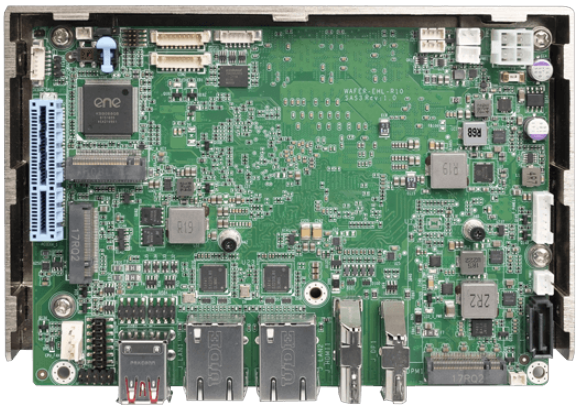
WAFER-EHL

3.5” SBC supports Intel® Celeron® J6412 on-board SoC, triple display with DP, HDMI™ and IDPM slot, dual 2.5 GbE, USB 3.2 Gen 2, M.2, SATA 6Gb/s, COM, iAUDIO and RoHS, -10°C ~60°C



Features

» 3.5” SBC supports Intel® Celeron® J6412 on-board SoC

» Support Triple independent display via HDMI™, DP, iDPM

» Support Dual Intel® 2.5GbE

» Support one PCIe Gen3 x4 slot, M.2 A key, M.2 B key expansions

Specifications

System	
CPU	Onboard Intel® Atom™ x6000 series / Pentium® / Celeron® processor (Elkhart Lake platform)
	Intel® Celeron® J6412 on-board SoC (up to 2.6GHz, quad-core, 1.5M Cache, TDP=10W)
Memory	Onboard LPDDR4x 8GB default
Memory Max.	up to 16GB
Cooling method / System Fan	1 x System fan connector (1x4 pin)
Physical Characteristics	
Dimensions (LxWxH) (mm)	146mm x 102mm
Net Weight	GW: 850g / NW: 350g
Storage	
Storage	1 x SATA : 6Gb/s with 5V SATA power connector
	1 x M.2(NGFF) : B Key (3042/2242) with PCIe Gen3 x2, support NVME storage
I/O Interface	
Display Output	1 x HDMI™ : up to 3840 x 2160@30Hz
	1 x Display Port : up to 3840 x 2160@60Hz
	1 x iDPM : 3040 slot (only for iEi eDP/LVDS/VGA module)
Ethernet	2 x LAN -
	LAN1: Intel® I225V/I226V 2.5GbE controller
	LAN2: Intel® I225V/I226V 2.5GbE controller
Audio	1 x HD Audio : 1 x iAUDIO, support IEI AC-KIT-888S Audio Module (2 x 5 pin)
I/O Interface	2 x Internal RS-232/422/485 : 1x9 pin, P=1.25
	4 x Internal USB 2.0 : 2x4 pin, P=2.00
	1 x DIO 12-bit digital I/O (2x7 pin)
	2 x External USB 3.2 Gen2x1 : 10Gb/s
Expansion	1 x PCIe x4 : PCIe Gen3 x2 signal
	2 x M.2(NGFF) - 1 x M.2 A Key for WIFI & BT (2230)(PCIe Gen3 x1/USB 2.0 signal) 1 x M.2 B key (3042/2242) w/ SIM holder (PCIe Gen3 x2/USB 2.0 signal)
Power	
Power Consumption	12V@3.14A (Intel® Celeron® J6412 2.0GHz with on-board 8GB 3200MHz LPDDR4 memory and EUP enabled)
Power Supply	+12V DC input power (AT/ATX mode)

Ordering Information

WAFER-EHL-J6412C-R11	3.5" SBC supports Intel® Celeron® J6412 on-board SoC with 8GB LPDDR4x memory on board default, triple display with DP, HDMI and iDPM slot, Dual Intel® I226V 2.5GbE, USB 3.2 Gen 2, M.2, SATA 6Gb/s, COM, iAUDIO, RoHS

Packing List

1 x WAFER-EHL single board computer	1 x Power cable for P4
1 x SATA with power cable kit	1 x QIG

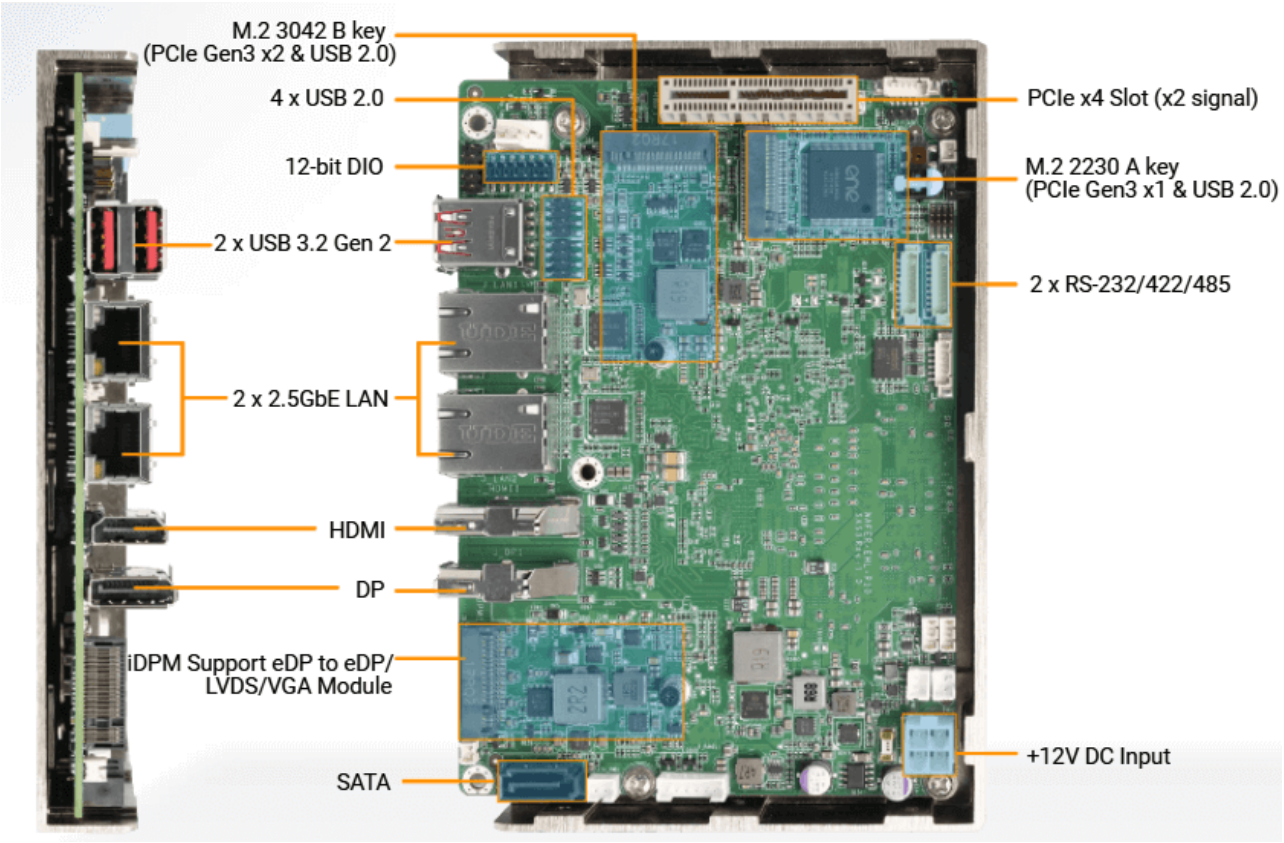
Options

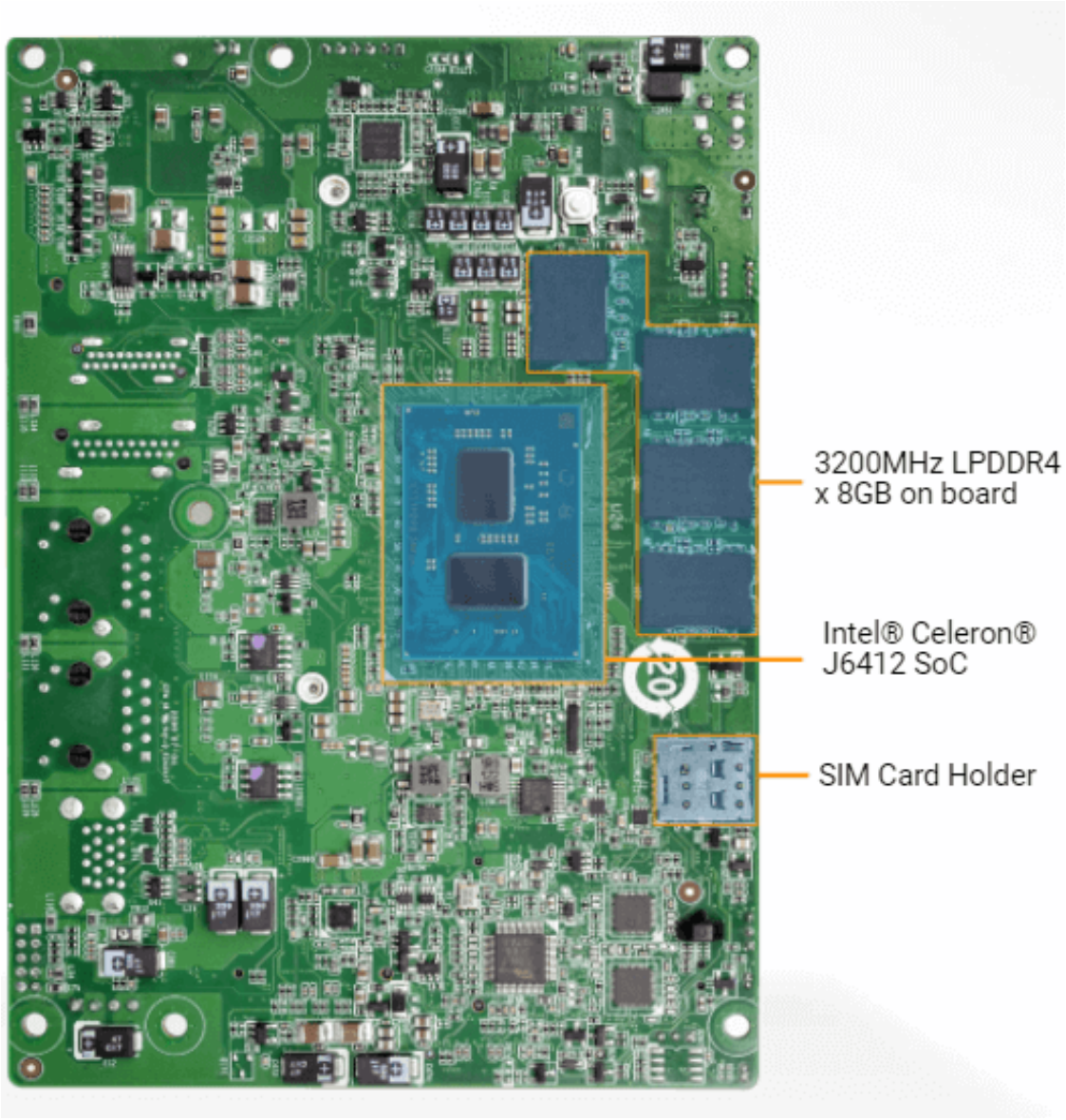
iDPM-eDP-R10	eDP to eDP Connetor converter board (For iEi Display Module)
iDPM-LVDS-R10	eDP to 24 bit dual channel LVDS converter board converter board (For iEi Display Module)
NWR-R2S-R10	PCIe x2 to two PCIe x1 riser card for NANO/WAFER on the right side
NWR-L2S-R10	PCIe x2 to two PCIe x1 riser card for NANO/WAFER on the left side
CM-WAFER-WOF-R10	Cooler Module(W/O FAN);Mechanical;for 3.5” WAFER series；RoHS
CM-WAFER-WF-R10	Cooler Module(W/FAN);Mechanical;for 3.5” WAFER series；RoHS
CB-USB02A-RS	Dual ports USB cable with bracket, with 2.0mm pitch USB connector;RoHS
AC-KIT-888S-R10	Realtek ALC888S 7.1 Channel HD Audio peripheral board,RoHS
32102-000100-200-RS	WIRE CABLE;POWER CABLE;SERIAL ATA POWER CABLE;3;150MM;18AWG;(A)MOLEX 8981-4M P=5.08;(B)SATA 15P 180° X2;ONE PCS PKG W/ LABEL;RoHS
32005-003500-200-RS	ROUND CABLE;RS-232/422/485;RS-232 CABLE;2;250MM;26AWG;(A)D-SUB 9P MALE+HEXAGONAL SCREW;(B)MOLEX 51021-0900 P=1.25;Wins Precision;RoHS

IDEAL SOLUTION FOR EDGE APPLICATION BY WAFER-EHL-J6412

The WAFER-EHL-J6412 3.5'' SBC supports Intel® Celeron® J6412 on-board SoC. It features reliable performance, advanced network connectivity, rich I/O, low power consumption with well-design thermal solution, and fanless design that fits small chassis size for space-critical installation like AMR (Autonomous Mobile Robot) and small cabinets in factories. The WAFER-EHL-J6412 is equipped with a PCI Express Gen3 x2 expansion slot, allowing users to take advantage of PCIe cards to expand AIoT application potential. It is an ideal choice for IoT edge applications, such as system control, kiosk, digital signage, electric vehicle charging station and medical imaging.

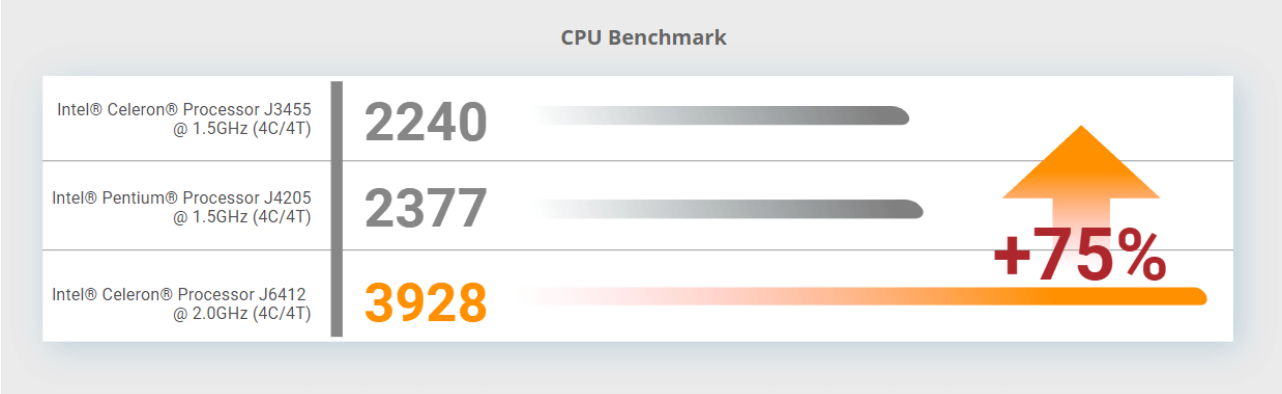
HARDWARE OVERVIEW





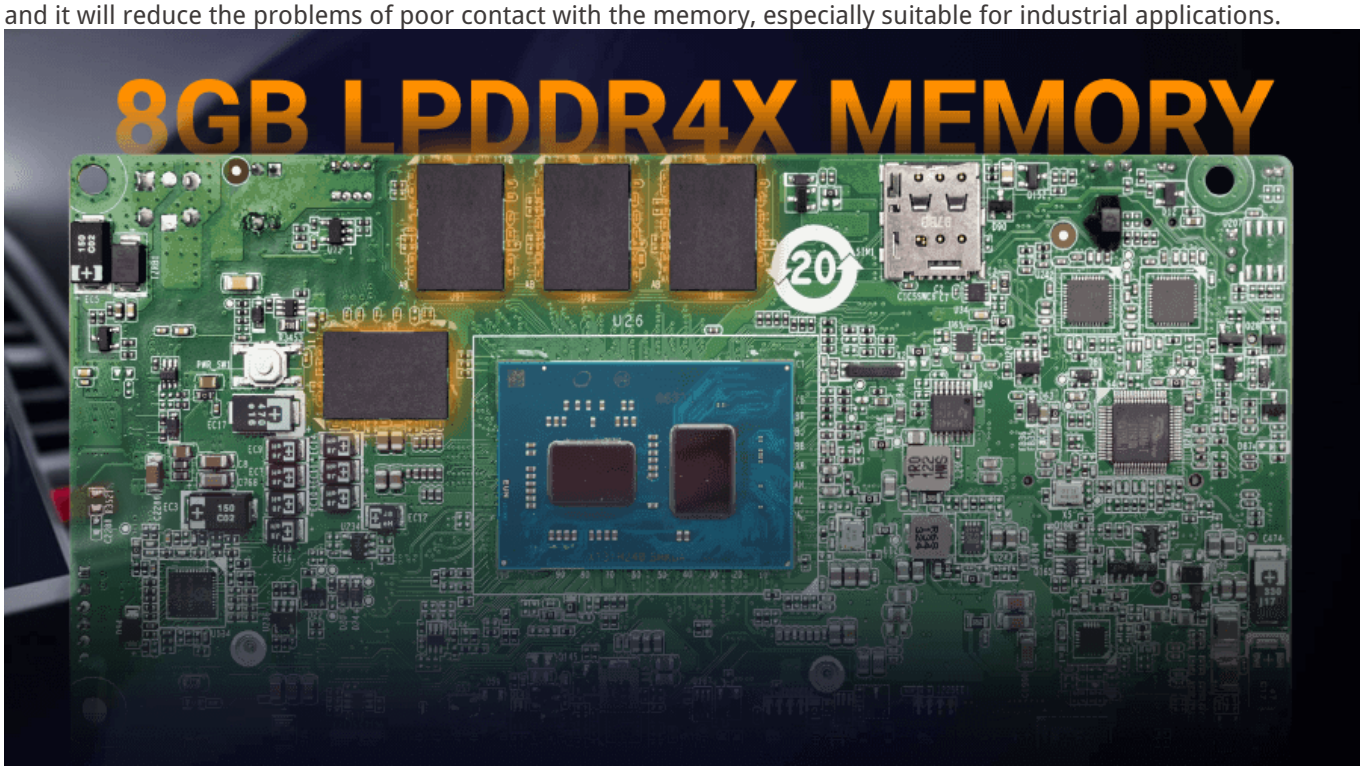
IMPROVED EFFICIENCY AND PERFORMANCE WITH INTEL® CELERON® J6412 ON-BOARD SOC

IEI WAFER-EHL is a motherboard powered by Intel® Celeron® J6412 on-board SoC, supporting up to 2.6GHz, quad-core, 1.5M cache and TDP 10W. It has a 75% performance gain over the previous generation, up to a 1.7x improvement in single-thread performance and up to a 1.5x improvement in multi-thread performance. The processor of IEI WAFER-EHL builds on new levels of CPU, and graphics performances with integrated IoT features, real-time performance, manageability, security, and functional safety.



8GB LPDDR4X MEMORY ON-BOARD

The WAFER-EHL-J6412 equips with rugged 8GB LPDDR4x on-board memory, which is widely used for application in high vibration and shock environment. With memory on board, it will provide flexible space usage, high reliability, and it will reduce the problems of poor contact with the memory, especially suitable for industrial applications.



TRIPLE INDEPENDENT DISPLAYS WITH UP TO 4K RESOLUTION

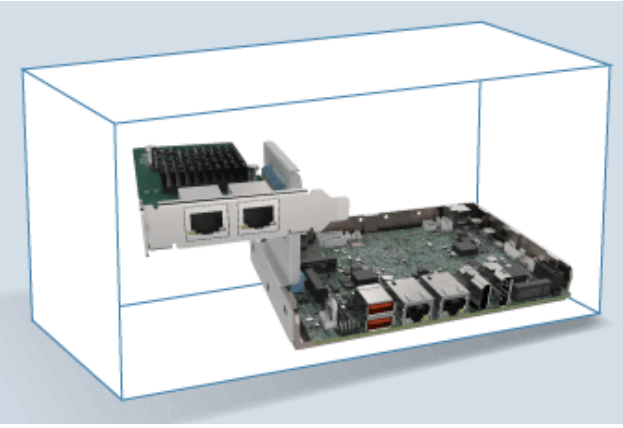
Intel® Celeron® J6412 processor is integrated with Intel® UHD Graphics, featuring max. 16 EUs and up to 2x performance improvement in graphics over the previous generation. Therefore, the WAFER-EHL has the ability to drive a maximum resolution of 4kp60 on up to three simultaneous displays through HDMI™ 1.4 (up to 4096 x 2160@30Hz), DP 1.4 (up to 4096 x 2160 @60Hz) and the optional iDPM module.

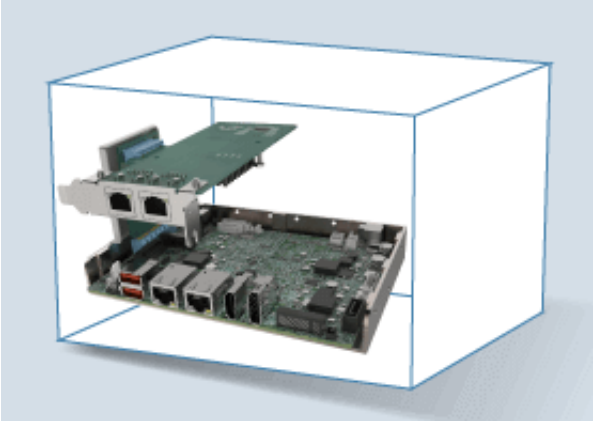
PCIE X4 EXPANSION FOR ADDED FUNCTIONALITY AND FAST APPLICATION DEPLOYMENT

The WAFER-EHL-J6412 features a PCIe x4 (x2 signal) slot, which is a new design of the WAFER motherboard to expand functionality providing easy integration of PoE, video capture or I/O cards with a compatible riser card. By installing an IEI-developed riser card into the PCIe slot, the x2 signal is divided into two x1 slots, offering great configuration flexibility and expandability.
Two types of riser cards with different orientation are available, one with slots facing outwards and the other with slots facing inwards to meet customers diverse applications.

Outwards-facing Riser Card

The outwards-facing riser card, although lower in height, is able to provide better spacing to ensure expansion cards run at a low temperature. It is ideal for the chassis that is wide enough for the expansion card to be placed. (P/N: NWR-L2S-R10)



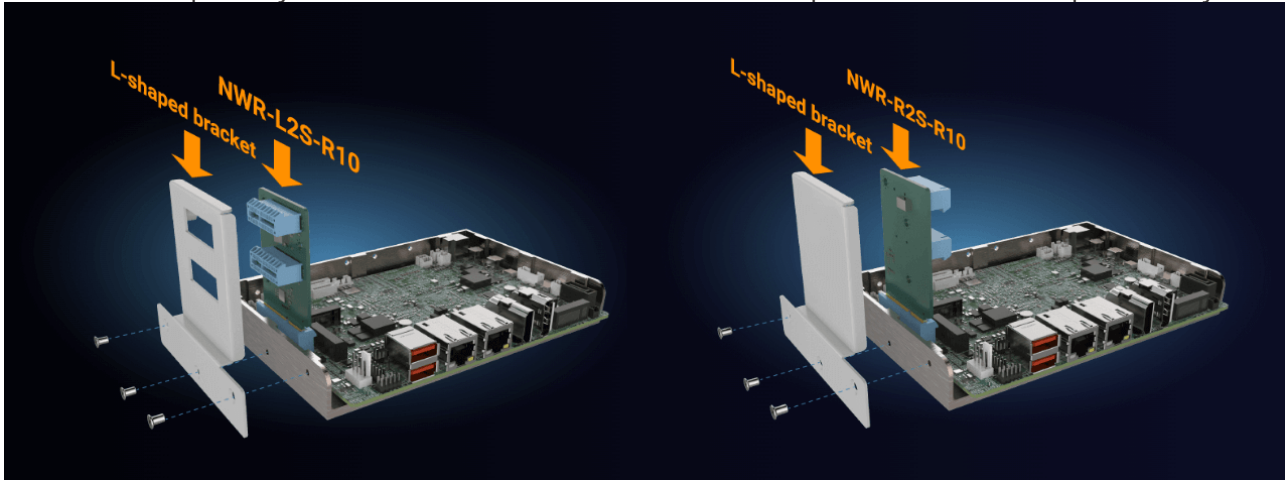


Inwards-facing Riser Card

The inwards-facing riser card is designed with higher height to keep a decent space between the expansion cards and the motherboard. This can help improve the airflow and heat transfer within the system. It is suitable for installation where space is limited. (P/N: NWR-R2S-R10)

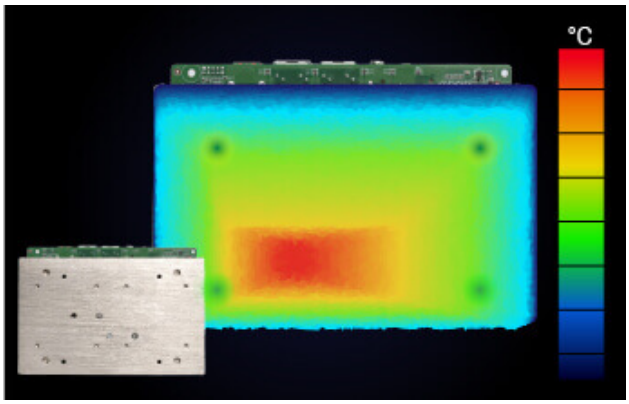
IEI-DEVELOPED RISER CARD WITH ENHANCED STABILITY

Moreover, both of the riser cards can be firmly secured to enhance stability by using the L-shaped bracket, in which screw holes are perfectly matched with those on the side of the heat spreader to make it simple and easy to install.



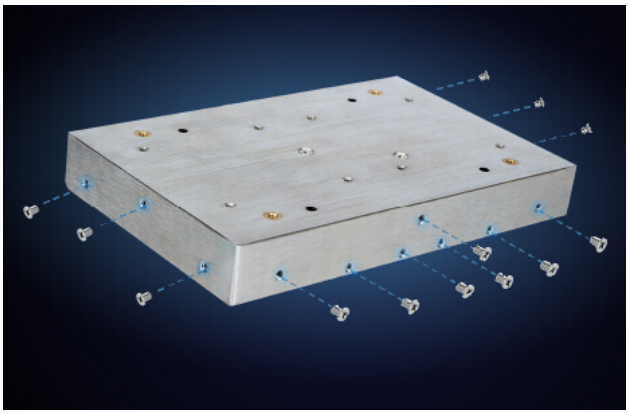
WELL-DESIGN THERMAL SOLUTION

IEI has developed a highly efficient thermal solution for the 3.5" motherboard - IEI Heat Conduction Casing (IHCC). The IHCC can effectively improve heat transfer performance ,and we will keep on improving our heat sink designs to ensure providing a innovative thermal solution for industrial market.
The IHCC consist of a casing and a heat conduction block that is made to perfectly fit with the CPU to achieve heat transfer.



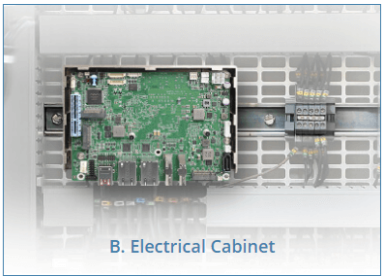
Diverse mounting options

With its well-design thurmal casing, WAFER-EHL provides complete 13 holes on three sides. It can be installed on a control cabinet's rear panel, door, or onto a DIN rail. And it is easy to install additional thermal module for operating under high ambient temperatures.

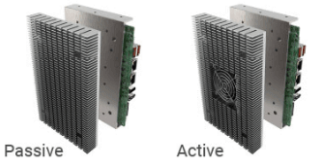


Fitting different mounting needs

A. Embedded System



B. Electrical Cabinet

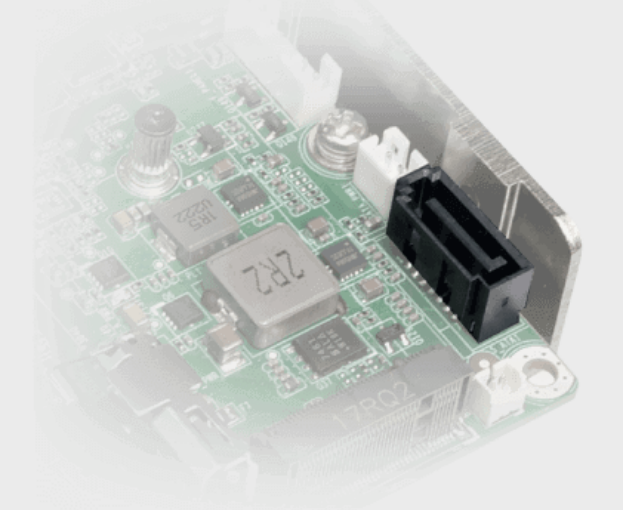


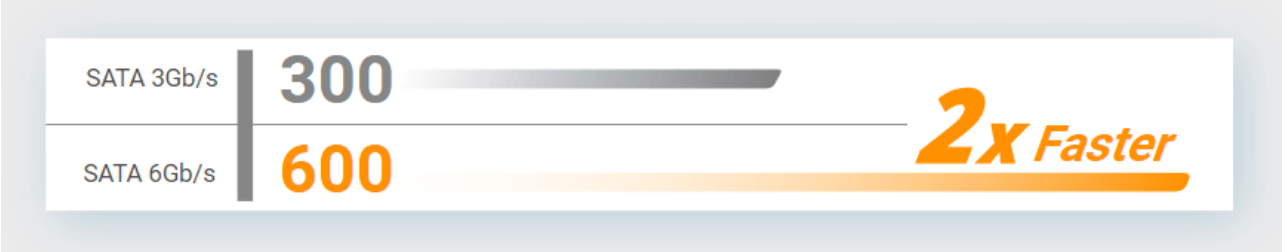
C. Flexible Thermal Module Stacking

HIGH SPEED TRANSMISSION

SATA 6Gbps Provides Faster Transfer Speeds

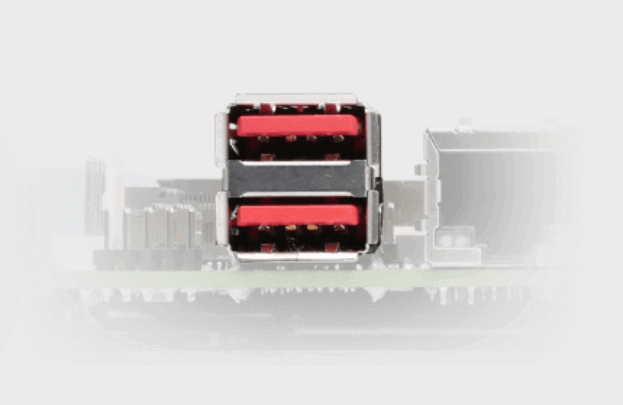
Twice as fast data processing it is capable of delivering lightning fast data transfer experience for edge AI data process applications.

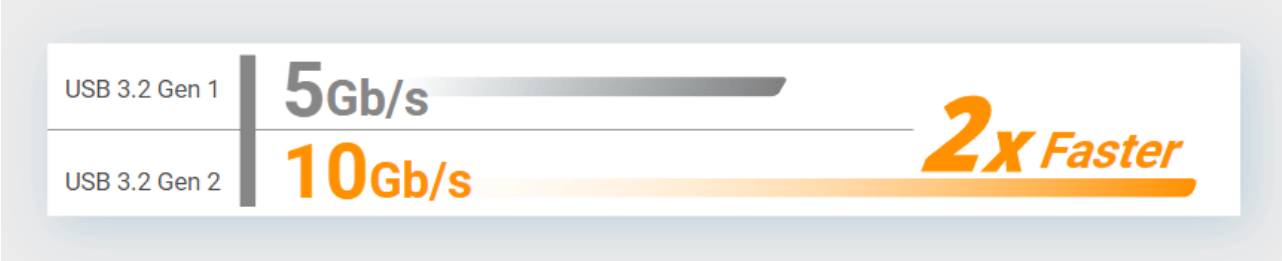




Two USB 3.2 Gen 2 (10Gb/s)

Two USB 3.2 Gen 2x1 ports are integrated to support 10 Gb/s data transmission speed, which is 2x faster than its predecessor.





NETWORKING

Delivers Dual Low-Latency 2.5G LAN Powered by Intel

2.5 GbE supports various connection speeds between 100 Mbps and 2.5 Gbps on Cat6 and Cat 5e cables, which means user can experience the full capability of high-performance network solutions without significant costs for upgrading cables.

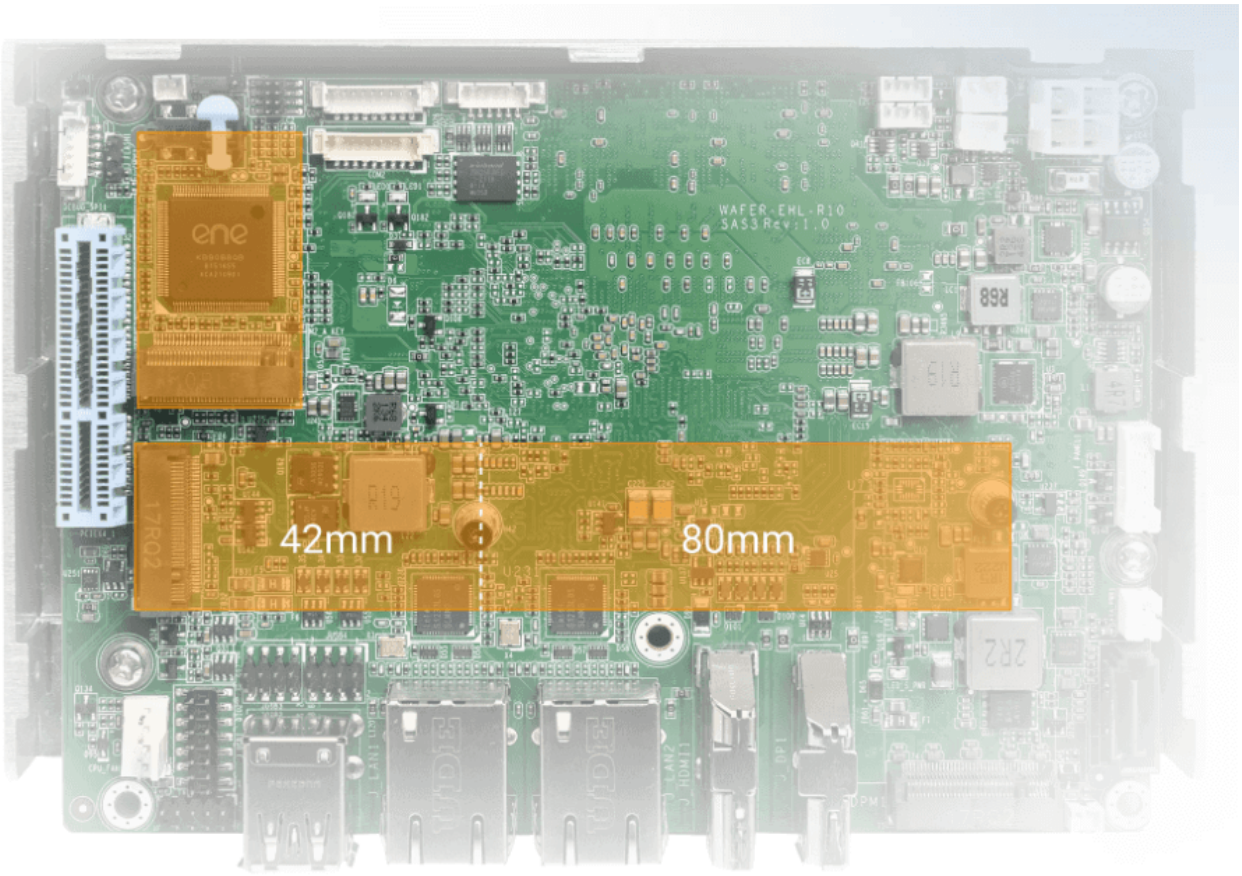
WIRELESS CONNECTIVITY

M.2 2230 A Key for Wi-Fi/Bluetooth

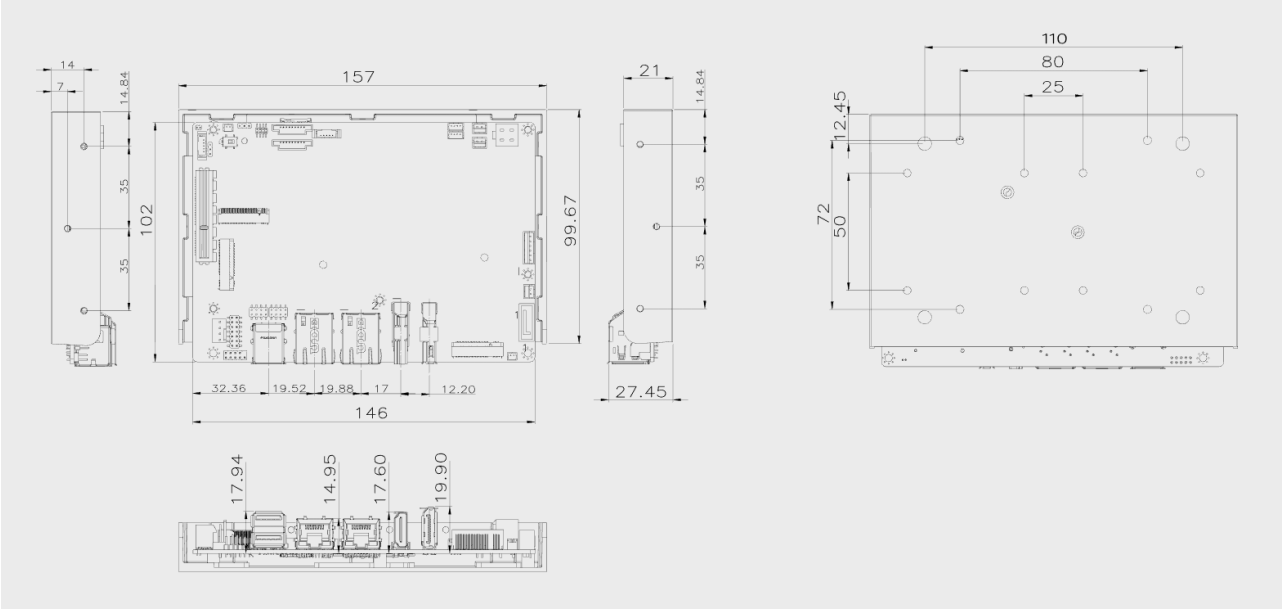
The M.2 2230 A key slot carrying with PCIe 3.0 x1 and USB 2.0 signals allows it to adopt the latest Wi-Fi 6E technology.
Wi-Fi 6E enhances low latency and supports service levels that are equivalent to 5G networks.

M.2 2242/80 M Key for PCIe

The M.2 2242/80 M key slot carrying with PCIe Gen3 x2 and USB 2.0 signals supports up to 16Gbps data-transfer speeds. It's the perfect choice for installing an operating system or application drive to provide fast data access.



DIMENSIONS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