

SCALING AT THE EDGE

AAEON UP
Element i12 Edge

AAEON[®]
an **ASUS** ASSOC. CO.

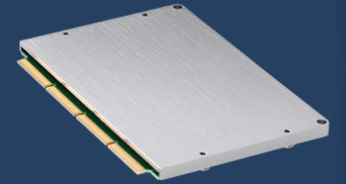


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Director of Product Mgmt., Robotics Sftw.
Intel



Owen Wei
Marketing & BDM Manager
AAEON Technology

THE NEXT-LEVEL EDGE SYSTEM UP Element i12 Edge



12th Gen Intel® Core™
processors



Intel® Iris® X^e
graphics



Intel® NUC 12
Compute Element



2.5GbE
LAN



Three 4K
Displays



Intel® Wi-Fi 6E
CE-RED
Certified

BUILT FOR THE RUGGED APPLICATION

Shock (Tested by AAEON) : with shock absorber kit
MIL-STD-202G Method 213B, Table 213-I Condition A

Vibration (Tested by AAEON) :
IEC 60068-2-6: 1G, 5-500Hz, 3 axes
IEC 60068-2-64: Operating 5Grms, 5-500 Hz, 3 axes



GPIO PIN define

1	GND	11	GND
2	D_OUT1	12	D_IN1
3	D_OUT2	13	D_IN2
4	D_OUT3	14	D_IN3
5	D_OUT4	15	D_IN4
6	D_OUT5	16	D_IN5
7	D_OUT6	17	D_IN6
8	D_OUT7	18	D_IN7
9	D_OUT8	19	D_IN8
10	GND	20	GND

COM Port and Isolated GPIO

RS232/422/485 PIN define

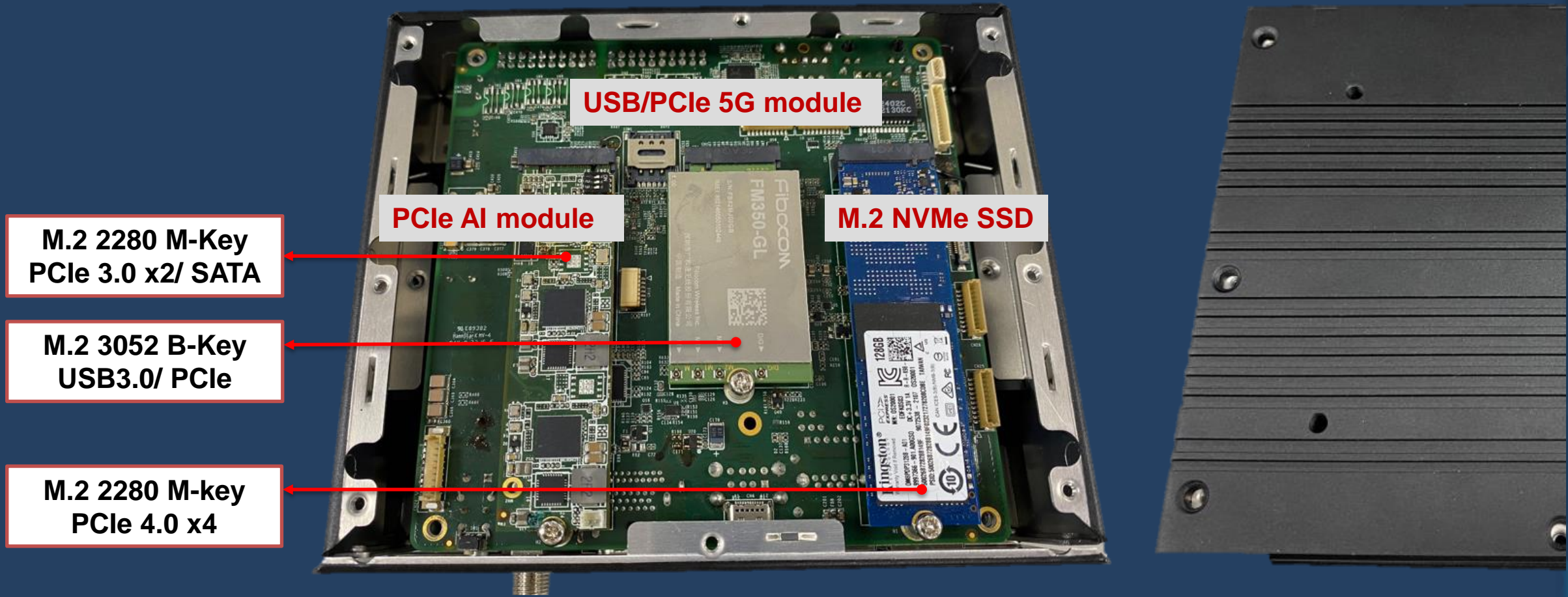
1	RxD	11	RxD
2	DCD	12	DCD
3	DTR	13	DTR
4	TxD	14	TxD
5	RTS	15	RTS
6	DSR	16	DSR
7	RI	17	RI
8	CTS	18	CTS
9	GND	19	GND
10	GND	20	GND

Lockable design reserved for I/O cables

Optional shock absorber kit

Easy for Expansion

After removing 8 screws, various M.2 modules can be installed!!



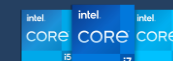
UP Element i12 Edge



Ruggedized Fanless System powered by System-On-Module Intel® NUC 12 Compute Element (U-Series)

- Support for up to three 4k@60Hz displays
- OOB support in Windows (vPro SKU only via i219 LAN)
- Up to 3x M.2 slots for expansion (AI/ Storage/ 5G)
- Upgradeable to next-generation Intel® NUC Compute Element
- Longevity follows Intel CCG policy – Estimated to 2026

OpenVINO™



- Intel® Core™ i3-1215U
- Intel® Core™ i5-1235U
- Intel® Core™ i7-1255U
- Intel® Celeron® 7305
- Up to 10C/ 12T with 28W
- Intel® Iris® Xe Graphics



POWERFUL



- PCIe 4.0x4 NVMe SSD supported
- 5G supported via M.2
- Dual-channel LPDDR5, up to 32GB @3200MT/s
- On board Intel® Wi-Fi 6E 802.11ax (CE-RED certified)

FAST



- 9~36V DC-IN
- Isolated 16-pin GPIO
- 2x RS232/422/485
- TPM 2.0
- Operating temp.: 0~60 degree
- Lockable I/O design
- Wall-mount support

INDUSTRIAL & SECURE



- Ubuntu 22.04 LTS/ Yocto 4.0.x/ Windows 10/11 IoT
- Intel® Distribution of OpenVINO™ toolkit/ Media SDK/ oneAPI/ ROS2
- Intel® Edge Insights for AMR SDK
- Intel® Edge Insights for Industrial

SOFTWARE & FRAMEWORK



UP Compute Element Robotic Kit



Q4, 2022

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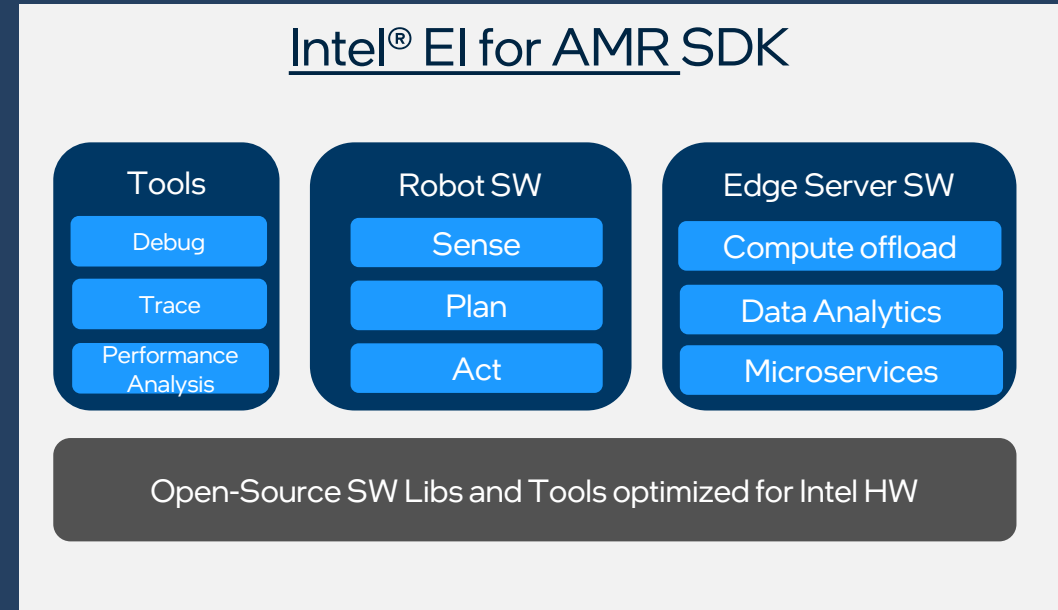
the gap

Intel® Edge Insights for Autonomous Mobile Robots (Intel® EI for AMR)

Built on Intel's CPU, GPU, and accelerator SoCs

An open and modular toolkit targeted for autonomous mobile robot applications

- Makes it easy to develop and deploy robotic solutions in various market segments across diverse use cases
- Usable as a whole stack or individual building blocks
- Allows full code reuse across Intel® SoC family: Atom®, Core™, Xeon®, and VPU, GPU
- Facilitates SW workload orchestration across Robot → Edge → Cloud
- Optimized for Intel Si architecture
- Rich ecosystem of HW and SW partners 
- Includes Distribution of OpenVINO™ toolkit & OneAPI toolkits to deploy specialized workloads across different Intel Si arch



Available for download today:
[EI for AMR](#)

What is Autonomous Mobile Robot (AMR)

3D Camera and AI Vision

AI Object Detection, DL model training, and 3-D sensing



Lidar and Robot Sensors

High-Definition Map Exploration, Localization and Obstacle Avoidance for Decision and Control System



Omnidirectional-Wheels

Based on Omni-directional movement with more accurate localization to reduce error accumulation



Hardware Time Synchronization

Hardware time sync feature for sensor fusion

Robot Controller

UP Element i12 Edge featuring Intel® NUC 12 Compute Element



Motion Controller

Control command transformed to corresponding speed and output to Motor Driver to realize various robot motion capabilities



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Flexible Robot Platform

- Omnidirectional Control
- Up to 80Kg payload for flexible upgrade components
- 200 x 190 mm free space for robot controller installation
- Maximum Flexible capability for upgrading
- Run on Ubuntu 20.04 + ROS 2 middleware
- Zephyr RTOS software for motor control
- Support ACRN hypervisor VM



Robotic Development Platform

Maximal freedom of movement with the omnidirectional wheel system. The robot platform is ideal for application development especially in the field of logistics and navigation, whether for motion planning, autonomous driving with sensor or actuators and equipped with an integrated robot controller, it is possible to work on a broad spectrum of topics.



AAEON TECHNOLOGY



Education Robot ARM
Hypervisor, Real-time control



UP Element i12 Edge
12th robot controller (In the future, 13th will also be available)



AI Depth Camera
Intel® RealSense™
D435i, D405, D457



TSMC card
Multi-channel time-sync
RTK support

GMSL Camera
GMSL2 camera



IP68 T-BOX
Multi-channel time-sync
RTK support

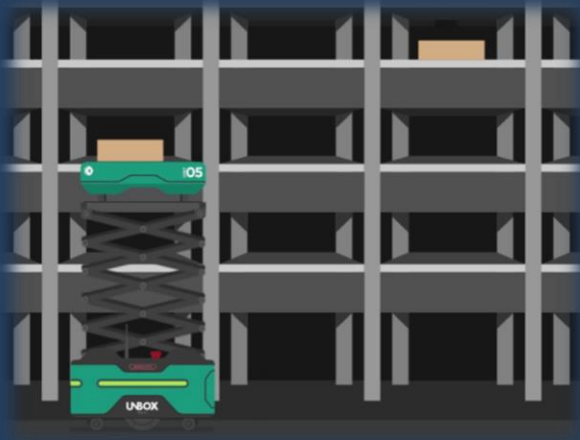
3D LiDAR
Syncbotic SLAM script
Velodyne, Ouster



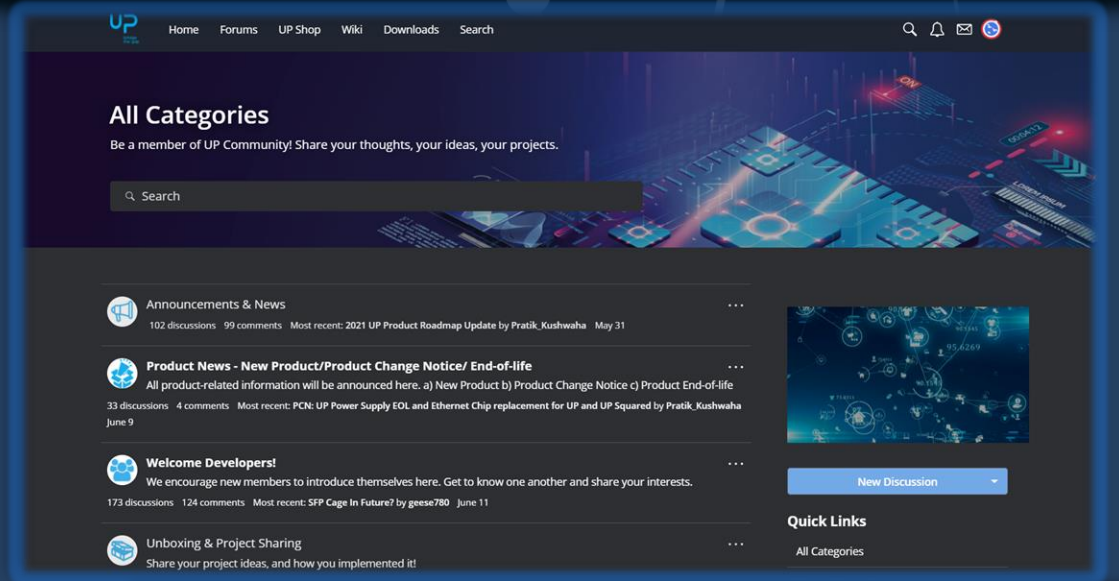
Motion Control Board
Zephyr OS, EtherCAT
control, Micro-ROS

Target Usage Scenarios

- Robotics (AMR)
- Industrial Automation
- AI Compute Vision
- Access Control



For more information:
<https://up-board.org/>



Community Support

UP Community

Join our developer community and share your knowledge about UP. Stuck with your project? Get help from one of the hundreds of industry professions that are already using UP!

UP Wiki

Learn more about UP with code and project examples, tutorials and OS installation guides

UP Downloads

Download everything you need to start your project. Our download area includes drivers, OS image, 2D/3D drawings, environment test reports, certifications and more.

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Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

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