consuming verification and testing processes. As consumer-grade graphics could reach EOL three times through the lifecycle of an embedded graphics solution, it is obvious that developing with embedded graphics would yield a superior return on investment (ROI).
- **Increased system responsiveness:** NVIDIA GPUDirect RDMA in NVIDIA Quadro Embedded GPUs can boost data throughput by approximately 80% and lower latency by 60%[5] . A direct path for data exchange is established between the GPU and third-party devices3, eliminating the need to copy data to CPU memory before reaching the GPU, such that data throughput and system responsiveness are significantly increased for GPU-accelerated applications.

[4] Product Development Cost and Timelines, https://www.acornpd.com/blog/product-development-cost-and-timelines
[5] The software and workloads used in performance tests may have been optimized for performance on ADLINK platforms. Performance tests are measured using specific computer systems, components, software, operations and functions. Tests performed under different conditions may produce varying results. Contact ADLINK for more information about performance and benchmarks.

Q3 How are NVIDIA Quadro Embedded GPUs benchmarked with other GPUs or CPUs?

A

For graphics-intensive applications involved with high-resolution, multi-display setup, please refer to performance benchmark testing results in Figure 8. For compute-intensive applications involved with highly-parallel workloads or AI training and inferencing, please refer to performance benchmark testing results in Figure 9.

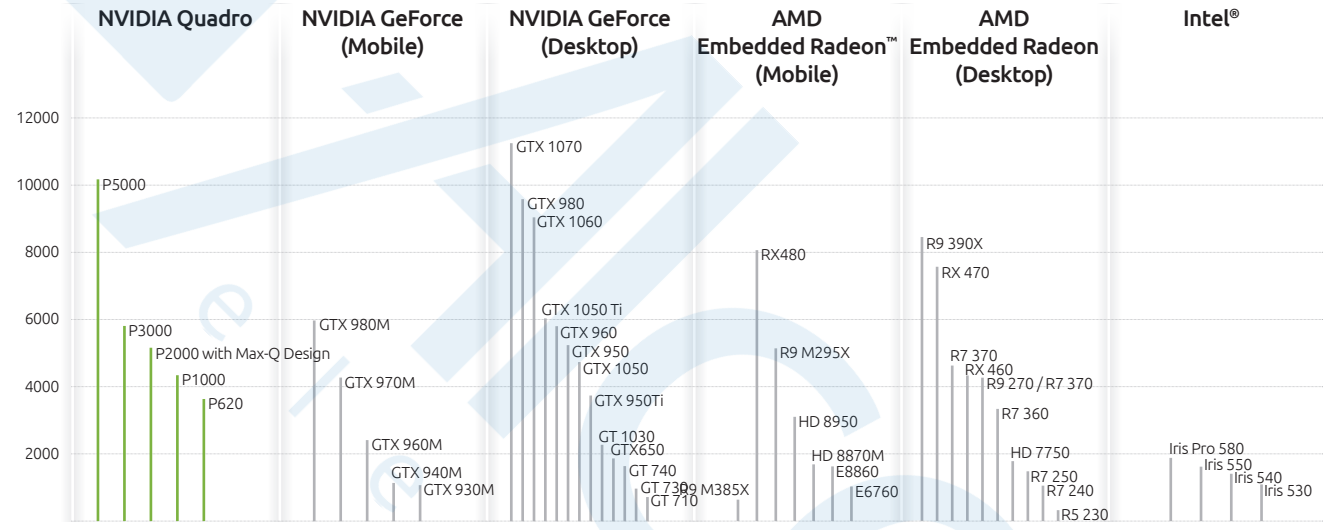


Figure 8. Passmark G3D Benchmark

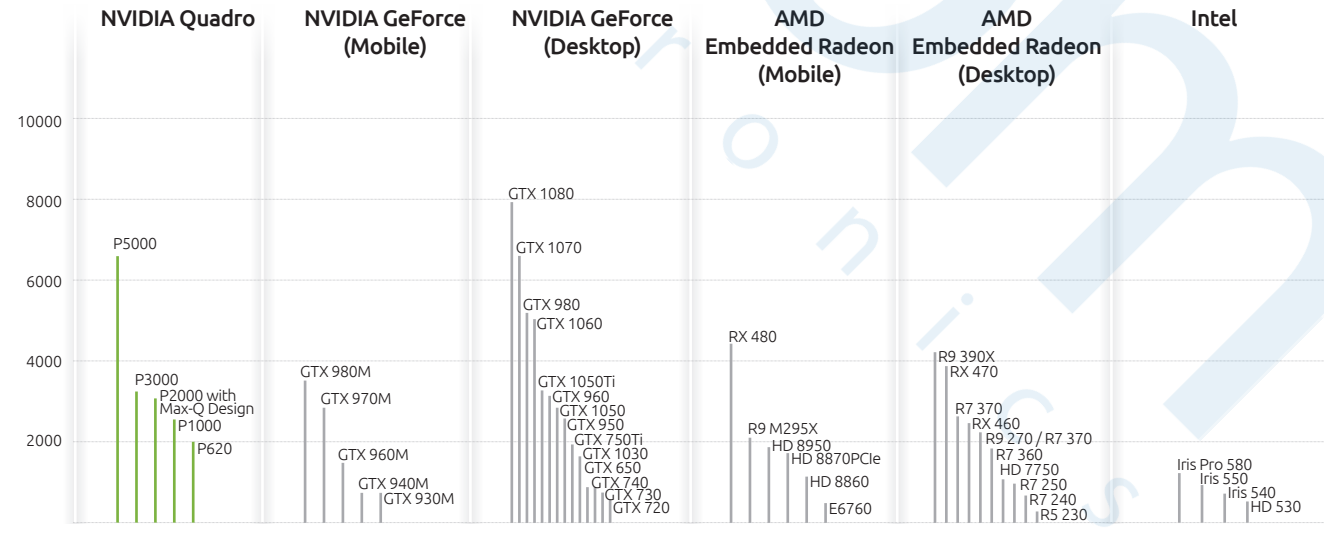


Figure 9. DirectCompute Benchmark

Q4 Why should customers choose ADLINK Embedded Graphics products over other graphics products?

A

ADLINK Embedded Graphics products offer long lifecycle support and very high performance, key requirements for many embedded applications. For high-resolution, multi-display applications, ADLINK embedded graphics products are a good choice when four or less displays are needed. As for highly-parallel computing and AI applications, ADLINK Embedded Graphics products can reduce CPU overhead, boost data throughput by approximately 80%, lower latency by 60%, and increase system responsiveness.

Q5 Why buy embedded graphics products powered by NVIDIA Quadro Embedded GPUs from ADLINK or ADLINK's distributors?

A

ADLINK is the top choice for embedded customers. Among only four NVIDIA Quadro Embedded Partners in the world, ADLINK is the only one with market-proven experience offering diverse product portfolios that address embedded application needs. ADLINK's offerings, including embedded graphics in MXM and PEG form factors, and MXM- and PEG-compatible platforms and modules, accelerate and facilitate GPU adoption in embedded applications.

Q6 How do I choose ADLINK Embedded Graphics products for embedded applications?

A

ADLINK's Mobile Express modules (MXMs), with high performance per watt and extended operating temperature options, are an ideal fit for mobile, SWaP-constrained, passive-cooling applications such as portable ultrasound, airborne radar, and aerial infrared imaging.

PCI Express Graphics (PEG) cards connect via a common interface, making them easy to integrate and use in many embedded applications, such as MRI and CT scanning in healthcare, quality inspection in industrial automation, and telecom multi-access edge computing.

GPU onboard solutions can fulfill ODM project requirements in different verticals (e.g., gaming and medical) and for various form factors, like PC/104 and VPX.

Q7 Other NVIDIA GPU-powered Mobile Express modules are available online. Why should I buy from ADLINK or ADLINK's distributors?

A

ADLINK and our distributors offer MXM modules powered by NVIDIA Quadro Embedded GPUs with five-year availability and technical support that cannot be offered by online vendors. Online NVIDIA GPU-powered MXMs are highly likely to be gray market goods without warranty or long lifecycle support. Additionally, Quadro-powered MXMs are designed for embedded applications requiring VBIOS, system BIOS, and cookie support.

Q8 What are lifecycles of NVIDIA Jetson Platforms?

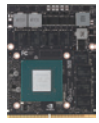
A

Some Jetson platforms are available through 2025. The long lifecycle support is in line with embedded application requirements.

Models	Available through
Jetson Nano	Jan 2025
Jetson TX2	Apr 2022
Jetson Xavier	Jan 2025

Product Selection

Embedded Graphics/Deep Learning Accelerators

Model Name	EGX-MXM-P1000	EGX-MXM-P2000	EGX-MXM-P3000	EGX-MXM-P5000
				
Graphic Core				
Graphic Architecture	NVIDIA® Pascal™ GP107		NVIDIA® Pascal™ GP104	
GPU	Quadro® P1000	Quadro® P2000	Quadro® P3000	Quadro® P5000
Display Output	4x DisplayPort 1.4 digital video outputs Support for High Dynamic Range (HDR) video 4K at 120Hz or 5K at 60Hz with 10-bit color depth		Up to 1 internal display plus 5 external display outputs 5x DisplayPort 1.4 digital video outputs (DP++) 1x HDMI, 2x DVI, 1x eDP	
Signal Interface	MXM 3.1, PCI Express Gen3 x16 support			
GPGPU Computing				
CUDA Support	512 CUDA® cores, 1.8 TFLOPS SP Peak	768 CUDA® cores, 2.3 TFLOPS SP Peak	1280 CUDA cores, 3.9 TFLOPS peak FP32 Performance	2048 CUDA cores, 6.4 TFLOPS peak FP32 performance
Memory	GDDR5 4GB memory, memory width: 128-bit, bandwidth: 96 GB/s	GDDR5 4GB memory, memory width: 128-bit, bandwidth: 96 GB/s	GDDR5 6GB memory, memory width: 192-bit, bandwidth: 168.2 GB/s	GDDR5 16GB memory, memory width: 256-bit, bandwidth: 192.2 GB/s
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1, OpenCL™ 1.2		CUDA Toolkit 8.0, CUDA Compute version 6.1, OpenCL™ 1.2, Direct Compute	
Graphic API	DirectX® 12, OpenGL 4.5, Vulcan 1.0		DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1	
NVIDIA Technology	-	-	NVIDIA® Mosaic Technology, NVIDIA® nView® Display Management Technology	NVIDIA® VR Ready, NVIDIA® Mosaic Technology, NVIDIA® nView® Display Management Technology
Mechanicals				
Dimensions	82 (W) x 70 (D) x 4.8 (H) mm		87 (W) x 105 (D) x 4.8 (H) mm	
Locking Mechanism	Standard MXM 3.1 Type A		Standard MXM 3.1 Type B	
Environmental				
Operating Temp.	Standard: 0˚C to 55˚C, ETT: -40˚C to 85˚C		0 to 55˚C	
Storage Temp.	-40˚C to 85˚C		-40˚C to 125˚C	
Module Power Consumption	48W	58W	75W	100W
SW Support				
OS Support	Windows 7/10 & Linux drivers, 64-bit			

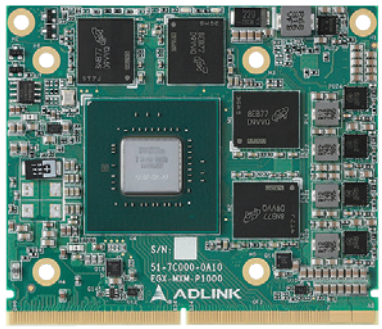
Model	Quadro-E PEG P620	Quadro-E PEG P1000	Quadro-E PEG P2200	Quadro-E PEG P4000
				
Graphic Core				
Graphic Architecture	NVIDIA® Pascal™ GP107		NVIDIA® Pascal™ GP106	NVIDIA® Pascal™ GP104
GPU	Quadro® P620	Quadro® P1000	Quadro® P2200	Quadro® P4000
Display Output	4x mDP 1.4, 4096x2160 @ 60Hz/5120x2880 @ 60Hz HDCP 2.2 support * VGA/DVI/HDMI support via adapter/connector/bracket		4x DP 1.4, 4096x2160 @ 60Hz/ 5120x2880 @ 60Hz * VGA/DVI/ HDMI support via adapter/ connector/bracket	4x DP 1.4, 7680×4320 @120 Hz/ 7680×4320 @ 60 Hz/ 5120×2880 @ 60 Hz HDCP 2.2 support * VGA/DVI/ HDMI support via adapter/ connector/bracket
Signal Interface	PCI Express Gen3 x16 support			
GPGPU Computing				
CUDA Support	512 CUDA cores, 1.38 TFLOPS peak FP32 performance	640 CUDA cores, 1.89 TFLOPS peak FP32 performance	1280 CUDA cores, 3.8 TFLOPS peak FP32 performance	1792 CUDA cores, 5.3 TFLOPS peak FP32 performance
Memory	GDDR5 2GB memory, memory width: 128-bit, bandwidth: 80 GB/s	GDDR5 4GB memory, memory width: 128-bit, bandwidth: 80 GB/s	GDDR5 5GB memory, memory width: 160-bit, bandwidth: 200 GB/s	GDDR5 8GB memory, memory width: 256-bit, bandwidth: 243 GB/s
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1, OpenCL™ 1.2, Direct Compute			
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1			
NVIDIA Technology	NVIDIA® Mosaic Technology, NVIDIA® nView® Display Management Technology			
Mechanicals				
Dimensions	2.713" × 5.7", single slot	2.713" × 5.7", single slot	4.4" H x 7.9" L, single slot	4.4" H x 9.5" L, single slot
Weight	129g	129g	256g	475g
Environmental				
Operating Temp.	0 to 55˚C			
Storage Temp.	-40˚C to 75˚C			
Module Power Consumption	40W	47W	75W	105W
SW Support				
OS Support	Windows 7/10 & Linux drivers, 64-bit			

EGX-MXM-P1000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P1000

Features

- MXM 3.1 Type A form factor (82 x 70 mm)
- 512 NVIDIA® CUDA® cores
- 1.8 TFLOPS SP peak performance
- 4GB GDDR5 memory
- 96GB/s maximum memory bandwidth
- Support up to 4 UHD displays, 50W TDP
- 5-year availability



Introduction

The EGX-MXM-P1000 features advanced NVIDIA Quadro GPU with NVIDIA Pascal™ Architecture technology in MXM 3.1 Type A form factor. The EGX-MXM-P1000 has 512 NVIDIA CUDA cores and a peak single-precision floating-point performance of 1.8 TFLOPS. The EGX-MXM-P1000 has 4GB of GDDR5 memory and supports NVIDIA GPUDirect™ RDMA which helps increase data throughput by up to 80% and consequently system responsiveness by up to 60%*. Additionally, 4 UHD display outputs and an extended operating temperature range of -40°C to 85°C are supported. The embedded graphics product is suitable for mission-critical harsh-environment edge computing applications with size, weight, and power (SWaP) and network connectivity constraints.

Ordering Information

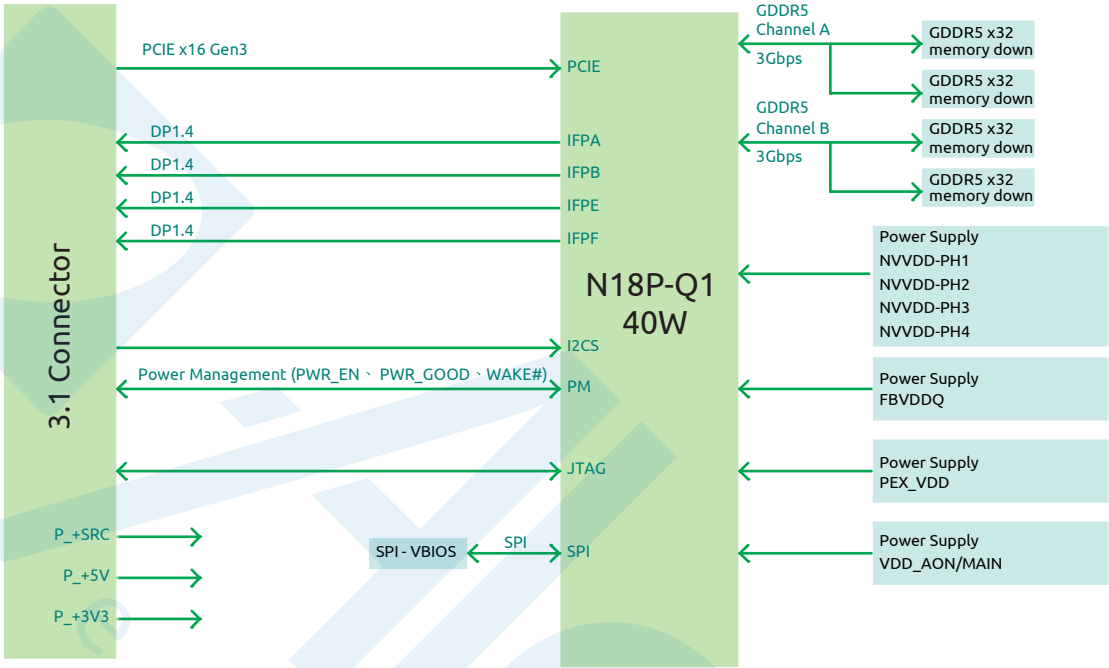
- **EGX-MXM-P1000**
  NVIDIA Quadro Embedded P1000, MXM 3.1 type A, 82 x 70mm, PCIe x16 Gen3

Specifications

	EGX-MXM-P1000
Graphic Core	
Graphic Architecture	NVIDIA Pascal GP107
GPU	Quadro P1000
Display Outputs	4x DisplayPort 1.4 digital video outputs Support for High Dynamic Range (HDR) video 4K at 120Hz or 5K at 60Hz with 10-bit color depth
Signal Interface	MXM 3.1, PCI Express Gen3 x16 supports
GPGPU Computing	
CUDA Supports	512 CUDA cores, 1.8 TFLOPS SP Peak CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, DirectX® 12, OpenGL 4.5, Vulcan 1.0
Memory	GDDR5 4GB memory, memory width: 128-bit, bandwidth: 96 GB/s
Mechanicals	
Dimensions	82 (W) x 70 (D) x 4.8 (H) mm
Locking Mechanism	Standard MXM 3.1 Type A
Environmental	
Operating Temp.	Standard: 0˚C to 55˚C, ETT: -40˚C to 85˚C
Storage Temp.	-40˚C to 85˚C
SW	
OS Support	Windows 7/10 & Linux Drivers, 64-bit

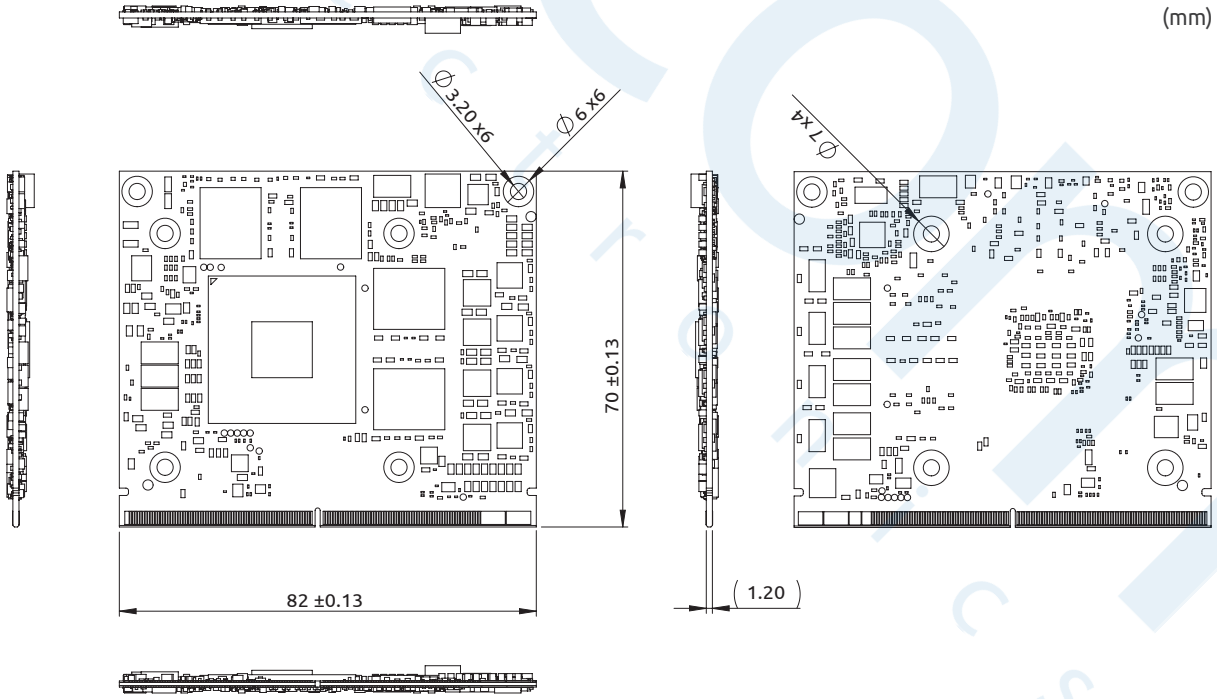
* The software and workloads used in performance tests were optimized for performance on ADLINK platforms. Performance tests are measured using specific computer systems, components, software, operations and functions. Any changes to these factors may cause the results to vary. Contact ADLINK for more complete information about performance and benchmark results.

Block Diagram



Mechanical Drawing

(mm)



EGX-MXM-P2000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P2000

Features

- MXM 3.1 Type A form factor (82 x 70 mm)
- 768 NVIDIA® CUDA® cores
- 2.3 TFLOPS SP peak performance
- 4GB GDDR5 memory
- 96GB/s maximum memory bandwidth
- Support up to 4 UHD displays, 58W TDP
- 5-year availability

Introduction

The EGX-MXM-P2000 features advanced NVIDIA Quadro GPU with NVIDIA Pascal™ Architecture technology in MXM 3.1 Type A form factor. The EGX-MXM-P2000 has 768 NVIDIA CUDA cores and a peak single-precision floating-point performance of 2.3 TFLOPS. The EGX-MXM-P2000 has 4GB of GDDR5 memory and supports NVIDIA GPUDirect™ RDMA which helps increase data throughput by up to 80% and consequently system responsiveness by up to 60%*. Additionally, 4 UHD display outputs and an extended operating temperature range of -40°C to 85°C are supported. The embedded graphics product is suitable for mission-critical harsh-environment edge computing applications with size, weight, and power (SWaP) and network connectivity constraints.

Ordering Information

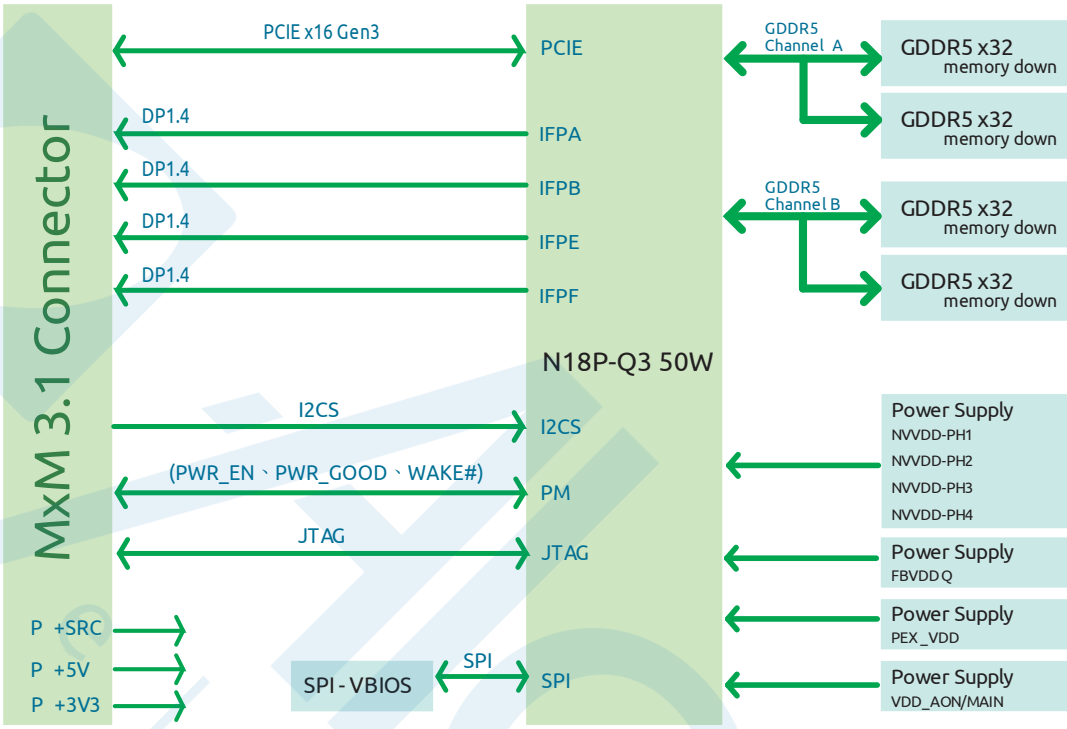
- **EGX-MXM-P2000**
  NVIDIA Quadro Embedded P2000, MXM 3.1 type A, 82 x 70mm, PCIe x16 Gen3

Specifications

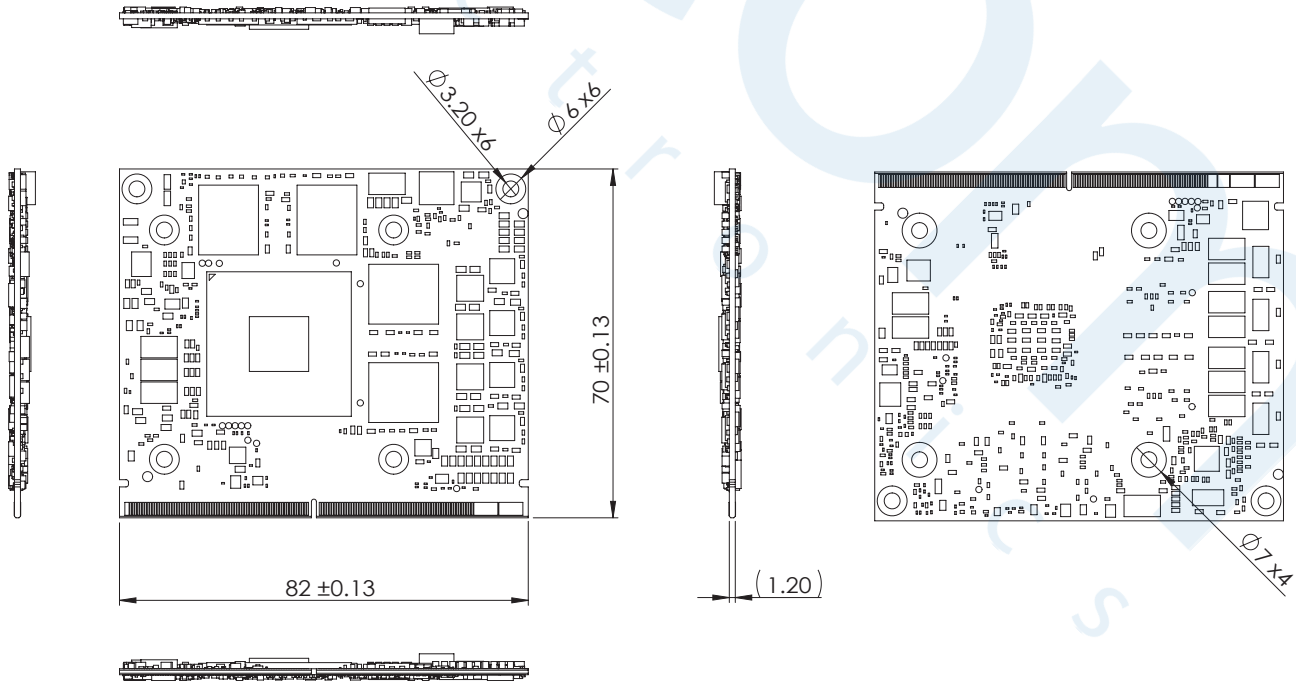
	EGX-MXM-P2000
Graphic Core	
Graphic Architecture	NVIDIA Pascal GP107
GPU	Quadro P2000
Display Outputs	4x DisplayPort 1.4 digital video outputs Support for High Dynamic Range (HDR) video 4K at 120Hz or 5K at 60Hz with 10-bit color depth
Signal Interface	MXM 3.1, PCI Express Gen3 x16 supports
GPGPU Computing	
CUDA Supports	768 CUDA cores, 2.3 TFLOPS SP Peak CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, DirectX® 12, OpenGL 4.5, Vulcan 1.0
Memory	GDDR5 4GB memory, Memory width: 128-bit, bandwidth: 96 GB/s
Mechanicals	
Dimensions	82 (W) x 70 (D) x 4.8 (H) mm
Locking Mechanism	Standard MXM 3.1 Type A
Environmental	
Operating Temp.	Standard: 0˚C to 55˚C, ETT: -40˚C to 85˚C
Storage Temp.	-40˚C to 85˚C
SW supports	
OS Support	Windows 7/10 & Linux Drivers, 64bit

* The software and workloads used in performance tests were optimized for performance on ADLINK platforms. Performance tests are measured using specific computer systems, components, software, operations and functions. Any changes to these factors may cause the results to vary. Contact ADLINK for more complete information about performance and benchmark results.

Block Diagram



Mechanical Drawing

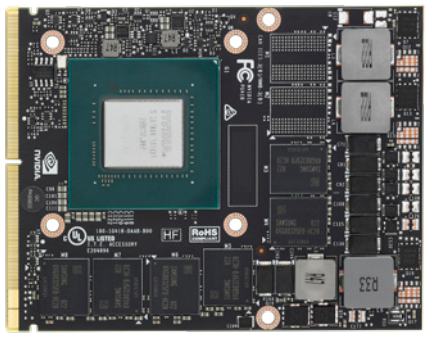


EGX-MXM-P3000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P3000

Features

- MXM 3.1 Type B form factor (82mm x 105 mm)
- 1280 CUDA cores
- 3.9 TFLOPS peak FP32 performance
- 6GB GDDR5 memory
- 168GB/s peak memory bandwidth
- Maximum power 75W
- 5-year availability



Introduction

Meeting the needs of embedded, ruggedized, and mobile system builders, the EGX-MXM-P3000 is specifically purposed to accommodate form factors incompatible with conventional PCI Express cards, and is built to maintain operations under a wide range of thermal and other environmental conditions. It's the ideal choice for blade-based and other deployments where high GPU density is critical, with a choice of GPU memory capacity, extremely reasonable power requirements, and flexible display options.

Ordering Information

- **EGX-MXM-P3000**
  NVIDIA® Quadro® Embedded P3000 , MXM 3.1 type B, 82 x 105mm, PCIe x16 Gen3
  * The product is recommended to use with PIS-5500.

Specifications

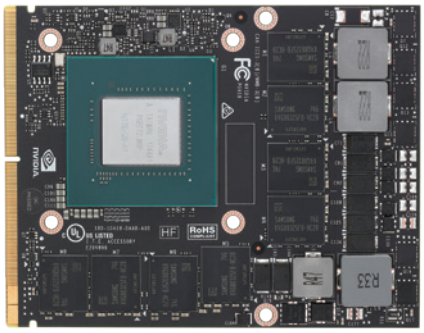
	EGX-MXM-P3000
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP104
GPU	Quadro® P3000
Display Outputs	Up to 4 display outputs 4x DisplayPort 1.4 digital video outputs (DP++), 1x HDMI, 2x DVI, 1x eDP
Signal Interface	MXM 3.1, PCI Express Gen3 x16 supports
GPGPU Computing	
CUDA Supports	1280 CUDA cores, 3.9 TFLOPS peak FP32 Performance
Memory	GDDR5 6GB memory, memory width: 192-bit, bandwidth: 168.2 GB/s
Mechanicals	
Dimensions	87 (W) x 105 (D) x 4.8 (H) mm
Locking Mechanism	Standard MXM 3.1 Type B
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 125˚C
Operating RH	5% to 90%
Storage RH	5% to 95%
Module Power Consumption	75W
SW	
OS Support	Windows 7/10 & Linux drivers, 64-bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA technology	NVIDIA® Mosaic Technology/ NVIDIA® nView® Display Management Technology

EGX-MXM-P5000

Mobile PCI Express Module with NVIDIA® Quadro® Embedded P5000

Features

- MXM 3.1 Type B form factor (82mm x 105 mm)
- 2048 CUDA cores
- 6.4 TFLOPS peak FP32 performance
- 16GB GDDR5 memory
- 192GB/s peak memory bandwidth
- Maximum power 100W
- 5-year availability



Introduction

Meeting the needs of embedded, ruggedized, and mobile system builders, the EGX-MXM-P5000 utilizes Quadro Pascal architecture to deliver superior graphics and computing performance. The EGX-MXM-P5000 is specifically purposed to accommodate form factors incompatible with conventional PCI Express cards, and is built to maintain operations under a wide range of thermal and other environmental conditions. It's the ideal choice for blade-based and other deployments where high GPU density is critical, with a choice of GPU memory capacity, extremely reasonable power requirements, and flexible display options.

Ordering Information

- **EGX-MXM-P5000**
  NVIDIA® Quadro® Embedded P5000, MXM 3.1 type B, 82 x 105mm, PCIe x16 Gen3

Specifications

	EGX-MXM-P5000
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP104
GPU	Quadro® P5000
Display Outputs	Up to 4 display outputs 4x DisplayPort 1.4 digital video outputs (DP++), 1x HDMI, 2x DVI, 1x eDP
Signal Interface	MXM 3.1, PCI Express Gen3 x16 support
GPGPU Computing	
CUDA Supports	2048 CUDA cores, 6.4 TFLOPS peak FP32 performance
Memory	GDDR5 16GB memory, memory width: 256-bit, bandwidth: 192.2GB/s
Mechanicals	
Dimensions	87 (W) x 105 (D) x 4.8 (H) mm
Locking Mechanism	Standard MXM 3.1 Type B
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 125˚C
Operating RH	5% to 90%
Storage RH	5% to 95%
Module Power Consumption	100W
SW	
OS Support	Windows 7/10 & Linux drivers, 64-bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA technology	NVIDIA® VR Ready/ NVIDIA® Mosaic Technology/ NVIDIA® nView® Display Management Technology

Quadro-E PEG P620

PCI Express Graphic Card with NVIDIA® Quadro® Embedded P620

Features

- Mini DisplayPort 1.4 x4
- DisplayPort with audio
- NVIDIA nView® Desktop Management Software
- HDCP 2.2 support
- NVIDIA Mosaic
- Dedicated hardware video encode and decode engines
- 3 (+5)†years

Introduction

Quadro-E PEG P620 combines a 512 CUDA core Pascal GPU, ample onboard memory, and advanced display technologies to deliver superior performance in a range of applications. 2GB ultrafast GPU memory enables complex 2D and 3D models, and a flexible single-slot, low-profile form factor allow compatibility with space and power-constrained chassis mounting, and display quality is maximized with support for up to four 4K displays (4096x2160 @ 60 Hz) with HDR color.

Ordering Information

- **Quadro-E PEG P620**
  NVIDIA® Quadro® Embedded P620, PCIe x16 Gen3, 4x mDP 1.4, 2.713" H x 5.7" L, single slot, low profile

* The product is recommended to use with MXC-6400, MVP-6010, MVP-6020 and MVP-6000.
† Special conditions apply.

Specifications

	Quadro-E PEG P620
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP107
GPU	Quadro® P620
Display Outputs	4x mDP 1.4, 4096x2160 @ 60Hz / 5120x2880 @ 60Hz HDCP 2.2 support * VGA/DVI/HDMI support via adapter/connector/bracket
Signal Interface	PCI Express Gen3 x16 support
GPGPU Computing	
CUDA Supports	512 CUDA cores, 1.38 TFLOPS peak FP32 performance
Memory	GDDR5 2GB memory, memory width: 128-bit, bandwidth: 80 GB/s
SW	
OS Support	Windows 7/10 & Linux Drivers, 64bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA technology	NVIDIA® Mosaic Technology/ NVIDIA® nView® Display Management Technology
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 75˚C
Operating RH	5% to 90%
Storage RH	5% to 95%
Module Power Consumption	40W
Mechanicals	
Dimensions	2.713" × 5.7", single slot
Weight	129g

Quadro-E PEG P1000

PCI Express Graphic Card with NVIDIA® Quadro® Embedded P1000

Features

- Mini DisplayPort 1.4 x4
- DisplayPort with audio
- NVIDIA nView® Desktop Management Software
- HDCP 2.2 support
- NVIDIA Mosaic
- Dedicated hardware video encode and decode engines
- 3 (+5)†years

Introduction

Quadro-E PEG P1000 combines a 640 CUDA core Pascal GPU, 4GB GDDR5 onboard memory, and advanced display technologies in a low-profile form factor to deliver the graphics performance demanded in professional application. Support for four 4K displays (4096x2160 @ 60Hz) with HDR color provides an expansive visual workspace with maximum detail.

Ordering Information

- **Quadro-E PEG P1000**
  NVIDIA® Quadro® Embedded P1000, PCIe x16 Gen3, 4x mDP 1.4, 2.713" H x 5.7" L, single slot, low profile

* The product is recommended to use with MXC-6400, MVP-6010, MVP-6020 and MVP-6000.
† Special conditions apply.

Specifications

	Quadro-E PEG P1000
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP107
GPU	Quadro® P1000
Display Outputs	4x mDP 1.4, 4096x2160 @ 60Hz / 5120x2880 @ 60Hz HDCP 2.2 support * VGA/DVI/HDMI support via adapter/connector/bracket
Signal Interface	PCI Express Gen3 x16 support
GPGPU Computing	
CUDA Supports	640 CUDA cores, 1.89 TFLOPS peak FP32 performance
Memory	GDDR5 4GB memory, memory width: 128-bit, bandwidth: 80 GB/s
SW	
OS Support	Windows 7/10 & Linux Drivers, 64-bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA technology	NVIDIA® Mosaic Technology/NVIDIA® nView® Display Management Technology
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 75˚C
Operating RH	5% to 90%
Storage RH	5% to 95%
Module Power Consumption	47W
Mechanicals	
Dimensions	2.713" × 5.7", single slot
Weight	129g

Quadro-E PEG P2200

PCI Express Graphic Card with NVIDIA® Quadro® P2200

Features

- DisplayPort 1.4 x4
- DisplayPort with audio
- NVIDIA nView® Desktop Management Software
- HDCP 2.2 support
- NVIDIA Mosaic
- NVIDIA Iray and MentalRay support

Introduction

The Quadro-E PEG P2200 perfectly balances performance, features, and compact form factor to deliver exceptional creative experience and productivity across a variety of 3D applications. The Pascal GPU with 1280 CUDA cores, 5GB GDDR5 onboard memory and support for up to four 5K (5120x2880 @ 60Hz) native displays accelerate product development and creation workflow demanding fluid interactivity for large, complex 3D workpieces.

Ordering Information

- **Quadro-E PEG P2200**
  NVIDIA® Quadro® P2200, PCIe x16 Gen3, 4x DP 1.4,
  4.4" H x 7.9" L, single slot
  * The product is sold with ADLINK platforms. Recommended models are AMITX-SL, IMB-M43H, IMB-M43-C236, IMB-M43, and NuPRO-E43 paired with
  EBP-13E2.

Specifications

	Quadro-E PEG P2200
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP106
GPU	Quadro® P2200
Display Outputs	4x DP 1.4, 4096x2160 @ 60Hz / 5120x2880 @ 60Hz HDCP 2.2 Support * VGA/DVI/HDMI support via adapter/connector/bracket
Signal Interface	PCI Express Gen3 x16 support
GPGPU Computing	
CUDA Support	1280 CUDA cores, 3.8 TFLOPS peak FP32 performance
Memory	GDDR5 5GB memory, memory width: 160-bit, bandwidth up to: 200 GB/s
SW	
OS Support	Windows 7/10 & Linux drivers, 64-bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA Technology	NVIDIA® Mosaic Technology/ NVIDIA® nView® Display Management Technology
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 75˚C
Operating RH	5% to 95%
Storage RH	5% to 95%
Module Power Consumption	75W
Mechanicals	
Dimensions	4.4" H x 7.9" L, single slot
Weight	256g

Quadro-E PEG P4000

PCI Express Graphic Card with NVIDIA® Quadro® P4000

Features

- DisplayPort 1.4 x4
- DisplayPort with audio
- NVIDIA nView® Desktop Management Software
- HDCP 2.2 support
- NVIDIA Mosaic
- NVIDIA Iray and MentalRay support
- 3 (+5)† years

Introduction

The Quadro-E PEG P4000 perfectly balances performance, features, and compact form factor to deliver exceptional creative experience and productivity across a variety of 3D applications. The Pascal GPU with 1792 CUDA cores, 8GB GDDR5 onboard memory and support for up to four 8K (7680×4320 @ 60 Hz) native displays accelerate product development and creation workflow demanding fluid interactivity for large, complex 3D workpieces.

Ordering Information

- **Quadro-E PEG P4000**
  NVIDIA® Quadro® P4000, PCIe x16 Gen3, 4x DP 1.4,
  4.4" H x 9.5" L, single slot

* The product is sold with ADLINK platforms. Recommended models are AMITX-SL, IMB-M43H, IMB-M43-C236, IMB-M43, and NuPRO-E43 paired with EBP-13E2.
† Special conditions apply.

Specifications

	Quadro-E PEG P4000
Graphic Core	
Graphic Architecture	NVIDIA® Pascal™ GP104
GPU	Quadro® P4000
Display Outputs	4x DP 1.4, 7680×4320 @120 Hz/7680×4320 @ 60 Hz/5120×2880 @ 60 Hz HDCP 2.2 support * VGA/DVI/HDMI support via adapter/connector/bracket
Signal Interface	PCI Express Gen3 x16 support
GPGPU Computing	
CUDA Supports	1792 CUDA cores 5.3 TFLOPS peak FP32 performance
Memory	GDDR5 8GB memory Memory width: 256-bit Bandwidth: up to 243 GB/s
SW	
OS Support	Windows® 7/10 & Linux drivers, 64-bit
Graphic API	DirectX® 12, OpenGL 4.5, Vulkan 1.0 Shader Model 5.1
Compute API	CUDA Toolkit 8.0, CUDA Compute version 6.1 OpenCL™ 1.2, Direct Compute
NVIDIA Technology	NVIDIA® Mosaic Technology/ NVIDIA® nView® Display Management Technology
Environmental	
Operating Temp.	0 to 55˚C
Storage Temp.	-40˚C to 75˚C
Operating RH	5% to 90%
Storage RH	5% to 95%
Module Power Consumption	105W
Mechanicals	
Dimensions	4.4" H x 9.5" L, single slot
Weight	475g

MVP-5100-MXM Series

Value Family 9th Gen Intel® Core™ i7/i5/i3® Processor-Based Embedded GPU/AI Platforms

Features

- 9th Gen Intel® Core™ i7/i5/i3 LGA processor
- Dual SODIMMs sockets for up to 32GB DDR4
- Abundant I/O:
  - Up to 4x additional DP 1.4 from MXM
  - 2x DP++, DVI, VGA, 3x GbE, 3x COM, TPM2.0
  - 3x USB 3.1 Gen 1, 3x USB 2.0
- Rich storage options: 2x 2.5" SATA, M.2 2280
- Front accessible I/O and adaptive Function Module 2.0 options
- Embedded slots for Mini PCIe, M.2 3042, 2x USIM
- World leading embedded GP/GPU computing options built-in

NVIDIA QUADRO CERTIFIED
EMBEDDED

Software Support

- **Windows 10 IoT Enterprise CBB/LTSB 64-bit**
- **Linux Ubuntu18.04 LTS**

Optional Accessories

- **Factory Installed 2.5" SSD/HDD/M.2 Storage**
- **Wireless Mini PCIe/M.2 Module**
  Wi-Fi/ BT/ 3G/ 4G LTE/ LoRa wireless kit (w/ antenna)
- **AC/DC Adapter**
  220W (P/N: 31-62149-0000)
  280W (P/N: 91-95263-0010)

Ordering Information

Model	CPU	Memory
MVP-510A-MXM/M4G/[GPU]	Intel® Core™ i7-9700E	4GB non-ECC DDR4
MVP-5101-MXM/M4G/[GPU]	Intel® Core™ i7-9700TE	4GB non-ECC DDR4
MVP-5102-MXM/M4G/[GPU]	Intel® Core™ i5-9500TE	4GB non-ECC DDR4
MVP-5103-MXM/M4G/[GPU]	Intel® Core™ i3-9100TE	4GB non-ECC DDR4

GPU Options

Model	GPU	Power	CUDA® Cores	Graphics Memory
EGX-MXM-P1000	NVIDIA® Quadro® Embedded P1000	47W	512	GDDR5 4GB
EGX-MXM-P2000	NVIDIA® Quadro® Embedded P2000	58W	768	GDDR5 4GB
EGX-MXM-P3000	NVIDIA® Quadro® Embedded P3000	75W	1280	GDDR5 6GB
EGX-MXM-P5000	NVIDIA® Quadro® Embedded P5000	100W	2048	GDDR5 16GB

Specifications

Model Name	MVP-510A-MXM	MVP-5101-MXM	MVP-5102-MXM	MVP-5103-MXM
System Core				
Processor	Intel® Core™ i7-9700E	Intel® Core™ i7-9700TE	Intel® Core™ i5-9500TE	Intel® Core™ i3-9100TE
TDP	65 W	35 W	35 W	35 W
# of Cores	8	8	6	4
Base Frequency	2.6 GHz	1.8 GHz	2.2 GHz	2.2 GHz
Max Turbo Frequency	4.4 GHz	3.8 GHz	3.6 GHz	3.2 GHz
Chipset	Intel® H310 (Optional: C246)			
Memory	4GB DDR4 non-ECC 2400 MHz, dual SODIMMs, up to 32GB (Optional: 8/16/32GB ECC, only for Intel Core i3 w/ C246)			
I/O Interface				
Graphics	Dual independent displays: 2x DP++ 1.2/ 1x DVI-D/VGA (3 independent ones w/ C246) Extra 4x DP 1.4 powered by MXM P1000/P2000 or 3x DP 1.4 powered by MXM P3000/P5000			
Ethernet	3x Intel® GbE: i219 + 2x i211AT (support Intel AMT/vPro w/ C246)			
Serial Ports	COM1/2: RS-232/422/485, COM3: RS-232			
USB	3x USB 3.1 Gen 1, 3x USB 2.0, 1x internal USB2.0 dongle (2x USB 3.1 up to Gen 2 w/ C246)			
M.2	1x socket 2, key B+M or B, 2280/3042 (USB3.1 + SATA III + PCIex1. Up to PCIex2 w/ C246)			
Mini PCIe	1x Full size (USB 2.0, PCIe)			
USIM	2			
I^2C	2 (3.3V/5V)			
TPM	TPM 2.0			
Storage Device				
2.5" SATA	2x internal (support RAID 0/1 w/ C246)			
Mechanical				
Dimensions	125 (W) x 240 (D) x 210 (H) mm (4.92" x 9.45" x 8.27")			
Cooling	Fanless passive cooling			
Weight	6.5 kg (14.4 lbs)			
Mounting	Wall mount			
Power Supply				
DC Input	12 to 24V			
AC Input	Optional 220W or 280W AC/DC adapter			
Environmental				
Operating Temperature	Standard: 0°C to 45°C, w/ air flow Extended: -20°C to 45°C (w/ air flow & Ind. storage)	Standard: 0°C to 50°C, w/ air flow Extended: -20°C to 60°C (w/ Ind. storage)		
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excl. storage)			
Humidity	~95% @ 40°C (non-condensing)			
Vibration	Operating: 3 Grms, 5-500 Hz, 3 axes (w/ 2.5" SSD/CFast))			
Shock	Operating: 50 G, half sine 11ms duration (w/ 2.5" SSD)			
ESD	Contact 4kV, Air 8kV			
EMC	EN61000-6-4/-2, CE, FCC Class A			
Safety	UL/cUL, CB			

MVP-6100-MXM Series

Value Family 9th Gen Intel® Xeon®/Core™ i7/i5/i3® Processor-Based Expandable GPU Workstation Platforms

Features

- 9th Gen Intel® Xeon®/Core™ i7/i5/i3 LGA processor
- Dual SODIMMs sockets for up to 32GB DDR4 non-ECC/ECC
- Abundant I/O:
  - Up to 4x additional DP 1.4 from MXM
  - 2x DP++, DVI, VGA, 3x GbE, 3x COM, TPM2.0
  - 2x USB 3.1 Gen 2, 1x USB 3.1 Gen 1, 3x USB 2.0
- Rich storage options: up to 4x 2.5" SATA, M.2 2280
- Front accessible I/O and adaptive Function Module 2.0 options
- Flexible functionality expansion:
  - Expansion slots for standard PCIe and PCI card
  - Embedded slots for Mini PCIe, M.2 3042, 2x USIM
- World leading embedded GP/GPU computing options built-in

Software Support

- **Windows 10 IoT Enterprise CBB/LTSB 64-bit**
- **Linux Ubuntu 18.04 LTS**

Optional Accessories

- **Factory Installed 2.5" SSD/HDD/M.2 Storage**
- **Optional 2x 2.5" SATA Kit**
  Includes cables and bracket
- **Wireless Mini PCIe/M.2 Module**
  Wi-Fi/ BT/ 3G/ 4G LTE/ LoRa wireless kit (w/ antenna)
- **AC/DC Adapter**
  220W (P/N: 31-62149-0000)
  280W (P/N: 91-95263-0010)

Ordering Information

Model	CPU	Expansion Slots
MVP-612X-MXM-1E/M4G/[GPU]	Intel® Xeon® E-2278GE	1 PCIe x4
MVP-612A-MXM-1E/M4G/[GPU]	Intel® Core™ i7-9700E	1 PCIe x4
MVP-6121-MXM-1E/M4G/[GPU]	Intel® Core™ i7-9700TE	1 PCIe x4
MVP-6122-MXM-1E/M4G/[GPU]	Intel® Core™ i5-9500TE	1 PCIe x4
MVP-6123-MXM-1E/M4G/[GPU]	Intel® Core™ i3-9100TE	1 PCIe x4
MVP-614X-MXM-2E/M4G/[GPU]	Intel® Xeon® E-2278GE	2 PCIe x4, 1 PCI
MVP-614A-MXM-2E/M4G/[GPU]	Intel® Core™ i7-9700E	2 PCIe x4, 1 PCI
MVP-6141-MXM-2E/M4G/[GPU]	Intel® Core™ i7-9700TE	2 PCIe x4, 1 PCI
MVP-6142-MXM-2E/M4G/[GPU]	Intel® Core™ i5-9500TE	2 PCIe x4, 1 PCI
MVP-6143-MXM-2E/M4G/[GPU]	Intel® Core™ i3-9100TE	2 PCIe x4, 1 PCI

GPU Options

Model	GPU	Power	CUDA® Cores	Graphics Memory
EGX-MXM-P1000	NVIDIA® Quadro® Embedded P1000	47W	512	GDDR5 4GB
EGX-MXM-P2000	NVIDIA® Quadro® Embedded P2000	58W	768	GDDR5 4GB
EGX-MXM-P3000	NVIDIA® Quadro® Embedded P3000	75W	1280	GDDR5 6GB
EGX-MXM-P5000	NVIDIA® Quadro® Embedded P5000	100W	2048	GDDR5 16GB

Specifications

Model Name	MVP-610X-MXM	MVP-610A-MXM	MVP-6101-MXM	MVP-6102-MXM	MVP-6103-MXM
System Core					
Processor	Intel® Xeon® E-2278GE	Intel® Core™ i7-9700E	Intel® Core™ i7-9700TE	Intel® Core™ i5-9500TE	Intel® Core™ i3-9100TE
TDP	80 W	65 W	35 W	35 W	35 W
# of Cores	8	8	8	6	4
Base Frequency	3.3 GHz	2.6 GHz	1.8 GHz	2.2 GHz	2.2 GHz
Max Turbo Frequency	4.7 GHz	4.4 GHz	3.8 GHz	3.6 GHz	3.2 GHz
Chipset	Intel® C246				
Memory	4GB DDR4 non-ECC 2400 MHz, dual SODIMMs, up to 32GB (Optional: 8, 16, 32GB ECC, only for Intel® Xeon®/Core™ i3)				
I/O Interface					
Graphics	3 independent displays: 2x DP++ 1.2/ 1x DVI-D/VGA Extra 4x DP 1.4 powered by MXM P1000/P2000 or 3x DP 1.4 powered by MXM P3000/P5000				
Ethernet	3x Intel® GbE(2x i211AT, 1x i219) w/ iAMT/vPro support				
Serial Ports	COM1/2: RS-232/422/485, COM3: RS-232				
USB	2x USB 3.1 Gen 2, 1x USB 3.1 Gen 1, 3x USB 2.0, 1x internal USB2.0 dongle				
I2C	2 (3.3V/5V)				
TPM	TPM 2.0				
M.2	1x socket 2, key B+M or B, 2280/3042 (USB3.1 + SATA III + PCIe x2)				
Mini PCIe	1x Full size (USB 2.0, PCIe)				
USIM	2				
Expansion Slots	MVP-6120-MXM: 1 PCIe x4 MVP-6140-MXM: 2 PCIe x4, 1 PCI				
Storage Device					
2.5" SATA	2 (extra 2 by optional kit), support RAID 0/1/5/10				
Mechanical					
Dimensions	MVP-6120-MXM: 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") MVP-6140-MXM: 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27")				
Cooling	System/MXM: Active fan cooling				
Weight	MVP-6120-MXM: 6.0 kg (13.2 lbs) MVP-6140-MXM: 6.4 kg (14.0 lbs)				
Mounting	Wall mount				
Power Supply					
DC Input	12 to 24V				
AC Input	220W or 280W AC/DC adapter (optional)				
Environmental					
Operating Temperature	Standard: (w/ air flow)				
	0°C to 40°C (35°C for P5000)	0°C to 50°C			
	Extended: (w/ air flow & ind. storage)				
	-20°C to 40°C (35°C for P5000)	-20°C to 50°C	-20°C to 60°C		
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excl. storage)				
Humidity	~95% @ 40°C (non-condensing)				
Vibration	Operating: 2 Grms, 5-500 Hz, 3 axes (w/ 2.5" SSD/CFast) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)				
Shock	Operating: 50 G, half sine 11ms duration (w/ 2.5" SSD)				
ESD	Contact 4kV, Air 8kV				
EMC	EN61000-6-4/-2, CE, FCC Class A				
Safety	UL/cUL, CB				

DLAP-3000-CFL Series

Embedded System supporting MXM Graphics Module with 8th/9th Generation Intel® Core™ i7/i5/i3 in LGA1151 Socket

Preliminary

Features

- ADLINK MXM Graphics module support (Type A/B, up to 120W)
- 8th/9th Gen Intel® Core™ i7/i5/i3, Celeron® processor
- Dual SODIMMs for up to 64GB DDR4 non-ECC memory (dependent on CPU)
- DisplayPort (2 from CPU, 4 from MXM)
- 1x M.2 E key supporting 1630 or 2230 for Wi-Fi/Bluetooth module, 1x M.2 B key supporting 2242 or 2280 for SATA storage module
- Reliable Molex type 12V DC-in connector

Software Support

- **Windows 10 IoT Enterprise CBB 64-bit**
- **Ubuntu 16.04 LTS**

Optional Accessories

- **2.5" SATA SSD/HDD, M.2 Storage**
- **Wireless Module**
  Wi-Fi/Bluetooth/4G LTE wireless kit (w/ antenna)
- **240W AC/DC Adapter**

Ordering Information

Model	MXM Support	Chipset	DC-in
DLAP-3000-CFP1	EGX-MXM-P1000	H310	12V
DLAP-3000-CFP2	EGX-MXM-P2000	H310	12V
DLAP-3000-CFP12	EGX-MXM-P1000/2000 (not incl.)	H310	12V
DLAP-3000-CFP3	EGX-MXM-P3000	H310	12V
DLAP-3000-CFP5	EGX-MXM-P5000	H310	12V
DLAP-3000-CFP35	EGX-MXM-P3000/5000 (not incl.)	H310	12V

Specifications

Model	DLAP-3000-CFP1	DLAP-3000-CFP2	DLAP-3000-CFP3	DLAP-3000-CFP5
	DLAP-3000-CFP12*		DLAP-3000-CFP35*	
MXM Support	EGX-MXM-P1000	EGX-MXM-P2000	EGX-MXM-P3000	EGX-MXM-P5000
Processor	Intel® Core™ i7-9700TE, 1.8GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/2T)			
Chipset	Intel® H310 Chipset			
Memory	Non-ECC DDR4 2666/2400MHz, 2x SO-DIMM, up to 64GB (dependent on CPU) system memory			
I/O Interfaces				
Display	6x DisplayPort (2 from CPU, 4 from MXM)			
Ethernet	1x GbE (Intel® i219-LM), 3x GbE (Intel® i210-AT)			
Serial Ports	1x RS-232/422/485, 1x RS-232			
USB	4x USB 3.1 Gen1 ports, 4x USB 2.0 ports			
M.2	1x M.2 E key supporting 1630 or 2230 for Wi-Fi/BT module, 1x M.2 B key supporting 2242 or 2280 for SATA storage module			
Digital IO	Default: w/o DIO Option: 1x DI/DO with 4 in, 4 out, one ground pin , and one power pin (no power/5V/12V, 0.5A by BIOS selection)			
Audio	Default: w/o Audio Option 1: Mic-in, Line-out, Line-in Option 2: Mic-in, L/R speaker-out (6W + 6W) Option 3: Line-in, L/R speaker-out (6W + 6W)			
TPM 2.0	Optional			
eSIM	Optional			
Storage				
SATA	2x 2.5" SATA 6Gb/s external drive bays 1x SATA 6Gb/s signal via M.2 B key connector			
Mechanical				
Dimensions	235 x 182 x 75mm (W x D x H)			
Mounting	Optional wall-mount bracket			
Power Supply				
DC Input	DC 12V input (Molex DC-in jack)			
AC Input	Optional: 240W (12V/20A) AC/DC adapter			
Environmental				
Operating Temperature	0°C to 50°C (W/MXM, W/SSD)			
Storage Temperature	-20°C to 60°C			
Humidity	10% to 90%, non-condensing			
EMC	EN55032/EN55024			
Safety	UL/cUL, CB, CCC			

*Note: These models do not include an MXM graphics module.

DLAP-4000 Series

Embedded System supporting FHFL dual-width PEG slot with 8th/9th Generation Intel® Core™ i7/i5/i3 in LGA1151 Socket

Preliminary

Features

- NVIDIA® Quadro® PEG card support
- 8th/9th Gen Intel® Core™ i7/i5/i3 processor
- Dual SODIMMs for up to 32GB DDR4 non-ECC memory (dependent on CPU)
- 1x DVI, 1x HDMI, 1x DP (from CPU), additional display outputs from PEG cards
- 1x Mini PCIe slot for Wi-Fi/Bluetooth or LTE module, 1x M.2 M key supporting 2280 SATA SSD module
- 300W/400W/500W Flex ATX PSU

Software Support

- **Windows 10 IoT Enterprise CBB 64-bit**
- **Ubuntu 16.04 LTS**

Optional Accessories

- **3.5" SATA HDD, 2.5" SATA SSD/HDD, M.2 2280 SATA SSD**
- **Wireless Module**
  Wi-Fi/Bluetooth or 4G LTE wireless kit (w/ antenna)

Ordering Information

Model	CPU	Memory
DLAP-4001/M8G/[PEG]	Intel® Core™ i7-9700E	8GB non-ECC DDR4
DLAP-4002/M8G/[PEG]	Intel® Core™ i5-9500E	8GB non-ECC DDR4
DLAP-4003/M8G/[PEG]	Intel® Core™ i3-9100E	8GB non-ECC DDR4
DLAP-4004/M8G/[PEG]	Intel® Core™ i7-9700TE	8GB non-ECC DDR4
DLAP-4005/M8G/[PEG]	Intel® Core™ i5-9500TE	8GB non-ECC DDR4
DLAP-4006/M8G/[PEG]	Intel® Core™ i3-9100TE	8GB non-ECC DDR4
DLAP-4007/M8G/[PEG]	Intel® Core™ i7-8700	8GB non-ECC DDR4
DLAP-4008/M8G/[PEG]	Intel® Core™ i5-8500	8GB non-ECC DDR4
DLAP-4009/M8G/[PEG]	Intel® Core™ i3-8100	8GB non-ECC DDR4
DLAP-400A/M8G/[PEG]	Intel® Core™ i7-8700T	8GB non-ECC DDR4
DLAP-400B/M8G/[PEG]	Intel® Core™ i5-8500T	8GB non-ECC DDR4
DLAP-400C/M8G/[PEG]	Intel® Core™ i3-8100T	8GB non-ECC DDR4

PEG Card Options

PEG	Model	Power	CUDA® Cores	Graphics Memory
P2200	NVIDIA® Quadro® P2200	75W	1280	GDDR5 5GB
P4000	NVIDIA® Quadro® P4000	105W	1792	GDDR5 8GB
P5000	NVIDIA® Quadro® P5000	180W	2560	GDDR5 16GB
RTX4000	NVIDIA® Quadro® RTX 4000	160W	2304	GDDR6 8GB
RTX5000	NVIDIA® Quadro® RTX 5000	265W	3072	GDDR6 16GB
RTX6000	NVIDIA® Quadro® RTX 6000	295W	4608	GDDR6 24GB
RTX8000	NVIDIA® Quadro® RTX 8000	295W	4608	GDDR6 48 GB

Specifications

Model	DLAP-4000						
Processor	Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i5-9500E, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-9100E, 3.1GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (4C/4T) Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i5-9500TE, 2.2GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-9100TE, 2.2GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (4C/4T) Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T)						
Chipset	Intel® H310 Chipset						
Memory	Non-ECC DDR4 2666/2400MHz, 2x SO-DIMM, up to 32GB (dependent on CPU) system memory						
PEG Card Support	NVIDIA® Quadro® P2200	NVIDIA® Quadro® P4000	NVIDIA® Quadro® P5000	NVIDIA® Quadro® RTX 4000	NVIDIA® Quadro® RTX 5000	NVIDIA® Quadro® RTX 6000	NVIDIA® Quadro® RTX 8000
I/O Interfaces							
Display	1x DVI, 1x HDMI, 1x DP (from CPU), additional display outputs from PEG cards						
Ethernet	2x GbE (Realtek RTL8111G)						
Serial Ports	1x RS-232/422/485, 4x RS-232						
USB	4x USB 3.1 Gen1 ports, 2x USB 2.0 ports						
M.2	1x Mini PCIe slot for Wi-Fi/Bluetooth or LTE module 1x M.2 M key supporting 2280 SATA SSD modules						
Audio	Mic-in, Line-out, Line-in						
TPM 2.0	Optional						
Storage							
SATA	2x 2.5" SATA 6Gb/s internal drive bays 1x SATA 6Gb/s signal via M.2 M key slot						
Mechanical							
Dimensions	220 x 300 x 150 mm (W x D x H)						
Power Supply							
AC Input	100 to 240 VAC						
Output Rating	300W	300W	400W	400W	500W	500W	500W
Environmental							
Operating Temperature	0°C to 50°C	0°C to 50°C	0°C to 40°C	0°C to 50°C	0°C to 40°C	0°C to 40°C	0°C to 40°C
Storage Temperature	-20°C to 60°C						
Humidity	5% to 90%, non-condensing						
EMC	EN55032/EN55035						
Safety	UL/cUL, CB, CCC						

ADi-SC1X

High-Performance Gaming Platform
Fully Modular Slot-In Platform with Backplane Architecture
Supports up to Eight Independent 4K/UHD Displays

Features

- Flexible platform selection: 6th Gen. and later Intel® Core™ CPU and AMD Ryzen™ APU with COMe support
- Flexible maintenance and upgrade: slot-in/backplane design, CPU COMe module, GPU MXM module
- Full-scale customization options: GDDR5, V-BIOS, video ports, I/O ports, etc.
- High level of integration: FPGA & logging controller onboard

Introduction

ADLINK's ADi-SC1X gaming platform with backplane architecture features a wide range of powerful processing and graphics options for gaming applications.

Equipped with a COM Express Type 6 interface and an MXM Type B slot, ADi-SC1X provides superior scalability for all possible use cases and performance requirements.

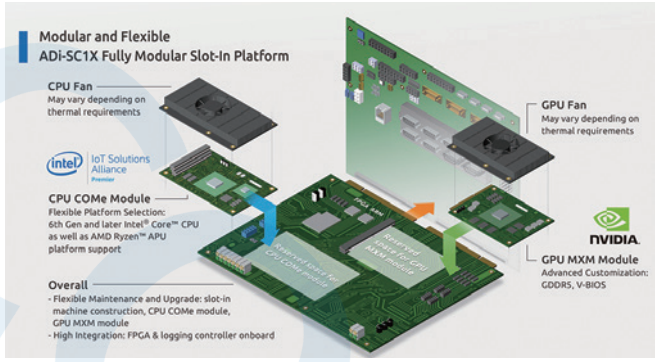
With the powerful processing performance, advanced security functions, smart middleware solutions, and versatile I/O array, ADi-SC1X fully satisfies the needs of gaming applications.

The platform is designed to meet the GLI-11 (Gaming Laboratories International) certification and all major global gaming market compliance requirements. The comprehensive middleware as well as the security and extensive I/O solutions enable developers to easily bridge applications with peripheral devices, sensors, and surrounding solutions up to central monitoring and control systems.

High Scalability and Ideal Range of Performance Class
ADi-SC1X is designed with highly scalable and reliable hardware that can be flexibly scaled from entry level up to the highest performance class, with tailored configuration of COMe CPU and MXM GPU selections.

Multi-Display Graphics Capabilities
ADi-SC1X provides support for up to 4K resolutions and is capable of supporting dedicated graphics cards for up to eight independent monitors that conform to the latest DisplayPort 1.2 standard.

Advanced Security and NVRAM PCI Express for Gaming Designed to Meet GLI-11
High-speed PCI Express card with up to 64 MB NVRAM. It offers a crypto and authentication security chip with power-off monitoring and event logging designed to meet the GLI-11 (Gaming Laboratories International) certification requirements. Further features are also available, such as TPM1.2 trusted platform module or custom secure BIOS options.



Ordering Information

- **ADi-SC1Xxxxxx**
- **ADi-SA2X-KB-BAAS (call for availability)**

*Other configurations on request

Options

- **ADiAPI**
  Intelligent middleware used for controlling peripheral devices

Optional Accessories

- **ADi-BSEC cable**
- **Box PC cable kit**
- **ADi-BSDK board**
- **ADi-BSDK board cable kit**

Specifications

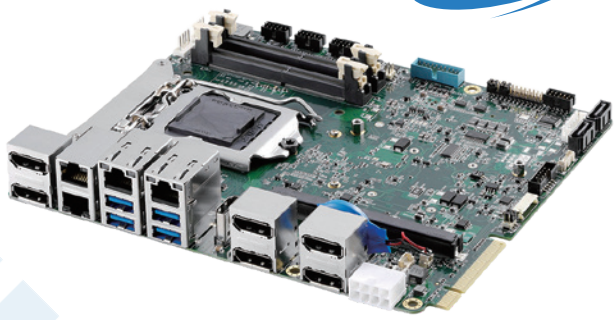
Model Name	ADi-SC1X (preliminary data subject to change)
Core System	
Processor	COM Express Type 6 up to 65W
Chipset	Dependent on COM Express module
BIOS	Socketed dual AMI uEFI-based BIOS on with Intel® AMT 11.0 support; onboard BIOS socket and SPI header
Expansion Slot	1x M.2 / 1x MXM Type B
Memory	Dual-channel, non-ECC 1333/1600/2133 MHz DDR4/DDR3L memory up to 32 GB in dual vertical SODIMM sockets
Graphics Card	Integrated graphics dependent on COM Express module
	NVIDIA Quadro® P1000 embedded MXM
	Various other MXM options
Storage	3x SATA 6Gb/s (onboard)
	2x HDD/SSD/CFast
	Flexible, field-removable 2.5" drive bay on front panel
	Up to 3x SATADOM support
	1x M.2 (M Key, Socket 3 type)
	3x EEPROM storage support (1x with 3.3V/5V support)
I/O Interfaces	
Ethernet	2x GbE ports (10/100/1000 GbE connection)
Serial Ports	2x RS232/422/485/TTL; 4x RS232; 2x RS232/TTL; 2x RS232/CCTALK
Audio Interface	7.1 channel audio via 5 jacks and S/PDIF output on rear I/O; 7.1 channel audio signals and S/PDIF output via internal header; optional 2.1 Class D amplifier
USB	8 x USB on backplane (USB 2.0/3.0 distribution dependent on chipset)
	2x USB 3.0 on front panel
	2x USB 2.0/3.0 on internal vertical connector
DisplayPort	Up to 4x COMe DP outputs dependent on COM Express module
	4x MXM card DP outputs (optional)
Other	SPI, 1-Wire, I²C, removable EEPROM modules
Gaming-Specific Features and Security	
	NVRAM up to 4x 8MB (battery-buffered)
	Intrusion detection
	Event logging processor (battery-buffered)
	3x high-current outputs
	24 x open drain /40V LED drivers
	32x digital inputs / 32x digital outputs
	8x independent current-sensed hardmeter support
	Key lock, eyelet for sealing, TPM, GLI covers, dedicated security ICs, secure key storage, SHA and AES support
	Fully customizable secure BIOS
Power Supply	
	12V or 24V input (optional)
Mechanical	
Dimensions	292mm (W) x 255mm (D) x 230mm (H)
Operating System Support	
	Windows® 32/64-bit, Linux 32/64-bit (optional)
Environmental & Safety	
Operating Temp.	0°C to 50°C (32°F to 122°F)
Storage Temp.	-20°C to 70°C (-4°F to 158°F) (excl. HDD/SSD/CFast)
Humidity	~ 85% @ 50°C (122°F) (non-condensing)
Shock	Operating, 20 G, half sine 11 ms duration (w/ CFast or SSD)
EMC	CE and FCC Class A
ESD	Contact +/-4 KV and Air +/-8 KV
Safety	UL/cUL, CB, KCC

AMSTX-CF Series

Embedded Motherboard supporting MXM Graphics Module with 8th/9th Generation Intel® Core™ i7/i5/i3 in LGA1151 Socket

Features

Preliminary



- ADLINK MXM Graphics module support (Type A/B, up to 120W)
- 8th/9th Gen Intel® Core™ i7/i5/i3, Celeron® processor
- Dual SODIMMs for up to 64GB DDR4 non-ECC memory (CPU dependent)
- 6 x DisplayPort (2 from CPU, 4 from MXM). one internal HDMI (vertical connector from CPU), LVDS optional
- 1x M.2 E key supporting 1630 or 2230 for wireless LAN / Bluetooth module, 1x M.2 B key supporting 2242 or 2280 for SATA storage module, 1x M.2 M key supporting 2242 or 2280 for SATA/PCIe x4 storage module (not supported by H310 Chipset)
- Reliable Molex type 12V DC-in connector

Software Support

- **Windows 10 IoT Enterprise CBB 64-bit**
- **Ubuntu 16.04 LTS**

Optional Accessories

- **2.5" SATA SSD/HDD, M.2 Storage**
- **Wireless Module**
  Wi-Fi/Bluetooth/4G LTE wireless kit (w/ antenna)
- **240W AC/DC Adapter**

Ordering Information

Model	MXM Support	Chipset	DC-in
AMSTX-CFP12-Q370	EGX-MXM-P1000/P2000	Q370	12V
AMSTX-CFP35-Q370	EGX-MXM-P3000/P5000	Q370	12V
AMSTX-CFP12-H310	EGX-MXM-P1000/P2000	H310	12V
AMSTX-CFP35-H310	EGX-MXM-P3000/P5000	H310	12V

Specifications

Model	AMSTX-CFP12-Q370	AMSTX-CFP35-Q370	AMSTX-CFP12-H310	AMSTX-CFP35-H310
MXM Support	EGX-MXM-P1000/P2000	EGX-MXM-P3000/P5000	EGX-MXM-P1000/P2000	EGX-MXM-P3000/P5000
Processor	Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T) Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T) Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T) Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T) Intel® Celeron® G4900, 3.1GHz, 2M Cache, 54W TDP, LGA1151, DDR4 2400MHz support (2C/2T) Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/2T)			
Chipset	Intel® Q370 Chipset		Intel® H310 Chipset	
Memory	Non-ECC DDR4 2666/2400MHz, 2x SO-DIMM, up to 64GB system memory (CPU dependent)			
I/O Interfaces				
Display	6x DisplayPort (2 from CPU, 4 from MXM). One internal HDMI (vertical connector from CPU), LVDS optional			
Ethernet	1x GbE (Intel® i219-LM), 3x GbE (Intel® i210-AT)			
Serial Ports	1x RS-232/422/485 pin header, 1x RS-232 pin header (CCtalk supported by jumper setting)			
USB	4x USB 3.1 Gen1 ports, 2x USB 2.0 pin headers, 2x USB 3.1 Gen1 pin headers		4x USB 3.1 Gen1 ports, 4x USB 2.0 pin headers	
Audio	Default: One 10-pin wafer(box header) for Mic-in/Line out/Line in Optional 1: Mic in /(6W speaker_out_L+6W speaker_out_R. (on board 10-pin wafer. Connector via additional audio module) Optional 2: Line in /(6W speaker_out_L+6W speaker_out_R. (on board 10-pin wafer. Connector via additional audio module)			
M.2	1x M.2 E key supporting 1630 or 2230 for Wi-Fi/ BT module, 1x M.2 B key supporting 2242 or 2280 for SATA storage module, 1x M.2 M key supporting 2242 or 2280 for SATA/PCIe x4 storage module		1x M.2 E key supporting 1630 or 2230 for Wi-Fi / BT module, 1x M.2 B key supporting 2242 or 2280 for SATA storage module	
PCB Edge Connector	1x PCIe x8 Gen2 PCB edge connector (data is from 2x PCIe x4 root ports, one set of clocks, up to 50W), one PCIe power connector up to 12V @3.5A		PCIe x1 Gen2 signals (up to 50W), one PCIe power connector up to 12V @3.5A	
Digital I/O	One 1x 10-pin/2.0mm wafer: DI/DO: 4 in and 4 out, one ground pin, one power pin (no power/5V/12V, 0.5A by BIOS selection)			
TPM 2.0	Optional			
eSIM	Optional			
Storage				
SATA	2x SATA 6Gb/s, one SATA power connector 2x SATA 6Gb/s signals via M.2 M & B key connector Intel® RST RAID Support		2x SATA 6Gb/s, one SATA power connector 1x SATA 6Gb/s signal via M.2 B key connector	
Mechanical				
Dimensions	197.72 x 167.32 mm (W x L)			
Mounting	ADLINK proprietary mounting hole locations, ADLINK proprietary CPU cooler bracket			
Power Supply				
DC Input	DC 12V input (Molex DC-in jack)			
AC Input	Optional: 240W (12V @20A) AC/DC adapter			
Environmental				
Operating Temperature	0°C to 60°C (w/o MXM), 0°C to 55°C (w/ MXM)			
Storage Temperature	-40°C to 85°C			
Humidity	10% to 90%, non-condensing			
EMC	EN55032/EN55024			

MVP-6100 Series

Value Family 9th Generation Intel® Xeon®/Core™ i7/i5/i3 & 8th Gen Celeron® Processor-Based Expandable Computer

Features

- 9th Gen Intel® Xeon®/Core™ i7/i5/i3 & 8th Gen Celeron® LGA processor
- Dual SODIMMs for up to 32GB DDR4 non-ECC/ ECC memory
- Rich I/O: 2x DP++/ DVI/ VGA/ 3x GbE/ 4x COM/ 8-ch DI/ 8-ch DO/ TPM2.0
- 2x USB 3.1 Gen2 + 1x USB 3.1 Gen1 + 3x USB 2.0
- Rich storage: up to 4x 2.5" SATA, CFast, M.2 2280
- Embedded Expansion: Mini PCIe/ M.2 3042/ 2x USIM
- Front accessible I/O and adaptive Function Module v.2 option
- Flexible modular expansion with 2 or 4 slots

Software Support

- **Win10 IoT Enterprise CBB 64bit**
- **Linux Ubuntu 18.04**

Optional Accessories

- **MVP-6100 Fan Kit (P/N: 91-95267-000E)**
- **Factory Installed 2.5" SATA SSD/HDD/M.2/CFast**
- **Wireless Module**
  Wi-Fi/ BT/ 3G/ 4G LTE/ LoRa wireless kit (w/ antenna)
- **Optional 2x 2.5" SATA Kit (w/ Bracket and Cable)**
- **AC/DC Adapter**
  220W (P/N: 31-62149-0000)
  280W (P/N: 91-95263-0010)
- **Internal power cable for add-on card**
  30-21656-0000-A0: for MVP-6120
  30-21655-0000-A0: for MVP-6140

Ordering Information

Model	CPU	PCH	Slot #
MVP-612X/M4G-1E	Intel® Xeon® E-2278GE	C246	2
MVP-612A/M4G-1E	Intel® Core™ i7-9700E	H310	2
MVP-6121/M4G-1E	Intel® Core™ i7-9700TE	H310	2
MVP-6122/M4G-1E	Intel® Core™ i5-9500TE	H310	2
MVP-6123/M4G-1E	Intel® Core™ i3-9100TE	H310	2
MVP-6124/M4G-1E	Intel® Celeron® G4900T	H310	2
MVP-614X/M4G-3E	Intel® Xeon® E-2278GE	C246	4
MVP-614A/M4G-3E	Intel® Core™ i7-9700E	C246	4
MVP-6141/M4G-3E	Intel® Core™ i7-9700TE	C246	4
MVP-6142/M4G-3E	Intel® Core™ i5-9500TE	C246	4
MVP-6143/M4G-3E	Intel® Core™ i3-9100TE	C246	4
MVP-6144/M4G-3E	Intel® Celeron® G4900T	C246	4

Specifications

Model Name	MVP-610X	MVP-610A	MVP-6101	MVP-6102	MVP-6103	MVP-6104
System Core						
Processor	Intel® Xeon® E-2278GE	Intel® Core™ i7-9700E	Intel® Core™ i7-9700TE	Intel® Core™ i5-9500TE	Intel® Core™ i3-9100TE	Intel® Celeron® G4900T
TDP	80W	65W	35W	35W	35W	35W
# of Cores	8	8	8	6	4	2
Base Freq.	3.3 GHz	2.6 GHz	1.8 GHz	2.2 GHz	2.2 GHz	2.9 GHz
Max Turbo Freq.	4.7 GHz	4.4 GHz	3.8 GHz	3.6 GHz	3.2 GHz	-
Chipset	C246	MVP-6120 series: H310 MVP-6140 series: C246				
Memory	4GB DDR4 non-ECC 2400 MHz, dual SODIMMs, up to 32GB (Optional: 4/8/16/32GB ECC, only for Intel® Xeon®/Core™ i3/Celeron w/ C246)					
I/O Interface						
Display	2x DP++ 1.2, DVI-D, VGA (dual independent displays w/ H310, 3 independent displays w/ C246)					
Ethernet	3x Intel GbE: 2x i211AT + i219 (Support Intel® AMT/vPro™ w/ C246)					
Serial Ports	COM1/2: RS-232/422/485, COM3/4: RS-232 (Optional COM5/6: RS-232, shared w/ DI/O)					
USB	3x USB 3.1 Gen 1 + 3x USB 2.0, 1x internal USB 2.0 dongle (2x USB 3.1 up to Gen 2 w/ C246)					
Audio	Line-out, Mic-in (Optional: speaker-out)					
Mini PCIe	1x Full size (USB 2.0 + PCIe)					
M.2	1x socket 2, key B+M or B, 2280/3042 (USB3.1 + SATA III + PCIe x1. Up to PCIe x2 w/ C246)					
USIM	2					
DI/O	8-CH DI and 8-CH DO					
I2C	2 (3.3V/5V)					
TPM	TPM2.0					
Expansion Slots	MVP-6120 series: PCIe x16 + PCI (total up to 150W) MVP-6140 series: PCIe x16 + 2 PCIe x4 + PCI (total up to 150W with 12V in; total up to 250W with 24V in)					
Storage Device						
2.5" SATA	2x internal (RAID 0/1/5/10 support w/ C246) (Optional: additional 2x internal, w/ C246)					
CFast	1 Type II					
Mechanical						
Dimensions	MVP-6120 series: 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") MVP-6140 series: 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27")					
Weight	MVP-6120 series: 4.8 kg (10.6 lbs) MVP-6140 series: 5.1 kg (11.2 lbs)					
Mounting	Wall mount					
Fan	Optional					
Power Supply						
DC Input	12-24V (± 10% tolerance)					
AC Input	Optional: 220W/280W AC/DC adapter					
Environmental						
Operating Temperature	Standard: (w/ air flow 0.6 m/s)					
	0°C to 40°C	0°C to 50°C				
	Extended: (w/ air flow 0.6 m/s & ind. storage)					
	-20°C to 40°C	-20°C to 50°C	-20°C to 60°C			
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excl. storage)					
Humidity	~95% @ 40°C (non-condensing)					
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/2.5" SSD/CFast, 3 Grms w/ fan) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)					
Shock	Operating: 50 Grms, half sine 11ms duration (w/ 2.5" SSD/CFast)					
ESD	Contact +/-4KV, Air +/-8KV					
EMC	EN61000-6-4/-2, CE & FCC Class A					
Safety	UL/cUL, CB, CCC					

MVP-6010/6020 Series

Value Family 6th Generation Intel® Core™ i7/i5/i3 Processor-Based Expandable Fanless Embedded Computer

Features

- 6th Gen Intel® Core™ i7/i5/i3 processors with H110/Q170 chipset
- Dual-channel DDR4 SO-DIMM sockets support up to 32GB memory
- Support for 2 independent displays with 1 VGA, 1 DVI and 2 DisplayPort
- 4 expansion slots
  - MVP-6010: 1 PCIe Gen3 x16 and 3 PCI expansion slots
  - MVP-6020: 2 PCIe Gen3 x8 and 2 PCI expansion slots
- 3 Intel® GbE ports with teaming function
- 2 software-programmable RS-232/422/485 + 2 RS-232 ports
- Built-in 8CH DI & 8CH DO
- Front-accessible I/O for simplified installation and maintenance
- Extremely cost-effective, high performance Fanless system
  - Support up to 65W CPU with fanless operation

Introduction

ADLINK's newly introduced MVP-6010/6020 Series value line of fanless embedded computing platforms, incorporating the 6th Generation Intel® Core™ processor, provides one PCIex16 and three PCI or two PCIe x8 and two PCI expansion slots, 1 mini PCIe slot and single-side access for I/O ports, optimizing easy maintenance in industrial automation environments. The series retains the robust design of all ADLINK MXC/MXE lines, at a new extremely cost-effective price point.

The MVP-6010/6020 Series supports dual-channel DDR4 memory for more powerful computing and the Intel® HD Graphics 530 speeds graphics performance. Along with a versatile I/O array and flexible expansion capacity, the MVP-6010/6020 Series fully satisfies all the needs of industrial automation with the performance demanded by vision inspection, motion control, and surveillance applications. Fanless construction not only overcomes contaminant and noise challenges presented by harsh IA environments, the elimination of problematic structural elements that negatively affect MTBF greatly increases life cycle expectations for the platform.

Optional Accessories

- **Optional Fan Module**
  Fan module for MVP-6010/6020 series
- **8/16/32 GB DDR4 Option**
  Upgrade to 8/16/32 GB DDR4 memory
- **500 GB / 1TB HDD Option**
  Factory-installed 500 GB / 1 TB SATA hard disk drive
- **64 GB SSD Option**
  Factory-installed 64 GB MLC SATA solid-state drive
- **160W AC-DC Adapter**
  160W Industrial grade AC-DC adapter

Software Support

- **Windows® 10 / 7 / Embedded Standard 7**
- **Linux**

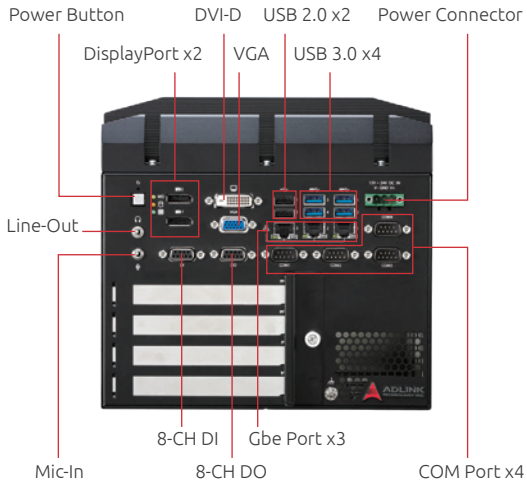
Ordering Information

- **MVP-6011**
  Intel® Core™ i7-6700TE fanless embedded computer
  1 PCIe Gen3 x16 + 3 PCI expansion slots
- **MVP-6012**
  Intel® Core™ i5-6500TE fanless embedded computer
  1 PCIe Gen3 x16 + 3 PCI expansion slots
- **MVP-6013**
  Intel® Core™ i3-6100TE fanless embedded computer
  1 PCIe Gen3 x16 + 3 PCI expansion slots
- **MVP-6015**
  Intel® Core™ i7-6700 fanless embedded computer
  1 PCIe Gen3 x16 + 3 PCI expansion slots
- **MVP-6021**
  Intel® Core™ i7-6700TE fanless embedded computer
  2 PCIe Gen3 x8 + 2 PCI expansion slots
- **MVP-6022**
  Intel® Core™ i5-6500TE fanless embedded computer
  2 PCIe Gen3 x8 + 2 PCI expansion slots
- **MVP-6023**
  Intel® Core™ i3-6100TE fanless embedded computer
  2 PCIe Gen3 x8 + 2 PCI expansion slots
- **MVP-6025**
  Intel® Core™ i7-6700 fanless embedded computer
  2 PCIe Gen3 x8 + 2 PCI expansion slots

Specifications

	Expandable Fanless Embedded Computers		Integrated Fanless Embedded Computers
Model Name	**MVP-6010/6020 Series**	**MVP-6000 Series**	**MVP-5000 Series**
			
System			
Processor	Intel® Core™ i7-6700TE/ i5-6500TE/ i3-6100TE; Intel® Core™ i7-6700 (65W)	Intel® Core™ i7-6700TE/ i5-6500TE/ i3-6100TE	
Chipset	MVP-6010 Series: H110 MVP-6020 Series: Q170	H110	
Video	1 VGA + 2 DisplayPort + 1 DVI-D		
Memory	4 GB DDR4 2133 MHz (up to 32 GB)		
I/O Interface			
Expansion slots	1 PCIe Gen3 x16 + 3 PCI expansion slots for MVP-6010 Series 2 PCIe Gen3 x8 + 2 PCI expansion slots for MVP-6020 Series	1 PCIe Gen3 x16 + 1 PCI	-
Ethernet	3 Intel® I211 AT GbE ports WOL and teaming functions are supported		
Serial Ports	4 COM by DB9 connector 2 BIOS selectable RS-232/422/485 + 2x RS-232 RS-485 with auto flow control		
USB	6 external USB ports (4 USB 3.0 +2 USB 2.0) 1 internal USB 2.0 port		
DIO	8-CH DI and 8-CH DO		
Mini PCIe	1 internal mini PCIe socket		
USIM	1 USIM socket		
Audio	1 Mic-in and 1 Line out		
Power Supply			
DC Input	Built-in 12-24 VDC wide-range DC input 3P pluggable connector with latch (V-, GND, V+)		
AC Input	Optional 160 W external AC-DC adapter for AC input		
Storage Device			
SATA HDD	1 SATA port for 2.5" HDD/SSD installation (up to 6 Gb/s)		
CompactFlash Socket	1 Type II CFast		
Mechanical			
Dimensions	220 (W) x 210 (D) x 208.7 (H)mm (8.67" x 8.27" x 8.21")	220 (W) x 210 (D) x 170 (H) mm (8.67" x 8.27" x 6.69")	220 (W) x 210 (D) x 121(H) mm (8.67" x 8.27" x 4.76")
Weight	4.7 kg (10.36 lbs)	4.5 kg (9.92 lbs)	3.6 kg (7.9 lb)
Mounting	Wall mount kit		
Environmental			
Operating Temperature	0 to 50°C; 0 to 40°C	0 to 50°C	
Storage Temperature	-40 to 85°C (-40 to 185°F) (excl. HDD/SDD/CFast)		
Humidity	~95% @ 40°C (non-condensing)		
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes (w/ CFast or SSD) Operating, 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)		
ESD	Contact +/-4KV, Air +/-8KV		
Shock	Operating, 100 Grms, half sine 11ms duration (w/ CFast or SSD)		
EMC	CE & FCC Class A		
Safety	UL/cUL, CB, CCC		

Product Illustration

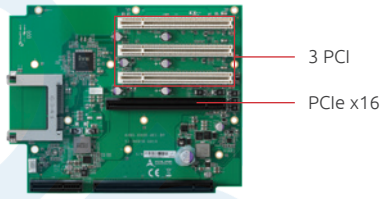


MVP-6010/6020 Series

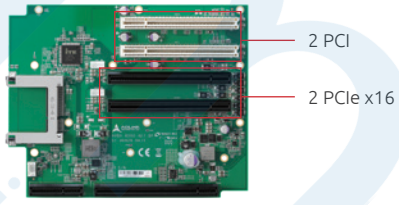
Versatile Expansion

The MVP-6010/6020 Series offer various of expansion slot options for flexible function enhancement and easier system integration.

MVP-6010 Series (4 Slots)



MVP-6020 Series (4 Slots)



MXC-6400 Series

6th Generation Intel® Core™ i7/i5/i3 Processor-Based Expandable Fanless Embedded Computer

Features

- 6th Gen Intel® Core™ i7/i5/i3 Processors and QM170 chipset
- 2 DDR4 SO-DIMM sockets support up to 32 GB memory
- 1 PCI and 2 PCIe Gen3 x8 (or 1 PCIe Gen3 x16) slots
- Support for 3 independent displays via 2 DisplayPort and 1 DVI-I ports with resolution up to 4K UHD
- 6 USB 3.0 ports and 1 internal USB 2.0 wafer connector
- 2 hot-swappable SATA III trays on the front panel and 2 internal SATA III ports with RAID 0/1/5/10 support
- Remote power on/off switch connector on the front panel
- Rugged construction provides fanless -20°C to 70°C operability (with industrial grade SSD/CFast)
- Built-in SEMA 3.0

Introduction

The Matrix MXC-6400 series is a line of high-performance fanless embedded computers, integrating 6th generation Intel® Core™ i7/i5/i3 processors and the QM170 chipset for more powerful computing and graphics performance with minimal power consumption.

Features include 3 PCI/PCIe expansion slots allowing installation of a variety of off-the-shelf PCI/PCIe cards for configurable applications, 2 internal mPCIe, and 1 USIM slot for 4G/3G communication. In addition, the MXC-6400 series offers independent digital display support from DisplayPort and DVI-I with resolution up to 4K UHD, as well as 6 USB 3.0 and 3 GbE LAN ports with Intel® iAMT 11.0 and teaming function. The 2 hot-swappable SATA III trays support 2.5" storage in the front panel with high speed SATA 6.0 Gb/s and 2 internal SATA III ports carry RAID 0, 1, 5, 10 support. 16 channel isolated DI/O with digital filter meets the needs of general purpose industrial automation.

Features with the integrated 6th Generation Intel® Core™ i7/i5/i3 processor, 4x 2.5” SATA III (6Gb/s) ports, fanless rugged constrction, operating shock tolerance up to 50G, withstanding vibration up to 5Grms and extended operating temperatures of -20°C to 70°C (with industrial grade SSD/CFast), the MXC-6400 Series fully satisfies all the needs of Intelligent Transportation System as railway rolling stock, maritime, in-vehicle infotainment, and high-speed data processing and mission critical industrial automation.

Software Support

- **Win10/Win7/Embedded Standard 7**
- **Linux® Ubuntu 16.04 LTS**

Ordering Information

- **MXC-6401D**
  Intel® Core™ i7-6820EQ, 4GB DDR4 SODIMM
- **MXC-6402D**
  Intel® Core™ i5-6440EQ, 4GB DDR4 SODIMM
- **MXC-6403D**
  Intel® Core™ i3-6100E, 4GB DDR4 SODIMM

Optional Accessories

- **MXC-6400 Optional Fan Module**
  P/N: 91-95199-0010
- **8/16/32 GB DDR4 Option**
  Upgrade to 1x 8GB/ 2x 8GB/ 2x 16GB DDR4 SODIMM
- **2.5" SATA HDD/SSD & CFast**
  Factory-installed and test
- **160W AC-DC Adapter**
  160W industrial grade AC-DC adapter (-20 to 70°C. -4°F to 158°F)
- **Extended Temperature Option***
  Optional screening service to extended operating temperature (-20 to 70°C)
- **Kit for Internal USB Wafer Connector**
  P/N: 91-95199-100E (including 2 sets)
  A cable for type A USB connector, bracket and screws for fixing the cable

Specifications

Model Name	MXC-6401D	MXC-6402D	MXC-6403D
System Core			
Processor	Intel® Core™ i7-6820EQ 4 Core/8 Threads, 2.8GHz, 8M Cache (Max Turbo Frequency 3.5 GHz)	Intel® Core™ i5-6440EQ 4 Core/4 Threads, 2.7GHz, 6M Cache (Max Turbo Frequency 3.4 GHz)	Intel® Core™ i3-6100E 2 Core/4 Threads, 2.7 GHz, 3M Cache
Chipset	Intel® QM170		
Video	2 DisplayPort (4K2K resolution) 1 DVI-I		
Memory	2x DDR4 SODIMM up to 32GB		
I/O Interface			
Expansion slots	1 PCI +2 PCIe Gen3 x8 or 1 PCI + 1 PCIe Gen3 x16 (auto switched)		
Mini PCIe	2x full size Mini PCIe		
USIM	1 USIM		
Ethernet	3x GbE (2 Intel I210IT + 1 I219 PHY)		
Serial Ports	COM1/2: RS-232/422/485 COM3/4: RS-232		
USB	6 USB 3.0 2 w/ 1600 mA, 4 w/ 900 mA 1 internal USB 2.0 wafer connector		
DIO	Isolated 16x DI + 16x DO		
Audio	ALC262, Line-out/ Mic-in		
KB/MS	1 PS/2 keyboard and 1 PS/2 mouse		
Manageability			
Security	TPM1.2		
WDT	Watch Dog Timer supported		
Storage Device			
2.5" SATA	2x removable drive bays 2x internal (RAID 0/ 1/ 5/ 10)		
CompactFlash	1 type II CFast		
Power Supply			
DC Input	Built-in 9-32 VDC wide-range DC input 3 pluggable connectors with latch (GND, V-, V+) 3-pin remote power on/off switch on the front		
AC Input	Optional 160 W external AC-DC adapter		
Mechanical			
Optional Fan Module	Optional hot-pluggable fan module, smart fan control		
Dimensions	170 (W) x 225 (D) x 200 (H) mm		
Weight	4 kg (8,82 lbs)		
Mounting	Wall-mount kit		
Environmental			
Operating Temperature	Standard: 0°C to 50°C (32°F to 122°F) (w/HDD) Extended option*: -20°C to 70°C (-4°F to 158°F) (w/Ind. SSD or CFast)		
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excl. HDD/SSD/CFast)		
Humidity	approx. 95% @ 40°C (104°F) (non-condensing)		
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes (w/ CFast or SSD) Operating, 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)		
ESD	Contact +/-4 KV and Air +/-8 KV		
Shock	Operating, 50 G, half sine 11 ms duration (w/ CFast or SSD)		
EMC	CE and FCC Class A		
Safety	UL/cUL,CB		

*Extended operating temperature is optional and requires use of an industrial solid-state drive storage device or CFast card.
**Other Linux Distribution support by request

MXC-6600 Series

9th Gen Intel® Xeon®, Core™ i7/i3 and 8th Gen Intel® Core™ i5 Processor-Based Embedded Fanless Computer

Features

- 9th Gen Intel® Xeon®, Core™ i7/i3 and 8th Gen Intel® Core™ i5 Processor-Based Embedded Fanless Computer
- Dual SODIMMs for up to 32GB DDR4
- Rich I/O: 2x DP++, 1x HDMI, 2x GbE, 6x COM, 8-ch DI, 8-ch DO, TPM 2.0
- 2x USB 3.1 Gen2, 2x USB 3.1 Gen1, 4x USB 2.0
- Rich storage: up to 4 internal 2.5" SATA 6 Gb/s ports with RAID 0/1/5/10 support, CFast, M.2 2280
- Embedded expansion: 1x Mini PCIe, 1x M.2 3042, 2x USIM
- Front accessible I/O and adaptive Function Module v.2 option
- 5x user defined LEDs
- Flexible modular expansion with 2 or 4 slots

Software Support

- **Win10 IoT Enterprise CBB 64bit**
- **Linux Ubuntu 18.04**

Ordering Information

- **MXC-662X-2E1/M4G**
  Intel® Xeon® E-2276ME 45W, CM246, 4GB RAM
- **MXC-6621-2E1/M4G**
  Intel® Core™ i7-9850HE 45W, CM246, 4GB RAM
- **MXC-6622-2E1/M4G**
  Intel® Core™ i5-8400H 45W, CM246, 4GB RAM
- **MXC-6623-2E1/M4G**
  Intel® Core™ i3-9100HL 45W, CM246, 4GB RAM
- **MXC-664X-3E1/M4G**
  Intel® Xeon® E-2276ME 45W, CM246, 4GB RAM
- **MXC-6641-3E1/M4G**
  Intel® Core™ i7-9850HE 45W, CM246, 4GB RAM
- **MXC-6642-3E1/M4G**
  Intel® Core™ i5-8400H 45W, CM246, 4GB RAM
- **MXC-6643-3E1/M4G**
  Intel® Core™ i3-9100HL 45W, CM246, 4GB RAM

Optional Accessories

- **2.5" SSD, HDD, M.2, CFast Storage**
- **MXC-6600 Fan Kit (P/N: 91-95267-000E)**
- **Additional 2x 2.5" SATA expansion kit**
- **Wireless Module**
  Wi-Fi, BT, 3G, 4G LTE, LoRa wireless kit (w/ antenna)
- **AC/DC Adapter**
  280W (P/N: 91-95263-0010)
  220W (P/N: 31-62149-0010-A0)

Specifications

Model Name	MXC-660X	MXC-6601	MXC-6602	MXC-6603
System Core				
Processor	Intel® Xeon® E-2276ME 45W	Intel® Core™ i7-9850HE 45W	Intel® Core™ i5-8400H 45W	Intel® Core™ i3-9100HL 25W
Core	6	6	4	4
Base Freq.	2.8 GHz	2.7 GHz	2.5 GHz	1.6 GHz
MAX Turbo Freq.	4.5 GHz	4.4 GHz	4.2 GHz	2.9 GHz
Chipset	Mobile Intel® CM246			
Memory	4GB DDR4 2400MHz, dual SODIMMs, up to 32GB Optional: 8, 16, 32GB DDR4 ECC 2400MHz (Xeon® and i3 support ECC)			
Display	2x DP++ and 1x HDMI			
I/O Interfaces				
Ethernet	2x Intel® GbE: 1x i211AT + 1x i219 iAMT support			
Serial Ports	COM1/2: RS-232/422/485, COM3/4/5/6: RS-232			
USB	2x USB 3.1 Gen 2 + 2x USB 3.1 Gen 1 + 4x USB 2.0, 1x internal USB 2.0 dongle			
Audio	Line-out, Mic-in (Optional: speaker-out)			
Mini PCIe	1x Full size (USB 2.0 + PCIe)			
M.2	1x socket 2, key B+M or B, 2280/3042: USB 3.1 Gen 1, SATA 6 Gb/s and PCIe x2			
USIM	2 (1 for Mini PCIe and 1 for M.2)			
DI/O	8-ch DI and 8-ch DO			
I2C	2 (3.3V & 5V)			
TPM 2.0	Supported			
Expansion Slots	MXC-6620 series : PCIe x16 + PCIe x4 (Total up to 150W) MXC-6640 series : PCIe x16 + 2 PCIe x4 + PCI (Total up to 150W with 12V in; total up to 250W with 24V in)			
Storage Devices				
2.5" SATA	2x internal (supports RAID 0, 1, 5, 10) Optional: additional 2x internal			
CFast	1x Type II			
Mechanical				
Dimensions	MXC-6620 series: 165 (W) x 240 (D) x 210 (H) mm (6.5" x 9.45" x 8.27") MXC-6640 series: 206 (W) x 240 (D) x 210 (H) mm (8.11" x 9.45" x 8.27")			
Weight	MXC-6620 series : 4.6 kg (10.2 lbs) MXC-6640 series : 4.9 kg (10.8 lbs)			
Mounting	Wall mount			
Power Supply				
DC Input	9 to 32V (± 10% tolerance)			
AC Input	Optional: 220W or 280W AC/DC adapter			
Environmental				
Operating Temperature	Standard: 0°C to 50°C w/ airflow			
	Extended temperature (w/ ind. storage, airflow) -20°C to 70°C (-4˚F to 158˚F) (only support single SODIMM) -20°C to 60°C (-4˚F to 140˚F) (w/ dual SODIMMs)			
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excluding storage)			
Humidity	~95% @ 40°C (104°F) (non-condensing)			
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/ SSD/CFast) Operating: 0.5 Grms, 5-500 Hz, 3 axes (w/ HDD)			
Shock	Operating: 100 Grms, half sine 11ms duration (w/ SSD/CFast)			
ESD	Contact ±8KV, Air ±15KV			
EMC	EN61000-6-4/-2, CE & FCC Class B with validated AC/DC adapter			
Safety	UL/cUL, CB			

ADi-SA1X-KB/SL

Ultimate Performance Gaming Platform based on 7th Gen Intel® Core™ Processors Supports up to 11x Independent Displays Including 4K UHD

Features

Perfect for multi-player table games!

- Ultimate " all-in-one" gaming platform
- The best-in-class graphics capabilities in games with high levels of detail
- Up to 11x independent HD monitors supporting 4K UHD
- Advanced security feature set and software solutions
- Intelligent middleware shortens development time

Introduction

ADLINK's ADi-SA1X-KB/SL all-in-one gaming platform features powerful processing and graphics performance for gaming infotainment and retail. Equipped with 7th Generation Intel® Core™ processors, the ADi-SA1X-KB/SL provides compelling graphics performance from a PCI Express 3.0 x16 discrete graphics card and/or an embedded Intel® HD Graphics 630 together with multi-display support for up to eleven independent monitors. With the powerful processing performance, advanced security functions, smart middleware solutions, and versatile I/O array, the ADi-SA1X-KB/SL fully satisfies the needs of your gaming application.

The ADi-SA1X-KB/SLL is a true application-ready gaming platform providing OEMs with a highly flexible and reliable all-in-one system that offers unparalleled portfolio of services that help developers save time and remain in compliance. The platform is designed to meet the GLI-11 (Gaming Laboratories International) certification and all major global gaming market compliance requirements. The comprehensive middleware as well as the security and extensive I/O solutions enable developers to easily bridge applications with peripheral devices, sensors, and surrounding solutions up to central monitoring and control systems.

Ultimate Performance Processing and Graphics
The ADi-SA1X-KB/SL supports Intel® Core™ i7/i5 processors clocked at up to 4.2 GHz with boost With integrated Intel® HD Graphics 630 and optionally with PCI Express 3.0 x16 or 2x PCI Express 3.0 x8 discrete graphics providing compelling processing and graphics performance.

Multi-Display Graphics Capabilities
The ADi-SA1X-KB/SL provides support for up to 4K resolutions via three standard video outputs based on the Intel® Q170 chipset. It is capable of supporting dedicated graphics cards for up to eleven independent monitors that conform to the latest DisplayPort 1.2 standard.

Advanced Security and NVRAM PCI Express for Gaming
Designed to Meet GLI-11
ADLINK's ADi-BSEC is a high-speed PCI Express card with up to 16 MB NVRAM & SRAM. It offers a crypto and authentication security chip with power-off monitoring and event logging designed to meet the GLI-11 (Gaming Laboratories International) certification requirements. Further features are also available, such as TPM1.2 trusted platform module, Bit Lock, Software Chain of Trust (sCOT), BIOS customizations, Intrusion Detection, Security Dongle to provide the comprehensive protection of the assets.

ADLINK Comprehensive Middleware Solutions
ADLINK's ADiAPI (intelligent Application Programming Interface) and SEMA® (Smart System Management Agent) provide advanced integration of hardware/software monitoring and controlling allowing simplified and unified application development without dependencies on the peripheral devices.

Product Illustration

ADi-SA1X-KB-CAAS
ADi-SA1X-SL-CAAS

ADi-SA1X-KB-DAAS
ADi-SA1X-SL-DAAS

Specifications

Model Name	ADi-SA1X-KB	ADi-SA1X-SL
Core System		
Processor	Socket LGA1151 supporting 7th Generation Intel® Core™ Processors from 35W up to 65W	Socket LGA1151 supporting 6th Generation Intel® Core™ Processors from 35W up to 65W
Chipset	Intel® Q170 or H110	
BIOS	AMI uEFI on 16 MB SPI BIOS flash with Intel® AMT 11.0 support via onboard BIOS socket and SPI header	
Expansion Slot	1 PCIe x16 slot	
	1 PCIe x1 slot	
	1 full-size Mini PCIe slot supporting PCIe+USB or mSATA (option for ADi-SA1X-SL)	
	1 half-size Mini PCIe slot supporting PCIe and USB	
Memory	Dual-channel, non-ECC 2133/2400 MHz DDR4 memory up to 32 GB in dual vertical SODIMM sockets	
Graphics	Intel® HD Graphics 630	Intel® HD Graphics 530
	NVIDIA® QUADRO® P620 embedded with extended availability NVIDIA® QUADRO® P1000 embedded with extended availability NVIDIA® QUADRO® P2000 embedded NVIDIA® QUADRO® P4000 embedded Other options on request	
Storage	2x HDD/SSD (2.5")	
	2x CFast (via 2.5" adapter option)	
	2x SATADOM *on request	
Security	Kensington Lock, Intrusion switch for ADi-BSEC power-off, Security Dongle, Eylet for seal, TPM, Bit Lock, Software Chain of Trust, BIOS Customization, ADi-BSEC security card (option) , Cable and connector covers (option)	
I/O interface		
Serial ATA	3x Serial ATA 6Gbps ports	
Ethernet	2x GbE ports (10/100/1000 GbE connection)	
Serial Ports	1x RS-232/422/485 via onboard header	
	3x RS-232 via onboard header	
Audio Interface	Codec Realtek ALC886	
	7.1 channel audio via 5 jacks and S/PDIF output on rear I/O	
	7.1 channel audio signals and S/PDIF output on internal header	
USB	4x USB 3.0 and 4x USB 2.0 on rear I/O	
	2x USB 3.0 on board header (H110:USB2.0)	
	1x USB 2.0 on vertical connector with keep out area for dongle	
DisplayPort	Q170: 3x outputs with resolution up to 4096 x 2160 pixels	
	H110: 2x outputs with resolution up to 4096 x 2160 pixels	
	Up to two additional PEG cards with up to 8x additional outputs (option, only for Q170)	
Wi-Fi	802.11 a/b/g/n (option)	
Power supply (option)		
	ADi-SPSU-500AC (500W), 24 pin ATX power adaptor	
Mechanical		
Dimensions	330 mm (W) x 330 mm (D) x 105 mm (H; w/o brackets) (13 in x 13 in x 4.1 in) ADi-SPSU option: +43 mm (w); ADi-BACC option: +20 mm (D)	
Environmental & Safety		
Operating Temperature	0°C to 50°C (32˚F to 122˚F)	
Storage Temperature	-20°C to 70°C (-4˚F to 158˚F) (excl. HDD/SSD/CFast)	
Humidity	~85% @ 50°C (144˚F) (non-condensing)	
Vibration	Operating, 1 Grms, 5-500 Hz, 3 axes (w/ CFast or SSD)	
	Operating, 0.5 Grms, 5-500 Hz, 3 axes (w/ 2.5" HDD)	
	Operating, 20 G, half sine 11 ms duration (w/ CFast or SSD)	
Shock	Operating, 20 G, half sine 11 ms duration (w/ CFast or SSD)	
EMC	CE and FCC Class A	
ESD	Contact +/-4 KV and Air +/-8 KV	
Safety	UL/cUL, CB, KCC	
Operating Systems		
	Windows® 10 IoT	Windows® 7 32/64-bit, Linux 32/64-bit (option)

ADi-SA2X-KB/SL

High-Performance Gaming Platform based on 7th Gen Intel® Core™ Processors Supports up to Seven Independent Displays Including 4K UHD

Features

- High performance "all-in-one" gaming platform
- Highly scalable platform meets individual performance, graphics and power needs
- Compact dimension yet with intensive expansion for vertical add-ons
- Advanced security feature set and software solutions
- Intelligent middleware shortens development time

Introduction

ADLINK's ADi-SA2X-KB/SL all-in-one gaming platform features powerful processing and graphics performance for gaming infotainment and retail. Equipped with 7th Generation Intel® Core™ processors, the ADi-SA2X-KB/SL provides compelling graphics performance from a PCI Express 3.0 x16 discrete graphics card and/or an embedded Intel® HD Graphics 630 together with multi-display support for up to seven independent monitors. With the powerful processing performance, advanced security functions, smart middleware solutions, and versatile I/O array, the ADi-SA2X-KB/SL fully satisfies the needs of your gaming application.

The ADi-SA2X-KB/SL is a true application-ready gaming platform providing OEMs with a highly flexible and reliable all-in-one system that offers unparalleled portfolio of services that help developers save time and remain in compliance. The platform is designed to meet the GLI-11 (Gaming Laboratories International) certification and all major global gaming market compliance requirements. The comprehensive middleware as well as the security and extensive I/O solutions enable developers to easily bridge applications with peripheral devices, sensors, and surrounding solutions up to central monitoring and control systems.

High Scalability and Ideal Range of Performance Class
The ADi-SA2X-KB/SL is designed with highly scalable and reliable hardware that can be flexibly scaled from entry level up to the highest performance class, with tailored configuration of CPU and GPU selections. The platform also provides compact dimensions for developers using a more compact cabinet footprint and offers extensive expansion capabilities for the needs of vertical add-ons.

Multi-Display Graphics Capabilities
The ADi-SA2X-KB/SL provides support for up to 4K resolutions via three standard video outputs based on the Intel® Q170 chipset. It is capable of supporting dedicated graphics cards for up to seven independent monitors that conform to the latest DisplayPort 1.2 standard.

Advanced Security and NVRAM PCI Express for Gaming Designed to Meet GLI-11
ADLINK's ADi-BSEC is a high-speed PCI Express card with up to 16 MB NVRAM & SRAM. It offers a crypto and authentication security chip with power-off monitoring and event logging designed to meet the GLI-11 (Gaming Laboratories International) certification requirements. Further features are also available, such as TPM1.2 trusted platform module, Bit Lock, Software Chain of Trust (sCOT), BIOS customizations, Intrusion Detection, Security Dongle to provide the comprehensive protection of the assets.

ADLINK Comprehensive Middleware Solutions
ADLINK's ADiAPI (intelligent Application Programming Interface) and SEMA® (Smart System Management Agent) provide advanced integration of hardware/software monitoring and controlling allowing simplified and unified application development without dependencies on the peripheral devices.

Ordering Information

- **ADi-SA2X-SL-BAAS**
  Intel® Core™ i5-6500TE, Intel® Q170, TPM, SEMA, ADi-BSEC card(4MB SRAM), ADi-BACC-G2F, ADi-BAMP Card, 8G DDR4, 128GB SSD, with +12V/120W ATX power adaptor
- **ADi-SA2X-KB-BAAS (Call for availability)**
  *Other configurations on request

Options

- **ADi-BSEC**
  Intelligent Infotainment Security and NVRAM PCI Express Card
- **ADi-BAMP**
  Audio Amplifier, 2x 12-15W
- **ADi-BACC**
  Gaming and Retail Extension I/O Board
- **ADiAPI**
  Intelligent middleware used for controlling peripheral devices
- **ADiDLL**
  Middleware used for controlling optional add-on devices
- **SAS 6.02/6.03 engine**

Optional Accessories

- **ADi-BSEC cable**
- **Box PC cable kit**
- **ADi-BACC Cable kit**

Product Illustration

ADi-SA2X-KB-BAAS
ADi-SA2X-SL-BAAS

ADi-SA2X-KB-DAAS
ADi-SA2X-SL-DAAS

ADi-SA2X-KB-AAAS
ADi-SA2X-SL-AAAS

Specifications

Model Name	ADi-SA2X-KB	ADi-SA2X-SL
Core System		
Processor	Socket LGA1151 supporting 7th Generation Intel® Core™ Processors from 35W up to 65W	Socket LGA1151 supporting 6th Generation Intel® Core™ Processors from 35W up to 65W
Chipset	Intel® Q170 or H110	
BIOS	AMI uEFI on 16 MB SPI BIOS flash with Intel® AMT 11.0 support via onboard BIOS socket and SPI header	
Expansion Slot	1 PCIe x16 slot	
	1 PCIe x1 slot	
	1 full-size Mini PCIe slot supporting PCIe+USB or mSATA (by option)	
	1 half-size Mini PCIe slot supporting PCIe and USB	
Memory	Dual-channel, non-ECC 1333/1600/2133 MHz DDR4/DDR3L memory up to 32 GB in dual vertical SODIMM sockets	
Graphics	Intel® HD Graphics 630	Intel® HD Graphics 530
	NVIDIA® QUADRO® P620 embedded with extended availability NVIDIA® QUADRO® P1000 embedded with extended availability Other options on request	
Storage	2x HDD/SSD (2.5“)	
	2x CFast (via 2.5“ adapter option)	
	2x SATADOM *on request	
Security	Kensington Lock, Intrusion switch for ADi-BSEC power-off, Security Dongle, Eylet for seal, TPM, Bit Lock, Software Chain of Trust, BIOS Customization, ADi-BSEC security card (option) , Cable and connector covers (option)	
I/O interface		
Serial ATA	3x Serial ATA 6Gbps ports	
Ethernet	2x GbE ports (10/100/1000 GbE connection)	
Serial Ports	1x RS-232/422/485 via onboard header	
	3x RS-232 via onboard header	
Audio Interface	Codec Realtek ALC886	
	7.1 channel audio via 5 jacks and S/PDIF output on rear I/O	
	7.1 channel audio signals and S/PDIF output on internal header	
USB	4x USB 3.0 and 4x USB 2.0 on rear I/O	
	2x USB 3.0 on board header (H110:USB2.0)	
	1x USB 2.0 on vertical connector with keep out area for dongle	
DisplayPort	Q170: 3x outputs with resolution up to 4096 x 2160 pixels	
	H110: 2x outputs with resolution up to 4096 x 2160 pixels	
	4x PEG card outputs (option)	
Wi-Fi	802.11 a/b/g/n (option)	
Power supply (option)		
	ADi-SPSU (100-240VAC) or 3pin DC in connector (+9-36VDC) or 14 pin ATX power adaptor (+12V/120W)	
Mechanical		
Dimensions	265 mm (W) x 225 mm (D) x 87 mm (H; w/o brackets) (10.4 in x 8.9 in x 3.4 in) ADi-SPSU option: +43 mm (w); ADi-BACC option: +20 mm (D)	
Environmental & Safety		
Operating Temperature	0°C to 50°C (32˚F to 122˚F)	
Storage Temperature	-20°C to 70°C (-4˚F to 158˚F) (excl. HDD/SSD/CFast)	
Humidity	~85% @ 50°C (144˚F) (non-condensing)	
Vibration	Operating, 1 Grms, 5-500 Hz, 3 axes (w/ CFast or SSD)	
	Operating, 0.5 Grms, 5-500 Hz, 3 axes (w/ 2.5“ HDD)	
Shock	Operating, 20 G, half sine 11 ms duration (w/ CFast or SSD)	
EMC	CE and FCC Class A	
ESD	Contact +/-4 KV and Air +/-8 KV	
Safety	UL/cUL, CB, KCC	
Operating Systems		
	Windows® 10 IoT	Windows® 7 32/64-bit, Linux 32/64-bit

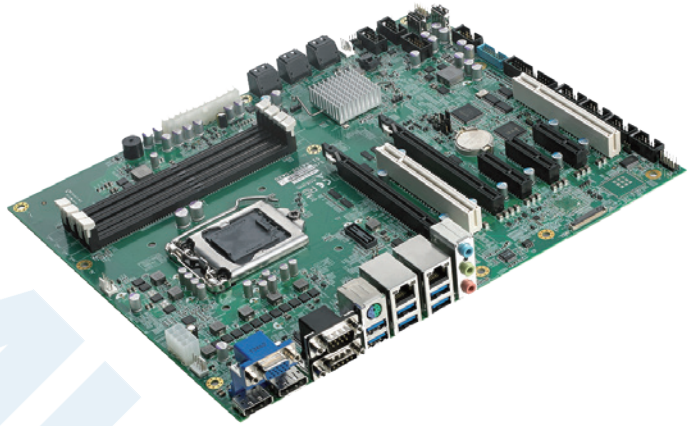
Gaming-Specific Features and Security (Options)	
	Up to 2x 8MB dual independent (battery-buffered) high-speed NVRAM (fast PCIe x1 interface)
	Crypto & Authentication Security Chip (SHA-256, RNG, UID, EEPROM, OTP)
	Intrusion detection and event logging (battery-buffered)
	EEPROM support (various; SMD down and DIP socket jurisdiction EEPROM)
	1-Wire bus support (multiple UID S/Ns silicon numbers and EEPROM)
	4x additional serial interfaces (RS-232, RS-232 TTL, ccTalk)
	ccTalk, ID003, EBDS, SSP, TCL and MDB
	32x digital inputs / 32x digital outputs
	24 x open drain /40V LED drivers
	3x high-current outputs
	EPFail support (early power fail detection input)
	User LEDs and function switches
	DIP switch option
	8x independent current-sensed hardmeter support
	SEC soft meter suport (SPI)
	1-Wire support (UID & EEPROM)
	Key lock, eyelet for sealing, TPM, dedicated security ICs, secure key storage
	Fully customizable secure BIOS

IMB-M43

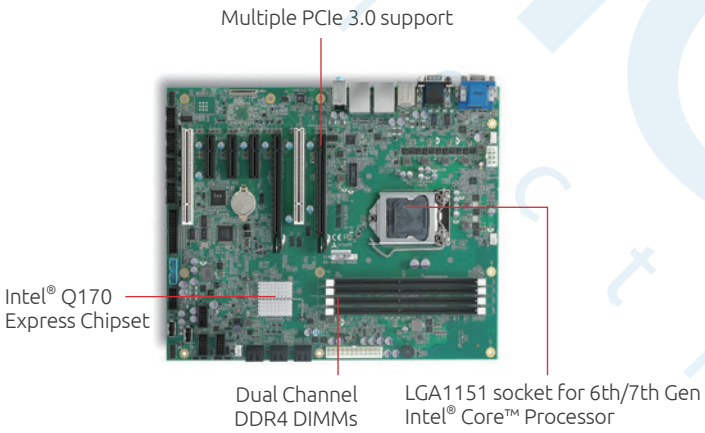
Industrial ATX Motherboard with 6th/7th Gen Intel® Core™ i7/i5/i3 Processor

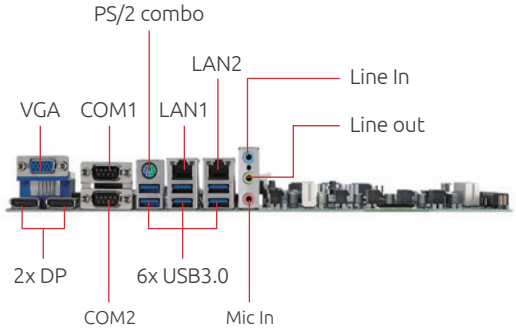
Features

- 6th/7th Gen Intel® Core™ i7/i5/i3 processors and Q170 chipset
- Dual-channel DDR4 2133/2400 MHz memory up to 64 GB
- Intel® PCIe 3.0 slot bifurcation supports up to 5x PCIe 3.0 expansion slots
- Rugged I/O design to enhance I/O port compatibility and reliability
- Unique power design to ensure stable USB power of 5V ±5%
- IEC 61000-4-2~6 (Performance Criterion A), CE/FCC class B certified



Product Illustration





Ordering Information

- **IMB-M43**
  ATX 6th/7th Intel® Core™ i7/i5/i3 industrial motherboard
  Note: CPU, Memory module and Cooler kit are not included

Packing Lists

- **IMB-M43**
- **IMB-M43 I/O shield**
  Optional Accessories
- **USB 3.0 Cable**
  2-port USB 3.0 port cable with bracket
- **USB 2.0 Cable**
  4-port USB 2.0 port cable with bracket
- **LPT Cable**
  1-port LPT port cable with bracket
- **COM Cable**
  2-port COM port cable with bracket
- **2U CPU Cooler**
  LGA1156 2U Thermal Module

Specifications

Processor System	
CPU	Intel® Core™ i7-6700, 3.4 GHz, 8M Cache, 14nm, 65W TDP, LGA1151 (4C/8T)
	Intel® Core™ i7-6700TE, 2.4 GHz 8M Cache, 14nm, 35W TDP, LGA1151 (4C/8T)
	Intel® Core™ i5-6500, 3.2 GHz, 6M Cache, 14nm, 65W TDP, LGA1151 (4C/4T)
	Intel® Core™ i5-6500TE, 2.3 GHz, 6M Cache, 14nm, 35W TDP, LGA1151 (4C/4T)
	Intel® Core™ i3-6100, 3.7 GHz, 3M Cache, 14nm, 51W TDP, LGA1151 (2C/4T)
	Intel® Core™ i3-6100TE, 2.7 GHz, 4M Cache, 14nm, 35W TDP, LGA1151 (2C/4T)
	Intel® Pentium® G4400, 3.3GHz, 3M Cache, 14nm, 54W TDP, LGA1151 (2C/2T)
	Intel® Pentium® G4400TE, 2.4GHz, 3M Cache, 14nm, 35W TDP, LGA1151 (2C/2T)
	Intel® Celeron® G3900, 2.8GHz, 2M Cache, 14nm, 51W TDP, LGA1151 (2C/2T)
	Intel® Celeron® G3900TE, 2.3GHz, 2M Cache, 14nm, 35W TDP, LGA1151 (2C/2T)
	Intel® Core™ i7-7700, 3.6GHz, 8M Cache, 14nm, 65W TDP, LGA1151 (4C/8T)
	Intel® Core™ i7-7700T, 2.9GHz 8M Cache, 14nm, 35W TDP, LGA1151 (4C/8T)
	Intel® Core™ i5-7500, 3.4GHz, 6M Cache, 14nm, 65W TDP, LGA1151 (4C/4T)
	Intel® Core™ i5-7500T, 2.7GHz, 6M Cache, 14nm, 35W TDP, LGA1151 (4C/4T)
	Intel® Core™ i3-7101E, 3.9GHz, 3M Cache, 14nm, 54W TDP, LGA1151 (2C/4T)
	Intel® Core™ i3-7101TE, 3.4GHz, 3M Cache, 14nm, 35W TDP, LGA1151 (2C/4T)
Chipset	Intel® Q170 Express Chipset
Memory	Four 288 PIN DDR4 Sockets (vertical type) Dual channel DDR4 2133/2400 MHz, up to 64 GB
BIOS	AMI® UEFI BIOS, 128 Mb SPI Flash Memory
Watchdog Timer	software programmable and can be generate system reset
Hardware Monitor	CPU voltage
	+3.3 V voltage
	+5 V voltage
	+12 V voltage
	CPU temperature
	System temperature
	CPU fan speed
	System fan speed
Operating Systems	Microsoft® Windows® 7 32/64-bit (only for 6th Gen Intel® Core™ processors)
	Microsoft® Windows® 8.1 64-bit
	Microsoft® Windows® 10 64-bit
	Ubuntu 15.10 32/64-bit

I/O Interfaces	
Serial ATA	6x SATA 6.0 Gb/s connectors
	Software RAID support 0/1/5/10
USB	6x USB 3.0 connectors (rear)
	2x USB 3.0 pin headers
	4x USB 2.0 pin headers
	2x USB 2.0 (vertical type A connector)
Serial Ports	2x RS-232/422/485 with auto flow control connector (rear)
	4x RS-232 pin headers
Expansion slots	<Signal> If PEG3 is occupied, PEG1 is PCIex8 Gen3, PEG2 is PCIex4 Gen3, and PEG3 is PCIex4 Gen3 If PEG3 is not occupied and PEG2 is occupied, PEG1 is PCIex8 Gen3, PEG2 is PCIex8 Gen3, and PEG3 is no signal If PEG3 is not occupied and PEG2 is not occupied, PEG1 is PCIex16 Gen3,PEG2 and PEG3 is no signal PCIe1: PCIe x4 Gen3, PCIe2: PCIe x4 Gen3, PCI1: PCI 2.2, PCI2: PCI 2.2
	<Physical Slot> PEG1: PCIex16 slot, PCI1: PCI slot, PEG2: PCIex16 slot,PEG3: PCIex4 slot,PCIe1: PCIex4 slot,PCIe2: PCIex4 slot,PCI2: PCI slot
Parallel Port	1x LPT pin header
PS2 Combo Port	1x PS/2 keyboard & Mouse connector (rear)
DIO	1x 10-pin/2.54mm GPIO pin header: 4 in and 4 out, one ground pin and one power pin (5V/12V/no power, jumper selected)
Audio	
Audio Codec	Realtek® ALC262-VC2-GR
Interface	1x Mic-in, 1x Line-out and 1x Line-in connector (rear)
Graphics	
Graphics Engine	Integrated Intel® HD Graphics series (based on CPU)
VGA	1x VGA connector (rear), resolution up to 1920 x 1200 @ 60 Hz
DisplayPort 1.2	2x DP connector (rear), resolution up to 4096 x 2304 @ 60 Hz
Ethernet	
Controller	LAN1: Intel® I219-LM via RJ45 connector (rear)
	LAN2: Intel® I211-AT via RJ45 connector (rear)
Intel® AMT	LAN1 Support
Wake On LAN	LAN1 and LAN2 support
Mechanical and Environmental	
Form Factor	ATX
Dimension	305 mm x 244 mm (W x L)
Operating Temperature	0 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Relative Humidity	40° C @ 95% RH Non-condensing
Certification	CE & FCC Class B

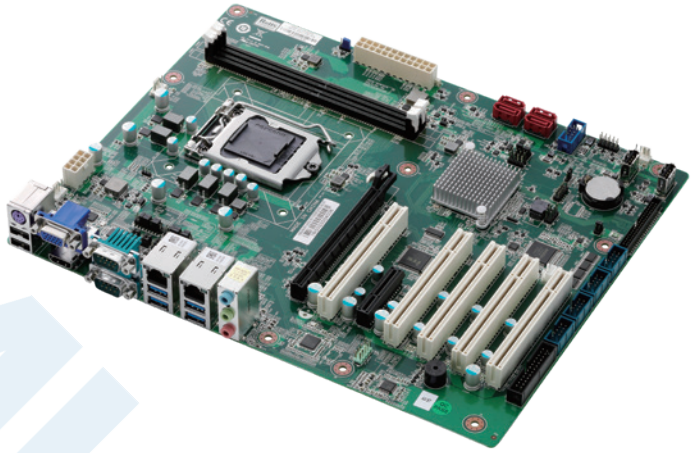
*Extending operating temperature is optional and requires use of an industrial solid-state drive storage device or CFast card..
**Other Linux Distribution support by request

IMB-M43H

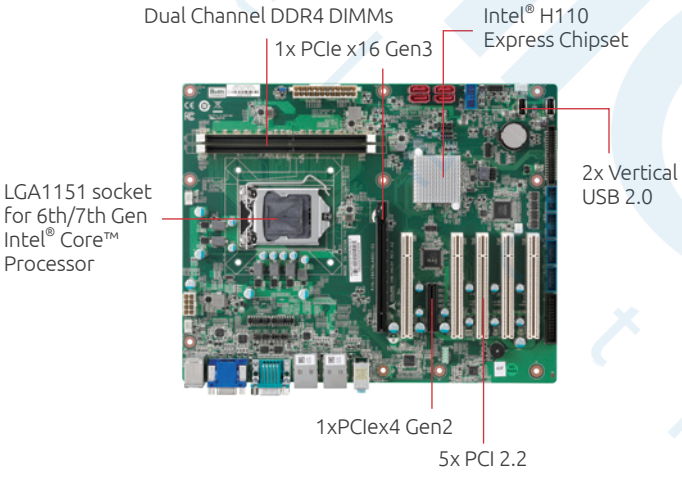
Industrial ATX Motherboard with 6th/7th Gen Intel® Core™ i7/i5/i3 Processor

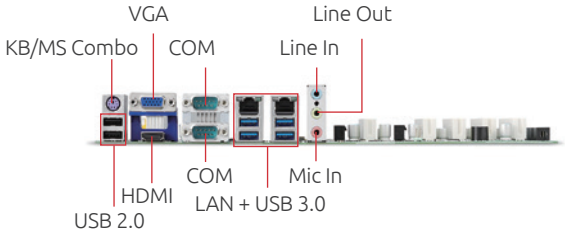
Features

- 6th Gen Intel® Core™ i7/i5/i3 processors support, compatible with Windows® 7
- 7th Gen Intel® Core™ i7/i5/i3 processors support
- Up to 32 GB Dual-channel DDR4 2133/2400 MHz
- Unique power design to ensure stable USB power of 5V ±5%
- IEC 61000-4-2~6 (Performance Criterion A), CE/FCC class B certified



Product Illustration





Ordering Information

- **IMB-M43H**
  ATX Intel® Core™ i7/i5/i3 industrial motherboard
  Note: CPU, Memory module and Cooler kit are not included

Packing Lists

- **IMB-M43H**
- **IMB-M43H I/O shield**

Optional Accessories

- **USB 2.0 Cable**
  2-port USB 2.0 port cable with bracket
- **LPT Cable**
  1-port LPT port cable with bracket
- **COM Cable**
  2-port COM port cable with bracket
- **2U CPU Cooler**
  LGA1156 2U Thermal Module

Specifications

Processor System	
CPU	Intel® Core™ i7-6700, 3.4 GHz, 8M Cache, 14nm, 65W TDP, LGA1151 (4C/8T)
	Intel® Core™ i7-6700TE, 2.4 GHz 8M Cache, 14nm, 35W TDP, LGA1151 (4C/8T)
	Intel® Core™ i5-6500, 3.2 GHz, 6M Cache, 14nm, 65W TDP, LGA1151 (4C/4T)
	Intel® Core™ i5-6500TE, 2.3 GHz, 6M Cache, 14nm, 35W TDP, LGA1151 (4C/4T)
	Intel® Core™ i3-6100, 3.7 GHz, 3M Cache, 14nm, 51W TDP, LGA1151 (2C/4T)
	Intel® Core™ i3-6100TE, 2.7 GHz, 4M Cache, 14nm, 35W TDP, LGA1151 (2C/4T)
	Intel® Pentium® G4400, 3.3GHz, 3M Cache, 14nm, 54W TDP, LGA1151 (2C/2T)
	Intel® Pentium® G4400TE, 2.4GHz, 3M Cache, 14nm, 35W TDP, LGA1151 (2C/2T)
	Intel® Celeron® G3900, 2.8GHz, 2M Cache, 14nm, 51W TDP, LGA1151 (2C/2T)
	Intel® Celeron® G3900TE, 2.3GHz, 2M Cache, 14nm, 35W TDP, LGA1151 (2C/2T)
	Intel® Core™ i7-7700, 3.6GHz, 8M Cache, 14nm, 65W TDP, LGA1151 (4C/8T)
	Intel® Core™ i7-7700T, 2.9GHz 8M Cache, 14nm, 35W TDP, LGA1151 (4C/8T)
	Intel® Core™ i5-7500, 3.4GHz, 6M Cache, 14nm, 65W TDP, LGA1151 (4C/4T)
	Intel® Core™ i5-7500T, 2.7GHz, 6M Cache, 14nm, 35W TDP, LGA1151 (4C/4T)
	Intel® Core™ i3-7101E, 3.9GHz, 3M Cache, 14nm, 54W TDP, LGA1151 (2C/4T)
	Intel® Core™ i3-7101TE, 3.4GHz, 3M Cache, 14nm, 35W TDP, LGA1151 (2C/4T)
Chipset	Intel® H110 Express Chipset
Memory	Two 288 PIN DDR4 Sockets (vertical type) Dual channel DDR4 2133/2400 MHz, up to 32 GB
BIOS	AMI® UEFI BIOS, 128 Mb SPI Flash Memory
Watchdog Timer	software programmable and can be generate system reset
Hardware Monitor	CPU voltage
	+3.3 V voltage
	+5 V voltage
	+12 V voltage
	CPU temperature
	System temperature
	CPU fan speed
	System fan speed
Operating Systems	Microsoft® Windows® 7 32/64-bit (only for 6th Gen Intel® Core™ processors)
	Microsoft® Windows® 8.1 64-bit
	Microsoft® Windows® 10 64-bit
	OpenSUSE Leap 42.1 64-bit
	Fedora 25 64-bit
	Ubuntu 16.04 LTS 64 bit

I/O Interfaces	
Serial ATA	4x SATA 6.0 Gb/s connectors
USB	4x USB 3.0 connectors (rear)
	2x USB 2.0 connectors (rear)
	2x USB 2.0 pin headers
	2x USB 2.0 (vertical type A connector)
Serial Ports	2x RS-232/422/485 with auto flow control connector (rear)
	4x RS-232 pin headers
Expansion slots	1xPCIe x16 Gen3 1xPCIe x4 Gen2 5x PCI 2.2
Parallel Port	1x LPT pin header
PS2 Combo Port	1x PS/2 keyboard & Mouse connector (rear)
DIO	2x 20-pin/2.0mm GPIO pin header: 16 in and 16 out, one ground pin and one power pin (5V/12V/no power, jumper selected)
Audio	
Audio Codec	Realtek® ALC892-CG
Interface	1x Mic-in, 1x Line-out and 1x Line-in connector (rear)
Graphics	
Graphics Engine	Integrated Intel® HD Graphics series (based on CPU)
VGA	1x VGA connector (rear), resolution up to 1920 x 1200 @ 60 Hz
HDMI 1.4	1x HDMI connector (rear) resolution up to 4096 x 2160 @ 24 Hz
Ethernet	
Controller	LAN1: Intel® I219-LM via RJ45 connector (rear)
	LAN2: Intel® I211-AT via RJ45 connector (rear)
Wake On LAN	LAN1 and LAN2 support
Mechanical and Environmental	
Form Factor	ATX
Dimension	305 mm x 244 mm (W x L)
Operating Temperature	0 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Relative Humidity	40° C @ 95% RH Non-condensing
Certification (EMC)	CE & FCC Class B

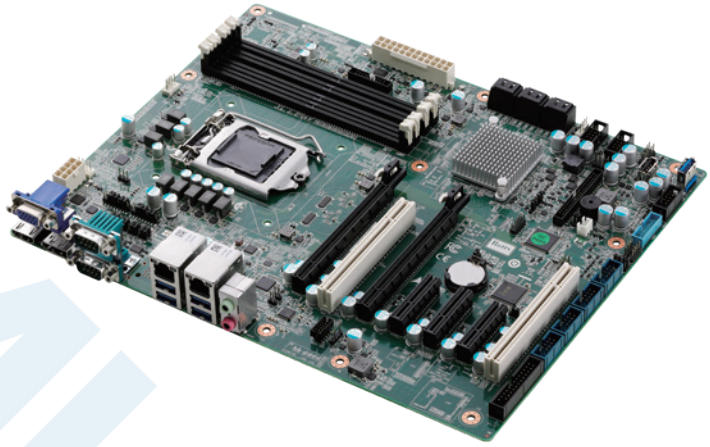
*Extending operating temperature is optional and requires use of an industrial solid-state drive storage device or CFast card..
**Other Linux Distribution support by request

IMB-M45

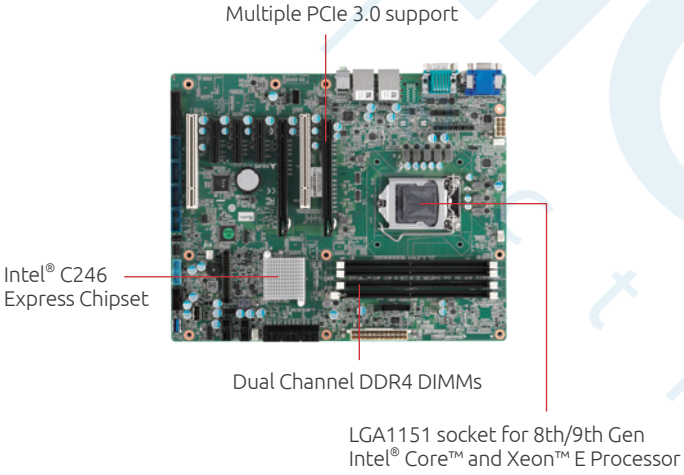
Industrial ATX Motherboard with 8th/9th Gen Intel® Core™ i7/i5/i3 or Xeon™ E Processors

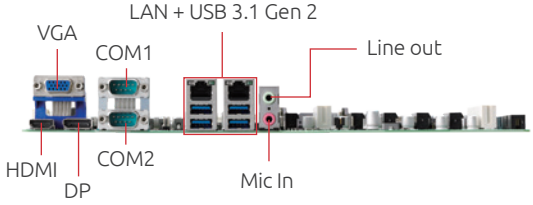
Features

- 8th/9th Gen Intel® Core™ i7/i5/i3 or Xeon™ E processors and C246 chipset
- ECC or NON ECC UDIMM support(based on CPU)
- Dual-channel DDR4 2400/2666 MHz memory up to 128 GB (based on CPU)
- Intel® PCIe 3.0 slot bifurcation supports up to 5x PCIe 3.0 expansion slots
- Unique power design to ensure stable USB power of 5V ±5%



Product Illustration





Ordering Information

- **IMB-M45**
  ATX 8th/9th Intel® Core™ i7/i5/i3 or Xeon™E industrial motherboard
  Note: CPU, Memory module and Cooler kit are not included

Packing Lists

- IMB-M45
- IMB-M45 I/O shield

Optional Accessories

- **USB 3.0 Cable**
  2-port USB 3.0 port cable with bracket
- **USB 2.0 Cable**
  4-port or 2-port USB 2.0 port cable with bracket
- **LPT Cable**
  1-port LPT port cable with bracket
- **COM Cable**
  2-port COM port cable with bracket
- **PS2 Cable**
  PS/2 KB/MS Cable with Bracket from 6P pin-header
- **CPU Cooler**
  LGA1156 Thermal Module for Core™ i7/i5/i3 CPU
  LGA1156 Thermal Module for Xeon™ E CPU (>65W)

Specifications

Processor System	
CPU	Intel® Xeon™ E-2278GE, 3.3GHz, 16M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (8C/16T)
	Intel® Xeon™ E-2226GE, 3.4GHz, 12M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (6C/6T)
	Intel® Xeon™ E-2176G, 3.7GHz, 12M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (6C/12T)
	Intel® Xeon™ E-2124G, 3.4GHz, 8M Cache, 71W TDP, LGA1151, DDR4 2666MHz support, (4C/4T)
	Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
	Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
	Intel® Core™ i5-9500E, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i5-9500TE, 2.2GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i3-9100E, 3.1GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i3-9100TE, 2.2GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/12T)
	Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T)
	Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Pentium® G5400, 3.7GHz, 4M Cache, 58W TDP, LGA1151, DDR4 2400MHz support (2C/4T)
	Intel® Pentium® G5400T, 3.1GHz, 4M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/4T)
	Intel® Celeron® G4900, 3.1GHz, 2M Cache, 54W TDP, LGA1151, DDR4 2400MHz support (2C/2T)
	Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/2T)
Chipset	Intel® C246 Express Chipset
Memory	Four 288 PIN DDR4 ECC or NON ECC Sockets Dual channel DDR4 2400/2666 MHz, up to 128 GB (based on CPU)
BIOS	AMI® UEFI BIOS, 256 Mb SPI Flash Memory
Watchdog Timer	software programmable and can be generate system reset
Hardware Monitor	CPU voltage
	+3.3 V voltage
	+5 V voltage
	+12 V voltage
	CPU temperature
	System temperature
	CPU fan speed
	System fan speed
Operating Systems	Microsoft® Windows® 10 64bit
	OpenSUSE Leap 15.1 64bit
	Fedora 30 64bit
	Ubuntu 18.10 LTS 64bit

*Other Linux Distribution support by request

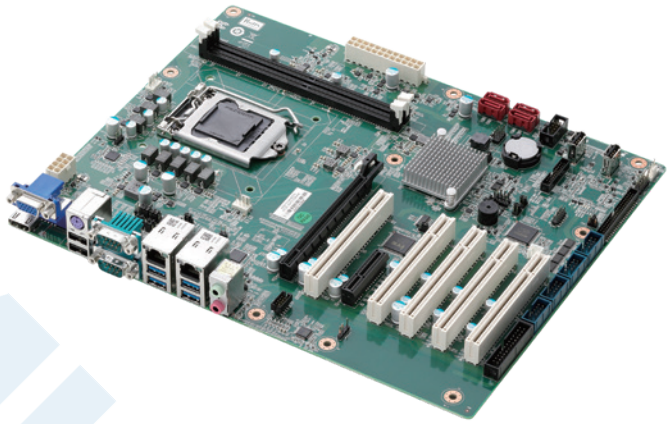
I/O Interfaces	
Serial ATA	6x SATA 6.0 Gb/s connectors
	Software RAID support 0/1/5/10
USB	4x USB 3.1 Gen2 connectors (rear)
	2x USB 3.1 Gen1 pin headers
	6x USB 2.0 pin headers
	1x USB 3.1 Gen1 (vertical type A connector)
	1x USB 2.0 (vertical type A connector)
Serial Ports	2x RS-232/422/485 with auto flow control connector (rear)
	4x RS-232 pin headers
Expansion slots	<Signal> If PEG2 is occupied, PEG1 is PCIex8 Gen3, PEG2 is PCIex8 Gen3 If PEG2 is not occupied, PEG1 is PCIex16 Gen3,PEG2 is no signal PCIe1: PCIe x4 Gen3, PCIe2: PCIe x4 Gen3,PCIe3: PCIe x4 Gen3, PCI1: PCI 2.2, PCI2: PCI 2.2
	<Physical Slot> PEG1: PCIex16 slot, PCI1: PCI slot, PEG2: PCIex16 slot,PCIe1: PCIex4 slot,PCIe2: PCIex4 slot,PCIe3: PCIex4 slot,PCI2: PCI slot
Parallel Port	1x LPT pin header
PS2 Combo Port	1x PS/2 keyboard & Mouse pin header
DIO	2x 20-pin/2.0mm GPIO pin header: 16 in and 16 out, one ground pin and one power pin (5V/12V/no power, jumper selected)
Audio	
Audio Codec	Realtek® ALC892
Interface	1x Line-out and 1x Mic-in connector (rear)
Graphics	
Graphics Engine	Integrated Intel® HD Graphics series (based on CPU)
VGA	1x VGA connector (rear), resolution up to 1920 x 1200 @ 60 Hz
DisplayPort 1.2	1x DP connector (rear), resolution up to 4096 x 2304 @ 60 Hz
HDMI 1.4	1x HDMI connector (rear) resolution up to 4096 x 2160 @ 24 Hz
Ethernet	
Controller	LAN1: Intel® I219-LM via RJ45 connector (rear)
	LAN2: Intel® I210-AT via RJ45 connector (rear)
Intel® AMT	LAN1 Support
Wake On LAN	LAN1 and LAN2 support
Mechanical and Environmental	
Form Factor	ATX
Dimension	305 mm x 244 mm (W x L)
Operating Temperature	0 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Relative Humidity	40° C @ 95% RH Non-condensing
Certification	CE & FCC Class B

IMB-M45H

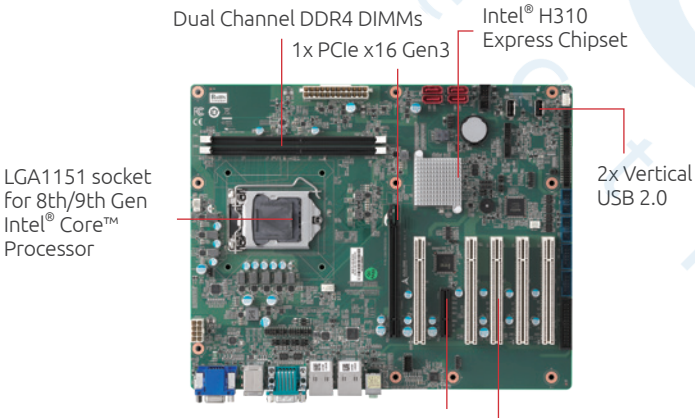
Industrial ATX Motherboard with 8th/9th Gen Intel® Core™ i7/i5/i3 Processor

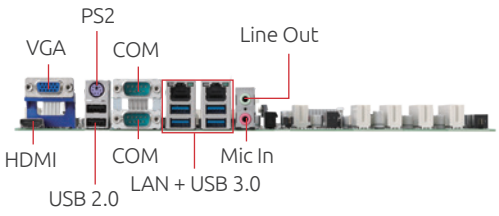
Features

- 8th/9th Gen Intel® Core™ i7/i5/i3 processors support, compatible with Windows® 10
- Up to 64 GB Dual-channel DDR4 2666 MHz(based on CPU)
- Unique power design to ensure stable USB power of 5V ±5%



Product Illustration





Ordering Information

- **IMB-M45H**
  ATX Intel® Core™ i7/i5/i3 industrial motherboard
  Note: CPU, Memory module and Cooler kit are not included

Packing Lists

- **IMB-M45H**
- **IMB-M45H I/O shield**

Optional Accessories

- **USB 2.0 Cable**
  2-port USB 2.0 port cable with bracket
- **LPT Cable**
  1-port LPT port cable with bracket
- **COM Cable**
  2-port COM port cable with bracket
- **2U CPU Cooler**

Specifications

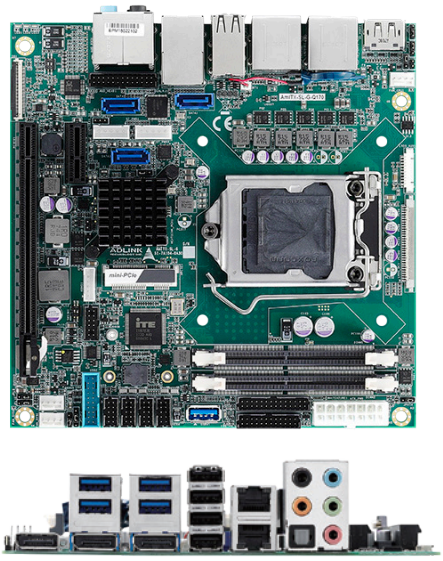
Processor System	
CPU	Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
	Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
	Intel® Core™ i5-9500E, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i5-9500TE, 2.2GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i3-9100E, 3.1GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i3-9100TE, 2.2GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/12T)
	Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/12T)
	Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
	Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (4C/4T)
	Intel® Pentium® G5400, 3.7GHz, 4M Cache, 58W TDP, LGA1151, DDR4 2400MHz support (2C/4T)
	Intel® Pentium® G5400T, 3.1GHz, 4M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/4T)
	Intel® Celeron® G4900, 3.1GHz, 2M Cache, 54W TDP, LGA1151, DDR4 2400MHz support (2C/2T)
	Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support (2C/2T)
Chipset	Intel® H310 Express Chipset
Memory	Two 288 PIN DDR4 Sockets (vertical type) Dual channel DDR4 2400/2666 MHz, up to 64 GB (based on CPU)
BIOS	AMI® UEFI BIOS, 128 Mb SPI Flash Memory
Watchdog Timer	software programmable and can be generate system reset
Hardware Monitor	CPU voltage
	+3.3 V voltage
	+5 V voltage
	+12 V voltage
	CPU temperature
	System temperature
	CPU fan speed
	System fan speed
Operating Systems	Microsoft® Windows® 10 64bit
	OpenSUSE Leap 15.1 64bit
	Fedora 30 64bit
	Ubuntu 18.10 LTS 64bit

*Other Linux Distribution support by request

I/O Interfaces	
Serial ATA	4x SATA 6.0 Gb/s connectors
USB	4x USB 3.0 connectors (rear)
	2x USB 2.0 connectors (rear)
	2x USB 2.0 pin headers
	2x USB 2.0 (vertical type A connector)
Serial Ports	2x RS-232/422/485 with auto flow control connector (rear)
	4x RS-232 pin headers
Expansion slots	1xPCIe x16 Gen3 1xPCIe x4 Gen2 5x PCI 2.2
Parallel Port	1x LPT pin header
PS2 Combo Port	1x PS/2 keyboard & Mouse connector (rear)
DIO	2x 20-pin/2.0mm GPIO pin header: 16 in and 16 out, one ground pin and one power pin (5V/12V/no power, jumper selected)
Audio	
Audio Codec	Realtek® ALC892
Interface	1x Mic-in and 1x Line-out connector (rear)
Graphics	
Graphics Engine	Integrated Intel® HD Graphics series (based on CPU)
VGA	1x VGA connector (rear), resolution up to 1920 x 1200 @ 60 Hz
HDMI 1.4	1x HDMI connector (rear) resolution up to 4096 x 2160 @ 24 Hz
Ethernet	
Controller	LAN1: Intel® I219-LM via RJ45 connector (rear)
	LAN2: Intel® I211-AT via RJ45 connector (rear)
Wake On LAN	LAN1 and LAN2 support
Mechanical and Environmental	
Form Factor	ATX
Dimension	305 mm x 244 mm (W x L)
Operating Temperature	0 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Relative Humidity	40° C @ 95% RH Non-condensing
Certification (EMC)	CE & FCC Class B

AmITX-SL-G

Mini-ITX Embedded Board with 6th/7th Gen Intel® Core™ i7/i5/i3 Desktop Processor



Features

- 6th/7th Gen Intel® Core™ i7/i5/i3, Intel® Pentium® and Celeron® Desktop Processor with Intel® Q170/H110 Chipset
- Up to 32GB dual channel DDR4 at 2133/2400MHz
- PCIe x16, PCIe x1 and Mini PCIe expansion
- 3 DisplayPort outputs on rear IO (Q170)
- Supports Smart Embedded Management Agent (SEMA®) functions

Specifications

- **Processor & System**

CPU

Desktop 6th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket

Intel® Core™ i7-6700 Processor, 4C, 3.4/4.0 GHz, 8M, 65W
Intel® Core™ i7-6700TE Processor, 4C, 2.4/3.4 GHz, 8M, 35W
Intel® Core™ i5-6500 Processor, 4C , 3.2/3.6 GHz 6M, 65W
Intel® Core™ i5-6500TE Processor, 4C, 2.3/3.3 GHz, 6M, 35W
Intel® Core™ i3-6100 Processor, 2C, 3.7 GHz, 3M, 51W
Intel® Core™ i3-6100TE Processor, 2C, 2.7 GHz, 4M, 35W
Intel® Pentium® G4400 Processor, 2C, 3.3 GHz, 3M, 54W
Intel® Pentium® G4400TE Processor, 2C, 2.4 GHz, 3M, 35W
Intel® Celeron® G3900 Processor, 2C, 2.8 GHz, 2M, 51W
Intel® Celeron® G3900TE Processor, 2C, 2.3 GHz, 2M, 35W

Desktop 7th Generation Intel® Core™ i7/i5/i3 and Pentium®/Celeron® Processor, LGA1151 socket

Intel® Core™ i7-7700 Processor, 4C, 3.6/4.2 GHz, 8M, 65W
Intel® Core™ i7-7700T Processor, 4C, 2.9/3.8 GHz, 8M, 35W
Intel® Core™ i5-7500 Processor, 4C, 3.4/3.8 GHz, 6M, 65W
Intel® Core™ i5-7500T Processor, 4C, 2.7/3.3 GHz, 6M, 35W
Intel® Core™ i3-7101E Processor, 2C, 3.9 GHz, 3M, 54W
Intel® Core™ i3-7101TE Processor, 2C, 3.4GHz, 3M, 35W

Supports: Intel® VT, Intel® TXT, Intel® SSE4.2, Intel® HT Technology, Intel® 64 Architecture, Execute Disable Bit, Intel® Turbo Boost Technology 2.0, Intel® AVX2, Intel® AES-NI, PCLMULQDQ Instruction, Intel® Secure Key and Intel® TSX-NI

Chipset

Intel® Q170/H110 Chipset

BIOS

AMI EFI in 16MB SPI BIOS with Intel® AMT 11.0 support (Q170 only)
SPI header for external BIOS, optional onboard SPI BIOS socket

Debug Interface

40-pin multipurpose flat cable connector for use in combination with DB-40 debug module providing BIOS

POST code LEDs, BMC access, SPI BIOS flashing, power testpoints, debug LEDs

Memory

Dual channel non-ECC 2133/2400 MHz DDR4 memory up to 32GB in dual vertical SODIM sockets

SEMA® Support

Supports: voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, flat panel control, general purpose I2C, failsafe BIOS (dual BIOS), watchdog timer and triple Smart Fan control

- **I/O Interfaces**

Expansion Slots

1 PCIe x16 Gen3

1 PCIe x1 Gen2

1x Mini-PCIe card (half size): support ing PCIex1(Gen 2)/USB 2.0 (top side)

1x Mini-PCIe card (full size): support ing PCIex1(Gen 2) or mSATA/USB 2.0 (bottom side)

Serial ATA

3x SATA 6 Gbps ports (Jumper select NA/3.3V/5V for SATA1 and SATA2 to deliver power by SATA pin7; Default is NA)

2x SATA power connector

USB

4x USB 3.0 and 4x USB 2.0 on rear I/O

2x USB 3.0 onboard header (H110: USB 2.0)

1x USB 3.0 on vertical connector with keep out area for dongle (H110: USB 2.0)

KB/MS

1x PS/2 internal header

Serial Ports

3x RS-232 headers, 1x RS-232/422/485 headers
(Support NA (Default)/5V/12V by jumper selection)

Digital IO

10 GPIO via onboard feature connector

Specifications

- **Audio**

Audio Codec

Realtek® ALC886

Interfaces

7.1 channel audio via 5 jacks and S/PDIF output on rear I/O

7.1 channel audio signals and S/PDIF output on internal header

- **Display**

Graphics Core

Intel® 9th generation LP graphics core architecture with up to 18 execution units supporting DirectX 11/12, OGL4.3/4.4, and up to three independent, simultaneous displays

DisplayPort

3x DisplayPort v1.2 with resolution up to 4096 x 2160 @ 24Hz
(3x DisplayPort(Q170) , 2x DisplayPort (H110)

LVDS

LVDS (optional): Single/dual channel 24-bit LVDS up to 1920x1080 @ 60 Hz (from eDP-to-LVDS converter)

eDP (build option)

eDP (optional): Supports 3840x2160 resolution @ 60Hz, 24bpp (not available concurrently with LVDS)

- **Ethernet**

Intel® i219-LM (PHY) Ethernet controller (H110: i219-V)

• Supports Intel® AMT 11.0 (Q170 only)

• Supports Intel® vPro™ (Q170 only)

Intel® i211AT (MAC/PHY) Ethernet controller

10/100/1000 GbE connection

- **TPM**

Atmel AT97SC3204 (optional)

- **Power**

Standard Input: ATX: 12V ±5% / 5Vsb ±5%

AT: 12V ±5%

Peripheral Output: Onboard headers for fan and SATA power

ATX Power Connector (14-pin)

- **Mechanical and Environmental**

Dimension (mm): 170 mm x 170 mm (L x W)

Operating Temperature

Standard: 0˚C to +60˚C

Storage Temperature: -20˚C to +80˚C

Certification: CE, FCC Class B

Relative Humidity

40° C @ 95% RH Non-condensing

- **Operating Systems**

Standard Support

6th Gen CPU: Windows 10/8.1/7, Linux

7th Gen CPU: Windows 10, Linux

Extended Support (BSP)

6th Gen CPU: WES7, Linux, VxWorks (TBD)

7th Gen CPU: Linux, VxWorks (TBD)

- **Intelligent Middleware**

SEMA®

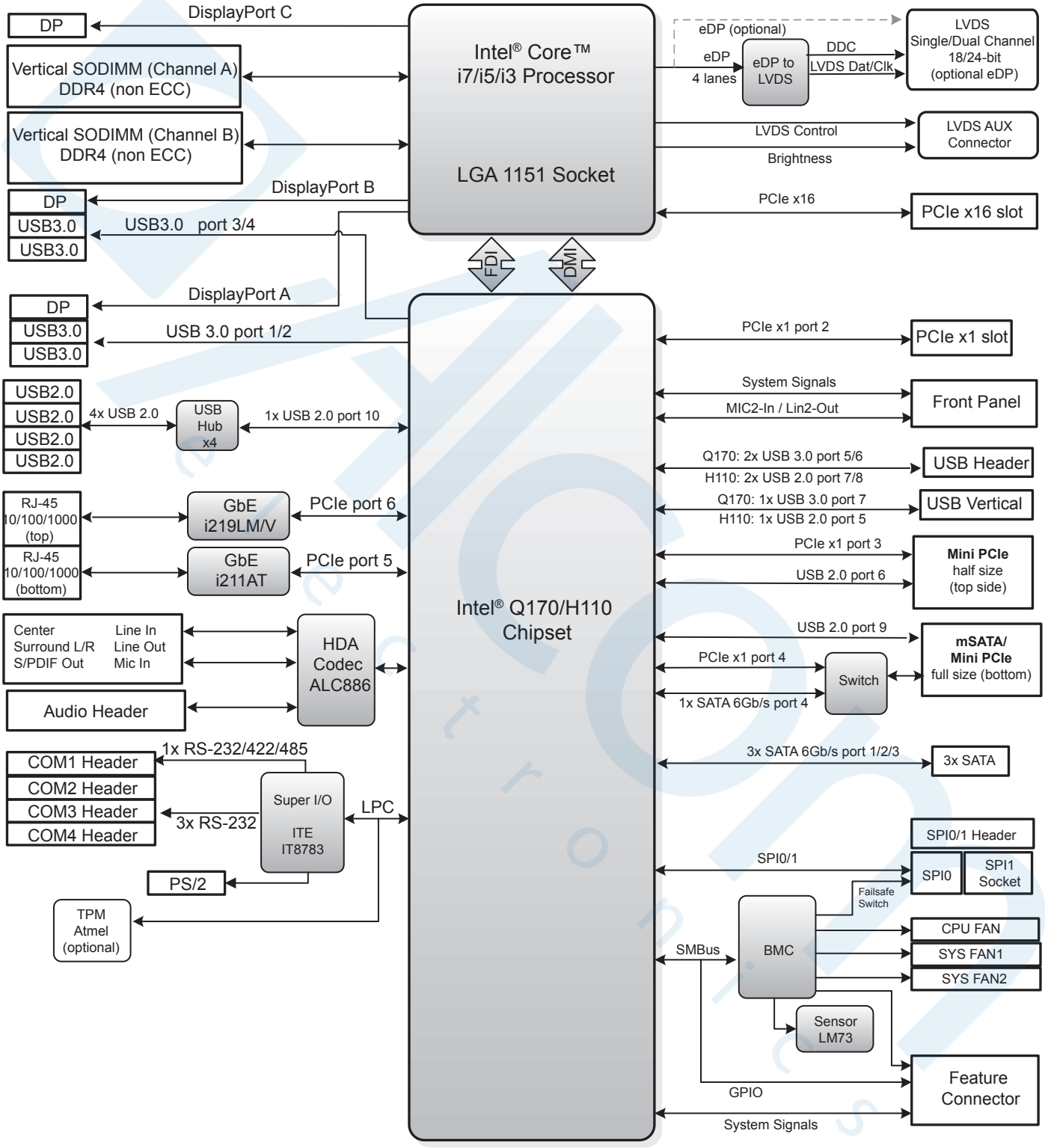
Local management, control of embedded computer systems

Extended EAPI for monitoring, controlling and analytics applications

Multiple OS support and across platforms (x86, ARM)

Note: "Build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that part numbers for SKUs with "build options" will need to be created and may cause production lead times.

Functional Diagram



Ordering Information

- **AmITX-SL-G-Q170**
  Mini-ITX Embedded Board with 6th/7th generation Intel® Core™ i7/i5/i3 Desktop Processor with Q170 Chipset

- **AmITX-SL-G-H110**
  Mini-ITX Embedded Board with 6th/7th generation Intel® Core™ i7/i5/i3 Desktop Processor with H110 Chipset

Packing List

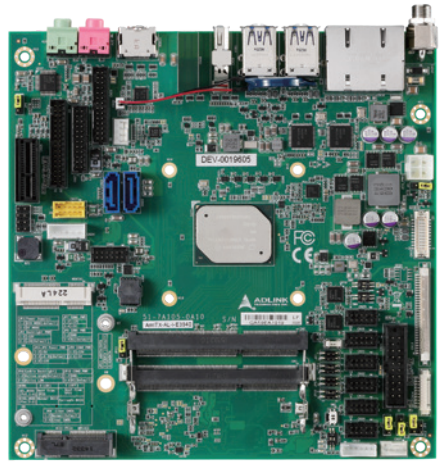
- **30-20872-0000**
  ATX/AT Power Cable
- **30-20875-0000**
  SATA Dual Power Cable
- **30-10057-0600**
  SATA Cable
- **34-25314-1000**
  Rear I/O Shield

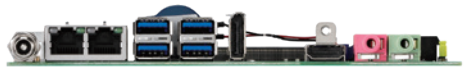
Optional Accessories

- **30-20876-0000**
  COM Port Cable, 1 Port, 25cm
- **30-20873-0000**
  PS/2 KB/MS Cable, 40cm
- **30-20963-0000**
  USB 3.0 Cable, 2 ports, 20cm (for AmITX-SL-G-Q170)
- **30-20874-1000**
  USB 2.0 Cable, 2 ports, 20cm (for AmITX-SL-G-H110)
- **32-20513-0000**
  LGA1150 CPU Cooler, H=30.0mm, 45W
- **32-20512-0000**
  LGA1150 CPU Cooler, H=46.05mm, 45W
- **32-20113-3000**
  LGA1150 CPU Cooler, H=50.2mm, 95W
- **32-20495-0000**
  LGA1150 CPU Cooler, H=61.4mm, 95W

AmITX-AL-I

Thin Mini-ITX Embedded board with Intel Atom® E3900 Series, Pentium®, and Celeron® SoC





Features

- Low-profile Thin Mini-ITX Embedded board
- Intel® VT-x/VT-d supported
- Up to 16GB non-ECC DDR3L memory at 1866/1600MHz in dual stacked SODIMM socket
- Intel® Gen9 Low Power graphics, up to 4k resolution and H.265 codec
- DisplayPort, HDMI, dual channel 18/24-bit LVDS (eDP by build option), supports three independent displays
- Supports Smart Embedded Management Agent (SEMA®) functions
- Extreme Rugged operating temperature: -40°C to +85°C (build option for selected SKUs)

Specifications

- **Processor & System**

CPU

Intel Atom®/Pentium®/Celeron® SoC on 14nm process
Atom® x7-E3950 1.6/2.0GHz (Burst Frequency), 12W (4C/1866)
Atom® x5-E3940 1.6/1.8GHz (Burst Frequency), 9.5W (4C/1866)
Atom® x5-E3930 1.3/1.8GHz (Burst Frequency), 6.5W (2C/1866)
Pentium® N4200 1.1/2.5GHz (Burst Frequency), 6W (4C/1866)
Celeron® N3350 1.1/2.4GHz (Burst Frequency), 6W (2C/1866)
Supports: Intel® VT, Intel® VT-d, Intel® TXT, Intel® 64 Architecture, IA 32-bit, Intel® AES-NI, dual or quad Out-of-Order Execution (OOE) processor cores, PCLMULQDQ Instruction DRNG

BIOS

AMI EFI in 16MB SPI BIOS

Debug Interface

40-pin multipurpose flat cable connector for use in combination with DB-40 debug module to provide BIOS POST code display, BMC access, SPI BIOS flashing, Power Testpoints, Debug LEDs

Memory

Dual channel non-ECC 1866/1600 MHz DDR3L memory up to 16GB in dual stacked SODIMM sockets

SEMA® Support

Supports: Voltage/Current monitoring, Power sequence debug support, AT/ATX mode control, Logistics and Forensic information, Flat Panel Control, General Purpose I2C, Failsafe BIOS (dual BIOS), Watchdog Timer and Fan Control

- **I/O Interfaces**

Expansion Slots

1x PCIe x1 slot
1x Mini PCIe (full size) with USB
1x mSATA (full size)
SIM card slot (build option)
microSD card slot (build option)
Serial ATA
2x SATA 6 Gbps ports (one shared with mSATA)

USB

4x USB 3.0 on rear I/O
1x USB 2.0 on front panel header
2x USB 2.0 on standard header
1x USB 2.0 on Mini PCIe

KB/MS

1x PS/2 internal header

Serial Ports

2x RS-232/422/485 via onboard headers (5V/12V support)
4x RS-232 via onboard headers

Digital IO

10x GPIO on internal feature connector

TPM

TPM header (supports TPM 2.0)

Specifications

- **Audio**

Audio Codec

Realtek® ALC888S

Interfaces

Line-out, Mic-in on rear I/O

7.1 channel signals and S/PDIF output on internal header

- **Display**

Graphics Core

Intel® Generation 9 Low Power Graphics Core Architecture supporting 3 independent and simultaneous display combinations of DisplayPort, HDMI, LVDS or eDP outputs

Hardware encode/transcode (including HEVC)

DirectX 12, DirectX 11.3, DirectX 10, DirectX 9.3 support

OpenGL 4.3 and ES 3.0 support

OpenCL 2.0 support

Triple display: DP + HDMI + LVDS (default)

DisplayPort

1x DisplayPort (2x DisplayPort is build option, one is in place of HDMI), resolution up to 4096x2160@24Hz

HDMI

1x HDMI (co-lay with DP), resolution up to 3840×2160@30 Hz

LVDS

Single/Dual channel 18/24-bit (build option, in place of eDP), resolution up to 1900x1200@ 60 Hz.

eDP

4 lane support (build option, in place of LVDS)

- **Ethernet**

Controller: 2x Intel® Ethernet controller i211 (MAC/PHY)
Note: Intel® Ethernet i210 (build option) is supported for -40°C to +85°C SKU

Interface: 10/100/1000 GbE connection

Wake-on-LAN: Yes

- **Power**

Standard Input: 12V ±5% from internal 4-pin power connector or external DC jack

Peripherals Output: Onboard headers for fan and SATA power

- **Mechanical and Environmental**

Form Factor: Thin Mini-ITX

Dimensions: 170 mm x 170 mm (L x W)

Operating Temp.

Standard Operating Temperature: 0°C to 60°C
Extreme Rugged Operating Temperature: -40°C + 85°C (build option for selected SKUs)

Shock and Vibration

MIL-STD-202G Method 214A, Table 214-I Condition D.

MIL-STD-202G Method 213B, Table 213-I Condition A.

Relative Humidity

10% to 90%, non-condensing

Certification

CE, FCC, Class B

- **Operating Systems**

Standard Support

Windows 10 64-bit, Linux 64-bit

Extended Support (BSP)

Linux 64-bit, VxWorks 64-bit (TBD)

- **Intelligent Middleware**

SEMA®

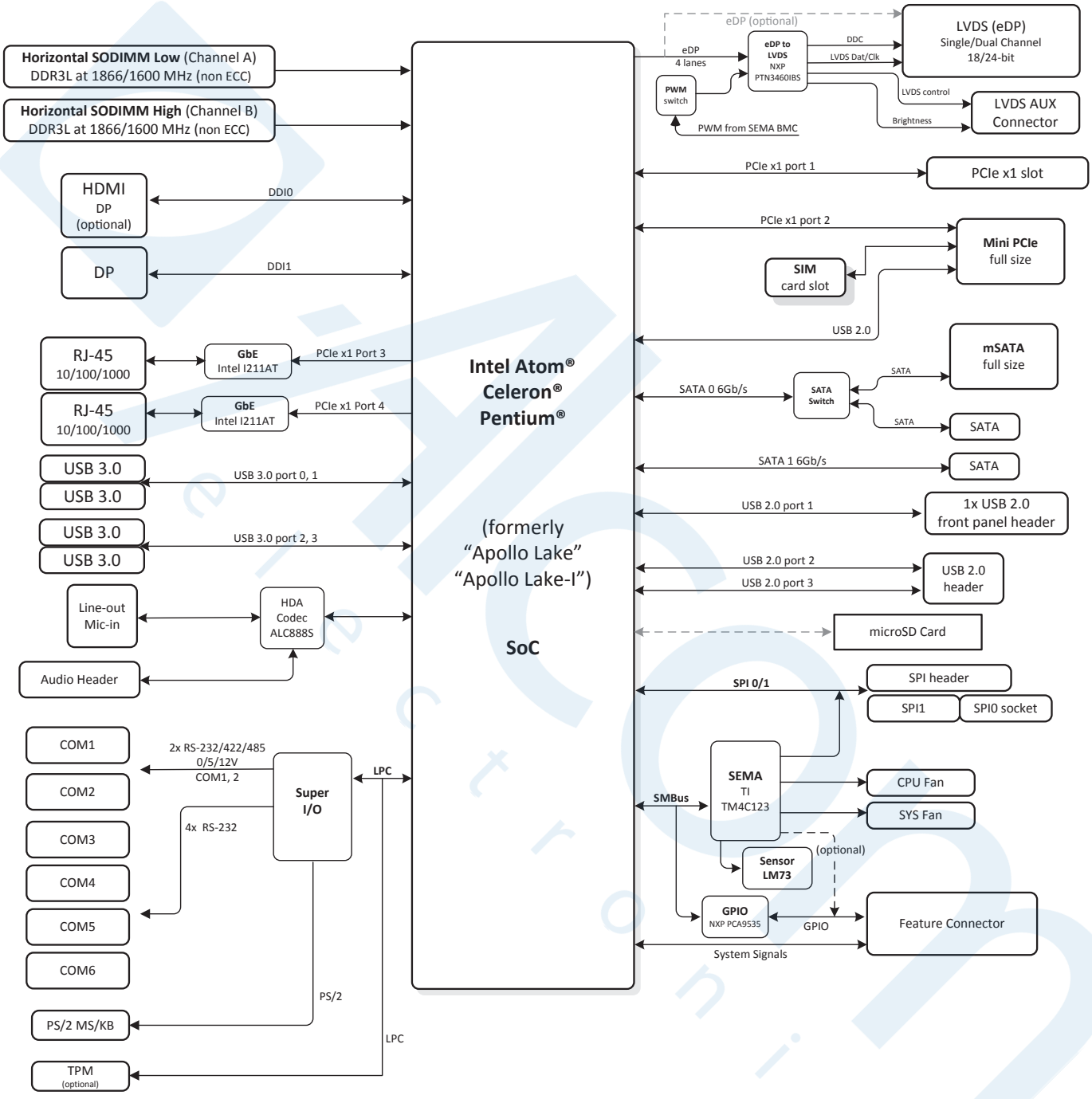
Local management, control of embedded computer systems

Extended EAPI for monitoring, control and analytics applications

Multiple OS support across platforms (x86, ARM)

Note: "Build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that part numbers for SKUs with "build options" will need to be created and may cause production lead times.

Functional Diagram



Ordering Information

- **AmITX-AL-I-E3950**
  Thin Mini-ITX motherboard with Intel Atom® x7-E3950 1.6/2.0GHz (Burst Frequency), 12W (4C/1866)
- **AmITX-AL-I-E3940**
  Thin Mini-ITX motherboard with Intel Atom® x5-E3940 1.6/1.8GHz (Burst Frequency), 9.5W (4C/1866)
- **AmITX-AL-I-E3930**
  Thin Mini-ITX motherboard with Intel Atom® x5-E3930 1.3/1.8GHz (Burst Frequency), 6.5W (2C/1866)
- **AmITX-AL-I-N4200**
  Thin Mini-ITX motherboard with Intel® Pentium® N4200 1.1/2.5GHz (Burst Frequency), 6W (4C/1866)
- **AmITX-AL-I-N3350**
  Thin Mini-ITX motherboard with Intel® Celeron® N3350 1.1/2.4GHz (Burst Frequency), 6W (2C/1866)

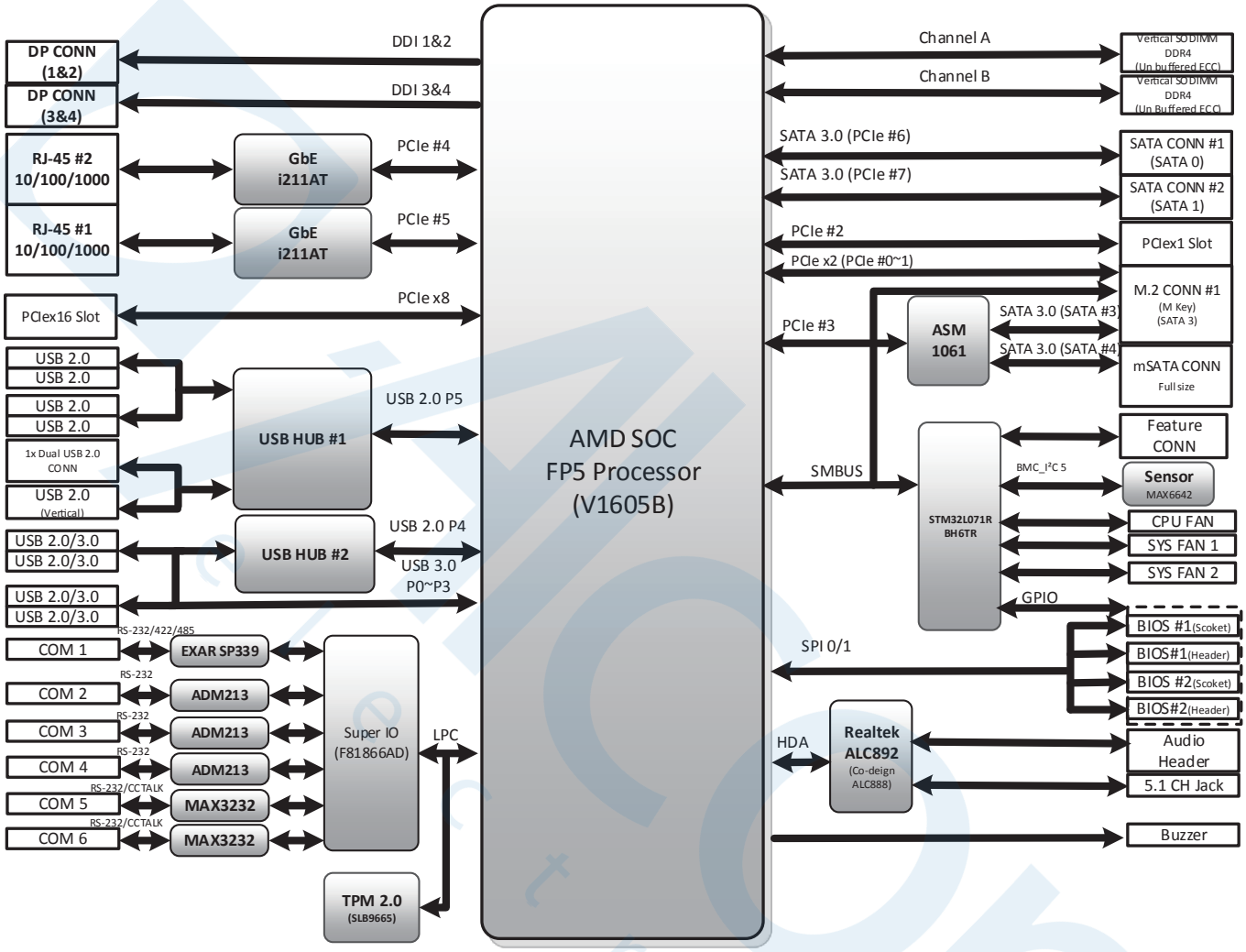
Packing List

- **30-20875-0000**
  SATA dual power cable
- **30-10057-0600**
  SATA cable

Optional Accessories

- **30-20876-0000**
  COM port cable (1 port, 25cm)
- **30-20873-0000**
  PS/2 KB/MS cable (40cm)
- **30-20874-1000**
  USB 2.0 cable (2 ports, 20cm)

Functional Diagram



M100-Nano-AINVR

AI-enabled Embedded NVR Powered by NVIDIA® Jetson Nano™

Preliminary

Features

- NVIDIA® Jetson Nano™ processing/inference engine
  - Quad-core ARM® Cortex®-A57 MPCore processor
  - 128 NVIDIA CUDA® cores
- 8x GbE/PoE for IP GigE cameras
- HDMI, 8-bit digital inputs/outputs, 2x RS-232, 2x USB, GbE for uplink
- Easy to maintain 2.5" SATA storage
- 12V DC input, optional AC/DC PSU

Specifications

	M100-Nano-AINVR
System Core	
Processor	NVIDIA® Jetson Nano™
Memory	4 GB LPDDR4
eMMC	16 GB eMMC 5.1
Graphic Output	
Graphic Output	1x HDMI 2.0
Front Panel I/O Interface	
Ethernet	2x GbE
Camera Interface	8x GbE/PoE (15W each)
USB 3.0	4
USB 2.0	OTG
Serial Port	2x RS-232/485
Side Panel I/O Interface	
DIO	4 input/ 4 output w/ 1KV isolation
Storage Device	
SATA Extension	2.5" SATA SSD
MicroSD	1 (on NVIDIA® Jetson Nano™)
Power Requirements	
DC Input	12V DC input
AC Input	Optional AC-DC adapter, 160W
Fail Reset	Reset/recovery button
Power LED Indicator	Power button
Mechanical	
Dimensions	210 x 170 x 55 (mm)
Weight	TBD
Mounting	Wall mount/ DIN-RAIL
Environmental	
Operating Temperature	0°C ~ +50°C
Operating Humidity	~95% @40°C (non-condensing)
Storage Temperature	-40°C ~ +85°C

DLAP-201-JT2

NVIDIA® Jetson™ TX2 Edge Inference Platform

Features

- Deep learning acceleration with NVIDIA® Jetson™ TX2
- Compact fanless system 148(W)x105(D)x50(H)mm
- Wide temperature range from -20°C to 70°C

Specifications

	DLAP-201-JT2
System Core	
Processor	NVIDIA® Jetson™ TX2
Memory	8GB
eMMC	32GB
Graphic Output	
Graphic Output	1 HDMI 2.0 (w. lock)
Front Panel I/O Interface	
Ethernet	2x GbE
USB 3.0	3x Type A
Audio	Mic-in, line-out (Optional)
Rear Panel I/O Interface	
USB 2.0	1x OTG
Serial Port	1x COM
CAN Bus	1 CAN bus (2.0b)
Internal I/O Interface	
Mini PCIe	1x PCIe mini-card slot
USIM	1x USIM slot
DIO	4 channel DIO
Debug Port	1x debug console
Storage Device	
SATA Extension	mSATA
SD Card	1x SD
Power Requirements	
DC Input	12V
AC Input	Optional 60 W AC-DC adapter
Fail Reset	Reset/recovery button
Power LED Indicator	Power button
CMOS Battery	
Holder	BR2032
Protection	Reverse charge protection
Mechanical	
Antenna Hole	4 x SMA
Dimensions	148(W)x105(D)x50(H)mm
Weight	TBD
IP Grade	IP40
Mounting	Wall mount & VESA & din rail
Environmental	
Operating Temperature	Standard -20°C~70°C
Operating Humidity	~95% @40C (non-condensing)
Storage Temperature	-40°C~85°C

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