AAEON AI SOLUTIONS Powering Intelligent Computing at the Edge

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Platforms Applications Selection guide

About AAEON

AAEON is an award-winning leader in designing and developing AI and Edge Computing hardware solutions. Leveraging our decades of experience in developing rugged embedded systems with our suppliers and partners, AAEON offers a wide range of flexible Al@Edge solutions built to power any project, from Smart Retail to Smart Cities and more. AAEON manufacturer services and OEM/ODM service provides our customers with customized hardware. By connecting our customers with software partners, AAEON can provide complete end-to-end solutions to get your project up and running quickly.

Fog/Workstation Level Solutions

Computing Performance Over 20 TOPS





Al@Edge Partnered Platforms

AAEON has partnered with several key Al Platform developers to provide our customers with turn-key hardware solutions utilizing the most popular platforms on the market today. AAEON provides several embedded systems featuring solutions from Intel®, Nvidia, HiSilicon, Google, and Rockchip. AAEON also offers AI modules powered by Intel® Movidius® Myriad™ X VPU and Kneron KL520 NPU ready to add an AI boost to your hardware.

Solutions Taking Flight with NVIDIA

AAEON is a Preferred Partner member of the NVIDIA Partner Network (NPN), offering platforms including the NVIDIA Jetson Nano, Jetson TX2, Jetson Xavier NX, and Jetson AGX Xavier, as well as NVIDIA GPU driven solutions. From edge solutions to high-performance computing, AAEON has a NVIDIA solution fit for your project.



AI Solutions Powered by Intel®

AAEON's Intel solutions are powered by the innovative Intel® Movidius® Myriad[™] X VPU, providing computing performance up to 4 TOPS per Myriad X on deep neural network inferences. AAEON was the first to offer the Intel Myriad X on a stand-alone mPCle card, the AI Core X. Along with AI Core XM2280 and AI Core XP4/XP8, the Intel Myriad X provides developers with an expandable computing solution, where adding more power is as easy as adding in additional Intel Myriad X modules.

AAEON continues to innovate, with plans to release products based on the 3rd Generation Intel Movidius VPU in the near future. All AAEON Intel Myriad solutions are compatible with the Intel® Distribution of OpenVINO[™] toolkit, and are compatible with frameworks such as Caffe and Tensorflow.



HiSilicon HI3559A

AAEON offers platforms powered by the HiSilicon HI3559A SoC, an 8-core SoC designed around three ARM processors, providing a stable platform with high computing power. Built for high-quality high-speed image processing, the HiSilicon HI3559A offers processing speeds of up to 4.0 TOPS and 4K image processing speeds of 120 fps. The HiSilicon HI3559A is perfect for smart community applications, employing facial recognition, behavioral analysis and object recognition to provide intelligent security. AAEON offers the HiSilicon HI3559A in the versatile BOXER-8410AI.



Google Edge offers low-power high-performance AI computing built for the edge. Leveraging Google's expertise and commitment to open-source utilities, Edge TPU allows you to deploy high-quality ML inferencing at the edge, using various prototyping and production products from Coral. AAEON products with Google Edge TPU are scheduled for release Summer 2020.

AAEON's commitment to offering AI computing at the Edge means expanding our lineup with products designed for low-power consumption with a price tag to match the tight budgets of light AI projects. Our partnership with Kneron and our lineup of products featuring the KL520 NPU is evidence of our continual innovation. Offered in several standard form factors, the Mini-AI-520 mPCle card, M2AI-2242-520 M.2 2242 module, and M2AI-2280-520 M.2 2280 module, the Kneron KL520 NPU delivers energy efficient performance of 0.56 TOPS per Watt, perfect for mobile and unmanned applications.

AAEON offers a range of compact RISC boards powered by Rockchip ARM solutions, providing stable, low-power performance for AI computing on the Edge. Continuing to innovate, AAEON looks to the future release of the RENE-Al99 3.5" sub-compact RISC board featuring the Rockchip RK3399Pro, a newer design of the RK3399 SoC with an on-board dedicated AI accelerator, offering up to 3.0 TOPs while maintaining the same space and energy efficient design.



Google Edge TPU

Google

Kneron KL520 NPU

PICO RISC Boards with Rockchip



AOI Inspection

Automated Optical Inspection (AOI) utilizes AI to identify a range of defects in PCB manufacturing to increase efficiency in production lines. The BOXER-8331AI from AAEON combines the power of high-end CPUs with high-performance Nvidia GPUs to power AOI with Deep Learning Algorithms. Utilizing Al processing in AOI provides for more accurate defect detection, and with the power of the BOXER-8331AI, high-quality images are processed guickly to maintain high production speeds and efficiency. With rich I/O support and expandability, the BOXER-8331AI provides the flexibility to integrate with existing infrastructure with Al solutions, shortening time-to-market and reducing downtime.





Smart Retail

Improving Smart Retail, and reducing loss in Self-Checkout lanes was the goal of one company which developed an Al software combining object recognition with behavioral analysis. They turned to AAEON and the RICO-3399 to power their innovative solution. The RICO-3399 provides stable and reliable operations with RISC processing, while it's compact PICO-ITX form factor allows it to fit into existing infrastructure. Utilizing two cameras, the system tracks items through the checkout process. It can detect if an item isn't scanned properly and alert store management of possible theft.

Smart Street Light

AAEON leads development of Smart City applications with our Smart Street Light solutions. Utilizing the Al Core X powered by Intel® Movidius® Myriad™ X, the AAEON Atlas solution combines several tasks into one system, with license plate and facial recognition. Linking to cloud services such as Microsoft Azure, the system can be deployed in conjunction with Digital Signage to deliver targeted advertising or public information based on the viewer's gender, age or even clothing. This brings even greater flexibility and integration of services to Smart City infrastructure.





interest.

Smart Parking

AAEON is on the forefront of developing solutions for Smart City applications. One example is license plate recognition in Smart Parking meters and garages. The BOXER-8120AI is a compact solution which brings AI computing to the edge, providing a rugged fanless platform capable of operating in any environment. Utilizing Deep Learning Algorithms, the BOXER-8120AI can process images in poor visibility, including low lighting or inclement weather. Cameras also do not need to be perfectly aligned with license plates, allowing greater flexibility in placement, including above street-side parking, easily integrating with street lights and other Smart City infrastructure.



Service Robots

Helping to reduce the workload of busy hotel staff, as well as prevent spreading of disease, the compact BOXER-8110AI is powering hotel service robots to help deliver food or supplies to guests. Powered by the NVIDIA Jetson TX2, the BOXER-8110Al is able to determine the best route to and from guest rooms, avoiding obstacles and people along the way. The system communicates wirelessly to control elevators, and can also detect when elevators are crowded and wait for an empty lift. The service robot provides a secure delivery system with integrated touch panel that allows only the correct guest to retrieve their order.

Smart Security

Deploying AI powered facial recognition in Smart Security applications give security staff a clearer picture of their watch. The AIOT-AIVD couples Intel® processors with Intel® Movidius® Myriad[™] X to power AI computing at the edge. The AIOT-AIVD is a compact system capable of deploying in a wide range of environments. Intel® distribution of OpenVINO™ provides access to model optimization for more efficient processing. With the AIOT-AIVD, security teams can power access control with VIP and blacklist identification, as well as identifying age, gender and even clothing for persons of



AI Systems

Intel® Platforms

(intel[®])









Model	BOXER-8310AI	BOXER-8320AI	AIOT-AIVD	UPX-EDGEI7-A10-1664-FX1
CPU	Intel® Pentium® N4200 Intel® Celeron® N3350	Intel® Core™ i3-6100U	Intel® Pentium® N4200 Processor	Intel® 8th Gen Core™ i3/i5/i7/Celeron® Processor
AI Solution	Intel® Movidius™ Myriad™ X x 1	Intel® Movidius™ Myriad™ X x 2	Intel® Movidius™ Myriad™ X x 1	Intel® Movidius™ Myriad™ X x 2
Computing Performance (TOPS)	4 TOPS	8 TOPS	4 TOPS per Myriad™ X	4 TOPS per Myriad™ X
Onboard Memory	DDR3L SODIMM slot x 1 Supports 1867 MHz and up to 8GB	DDR4 SODIMM slot x 1, Support 2133MHz and up to 16GB	Onboard 8GB LPDDR4 memory	Onboard 16GB LPDDR4 memory
Onboard Storage	mSATA	HDD/SSD	64GB eMMC on board 500GB HDD x 1 (Optional)	64GB eMMC on board with pre-load Ubuntu 18.04
1/0	USB 3.2 Gen 1 x 4 HDMI x 1 LAN x 2 RS-242/422/485 x 3 VGA x 1 Antenna hole x 2 Mic in and Line out Remote on/off	RS-232/422/485 x 4 LAN x 2 USB 3.2 Gen 1 x 4 VGA x 1 HDMI x 1 Antenna hole x 2	LAN x 1 HDMI x 1 DP x 1 USB 3.2 Gen 1 x 3	LAN x 2 HDMI x 1 DP x 1 USB 3.2 Gen 1 x 4 40 pin GPI0 RS-232/422/485 x 2
Operating Temperature	-25°C ~ 55°C	-25°C ~ 60°C	0°C ~ 60°C	-20°C ~ 70°C



















Model	UPS-GWS01X7-0464-WIND01	UPS-GWS01X7-0464-AI	VPC-5600AI	VPC-3350AI
СРИ	Intel Atom® E3950	Intel Atom® E3950	Intel® 7th Gen. Core™ i3/i5/i7 Processor (Default: i3-7100U; Project base: i5-7300U, i7-7600U)	Intel® Atom™ Processor E3940
AI Solution	Intel® Movidius™ Myriad™ X x 1	Intel® Movidius [™] Myriad [™] X x 1	Intel® Movidius™ Myriad™ X x 1	Intel® Movidius™ Myriad™ X x 1, up to 4
Computing Performance (TOPS)	4 TOPS per Myriad™ X	4 TOPS per Myriad™ X	4 TOPS	4 TOPS, Up to 16 TOPS
Onboard Memory	Onboard 4GB LPDDR4 memory	Onboard 4GB LPDDR4 memory	Up to 32GB, DDR4 260-pin SODIMM	Up to 8GB, DDR3L 204-pin SODIMM
Onboard Storage	64GB eMMC on board with pre-load Windows 10	64GB eMMC on board	2.5" SSD x 2, mSATA Slot x 1	2.5" HDD/SSD Bay x 1, eMMC/mSATA (optional)
1/0	LAN x 1 HDMI x 1 DP x 1 USB 3.2 Gen 1 x 3	LAN x 1 HDMI x 1 DP x 1 USB 3.2 Gen 1 x 3	HDMI x 1 DP x 1 Giga LAN x 2 + 4 PoE Ports USB 3.2 Gen 1 x 4 RS-232/422/485 x 2 8bit DIO x 1 CANBus x 1 Audio input x 1 Audio output x 1	HDMI x 1 DP x 1 Giga LAN x 1 + 4 PoE Ports USB 3.2 Gen 1 x 2 RS-232/422/485 x 2 8bit DIO x 1 Audio input x 1 Audio output x 1
Operating Temperature	0°C ~ 60°C	0°C ~ 60°C	-20°C ~ 60°C	-20°C ~ 60°C for Myriad™ X x 2

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Model	BOXER-8170AI	BOXER-8220AI	BOXER-8221AI	BOXER-8222AI
PU	HMP Dual Denver 2 + Quad ARM A57	Quad Core ARM® Cortex®-A57 MPCore Proccessor	Quad Core ARM® Cortex®-A57 MPCore Proccessor	Quad Core ARM® Cortex®-A57 MPCore Proccessor
Solution	Nvidia Jetson TX2	Nvidia Jetson Nano	Nvidia Jetson Nano	Nvidia Jetson Nano
omputing erformance	1.3 TFLOPS	472GFL0Ps	472GFL0Ps	472GFL0Ps
ystem Memory	8GB LPDDR4	4GB LPDDR4	4GB LPDDR4	4GB LPDDR4
torage Device	32GB eMMC 5.1 MicroSD	16GB Micro-SD or eMMC	16GB Micro-SD or eMMC	16GB Micro-SD or eMMC
0	LAN x 1 HDMI 2.0 x 2 PoE x 4 (PSE 15W) USB 3.2 Gen 1 x 4 RS-232/422/485 x 2 OTG x 1 Antenna hole x 2	USB 3.2 Gen 1 x 4 LAN x 5 RS-232 x 2 HDMI x 1 Micro-USB x 1 (Flash OS)	USB 3.2 Gen 1 x 4 LAN x 1 RS-232 x 2 HDMI x 1 MicroSD x 1 Micro-USB x 1 (Flash OS)	USB Type A x 4 for USB 3.2 Gen 1 GbE LAN x 2 (GbE PD x 1 + GbE LAN x 1) 40-pin I/O x 1 (GPIO/I2S/I2C/Audio/SPI/ UART) HDMI Type A x 1 for HDMI 2.0 a/b DB-9 (RS232) 0.S Flash port x 1 Recovery port x 1 Antenna opening x 2
perating Temperature	-20°C ~ 50°C	-20°C ~ 60°C	-20°C ~ 50°C	-20°C ~ 60°C





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20AI	BOXER-8130AI	BOXER-8150AI
I ARM A57	HMP Dual Denver 2 + Quad ARM A57	HMP Dual Denver 2 + Quad ARM® A57
	Nvidia Jetson TX2	Nvidia Jetson TX2
	1.3 TFLOPS	1.3 TFLOPS
	8GB LPDDR4	8GB LPDDR4
	32GB eMMC 5.1 MicroSD	32GB eMMC 5.1 MicroSD
	USB 3.2 Gen 1 x2 LAN x 1 RS-232 x 1 MicroSD x 1 OTG x 1 MIPI-CSI2 board to board connector	USB 3.2 Gen 1 x 8 RS-232 x 1 HDMI x 2 LAN x 1 MicroSD x 1 Antenna hole x 2 OTG x 1
	-20°C ~ 50°C	-20°C ~ 50°C







AI Systems

Nvidia[®] Platforms









	Model	BOXER-8331AI	BOXER-8240AI (TBD)	BOXER-8251AI	VPC-N400AI
	CPU	6th / 7th Gen Intel® Core™ i desktop and Xeon® server grade processor	8-core ARM v8.2 64bit CPU, 8MB L2 + 4MB L3	6-core NVIDIA Carmel ARM®v8.2 64-bit CPU 6MB L2 + 4MB L3	Quad-core ARM® Cortex®-A57 MPCore processor
	AI Solution	Nvidia RTX Graphic Card	Nvidia Jetson AGX Xavier	Nvidia Jetson Xavier NX	Nvidia Jetson Nano
	Computing Performance	227.7 TOPS	32 TOPS	21 TOPS	472GFLOPs
	System Memory	DDR4 ECC or Non-ECC SODIMM, up to 32GB	16GB 256-Bit LPDDR4x 137GB/s	8 GB 128-bit LPDDR4x @ 1600 MHz 51.2GB/s	4 GB LPDDR4
	Storage Device	2 x 2.5" Drive Bay	32GB eMMC 5.1 with MicroSD	16GB EMMC with Micro SD	16 GB eMMC SATA x 1 removable
	1/0	HDMI x 2 USB 3.2 Gen 1 x 4 RS-232/422/485 x 1 LAN x 5 Mic in Line out	POE (PSE 15W) x 4 Type C USB 3.2 Gen1 x 2 Type A USB 3.2 Gen1 x 1 Type A USB 2.0 x 1 Line in and out HDMI x 1 DP x1 RS-232/422/485 x2 UFS/SD card x 1	USB 3.2 Gen 1 x 4 LAN x 1 RS-232 x 2 HDMI x 1 MicroSD x 1 DC Power Input x 1 Recovery Button x 1 Micro-USB for Flash OS x 1	Power button x 1 IR receiver x 1 USB 2.0 x 1 Giga LAN x 1 PoE port x 8 Audio input x 1 Audio output x 1 USB 3.0 x 1 RS-232 x 1 RS485 x 1 HDMI x 1
	Operating Temperature	-20°C ~55°C (TDP 35W Processor) -20°C ~45°C (TDP 73W Processor)	-25°C ~ 55°C	-20°C ~ 30°C	-20°C ~ 65°C

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Google Platform



Model	BOXER-8521AI	
CPU	NXP i.MX 8M SoC (Quad-core Cortex-A53, plus Cortex-M4F)	
AI Solution	Google Edge TPU ML accelerator coprocessor	
Computing Performance	4 TOPS	
System Memory	1GB LPDDR4	
Storage Device	8GB eMMC Micro-SD	
1/0	PoE/PD x 1 USB 3.2 Gen 1 x 2 USB2.0 x 2 HDMI x 1 MicroSD slot x 1 OTG x 1 RS-232/485 x 1 40-pin Expansion header x 1	
Operating Temperature	-20°C ~ 60°C	

HiSilicon Platforms



USB Type B (USB 2.0) x 1 (for flash image),

RJ-45 GbE LAN x 2, DB-9 RS-232 x 2, DB-9

terminal block +12V DC-in x 1, MicroSD x 1,

Remote Power On/Off

Operating Temperature -20°C ~ 55°C

RJ-45 GDE LAN x 2, DB-9 RS-232 x 2, DB-9 Console Port x 1, Audio in x 1, Line out x 1, 2-pin RS-485 x 1

Rockchip Platform



woaei	KUXEK-32TUAI
CPU	Dual-core Cortex-A72 up to 2.0GHz Quad-core Cortex-A53 up to 1.5GHz
Al Solution	RK1808 NPU 1920 INT8 MACs, 192 INT16 MACs, 64 FP16 MACs
Computing Performance	3 TOPS
System Memory	LPDDR4 4GB RAM for CPU LPDDR3 1GB RAM for NPU
Storage Device	16GB eMMC onboard Micro-SD
I/O	USB 2.0 x 2, HDMI x 1, LAN x 1, MicroSD x 1, OTG x 1, RS-232 x 1, Audi Jack x 4 $$
Operating Temperature	0°C ~ 60°C

AI Modules

Intel® Platforms



System			
Platform	Intel®	Intel®	Intel®
IC	Intel® Movidius™ Myriad™ X VPU x 2, MA2485	Intel® Movidius™ Myriad™ X VPU, MA2485	Asmedia PCIe switch
Support frame work	Tensorflow, Caffe, MXNET	Tensorflow, Caffe, MXNET	Tensorflow, Caffe, MXNET
Others			
Form Factor	M.2 2280 B+M KEY	Mini PCle	PCIe x 4 card, full length, low profile
Dimension	3.15" x 0.87" (80 mm x 22 mm)	2.01" x 1.18" (51 mm x 30 mm)	4.37" x 6.57" (111 mm x 167 mm)
Certification	CE/FCC Class A	CE/FCC Class A	CE/FCC Class A
Operating Temperature	32°F ~ 122°F (0°C ~ 50°C)	32 °F ~ 140 °F (0 °C ~ 60 °C)	32°F ~ 122°F (0°C ~ 50°)
Operating Humidity	10% ~ 80% relative humidity, non-condensing	10% ~ 80% relative humidity, non-condensing	10% ~ 80% relative humidity, non-condensing

USB 3.2 Gen 1 x 2

MicroSD slot x 1

-20°C ~ 55°C

AI Development Kit

Kneron Platform





Model	PICO-APL3-A10-CS-WAI01
CPU	N3350
AI Solution	M.2 2280 Kneron KL520
Computing Performance	0.5 TOPS
System Memory	2GB DDR3L
Storage Device	32GB eMMC
Display Interface	HDMI
I/O Interface	USB 3.2 Gen1 x 2, GbE x 1
Accessories	Power Adapter, USB HD Camera

Kneron Platforms









Model	M2AI-2242-520	M2AI-2280-520	Mini-Al-520	
System				
Platform	Kneron	Kneron	Kneron	
IC	Kneron KL520	Kneron KL520	Kneron KL520	
Туре	Integrated SoC	Integrated SoC	Integrated SoC	
Support Framework	ONNX, TensorFlow, Keras, Caffe	ONNX, TensorFlow, Keras, Caffe	ONNX, TensorFlow, Keras, Caffe	
Support Model	Vgg16, Resnet, GoogleNet, YOLO, Tiny YOLO, Lenet, MobileNet, DenseNet	Vgg16, Resnet, GoogleNet, YOLO, Tiny YOLO, Lenet, MobileNet, DenseNet	Vgg16, Resnet, GoogleNet, YOLO, Tiny YOLO, Lenet, MobileNet, DenseNet	
Memory Type	LPDDR2	LPDDR2	LPDDR2	
NPU Power Efficiency	0.56Tops @ 0.5W	0.56Tops @ 0.5W	0.56Tops @ 0.5W	
Overall Power Consumption	0.5-0.9W	0.9W	0.5-0.9W	
Others				
Operating Temperature	32°F ~ 158°F (0°C ~ 70°C)	32°F ~ 158°F (0°C ~ 70°C)	32°F ~ 158°F (0°C ~ 70°C)	
Storage Temperature	-40°F ~ 185°F (-40°C ~ 85°C)	-40°F ~ 185°F (-40°C ~ 85°C)	-40°F ~ 185°F (-40°C ~ 85°C)	
Operating Humidity	0% ~ 90% relative humidity, non-condensing	0% ~ 90% relative humidity, non-condensing	0% ~ 90% relative humidity, non-condensing	
Certification	CE/FCC Class A	CE/FCC Class A	CE/FCC Class A	



Focus • Agility • Competitiveness

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