



## KEY FEATURES

- Intel® 12<sup>th</sup> Gen Core™ Processors with R680E Chipset
- 4 x 260-pin DDR4 SO-DIMM up to 128GB (32GB per DIMM)
- 1 x PCIe x16 (PCIe Gen4) or 2 x PCIe x8 (PCIe Gen4), 2 x PCIe x 4 (PCIe Gen4)
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 6 x USB 3.2 Gen2x1, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 5 x Intel 2.5G LAN (2 support PoE, 1 supports vPro)
- 1 x Displayport, 1 x HDMI 2.0b, 1 x VGA
- Powerful Edge AI acceleration enabled by the most flexible mechanical, thermal, and power design, with support for 275mm x 111.15 mm (L x H) max. and up to 255W graphic card

## SPECIFICATIONS

### Processor System

CPU	Intel® 12 <sup>th</sup> Gen Core™, Pentium or Celeron Processors
Chipset	Intel® R680E
Socket	LGA 1700

### Memory

Technology	Dual Channel DDR4 2933MHz (ECC memory supported by R680E + Selected CPU)
Capacity	128 GB (32 GB per DIMM)
Socket	4 x 260-pin SO-DIMM

### Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.4a, DP++ Max resolution up to 4096x2160@60Hz
HDMI	HDMI 2.0b Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz

### Expansion Slot

PCIe	1 x PCIe Gen4 x16 (single x16 or dual x8), PCIe x16 slot with default power cable can support up to 180W graphic card (275mm x 111.15 mm (L x H), dual slot width max). Graphic card can be up to 255W with optional VGA module 1 x PCIe Gen4 x8 (shared with dual x8) 2 x PCIe Gen4 x4
Mini-PCIe	2 x Full/Half size with PCIe Gen3 x1 and USB 2.0
RF& Antenna	8 x SMA connector hole reserved
M.2	1 x M.2 (Key E, 2230) with CNVI/PCIe Gen3 x1 and USB2.0 for Wi-Fi/BT module 1 x M.2 (Key B, 2280/3042/3052) with PCIe Gen3 x1 / USB3.2 Gen1x1 for 4G / 5G
SIM Socket	2 x Nano SIM Card slot (1 connected to Mini PCIe, 1 connected to M.2 Key B)

### Audio

Interface	Realtek ALC897, High Definition Audio.
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### Ethernet

Controller/ Speed	5 x Intel 2.5G LAN (2 support PoE, each port supports IEEE 802.3AF PoE, PoE output max.15.4W/port), (1 supports vPro)
Connector	5 x RJ45

### Storage

M.2	1 x M.2 (Key M, 2280) with Gen4/Gen3 x4 for NVMe SSD
SATA	4 x SATA3 (6Gb/s), support RAID 0/1/5/10 4 x 2.5" HDD/SSD Tray
CFast (Option)	1 x Type II socket (Shared with SATA3)

### Front I/O

DisplayPort	1
HDMI	1
VGA	1
Ethernet	5 x 2.5G LAN
USB	6 x USB 3.2 Gen2x1, 1 x USB2.0 internal connector w/ lock function
Audio	1 x Mic-in, 1 x Line-out
COM	4 x RS232/422/485 2 x RS232
DIO	8DI/8DOs

### Watchdog Timer

Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

### Power Requirements

Input PWR	9V-36V VDC with Ignition control and remote power on/off switch. 80V Surge Protection, OVP, UVP, OCP and reverse protection Ignition Power Input w/ 13-mode condition
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### Environment

Operating Temperature	35W CPU: -40°C~75°C (-40°F~167°F) 46W~65W CPU: -40°C~55°C (-40°F~131°F) (with FAN inside) (w/ air flow 0.5~0.8 m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~95% @ 40°C (non-condensing)
Shock	Operating: 50 G, half sine 11ms duration with SSD
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes with SSD
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	LVD

### Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Desk Mount
Dimensions	202mm (W) x 290mm (D) x 209.3mm (H) (7.95" x 11.42" x 8.24")
Net Weight	10kg

### Others

OS Support	Windows 10 & Linux
SW Support	ACRN ( <a href="https://projectacrn.org/">https://projectacrn.org/</a> )
TPM	TPM 2.0
Real-Time Enablement	TSN, TCC support under YOCTO