

Empowering a **SMART FUTURE** Avalue IoT Ready



- Healthcare
- Retail
- Transportation
- Manufacturing
- Surveillance
- Factory Automation
- Gaming

3.5" Single Board Computer



Model Number	ECM-CFS	ECM-KBLH	ECM-SKLH	ECM-WHL	ECM-KBLU	ECM-SKLU	ECM-EHL	ECM-EHL3	ECM-TGU	ECM-APL
Processor	8/9th Gen Intel® Core™ i7/i5/i3/Celeron® rPGA processor	7th Gen Intel® Core™ i7/i5/i3/Celeron® processor	6th Gen Intel® Core™ i7/i5/i3/Celeron® processor	8th Gen Intel® Core™ i7/i5/i3/Celeron® Processor (with CPU Bottom Mounted)	7th Gen Intel® Core™ i7/i5/i3/Celeron® Processor	6th Gen Intel® Core™ i7/i5/i3/Celeron® processor	Onboard Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor (Elkhart Lake Platform 4.5-12W)- (with CPU Bottom Mounted)	Onboard Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor (Elkhart Lake Platform 4.5-12W) (with CPU Bottom Mounted)	Onboard 11th Gen Intel® Tiger Lake U Core™ & Celeron® BGA Processor (with CPU Bottom Mounted)	Intel® Pentium®/Celeron®/Atom™ SoC Processor
System Chipset	Intel® Q370/H310 Express Chipset	Intel® QM175 Express Chipset	Intel® QM170 Express Chipset	N/A	N/A	N/A	N/A	N/A	N/A	N/A
System Memory	1x 260-Pin DDR4 2400MHz SO-DIMM up to 32 GB	1x 260-Pin DDR4 2400MHz SO-DIMM up to 16 GB	1x 260-Pin DDR4 2133MHz SO-DIMM up to 16 GB	2X 260-pin DDR4 2400MHz SO-DIMM up to 64GB	1x 260-Pin DDR4 2133MT/s SO-DIMM Up to 16 GB	1x 260-Pin DDR4 2133MHz SO-DIMM up to 16 GB	1x 260-pin DDR4 SODIMM, supports Up to 32GB DDR4 3200MTs SDRAM (non ECC Supported)	1x 260-pin DDR4 SODIMM, supports Up to 32GB DDR4 3200MTs SDRAM (non ECC Supported)	1x 260-pin DDR4 SODIMM, supports Up to 32GB DDR4 3200MTs SDRAM (non ECC Supported)	1x 204-pin DDR3L 1600 & 1333MHz SO-DIMM supports up to 8 GB SDRAM (Non-ECC)
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec.	H/W Reset, 1sec. ~ 65535sec. and 1sec./step	H/W Reset, 1sec. ~ 65535sec. and 1sec./step	H/W Reset, 1sec. ~ 65535sec. and 1sec./step	H/W Reset, 1sec. ~ 65535sec. and 1sec./step
Expansion	1x Mini PCIe Supports mSATA (Q370 support mPCIe/mSATA/USB2.0 device, H310 support mSATA/USB2.0 device)	1x Mini PCIe Supports mSATA 1x M.2 (2242) B-Key	1x Mini PCIe Supports mSATA 1x M.2 (2242) B-Key	1x M.2 (2242/3042) B Key, (SATA, USB3.0/2.0, SIM Slot) 1x M.2 E Key 2230, (PCIe, USB2.0, CNVi)	1x Full Size mPCIe, 1x M.2 (2242/3042) B Key	1x Mini PCIe Supports mSATA 1x M.2 (2242) B-Key	1x M.2 (2242) B-Key 1x M.2 (2230) E-Key	1x M.2 (2242) B-Key 1x M.2 (2260) M-Key	1x M.2 (2242) B-Key 1x M.2 (2230) E-Key 1x M.2 (2260) M-Key	1x Mini PCIe (for PCIe & USB2.0) 1x M.2 (2242) B-Key
Storage	1x mSATA Supported from Mini PCIe	1x mSATA Supported from Mini PCIe, 1x M.2 (M.2 support SATA or PCIe x1/USB)	1x mSATA Supported from Mini PCIe, 1x M.2 (M.2 support SATA or PCIe x1/USB)	1x SATA III 1x M.2 B Key (2242)	1x mSATA support from Mini PCIe, 1x M.2 (M.2 support SATA or PCIe x1/USB)	1x mSATA Supported from Mini PCIe 1x M.2 (M.2 support SATA or PCIe x1/USB)	1x M.2 (2242) B-Key 1x SATA III	1x M.2 (2242) B-Key 1x SATA III	1x M.2 (2242) B-Key 1x SATA III	1x M.2 (M.2 support SATA or PCIe x1/USB)
I/O	2x USB 2.0, 4x USB 3.1, 2x SATA III, 2x RS-232, 1x 8bit GPIO, 1x LPC, 1x SPI	2x USB 2.0, 4x USB 3.0, 2x SATA III, 1x RS-232, 1x RS-232/422/485, 1x 8bit GPIO, 1x LPC, 1x SPI	2x USB 2.0, 4x USB 3.0, 2x SATA III, 1x RS-232, 1x RS-232/422/485, 1x 8bit GPIO, 1x LPC, 1x SPI	2x USB 2.0, 4x USB 3.1, 1x SATA III, 1x 8-bit GPIO, 1x LPC, 1x SPI	2x USB 2.0, 4x USB 3.0, 1x SATA III, 5x RS-232, 1x RS-232/422/485, 1x 8bit GPIO, 1x LPC, 1x SPI	2x USB 2.0, 4x USB 3.0, 1x SATA III, 5x RS-232, 1x RS-232/422/485, 1x 8bit GPIO, 1x LPC, 1x SPI	4x USB 2.0, 2x USB 3.1 Gen2 1x SATA III, 3x RS-232, 1x RS-422/485 1x 8bit GPIO, 1x e-SPI	6x USB 2.0, 2x USB 3.1 Gen2 1x SATA III, 4x RS-232, 2x RS-232/422/485 1x 8bit GPIO, 1x e-SPI, 1x SPI	4x USB 2.0, 4x USB 3.1 Gen2 1x SATA III, 4x RS-232, 2x RS-232/422/485 1x 8bit GPIO, 1x LPC, 1x SPI	1x USB 2.0, 4x USB 3.0, 1x SATA III, 5x RS-232, 1x RS-232/422/485, 1x Micro SIM Card Slot, 1x 8bit GPIO, 1x LPC, 1x SPI
Display Chipset	Intel® UHD Graphics 630 Intel® UHD Graphics 610 H310 only support Dual Display: LVDS+HDMI1(default LVDS enable) or HDMI1+HDMI2 (LVDS disabled) Q370 support Triple Display	Intel® Kaby lake SoC integrated Graphics Supports triple display	Intel® Skylake SoC integrated Graphics Supports triple display	Intel® UHD Graphics 620 (i7-8665UE, i5-8365UE, i3-8145UE), Intel® UHD Graphics 610 (4305UE) support triple display	Intel® HD Graphics 620 (i7-7600U, i5-7300U, i3-7100U), Intel® HD Graphics 610 (Celeron 3965U) support triple display	Intel® Skylake U SoC integrated Graphics Supports triple display	Intel® Elkhart Lake SoC Processor integrated Gen11 LP graphics HDMI, DP, eDP Supports triple display	Intel® Elkhart Lake SoC Processor integrated Gen11 LP graphics 2x DP++, 1x 2CH LVDS/eDP (default LVDS) Supports triple display	Intel® Tiger Lake UP3 SoC Processor integrated Gen12 graphics 2x DP++, 1x 2CH LVDS, 1x eDP Supports four display	Intel® Apollo Lake SoC integrated Gen9 LP Graphics Supports triple display
Resolution	Dual HDMI: Max. resolution 4096 x 2304 @ 30Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	Dual HDMI: Max. resolution 4096 x 2160 @ 24Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	Dual HDMI: Max. resolution 4096 x 2160 @ 24Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	Dual HDMI: Max. Resolution 4096 x 2160 @ 24/30Hz, LVDS: Max. Resolution 1920 x 1080 @ 60Hz	Dual HDMI: Max. Resolution 4096 x 2160 @ 24Hz, LVDS: Max. Resolution 1920 x 1080 @ 60Hz	Dual HDMI: Max. resolution 4096 x 2160 @ 24Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	HDMI: Max. resolution 4096 x 2160 @ 24Hz DP: Max. resolution 4096 x 2160 @ 60Hz eDP: Max. resolution 4096 x 2160 @ 60Hz	2x DP++: Max. resolution 4096 x 2304 @ 60Hz Dual Channel 18/24bits LVDS Max. resolution 1920 x 1080 @ 60Hz eDP Max. resolution 4096 x 2160 @ 60Hz	2x DP++: Max. resolution 4096 x 2304 @ 60Hz Dual Channel 18/24bits LVDS Max. resolution 1920 x 1080 @ 60Hz eDP Max. resolution 4096 x 2160 @ 60Hz	Dual HDMI: Max. resolution 3840 x 2160 @ 30Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz
Audio Chipset	Realtek Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Audio Amp.:2W	Realtek Audio code Audio Amp.:2W	Realtek Audio code Mic-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	Tempo Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	Tempo Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	
Ethernet Chipset	1x Intel® I211AT 1x Intel® I219LM	1x Intel® I210AT 1x Intel® I219LM	1x Intel® I210AT 1x Intel® I219LM	1x Intel® I210AT 1x Intel® I219LM	1x Intel® I211AT 1x Intel® I219LM	1x Intel® I225LM/IT 1x Intel® I210AT/IT	1x Intel® I225LM 2x Intel® I210AT	1x Intel® I225LM 2x Intel® I210IT	2x Intel® I211AT (Intel I210IT for WT)	
Power Requirement	+12V	+12V	+12V	+12V	+12V ~ +26V	+12V ~ +26V	+9V ~ +36V	+9V ~ +36V	+12V ~ +24V	+12V ~ +26V
Power Type	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F) -40°C ~ 85°C (-40°F ~ 185°F) -For wide temperature CPU SKU
Dimension (L x W)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)

3.5" Single Board Computer

Mini-ITX



Model Number	ECM-APL2-A	ECM-BSWA	ECM-BYT2	ECM-BYT	ECM-KA
Processor	Intel® Pentium®/Celeron®/Atom™ SoC Processor (with CPU Bottom Mounted)	Intel® Pentium®/Celeron® processor	Intel® Atom™/Celeron® processor (with CPU Bottom Mounted)	Intel® Atom™/Celeron® processor	AMD G-Series processor
System Chipset	N/A	N/A	N/A	N/A	N/A
System Memory	1 x 204-pin DDR3L 1600 & 1333MHz SO-DIMM supports up to 8 GB SDRAM (Non-ECC)	1 x 204-Pin DDR3L 1600MHz SO-DIMM up to 8 GB	1 x 204-Pin DDR3L 1066/1333MHz SO-DIMM up to 8 GB	1 x 204-Pin DDR3L 1066/1333MHz SO-DIMM up to 8 GB	1 x 204-Pin DDR3 1600MHz SO-DIMM up to 8 GB
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec./step	H/W Reset: 1sec. ~ 65535sec./min. and 1sec. or 1min./step	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step	H/W Reset, 1sec. ~ 65535sec.
Expansion	2 x Mini PCIe 1 x Full-size Mini PCIe with mSATA Supported 1 x Half-size Mini PCIe	2 x Mini PCIe, 1 x Full-size Mini PCIe with mSATA Supported 1 x Half-size Mini PCIe	2 x Mini PCIe, 1 x Full-size Mini PCIe with mSATA Supported, 1 x Half-size Mini PCIe	1 x Mini PCIe Supports mSATA	1 x Mini PCIe Supports mSATA
Storage	1 x mSATA Supported from Mini PCIe	1 x mSATA Supported from Mini PCIe	1 x mSATA Supported from Mini PCIe	1 x CompactFlash Type I/II Socket 1 x mSATA Supported from Mini PCIe	1 x CompactFlash Type I/II Socket 1 x mSATA Supported from Mini PCIe
I/O	2 x USB 2.0, 4 x USB 3.0, 1 x SATA III, 2 x RS-232/422/485, 1 x 8bit GPIO, 1 x LPC, 1 x SPI	2 x USB 2.0, 4 x USB 3.0, 1 x SATA III, 5 x RS-232, 1 x RS-232/422/485, 1 x 8bit GPIO, 1 x LPC, 1 x SPI	7 x USB 2.0, 1 x USB 3.0, 1 x SATA II, 1 x RS-232, 1 x RS-232/422/485, 1 x 8bit GPIO, 1 x LPC	5 x USB 2.0, 1 x USB 3.0, 1 x SATA II, 3 x RS-232, 1 x RS-232/422/485, 1 x 8bit GPIO, 1 x LPC, 1 x PS2/ KB & MS	6 x USB 2.0, 2 x USB 3.0, 2 x SATA III, 1 x RS-232, 1 x RS-232/422/485, 1 x 8bit GPIO, 1 x LPC, 1 x SPI, 1 x PS2/ KB & MS
Display Chipset	Intel® Apollo Lake SoC integrated Gen9 LP Graphics Supports triple display	Intel® Braswell SoC integrated Graphics Supports triple display	Intel® Valleyview SoC integrated Graphics Supports dual display	Intel® Valleyview SoC integrated Graphics Supports dual display	AMD SoC Integrated Graphics Supports dual display
Resolution	Dual HDMI: Max. resolution 3840 x 2160 @ 30Hz VGA: 1920 x 1200 @ 60Hz	HDMI: Max. resolution 1920 x 1080 @ 30Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	VGA: Max. resolution 2560 x 1080 @ 60Hz HDMI: Max. resolution 1920 x 1200 @ 60Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	VGA: Max. resolution 2560 x 1080 @ 60Hz HDMI: Max. resolution 1920 x 1200 @ 60Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz	VGA: Max. resolution 1920 x 1200 @ 60Hz HDMI: Max. resolution 1920 x 1080 @ 60Hz LVDS: Max. resolution 1920 x 1080 @ 60Hz
Audio Chipset	Realtek Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out	Realtek Audio code Mic-In, Line-In, Line-Out
Ethernet Chipset	2 x Intel® I211AT (Intel I210IT for WT)	2 x Intel I211AT	2 x Realtek 8111E	2 x Intel® I211AT	2 x Realtek 8111E
Power Requirement	+12V ~ +26V	+12V ~ +26V	+12V ~ +26V	+12V ~ +26V	+12V ~ +26V
Power Type	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F) -40°C ~ 85°C (-40°F ~ 185°F) (Optional for Wide Temp.)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F) -40°C ~ 85°C (-40°F ~ 185°F) (Optional for Wide Temp.)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)	5.7" x 4" (146 mm x 101 mm)



Model Number	EMX-H310P	EMX-C246P	EMX-Q170KP	EMX-Q170P	EMX-H110KP	EMX-H110P
Processor	Intel® LGA1151 Socket Supports 8/9th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors	Intel® LGA1151 Socket Supports 8/9th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors	Intel® LGA1151 Socket Supports 6/7th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors (Max. TDP at 95W)	Intel® LGA1151 Socket Supports 6th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors (Max. TDP at 95W)	Intel® LGA1151 Socket Supports 6/7th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors (Max. TDP at 95W)	Intel® LGA1151 Socket Supports 6th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors (Max. TDP at 95W)
System Chipset	Intel® H310 Chipset	Intel® C246 Chipset	Intel® Q170 Chipset	Intel® H110 Chipset	Intel® H110 Chipset	Intel® H110 Chipset
System Memory	2 x 260-pin DDR4 2400/2666MHz SO-DIMM supports up to 64GB	2 x 260-pin DDR4 2400/2666MHz SO-DIMM supports up to 64GB (ECC memory supported by CPU)	2 x 260-pin DDR4 2400MHz SO-DIMM supports up to 32GB	2 x 260-pin DDR4 2400MHz SO-DIMM supports up to 32GB	2 x 260-pin DDR4 2400MHz SO-DIMM supports up to 32GB	2 x 260-pin DDR4 2400MHz SO-DIMM supports up to 32GB
Expansion	1 x PCI-e x16 1 x M.2 B-Key 1 x M.2 E-Key	1 x PCI-e x16 1 x M.2 M-Key 1 x M.2 E-Key	1 x PCI-e x16 1 x Full Size Mini PCI-e 1 x Half Size Mini PCI-e	1 x PCI-e x16 1 x Full Size Mini PCI-e 1 x Half Size Mini PCI-e	1 x PCI-e x16 1 x Full Size Mini PCI-e 1 x Half Size Mini PCI-e	1 x PCI-e x16 1 x Full Size Mini PCI-e 1 x Half Size Mini PCI-e
Display	Intel® 8/9th Gen. CPU integrated VGA + LVDS, VGA + HDMI, VGA + DP, HDMI + LVDS, HDMI + DP, LVDS + DP	Intel® 8/9th Gen. CPU integrated VGA + HDMI + LVDS	Intel® 6/7th Gen. CPU integrated VGA + LVDS, VGA + HDMI, VGA + DP, HDMI + LVDS, HDMI + DP, LVDS + DP	Intel® 6/7th Gen. CPU integrated VGA + LVDS, VGA + HDMI, VGA + DP, HDMI + LVDS, HDMI + DP, LVDS + DP	Intel® 6/7th Gen. CPU integrated VGA + LVDS, VGA + HDMI, VGA + DP, HDMI + LVDS, HDMI + DP, LVDS + DP	Intel® 6/7th Gen. CPU integrated VGA + LVDS, VGA + HDMI, VGA + DP, HDMI + LVDS, HDMI + DP, LVDS + DP
Resolution	VGA: 2048 x 1536 @ 60Hz HDMI: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz DP++: 4096x2160@30Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS) By BOM option	VGA: 2048 x 1536 @ 60Hz HDMI: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz DP: 4096 x 2304 @ 60Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS)
Audio	Realtek Audio code 6W Audio Amplifier	Realtek Audio code 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out, Line-in 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out, Line-in 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out, Line-in 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out, Line-in 6W Audio Amplifier
Ethernet	1 x Intel® I219LM 3 x Intel® I210AT	1 x Intel® I219LM 3 x Intel® I210AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I211AT
USB/SATA/COM/LAN	12/3/6/4	13/4/6/4	12/6/6/2	8/4/6/2	8/4/6/2	8/4/6/2
Power Requirement	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V
Power Type	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX
Operating Temp.	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)
Weight	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)

Thin Mini-ITX



Model Number	EMX-TGLP	EMX-WHLGP	EMX-SKLP
Processor	Onboard 11th Gen Intel® Tiger Lake U Core™ & Celeron® BGA Processor	Onboard 8th Gen Intel® Whiskey Lake U Core™ SoC i7/i5/i3 & Celeron® BGA Processor	Onboard 6th Gen. Intel® Core™ & Celeron® BGA Processor
System Chipset	N/A	N/A	N/A
System Memory	2 x 260-pin DDR4 3200MHz SO-DIMM supports up to 64GB	2 x 260-pin DDR4 2400MHz SO-DIMM supports up to 32GB	2 x 260-pin DDR4 2133MHz SO-DIMM supports up to 32GB
Expansion	1 x M.2 B-Key 1 x M.2 E-Key	1 x M.2 B-Key 1 x M.2 A-Key	1 x PCI-e x1 1 x M.2 B-Key, 1 x M.2 A-Key, 1 x SD card slot
Display	Intel® 12th Gen. CPU integrated 2 x DP++, 2 x DP, eDP, LVDS (Maximum: 6 for quadruple independent displays)	Intel® 8th Gen. CPU integrated HDMI/LVDS, HDMI, HDMI	Intel® 6th Generation CPU integrated Triple Display
Resolution	2 x DP++: 4096 x 2304 @ 60 Hz, DP: 4096 x 2304 @ 60 Hz, (2 x DP++, 2 x DP, eDP, LVDS) Dual Channel 18/24bits LVDS 1920 x 1080 Hz eDP 4096 x 2304 @ 60 Hz	3 x HDMI 1.4b: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz, (1 x HDMI/LVDS, 1 x HDMI, 1 x HDMI) Dual Channel 18/24bits LVDS 1920 x 1080 Co-lay eDP 1.3: 4096 x 2160 BOM optional	HDMI 1.4b: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz 2 x DP 1.2a: 4096 x 2160 @ 60Hz (1 x HDMI/DP, 1 x DP++), Dual channel 18/24-bits LVDS, Co-lay eDP 1.3: 4096 x 2160 BOM optional
Audio	Realtek/Tempo Audio code 2 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out, Line-in 2 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out 2 x 6W Audio Amplifier
Ethernet	1 x Intel® I255LM 1 x Intel® I219LM 2 x Intel® I210IT	1 x Intel® I219LM 2 x Intel® I210IT	1 x Intel® I219LM 1 x Intel® I211AT
USB/SATA/COM/LAN	8/2/6/4	8/1/6/3	8/2/6/2
Power Requirement	+12V-24V	+12V-24V	+12V-24V
Power Type	AT/ATX	AT/ATX	AT/ATX
Operating Temp.	0 ~ 60°C (32°F ~ 140°F) -20 ~ 60°C (-4~140°F) -For wide temperature CPU SKU	-20 ~ 60°C (-4~140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)
Weight	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)



Model Number	EMX-EHLP	EMX-APLP	EMX-BYT2	EMX-C246DP	EMX-H310DP
Processor	Intel® Pentium®/ Celeron®/ Atom™ SoC Processor	Intel® Celeron®/ Atom™ SoC Processor	Intel® Celeron® Processor J1900 (2M Cache, Up to 2.42 GHz)	Intel® LGA1151 Socket Supports 8/9th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors	Intel® LGA1151 Socket Supports 8/9th Gen. Core™ i7/ i5/ i3/ Pentium®/ Celeron® Processors
System Chipset	N/A	N/A	N/A	Intel® C246 Chipset	Intel® H310 Chipset
System Memory	1 x 260-pin DDR4 3200MHz SO-DIMM supports up to 32GB (Only Atom® x6000 Series Processors support IBEC)	2 x 204-pin DDR3L 1333/1600MHz SO-DIMM supports up to 16GB	2 x 204-pin DDR3L 1333MHz SO-DIMM supports up to 8GB	2 x 260-pin DDR4 2400/2666MHz SO-DIMM supports up to 64GB (ECC memory supported by CPU)	2 x 260-pin DDR4 2400/2666MHz SO-DIMM supports up to 64GB
Expansion	1 x M.2 B-Key 1 x M.2 E-Key	1 x PCI-e 2 x Mini PCI-e 1 x SD card slot 1 x SIM card slot	1 x PCI-e 2 x Mini PCI-e, 1 x SD card slot, 1 x SIM card slot	1 x PCI-e x16 1 x M.2 M-Key 1 x M.2 E-Key 1 x M.2 B-Key	1 x PCI-e x16 1 x M.2 E-Key 1 x M.2 B-Key
Display	Intel® Elkhart Lake SoC Processor integrated Triple Display DP++, HDMI, LVDS (eDP by BOM option)	Intel® Apollo Lake SoC integrated Gen Graphics Triple Display HDMI + LVDS, HDMI/DP + DP, HDMI + LVDS	Intel® Atom™/ Celeron® SoC Integrated Graphics HDMI + LVDS, HDMI + VGA, VGA + LVDS	Intel® 8/9th Gen. CPU integrated HDMI + HDMI + LVDS	Intel® 8/9th Gen. CPU integrated HDMI + HDMI + LVDS
Resolution	1 x HDMI 2.0b: 4096 x 2160 @ 60 Hz 1 x DP++: 4096 x 2160 @ 60 Hz Dual Channel 18/24bits LVDS 1920 x 1080 1 x eDP 4096 x 2160 @ 60Hz (BOM optional)	HDMI 1.4b: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz; LVDS: 1920 x 1080 @ 60Hz; 2 x DP 1.2a: 4096 x 2160 @ 60Hz (1 x HDMI/DP, 1 x DP)	VGA: 2560 x 1600 @ 60Hz HDMI: 1920 x 1200 @ 60Hz LVDS 1920 x 1080 @ 60Hz	3 x HDMI 1.4b: 3840 x 2160 @ 30 Hz 2560 x 1600 @ 30 Hz	3 x HDMI 1.4b: 3840 x 2160 @ 30 Hz 2560 x 1600 @ 30 Hz
Audio	Realtek Audio code Mic-in, Line-out 2 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-out 2 x 3W Audio Amplifier	Realtek Audio code Mic-in, Line-out 2 x 3W Audio Amplifier	Realtek Audio code 6W Audio Amplifier	Realtek Audio code 6W Audio Amplifier
Ethernet	4 x Intel® I225LM	2 x Intel® I211AT	2 x Intel® I211AT	1 x Intel® I219LM 2 x Intel® I210AT	1 x Intel® I219LM 2 x Intel® I210AT
USB/SATA/COM/LAN	8/2/6/4	9/2/6/2	6/2/6/2	10/2/4/3	8/2/4/3
Power Requirement	+12V ~ 24V	+12V ~ 24V	+12V	+12V ~ 28V	+12V ~ 28V
Power Type	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX
Operating Temp.	0 ~ 60 °C (32 ~ 140 °F) -40 ~ 85°C (-40 ~ 185°F) - For wide temperature CPU SKU	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)	6.69" x 6.69" (170 mm x 170 mm)
Weight	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)	0.88 lbs (0.4 kg)

ATX/ Micro ATX

ATX



Model Number	EAX-W480P	EAX-C246P	EAX-C246BP	EAX-Q170KP (C236KP)	EAX-Q170P	EAX-H110KP
Processor	Intel® LGA1120 Socket Supports 10th Gen. Intel® Xeon® (Workstation)/Core™, Pentium®/Celeron® Processors	Intel® LGA1151 Socket Supports 8/9th Gen. Intel® Xeon® (Workstation)/Core™, Pentium®/Celeron® Processors	Intel® LGA1151 Socket Supports 8/9th Gen. Intel® Xeon® (Workstation)/Core™, Pentium®/Celeron® Processors	Intel® LGA1151 Socket Supports 6/7th Gen. Core™, Pentium®/Celeron® Processors (Max. TDP at 95W) *C236KP support Intel® Xeon® (Workstation)	Intel® LGA1151 Socket Supports 6th Gen. Core™, Pentium®/Celeron® Processors (Max. TDP at 95W)	Intel® LGA1151 Socket Supports 6/7th Gen. Core™, Pentium®/Celeron® Processors (Max. TDP at 95W)
System Chipset	Intel® W480E Chipset	Intel® C246 Chipset	Intel® C246 Chipset	Intel® Q170 Chipset (Co-lay C236 Chipset)	Intel® Q170 Chipset	Intel® H110 Chipset
System Memory	4 x 288-pin DDR4 2400/2666/2933MHz DIMM supports up to 128GB (ECC memory supported by CPU)	4 x 288-pin DDR4 2400/2666MHz DIMM supports up to 128GB (ECC memory supported by CPU)	4 x 288-pin DDR4 2400/2666MHz DIMM supports up to 128GB (ECC memory supported by CPU)	4 x 288-pin DDR4 2400MHz DIMM supports up to 128GB *C236: (ECC memory supported by CPU)	4 x 288-pin DDR4 2400MHz DIMM supports up to 64GB	2 x 288-pin DDR4 2400MHz DIMM supports up to 32GB
Expansion	1 x PCI-e x16 or 2 x PCI-e x8, 4 x PCI-e x4	1 x PCI, 1 x PCI-e x16 or 2 x PCI-e x8 by BOM, 1 x PCI-e x4, 3 x PCI-e x1, 1 x M.2 M-Key, 1 x M.2 A-Key=	1 x PCI, 1 x PCI-e x16 or 2 x PCI-e x8 by auto switch, 3 x PCI-e x4	4 x PCI, 1 x PCI-e x16 1 x PCI-e x4, 1 x PCI-e x1 1 x M.2 Key-A, 1 x SIM card slot, 1 x Full/Half Size Mini-PCIe	4 x PCI, 1 x PCI-e x16 1 x PCI-e x4, 1 x PCI-e x1 1 x M.2 Key-A, 1 x SIM card slot, 1 x Full/Half Size Mini-PCIe	4 x PCI, 1 x PCI-e x16, 2 x PCI-e x4
Display	Intel® 10th Gen. CPU Integrated DVI-D + DP+++ + DP++	Intel® 8/9th Gen. CPU Integrated VGA + HDMI + DP	Intel® 8/9th Gen. CPU Integrated DVI-I + DP+++ + DP++	Intel® 6/7th Gen. CPU Integrated VGA + HDMI + DP	Intel® 6th Gen. CPU Integrated VGA + HDMI + DP	Intel® 6/7th Gen. CPU Integrated VGA + HDMI + DP
Resolution	DVI-D: 2048 x 1536 @ 60Hz DP++: 3840 x 2160 @ 60Hz	VGA: 2048 x 1536 @ 60 Hz HDMI: 3840 x 2160 @ 30 Hz, 2560 x 1600 @ 30 Hz DP: 4096 x 2304 @ 60Hz	DVI-I: 2048 x 1536 @ 60 Hz 2 x DP++: 4096 x 2304 @ 60Hz	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz	VGA: 2048 x 1536 @ 50Hz HDMI: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz DP: 4096 x 2304 @ 60Hz
Audio	N/A	Realtek Audio code Mic-in, Line-in, Line-out 1 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-in, Line-out 1 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-in, Line-out 2 x 6W Audio Amplifier	Realtek Audio code Mic-in, Line-in, Line-out 2 x 6W Audio Amplifier	Realtek Audio code Line-in, Mic-in, Line-out 1 x 2W Amplifier
Ethernet	1 x Intel® I225V 1 x Intel® I219LM 1 x Intel® I210AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I210AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I211AT	1 x Intel® I219LM 1 x Intel® I211AT
USB/SATA/COM/LAN	12/4/10/3	14/6/10/2	16/4/10/2	12/6/6/2	12/6/6/2	10/4/10/2
Power Requirement	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5Vsb/+3.3V/-12V	+12V/+5V/5Vsb/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V
Power Type	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX	AT/ATX
Operating Temp.	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	12" x 9.6" (304.8 mm x 243.84 mm)	12" x 9.6" (304.8 mm x 243.84 mm)	12" x 9.6" (304.8 mm x 243.84 mm)	12" x 9.6" (304.8 mm x 243.84 mm)	12" x 9.6" (304.8 mm x 243.84 mm)	12" x 9.6" (304.8 mm x 243.84 mm)
Weight	1.32 lbs (0.6 kg)	1.32 lbs (0.6 kg)	1.32 lbs (0.6 kg)	1.32 lbs (0.6 kg)	1.32 lbs (0.6 kg)	1.32 lbs (0.6 kg)

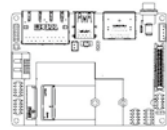
Micro ATX



Model Number	ERX-W480P	ERX-C236KP
Processor	Intel® LGA1151 Socket Supports 10th Gen. Intel® Xeon® (Workstation)/Core™, Pentium®/Celeron® Processors (Max. TDP at 95W)	Intel® LGA1151 Socket Supports 6/7th Gen. Intel® Xeon® (Workstation)/Core™, Pentium®/Celeron® Processors (Max. TDP at 95W)
System Chipset	Intel® W480E Chipset	Intel® C236 Chipset
System Memory	4 x 288-pin DDR4 2400~2933MHz DIMM supports up to 128GB (ECC memory supported by CPU)	4 x 288-pin DDR4 2400MHz DIMM supports up to 64GB (ECC memory supported by CPU)
Expansion	2 x PCI-e x16 (1 x PCI-e x16 or 2 x PCIe-x8), 2 x PCI-e x4	1 x PCI-e x16, 1 x PCI-e x4, 2 x PCI, 1 x SIM card slot, 1 x Full Size Mini-PCIe
Display	Intel® 10th Gen. CPU Integrated VGA / HDMI /DP++ / LVDS Triple display	Intel® 6/7th Gen. CPU Integrated HDMI + HDMI, HDMI + VGA, VGA + HDMI
Resolution	VGA: 2048 x 1536 @ 60Hz HDMI 2.0a: 4096 x 2304 @ 60Hz DP++: 4096 x 2304 @ 60Hz LVDS: 1920 x 1080 Dual channel 18/24-bits	VGA: 2048 x 1536 @ 50Hz HDMI 1.4: 4096 x 2160 @ 24Hz, 2560 x 1600 @ 60Hz
Audio	Realtek Audio code Line-in, Mic-in, Line-out 6W Amplifier	Realtek Audio code Line-in, Mic-in, Line-out 2 x 3W Amplifier
Ethernet	1 x Intel® I219LM 1 x Intel® I210AT 2 x Intel® I225LM 1 x Intel® X550-AT2 (BOM option)	1 x Intel® I219LM 3 x Intel® I211AT
USB/SATA/COM/LAN	14/4/6/4 or 6	13/6/10/4
Power Requirement	+12V/+5V/5VSB/+3.3V/-12V	+12V/+5V/5VSB/+3.3V/-12V
Power Type	AT/ATX	AT/ATX
Operating Temp.	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	9.6" x 9.6" (243.84 mm x 243.84 mm)	9.6" x 9.6" (243.84 mm x 243.84 mm)
Weight	1.35 lbs (0.6 kg)	1.35 lbs (0.6 kg)

Pico ITX / 1.8" SBC

Pico ITX



Model Number	EPX-EHLP	EPX-APLP
Processor	Intel® Pentium®/ Celeron®/ Atom™ SoC Processor	Intel® Pentium®/ Celeron®/ Atom™ SoC Processor
System Chipset	N/A	N/A
System Memory	1x 260-pin DDR4 3200MHz SO-DIMM supports up to 32 GB	1x 204-pin DDR3L 1600 & 1333MHz SO-DIMM supports up to 8 GB
Expansion	1x M.2 Key-B, 1x M.2 Key-E, 1x Micro SIM to SIM adapter by option	1x M.2 Key-B, 1x M.2 Key-A, 1x Micro SIM to SIM adapter by option
Display	Intel® Atom™/ Celeron®/Pentium® SoC Integrated Graphics DP++/HDMI/LVDS	Intel® Atom™/ Celeron®/Pentium® SoC Integrated Graphics HDMI + LVDS, HDM/DPI + DP, HDMI + LVDS
Resolution	HDMI 2.0b: 4096 x 2160 @ 60 Hz DP++: 4096 x 2160 @ 60Hz LVDS: 1920 x 1080 (1x HDMI, 1x DP++, LVDS)	HDMI 1.4b: 3840 x 2160 @ 30Hz, 2560 x 1600 @ 30Hz LVDS: 1920 x 1800 @ 60Hz 2 x DP 1.2a: 4096 x 2160 @ 60Hz (1x HDMI/DP, 1x DP)
Audio	Realtek Audio code 2 x 3W Audio Amplifier	Realtek Audio code Mic-in, Line-out 2 x 3W Audio Amplifier
Ethernet	2 x Intel® I225LM 1x Intel® I210IT	2 x Intel® I211AT
USB/SATA/COM/LAN	6/1/2/2	6/1/6/2
Power Requirement	+12V	+12V
Power Type	AT/ATX	ATX
Operating Temp.	0 ~ 60 °C (32 ~ 140 °F) -40 ~ 85°C (-40 ~ 185°F) - For wide temperature CPU SKU	-5 ~ 60°C (23 ~ 140°F)
Dimension (L x W)	3.93" x 2.83" (100 mm x 72 mm)	3.93" x 2.83" (100 mm x 72 mm)
Weight	0.88 lbs (0.4 Kg)	0.88 lbs (0.4 Kg)

1.8" SBC



Model Number	EZX-EHLP
Processor	Intel® Pentium®/ Celeron® / Atom™ Processor
System Chipset	N/A
System Memory	Single channel LPDDR4 2/4/8GB memory down
Expansion	1x M.2 Key-B, 1x Micro SIM to SIM adapter by option onboard eMMC
Display	Intel® Atom™/ Celeron®/Pentium® SoC Integrated Graphics Mini DP/ eDP
Resolution	mini DP++ : 4096 x 2160@60 Hz eDP: 4096 x 2160@60 Hz LVDS: 1920 x 1080
Audio	N/A
Ethernet	1x Intel® I211AT
USB/SATA/COM/LAN	6/0/1/1
Power Requirement	+12V
Power Type	AT/ ATX
Operating Temp.	0 ~ 60 °C (32 ~ 140 °F) -40 ~ 85°C (-40 ~ 185°F) - For wide temperature CPU SKU
Dimension (L x W)	3.3" x 2.5" (85 mm x 65 mm)
Weight	0.66 lbs (0.3 Kg)

COM Service

We convert complex COM development into easy tasks so our customers can better meet new market challenges. COM Design-in Service is focused on real-time response to customers' issues. We offers proactive services with pre-valid technology to ensure project success and time-to-market.

COM Sizes Overview

- COM Express Basic**
For Type 2, Type 6 and Type 7 pinout
125 x 95mm
- COM Express Compact**
For Type 2 and Type 6 pinout
95 x 95mm
- COM Express Mini**
For Type 1 and Type 10 pinout
84 x 65mm
- Qseven**
70 x 70mm

COM Express Type 10



Model Number	ESM-APLM
Processor	Intel® Celeron®/ Pentium®/ Atom™ SoC Processor
System Memory	1x 204-pin DDR3L 1600/1333MHz SO-DIMM up to 8GB
Expansion	1 x PCIe x4
USB	6 x USB 2.0 2 x USB 3.0
SATA	2 x SATA III
COM Port	N/A
MIO	1 x SMBus 1 x LPC
Display Chipset	Intel® Apollo lake SoC integrated Graphics
Display	LVDS, DDI
Audio	Intel® High Definition Audio
Ethernet	1 x Intel® WGI211AT
Power Requirement	+4.75V ~ +20V
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	3.31" x 2.17" (84mm x 55mm)
Certification	CE, FCC Class B

COM Competence Service for Design-Win



COM Application

- Measurement & Testing
- Military & Marine
- Transportation
- Multimedia & Gaming
- Automation
- Healthcare

COM Express Type 6

COM Express Type 6 - Compact Module



Model Number	ESM-EHLC	ESM-APLC	ESM-BYT2	ESM-KBLU	ESM-SKLU
Processor	Intel® Atom® x6000E Series and Intel® Pentium® and Celeron® J and N Series processors	Intel® Pentium®/ Celeron® SoC Processor	Intel® Atom™/Celeron® processor	7th Gen Intel® Core™ i7/i5/i3/Celeron® processor	6th Gen Intel® Core™ i7/i5/i3/Celeron® processor
System Memory	Two 260-pin SODIMM DDR4 3200 SDRAM slot up to 32GB	1 x 204-pin DDR3L 1600/1333MHz SO-DIMM up to 8GB	2 x 204-pin DDR3L 1600MHz SO-DIMM or 204-pin DDR3L 1333MHz SO-DIMM up to 4 GB (Processor E3845 & J1900 only support 1333MHz)	2 x 260-pin DDR4 2133MHz SO-DIMM up to 32 GB	2 x 260-pin DDR4 2133MHz SO-DIMM up to 32 GB
Expansion	3 x PCIe1	3 x PCIe1	3 x PCIe1	8 x PCIe1	8 x PCIe1
USB	8 x USB 2.0 4 x USB 3.2 Gen2x1 (10 Gbps)	8 x USB 2.0 4 x USB 3.0	7 x USB 2.0 1 x USB 3.0	8 x USB 2.0 4 x USB 3.0	8 x USB 2.0 4 x USB 3.0
SATA	2 x SATA III	2 x SATA III	2 x SATA II	3 x SATA III	4 x SATA III
COM Port	2 x UART	1 x UART	2 x UART	2 x UART	2 x UART
MIO	1 x SMBus 1 x LPC/eSPI (default) 1 x I ² C 1 x SPI	1 x SMBus 1 x LPC 1 x I ² C	1 x SMBus 1 x LPC 1 x I ² C	1 x SMBus 1 x LPC 1 x I ² C 1 x SPI	1 x SMBus 1 x LPC 1 x I ² C 1 x SPI
Display Chipset	Intel® Elkhart Lake SoC Processor integrated Gen11 LP graphics	Intel® Apollo lake SoC integrated Graphics	Intel® Valleyview SoC integrated Graphics	Intel® Kabylake SoC integrated Graphics	Intel® Skylake Processor integrated Graphics
Display	VGA, LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI
Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® Valleyview SoC integrated	Intel® High Definition Audio	Intel® High Definition Audio
Ethernet	1 x Intel® I225LM	1 x Intel® WGI211AT	1 x Intel® I211AT	1 x Intel® I219LM	1 x Intel® I219LM
Power Requirement	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F) (Standard) Extend: -40°C ~ 85°C (-40°F ~ 185°F) on request	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F) (Standard) Extend: -40°C ~ 85°C (-40°F ~ 185°F) on request	0°C ~ 60°C (32°F ~ 140°F) (Standard) Extend: -20°C ~ 70°C (-4°F ~ 158°F) on request	-20°C ~ 80°C (-4°F ~ 176°F) (Standard) Extend: -20°C ~ 70°C (-4°F ~ 158°F) on request
Dimension (L x W)	3.7" x 3.7" (95 mm x 95 mm)	3.7" x 3.7" (95 mm x 95 mm)	3.7" x 3.7" (95 mm x 95 mm)	3.7" x 3.7" (95 mm x 95 mm)	3.7" x 3.7" (95 mm x 95 mm)
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B

COM Express Type 6 - Basic Module



Model Number	ESM-TGH	ESM-CFH	ESM-KBLH	ESM-SKLH	ESM-BYT
Processor	11th Gen Intel® Xeon®/Core™/ Celeron® BGA 10nm Processor	9/8th Gen Intel® Xeon®/ Core™ i7/i5/i3 processor	7th Gen Intel® Core™ i7/i5/i3 processor	6th Gen Intel® Core™ i7/i5/i3 processor	Intel® Atom™/Celeron® processor
System Memory	3x 260-pin DDR4-3200MHz SO-DIMM with up to 96 GB with ECC (ECC is supported with specific SKU) *3rd socket on rear side by request	3 x 260-pin DDR4 2400/2133MHz SO-DIMM up to 96 GB	2 x 260-pin DDR4 2400/2133MHz SO-DIMM up to 32 GB	2 x 260-pin DDR4 SO-DIMM up to 32GB	2 x 204-pin DDR3L 1066MHz SO-DIMM (for Bay trail-I E3826/ E3825/E3815) or 204-pin DDR3L 1333MHz SO-DIMM up to 8 GB (E3845 & J1900 only support 1333MHz)
Expansion	1 PEGx16 (Gen4, 16.0 GT/s) 8 PCIe1 (Gen3, 8.0 GT/s)	1 x PCIe x16 Gen3 8 x PCIe x1	8 x PCIe1	8 x PCIe1	3 x PCIe1
USB	8 x USB 2.0 4 x USB 3.2 Gen2x1 (10Gbps)	8 x USB 2.0 4 x USB 3.1	8 x USB 2.0 4 x USB 3.0	8 x USB 2.0 4 x USB 3.0	7 x USB 2.0 1 x USB 3.0
SATA	4 x SATA III	4 x SATA III	4 x SATA III	4 x SATA III	2 x SATA II
COM Port	2 x UART	2 x UART	2 x UART	2 x UART	1 x UART
MIO	1 x SMBus 1 x LPC (eSPI default) 1 x I ² C	1 x SMBus 1 x LPC 1 x I ² C 1 x SPI	1 x SMBus 1 x LPC 1 x I ² C	1 x SMBus 1 x LPC 1 x I ² C	1 x SMBus 1 x LPC 1 x I ² C
Display Chipset	Intel® Tiger Lake-H Processor integrated Graphics	Intel® Coffee Lake Processor integrated Graphics	Intel® Kabylake SoC integrated Graphics	Intel® Valleyview SoC integrated Graphics	Intel® Valleyview SoC integrated Graphics
Display	VGA LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI	VGA, LVDS, DDI
Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® Valleyview SoC integrated
Ethernet	1 x Intel® I225LM	1 x Intel® I219LM	1 x Intel® I219LM	1 x Intel® I219LM	1 x Intel® I211AT
Power Requirement	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V	+9V ~ +19V
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F) (Standard) Extend: -40°C ~ 85°C (-40°F ~ 185°F) on request	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F) (Standard) Extend: -40°C ~ 85°C (-40°F ~ 185°F) on request
Dimension (L x W)	5" x 3.7" (125 mm x 95 mm)	5" x 3.7" (125 mm x 95 mm)	5" x 3.7" (125 mm x 95 mm)	5" x 3.7" (125 mm x 95 mm)	5" x 3.7" (125 mm x 95 mm)
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B

ARM-based SBC

Qseven Module



Model Number	RSC-IMX8M	RSC-IMX61	ACP-IMX6POS	RSC-BCX6
Processor	NXP i.MX8M Cortex-A53 Quad Core 1.3GHz; Cortex-M4 core processor	NXP i.MX6 Dual Lite NXP i.MX6 Quad Core	NXP i.MX6 Dual Lite NXP i.MX6 Quad Core	NXP i.MX6 Solo
System Memory	2GB DDR4	1GB DDR3 expandable to 2 GB	1GB DDR3 (Dual Lite) 2GB DDR3 (Quad Core) expandable to 2 GB	512 MB DDR3 expandable to 1 GB
Storage	8GB eMMC	eMMC 4GB	eMMC 4GB	N/A
External I/O Connector	1 x USB 3.0 Type A (Vertical type) 1 x USB 3.0 Type C 2 x Gigabit LAN 1 x HDMI (Vertical type) 1 x Micro SD socket 1 x Hand Phone 1 x Reset 1 x Power LED (Green)	1 x USB2.0 Type A x2 (Double deck) 1 x HDMI with screw lock 1 x 10/100/1000 LAN Optional Powered LAN support (IEEE 802.3at), 1 x Micro SD socket, 1 x Jack for I/R extender cable, co-design (Optional) with on board I/R sensor (Optional)	1 x USB2.0 Type A x2 (Double deck) 1 x 10/100/1000 LAN Optional 2nd 1 x 10/100/1000 LAN (RJ45x1), 1 x HDMI Connector (Vertical Type) 1 x Mini USB Connector 1 x RJ11 Connector for Cash Drawer 2 x DB9 Male Connector (COM 1 & 2 can be select from RS232/422/485) 1 x DC 12V Power Input by Power DC Jack 1 x Micro SD socket	1 x Line-Out 2 x USB 2.0 1 x Micro USB Connector (USB OTG) 1 x HDMI 1 x RJ-45 1 x Barrel Type Connector 1 x DC-in Jack
Internal I/O Connector	1 x Front Panel 2 x MIPI CSI, 1 x MIPI DSI 1 x DC in 1 x LVDS, 1 x Black Light 1 x I ² C, 1 x USB 2 x M.2 socket 1 x SIM Socket 1 x Extend connector	1 x USB2.0, 1 x USB OTG 1 x 2x5 GPIO, 1 x LVDS 24bit x2 1 x Backlight control 1 x Line-out, speaker-out Mic-in, 1 x Mini-PCIe (half size) 1 x I ² C, 1 x SATA (i.MX6 Quad only) 1 x Battery connector for RTC 1 x debug port, 1 x RS232	2 x RS232, 1 x debug port 1 x LVDS 24bit x2, 1 x Backlight control 1 x VGA, 1 x I ² C 3 x USB pin header 1 x 5-wire Resistive Touch Interface 1 x Dual Channel 24-bit LVDS 1 x Stereo Speaker-out 1 x Mini PCIe (Full size) 1 x SIM Socket 1 x Front Panel Connector with Power Button & Indicate LED for Power & WIFI 1 x Battery connector for RTC	1 x LVDS, 1 x Backlight control 1 x USB 2.0, 1 x RS232 1 x 8 bits GPIO 1 x Front Panel, 1 x Battery connector for RTC 1 x I ² C, 1 x CAN Bus, 1 x Mic-in, 1 x Line-out (Optional), 1 x Micro SD socket 1 x Mini PCIe (Half size) 1 x SIM Socket
Power Requirement	12 ~ 24V DC input, Terminal block	12 ~ 26V DC input, 2.5mm DC Jack, typical 19V input With brownout detection or Powered LAN	12 ~ 24V DC input	5V DC input
Operating Temperature	-40°C ~ 85°C (-40°F ~ 185°F)	-20°C ~ 85°C (-4°F ~ 185°F)	A Version 0°C ~ 60°C (32°F ~ 140°F) B Version -20°C ~ 85°C (-4°F ~ 185°F)	0°C ~ 60°C (32°F ~ 140°F)
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)	-40°C ~ 85°C	-40°C ~ 85°C (-40°F ~ 185°F)	-20°C ~ 80°C (-4°F ~ 176°F)
Dimension (L x W)	146 mm x 102 mm	146 mm x 102 mm	175 mm x 110 mm	120 mm x 78 mm
Weight	0.15 kg	0.15 kg	0.16 kg	0.1 kg
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class A
Software Support	Android 9.0 Yocto 2.5	Android 4.4 / 6.0 Ubuntu 12.04 Yocto 2.1	Android 4.4 Ubuntu 14.04 Yocto 1.7	Android 4.3, 4.4 and 5.0 can be supported if upgraded to 1G DDR3 memory Linux Ubuntu 14.04 Linux Yocto 1.7

Model Number	EQM-APL	EQM-BYT	EQM-BYT2	ROM-IMX6
Processor	Intel® Pentium®/ Celeron® processor	Intel® Atom™/ Celeron® processor	Intel® Atom™ Processor (E3825/ E3845)	NXP i.MX6 Solo/ Quad
System Memory	Onboard DDR3L 1600 & 1333MHz 4GB Up to 8GB	Onboard DDR3L 2GB up to 4 GB (Processor E3845 only support 1333MHz)	2GB DDR3 (E3825) 4GB DDR3 (E3845)	1GB RAM (Solo) 1GB RAM (Quad)
Expansion	3 x PCIe1	3 x PCIe1	3 x PCIe1	3 x PCIe1
USB	6 x USB 2.0, 2 x USB 3.0	5 x USB 2.0, 1 x USB 3.0	5 x USB 2.0, 1 x USB 3.0	4 x USB 2.0, 1 x USB OTG
SATA	2 x SATA III	2 x SATA II	2 x SATA II	1 x SATA II (Quad only)
UART	1 x UART	1 x UART	1 x UART	1 x UART
MIO	1 x SMBus, 1 x LPC, 1 x I ² C, 1 x SPI	1 x LPC, 1 x SMBus, 1 x I ² C	1 x LPC, 1 x SMBus, 1 x I ² C	3 x I ² C
Display Chipset	Apollo lake SoC integrated Graphics	Intel® Valleyview SoC integrated Graphics	Intel® Valleyview SoC integrated Graphics	NXP
Display	(HDMI or DP) + (eDP or LVDS)	DDI (HDMI or DP) + LVDS	DDI (HDMI or DP) + LVDS	1 x HDMI/ LVDS
Audio	Intel® Apollo lake SoC integrated	Intel® Valleyview SoC integrated	Intel® Valleyview SoC integrated	Supports I ² C interface
Ethernet Chipset	1 x Intel® I210 (N4200/N3350) Industrial 1 x Intel® I211 (N4200/N3350) commercial	1 x Intel® I211 (commercial)	1 x Intel® I210 for Industrial 1 x Intel® I211 for commercial	1 x KSZ9031
Power Requirement	+5V	+5V	+5V	+5V
Others	N/A	N/A	N/A	Support Mipi CSI Camera
Operating Temperature	0°C ~ 70°C (32°F ~ 140°F) (Standard) Extend: -20°C ~ 70°C (-4°F ~ 158°F) on request	0°C ~ 60°C (32°F ~ 140°F) (Standard)	0°C ~ 60°C (32°F ~ 140°F) (Standard) -40°C ~ 85°C (-40°F ~ 185°F) (Extended)	0°C ~ 60°C (32°F ~ 140°F) (Standard) -40°C ~ 85°C (-40°F ~ 185°F) (Extended)
Dimension (L x W)	2.8" x 2.8" (70 mm x 70 mm)	2.8" x 2.8" (70 mm x 70 mm)	2.8" x 2.8" (70 mm x 70 mm)	2.8" x 2.8" (70 mm x 70 mm)
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B
Software Support	Win 10 Linux Android	Win 10 Win 7 Win 8 Linux	Ubuntu 12.04 Win 7/ 8/ 10	Android 6.0 Yocto 2.1

SMARC/ SMARC Eval Carrier Board

Qseven Carrier Board/ Eval Carrier Board

SMARC



Model Number	SMA-X81	SMA-IMX6
Processor	NXP i.MX 8M Mini	NXP i.MX 6 Solo NXP i.MX 6 Dual Lite NXP i.MX 6 Dual NXP i.MX 6 Quad Core
System Memory	1GB DDR3	1GB DDR3 expandable to 2 GB
Storage	eMMC 8GB	eMMC 4GB
External I/O Connector	1 x USB 2.0 Port (One OTG) 3 x I ² C 1 x I ² S 1 x SPI 8 x GPIO 1 x Uart 1 x MIPI CSI 1 x MIPI DSI 1 x LVDS 3 x PCIe 4 x USB 2.0 1 x Giga Lan	2 x USB 2.0 Port (One OTG) 2 x RX/TX (Ser1/3) 2 x UART (Ser0/2) 3 x PCIe x1 1 x MLB150 12 x GPIOs, 1 x SDIO, 1 x SATA eMMC, 2 x SPI, 3 x I ² C, 1 x SPDIF, 1 x WDT, 2 x CAN, 1 x JTAG
Internal I/O Connector	N/A	N/A
Power Requirement	12~24V	3V to 5.25V - Operates Directly from Single Level Lithium Ion Cells, or Fixed 3.3V or 5V Power Supplies
Operating Temperature	Optional Commercial Temp.: 0°C ~ 85°C (32°F ~ 185°F) Industrial Temperature: -40°C ~ 85°C (-40°F ~ 185°F)	Optional Commercial Temp.: 0°C ~ 60°C (32°F ~ 140°F) Industrial Temperature: -40°C ~ 85°C (-40°F ~ 185°F)
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)	-40°C ~ 85°C (-40°F ~ 185°F)
Dimension (L x W)	82 mm x 50 mm	82 mm x 50 mm
Weight	0.06 kg	0.06 kg
Certification	CE, FCC Class B	CE, FCC Class B
Software Support	Android 9.0 Yocto 2.5	Android 4.4 Ubuntu 12.04 Yocto 2.0

SMARC Eval Carrier Board



Model Number	REV-SA01	REV-SA02	REV-SA03
Processor	N/A	N/A	N/A
System Memory	N/A	N/A	N/A
Storage	N/A	N/A	N/A
External I/O Connector	1 x HDMI, 1 x VGA, 2 x RJ45, 1 x DB9, 1 x Mini-USB, 2 x USB Type A	1 x LAN, 2 x RCA, 1 x Micro SD socket, 1 x Mini USB (OTG), 1 x USB Type A 2.0 double deck, 1 x HDMI, 1 x VGA, 1 x Display port, 2 x RS232, 1 x RST Switch, 1 x Power Switch, 1 x Power LED, 1 x DIP SW	1 x Power Key 1 x Reset Key 1 x DC Jack 1 x USB 2.0 Type A 1 x USB Type C 1 x Giga Ethernet 1 x Headphone 1 x Micro SD Socket 1 x SIM Socket
Internal I/O Connector	1 x LVDS, 1 x Backlight, 1 x SD Socket, 1 x USB Connector, 2 x CAN BUS, 1 x Speaker-out/Mic-in, 1 x RS-232, 1 x GPIO, 1 x SATA, 1 x RTC Battery, 1 x 2 Cell Li Battery Connector	1 x Camera, 2 x Speaker, 1 x D-MIC, 1 x Mini PCIe (SATA), 1 x Mini PCIe (USB), 1 x Sim Card, 1 x GPIO, 1 x I ² C, 1 x USB2.0, 1 x PCIe-1, 1 x LVDS, 1 x Battery charger connect, 1 x Inverter, 2 x RS485, 2 x CAN	1 x USB 2.0 4P Header 1 x Mic Phone 2P Header 1 x Speaker 2P Header 1 x RTC-Battery (CR2032) 1 x M.2 key E for WIFI /BT 1 x M.2 key B for LTE 1 x M.2 key M for SSD 1 x BackLight 4P Header 1 x I2C Touch Screen connector 1 x MIPI DSI Screen connector 1 x MIPI CSI Screen connector 1 x LVDS Screen connector 1 x GPIO 16 bit 1 x CAN Bus
Power Requirement	+9V ~ 36V DC-in (REV-SA01-02-A1R) +9V ~ 24V DC-in (REV-SA01-03-A1R)	DC +12V	DC +12V
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F)	-40°C ~ 85°C (-40°F ~ 185°F)	-40°C ~ 85°C (-40°F ~ 185°F)
Storage Temperature	-20°C ~ 80°C (-40°F ~ 176°F)	-40°C ~ 85°C (-40°F ~ 185°F)	-40°C ~ 85°C (-40°F ~ 185°F)
Dimension (L x W)	146 mm x 101 mm	170 mm x 170 mm	165 mm x 120 mm
Weight	0.13 kg	0.024 kg	0.024 kg
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B
Software Support	N/A	N/A	N/A

Qseven Carrier Board



Model Number	REV-0703 (A/B)
USB	4 x USB 2.0, 2 x USB 3.0 (2 x USB on board, 2 x USB 3.0/ 1 x USB external)
SATA	2 x SATA (On board)
COM Port	1 x RS-232
Video	1 x HDMI, 1 x LVDS, 1 x DP, 1 x eDP (1 x LVDS & 1 x eDP on board)
Other	External I/O Connector 1 x Ethernet, 1 x SD socket, 3 x Audio phone jack Internal I/O connector 1 x GPIO, 1 x PCIe x1, 1 x mPCIe, 1 x SPI, 1 x CAN, 1 x LPC, 1 x JFP (Miscellaneous Setting Connector), 1 x PWM CPU Fan Header 1 x PWR Header
DIO	1 x 16 bit GPIO
MIO	1 x SD socket for version A 1 x Micro SD socket for version B
Expansion	1 x Mini PCIe Supports SIM Card
Audio Chipset	ALC892/ WM8962
Audio Interface	Mic-In, Line-In, Line-Out
Power Requirement	DC +12V
Operating Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
Dimension (L x W)	6.69" x 6.69" (170 mm x 170 mm)
Certification	CE, FCC Class B

Eval Carrier Board



Model Number	EEV-EX16-B1	EEV-EX15	EEV-EX14
USB	4 x USB 2.0, 4 USB 3.2 (Gen2/10Gbps)	8 x USB 2.0, 2 x USB 3.0 (2 USB External)	8 x USB 2.0, 4 x USB 3.0 (4 USB External)
SATA	4 x SATA III (On Board)	2 x SATA III (On Board)	4 x SATA II (On Board)
COM Port	N/A	N/A	1 x RS-232/422/485, 1 x RS-232, 1 x LPT (1 x RS232/422/485 external, 1 x RS232 on board)
Video	3 x Display Port, 1 x VGA, 3 x HDMI, 1 x LVDS (1 x LVDS on board) 1 x eDP	1 x Display Port, 1 x HDMI, 1 x LVDS (1 x LVDS on board)	1 x Display Port, 1 x VGA, 1 x HDMI, 1 x LVDS (1 x LVDS on board)
Other	1 x SDIO 1 x LAN (support 2.5G)	1 x LAN	1 x PS2/ KB & MS, 1 x SDIO, 2 x LAN
DIO	1 x 8bit GPIO	1 x 8bit GPIO	1 x 8bit GPIO
MIO	N/A	N/A	1 x IrDA
Expansion	2 x PCIe Slot x4 1 x PCIe x16 1 x IET 1 x SDIO/DIO (optional, depend on module board)	1 x PCIe x4 1 x IET 1 x SDIO/DIO (optional, depend on module board)	1 x PCIe x16 1 x PCIe x4 1 x PCIe x1 1 x Express Card 1 x Mini PCIe
Audio Chipset	ALC888	ALC892	ALC892
Audio Interface	Mic-In and Line-Out	Mic-In and Line-Out	Mic-In, Line-In and Line-Out
Power Requirement	ATX	ATX	AT/ATX
Operating Temperature	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)
Dimension (L x W)	9.6" x 9.6" (243.84 mm x 243.84 mm)	6.7" x 6.7" (170 mm x 170 mm)	9.6" x 9.6" (243.84 mm x 243.84 mm)
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B

Peripherals & Accessories

Peripheral Vertical-Market

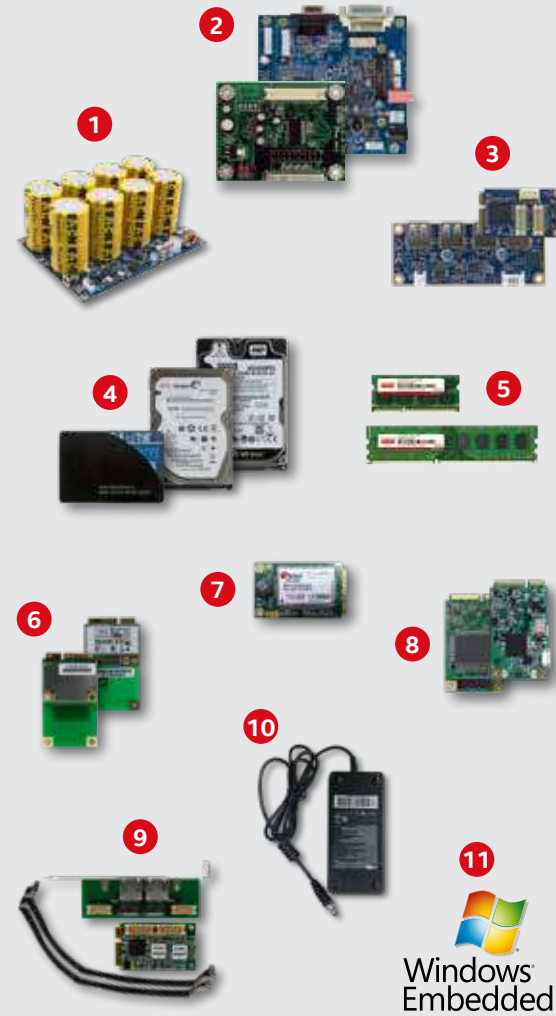
In the IoT new era, we are moving toward automation future instead of human operation. Furthermore, an exponentially growing interconnected devices are applied to unbridled industrial demands.



Marine

Factory Automation

Transportation



With a full line of products, Avalue peripherals can provide everything that you need to build a system or solution. If the item is not covered by our standard product offerings, our purchasing team can help source any part based on a customer's specified vendor and product.

In short, the ultimate goal of us is to provide customers the most efficient services, the best quality products, and the shortest shipment lead time.

Peripherals & Accessories		
	Embedded Peripherals	Description
1	Power Board	EPM-1712 Vehicle 100Watt Smart DC/DC Converter
		EPM-1715 Super Cap Power Module
		EPM-1718 60W DC to DC Marine Power Module
2	Display Board	EPM-1522 18/24-bit TTL/LVDS to DVI transmitter
		EPM-1534 1 LVDS to 4 LVDS Module
3	IO Board	EPM-1601 mPCIe to 4-RS-232 Module
		EPM-1602 mPCIe to 4-RS-422/485 Module
		EPM-1603 USB to 4-RS-232/422/485 Module
		EPM-1604 4 Port USB 2.0 Hub
		EPM-1605 USB to mPCIe Module
		EPM-1606 mPCIe to M.2 Transfer Board
		EPM-1607 M.2 2242/2260/2280 to 4 -RS-232 Module
		EPM-1608 M.2 2242/2260/2280 Dual GbE LAN module
4	Industrial Storage	SSD: 2.5", mSATA, M.2, CFAST, CF, DOM HDD: 2.5", 3.5"
5	Industrial Module	Type: SO-DIMM, Long-DIMM Capacity: Max. Up to 32GB Temperature: Standard or Industrial temperature
6	Wi-Fi Module	Form Factor: mPCIe/ M.2 Bluetooth supported
7	3G/4G/5G Module	Type: 3G/ 4G / 5G Module Interface: mCPIE, M.2
8	Capture Card	Mini SDI/HDV capture card w/H.264 High Profile encoding
9	Mini LAN Port	2-port 10/100/1000 Ethernet board
10	Power Adapter	AC DC Adapter 60W/84W/120W
11	Microsoft Windows Embedded OS	Avalue provides Embedded Software to customers who integrated Avalue's hardware products. Windows Embedded Standard 7/8 Windows 10 IoT Enterprise



Quality

All our peripherals have been tested compatible with Avalue boards and systems during development. We would like to enhance the product quality and recommend to customer.



Longevity

We design our products using components with a long lifecycle to ensure our modules are available in the long term for the market's needs.



Variety

We provide the various peripherals for different usage Such as the marine power board, I/O board, Display board.



EPM-1601 mPCIe to 4-RS-232 Module

- Input Interface PCI-Express. 2.0
- Output Interface 4 x RS-232
- Industrial temperature (W/T temp. -40°C to 85°C) operation
- Support Ring Wake function (optional)



EPM-1602 mPCIe to 4-RS-422/485 Module

- Input Interface PCI-Express. 2.0
- Output Interface 4 x RS-422/285
- Industrial temperature (W/T temp. -40°C to 85°C) operation
- Support auto flow control
- Cable for mPCIe to four DB-9 connectors



EPM-1603 USB to 4-RS-232/422/485 Module

- Input Interface USB2.0
- Output Interface 4 x RS232/422/485
- 2 x USB 2.0 w/type A connector
- Industrial temperature (W/T temp. -40°C to 85°C) operation



EPM-1604 4-Port USB 2.0 Hub

- 4 x Port USB Hub, open bare-board design
- 4 x Internal USB2.0 type A female connector for down port
- 1 x Internal wafer 2pin connector for DC-input (+12V, Max 1A)
- Compliant with Universal Serial Bus Specification Revision 2.0 (Data Rate 1.5/12/480 Mbps), USB1.1 compatible



EPM-1605 USB to mPCIe Module with USIM

- Input Interface USB 2.0
- Output Interface USB 2.0
- Operation temperature : 0 °C to 60°C
- 1 x USIM Slot expansion



EPM-1606 mPCIe to M.2 A/E key Transfer Board

- M.2 Wi-Fi & Bluetooth Module (PCIe and USB Base) to Mini PCIe Converter
- Support Windows, MAC and Linux
- Multiple plated-holes support M.2 type 2230 / 2242
- Operating temperature:-40 ~ 80°C



EPM-1607 M.2 2242/2260/2280 to 4 -RS-232 Module

- Input Interface PCI-Express. 2.0
- Output Interface 4 x RS-232
- Support M.2 type 2242/2260/2280 plated-holes
- Industrial temperature (W/T temp. -40°C to 85°C) operation
- Support Ring Wake function (optional)



EPM-1608 M.2 2242/2260/2280 Dual GbE LAN module

- 3-in-1 form factor 2280/2260/2242
- Ultrafast Transfer Speeds via 2-Native PCIe Lane
- Quickly adds two independent Gigabit Ethernet ports (with 2kV isolation) to embedded systems
- Industrial-grad design (-40°C ~ +85°C) for harsh environments
- Supports Wake-on LAN ensures unhindered remoting



EPM-1712 Vehicle 100Watt Smart DC/DC Converter

- Wide Range DC Input: Typical 12/24Vdc (+9V ~ +36V)
- Intelligent system on/off control via jumper setting
- 6 selectable power on/off timing modes
- Load Down/Over Voltage/Short Circuit/Over current Protection
- Battery voltage monitor



EPM-1715 Supercap Power Module

- 500'000 Charge & Discharge Cycling
- 4 x 400F Supercapacitor up to 6-Cell and 8-Cell
- AP for the Parameter Selecting
- Wide Temperature Range: 0°C ~ +60°C
- Wide DC Input: +12 ~ 24Vdc
- Over Temperature Protection



EPM-1718 Marine 60W Power Module

- 60W Marine Power Board w/ IEC 60945 Certified
- Wide DC Input Range: +9 ~ 36Vdc; DC Output: +12Vdc
- Supports Over voltage/current protection
- Input to Output Isolation: 1500Vdc
- Operating Temperature Range: -40°C ~ 85°C
- Dimension: 100mm x 80mm

VM System - Automation

Avalue Factory Automation Solutions

- key points, advantages, focused segments, and applications

Manufacturers today are looking for efficiencies in production, and the way to transform our business through Industry 4.0. Realizing that Industry 4.0 doesn't have to replace a major infrastructure overhaul that costs a lot of money. Intelligent factory solutions able to connect compute device and visualize the data for management and data-driven digital transformation. We are pleased to introduce Avalue Factory Automation Solution to help you and your customers to achieve below key features.

Essential Professional Capabilities



Throughput enhanced by 20-30% Over legacy non-ECAT solution



Time-deterministic control for wide variety of automation usage



Avalue offers easy to use utilities which enable quick installation of the entire system.

Solutions Highlights



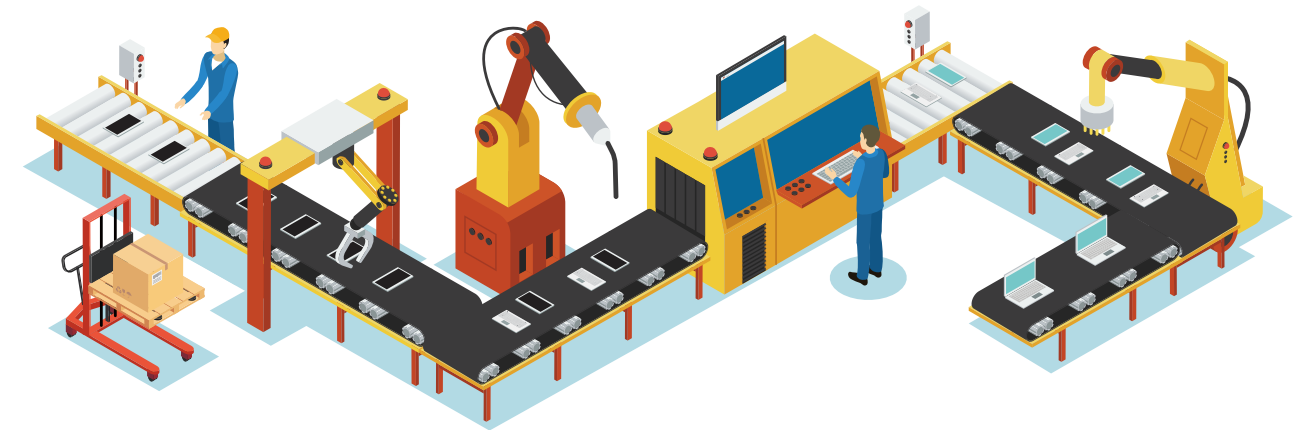
Computing Platform + Software	 Panel PC	 Embedded PC	 Motherboard	 HPC Server	 EtherCat/ IET

EtherCAT Solution

- **Factory Automation**
- **Throughput enhanced by 20-30% Over legacy non-ECAT solution**
- **Non- stop Producing Factory**
- **Robotic Production**

Industrial Automation

Challenge	Solution
PCIe Expansion	Barebone System w/PCIe Expansion
Low Cycle Time	Less than 250 μs
High Cost Issue	Low cost of implementation



Machine Vision Solution

- **Factory Automation**
- **4 PoE Smart Camera Support**
- **Din Rail Design Support**
- **Powerful Edge Computing System**

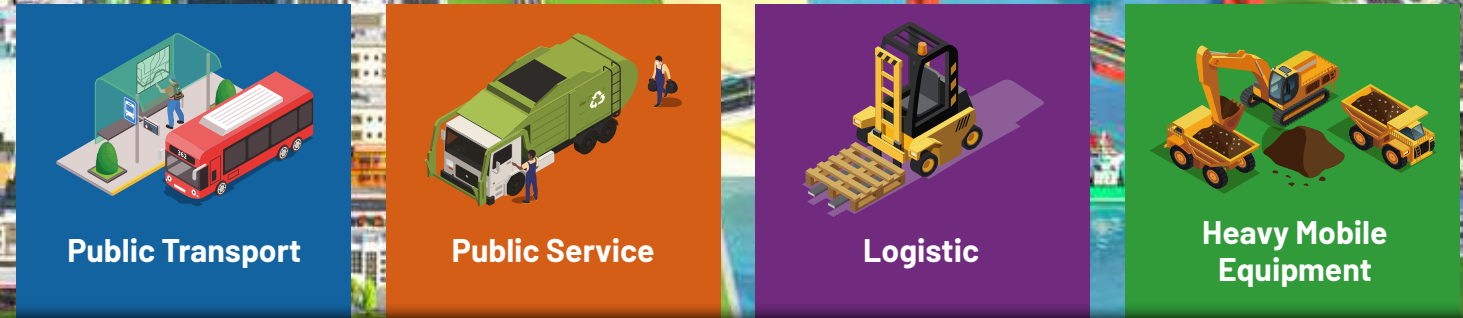
Industrial Automation

Challenge	Solution
Wide Voltage	9-32V
Harsh Environment	Fanless and Rugged Design
Power Requirement	44-bit GPIO, Supports 1.5KV Isolation



EMS-SKLU-GPIO EMS-TGL-GPIO

Transportation



How Avalue will shape transportation in smart cities?

We support our customers with innovative solutions in fields of public transport, first response, logistic and related infrastructure in a smart city. We also help our customers to achieve faster time-to-market within our ideal solutions, how to make this world smarter, at the same time, with the best quality, performance and support.



Essential Professional Capabilities



Wide Range of Product Series Selection



Domain Know-How in Transportation Market



Solution-Build Thinking



Dedicated Teams to Support



Win/ Linux/ Android OS Support

Transportation Product Highlights

Application Layer						
Computing platform						
	Ruggedized Box PC	Transportation System	Panel PC	Industrial-grade Monitor	E Ink	Ruggedized Tablet
Software layer						
	Remote Management Device	Positioning System	Vehicle Power Management	OS Build (Win/ Linux/ Android)	API/ SDK	Ignition Control

Marine



Railway



Vehicle



Model Number	EMS-SKLU-Marine	VMS-EHLR	VMS-CFS	VMS-CFS-PSE	VMS-APL
Processor	i7-6600U, i5-6300U, i3-6100U, Celeron 3955U	Intel Atom X6425E, 2.0 GHz (up to 3.0GHz), 12W	i7-8700T, i7-9700TE, i5-8500T, i5-9500TE, i3-8100T, i3-9100TE, G5400T, G4900T	i7-8700T, i7-9700TE, i5-8500T, i5-9500TE, i3-8100T, i3-9100TE, G5400T, G4900T	N4200, N3350, x7-E3950, x5-E3940, x5-E3930
System Memory	1x 260-Pin DDR4 2133MHz SO-DIMM up to 16 GB	1x 260-pin SODIMM socket Max. up to 32GB DDR4 3200MT/s	2x 260-pin SODIMM socket Max. up to 64GB DDR4 2666MT/s	2x 260-pin SODIMM socket Max. up to 64GB DDR4 2666MT/s	1x 204-Pin DDR3L 1866MHz SO-DIMM up to 8 GB
Expansion	1x M.2 Key-B 2242/ 3042 (SATA/ PCIe/ USB 3.0) 1x Mini PCIe (PCIe/ USB 2.0)	1x M.2 Key-B 2242/ 3042/ 3052 (PCIe/ USB 3.1 Gen.2), w/SIM slot1 (external) 1x M.2 Key-E 2230 (PCIe/ USB 2.0) 1x mPCIe (PCIe/ USB 2.0), w/ SIM slot2 (external)	1x Avalue 80-Pin IET Interface 1x Mini PCIe (PCIe/ USB 2.0), w/ SIM1 Slot (external) 1x M.2 Key-E 2230 (PCIe/ USB 2.0) 2x M.2 Key-B 2242/ 3042/ 2280 (PCIe/ USB 3.1/ SATA), w/ SIM2, 3 Slot (external) 1x CANBus Module Interface	1x Mini PCIe (PCIe/ USB 2.0), w/ SIM1 Slot (external) 1x M.2 Key-E 2230 (PCIe/ USB 2.0) 2x M.2 Key-B 2242/ 3042/ 2280 (PCIe/ USB 3.1/ SATA), w/ SIM2, 3 Slot (external) 1x CANBus Module Interface	1x Avalue 80-Pin IET Interface 1x Mini PCIe (PCIe/ USB2.0), w/ SIM1 Slot (external) 1x Mini PCIe (PCIe/ USB2.0), w/ SIM2 Slot (external) 1x CANBus module Interface
Storage	1x 2.5" Drive Bay, 1x M.2 (SATA)	1x 2.5" SSD/HDD drive Bay (SATA III), external w/9.5 mm height; 1x M.2 2242 (SATA III)	2x 2.5" Drive Bay (Front Access) 2x M.2 Key-B SSD (2242/2280)	2x 2.5" Drive Bay (Front Access) 2x M.2 Key-B SSD (2242/2280)	1x 2.5" Drive Bay (SATA III) 1x M.2 (SATA III, 2242) 1x SD (3.0)
USB	4 x USB 3.0, 2 x USB 2.0	2x USB 3.1 Gen.2 (10Gbps), Type A 1x USB 2.0 (w/ M12 A-coded)	6 x USB 3.1	6 x USB 3.1, 2 x USB 2.0	4 x USB 3.0
COM Port	2 x RS-232/422/485 (Jumper) 4 x RS-232/422/485 (BIOS, 2.5KV isolation)	2 x COM RS232/422/485 (auto flow control via HW, via BIOS and Jumper)	1 x RS232, 2 x RS-232/422/485	1 x RS232, 2 x RS-232/422/485	2 x RS-232/422/485 (Jumper)
Other	2 x SIM Card Slot, 1x SMBus, 2 x PS2/ KB & MS 2 x Antenna mounting w/ cover	2 x SIM Card Slot (external), 9 x Antenna with dust cover, 1x CAN2.0B (DB9), optional	1 x DC-Out (12V/4A), 3 x SIM Card Slot (External Accessible) 5 x Antenna Mounting w/ Dust Cover	3 x SIM Card Slot (External Accessible) 5 x Antenna Mounting w/ Dust Cover	1 x DC-Out (12V/6A), 2 x SIM Card Slot (External Accessible) 5 x Antenna Mounting w/ Dust Cover
DIO	1x 12-bit GPIO	1x DB9 GPIO - 4 x DI and 4 x DO with 2.5KV isolation	1 x 8-Bit GPIO, w/ 1.5KV isolation	1 x 8-Bit GPIO, w/ 1.5KV isolation	1 x 8-Bit GPIO
Display Chipset	Intel® HD Graphics 520/ 510	Intel® UHD Graphics for 10th Gen Intel® Processors	Intel® UHD Graphics 630/610	Intel® UHD Graphics 630/610	Intel® HD Graphics 505/500
Display Resolution	DP: Max. resolution 4096x2304 @ 60Hz	DP++ 1.4: 4096x2304 @ 60Hz HDMI 2.0 : Max. resolution 4096 x 2304 @ 60Hz VGA: 1920 x 1080 @ 60Hz (optional)	DP 1.2: 4096 x 2160 @ 60Hz w/HDR HDMI 1.4: 4096 x 2160 @ 30Hz LVDS: 1920 x 1200 @ 60Hz, supports 2 channels 18/24-bit	DP 1.2: 4096 x 2160 @ 60Hz w/HDR HDMI 1.4: 4096 x 2160 @ 30Hz LVDS: 1920 x 1200 @ 60Hz, supports 2 channels 18/24-bit	DP: Max. Resolution 4096 x 2160 @ 60Hz LVDS: Max. Resolution 1920 x 1200 @ 60Hz
Audio Interface	Mic-In, Line-In and Line-Out	Mic-In, Line-Out, Line-in (DB15)	2 x Mic-In, 2 x Line-Out	2 x Mic-In, 2 x Line-Out	2 x Mic-In, 2 x Line-Out
Ethernet Chipset	2 x Intel® I211AT	2 x Intel® I210-IT	1 x Intel® I211-AT GbE Controller, 1 x Intel® I219-LM GbE PHY	1 x Intel® I211-AT GbE Controller, 1 x Intel® I219-LM GbE PHY	2 x Intel® I211AT
Ethernet Interface	2 x RJ45	2 x M12, X-coded	2 x RJ45; 4 x Port RJ45/ M12, supports 802.3af PoE (optional)	2 x RJ45 (LAN); 4 x RJ45/ M12 (PoE), supports 802.3af PoE.	2 x RJ45
Power Requirement	Typical 12/24Vdc (+9V ~ +36V), w/ isolation	Typical 12/24Vdc (+9V ~ +36V), w/ isolation	Typical 12/24Vdc (+9V ~ +36V), w/ isolation	Typical 12/24Vdc (+9V ~ +36V), w/ isolation	Typical 12/24Vdc (+9V ~ +36V), w/ isolation
Power Mode	AT/ATX (ATX is the default setting)	AT/ATX (AT default), w/ignition control and power management	AT/ATX (AT default), w/ignition control and power management	AT/ATX (AT default), w/ignition control and power management	AT/ATX (AT default), w/ignition control and power management
Dimension (L x W x H)	(240 x 151.5 x 75 mm)	240 mm x 150 mm x 55mm	(210 x 240 x 110 mm)	(210 x 240 x 110 mm)	(239 x 186 x 62 mm)
Operating Temperature	(w/SSD), ambient w/ air flow -20°C ~ 60°C (-4°F ~ 140°F)	-40°C ~ 70°C (w/SSD) ambient w/ air flow. Follow EN50155, Class OT4 -40 ~ 70°C, 85°C for 10 minutes	With extended temperature peripherals, w/ air flow: -40°C ~ 70°C (-40°F ~ 158°F)	With extended temperature peripherals, w/ air flow: -40°C ~ 60°C (-40°F ~ 140°F)	With extended temp. peripherals N4200/N3350: -20°C ~ 70°C (-4°F ~ 158°F) w/ air flow ; E3950/E3940/E3930: -40°C ~ 70°C (-40°F ~ 158°F) w/ air flow
Certification Information	CE, FCC Class A, IEC 60945	CE, FCC Class A, EN50155 (24Vdc in), EN50121-3-2, EN45545-2	CE, FCC Class A, E13 Mark, ISO7637-2, IP50 Rating	CE, FCC Class A, E13 Mark, ISO7637-2, IP50 Rating	CE, FCC Class B, E13 Mark, ISO7637-2, IP50 Rating

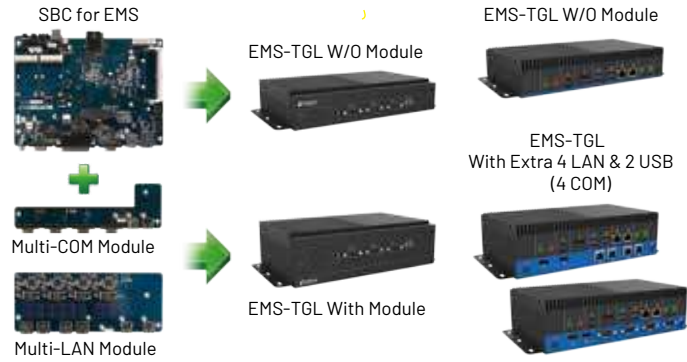
Modular System with IET Modules



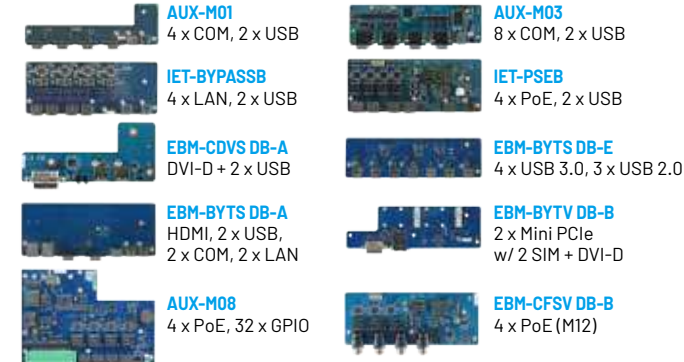
Expandable Fanless System



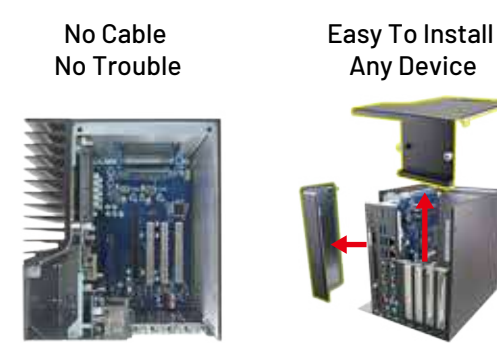
Modularization via IET Module



IET Module Family



Fanless & Easy Maintenance



Expansion - Avalue IET Module



Model Number	EMS-EHL	EMS-TGL	EMS-SKLU
Board	EBM-EHLS	EBM-TGLS	EBM-SKLUS
Processor	Intel® Celeron® Processor J6413 Intel® ATOM® Processor X6425E	i7-1185GRE/ i5-1145GRE/ i3-1115GRE (WT) i7-1185G7E/i5-1145G7E/i3-1115G4E (ST)	i7-6600U/ i5-6300U/ i3-6100U/3955U
System Memory	1 x 260-pin DDR4 3200MHz SO-DIMM up to 32GB	2 x 260-pin DDR4 3200MHz SO-DIMM up to 64GB	1 x 260-Pin DDR4 2133MHz SO-DIMM up to 16 GB
Expansion	1 x IET interface (1 x DDI, 2 x PCIeII x2, 3 x USB2.0, 1 x Line-Out(R/L), 1 x SMBus, LPC) 1 x M.2 Key-B 2242/3042/3052 support SATA3/ PCIe III/ USB2.0 and SIM slot1 (internal) 1 x M.2 Key-E 2230 for Wi-Fi & BT Module (USB2.0/ PCIe III)	1 x Avalue 80-Pin IET Module Interface 1 x M.2 Key-B 2242/3042/3052 (SATA/ PCIe/ USB3.1) 1 x M.2 Key-E 2230 for Wi-Fi & BT Module (CNVi)	1 x Avalue 80-Pin IET Module Interface 1 x M.2 Key B, Size 2242/ 3042 (SATA/ PCIe/ USB3.0) 1 x Mini PCIe
Storage	1 x M.2 Key-B 2242/2280, support SATA 1 x M.2 Key-B 2242, support SATA (share with expansion slot)	1 x M.2 Key-M 2280, support PCIe Gen. III x4 (NVMe SSD) 1 x M.2 Key-B 2242 (SATA), share with expansion slot	1 x 2.5" Drive Bay 1 x M.2 (SATA)
USB	4 x USB 3.1 Gen.2 (10Gbps)	2 x USB 3.1 Gen.2 (10Gbps) 2 x USB 3.1 Gen.1 (5Gbps)	4 x USB 3.0
COM Port	2 x COM RS232/422/485 (select via BIOS, auto flow control via HW)	2 x RS-232/422/485 (BIOS), supports auto-flow	2 x RS-232/422/485 (BIOS + DIP Switch), supports auto-flow
Other	1 x SIM Card Slot (internal) 8 x Antenna with dust cover (6 x LTE+GPS/ 2 x Wifi)	1 x SIM Card Slot (internal) 8 x Antenna with dust cover (6 x LTE+GPS/ 2 x Wifi)	2 x SIM Card Slot, 1 x SMBus, 2 x PS2/ KB & MS, 2 x Antenna mounting w/ cover
DIO	1 x 8-bit GPIO (DB9), optional	1 x 8bit GPIO	1 x 12bit GPIO
Display Chipset	Intel® UHD Graphics for 10th Gen Intel® Processors	Intel® Iris® Xe Graphics (i7-1185GRE/i5-1145GRE) Intel® UHD Graphics (i3-1115GRE)	Intel® HD Graphics 520/510
Display Resolution	DP++ 1.4: 4096x2304 @ 60Hz HDMI 2.0b : Max. resolution 4096x2304 @ 60Hz	1 x DP 1.4 Max. resolution 4096 x 2304 @ 60Hz 1 x HDMI 2.0b Max. resolution 4096 x 2304 @ 60Hz	DP: Max. resolution 4096 x 2304 @ 60Hz
Audio Chipset	Realtek Audio code	Realtek Audio code	Realtek Audio code
Audio Interface	Mic-In, Line-Out	Mic-In, Line-out	Mic-In, Line-In, Line-Out
Ethernet Chipset	1 x Intel I225-LM, 1 x Intel I219-LM	1 x Intel I225-LM, w/ TSN (need SW support for TSN) 1 x Intel I219-LM, w/ vPro (w/ i5 and i7 CPU)	1 x Intel® I211AT, 1 x Intel® I219LM
Ethernet Interface	2 x RJ45	2 x RJ45	2 x RJ45
Power Connector	3-Pin Terminal Block	3-Pin Terminal Block	3-Pin Terminal Block
Power Requirement	Typical +12 ~ +24Vdc (+9V ~ +32Vdv)	Typical +12 ~ +24Vdc (+9V ~ +32Vdv)	Typical +12 ~ +24Vdc (+9V ~ +32Vdv)
ACPI	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant
Power Mode	AT/ ATX (ATX is default setting)	AT/ ATX (ATX is default setting)	AT/ ATX (ATX is default setting)
Adapter	Optional AC-DC Adapter (60W)	Optional AC-DC Adapter (60W)	Optional AC-DC Adapter (60W)
Construction	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal
Dimension (L x W x H)	240mm x 150mm x 48 mm (Standard) 240mm x 150mm x 69 mm (w/ IET module)	Standard: 240mm x 150mm x 48mm w/ IET module: 240mm x 150mm x 69mm	Standard: 240mm x 151.5mm x 45mm w/ IET module: 240mm x 151.5mm x 60mm
Operating Temperature	-40°C ~ 75°C (w/SSD) ambient w/ 0.5 air flow, WT sku -40°C ~ 65°C (w/SSD) ambient w/ 0.2 air flow, WT sku 0°C ~ 75°C (w/SSD) ambient w/ 0.5 air flow, ST sku 0°C ~ 65°C (w/SSD) ambient w/ 0.2 air flow, ST sku	-40°C ~ 70°C (w/SSD) ambient w/ air flow, WT sku, 15W CPU 0°C ~ 70°C (w/SSD) ambient w/ air flow, ST sku, 15W CPU	(w/SSD), ambient w/ air flow -20°C ~ 60°C (-4°F ~ 140°F)
Certification Information	CE, FCC Class B	CE, FCC Class B	CE, FCC Class A

Model Number	SLP-WHG	SLP-SKL	SLP-SKLB	SLP-SKG
Processor	Onboard 8th Gen Intel® Core™ SoC i7-8665UE/ i5-8365UE/ i3-8145UE & Celeron® 4305UE BGA Processor	Onboard 6th Gen Intel® Core™ i7-6700TE/ i5-6500TE/ i3-6100TE Processor & Celeron® G3900TE Processor	Onboard 6th Gen Intel® Core™ i7-6700TE/ i5-6500TE / i3-6100TE Processor & Celeron® G3900TE Processor	Onboard 6th Gen Intel Core SoC i7-6600U/ i5-6300U/ i3-6100U & Celeron 3955U BGA Processor
System Chipset	N/A	Intel® Q170 Chipset	i5-6500TE / i3-6100TE Processor & Celeron® G3900TE Processor	N/A
System Memory	2 x 260-pin SODIMM socket Max. up to 32GB DDR4 2133MT/s	2 x 260-Pin DDR4 2133MHz SO-DIMM up to 32 GB (Default: 1 x 4GB DDR4)	2 x 260-Pin DDR4 2133MHz SO-DIMM up to 32 GB (Default: 1 x 4GB DDR4)	2 x 260-Pin DDR4 2133MHz SO-DIMM up to 32 GB (Default: 1 x 4GB DDR4)
Expansion	1 x PCIe x1 slot 1 x PCIe x4 slot 1 x M.2 Key-E 2230 for Wi-Fi & BT Module	1 x PCI-e x16 3 x PCI	1 x PCI-e x8 2 x PCI-e x4 1 x PCI	3 Slot : 2 x PCI, 1 x PCIe-1 2 Slot : 1 x PCI, 1 x PCIe-1 1 Slot : 1 x PCIe-4 1 x Key A M.2 2230
Storage	1 x M.2 Key-B 3042/2242/2260/2280, support SSD 1 x 2.5" Drive Bay (internal)	1 x Mini PCI-e Supports mSATA 2 x 2.5" Drive Bay support RAID 0, 1 1 x CFast™	1 x Mini PCI-e Supports mSATA 2 x 2.5" Drive Bay support RAID 0, 1 1 x CFast™	1 x 2.5" Drive Bay
USB	3 x USB3.1 Gen1 1 x USB Type C w/o ALT mode	6 x USB 3.0	6 x USB 3.0	4 x USB 3.0
COM Port	4 x RS-232	2 x RS-232 2 x RS-232/422/485	2 x RS-232 2 x RS-232/422/485	4 x RS232
Other	1 x Power on/off switch with LED 1 x Reset button 1 x HDD LED 1 x Internal USB 2.0 (Type-A) 1 x PS/2 Keyboard/ Mouse	1 x Power on/off switch with LED 1 x Reset button 1 x HDD LED, 1 x CFast LED 1 x Internal USB 2.0 (Type-A) 1 x PS/2 Keyboard/ Mouse 1 x 16CH isolated DIO	1 x Power on/off switch with LED 1 x Reset button 1 x HDD LED, 1 x CFast LED 1 x Internal USB 2.0 (Type-A) 1 x PS/2 Keyboard/ Mouse	1 x Power on/off switch with LED 1 x Reset button 1 x HDD LED 1 x Internal USB 2.0 (Type-A) 1 x PS/2 Keyboard/ Mouse
Display	3 x HDMI 1.4b: 3840 x 2160 @ 30 Hz	DP + DVI-I	DP + DVI-I	HDMI + VGA
Audio	N/A	Mic-In, Line-In and Line-Out	Mic-In, Line-In and Line-Out	Mic-In and Line-Out
Ethernet	1 x Intel® I219-LM 1 x Intel® I210-IT	1 x Intel® I219LM 1 x Intel® I210AT	1 x Intel® I219LM 1 x Intel® I210AT	1 x Intel® I219LM 1 x Intel® I211AT
Power Connector	Phoenix Connector	Phoenix Connector	Phoenix Connector	Phoenix Connector Mini Din connector
Power Requirement	DC in +12V ~ +24V, wide voltage	Built-in 9-36 VDC wide-range DC input	Built-in 9-36 VDC wide-range DC input	+12-24 VDC input
Power Mode	AT/ ATX (ATX is default setting)	ATX	ATX	ATX / AT
Adapter	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 180W Adapter (24V @ 7.5A)	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 180W Adapter (24V @ 7.5A)	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 180W Adapter (24V @ 7.5A)	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 180W Adapter (24V @ 7.5A)
Operating Temperature	-20~50°C (-4°F ~ 122°F) w/WT SSD, ambi- ent w/ 0.5m/s air flow	(w/Industrial SSD, CFast), ambient w/ air flow 0°C ~ 50°C (32°F ~ 122°F) (w/ HDD), ambient w/ air flow 0°C ~ 40°C (32°F ~ 104°F)	(w/Industrial SSD, CFast), ambient w/ air flow 0°C ~ 50°C (32°F ~ 122°F) (w/ HDD), ambient w/ air flow 0°C ~ 40°C (32°F ~ 104°F)	-5°C ~ 45°C (23°F ~ 113°F) w/ HDD, ambient w/ air flow -5°C ~ 55°C (23°F ~ 131°F) w/ Industrial SSD/ RAM, ambient w/ air flow
Storage Temperature	-40°C ~ 75°C (-40°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)
Construction	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal
Mounting Kit	NA	Wall Mount VESA (Optional)	Wall Mount VESA (Optional)	N/A
Dimension (L x W x H)	217 mm x 115 mm x 220 mm	200 x 225 x 218 mm	200 x 225 x 218 mm	221.8 x 135 x 232.85 mm
Weight	2.6 kg	4.5 kg	4.5 kg	3.6 kg

Fanless Embedded System



Model Number	EPS-ADS	EPS-CFS	EPS-CFS2	EPS-KBLHE
Board	ECM-ADS	ECM-CFS	ECM-CFS	ECM-KBLH
Processor	i9-12900TE, i7-12700TE, i5-12500TE, i3-12100TE	i7-8700T, i7-9700TE, i5-8500T, i5-9500TE, i3-8100T, i3-9100TE, G5400T, G4900T	i7-8700T, i7-9700TE, i5-8500T, i5-9500TE, i3-8100T, i3-9100TE, G5400T, G4900T	i7-7820E0, i5-7440E0, i3-7100E
System Chipset	Intel® Q670E Express Chipset Intel® H610E Express Chipset	Intel® Q370 Express Chipset Intel® H310 Express Chipset	Intel® Q370 Express Chipset Intel® H310 Express Chipset	Intel® QM175 Express Chipset
System Memory	2 DIMM Dual Channel DDR5 4800MHz Up to 128GB	1 x 260-Pin DDR4 2400/2666MHz SO-DIMM up to 32 GB	1 x 260-Pin DDR4 2400/2666MHz SO-DIMM up to 32 GB	1 x 260-Pin DDR4 2400MHz SO-DIMM up to 16 GB
Expansion	1 x mPCIe (default) 1 x M.2 Key-B 2242/3042/3052 support SATA3/PCIeIII x1/ USB3.1 Gen. 1/USB 2.0 (for Q670E) 1 x M.2 Key-B 2242/3042/3052 support SATA3/PCIeIII x1/ USB 2.0 (for H610E) 1 x M.2 Key-E 2230 PCIeIII x1/USB2.0 for Wi-Fi & BT Modules	1 x mPCIe (default) (Q370 - PCIe/SATA/USB 2.0) (H310 - SATA/USB 2.0) 1 x mPCIe, support USB 2.0 (factory option)	1 x mPCIe (default) (Q370 - PCIe/SATA/USB 2.0) (H310 - SATA/USB 2.0)	1 x mPCIe Supports mSATA 1 x M.2 (B-Key, 2242)
Storage	2 x 2.5" Drive Bay 1 x M.2 (B-Key, 2242/2280), support PCIe Gen IV x4 (NVMe SSD)	2 x 2.5" Drive Bay 1 x mSATA	2 x 2.5" Drive Bay 1 x mSATA	2 x 2.5" Drive Bay 1 x M.2 (B-Key, 2242) 1 x mSATA
USB	2 x USB 2.0, 6 x USB 3.1	2 x USB 2.0, 4 x USB 3.1	2 x USB 2.0, 4 x USB 3.1	2 x USB 2.0, 4 x USB 3.0
COM Port	2 x RS232 4 x RS232/422/485	2 x RS-232	2 x RS-232	1 x RS-232 1 x RS-232/422/485
Display Chipset	Intel® 12th Generation CPU integrated	Intel® UHD Graphics 630/610	Intel® UHD Graphics 630/610	Intel® HD Graphics 630
Display Resolution	HDMI: Max. resolution 4096 x 2304 @ 30Hz	HDMI: Max. resolution 4096 x 2304 @ 30Hz	HDMI: Max. resolution 4096 x 2304 @ 30Hz	HDMI: Max. resolution 4096 x 2160 @ 24Hz
Audio Chipset	Realtek Audio code	Realtek Audio code	Realtek Audio code	Realtek Audio code
Audio Interface	Mic-In and Line-Out	Mic-In and Line-Out	Mic-In and Line-Out	Mic-In and Line-Out
Ethernet Chipset	1 x Intel® I219LM 1 x Intel® I225-LM	1 x Intel® I211AT 1 x Intel® I219LM	1 x Intel® I211AT 1 x Intel® I219LM	1 x Intel® I210AT 1 x Intel® I219LM
Ethernet Interface	2 x RJ45	2 x RJ45	2 x RJ45	2 x RJ45
Power Connector	3-Pin Terminal Block	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack
Power Requirement	DC in typical 12/24V, +9V ~ +32V, wide voltage	+12V	+12V	+12V +9V ~ +36V (optional w/ EPM-1712)
ACPI	Single Power ATX Support S0, S1, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S1, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S1, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant
Power Mode	AT/ATX (ATX is default setting)	AT/ATX (ATX is default setting)	AT/ATX (ATX is default setting)	AT/ATX (ATX is default setting)
Dimension (L x W x H)	149 x 216 x 75 mm	212 x 240 x 85 mm	170 x 195 x 65 mm	240 x 229 x 66 mm
Operating Temperature	With extended temperature peripherals w/ air flow: -10°C ~ 60°C (14°F ~ 140°F)	With extended temperature peripherals w/ air flow: -10°C ~ 50°C (14°F ~ 122°F)	With extended temperature peripherals w/ air flow: -10°C ~ 45°C (14°F ~ 113°F)	With extended temperature peripherals w/ air flow: -10°C ~ 50°C (14°F ~ 122°F)
Certification	CE, FCC Class A (DC-in)	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B



Model Number	ECS-APCL	NUC-TGU	NUC-APL	NUC-APL-Slim
Processor	Intel® Celeron® J3455E Processor	11th Gen. Intel® Core™ i7/i5/i3 BGA Processor	Intel® Celeron® J3455/N3350 Processor	Intel® Celeron® J3455/N3350 Processor
System Memory	1 x 204-pin SO-DIMM Socket, Max. Up to 8GB DDR3L 1600MHz	1 x 260-pin SODIMM socket Max. up to 64GB DDR4 3200 MT/s	1 x 204-pin SO-DIMM Socket, Max. Up to 8GB DDR3L 1866MHz	1 x 204-pin SO-DIMM Socket, Max. Up to 8GB DDR3L 1866MHz
Expansion	1 x M.2 (Key-B, 3042/2242/2260) 1 x M.2 (Type A, 2230)	1 x M.2 (Key-M, 2242/2280) 1 x M.2 (Key-B, 2242/3024/3052, w/SIM Slot) 1 x M.2 (Key-E 2230)	1 x M.2 (Key-B, 2242/3042, w/ SIM Slot) 1 x M.2 (Key-E, 2230)	1 x M.2 (Key-B, 2242/3042) 1 x M.2 (Key-E, 2230, PCIe, USB2.0)
Storage	1 x M.2 (Key-B, 3042/2242/2260)	1 x M.2 (Key-M, 2242/2280, NVMe) 1 x M.2 (Key-B, 2242)	1 x 2.5" Drive Bay (7mm) 1 x M.2 (Key-B, 2242)	1 x M.2 (Key-B, 2242)
USB	2 x USB 3.0, 2 x USB 2.0	4 x USB 3.1 Gen.2, 2 x USB 2.0	4 x USB 3.0 (5Gbps)	4 x USB 3.0 (5Gbps)
COM Port	1 x RS-232	2 x RS232/422/485 (BIOS)	1 x RS-232/422/485 (BIOS & Cable) 1 x RS-232	1 x RS-232/422/485 (BIOS&Cable)
Other	1 x Power on/off Button 1 x Storage LED 2 x SMA Connector (Optional)	1 x Power on/off Button w/ LED 1 x LED for HDD/ WLAN/ WWLAN 4 x Antenna Mounting with Dust Cover	1 x Power on/off Button w/ LED 1 x Storage LED 2 x Antenna Mounting w/ Dust Cover	1 x Power on/off Button w/ LED 1 x Storage LED 2 x Antenna Mounting w/ Dust Cover
Display	1 x DP++: Max. Resolution 4096 x 2160 @ 60Hz 1 x HDMI: Max. Resolution 3840 x 2160 @ 30Hz	2 x DP++ 1.4a: Max. Resolution 4096x2304@60Hz	2 x HDMI 1.4b: Max. Resolution 3840 x 2160 @ 30Hz 1 x DP/ DVI-I/ VGA Factory Option): Max. Resolution 1920 x 1080 @ 60Hz	2 x HDMI 1.4b: Max. Resolution 3840 x 2160 @ 30Hz *1 x DP/ DVI-I/ VGA Factory Option): Max. Resolution 1920 x 1080 @ 60Hz *DP/ DVI-I/ VGA is an option which will replace the location of COM
Audio	Realtek Audio code 1 x Line-out	1 x Mic-in, 1 x Line-out	Realtek Audio code 1 x Audio Jack (Mic-in + Line-out Combo)	Realtek Audio code 1 x Audio Jack (Mic-in + Line-out Combo)
Ethernet	2 x Intel I211AT	1 x Intel I225LM, 1 x Intel I219LM	2 x Realtek RTL8111E Gigabit	2 x Realtek RTL8111E Gigabit
Power Connector	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack
Power Requirement	+12V	+12V	+12V	+12V
Power Mode	ATX	ATX	ATX	ATX
Adapter	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 60W Adapter (12V @ 5A)	Input: 100 ~ 240Vdc/50 ~ 60Hz Output: 120W Adapter (12V @ 10A)	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 60W Adapter (12V @ 5A)	Input: 100 ~ 240Vac/ 50 ~ 60Hz Output: 60W Adapter (12V @ 5A)
Operating Temperature	0°C ~ 40°C (32°F ~ 104°F) (w/HDD) ambient w/air flow.	Fanless Mode: 0°C ~ 40°C (32°F ~ 104°F) with 0.2m/s air flow; 0°C ~ 50°C (32°F ~ 122°F) with 0.5m/s air flow Fan Kit Mode: 10~15°C increased while the Fan kit be installed: -10°C ~ 60/ 65°C (32°F ~ 104/ 149°F) with 0.5m/s air flow	With extended temperature peripherals -10°C ~ 50°C (14°F ~ 122°F), 0.2m/s air flow With extended temperature peripherals -10°C ~ 60°C (14°F ~ 140°F), 0.5m/s air flow	-10°C ~ 40°C (14°F ~ 104°F), 0.2m/s air flow -10°C ~ 50°C (14°F ~ 122°F), 0.5m/s air flow
Storage Temperature	-20°C ~ 75°C (-4°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)	-40°C ~ 75°C (-40°F ~ 167°F)
Construction	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal
Mounting Kit	Wall Mount (Optional)	Stand (default), Dina Rail/ VESA (Optional)	VESA/ Din rail	VESA/ Din rail
Dimension (L x W x H)	4.75" x 3.75" x 1.96" (120.6 x 95.2 x 49.8 mm)	6.69" x 4.92" x 1.42" (170 x 125 x 36 mm)	4.53" x 4.37" x 2.28" (115mm x 111mm x 58mm)	4.53" x 4.37" x 1.77" (115mm x 111mm x 45mm)
Weight	1.2 kg	1 kg	0.85 kg	0.72kg
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class A	CE, FCC Class A

Fanless Embedded System



ARM-based System



Fanless Embedded System



Model Number	EPC-TGU	EPC-EHL	EPC-WHL	EPC-SKLU	EPC-APL
Board	ECM-TGU	ECM-EHL	ECM-WHL	ECM-SKLU	ECM-APL2
Processor	11th Gen. Intel® Core™ i7/i5/i3 BGA Processor	Intel® ATOM® Processor x6211E/x6413E/x6425E Processor	8th Generation Intel® Core™ i7/ i5/ i3/ Celeron® Processor	6th Generation Intel® Core™ i7/ i5/ i3/ Celeron® Processor	Intel® Pentium® N4200 Processor Intel® Celeron® J3455/N3350 Processor
System Memory	1x 260-Pin SO-DIMM Socket, Max. Up to 32GB DDR4 3200MHz	1x 260-Pin SO-DIMM Socket, Max. Up to 32GB DDR4 3200MHz	2x 260-Pin DDR4 2400MHz SO-DIMM Socket Up to 64GB	1x 260-Pin DDR4 2133MHz SO-DIMM up to 16 GB	1x 204-Pin DDR3L 1866MHz SO-DIMM up to 8 GB
Expansion	1x M.2 (Key-M, 2242) 1x M.2 (Key-B, 2242/3042/3052, w/ SIM Slot) 1x M.2 (Key-E, 2230)	1x M.2 (Key-B, 2242/3042, w/ SIM Slot) 1x M.2 (Key-E, 2230)	1x M.2 (Key-B, 2242/3042, w/ SIM Slot) 1x M.2 (Key-E, 2230, CNVi)	1x Full Size Mini PCIe (mSATA) 1x M.2 (B-KEY, 2242, w/SIM Slot)	1x Full size Mini PCIe Supports mSATA 1x Half size Mini PCIe Supports Wi-Fi Module
Storage	1x 2.5" Drive Bay (7mm) 1x M.2 (Key-M, 2242, NVMe) 1x M.2 (Key-B, 2242)	1x 2.5" Drive Bay (7mm) 1x M.2 (Key-B, 2242)	1x 2.5" Drive Bay (7mm) 1x M.2 (Key-B, 2242)	1x 2.5" Drive Bay (7mm) 1x M.2 (Key-B, 2242) 1x mSATA	1x 2.5" Drive Bay 1x mSATA
USB	4x USB 3.1 Gen.2 2x USB 2.0	2x USB 3.1, 2x USB2.0	4x USB 3.1	2x USB 2.0, 4x USB 3.0	4x USB 3.0
COM Port	2x RS232/422/485 (BIOS)	4x RS232	1x RS232 (Factory Option)	1x RS-232 1x RS-232/422/485 (Cable & BIOS)	1x RS-232/422/485 (Jumper)
Other	2x Antenna Mounting with Dust Protection Cove	2x Antenna Mounting with Dust Protection Cove	2x Antenna Mounting with Dust Protection Cove	2x Antenna Mounting with Dust Protection Cover	2x Knockouts for Antenna Mounting
Display Chipset	Intel® Iris® Xe Graphics (i7/ i5) Intel® Iris® UHD Graphics (i3)	Intel® UHD Graphics for 10th Gen Intel® Processors	Intel® UHD Graphics 620	Intel® HD Graphics 520/ 510	Intel® HD Graphics 505/500
Resolution	DP++ 1.4a: 4096x2304@60Hz	1x HDMI 2.0b Max resolution 4096x2160@60Hz 1x DP 1.4a Max resolution 4096x2160@60Hz	2x HDMI 1.4: Max. Resolution 4096 x 2160 @ 24Hz	2x HDMI: Max. Resolution 4096 x 2160 @ 24Hz	1x VGA: Max. resolution 1920 x 1200 @ 60Hz 1x HDMI: Max. resolution 3840 x 2160 @ 30Hz
Audio Chipset	Tempo 92HD73C	Tempo 92HD73C	Realtek Audio code	Realtek Audio code	Realtek Audio code
Audio Interface	1x Combo Jack (Mic-In + Line-Out)	1x Line-Out 1x Mic-In	1x Line-Out 1x Mic-In	Mic-in/ Line-out (Factory Option)	Mic-in/ Line-out (Factory Option)
Ethernet Chipset	Intel® I225-LM Intel® I210-AT	1x Intel® I225-IT, 1x Intel® I210-IT	1x Intel® I211AT 1x Intel® I219LM	1x Intel® I211AT 1x Intel® I219LM	2x Intel® I211AT
Ethernet Interface	2x RJ45	2x RJ45	2x RJ45	2x RJ45	2x RJ45
Power Connector	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack	Lockable DC Jack
Power Requirement	+12V	+12V	+12V	+12V ~ +26V	+12V ~ +26V
ACPI	Single Power ATX Support S0, S3	Single Power ATX Support S0, S3	Single Power ATX Support S0, S3	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant	Single Power ATX Support S0, S3, S4, S5; ACPI 5.0 Compliant
Power Mode	AT/ ATX (ATX is default setting)	AT/ATX (ATX is default setting)	AT/ ATX (ATX is default setting)	AT/ ATX (ATX is default setting)	AT/ ATX (ATX is default setting)
Adapter	Input: 100 ~ 240Vdc/ 50 ~ 60Hz Output: 120W Adapter (12V @ 10A Adapter) AC-DC Adapter	Input: 100 ~ 240Vdc/50 ~ 60Hz Output: 60W Adapter (12V @ 5A Adapter) AC-DC Adapter	Input: 100 ~ 240Vdc/ 50 ~ 60Hz Output: 120W Adapter (12V @ 10A Adapter) AC-DC Adapter	Input: 100 ~ 240Vdc/ 50 ~ 60Hz Output: 60W Adapter (12V @ 5A Adapter) AC-DC Adapter	Input: 100 ~ 240Vdc/ 50 ~ 60Hz Output: 60W Adapter (12V @ 5A Adapter) AC-DC Adapter
Construction	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal	Aluminum + Metal
Dimension (L x W x H)	6.97" x 4.84" x 2.17" (177mm x 123mm x 55mm)	6.97" x 4.84" x 2.2" (177mm x 123mm x 65mm)	6.97" x 4.84" x 2.17" (177mm x 123mm x 55mm)	7" x 4.8" x 2.0" (177mm x 123mm x 50mm)	6.97" x 4.84" x 1.77" (177mm x 123mm x 45mm)
Operating Temperature	With extended temp. peripherals w/ air flow: -10°C ~ 50°C (32°F ~ 122°F) with air flow	With extended temp. peripherals w/ air flow: -40°C ~ 70°C (-40°F ~ 158°F)	With extended temp. peripherals w/ air flow: -10°C ~ 40°C (14°F ~ 104°F)	With extended temp. peripherals w/ air flow: -10°C ~ 50°C (14°F ~ 122°F)	With extended temp. peripherals w/ air flow: -10°C ~ 50°C (14°F ~ 122°F)
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B

ARM-based System



Model Number	AIB-IMX6	AIB-IMX6A	AIB-IMX8M
Processor	NXP i.MX6 Cortex-A9 Dual Lite/ Quad 1GHz CPU	NXP i.MX6 Cortex-A9 Quad 1GHz CPU	NXP i.MX8M Cortex-A53 Quad Core 1.3GHz; Cortex-M4 core processor
System Memory	Onboard DDR3 1GB	Onboard DDR3 1GB	Onboard DDR4 2GB
Storage	1x On board 4GB eMMC	1x On board 8GB eMMC	1x On board 8GB eMMC
External I/O Connector	1x USB2.0 Type A (Double deck) 1x HDMI 1x 10/100/1000 LAN RJ45 Optional Powered LAN support (IEEE 802.3at) 1x Micro SD socket	2x USB 2.0 (Double deck) 1x Mini-USB Connector 4x COM Port COM1/2 on board-DB9 (RS232/422/485) COM3 Cable-DB9 (RS232) Debug Port 1x HDMI 2x Gigabit LAN 1x Micro SD socket	1x USB 3.0 Type A (Vertical type) 1x USB 3.0 Type C 2x Gigabit LAN 1x HDMI (Vertical type) 1x Micro SD socket 1x Hand Phone 1x Reset 1x Power LED (Green)
Power Requirement	12 ~ 26V DC input, 2.5mm DC Jack, typical 19V input With brownout detection or Powered LAN (optional)	12 ~ 24V DC input, 2.5mm DC Jack, typical 19V input With brownout detection	12 ~ 24V DC input, Terminal block
Operating Temperature	-20°C ~ 70°C (-4°F ~ 158°F)	-20°C ~ 50°C (-4°F ~ 122°F)	-40°C ~ 85°C (-40°F ~ 185°F)
Storage Temperature	-40°C ~ 70°C (-40°F ~ 158°F)	-20°C ~ 70°C (-4°F ~ 158°F)	-40°C ~ 85°C (-40°F ~ 185°F)
Dimension (L x W x H)	153 mm x 107.8 mm x 30 mm	186 mm x 121.35 mm x 37 mm	177 mm x 112 mm x 53.5 mm
Weight	1.5 kg	1.0 kg	2.0 kg
Certification	CE, FCC Class B	CE, FCC Class B	CE, FCC Class B
Software Support	Android 4.4 or 6.0 Ubuntu 12.04 Yocto 2.1	Yocto 1.7 / 2.5	Android 9.0 Linux Yocto 2.5

High Performance Computing Solution



Time-to-solutions



IPMI 2.0 Supported



Extended Lifecycle

Healthcare

Precision Diagnosis/
Life Science

Medical

Advanced Medical
Imaging Technology

Communication

Superior Accelerated
Workstation

Smart Manufacturing

Visualization Machine Vision/
Transformative Analytics

Smart City

Smart Public Safety and
Enforcement Technology

High Performance Computing System



Model Number	HPS-246U4A	HPS-621D4A	HPS-621U4A	HPS-246UTA	HPS-621DTA	HPS-621UTA
Processor (CPU Type)	Intel® LGA1151 Socket supports 8th/9th Gen. Core i7/i5/i3/Pentium/Celeron/Xeon E Processors (Max. TDP at 95W)	Dual Intel® FCLGA3647 Sockets support 1st and 2nd Gen. Intel® Xeon Scalable Processors (Max. TDP at 150W each)	Intel® FCLGA3647 Sockets supports 1st and 2nd Gen. Intel® Xeon Scalable Processors (Max. TDP at 150W)	Intel® LGA1151 Socket supports 8th/9th Gen. Core i7/i5/i3/Pentium/Celeron/Xeon E Processors (Max. TDP at 95W)	Dual Intel® FCLGA3647 Sockets support 1st and 2nd Gen. Intel® Xeon Scalable Processors (Max. TDP at 150W each)	Intel® FCLGA3647 Sockets supports 1st and 2nd Gen. Intel® Xeon Scalable processors (Max. TDP at 150W)
Chipset	Intel® C246 Chipset	Intel® C621 Chipset	Intel® C621 Chipset	Intel® C246 Chipset	Intel® C621 Chipset	Intel® C621 Chipset
Memory	4 x DDR4 2666MHz ECC and Non-ECC DIMM support up to 128GB (ECC memory supported by specific CPU SKUs)	12 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 1.5TB	6 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 768GB	4 x DDR4 2666MHz ECC and Non-ECC DIMM support up to 128GB (ECC memory supported by specific CPU SKUs)	12 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 1.5TB	6 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 768GB
Storage	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay	External: 1 x 5.25" storage bay 3 x Front accessible 2.5" storage bay
IPMI	IPMI 2.0	IPMI 2.0	IPMI 2.0	IPMI 2.0	IPMI 2.0	IPMI 2.0
Expansion Slots	1 x PCIe Gen 3.0 x16 slot 1 x PCIe Gen 2.0 x 8 slot 1 x PCIe Gen 3.0 x 4 slot 1 x PCIe Gen 3.0 x 1 slot 1 x PCI 3.0 slot	Slot 1, PCIe 3.0 x16 from CPU1 Slot 2, PCI 3.0 Slot 3, PCIe 3.0 x16 from CPU1 Slot 4, PCIe 3.0 x16 from CPU2 Slot 5, PCIe 3.0 x16 from CPU2 Slot 6, PCIe 3.0 x8 from CPU1 Slot 7, PCIe 3.0 x8 from CPU1 (Slot 7 is the slot closest to CPU)	Slot 1, PCI 3.0 slot Slot 2, PCIe 3.0 x8 Slot 3, PCIe 3.0 x16 Slot 4, PCIe 3.0 x8 Slot 5, PCIe 3.0 x16 Slot 6, PCIe 3.0 x8 from CPU1 Slot 7, PCIe 3.0 x16 (Slot 7 is the slot closest to CPU, x16 will switch to x8 automatically when Slot 6 is used)	1 x PCIe Gen 3.0 x16 slot 1 x PCIe Gen 2.0 x 8 slot 1 x PCIe Gen 3.0 x 4 slot 1 x PCIe Gen 3.0 x 1 slot 1 x PCI 3.0 slot	Slot 1, PCIe 3.0 x16 from CPU1 Slot 2, PCI 3.0 Slot 3, PCIe 3.0 x16 from CPU1 Slot 4, PCIe 3.0 x16 from CPU2 Slot 5, PCIe 3.0 x16 from CPU2 Slot 6, PCIe 3.0 x8 from CPU1 Slot 7, PCIe 3.0 x8 from CPU1 (Slot 7 is the slot closest to CPU)	Slot 1, PCI 3.0 slot Slot 2, PCIe 3.0 x8 Slot 3, PCIe 3.0 x16 Slot 4, PCIe 3.0 x8 Slot 5, PCIe 3.0 x16 Slot 6, PCIe 3.0 x8 Slot 7, PCIe 3.0 x16 (Slot 7 is the slot closest to CPU, x16 will switch to x8 automatically when Slot 6 is used)
LAN	7 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port	4 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port	4 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port	7 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port	4 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port	4 x RJ45 Gigabit Ethernet Ports, IPMI shared LAN1 Port
USB	Front: 2 x USB 3.2 Gen1 Port Rear: 2 x USB 3.2 Gen2 Port	Front: 2 x USB 3.2 Gen1 Port Rear: 4 x USB 3.2 Gen1 Port	Front: 2 x USB 3.2 Gen1 Port Rear: 4 x USB 3.2 Gen1 Port	Front: 2 x USB 3.2 Gen1 Port Rear: 2 x USB 3.2 Gen2 Port	Front: 2 x USB 3.2 Gen1 Port Rear: 4 x USB 3.2 Gen1 Port	Front: 2 x USB 3.2 Gen1 port Rear: 4 x USB 3.2 Gen1 Port
Display	Intel® 8/9th Gen. CPU Integrated AST 2500 BMC Controller	AST 2500 BMC Controller	AST 2500 BMC Controller	Intel® 8/9th Gen. CPU Integrated AST 2500 BMC Controller	AST 2500 BMC Controller	AST 2500 BMC Controller
Display Resolution	3 x DP++ Port DP: 4096 x 2304 @ 60Hz HDMI : 4096 x 2160 @ 30Hz VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA Port VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA Port VGA: 1920 x 1200 @ 60Hz 32bpp	3 x DP++ Port DP: 4096 x 2304 @ 60Hz HDMI : 4096 x 2160 @ 30Hz VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA Port VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA Port VGA: 1920 x 1200 @ 60Hz 32bpp
Cooling Fan	2x 80 x 25mm Rear Fan	1x 120 x 25mm Front Fan 2x 80 x 25mm Rear Fan	1x 120 x 25mm Front Fan 2x 80 x 25mm Rear Fan	2x 80 x 25mm Rear Fan	1x 120 x 25mm Front Fan 2x 80 x 25mm Rear Fan	1x 120 x 25mm Front Fan 2x 80 x 25mm Rear Fan
Power Supply	1 x 500W PS2 ATX PSU	1 x 1300W PS2 ATX PSU	1 x 1300W PS2 ATX PSU	1 x 500W PS2 ATX PSU	1 x 1300W PS2 ATX PSU	1 x 1300W PS2 ATX PSU
Operating Temp.	0°C ~ 45°C (32°F ~ 113°F)	0°C ~ 40°C (32°F ~ 104°F)	0°C ~ 40°C (32°F ~ 104°F)	0°C ~ 45°C (32°F ~ 113°F)	0°C ~ 40°C (32°F ~ 104°F)	0°C ~ 40°C (32°F ~ 104°F)
Dimension (W x H x D)	482.6mm x 174.8mm x 528mm with ear mount	482.6mm x 174.8mm x 528mm with ear mount	482.6mm x 174.8mm x 528mm with ear mount	340mm x 488mm x 528mm with external handles & pedestal stand	340mm x 488mm x 528mm with external handles & pedestal stand	340mm x 488mm x 528mm with external handles & pedestal stand
Form Factor	19" 4U Rackmount	19" 4U Rackmount	19" 4U Rackmount	Tower Chassis	Tower Chassis	Tower Chassis
OS	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019	Windows 10 IoT Enterprise 64-bit Windows Server 2016 Windows Server 2019

High Performance Computing Server Board



Model Number	HPM-246UA	HPM-621DE	HPM-621UA	HPM-SRSUA
Processor	Intel® LGA1151 Socket supports 8th/9th Gen. Core i7/i5/i3/Pentium/Celeron/Xeon E Processors (Max. TDP at 95W)	Dual Intel® FCLGA3647 Sockets support 1st and 2nd Gen. Intel® Xeon Scalable Processors (Max. TDP at 150W each)	Intel® FCLGA3647 Socket supports 1st and 2nd Gen. Intel® Xeon Scalable Processors (Max. TDP at 150W)	Intel® LGA4677 Socket supports 4th Gen. Intel® Xeon Scalable Processor (Max. TDP at 250W)
System Chipset	Intel® C246 Chipset	Intel® C621 Chipset	Intel® C621 Chipset	Intel® Emmitsburg Chipset
System Memory	4 x DDR4 2666MHz ECC and Non-ECC DIMM support up to 128GB (ECC memory supported by specific CPU SKUs)	12 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 1.5TB	6 x DDR4 2933/ 2666/ 2400/ 2133 MHz RDIMM/ LRDIMM up to 768GB	6 x DDR5 4800/ 4400 MHz RDIMM/ LRDIMM up to 768GB
Expansion	1 x PCIe Gen 3.0 x16 slot 1 x PCIe Gen 2.0 x 8 slot 1 x PCIe Gen 3.0 x 4 slot 1 x PCIe Gen 3.0 x 1 slot 1 x PCI 3.0 slot	Slot 1, PCIe 3.0 x16 from CPU1 Slot 2, PCI 3.0 Slot 3, PCIe 3.0 x16 from CPU1 Slot 4, PCIe 3.0 x16 from CPU2 Slot 5, PCIe 3.0 x16 from CPU2 Slot 6, PCIe 3.0 x8 from CPU1 Slot 7, PCIe 3.0 x8 from CPU1 (Slot 7 is the slot closest to CPU, x16 will switch to x8 automatically when Slot 6 is used)	Slot 1, PCI 3.0 slot Slot 2, PCIe 3.0 x8 Slot 3, PCIe 3.0 x16 Slot 4, PCIe 3.0 x8 Slot 5, PCIe 3.0 x16 Slot 6, PCIe 3.0 x8 Slot 7, PCIe 3.0 x16 (Slot 7 is the slot closest to CPU)	Slot 1, PCIe 5.0 x16 Slot 2, PCIe 5.0 x4 Slot 3, PCIe 5.0 x16 Slot 4, PCIe 5.0 x4 Slot 5, PCIe 5.0 x16 Slot 6, PCIe 5.0 x4 Slot 7, PCIe 5.0 x16 (Slot 7 is the slot closest to CPU)
Display	Intel® 8/9th Gen. CPU Integrated AST 2500 BMC Controller	AST 2500 BMC Controller	AST 2500 BMC Controller	AST 2600 BMC Controller
Resolution	3 x DP++ port DP: 4096 x 2304 @ 60Hz HDMI : 4096 x 2160 @ 30Hz VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA port VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA port VGA: 1920 x 1200 @ 60Hz 32bpp	1 x VGA port VGA: 1920 x 1200 @ 60Hz 32bpp
Ethernet	7 x Intel® I210AT Giga-bit Ethernet	4 x Intel® I210AT Giga-bit Ethernet	4 x Intel® I210AT Giga-bit Ethernet	1 x Intel® I210AT Giga-bit Ethernet 1 x Intel® I225V 2.5Giga-bit Ethernet 1 x Intel® X550-AT2 10Giga-bit Ethernet (Option)
USB/SATA/COM/LAN	8/4/2/7	8/10/2/4	8/9/2/4	12/5/2/4
Power Requirement	1 x Std. 24 pin ATX Connector 1 x 8 Pin SSI 12V Connector	1 x Std. 24 Pin ATX Connector 2 x 8 Pin SSI 12V Connectors	1 x Std. 24 Pin ATX Connector 3 x 8 Pin SSI 12V Connectors	1 x Std. 24 Pin ATX Connector 3 x 8 Pin SSI 12V Connector
IPMI	IPMI 2.0	IPMI 2.0	IPMI 2.0	IPMI 2.0
Operating Temp.	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0°C ~ 60°C (32°F ~ 140°F)	0 ~ 60°C (32 ~ 140°F)
Dimension (L x W)	12" x 9.6" (304.8 mm x 243.84 mm) PCB thickness is 2.0mm	12" x 13" (304.8mm x 330.2mm) PCB thickness is 2.0mm	12" x 9.6" (304.8mm x 243.84mm) PCB thickness is 2.0mm	12" x 9.6" (304.8mm x 243.84mm) PCB thickness is 2.54mm
Weight	1.54 lbs (0.7 kg)	3.96 lbs (1.8 kg)	2.14 lbs (0.97 kg)	2.62 lbs (1.19 kg)

Barebone System

Rackmount System

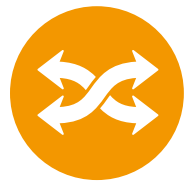
Desktop Chassis

Avalue offers several different kinds of desktop chassis to create custom-made products according to exact specifications of clients for mother boards, PSUs, coolers, add on cards and accessories. Most of our chassis may provide enclosure for Mini-ITX form factor and even Micro ATX Motherboard. We also provides relatively internal AC/DC power supply which have standard ATX power output interface. Customer may choose suitable one to fulfill the application.

Essential Professional Capabilities and Key Attributes



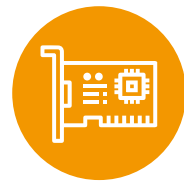
Configure to order



Flexible customer service



Multiple combination



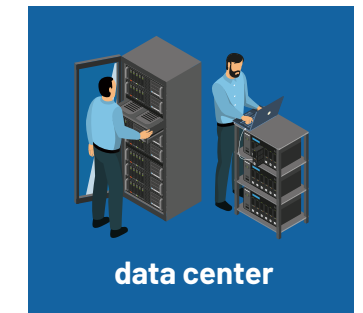
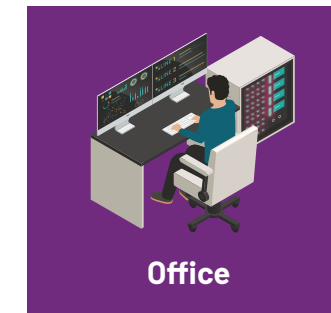
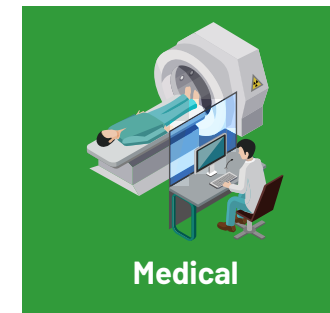
PCIe Expansion



Supplier	Desktop Chassis	Desktop Chassis	Medical Box
Model name	BMX-T550	BMX-T540	MAB-T600
M/B Form Factor	Up to 6.7"(W)x 6.7"(D) Mini ITX compliant MB	Up to 6.7"(W)x 6.7"(D) Mini ITX compliant MB	Up to 9.6"(W)x 9.6"(D) Micro ATX and Mini ITX compliant MB
Color	Black	Black	White
Dimension (W x D x H)	280 x 75 x 265 mm	372 x 307 x 107 mm	330.2 x 341 x 160 mm
Drive Bay	Internal 2 x 2.5"	Internal 2 x 2.5"	Internal 2 x 2.5"
Peripheral Bay	-	-	-
Expansion Slot	1 full height via riser card	2 full height via riser card	2 full height via riser card
System Cooling	60 x 60 x 25mm fan	70 x 70 x 15mm fan	70 x 70 x 15mm fan (TBD)
Front I/O	2 x USB ports	2 x USB ports	2 x USB ports
Button	System power on/off System reset	System power on/off	System power on/off
LED	Power LED HDD LED	Power LED HDD LED LAN LED	Power LED
Security	Depend on M/B	Depend on M/B	Depend on M/B
Limitation of CPU Cooler	Depend on CPU TDP	Depend on CPU TDP	Depend on CPU TDP
Power Supply	220W 1U Flex ATX Power Supply	400W ATX Power Supply	500W ATX Power Supply (Medical grade)
Operating Temperature	0 ~ 40°C (32°F ~ 104°F) w/ SSD, ambient w/ 0.5m/s air flow	0 ~ 40°C (32°F ~ 104°F) w/ SSD, ambient w/ 0.5m/s air flow	0°C ~ 35°C (32°F ~ 95°F), (w/HDD), ambient w/ air flow
Gross Weight	3.5kg	6.4kg	TBD

Rackmount Chassis

Avalue can provide several standard chassis including rackmount series such as 1U, 1U, 4U etc. for customer to choose. We offer many different features. Such as 5.25" bays allows user to install CDs, DVDs and drive bays as well as full length cards supported even at shortened depth for performance demanding application. Since the configure to order process is fully customizable, it creates products that are tailored exactly to customer requirements.



Supplier	1U Racmount Chassis	2U Racmount Chassis	4U Racmount Chassis
Model name	BCC-CASE-R1U0-01R	BCC-CASE-R2U0-01R	BCC-CASE-R4U0-02R
M/B Form Factor	Up to 12"(W)x 9.6"(D) ATX compliant MB	Up to 12"(W)x 9.6"(D) ATX compliant MB	Up to 12"(W)x 9.6"(D) ATX compliant MB
Color	Black	Black	Black
Dimension (W x D x H)	381 x 482.6 x 44.4 mm	504 x 482.6 x 88.9 mm	504 x 482.6 x 88.9 mm
Drive Bay	2 x 3.5" Drive Bay	2 x 5.25" + 4 x 3.5" Drive Bay	2 x 5.25" + 4 x 3.5" Drive Bay
Peripheral Bay	1 x Slim ODD	1 x Slim DVD-ROM	1 x Slim DVD-ROM
Expansion Slot	1 full height via riser card	7 low profile	7 low profile
System Cooling	2 x 40 x 28mm fans	2 x 80x25mm fans 1 x 97mm blower (rear)	2 x 80x25mm fans 1 x 97mm blower (rear)
Front I/O	2 x USB ports	2 x USB ports	2 x USB ports
Button	System power on/off System reset	System power on/off System reset	System power on/off System reset
LED	Power LED HDD LED LAN 1 LAN 2	Power status LAN activity Drive activity	Power status LAN activity
Security	Depend on M/B	Depend on M/B	Depend on M/B
Limitation of CPU Cooler	Depend on CPU TDP	Depend on CPU TDP	Depend on CPU TDP
Power Supply	315W 1U Flex 100-240Vac (included)	500W PS2 100-240Vac Power Supply	500W PS2 100-240Vac Power Supply
Operating Temperature	0°C ~ 35°C (32°F ~ 95°F), (w/HDD), ambient w/ air flow	0°C ~ 35°C (32°F ~ 95°F), (w/HDD), ambient w/ air flow	0 ~ 40°C (32°F ~ 104°F) w/ SSD, ambient w/ 0.5m/s air flow
Gross Weight	7.5kg	18kg	20kg

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