



# PRODUCT CATALOG 2021

Cocreate an Intelligent World

# TABLE OF CONTENTS

- 1 About ASRock Industrial
- 2 Product Category
- 3 Applications

## Fanned Embedded BOX PC

- 4 NUC 1100 BOX Series
- 5 4X4 BOX-4000 Series
- 6 NUC BOX-8365UE
- 7 4X4 BOX-R1000/ 4X4 BOX-V1000M

## Fanless Embedded BOX PC

- 8 iBOX-1100 Series
- 9 iBOX-V2000 Series
- 10 iBOX-8365UE
- 11 iBOX-R1000/V1000
- 12 iBOX-350
- 13 Ubox-115

## Edge AIoT Platform

- 14 iEPF-9000S-EX4/ iEPF-9001S-EX4
- 15 iEPF-9002S-EX4
- 16 iEP-9000E/ iEP-9001E
- 17 iEP-9002E
- 18 iEPF-7001
- 19 athena A2 kit

## Mini-ITX

- 20 IMB-1224
- 21 IMB-1220-L/D
- 22 IMB-1221-L/D
- 23 IMB-1222/ IMB-1222-WV
- 24 IMB-1223/ IMB-1223-WV
- 25 IMB-1225
- 26 IMB-X1220-L
- 27 IMB-X1222-WV
- 28 IMB-1216
- 29 IMB-1210-L/ D
- 30 IMB-1211-L/ D
- 31 IMB-1212/ IMB-1213
- 32 IMB-1214/ IMB-1215
- 33 IMB-156
- 34 IMB-157
- 35 IMB-V2000
- 36 IMB-A1001
- 37 IMB-A1000
- 38 IMB-V1000/ IMB-R1000

## Mini-STX

- 39 STX-1001
- 40 STX-1500
- 41 STX-1000

## Micro-STX

- 42 MXM IPC-Q470E
- 43 MXM IPC-Q370/ Q370-12V

## Micro-ATX

- 44 IMB-X1313
- 45 IMB-1313
- 46 IMB-1312
- 47 IMB-1311-L/ D
- 48 IMB-1310
- 49 IMB-A1300/ A1301

## ATX

- 50 IMB-X1711
- 51 IMB-1711
- 52 IMB-1710

## SBC

- 53 SBC-360
- 54 SBC-350
- 55 SBC-230
- 56 SBC-240

## NUC

- 57 NUC 1100 Series
- 58 NUC-8665UE/ 8365UE/ 8145UE
- 59 J3455-NUC-DL

## 4X4

- 60 4X4-4000 Series
- 61 4X4-V2000 Series
- 62 4X4-R1000/ 4X4-V1000M

## UTX

- 63 UTX-115

## Pico-ITX

- 64 SOM-P101/ SOM-P102

## QSeven

- 65 SOM-QMX101-WT
- 66 CAB-IVI701
- 67 SOM-Q101/ SOM-QA101/ CAB-701

## COM Express

- 68 COM-653
- 69 COM-652

## Network

- 70 NAS-9602/ NAB-9602

## Add-on-Cards

- 71 Display/ Storage module cards
- 72 Bifurcation/ PoE cards

# ABOUT ASROCK INDUSTRIAL

## Cocreate an Intelligent World

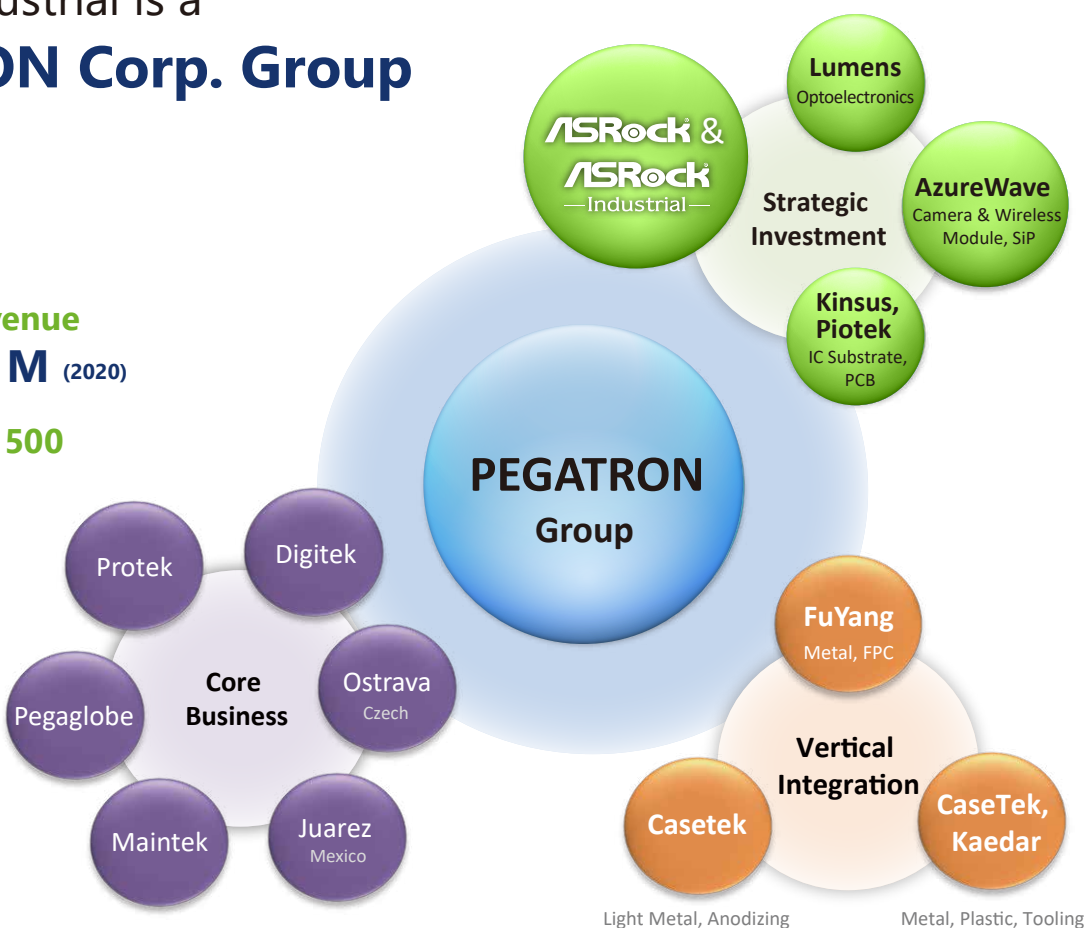
ASRock Industrial Computer was established as an independent company in July 2018, focusing on the fields of motherboards, edge computers, and other products for the manufacturing, business, and retail industries. It is the world's leader in Industrial PC motherboards, with customers located around the globe. Previously, it had been a business unit of ASRock Inc. (est. 2002) that was set up in 2011.

By becoming an independent company ASRock Industrial can devote all its resources to B2B activities. Our vision is to Cocreate an intelligent world, which encompasses the ASRock Industrial's core focus in CARES (Commerce/ Automation/ Robot/ Entertainment/ Security) industries. With a central R&D design team of almost 65% of total staff, ASRock Industrial has the resources to develop reliable, leading-edge products for your business needs. All products can be bought off-the-shelf or customized to the demands of OEMs/ODMs.

ASRock Industrial is a  
**PEGATRON Corp. Group**  
 Company

**PEGATRON Revenue**  
**US\$ 44,207 M** (2020)

**Fortune Global 500**  
**269** (2020)





# PRODUCT CATEGORY



INDUSTRIAL & EMBEDDED MB

INDUSTRIAL COMPUTER SYSTEM



COMMERCE

- POS
- KIOSK
- Digital Signage

## Cocreate an Intelligent World for C.A.R.E.S Applications

Commerce / Automation / Robot / Entertainment / Security



AUTOMATION

- Factory Automation
- Autonomous Vehicle





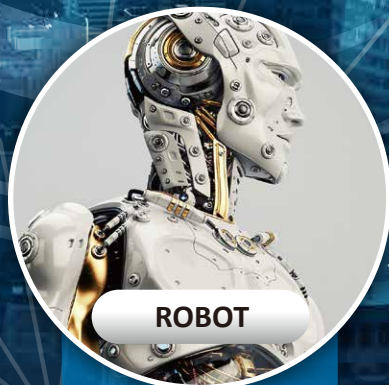
## EDGE AIOT PLATFORM

## NETWORK APPLIANCE



### SECURITY

- Video Surveillance
- Network Security



### ROBOT

- Service Robot
- Pet Robot



### ENTERTAINMENT

- Slot Machine
- Gambling
- Lottery



# NUC 1100 BOX Series

NUC BOX-1165G7/ NUC BOX-1135G7/ NUC BOX-1115G4  
Fanned Embedded BOX PC



## KEY FEATURES

- Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors
- 2 x 260-pin SO-DIMM up to 64GB DDR4 3200 MHz
- 5 x USB 3.2 Gen2, 1 x M.2 Key M, 1 x M.2 Key E (WiFi-6 AX200), 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.4 (2 from Type C)
- TPM onboard
- 19V/90W Power Adapter
- 110.0 x 117.5 x 47.85mm, Fanned Barebone

## SPECIFICATIONS

### Processor System

CPU	NUC BOX-1165G7 (I7-1165G7, QC, Max Speed up to 4.7GHz) NUC BOX-1135G7 (I5-1135G7, QC, Max Speed up to 4.2GHz) NUC BOX-1115G4 (I3-1115G4, DC, Max Speed up to 4.1GHz)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3/Celeron CPU
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.4, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Quad-Display (Included 2 outputs from Type-C)

### Expansion Slot

M.2/ WLAN	1 x Intel® Wi-Fi 6 AX200 module (M.2 Key E, 2230 PCIe x1, USB 2.0 for Wireless)
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### Audio

Interface	Realtek ALC233, High Definition Audio.
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### Ethernet

Controller/ Speed	LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Intel® I225LM with 10/100/1000/2500 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe Gen4 x4 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

### Front I/O

USB	1 x USB 3.2 Gen2 (Type A) 2 x USB 3.2 Gen2 (Type-C, Supports DP1.4 display output) * USB4™ Compliance Test is pending for certification
Audio	1 (headphone & microphone jack)

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.4
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 Gen2 (Type-A)
DC Jack	1

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 19V/90W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

### Mechanical

Construction	Plastic
Mounting	VESA mounting
Dimensions (W x D x H)	110.0 x 117.5 x 47.85mm
Weight	Net Weight:1.0Kg

### Others

OS Support	Windows 10
Certifications	CE, FCC Class A
Packing List	1 x 19V/90W Power Adapter 1 x Screw Package 1 x VESA mounting bracket





# 4X4 BOX-4000 Series

## 4X4 BOX-4800U/4X4 BOX-4500U/4X4 BOX-4300U

### Fanned Embedded BOX PC



#### KEY FEATURES

- AMD Ryzen™ 4000U-Series  
(4X4 BOX-4800U/4X4 BOX-4500U/4X4 BOX-4300U)
- 2 x 260-pin SO-DIMM up to 64GB DDR4 3200 MHz
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x SATA3
- 1 x Realtek 1 Gigabit LAN (support DASH), 1 x Realtek 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.2a (2 from Type C)
- TPM onboard
- 19V/90W Power Adapter
- 110.0 x 117.5 x 47.85mm, Fanned Barebone

#### SPECIFICATIONS

##### Processor System

CPU	4X4 BOX-4800U (AMD Ryzen™ 7 4800U, 8Cores, Max Speed up to 4.2GHz) 4X4 BOX-4500U (AMD Ryzen™ 5 4500U, 6Cores, Max Speed up to 4.0GHz) 4X4 BOX-4300U (AMD Ryzen™ 3 4300U, 4Cores, Max Speed up to 3.7GHz)
Chipset	SoC
BIOS	AMI SPI 128 Mbit

##### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

##### Graphics

Controller	AMD Radeon™ Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Max 4 display (Included 2 outputs from Type C)

##### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless
WLAN	1 x Intel® Wi-Fi 6 AX200 module

##### Audio

Interface	Realtek ALC233, High Definition Audio.
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##### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN2: Realtek R8111FPV with 10/100/1000 Mbps, support DASH function
Connector	2 x RJ-45

##### Storage

M.2	1 x M.2 (KEY M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

##### Front I/O

USB	1 x USB 3.2 Gen2 (Type A) 2 x USB 3.2 Gen2 (Type C, Supports DP1.2a display output)
Audio	1 (headphone & microphone jack)

##### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2a
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 2.0
DC Jack	1

##### Watchdog Timer

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

##### Power Requirements

Input PWR	1 x 19V/90W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

##### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

##### Mechanical

Construction	Plastic
Mounting	VESA mounting
Dimensions (W x D x H)	110.0 x 117.5 x 47.85mm
Weight	Net Weight: 1kg

##### Others

OS Support	Windows 10
Certifications	CE, FCC Class A
Packing List	1 x 19V/90W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket 1 x Bracket for M.2 2280 support



# NUC BOX-8365UE

Faned Embedded BOX PC



## KEY FEATURES

- Intel® 8th Gen (Whiskey lake-U) Core™ Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 2 x DP 1.2a
- TPM 2.0 onboard IC
- 12V DC-In
- 110.0 x 118.5 x 67.3 mm, Faned Barebone

## SPECIFICATIONS

### Processor System

CPU	Intel® 8th Gen (Whiskey lake-U) Core™ Processors NUC BOX-8145UE (I3-8145UE DC, 2.2GHz, 15 W) NUC BOX-8365UE (I5-8365UE QC, 1.6GHz, 15 W) NUC BOX-8665UE (I7-8665UE QC, 1.8GHz, 15 W)
Chipset	MCP
Socket	N/A
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2a Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

mini-PCIe/ mSATA	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230)with PCIe x1 and USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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### Ethernet

Controller/ Speed	NUC BOX-8365UE / NUC BOX-8665UE: LAN1: Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro LAN2: Realtek RTL8111H with 10/100/1000 Mbps NUC BOX-8145UE: LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Realtek RTL8111H with 10/100/1000 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (Key M, 2242/2260) with PCIe x4 and SATA3 for SSD *Not support M.2 Key M 2280
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen2) + 2 x USB 2.0
Audio	1 (Mic-in or Line-out)

### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	2 x DP 1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 12V/96W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C – 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

### Mechanical

Construction	Plastic
Mounting	VESA mounting
Dimensions (W x H x D)	110.0 x 118.5 x 67.3 mm
Weight	Net Weight: 0.7kg

### Others

OS Support	Windows 10
TPM	N/A
Certifications	CE, FCC Class A
Packing List	1 x 12V/96W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket 1 x Heatsink for M.2 Key M





# 4X4 BOX-R1000/ 4X4 BOX-V1000M

## Faned Embedded BOX PC



### KEY FEATURES

- AMD Ryzen™ Embedded R-Series (4X4 BOX-R1000M/4X4 BOX-R1000V)
- AMD Ryzen™ Embedded V-Series (4X4 BOX-V1000M)
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz with ECC support (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x SATA3
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 2.0, 2 x DP 1.2a
- 12V DC-In
- 110.0 x 118.5 x 67.3 mm, Faned Barebone

### SPECIFICATIONS

Processor System	4x4 BOX-R1000	4x4 BOX-V1000M
CPU	AMD Ryzen™ Embedded R-Series -4X4 BOX-R1000M (R1606G, DC, 2.6GHz, 12-25W) -4X4 BOX-R1000V (R1505G, DC, 2.4GHz, 12-25W)	AMD Ryzen™ Embedded V-Series (V1605B, QC, 2GHz, 12-25W)
Chipset	SoC	
Socket	N/A	
BIOS	AMI SPI 64 Mbit	

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	4x4 BOX-R1000 AMD Radeon™ Vega3 Graphics 4x4 BOX-V1000M AMD Radeon™ Vega8 Graphics
HDMI	HDMI 2.0 Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a Max resolution up to 3840*2160@60Hz
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

mini-PCIe/ mSATA	N/A
mini-PCIe	N/A
M.2	1 x Key E(2230) with PCIe1 and USB2.0 for Wireless
WLAN	1 x Intel® Wireless-AC 3168 module

#### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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#### Ethernet

Controller/ Speed	2 x Realtek RTL8111G with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Storage

M.2	1 x M.2 (Key M, 2242/2260) with PCIe x4 and SATA3 for SSD *Not support M.2 Key M 2280
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

#### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen2), 2 x USB 2.0
Audio	1 (Mic-in or Line-out)

#### Rear I/O

HDMI	1 x HDMI 2.0
DisplayPort	2 x DP1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	1 x 12V/96W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

#### Mechanical

Construction	Plastic
Mounting	VESA mounting
Dimensions (W x H x D)	110.0 x 118.5 x 67.3 mm
Weight	Net Weight: 1kg

#### Others

OS Support	Windows 10
TPM	N/A
Certifications	CE, FCC Class A
Packing List	1 x 12V/96W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket 1 x Heatsink for M.2 Key M



# iBOX 1100 Series

iBOX-1185G7E/ iBOX-1145G7E/ iBOX-1115G4E  
Fanless Embedded BOX PC



## KEY FEATURES

- Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors
- 2 x 260-pin SO-DIMM up to 64GB DDR4 3200 MHz
- 6 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.4 (2 from Type C)
- TPM onboard
- 19V/90W Power Adapter
- 171.8 x 50.05 x 109.45 mm, Fanless Embedded BOX PC

## SPECIFICATIONS

### Processor System

CPU	iBOX-1185G7E (I7-1185G7E, QC, Max Speed up to 4.4GHz) iBOX-1145G7E (I5-1145G7E, QC, Max Speed up to 4.1GHz) iBOX-1115G4E (I3-1115G4E, DC, Max Speed up to 3.9GHz)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3/Celeron CPU
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.4, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Quad-Display (Included 2 outputs from Type-C)

### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless
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### Audio

Interface	Realtek ALC233, High Definition Audio.
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### Ethernet

Controller/ Speed	iBOX-1185G7E/ iBOX-1145G7E: LAN1: Intel® I219LM with 10/100/1000 Mbps LAN2: Intel® I225LM with 10/100/1000/2500 Mbps iBOX-1115G4E: LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Intel® I225LM with 10/100/1000/2500 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe Gen4 x4 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

### Front I/O

USB	2 x USB 3.2 Gen2 (Type A), 2 x USB 2.0 2 x USB 3.2 Gen2 (Type-C, Supports DP1.4 display output) * USB4™ Compliance Test is pending for certification 2 x USB 2.0
Audio	1 (headphone & microphone jack)

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.4
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 Gen2 (Type-A)
DC Jack	1
COM	1 x COM(RS-232)

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 19V/90W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

### Mechanical

Construction	Aluminum
Mounting	VESA mounting · Wall mounting
Dimensions (W x H x D)	171.8 x 50.05 x 109.45 mm
Weight	Net Weight:1.6Kg

### Others

OS Support	Windows 10
Certifications	CE, FCC Class A
Packing List	1 x 19V/90W Power Adapter 1 x Screw Package 1 x VESA mounting bracket 1 x Bracket for M.2 2280 support





# iBOX V2000 Series

## iBOX-V2000M/iBOX-V2000V

### Fanless Embedded BOX PC



## KEY FEATURES

- AMD Ryzen™ Embedded V2718/V2516
- 2 x 260-pin non-ECC/ECC SO-DIMM up to 64GB DDR4 3200 MHz
- 4 x USB 3.2 Gen2, 4 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 1 x Realtek 1 Gigabit LAN, 1 x Realtek 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.2a (2 from Type C)
- TPM onboard
- 19V/90W Power Adapter
- 171.8 x 109.45 x 50.05mm, Fanless Barebone

## SPECIFICATIONS

### Processor System

CPU	iBOX-V2000M (V2718, 8C, Max Speed up to 4.15GHz) iBOX-V2000V (V2516, 6C, Max Speed up to 3.95GHz)
Chipset	SOC
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel non-ECC/ECC DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	AMD Radeon™ Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Quad-Display (Included 2 outputs from Type-C)

### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless
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### Audio

Interface	Realtek ALC233, High Definition Audio.
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### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN2: Realtek R8111FPV (Dash) with 10/100/1000 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (KEY M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

### Front I/O

USB	2 x USB 3.2 Gen2 (Type A) 2 x USB 3.2 Gen2 (Type-C, Supports DP1.4 display output) 2 x USB 2.0
Audio	1 (headphone & microphone jack)
COM	1 x COM(RS-232)

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2a
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 2.0
DC Jack	1

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 19V/90W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

### Mechanical

Construction	Aluminum
Mounting	VESA mounting 、 Wall mounting
Dimensions (W x D x H)	171.8 x 109.45 x 50.05mm
Weight	Net Weight:1.6Kg

### Others

OS Support	Windows 10
Certifications	CE, FCC Class A
Packing List	1 x 19V/90W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket 1 x Bracket for M.2 2280 support



# iBOX-8365UE

Fanless Embedded BOX PC



## KEY FEATURES

- Intel® 8<sup>th</sup> Gen (Whiskey lake-U) Core™ Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 2 x DP 1.2a
- TPM 2.0 onboard IC
- 12V DC-In
- 171.8 x 150 x 71.5 mm, Fanless Barebone

## SPECIFICATIONS

### Processor System

CPU	Intel® 8th Gen (Whiskey lake-U) Core™ Processors -iBOX-8145UE (I3-8145UE DC, up to 3.90 GHz) -iBOX-8365UE (I5-8365UE QC, up to 4.10 GHz) -iBOX-8665UE (I7-8665UE QC, up to 4.40 GHz)
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2a Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

mini-PCIe/ mSATA	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230)with PCIe x1 and USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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### Ethernet

Controller/ Speed	iBOX-8365UE / iBOX-8665UE: LAN1: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro LAN2: 1 x Realtek RTL8111H with 10/100/1000 Mbps iBOX-8145UE: LAN1: 1 x Intel® I219V with 10/100/1000 Mbps LAN2: 1 x Realtek RTL8111H with 10/100/1000 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe4 and SATA3 for SSD *M.2 Key M 2280(optional support, by bracket)
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen1) + 2 x USB 2.0
Audio	1 (Mic-in or Line-out)
COM	1 x COM (RS-232)

### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	2 x DP 1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 12V/96W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C – 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

### Mechanical

Construction	Aluminum
Mounting	VESA mounting 、 Wall mounting
Dimensions (W x H x D)	171.8 x 150 x 71.5 mm
Weight	Net Weight: 2.2kg

### Others

OS Support	Windows 10
TPM	TPM 2.0 onboard IC
Certifications	CE, FCC Class A
Packing List	1x 12V/96W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket





# iBOX-R1000/ iBOX-V1000M

## Fanless Embedded BOX PC



### KEY FEATURES

- AMD Ryzen™ Embedded R-Series (iBOX-R1000M/iBOX-R1000V)
- AMD Ryzen™ Embedded V-Series (iBOX-V1000M)
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz with ECC support (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 2.0, 2 x DP 1.2a
- TPM Header
- 12V DC-In
- 171.8 x 150 x 71.5 mm, Fanless Barebone

### SPECIFICATIONS

Processor System	iBOX-R1000	iBOX-V1000M
CPU	AMD Ryzen™ Embedded R-Series -iBOX-R1000M (R1606G, DC, up to 3.5GHz) -iBOX-R1000V (R1505G, DC, up to 3.3GHz)	AMD Ryzen™ Embedded V-Series (V1605B, QC, up to 3.6GHz)
Chipset	SoC	
Socket	N/A	
BIOS	AMI SPI 64 Mbit	

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ Vega 8 Graphics (iBOX-R1000)AMD Radeon™ Vega 3 Graphics (iBOX-V1000)AMD Radeon™ Vega 8 Graphics
HDMI	HDMI 2.0 Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

mini-PCIe/ mSATA	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230) with PCIe1 and USB2.0 for Wireless
SIM Socket	N/A

#### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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#### Ethernet

Controller/ Speed	2 x Realtek RTL8111G with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe4 and SATA3 for SSD *M.2 Key M 2280(optional support, by bracket)
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

#### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen2) + 2x USB 2.0
Audio	1 (Mic-in or Line-out)
COM	1 x COM (RS-232)

#### Rear I/O

HDMI	1 x HDMI 2.0
DisplayPort	2 x DP1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit Realtek LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	1 x 12V/96W Power Adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 40°C
Storage Temp	-40° C – 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

#### Mechanical

Construction	Aluminum
Mounting	VESA mounting 、 Wall mounting
Dimensions (W x H x D)	171.8 x 150 x 71.5 mm
Weight	Net Weight: 2.2kg

#### Others

OS Support	Windows 10
TPM	N/A
Certifications	CE, FCC Class A
Packing List	1 x 12V/96W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket



# iBOX-350

Fanless Embedded BOX PC



## KEY FEATURES

- Intel®8<sup>th</sup> Gen (Whiskey lake-U) Core™ MCP Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 4 x USB 3.2 Gen2, 2 x USB 3.2 Gen1, 2 x M.2 Key M, 1 x M.2 Key E, 4 x COM, 1 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports dual display, 2 x DP 1.2a
- TPM 2.0 onboard IC (SBC-350P, SBC-350M)
- 1 x 12V/96W AC-DC power brick adapter
- 208 x 178.6 x 62.9mm, Fanless Barebone

## SPECIFICATIONS

### Processor System

CPU	Intel® 8th Gen (Whiskey lake-U) Core™ MCP Processors -iBOX-350P (i7-8665UE, QC, up to 4.40 GHz) -iBOX-350M (i5-8365UE, QC, up to 4.10 GHz) -iBOX-350V (i3-8145UE, DC, up to 3.90 GHz)
Chipset	SoC
Socket	BGA1528
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® UHD Graphics 620
HDMI	N/A
DisplayPort	DisplayPort 1.2a, DP++ Max resolution up to 4096 x 2304@60Hz
VGA	N/A
LVDS	Dual channel 48 bit up to 1920 x 1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Dual Display

### Expansion Slot

Mini-PCIe/ mSATA	N/A
Mini-PCIe	N/A
M.2	1 x Key E (2230)with PCIe x1, CNVI and USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	N/A
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### Ethernet

Controller/ Speed	iBOX-350P/M LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2:1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro iBOX-350V LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2:1 x Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x Key M (2242/2280)with PCIe4 and SATA3 for SSD 1 x Key M (2242)with SATA3 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

### Front I/O

HDMI	N/A
DisplayPort	1 x DP 1.2a++
USB	2 x USB 3.2 (Gen1), 2 x USB 2.0
Audio	N/A
COM	1 x COM (RS232/422/485), 3 x COM (RS232)
GPIO(Phoenix)	1 (4 x GPI, 4 x GPO)

### Rear I/O

HDMI	N/A
DisplayPort	1 x DP 1.2a, DP++
VGA	N/A
DVI	N/A
Ethernet	2 x Intel 1 Gigabit LAN
USB	4 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	1 x 12V/96W AC-DC power brick adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

### Mechanical

Construction	Aluminum housing
Mounting	VESA mounting
Dimensions (W x H x D)	208 x 178.6 x 62.9mm
Weight	Net Weight:2.4kg

### Others

OS Support	Windows 10
TPM	TPM 2.0 onboard IC (iBOX-350P、iBOX-350M)
Certifications	CE, FCC Class A
Packing List	1 x 12V/96W Power Adapter 1 x Screw Package 1 x Product DVD 1 x VESA mounting bracket



# uBOX-115

Fanless Embedded BOX PC



## KEY FEATURES

- Intel® Apollo Lake SoC Processor
- 2 x 204-pin SO-DIMM up to 16GB DDR3L 1866 MHz (8GB per DIMM)
- 2 x USB 3.1 Gen1, 1 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key B
- 2 x Realtek 1 Gigabit LAN
- Supports dual display, 2 x HDMI 1.4b
- 1 x 12V/60W AC-DC power brick adapter
- 135 x 116 x 25.4mm, Fanless Barebone

## SPECIFICATIONS

### Processor System

CPU	Intel® Apollo Lake SoC Processor - uBOX-115J (J3455, QC, up to 2.30 GHz) - uBOX-115D (N4200, QC, up to 2.50 GHz) - uBOX-115L (N3350, DC, up to 2.40 GHz)
Chipset	SoC
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	16 GB (8GB per DIMM)
Socket	2 x 204-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096 x 2160@24Hz
DisplayPort	N/A
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Dual Display

### Expansion Slot

M.2	1 x M.2 (KEY E, 2230) with PCIe x1 and USB 2.0 for Wireless
SIM Socket	1 x Socket connected to M.2 Key_B

### Audio

Interface	Realtek ALC233, High Definition Audio
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### Ethernet

Controller/ Speed	2 x Realtek RTL8111G with 10/100/1000 Mbps
Connector	2 x RJ-45

### Storage

M.2	1 x M.2 (KEY B, 3042) with USB 2.0 + SATA/PCIe x2 + SIM for 4G
mSATA	N/A
SATA	N/A
eMMC	32GB/64GB

### Front I/O

HDMI	2 x HDMI 1.4b
DisplayPort	N/A
USB	2 x USB 3.1 (Gen1)
Audio	1 (Mic-in, Line-out)
DC Jack	1

### Rear I/O

HDMI	N/A
DisplayPort	N/A
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	1 x USB 2.0
Audio	N/A
COM	N/A
PS2	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V/60W AC-DC power brick adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

### Mechanical

Construction	Aluminum housing
Mounting	VESA mounting bracket
Dimensions (W x H x D)	135 x 116 x 25.4mm
Weight	Net Weight:0.5kg

### Others

OS Support	Windows 10
TPM	N/A
Certifications	CE, FCC Class A
Packing List	1 x 12V/60W Power Adapter 1 x VESA mounting bracket 1 x Screw Package 1 x Product DVD





# iEPF-9000S-EX4 / iEPF-9001S-EX4

## Intelligent Edge Platform



### KEY FEATURES

- Intel® 10th Gen (Comet Lake) Xeon® W and Core™ Processors with W480E & Q470E Chipset
- 4 x 260-pin SO-DIMM up to 128GB (32GB per DIMM)
- 1 x PCIe x16 (Gen 3) or 2 x PCIe x8 (Gen 3), 2 x PCIe x4
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 4 x USB 3.2 Gen2, 3 x USB 2.0, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 5 x Intel Gigabit LAN (2 support PoE)
- Supports Triple Display, 2 x Displayport, 1 x VGA

### SPECIFICATIONS

Processor System	iEPF-9000S-EX4	iEPF-9001S-EX4
CPU	Intel® 10th Gen (Comet Lake) Xeon® W and Core™ Processors	
Chipset	Intel® W480E	Intel® Q470E
Socket	LGA 1200	

#### Memory

Technology	Dual Channel DDR4 2933 / 2666 / 2400 / 2133 MHz (ECC memory supported by CPU) - Intel® Xeon® W (10 & 8 Core) and Core™ CPUs support DDR4 up to 2933 MHz - Intel® Xeon® W (6 Core) and Core™ CPUs support DDR4 up to 2666 MHz - Intel Pentium / Celeron CPU support DDR4 up to 2400 MHz - When all 4 x SO-DIMM are occupied, the DDR4 frequency is up to 2133 MHz
Capacity	128 GB (32 GB per DIMM)
Socket	4 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	1 x PCIe x16 (Single at x16 or dual at x8), 1 x PCIe x8 (shared with dual at x8) 2 x PCIe x4 (1 shared with M.2 Key M)
Mini-PCIe	2 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and USB 2.0 for Wireless 1 x M.2 (Key B, 2280/3042/3052) with PCIe x1 / SATA / USB 3.2 and SIM for 4G / 5G
SIM Socket	2 (1 connected to Mini PCIe, 1 connected to M.2 Key B)

#### Audio

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

Controller / Speed	4 x I210IT (2 support PoE) + 1 x I219LM (vPro support)
Connector	5 x RJ45

#### Storage

M.2	1 x M.2 (Key M, 2230/2242/2280) with PCIe x4 (shared with PCIe x4 slot) and SATA for SSD
SATA	4 x SATA3 (6Gb/s), support RAID 0/1/5/10 4 x 2.5" HDD/SSD Tray
CFAST	1 x Type II socket (Shared SATA)

#### Rear I/O

DisplayPort	2
VGA	1
Ethernet	5 x 1 Gigabit LAN
USB	4 x USB 3.2 Gen2, 3 x USB 2.0 (1 x internal connector w/ lock function)
Audio	1 x Mic-in, 1 x Line-out
COM	6 x COM (2 x RS-232, 4 x RS-232/422/485)
DIO	8-ch DI and 8-ch DO

#### Watchdog Timer

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

#### Power Requirements

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

Operating Temp	35W CPU: -40°C~75°C (-40°F~167°F) 65W CPU: -40°C~55°C (-40°F~131°F) 80W CPU: -40°C~45°C (-40°F~113°F)
Storage Temp	-40°C~85°C (-40°F~185°F)
Operating Humidity	95% @ 40°C (non-condensing)
Storage Humidity	95% @ 40°C (non-condensing)
Shock	Operating: 50 Grms, half sine 11ms duration (w/ 2.5" SSD/CFAST)
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/ 2.5" SSD/CFAST) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	CB, UL, CCC

#### Mechanical

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

#### Others

OS Support	Windows 10 & Linux (Ubuntu)
TPM	TPM 2.0



# iEPF-9002S-EX4

## Intelligent Edge Platform



### KEY FEATURES

- Intel® 10th Gen (Comet Lake-S) Core™ Processors with H420E chipset
- 2 x 260-pin SO-DIMM up to 64GB (32GB per DIMM)
- 1 x PCIe x16 (Gen 3), 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 4 x USB 3.2 Gen1, 3 x USB 2.0, 6 x COM, 2 x SATA3, 8 x DI, 8 x DO
- 3 x Intel Gigabit LAN

### SPECIFICATIONS

#### Processor System

CPU	Intel® 10th Gen (Comet Lake-S) Core™ Processors
Chipset	Intel® H420E
Socket	LGA 1200

#### Memory

Technology	Dual Channel DDR4 2933 / 2666 / 2400 MHz, - Intel Core i9 / i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5 / i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium / Celeron CPU support DDR4 up to 2400 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
MultiDisplay	Dual Display

#### Expansion Slot

PCIe	1 x PCIe x16
Mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0 1 x Full/Half size with PCIe x1
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and USB 2.0 for Wireless 1 x M.2 (Key B, 2280/3042/3052) with PCIe x1, USB 3.2 for 4G / 5G
SIM Socket	2 (1 connected to Mini PCIe, 1 connected to M.2 Key B)

#### Audio

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

Controller/ Speed	2x I210IT + 1x I219V
Connector	3 x RJ45

#### Storage

M.2	1 x M.2 (Key M, 2230/2242/2280) with SATA for SSD
SATA	2 x SATA3 (6Gb/s) 2 x 2.5" HDD/SSD Tray
CFast	1 x Type II socket (Shared SATA)

#### Rear I/O

DisplayPort	2
VGA	1
Ethernet	3 x 1 Gigabit LAN
USB	4 x USB 3.2 Gen1, 3 x USB 2.0 (1 x internal connector w/ lock function)
Audio	1 x Mic-in, 1 x Line-out
COM	6 x COM (2 x RS-232, 4 x RS-232/422/485)
DIO	8-ch DI and 8-ch DO

#### Watchdog Timer

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

#### Power Requirements

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

Operating Temp	35W CPU: -40°C~75°C ( -40°F~167°F) 65W CPU: -40°C~55°C ( -40°F~131°F) 80W CPU: -40°C~45°C ( -40°F~113°F)
Storage Temp	-40°C~85°C ( -40°F~185°F)
Operating Humidity	95% @ 40°C (non-condensing)
Storage Humidity	95% @ 40°C (non-condensing)
Shock	Operating: 50 Grms, half sine 11ms duration (w/ 2.5" SSD/CFast)
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/ 2.5" SSD/CFast) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	CB, UL, CCC

#### Mechanical

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

#### Others

OS Support	Windows 10 & Linux (Ubuntu)
TPM	TPM 2.0



# iEP-9000E / iEP-9001E

## Intelligent Edge Platform



### Expansion Slot

Mini-PCIe	2 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and USB 2.0 for Wireless 1 x M.2 (Key B, 2280/3042/3052) with PCIe x1, SATA and USB 3.2
SIM Socket	2 (1 connected to Mini PCIe, 1 connected to M.2 Key B)

### Audio

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

Controller/ Speed	4 x I210IT (2 support PoE) + 1 x I219LM (vPro support)
Connector	5 x RJ45

### Storage

M.2	1 x M.2 (Key M, 2230/2242/2280) with PCIe x4 (shared with PCIe x4 slot) and SATA for SSD
SATA	4 x SATA3 (6Gb/s), support RAID 0/1/5/10 4 x 2.5" HDD/SSD Tray
CFAST	1 x Type II socket (Shared SATA)

## KEY FEATURES

- Intel® 10th Gen (Comet Lake) Xeon® W and Core™ Processors with W480E & Q470E Chipset
- 4 x 260-pin SO-DIMM up to 128GB (32GB per DIMM)
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 4 x USB 3.2 Gen2, 3 x USB 2.0, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 5 x Intel Gigabit LAN (2 support PoE)
- Supports Triple Display, 2 x Displayport, 1 x VGA

## SPECIFICATIONS

Processor System	iEP-9000E	iEP-9001E
CPU	Intel® 10th Gen (Comet Lake) Xeon® W and Core™ Processors	
Chipset	Intel® W480E	Intel® Q470E
Socket	LGA 1200	

### Memory

Technology	Dual Channel DD4 2933 / 2666 / 2400 / 2133 MHz (ECC memory supported by CPU) - Intel® Xeon® W (10 & 8 Core) and Core™ CPUs support DDR4 up to 2933 MHz - Intel® Xeon® W (6 Core) and Core™ CPUs support DDR4 up to 2666 MHz - Intel Pentium / Celeron CPU support DDR4 up to 2400 MHz - When all 4 x SO-DIMM are occupied, the DDR4 frequency is up to 2133 MHz
Capacity	128 GB (32 GB per DIMM)
Socket	4 x 260-pin SO-DIMM

### Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
MultiDisplay	Triple Display

### Rear I/O

DisplayPort	2
VGA	1
Ethernet	5 x 1 Gigabit LAN
USB	4 x USB 3.2 Gen2, 3 x USB 2.0 (1 x internal connector w/ lock function)
Audio	1 x Mic-in, 1 x Line-out
COM	6 x COM (2 x RS-232, 4 x RS-232/422/485)
DIO	8-ch DI and 8-ch DO

### Watchdog Timer

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

### Power Requirements

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

Operating Temp	35W CPU: -40°C~70°C (-40°F~158°F) 65W CPU: -40°C~50°C (-40°F~122°F) 80W CPU: -40°C~45°C (-40°F~113°F)
Storage Temp	-40°C~85°C (-40°F~185°F)
Operating Humidity	95% @ 40°C (non-condensing)
Storage Humidity	95% @ 40°C (non-condensing)
Shock	Operating: 100 Grms, half sine 11ms duration (w/ 2.5" SSD/CFAST)
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/2.5" SSD/CFAST) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	CB, UL, CCC

### Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Wall Mount
Dimensions (W x H x D)	202mm (W) x 244mm (D) x 108.7mm (H) (7.95" x 9.61" x 4.28")
Weight	TBD

### Others

OS Support	Windows 10 & Linux (Ubuntu)
TPM	TPM 2.0





# iEP-9002E

## Intelligent Edge Platform



### KEY FEATURES

- Intel®10th Gen (Comet Lake-S) Core™ Processors with H420E chipset
- 2 x 260-pin SO-DIMM up to 64GB (32GB per DIMM)
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 4 x USB 3.2 Gen1, 3 x USB 2.0, 6 x COM, 2 x SATA3, 8 x DI, 8 x DO
- 3 x Intel Gigabit LAN

### SPECIFICATIONS

#### Processor System

CPU	Intel® 10th Gen (Comet Lake-S) Core™ Processors
Chipset	Intel® H420E
Socket	LGA 1200

#### Memory

Technology	Dual Channel DDR4 2933 / 2666 / 2400 MHz, - Intel Core i9 / i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5 / i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium / Celeron CPU support DDR4 up to 2400 MHz
Capacity	64 GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
MultiDisplay	Dual Display

#### Expansion Slot

Mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0 1 x Full/Half size with PCIe x1
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and USB 2.0 for Wireless 1 x M.2 (Key B, 2280/3042/3052) with PCIe x1 and USB 3.2 for 4G / 5G
SIM Socket	2 (1 connected to Mini PCIe, 1 connected to M.2 Key B)

#### Audio

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

Controller/ Speed	2 x I210IT + 1 x I219V
Connector	3 x RJ45

#### Storage

M.2	1 x M.2 (Key M, 2230/2242/2280) with SATA for SSD
SATA	2 x SATA3 (6Gb/s) 2 x 2.5" HDD/SSD Tray
CFast	1 x Type II socket (Shared SATA)

#### Rear I/O

DisplayPort	2
VGA	1
Ethernet	3 x 1 Gigabit LAN
USB	4 x USB 3.2 Gen1, 3 x USB 2.0 (1 x internal connector w/ lock function)
Audio	1 x Mic-in, 1 x Line-out
COM	6 x COM (2 x RS-232, 4 x RS-232/422/485)
DIO	8-ch DI and 8-ch DO

#### Watchdog Timer

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

#### Power Requirements

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

Operating Temp	35W CPU: -40°C~70°C (-40°F~158°F) 65W CPU: -40°C~50°C (-40°F~122°F) 80W CPU: -40°C~45°C (-40°F~113°F)
Storage Temp	-40°C~85°C (-40°F~185°F)
Operating Humidity	95% @ 40°C (non-condensing)
Storage Humidity	95% @ 40°C (non-condensing)
Shock	Operating: 100 Grms, half sine 11ms duration (w/ 2.5" SSD/CFast)
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes (w/ 2.5" SSD/CFast) Operating: 0.3 Grms, 5-500 Hz, 3 axes (w/ HDD)
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	CB, UL, CCC

#### Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Wall Mount
Dimensions (W x H x D)	202mm (W) x 244mm (D) x 108.7mm (H) (7.95" x 9.61" x 4.28")
Weight	TBD

#### Others

OS Support	Windows 10 & Linux (Ubuntu)
TPM	TPM 2.0



# iEPF-7001

Fanned Embedded BOX PC

## Expansion Slot

M.2	1 x M.2 Key E (Intel® Wi-Fi 6 3168 + Bluetooth 4.2)
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## Audio

Interface	Realtek ALC233, High Definition Audio
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## Ethernet

Controller/ Speed	1 x Realtek RTL8111GN with 10/100/1000 Mbps
Connector	1 x RJ-45

## Storage

M.2	1 x Key M (2280) with PCIe x4 and SATA3 for SSD
SATA	1 x SATA3 (6Gb/s)

## Front I/O

HDMI	N/A
DisplayPort	N/A
USB	2 x USB 3.2 Gen1 (Type-A) 2 x USB 3.2 Gen1 (Type-C)
Audio	2 (Mic-in, Line-out)

## Rear I/O

HDMI	1 x HDMI 1.4b
DisplayPort	1 x DP 1.4a
VGA	1
Ethernet	1 x Realtek 1 Gigabit LAN
USB	4 x USB 2.0
Audio	N/A
COM	1 x COM (RS-232)
PS2	N/A

## Watchdog Timer

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

## Power Requirements

Input PWR	1 x 19V/90W AC-DC power brick adapter
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

## Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

## Mechanical

Construction	Front Panel - Plastic / Base - Metal
Mounting	VESA mounting
Dimensions (W x H x D)	178 x 178 x 34mm
Weight	Net Weight: 1.0Kg

## Others

OS Support	Windows 10
Certifications	CE, FCC Class A
Packing List	- 1 x SATA Data with Power Cable - 1 x Screw Pack - 1 x Stand - 1 x VESA Mount - 2 x Antenna

## KEY FEATURES

- Intel®10<sup>th</sup> Gen LGA1200 Processors, up to 65W
- 2 x 260-pin SO-DIMM DDR4-2933MHz up to 64GB (32GB per DIMM)
- 2 x USB 3.2 Gen1 (Type-A), 2 x USB 3.2 Gen1 (Type-C), 4 x USB 2.0
- 1 x M.2 Key E, 1 x M.2 Key M, 1 x SATA3, 1 x COM
- 1 x Realtek 1 Gigabit LAN
- Supports dual display, 1 x HDMI 1.4b, 1 x DP 1.4a, 1 x VGA
- 1 x 19V/90W AC-DC power brick adapter
- 178 x 178 x 34mm, Fanned Barebone

## SPECIFICATIONS

### Processor System

CPU	Intel®10 <sup>th</sup> Gen (Comet lake-S) Core™ Processors up to 65W
Chipset	H410
Socket	LGA1200
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2933 / 2666 / 2400 MHz - Intel Core i9 / i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	64 GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

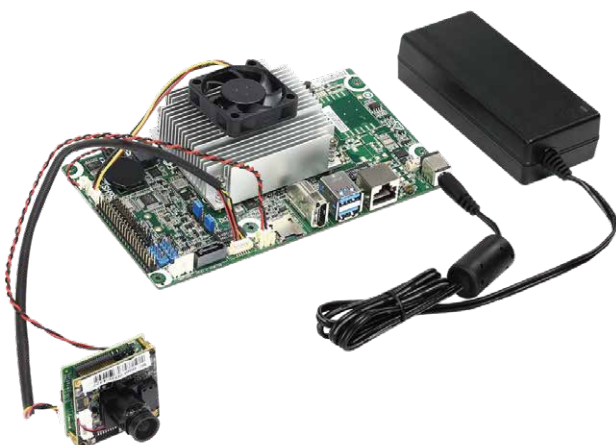
### Graphics

Controller	Integrated Intel®UHD Graphics
HDMI	HDMI 1.4b Max resolution up to 4096x2160@30Hz
DisplayPort	DisplayPort 1.4a Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
MultiDisplay	Dual Display



# athena A2 Kit

AloT Kit



## KEY FEATURES

- Intel® Apollo Lake J3455 Processor
- 1 x IP camera (2MP, 1080P@30fps, H.264)
- 1 x Movidius Myriad X/Keem Bay (Optional)
- Supports LPDDR4 2400MHz 4GB, up to 8GB
- 2 x USB 3.2 Gen1, 1 x M.2 Key B, 1 x M.2 Key M, 1 x M.2 Key E
- 2 x Realtek Gigabit LAN
- 1 x HDMI 1.4b
- 1 x micro SD card slot
- 1 x 32GB eMMC
- 1 x micro SIM socket
- TPM 2.0 onboard IC
- 12V DC-In/ PoE (PD) with 25.5W (Optional)

## SPECIFICATIONS

### Form Factor

Dimensions	6.5-in x 3.8-in
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### Processor System

CPU	Intel® Atom Apollo Lake J3455 processor
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Onboard LPDDR4 2400 MHz
Capacity	4 GB, up to 8GB
Socket	N/A

### Graphics

Controller	SoC integrated graphics
HDMI	HDMI 1.4b Max resolution up to 3840x2160@30Hz
DisplayPort	N/A
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	N/A

### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and USB 2.0 for Wireless
SIM Socket	1 x micro SIM Socket connected to M.2 Key B 3042/3052

### Audio

Interface	N/A
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### Ethernet

Controller/ Speed	LAN: 1 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps (PoE (PD) with 25.5W) LAN: 2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps (IP Camera Header)
Connector	1 x RJ-45

### Rear I/O

HDMI	1 x HDMI 1.4b
DisplayPort	N/A
VGA	N/A
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, PoE (PD) with 25.5W (Optional)
USB	2 x USB 3.2 (Gen1)
Audio	N/A
COM	N/A
PS2	N/A
others	1 x micro SD connector

### Internal Connector

USB	2 x USB 2.0 header
COM	N/A
Parallel	N/A
GPIO	N/A
TPM	TPM 2.0 onboard IC
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	1 x 4-pin SATA Power
Speaker Header	N/A
IPCAM interface	LAN signal 1x6 header Power 1x2 header
40-pin GP-bus	40 pin General Purpose bus

### Storage

M.2	1 x M.2 (Key B, 3042/3052) with PCIe x1 and USB 3.2Gen1, USB 2.0 1 x M.2 (Key M, 2280) with PCIe x2
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	Onboard eMMC 32GB

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC-In (DC Jack) PoE (PD) with 25.5W (LAN Port) (Optional)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 50°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	10% ~ 90%
Storage Humidity	10% ~ 90%

### Others

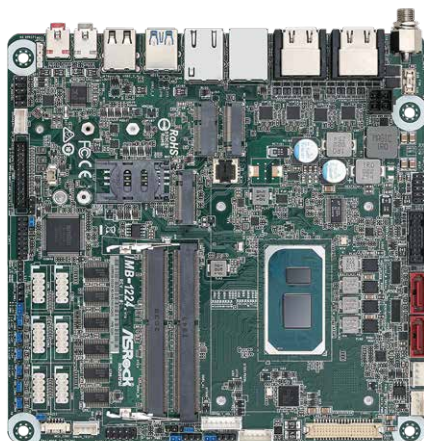
IP camera	2MP, 1080P @30fps, H.264
Movidius	1 x M.2 (Key M, 2280) Myriad X/Keem Bay (Optional)
Adapter	1 x AC-in 100~240V, DC-out 12V
OS Support	Linux Ubuntu 16.04
Accessories	1 x IP Camera Signal Cable 1 X IP Camera Power Cable 1 x SATA Data Cable 1 x SATA Power Cable 1 x Heatsink Fan 8 x Standoffs





# IMB-1224

Mini-ITX Motherboard



## KEY FEATURES

- Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors
- 2 x 260-pin SO-DIMM DDR4 3200 MHz, up to 64GB
- 2 x USB 3.2 Gen2, 1 x USB 3.2 Gen1, 5 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 2 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Quad display, 1 x LVDS, 1 x eDP, 4 x HDMI 2.0b
- TPM 2.0 onboard (IMB-1224P/IMB-1224M)
- Support Intel® RAID 0/1
- 12~28V DC-In(Lockable DC Jack)/ ATX PWR

## SPECIFICATIONS

### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in)
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### Processor System

CPU	Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors, up to 28W -IMB-1224P (i7-1185G7E, QC, Max Speed up to 4.4GHz) -IMB-1224M (i5-1145G7E, QC, Max Speed up to 4.1GHz) -IMB-1224V (i3-1115G4E, DC, Max Speed up to 3.9GHz) -IMB-1224E (Celeron 6305E, DC, 1.8GHz)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3/Celeron CPU
HDMI	4 x HDMI 2.0b Max resolution up to 4096x2160@60Hz
DisplayPort	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	eDP Max resolution up to 4096x2304@60Hz
DVI	N/A
MultiDisplay	Quad display

### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B*, 3042/3052) with PCIe x1/USB 3.2/USB2.0/SATA and SIM for 4G/5G * Shared with SATA3_1
SIM Socket	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC897 HD , High Definition Audio. Mic-In / Line-Out
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### Ethernet

Controller/ Speed	IMB-1224P/IMB-1224M: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps IMB-1224V/IMB-1224E: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

### Front I/O

USB	N/A
HDMI	N/A
Audio	N/A

### Rear I/O

HDMI	4 x HDMI 2.0b
DisplayPort	N/A
VGA	N/A
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 (Gen2), 2 x USB2.0
Audio	2 (Mic-in, Line-out)
DC Jack	1 (Screw type)

### Internal Connector

USB	1x USB 3.2 Gen1 3 x USB 2.0 (1x2.54 pitch header, 1xUSB3.2 header)
COM	4 x COM (RS-232) 2 x COM (RS-232/422/485)
Parallel	1
GPIO	8 x GPI, 8 x GPO
TPM	IMB-1224P/IMB-1224M: 1 x TPM 2.0 IC onboard
LVDS	1
eDP	1
SATA PWR Output	1
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe Gen4 x4 for SSD * Shared with SATA3_0
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12~28V DC-In with 4-pin wafer PWR cable or DC Jack(Screw type)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1220-L/ IMB-1220-D

Mini-ITX Motherboard

## KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with Q470E chipset
- 2 x 260-pin SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- 1 x PCIe x16 Gen3, 6 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 5 x COM, 4 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x LVDS, 1 x HDMI 2.0a (IMB-1220-L)
- Support Triple display, 2 x DP1.2, 1 x eDP, 1 x HDMI 2.0a (IMB-1220-D)
- TPM 2.0 onboard
- Special Feature: Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+4-pin)



IMB-1220-L



IMB-1220-D

## SPECIFICATIONS

Form Factor	IMB-1220-L	IMB-1220-D
Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1.5-in)	
Processor System		
CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W *The performance of CPUs over 80W will be limited due to power design.	
Chipset	Intel® Q470E	
Socket	LGA1200	
BIOS	AMI SPI 256 Mbit	
Memory		
Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz	
Capacity	64GB (32 GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	
Graphics		
Controller	Intel® UHD Graphics	
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	N/A
eDP	N/A	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A	
MultiDisplay	Triple Display	
Expansion Slot		
PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)	
PCI	N/A	
mini-PCIe	N/A	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G	
SIM Socket	1 x SIM socket connected to M.2 key B	
Audio		
Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out/Mic-in	

<b>Ethernet</b>		
Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro	
Connector	2 x RJ-45	

Rear I/O	IMB-1220-L	IMB-1220-D
HDMI	1 x HDMI 2.0a	
DisplayPort	1 x DP 1.2	2 x DP 1.2
VGA	1	N/A
DVI	N/A	
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN	
USB	4 x USB 3.2 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	2 x COM(RS-232/422/485)	
PS2	N/A	

### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 4 x USB 2.0 (2 x 2.54 pitch header)	
COM	3 x COM (RS-232)	
Parallel	N/A	
GPIO	4 x GPI, 4 x GPO	
TPM	TPM 2.0 onboard	
LVDS	1	N/A
eDP	N/A	1
VGA	N/A	
SATA PWR Output	1	
Speaker Header	1	

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe4 or SATA3
mSATA	N/A
SATA	4 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR 4pin+24 Pin
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1221-L/IMB-1221-D

Mini-ITX Motherboard

## KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with H420E chipset
- 2 x 260-pin SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- 1 x PCIe x16 Gen3, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 4 x COM, 4 x SATA3
- 1 x Intel 1 Gigabit LAN
- 1 x Intel 2.5 Gigabit LAN
- Support Dual display, 1 x DP1.2, 1 x VGA, 1 x LVDS. 1 x HDMI 2.0a (IMB-1221-L)
- Support Dual display, 2 x DP1.2, 1 x eDP, 1 x HDMI 2.0a (IMB-1221-D)
- ATX-PWR (24+4-pin)



IMB-1221-L



IMB-1221-D

## SPECIFICATIONS

Form Factor	IMB-1221-L	IMB-1221-D
Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1.5-in)	
Processor System		
CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W <small>*The performance of CPUs over 80W will be limited due to power design</small>	
Chipset	Intel® H420E	
Socket	LGA1200	
BIOS	AMI SPI 256 Mbit	
Memory		
Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz	
Capacity	64GB (32 GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	
Graphics		
Controller	Intel® UHD Graphics	
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz	
DisplayPort	DisplayPort 1.2 , DP++ Max resolution up to 4096x2160@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz	N/A
eDP	N/A	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A	
MultiDisplay	Dual Display	
Expansion Slot		
PCIe	1 x PCIe x16 (Gen3)	
PCI	N/A	
Mini-PCIe	N/A	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless 1 x M.2 (Key B, 3042) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G	
SIM Socket	1x SIM socket connected to M.2 key B	
Audio		
Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out,Mic-in	
Ethernet		
Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219V with 10/100/1000 Mbps	
Connector	2 x RJ-45	

Rear I/O	IMB-1221-L	IMB-1221-D
HDMI	1 x HDMI 2.0a	
DisplayPort	1 x DP 1.2	2 x DP 1.2
VGA	1	N/A
DVI	N/A	
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN	
USB	2 x USB 3.2 (Gen1), 2 x USB 2.0	
Audio	2 (Mic-in, Line-out)	
COM	2 x COM (RS-232/422/485)	
PS2	N/A	

### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 2 x USB 2.0 (1 x 2.54 pitch header)	
COM	2 x COM (RS-232)	
Parallel	N/A	
GPIO	4 x GPI, 4 x GPO	
TPM	TPM Header	
LVDS	1	N/A
eDP	N/A	1
VGA	N/A	
SATA PWR Output	1	
Speaker Header	1	

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x2 and shared with SATA3 by switch IC (Default M.2)
mSATA	N/A
SATA	4 x SATA3 (6Gb/s), SATA3_1 shared with M.2 key M (Default M.2)
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR 4pin+24 Pin
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



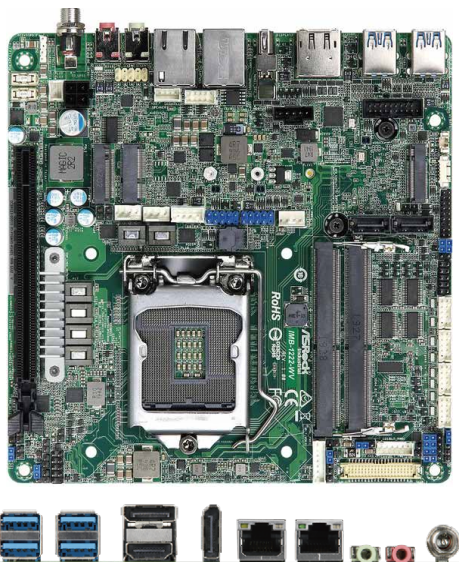


## IMB-1222/ IMB-1222-WV

Mini-ITX Motherboard

## KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with Q470E chipset
- 2 x 260-pin SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- 1 x PCIe x16 Gen3, 6 x USB 3.2 Gen1, 4 x USB 2.0
- 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 4 x COM, 2 x SATA3
- 1 x Intel 2.5 Gigabit LAN, 1 x Intel 1 Gigabit LAN
- Support Triple display, 2 x DP1.2, 1 x LVDS or eDP, 1 x HDMI 2.0a
- TPM 2.0 onboard
- Special Feature: Supports Intel® vPro, AMT, RAID 0/1/5/10
- 12V (IMB-1222)
- 12V~28V DC in (IMB-1222-WV)



## SPECIFICATIONS

Form Factor	IMB-1222	IMB-1222-WV
Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1-in)	
Processor System		
CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W <small>*The performance of CPUs over 80W will be limited due to power design.</small>	
Chipset	Intel® Q470E	
Socket	LGA1200	
BIOS	AMI SPI 256 Mbit	
Memory		
Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz	
Capacity	64GB (32 GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	
Graphics		
Controller	Intel® UHD Graphics	
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz	
DisplayPort	DisplayPort 1.2 , DP++ Max resolution up to 4096x2160@60Hz	
VGA	N/A	
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz	
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz	
DVI	N/A	
MultiDisplay	Triple Display	
Expansion Slot		
PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)	
PCI	N/A	
mini-PCIe	N/A	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G	
SIM Socket	N/A (BOM option support)	1x SIM socket connected to M.2 key B
Audio		
Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out,Mic-in	
Ethernet		
Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro	
Connector	2 x RJ-45	

Rear I/O	IMB-1222	IMB-1222-WV
HDMI	1 x HDMI 2.0a	
DisplayPort	2 x DP1.2	
VGA	N/A	
DVI	N/A	
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN	
USB	4 x USB 3.2 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	N/A	
PS2	N/A	

## Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 4 x USB 2.0 (2 x 2.54 pitch header)
COM	COM1,2 (RS-232/422/485), COM3,4 (RS-232 only)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM 2.0 onboard
LVDS	1, switch by BIOS default LVDS
eDP	1, switch by BIOS default LVDS
VGA	N/A
SATA PWR Output	1
Thunderbolt header	1
Speaker Header	1

## Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 or SATA3
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

## Watchdog Timer

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

## Power Requirements

Input PWR	12V DC in with 4 pin plug PWR cable or DC Jack	12V~28V
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready	

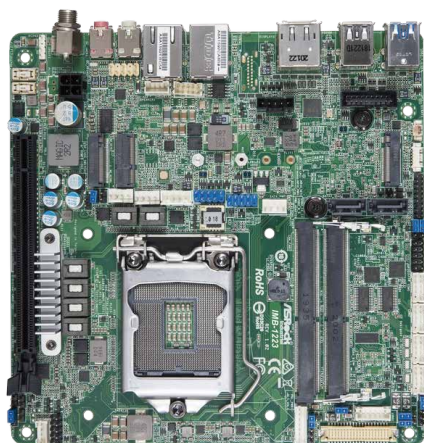
## Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1223/ IMB-1223-WV

Mini-ITX Motherboard



## KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with H420E chipset
- 2 x 260-pin SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- 1 x PCIe x16 Gen3, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 4 x COM, 2 x SATA3
- 1 x Intel 2.5 Gigabit LAN, 1 x Intel 1 Gigabit LAN
- Support Dual display, 1 x DP1.2, 1 x LVDS or eDP, 1 x HDMI 2.0a , 1 x VGA(Header)
- 12V (IMB-1223)
- 12V~28V DC in (IMB-1223-WV)

## SPECIFICATIONS

Form Factor	IMB-1223	IMB-1223-WV
Dimensions	Mini-ITX (6.7-in x 6.7-in)	

### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W <small>*The performance of CPUs over 80W will be limited due to power design.</small>	
Chipset	Intel® H420E	
Socket	LGA1200	
BIOS	AMI SPI 256 Mbit	

### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz	
Capacity	64GB (32 GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	

### Graphics

Controller	Intel® UHD Graphics	
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz	
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz	
DVI	N/A	
MultiDisplay	Dual Display	

### Expansion Slot

PCIe	1 x PCIe x16 (Gen3)	
PCI	N/A	
mini-PCIe	N/A	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G	
SIM Socket	N/A (BOM Option support)	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out, Mic-in
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### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

Rear I/O	IMB-1223	IMB-1223-WV
HDMI	1 x HDMI 2.0a	
DisplayPort	1 x DP1.2	
VGA	N/A	
DVI	N/A	
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN	
USB	2 x USB 3.2 (Gen1), 2 x USB2.0	
Audio	2 (Mic-in, Line-out)	
COM	N/A	
PS2	N/A	

### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 2 x USB 2.0 (1 x 2.54 pitch header)
COM	4, COM1,2 (support RS-232/422/485), COM3,4 (support RS-232 only)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM Header
LVDS	1, switch by BIOS default LVDS
eDP	1, switch by BIOS default LVDS
VGA	1
SATA PWR Output	1
Thunderbolt header	1
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x2 and SATA3 for SSD
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC in with 4 pin plug PWR cable or DC Jack	12V~28V
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready	

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1225

## Mini-ITX Motherboard



### KEY FEATURES

- Intel® 10th Gen (Comet lake-S) Core™ Processors with H410 chipset
- 2 x 260-pin SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU)/ 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- 1 x PCIe x16 Gen3, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 6 x COM, 4 x SATA3
- 2 x Intel 1 Gigabit LAN
- Support Dual display, 1 x DP1.4, 1 x VGA, 1 x HDMI 1.4, 1 x LVDS
- ATX-PWR (24+4-pin)

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in)
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#### Processor System

CPU	Intel® 10th Gen (Cometlake-S) Core™ Processors, up to 65W *The performance of CPUs over 65W will be limited due to power design.
Chipset	Intel® H410
Socket	LGA1200
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SODIMM

#### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 1.4 Max resolution up to 4096x2160 @30Hz
DisplayPort	DisplayPort 1.4, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Dual Display

#### Expansion Slot

PCIe	1 x PCIe x16 (Gen3)
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless
SIM Socket	N/A

#### Audio

Interface	Realtek ALC897 HD, High Definition Audio. Line-out, Mic-in.
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#### Ethernet

Controller/ Speed	LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Intel® I210 with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	1x DP 1.4
VGA	1
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB2.0, 2 x USB 3.2 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	COM1,2 (support RS-232/422/485), COM3(support RS-232 only)
PS2	N/A

#### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 2 x USB 2.0 (1 x 2.54 pitch header)
COM	3 x COM (RS-232)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	N/A
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4
mSATA	N/A
SATA	4 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX PWR 4pin+24 Pin
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# IMB-X1220-L

Mini-ITX Motherboard

## KEY FEATURES

- Intel® Xeon® W-1200 series & Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with W480E chipset
- 2 x 260-pin ECC/non-ECC SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- support ECC SO DIMM memory modules
- 1 x PCIe x16 Gen3, 6 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 5 x COM, 4 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x LVDS, 1 x HDMI 2.0a
- TPM 2.0 onboard
- Special Feature: Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+4-pin)



## SPECIFICATIONS

### Form Factor

Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1.5-in)
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### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W <small>*The performance of CPUs over 80W will be limited due to power design.</small>
Chipset	Intel® W480E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz, (ECC memory supported by CPU) - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)
PCI	N/A
Mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out/Mic-in
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### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2
VGA	1
DVI	N/A
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	2 x COM(RS-232/422/485)
PS2	N/A

### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 4 x USB 2.0 (2 x 2.54 pitch header)
COM	3 x COM (RS-232)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM 2.0 onboard
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	1
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 or SATA3
mSATA	N/A
SATA	4 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR 4pin+24 Pin
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

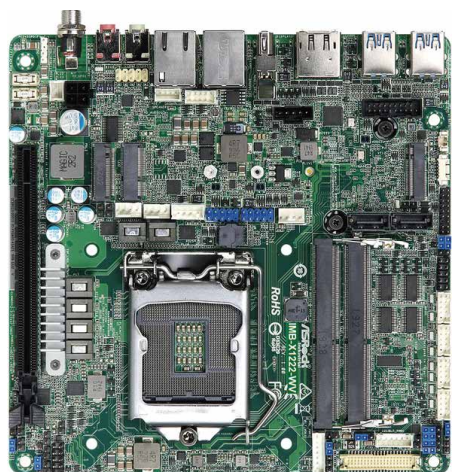
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



## IMB-X1222-WV

Mini-ITX Motherboard



## KEY FEATURES

- Intel® Xeon® W-1200 series & Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with W480E chipset
- 2 x 260-pin ECC/non-ECC SO-DIMM Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- support ECC SO DIMM memory modules
- 1 x PCIe x16 Gen3, 6 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 4 x COM, 2 x SATA3
- 1 x Intel 2.5 Gigabit LAN, 1 x Intel 1 Gigabit LAN
- Support Triple display, 2 x DP1.2, 1 x LVDS or eDP, 1 x HDMI 2.0a
- TPM 2.0 onboard
- Special Feature: Supports Intel® vPro, AMT, RAID 0/1/5/10
- 12V~28V DC in

## SPECIFICATIONS

## Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in x 1.0-in)
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## Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 80W <small>*The performance of CPUs over 80W will be limited due to power design.</small>
Chipset	Intel® W480E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

## Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz, (ECC memory supported by CPU) - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

## Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A
MultiDisplay	Triple Display

## Expansion Slot

PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

## Audio

Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-out, Mic-in
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## Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

## Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	2 x DP1.2
VGA	N/A
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	N/A
PS2	N/A

## Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 4 x USB 2.0 (2 x 2.54 pitch header)
COM	4, COM1,2 (support RS-232/422/485), COM3,4 (support RS-232 only)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM 2.0 onboard
LVDS	1, switch by BIOS default LVDS
eDP	1, switch by BIOS default LVDS
VGA	N/A
SATA PWR Output	1
Thunderbolt header	1
Speaker Header	1

## Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 or SATA3
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

## Watchdog Timer

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

## Power Requirements

Input PWR	12V~28V DC-in with 4 pin plug PWR cable or DC Jack (Screw type)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

## Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1216

## Mini-ITX Motherboard



### KEY FEATURES

- Intel® 8<sup>th</sup> Gen (Whiskey Lake-U) Core™ MCP Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400MHz (16GB per DIMM)
- 5 x USB 3.2 Gen1, 3 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key B, 1 x M.2 Key M, 6 x COM, 2 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 2.0a, 1 x DP 1.2 or VGA, 1 x LVDS or eDP
- TPM Header (IMB-1216V)
- TPM 2.0 onboard IC, supports Intel® vPro, AMT (IMB-1216M/IMB-1216P)
- Supports Intel® RAID 0/1
- 12V~28V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in)
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#### Processor System

CPU	Intel® 8 <sup>th</sup> Gen (Whiskey Lake-U) Core™ MCP Processors IMB-1216V (i3-8145UE, DC, 2.2GHz, 15W) IMB-1216M (i5-8365UE, QC, 1.6GHz, 15W) IMB-1216P (i7-8665UE, QC, 1.7GHz, 15W)
Chipset	MCP
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 11/12
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042) with PCIe x1, USB 3.0 and UIM for 4G
SIM Socket	1 x Socket connected to M.2 Key_B

#### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in
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#### Ethernet

Controller/ Speed	IMB-1216V LAN1: 1 x Intel I219V with 10/100/1000 Mbps LAN2: 1 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps IMB-1216M/IMB-1216P LAN1: 1 x Intel I219LM with 10/100/1000 Mbps, supports AMT/vPro LAN2: 1 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP 1.2 (shared with internal VGA, by BIOS setting)
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.2 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	N/A
PS2	N/A

#### Internal Connector

USB	1 x USB 3.2 (Gen1) (1 x Type-A vertical con) 3 x USB 2.0 (2 x 2.54 pitch header)
COM	COM1, 2(RS232/422/485), COM3, 4, 5, 6 (RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO (shared with LPT header)
TPM	IMB-1216V: TPM Header IMB-1216M/IMB-1216P: TPM 2.0 IC onboard
LVDS	1 (shared with eDP, by BIOS setting)
eDP	1 (shared with LVDS, by BIOS setting)
VGA	1 x Header (shared with DP port, by BIOS setting)
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V~28V DC-In with 4-pin plug PWR cable or DC Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



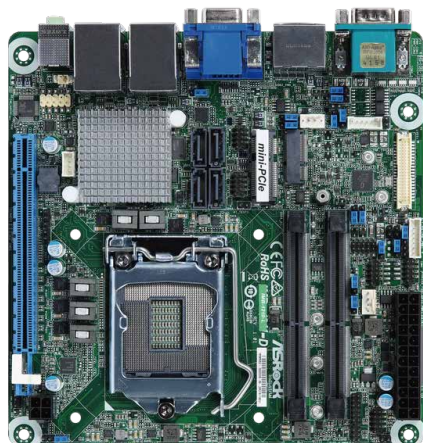


## IMB-1210-L/ IMB-1210-D

Mini-ITX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with H310 chipset
- 2 x 260-pin SO-DIMM up to 64GB\* DDR4 2666MHz
- 1 x PCIe x16 (Gen3), 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x mini-PCIe, 1 x M.2 Key E, 1 x M.2 Key M, 4 x COM, 4 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports dual display, 2 x DP 1.2, 1 x VGA, 1 x LVDS (IMB-1210-L)
- Supports dual display, 3 x DP 1.2, 1 x eDP (IMB-1210-D)
- TPM header
- ATX PWR



IMB-1210-L



IMB-1210-D

## SPECIFICATIONS

Form Factor	IMB-1210-L	IMB-1210-D
Dimensions	Mini-ITX (6.7-in x 6.7-in)	
Processor System		
CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 65W *The Performance of CPUs over 65W will be limited due to power design.	
Chipset	Intel® H310	
Socket	LGA1151	
BIOS	AMI SPI 128 Mbit	
Memory		
Technology	Dual Channel DDR4 2666 MHz	
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	
Graphics		
Controller	Coffee Lake integrated graphics	
HDMI	N/A	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	N/A
eDP	N/A	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A	
MultiDisplay	Dual Display	
Expansion Slot		
PCIe	1 x PCIe x16 (Gen3)	
PCI	N/A	
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless	
SIM Socket	N/A	
Audio		
Interface	Realtek ALC887/897, High Definition Audio. Line-out,Mic-in	
Ethernet		
Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219V with 10/100/1000 Mbps	
Connector	2 x RJ-45	

Rear I/O	IMB-1210-L	IMB-1210-D
HDMI	N/A	
DisplayPort	2 x DP 1.2	3 x DP 1.2
VGA	1	N/A
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	COM3(RS-232/422/485) COM4(RS-232)	
PS2	N/A	
Internal Connector		
USB	4 x USB 2.0 (2 x 2.00pitch header)	
COM	COM1, 2(RS232)	
Parallel	N/A	
GPIO	4 x GPI, 4 x GPO	
TPM	TPM Header	
LVDS	1	N/A
eDP	N/A	1
VGA	N/A	
SATA PWR Output	N/A	
Speaker Header	1	
Storage		
M.2	1 x M.2 (Key M, 2242/2260/2280) with shared SATA3 for SSD	
mSATA	N/A	
SATA	4 x SATA3 (6Gb/s), SATA3_1 shared with M.2 Key M	
eMMC	N/A	

## Watchdog Timer

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

## Power Requirements

Input PWR	ATX PWR (24+4-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

## Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

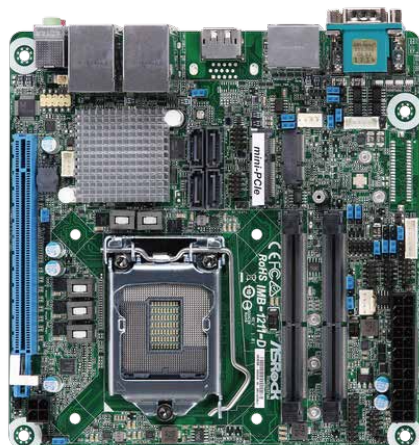


# IMB-1211-L/ IMB-1211-D

Mini-ITX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset
- 2 x 260-pin SO-DIMM up to 64GB\* DDR4 2666MHz
- 1 x PCIe x16 (Gen3), 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x mini-PCle, 1 x M.2 Key E, 1 x M.2 Key M, 5 x COM, 4 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 2 x DP 1.2, 1 x VGA, 1 x LVDS (IMB-1211-L)
- Supports triple display, 3 x DP 1.2, 1 x eDP (IMB-1211-D)
- TPM 2.0 onboard IC
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX PWR



IMB-1211-L



IMB-1211-D

## SPECIFICATIONS

Form Factor	IMB-1211-L	IMB-1211-D
Dimensions	Mini-ITX (6.7-in x 6.7-in)	

### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 65W *The Performance of CPUs over 65W will be limited due to power design.	
Chipset	Intel® Q370	
Socket	LGA1151	
BIOS	AMI SPI 128 Mbit	

### Memory

Technology	Dual Channel DDR4 2666 MHz	
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	

### Graphics

Controller	Coffee Lake integrated graphics	
HDMI	N/A	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	N/A
eDP	N/A	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A	
MultiDisplay	Triple Display	

### Expansion Slot

PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)
PCI	N/A
mini-PCle	1 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC887/897, High Definition Audio. Line-out, Mic-in
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### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	2 x RJ-45

Rear I/O	IMB-1211-L	IMB-1211-D
HDMI	N/A	
DisplayPort	2 x DP 1.2	3 x DP 1.2
VGA	1	N/A
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	COM3, 4(RS-232/422/485)	
PS2	N/A	

### Internal Connector

USB	4 x USB 2.0 (2 x 2.00 pitch header)	
COM	COM1, 2, 5(RS232)	
Parallel	N/A	
GPIO	4 x GPI, 4 x GPO	
TPM	TPM 2.0 onboard IC	
LVDS	1	N/A
eDP	N/A	1
VGA	N/A	
SATA PWR Output	N/A	
Speaker Header	1	

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD
mSATA	N/A
SATA	4 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+4-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

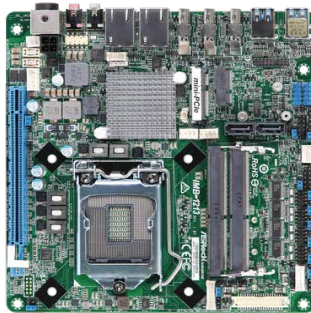


## IMB-1212/ IMB-1213

## Mini-ITX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with H310 chipset (IMB-1212)
- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset (IMB-1213)
- 2 x 260-pin SO-DIMM up to 64GB\* DDR4 2666MHz
- 1 x PCIe x16 (Gen3), 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x mini-PCIe, 1 x M.2 Key E, 1 x M.2 Key M, 4 x COM, 2 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports dual display, 2 x DP 1.2, 1 x VGA, 1 x LVDS or eDP (IMB-1212)
- Supports triple display, 3 x DP 1.2, 1 x LVDS or eDP (IMB-1213)
- TPM header (IMB-1212)
- TPM 2.0 onboard IC, supports Intel® vPro, AMT, RAID 0/1 (IMB-1213)
- 12V/19~28V DC-In



IMB-1212

IMB-1213

## SPECIFICATIONS

Form Factor	IMB-1212	IMB-1213
Dimensions	Mini-ITX (6.7-in x 6.7-in)	

## Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 65W *The Performance of CPUs over 65W will be limited due to power design.	
Chipset	Intel® H310	Intel® Q370
Socket	LGA1151	
BIOS	AMI SPI 128 Mbit	

## Memory

Technology	Dual Channel DDR4 2666 MHz	
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	

## Graphics

Controller	Coffee Lake integrated graphics	
HDMI	N/A	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz	
DVI	N/A	
MultiDisplay	Dual Display	Triple Display

## Expansion Slot

PCIe	1 x PCIe x16 (Gen3)	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)
PCI	N/A	
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless	

## Audio

Interface	Realtek ALC887/897, High Definition Audio. Line-out, Mic-in	
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## Ethernet

Controller/ Speed	LAN1: 1 x Intel® I219V with 10/100/1000 Mbps	LAN1: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
	LAN2: 1 x Intel® I210 with 10/100/1000 Mbps	
Connector	2 x RJ-45	

Rear I/O	IMB-1212	IMB-1213
HDMI	N/A	
DisplayPort	2 x DP 1.2	3 x DP 1.2
VGA	N/A	
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	N/A	
PS2	N/A	

## Internal Connector

USB	4 x USB 2.0 (2 x 2.54 pitch header)	
COM	COM3, 4(RS232/422/485) COM1, 2(RS232)	
Parallel	N/A	
GPIO	4 x GPI, 4 x GPO	
TPM	TPM Header	TPM 2.0 onboard IC
LVDS	1 (shared with eDP, by jumper setting)	
eDP	1 (shared with LVDS, by jumper setting)	
VGA	1	N/A
SATA PWR Output	1	
Speaker Header	1	

## Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 for SSD	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD
mSATA	N/A	
SATA	2 x SATA3 (6Gb/s)	
RAID	N/A	Intel® SATA RAID 0/1

## Watchdog Timer

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

## Power Requirements

Input PWR	12V or 19~28V DC-In with 4-pin plug PWR cable or 4-pin DC Jack	
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready	

## Environment

Operating Temp	0°C ~ 60°C	
Storage Temp	-40°C ~ 85°C	
Operating Humidity	5% ~ 90%	
Storage Humidity	5% ~ 90%	

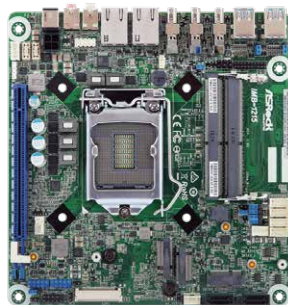


# IMB-1214/ IMB-1215

## Mini-ITX Motherboard

### KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with H310 chipset (IMB-1214)
- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset (IMB-1215)
- 2 x 260-pin SO-DIMM up to 64GB\* DDR4 2666MHz
- 1 x PCIe x16 (Gen3), 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 2 x M.2 Key M, 4 x COM, 2 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Realtek 1 Gigabit LAN
- Supports dual display, 2 x DP 1.2, 1 x eDP (IMB-1214)
- Supports triple display, 3 x DP 1.2, 1 x eDP (IMB-1215)
- TPM header (IMB-1214)
- TPM 2.0 onboard IC (IMB-1215)
- Supports Intel® vPro, AMT, RAID 0/1 (IMB-1215)
- 19V DC-In



IMB-1214



IMB-1215

### SPECIFICATIONS

Form Factor	IMB-1214	IMB-1215
Dimensions	Mini-ITX (6.7-in x 6.7-in)	

#### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 65W *The Performance of CPUs over 65W will be limited due to power design.	
Chipset	Intel® H310	Intel® Q370
Socket	LGA1151	
BIOS	AMI SPI 128 Mbit	

#### Memory

Technology	Dual Channel DDR4 2666 MHz	
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	

#### Graphics

Controller	Coffee Lake integrated graphics	
HDMI	N/A	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz	
VGA	N/A	
LVDS	N/A	
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz	
DVI	N/A	
MultiDisplay	Dual Display	Triple Display

#### Expansion Slot

PCIe	1 x PCIe x16 (Gen3)	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4)
PCI	N/A	
mini-PCIe	N/A	
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless	

#### Audio

Interface	Realtek ALC887/897, High Definition Audio. Line-out, Mic-in	
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#### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I219V with 10/100/1000 Mbps	LAN1: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	LAN2: 1 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps 2 x RJ-45	

Rear I/O	IMB-1214	IMB-1215
HDMI	N/A	
DisplayPort	2 x DP 1.2	3 x DP 1.2
VGA	N/A	
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	2 (Mic-in, Line-out)	
COM	N/A	
PS2	N/A	

#### Internal Connector

USB	4 x USB 2.0 (2 x 2.54 pitch header)	
COM	COM3(RS232/422/485) COM1, 2, 4(RS232)	
Parallel	N/A	
GPIO	N/A	
TPM	TPM Header	TPM 2.0 onboard IC
LVDS	N/A	
eDP	1	
VGA	N/A	
SATA PWR Output	1	
Speaker Header	1	

#### Storage

M.2	1 x M.2 (Key M, 2242/2260) with PCIe x1 for SSD 1 x M.2 (Key M, 2242/2280) with SATA3 for SSD	1 x M.2 (Key M, 2242/2280) with PCIe x4 and SATA3 for SSD
mSATA	N/A	
SATA	2 x SATA3 (6Gb/s)	
RAID	N/A	Intel® SATA RAID 0/1

#### Watchdog Timer

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

#### Power Requirements

Input PWR	19V DC-In with 4-pin plug PWR cable or DC Jack	
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready	

#### Environment

Operating Temp	0°C ~ 60°C	
Storage Temp	-40°C ~ 85°C	
Operating Humidity	5% ~ 90%	
Storage Humidity	5% ~ 90%	





# IMB-156

## Mini-ITX Motherboard

### KEY FEATURES

- Intel® Apollo Lake SoC Processor
- 2 x 204-pin SO-DIMM up to 16GB DDR3L 1866 MHz (8GB per DIMM)
- 1 x PCIe x1 (Gen2), 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x mini-PCIe, 1 x M.2 Key M, 1 x M.2 Key E, 6 x COM, 1 x SATA3
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4b, 1 x VGA, 1 x LVDS
- TPM header
- 12V or +19V~+24V DC-In/ ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in x 1.5-in)
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#### Processor System

CPU	Intel® Apollo Lake SoC Processor IMB-156M (E3940, QC, 1.6 GHz, 9.5 W) IMB-156J (J3455, QC, 1.5 GHz, 10 W) IMB-156D (N4200, QC, 1.1 GHz, 6 W) IMB-156L (N3350, DC, 1.1 GHz, 6 W)
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	16 GB (8 GB per DIMM)
Socket	2 x 204-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096 x 2160@24Hz
DisplayPort	N/A
VGA	Max resolution up to 1920 x 1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	1 x PCIe x1 (Gen2)
PCI	N/A
mini-PCIe	1 x Full size with PCIe x1 and shared USB 2.0
M.2	1 x Key E (2230) with PCIe x1 and shared USB 2.0 for Wireless

#### Audio

Interface	Realtek ALC887/ALC897, High Definition Audio. Line-out, Mic-in
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#### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 1.4b
DisplayPort	N/A
VGA	1
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.1 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	3 x COM(RS-232/422/485)
PS2	1 x PS/2 combo

#### Internal Connector

USB	4 x USB 2.0 (2 x 2.54 pitch header)
COM	3 x COM (RS232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO (shared with LPT header)
TPM	TPM Header
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x Key M (2242/2260) with SATA3 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V or +19V~+24V DC-In/ ATX PWR
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-157

Mini-ITX Motherboard



## KEY FEATURES

- Intel® Apollo Lake SoC Processor
  - IMB-157D (N4200)
  - IMB-157D-WF (N4200)
  - IMB-157L (N3350)
  - IMB-157J (J3455)
- Supports Dual Channel DDR3L SO-DIMM 1867, up to 8GB
- 1 x VGA, 1 x HDMI, 1 x eDP or LVDS (Jumper Switch)
- 4 x USB 3.0, 4 x USB 2.0, 1 x SATA3, 6 x COM
- 1 x Mini-PCIe, 1 x PCIe x1, 1 x M.2 (KEY E), 1 x M.2 (KEY M)
- 2 x Realtek LAN
- 1 x TPM Header
- +12V or +19V~+24V DC-In (DC Jack / 4-pin DC-in PWR Con)

## SPECIFICATIONS

### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in x 1.5-in)
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### Processor System

CPU	Intel® Apollo Lake SoC Processor -IMB-157D /IMB-157D-WF (N4200, QC, 1.10 GHz, 6 W) -IMB-157L (N3350, DC, 1.10 GHz, 6 W) -IMB-157J (J3455, QC, 1.50 GHz, 10 W)
Chipset	SoC N/A

### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	8GB
Socket	2 x SO-DIMM

### Graphics

Controller	Intel® HD Graphics
VGA	Supports max resolution up to 1920 x 1200
LVDS	Supports max resolution up to 1920 x 1200@60Hz
eDP	Supports max resolution up to 4096 x 2160@60Hz
HDMI	Supports max resolution up to 4096 x 2160@24Hz
DVI	N/A
DisplayPort	N/A
Multi Display	Triple Display

### Expansion Slot

PCIe	1 x PCIe x1
Mini-PCIe	1 x full/half size with PCIe x1 and shared USB2.0
M.2	1 x M.2 (KEY E, 2230) with PCIe x1 and shared USB2.0 for Wireless
mSATA	N/A

### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in
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### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

### Rear I/O

VGA	1
DVI	N/A
HDMI	1
DisplayPort	N/A
Ethernet	2
USB	4 x USB 3.0
Audio Jack	2 (Mic-in, Line-out)
Serial	N/A
PS/2	N/A

### Internal Connector

USB	4 x USB 2.0
LVDS	1
eDP	1
VGA	1
Serial	4 x COM (RS-232), 2 x COM (RS-232/422/485)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI + 8 x GPO (shared with LPT header)
SATA PWR Output Con	1
Speaker Header	1
TPM	1 x Header

### Storage

M.2	1 x M.2 (KEY M, 2242/2260) with SATA3 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	+12V or +19V~+24V DC-In (DC Jack / 4-pin DC-in PWR Con)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

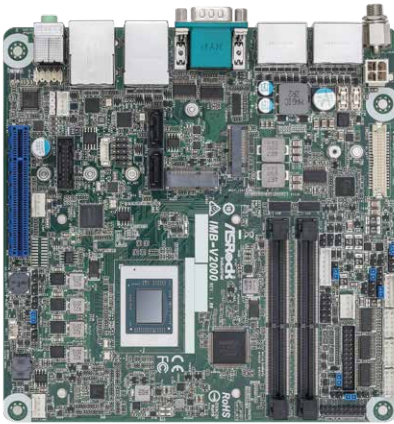
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-V2000

## Mini-ITX Motherboard



### KEY FEATURES

- AMD Ryzen™ Embedded V2000 SoC processors
- 2 x 260-pin ECC/non-ECC SO-DIMM DDR4 3200 MHz, up to 64GB (32GB per DIMM)
- 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 1 x PCIe x8, 5 x COM, 2 x SATA3
- 1 x Realtek 1 Gigabit LAN (Support DASH), 1 x Realtek 2.5 Gigabit LAN
- Support Quad display, 1 x LVDS, 1 x eDP, 3 x DP1.2, 1 x DP1.4
- TPM header
- Support DASH, Teaming function
- 12~28V DC-In (Lockable DC Jack)/ ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1.5-in)
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#### Processor System

CPU	AMD Ryzen™ Embedded V2000 SoC processors, up to 54W IMB-V2000P(V2748, 2.9GHz, 35-54W) IMB-V2000S(V2546, 3.0GHz, 35-54W) IMB-V2000M(V2718, 1.7GHz, 10-25W) IMB-V2000V(V2516, 2.1GHz, 10-25W)
Chipset	SoC
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel ECC/non-ECC DDR4 3200 MHz
Capacity	64GB (32GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ Vega 7 Graphics
DisplayPort	3 x DP1.2a, Max resolution up to 3840x2160 @60Hz 1 x DP1.4, Max resolution up to 5120x2880 @120Hz
LVDS	LVDS shared with DP_1 Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP shared with DP_0 Max resolution up to 3840x2160 @60Hz
MultiDisplay	Quad display

#### Expansion Slot

PCIe	1 x PCIe x8
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x2/USB 3.2 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC897 HD , High Definition Audio. Mic-In / Line-Out
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#### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN2: Realtek R8111EPV with 10/100/1000 Mbps Support DASH, Teaming function
Connector	2 x RJ-45

#### Rear I/O

DisplayPort	3 x DP1.2, 1 x DP1.4
COM	1 x COM (RS-232) 1 x COM (RS-232/422/485)
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 (Gen1), 2 x USB2.0
Audio	2 (Mic-in, Line-out)
DC Jack	1 (Screw Type)

#### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 2 x USB 2.0 (1 x 2.54 pitch header)
COM	3 x COM (RS-232)
GPIO	8 x GPI, 8 x GPO
TPM	TPM 2.0 header
LVDS	1
eDP	1
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12~28V DC-In with 4-pin wafer PWR cable or DC Jack (Screw Type)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-A1001

## Mini-ITX Motherboard

# Coming Soon

### KEY FEATURES

- AMD Ryzen 7<sup>th</sup>/5<sup>th</sup>/3<sup>th</sup> Gen (Renoir/Picasso/Raven Ridge/) Core™ Processors with A300 chipset
- 2 x 260-pin ECC/non-ECC SO-DIMM DDR4 3200 MHz, up to 32GB (16GB per DIMM)
- 4 x USB 3.2 Gen1, 6 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 1 x PCIe x16 Gen4, 2 x COM, 2 x SATA3
- 1 x Realtek 1 Gigabit LAN, 1 x Realtek 2.5 Gigabit LAN (DASH)
- Support triple display, 1 x eDP, 3 x DP1.2
- TPM 2.0 onboard
- Support DASH, Teaming function
- ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions(LxWxH)	Mini-ITX (6.7-in x 6.7-in x 1.5-in)
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#### Processor System

CPU	AMD Ryzen 7 <sup>th</sup> /5 <sup>th</sup> /3 <sup>th</sup> Gen (Renoir/Picasso/Raven Ridge/) Core™ Processors
Chipset	AMD A300
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel ECC/non-ECC DDR4 3200 MHz
Capacity	32GB (16GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ Vega Series Graphics in Ryzen Series APU AMD Radeon™ R-Series Graphics in A-series APU
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2160 60Hz
MultiDisplay	Triple display

#### Expansion Slot

PCIe	1 x PCIe x16 (Gen4)
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wifi/Bluetooth 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.2/USB2.0/SATA and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC897 HD, High Definition Audio. Mic-In / Line-Out
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#### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN2: Realtek R8111EPV with 10/100/1000 Mbps Support DASH, Teaming function
Connector	2 x RJ-45

#### Rear I/O

DisplayPort	3 x DP1.2++
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 (Gen1), 4 x USB2.0
Audio	2 (Mic-in, Line-out)

#### Internal Connector

USB	2x USB 3.2 (Gen1) 2 x USB 2.0 (1x2.54 pitch header)
COM	1 x COM (RS-232) 1 x COM (RS-232/422/485)
GPIO	8 x GPI, 8 x GPO
TPM	TPM 2.0 onboard
eDP	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 for SSD
SATA	2 x SATA3 (6Gb/s) SATA3_1 shared with M.2 Key B

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# IMB-A1000

## Mini-ITX Motherboard



### KEY FEATURES

- AMD Ryzen 7<sup>th</sup>/5<sup>th</sup>/3<sup>th</sup> Gen (Raven Ridge/Matisse) Core™ Processors with B450 chipset
- 2 x 204-pin SO-DIMM up to 32GB DDR4 3200 MHz (16GB per DIMM)
- 1 x PCIe x16 (Gen3), 4x USB 3.1 Gen2, 4 x USB 3.1 Gen1, 4 x USB 2.0 with Matisse CPU
- 1 x PCIe x16 (Gen3), 8 x USB 3.1 Gen1, 4 x USB 2.0 with Raven Ridge CPU
- 2 x M.2 Key M, 1 x M.2 Key E, 1 x M.2 Key B, 2 x COM, 3 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 3 x DP++ 1.2, 1 x eDP
- TPM 2.0 onboard IC
- Support RAID 0/1
- ATX PWR (24+8-pin)

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-ITX (6.7-in x 6.7-in)
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#### Processor System

CPU	AMD Ryzen 7 <sup>th</sup> /5 <sup>th</sup> /3 <sup>th</sup> Gen (Raven Ridge/Matisse) Core™ Processors Ryzen 7 <sup>th</sup> :Matisse (3700X, 8cores, 3.6GHz, 65W) Ryzen 5 <sup>th</sup> :Raven Ridge (2400G, QC, 3.6GHz, 65W); Matisse (3600, 6cores, 3.6GHz, 65W) Ryzen 3 <sup>th</sup> :Raven Ridge (2200G, QC, 3.5GHz, 65W)
Chipset	AMD Promontory B450
Socket	AM4
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 204-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ HD Vega DirectX 12
HDMI	N/A
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	N/A
eDP	eDP 1.4 (share with DisplayPort) Max resolution up to 4096x2160@60Hz
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	1 x PCIe x16 (PCIe Gen3 x8 for Raven Ridge) 1 x PCIe x16 (PCIe Gen3 x16 for Matisse)
PCI	N/A
mini-PCIe	N/A
M.2	1 x Key B (3042) with PCIe, USB 2.0 and SIM Socket for 4G 1 x Key E (2230) with PCIe x1 and USB 2.0 for Wireless
SIM Socket	1 x Socket connected to M.2 Key_B

#### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in
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#### Ethernet

Controller/ Speed	2 x Intel® I210AT with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	N/A
DisplayPort	3x DP 1.2++
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	Matisse: 4 x USB 3.1 (Gen2), 2 x USB 3.1 (Gen1) Raven Ridge: 6 x USB 3.1 (Gen1)
Audio	2 (Mic-in, Line-out)
COM	N/A
PS2	N/A

#### Internal Connector

USB	2 x USB 3.1 Gen1 (1 x USB 3.1 header) 4 x USB 2.0 (2 x 2.54 pitch header)
COM	2 x COM (RS232/422/485)
Parallel	N/A
GPIO	N/A
TPM	TPM 2.0 onboard IC
LVDS	N/A
eDP	1 (share with DisplayPort)
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x Key M (2242/2260/2280) with PCIe x4 and SATA3 for SSD 1 x Key M (2242/2280) with PCIe x1 for SSD
mSATA	N/A
SATA	3 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
RAID	SATA RAID 0/1
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-R1000/ IMB-V1000

Mini-ITX Motherboard



IMB-R1000

IMB-V1000

## KEY FEATURES

- AMD Ryzen™ Embedded R1000 SoC processors (IMB-R1000)
- AMD Ryzen™ Embedded V1000 SoC processors (IMB-V1000)
- 2 x 260-pin SO-DIMM up to 32GB DDR4 3200 MHz (16GB per DIMM)
- 1 x PCIe x4 (Gen3) (IMB-R1000), 1 x PCIe x8 (Gen3) (IMB-V1000),  
2 x USB 3.2 Gen2, 7 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E,  
1 x mini-PCIe, 6 x COM, 2 x SATA3
- 2 x Realtek Gigabit LAN
- Supports Triple display, 3 x DisplayPort 1.2a (IMB-R1000)
- Supports Quad display, 4 x DisplayPort 1.2a (IMB-V1000)
- TPM 2.0 onboard IC
- 12V/19~28V DC-In/ ATX PWR (4-pin)

## SPECIFICATIONS

Form Factor	IMB-R1000	IMB-V1000
Dimensions	Mini-ITX (6.7-in x 6.7-in)	

### Processor System

CPU	AMD Ryzen™ Embedded R1000 SoC processors IMB-R1000M (R1606G, DC, 2.6GHz, 12-25W) IMB-R1000V (R1505G, DC, 2.4GHz, 12-25W)	AMD Ryzen™ Embedded V1000 SoC processors IMB-V1000P (V1807B, QC, 3.35GHz, 35-54W) IMB-V1000M (V1605B, QC, 2GHz, 12-25W) IMB-V1000V (V1202B, DC, 2.3GHz, 12-25W)
Chipset	SoC	
Socket	N/A	
BIOS	AMI SPI 64 Mbit	

### Memory

Technology	Dual Channel DDR4 2400 MHz	Dual Channel DDR4 2400 MHz (V1605B/ V1202B) Dual Channel DDR4 3200 MHz (V1807B)
Capacity	32 GB (16 GB per DIMM)	
Socket	2 x 260-pin SO-DIMM	

### Graphics

Controller	AMD Radeon™ Vega 3 Graphics	AMD Radeon™ Vega 11 Graphics (IMB-V1000P) AMD Radeon™ Vega 8 Graphics (IMB-V1000M) AMD Radeon™ Vega 3 Graphics (IMB-V1000V)
HDMI	N/A	
DisplayPort	DisplayPort 1.2a Max resolution up to 3840x2160@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	
LVDS	Dual channel 48 bit up to 1920 x 1200@60Hz	
eDP	eDP 1.3 Max resolution up to 3840x2160@60Hz	
DVI	N/A	
MultiDisplay	Triple Display	Quad Display

### Expansion Slot

PCIe	1 x PCIe x4 (Gen3)	1 x PCIe x8 (Gen3)
PCI	N/A	
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0	
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and shared USB 2.0 for Wireless	
SIM Socket	N/A	

### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in, Line-in
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### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

Rear I/O	IMB-R1000	IMB-V1000
HDMI	N/A	
DisplayPort	3 x DP 1.2a	4 x DP 1.2a
VGA	N/A	
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	2 x USB 3.2 Gen2 2 x USB 2.0	
Audio	2 (Mic-in, Line-out)	
COM	2 x COM (RS-232/422/485)	
PS2	N/A	

### Internal Connector

USB	5 x USB 2.0 (2 x 2.54 pitch header, 1 x USB 2.0 Type-A vertical con)	
COM	4 x COM (RS-232, COM6 shared with ccTalk)	
GPIO	8 x GPI, 8 x GPO (shared with LPT header)	
TPM	TPM 2.0 onboard IC	
LVDS	1(Shared with DP1)	
eDP	1(Shared with DP0)	
VGA	1(Shared with DP3)	
SATA PWR Output	1	
Speaker Header	1	

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA for SSD	1 x M.2 (Key M, 2242/2260/2280) with PCIe x2 and SATA for SSD
mSATA	N/A	
SATA	2 x SATA3 (6.0Gb/s), Red header shared with M.2 Key M SATA signal	
eMMC	N/A	

### Watchdog Timer

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

### Power Requirements

Input PWR	12V or 19~28V DC-In with 4-pin plug PWR cable or DC Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

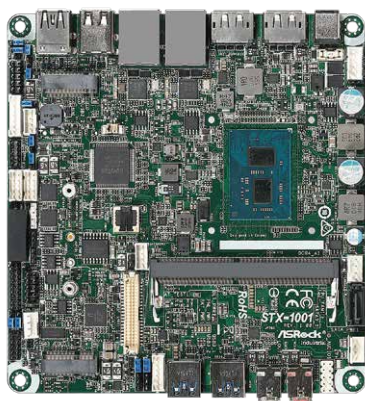
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# STX-1001

## Mini-STX Motherboard



### KEY FEATURES

- Intel® 11th Gen (Elkhart Lake) SoC Processor
- 1 x 260-pin SO-DIMM DDR4 3200 MHz, up to 32GB
- 3 x USB 3.2 Gen1, 5 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 2 x COM, 1 x SATA3
- 2 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x LVDS or eDP, 2 x DP
- TPM Header
- 12~28V DC-In/ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-STX (5.5-in x 5.8-in)
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#### Processor System

CPU	Intel® 11th Gen (Elkhart Lake) SoC Processors, up to 12W
Chipset	SoC
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	32GB
Socket	1 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics
HDMI	N/A
DisplayPort	2 x DisplayPort 1.2, DP++ Max resolution up to 4096 x 2160@60Hz
VGA	N/A
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz (shared with eDP)
eDP	Max resolution up to 4096x2304 60Hz (shared with LVDS)
DVI	N/A
MultiDisplay	Triple display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 1 x M.2 (Key B*, 3042/3052) with PCIe x1/USB 3.0/USB 2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC897 HD , High Definition Audio. Mic-In / Line-Out
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#### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® GPHY211 with 10/100/1000/2500 Mbps
Connector	2 x RJ-45

#### Front I/O

USB	2 x USB 3.2 (Gen1)
HDMI	N/A
Audio	2 (Mic-In, Line-Out)

#### Rear I/O

HDMI	N/A
DisplayPort	2 x DP 1.2
VGA	N/A
DVI	N/A
Ethernet	2 x 2.5 Gigabit LAN
USB	1 x USB 3.2 (Gen1), 3 x USB2.0
DC Jack	1

#### Internal Connector

USB	2 x USB 2.0 (1x2.54 pitch header)
COM	2 x COM (RS-232/422/485)
Parallel	N/A
GPIO	N/A
TPM	TPM Header
LVDS	1 (shared with eDP)
eDP	1 (shared with LVDS)
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2280) with SATA3 and PCIe x2 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	1

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12~28V DC-In with 4-pin wafer PWR cable or DC Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

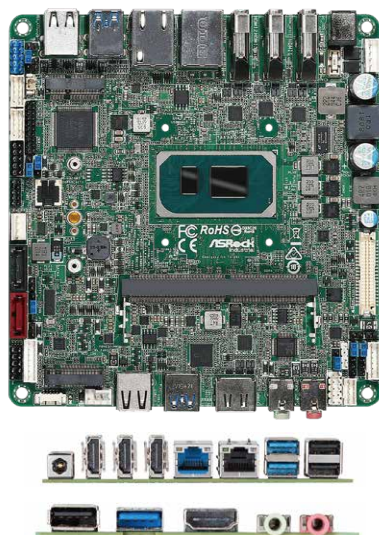
#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# STX-1500

## Mini-STX Motherboard



### KEY FEATURES

- Intel® Tiger Lake-UP3 MCP Processor
- 2 x 260-pin SO-DIMM, Support Dual Channel up to 64GB DDR4 3200 MHz
- 3 x USB 3.2 Gen2, 5 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 2 x COM, 2 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Quadruple display, 1 x LVDS, 1 x eDP1.4, 4 x HDMI 2.0a
- TPM 2.0 onboard
- Supports Intel® vPro, AMT, RAID 0/1
- 12~28V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-STX (5.5-in x 5.8-in)
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#### Processor System

CPU	Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors -STX-1500P (i7-1185G7E, 2.8GHz, 28W) -STX-1500M (i5-1145G7E, 2.6GHz, 28W) -STX-1500V (i3-1115G4E, 3.0GHz, 28W) -STX-1500E (6305E, 1.8GHz, 15W)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3 Processor
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	N/A
VGA	N/A
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A
MultiDisplay	Quadruple display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3052/3042/2280) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC897 HD , High Definition Audio. Mic-In / Line-Out
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#### Ethernet

Controller/ Speed	STX-1500P/STX-1500M: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps STX-1500V: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Front I/O

USB	1 x USB 3.2 Gen2, 1 x USB2.0
HDMI	1 x HDMI 2.0a
Audio	2 (Mic-In, Line-Out)

#### Rear I/O

HDMI	3 x HDMI 2.0a
DisplayPort	N/A
VGA	N/A
DVI	N/A
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 (Gen2), 2 x USB2.0
DC Jack	1

#### Internal Connector

USB	1 x USB 2.0 (1x2.54 pitch header)
COM	1 x COM (RS-232) 1 x COM (RS-232/422/485)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM 2.0 onboard
LVDS	1
eDP	1
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD * Shared with SATA3_0
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12~28V DC-In with 4-pin wafer PWR cable or DC Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

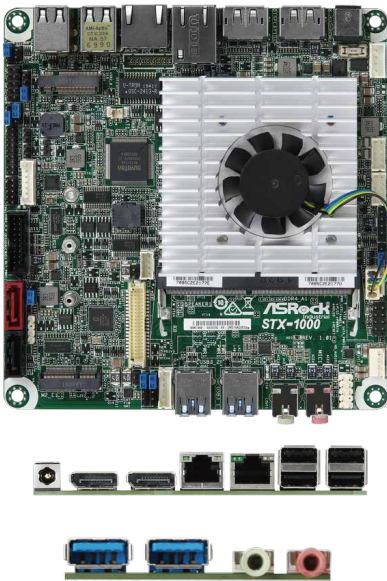
Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# STX-1000

## Mini-STX Motherboard



### KEY FEATURES

- Intel® Gemini Lake Refresh SoC Processor
- 1 x 260-pin SO-DIMM up to 8 GB DDR4 2400 MHz
- 4 x USB 3.1 Gen1, 5 x USB 2.0, 1 x M.2 Key B, 1 x M.2 Key E, 2 x COM, 2 x SATA3
- 1 x Intel Gigabit LAN, 1 x Realtek Gigabit LAN
- Supports triple display, 2 x DP, 1 x eDP or LVDS
- TPM Header
- 9~24V DC-In/ ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions	Mini-STX (5.5-in x 5.8-in x 1.12-in)
------------	--------------------------------------

#### Processor System

CPU	Intel® Gemini Lake Refresh SoC Processor -STX-1000BR (J4025, DC, 2.0 GHz, 10 W) -STX-1000JR (J4125, QC, 2.0 GHz, 10 W) -STX-1000DR (J5040, QC, 2.0 GHz, 10 W)
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Single Channel DDR4 2400 MHz
Capacity	8 GB
Socket	1 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics
HDMI	N/A
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	Dual channel 24 bit up to 1920X1200@60Hz (shared with eDP)
eDP	eDP 1.4 (shared with LVDS) Max resolution up to 4096X2160@60Hz
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, CNVi and USB 2.0 for WiFi+BT
SIM Socket	1 x Socket connected to M.2 Key_B

#### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in
-----------	---

#### Ethernet

Controller/ Speed	LAN1: Intel I210AT with 10/100/1000 Mbps LAN2: Realtek RTL8111G/RTL8111H-CG with 10/100/1000Mbps
Connector	2 x RJ-45

#### Front I/O

USB	2 x USB 3.1 (Gen1)
Audio	2 (Mic-in, Line-out)

#### Rear I/O

HDMI	N/A
DisplayPort	2 x DP 1.2
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 2.0
Audio	N/A
COM	N/A
PS2	N/A
DC Jack	1

#### Internal Connector

USB	2 x USB 3.1 (Gen1) (1 x USB 3.1 header) 1 x USB 2.0 (1 x 2.54 pitch header)
COM	COM3(RS232/422/485) COM2(RS232)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM Header
LVDS	1 (shared with eDP)
eDP	1 (shared with LVDS)
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

mSATA	N/A
M.2	1 x M.2 (Key B, 2242/2260/2280) with PCIe x1, USB 2.0 and SATA3
SATA	2 x SATA3 (6Gb/s), SATA3_2 shared with M.2 Key B
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	9~24V DC-In with 4-pin wafer PWR cable or DC Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

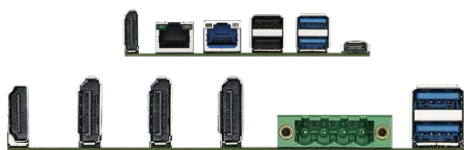
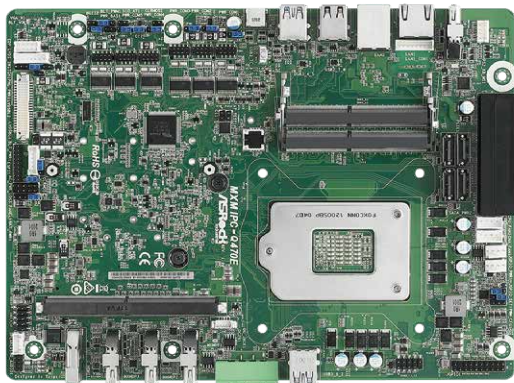
#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# MXM IPC-Q470E

## Micro-STX Motherboard



### KEY FEATURES

- Intel® 10th Gen (Comet lake-S) Core™ Processors with Q470E chipset
- 2 x 260-pin SO-DIMM, Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 64GB
- Supports MXM Graphics Card (Type-A or Type-B , Up to 150W)
- 1 x PCIe x4 Gen3, 1 x mini-PCIe
- 4 x USB 3.2 Gen1, 1 x USB 3.2 Gen1 (Type-C), 4 x USB 2.0, 1 x M.2 Key E, 2 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 4 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Hepta display, 1 x DP 1.2, 1 x VGA, 1 x eDP 1.4 / LVDS (from CPU) and 3 x DP 1.2, 1 x HDMI 2.0a (from MXM)
- TPM 2.0 on Board
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- 18~26V DC-In wide range DC input with lockable connector
- (220W for Quadro P5000, GTX 1050 / 1060 / 1070, 270W for GTX1080)

### SPECIFICATIONS

#### Form Factor

Dimensions	(7.0-in x 9.6-in)
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#### Processor System

CPU	Intel® 10th Gen (Cometlake-S) Core™ Processors, up to 125 W
Chipset	Intel® Q470E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 2933 / 2666 / 2400 MHz - Intel Core i9 / i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5 / i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	64GB (32GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	- CPU integrated graphics to support 1 x DP + 1 x VGA + 1 eDP / LVDS (Gen9 Intel® Graphics, Support for DirectX 11/12, OpenCL 2.0) - Add on MXM Graphic Card (Type B) to support 3 x DP + 1 x HDMI - NVIDIA® Quadro series P5000, NVIDIA® GeForce GTX 1050 / 1060 / 1070 / 1080
HDMI	HDMI 2.0a Max resolution up to 4096 x 2160 @60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096 x 2160 @60Hz
VGA	Max resolution up to 1920 x 1200 @60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200 @60Hz
eDP	eDP 1.4 Max resolution up to 4096 x 2304 @60Hz
DVI	N/A
MultiDisplay	Hepta Display

#### Expansion Slot

PCIe	1 x PCIe x4 Gen3
PCI	N/A
mini-PCIe	1 x Full Size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless and BT 1 x M.2 (Key B, 3042 / 3052) with PCIe x1 / USB 3.0 / USB 2.0 and SIM for 4G / 5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC887 HD, High Definition Audio. Line-In / Line-Out / Mic-In
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#### Ethernet

Controller/ Speed	LAN1: Intel® I219LM, with 10 / 100 / 1000 Mbps, support AMT / vPro LAN2: Intel® I225LM with 10 / 100 / 1000 / 2500 Mbps
Connector	2 x RJ-45

#### Front I/O

Power In	Phoenix Contact
HDMI	1 x HDMI 2.0a from MXM
DisplayPort	3 x DP 1.2 from MXM
USB	2 x USB 3.2 (Gen1)
Audio	N/A

#### Rear I/O

HDMI	N/A
DisplayPort	1 x DP 1.2 from CPU
DVI	N/A
Ethernet	1 x 1 Gigabit LAN 1 x 2.5 Gigabit LAN
USB	2 x USB 2.0 2 x USB 3.2 (Gen1) 1 x USB 3.2 (Gen1) Type-C
Audio	N/A
COM	N/A
PS2	N/A

#### Internal Connector

USB	2 x USB 2.0 (1 x 2.54 pitch header)
COM	4 x COM (RS-232), 2 x COM (RS-232 / 422 / 485)
Parallel	N/A
GPIO	8 x GPI, 8 x GPO
TPM	TPM 2.0 onboard
LVDS	1 (shared with eDP)
eDP	1 (shared with LVDS)
VGA	1
SATA PWR Output	2
Audio Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242 / 2260 / 2280) with SATA3 and PCIe x4 for SSD 1 x M.2 (Key M, 2242 / 2260 / 2280) with SATA3 or PCIe x4 for SSD
mSATA	N/A
SATA	4 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	18~26V DC-In Jack (220W for Quadro P5000, GTX1060/1070, 270W for GTX1080)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

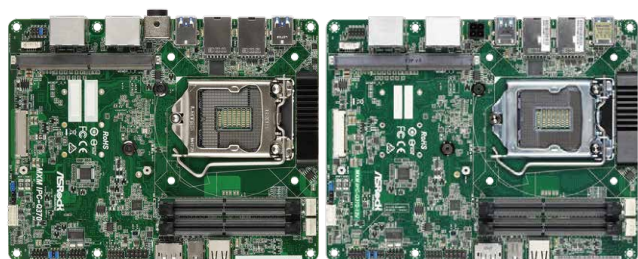


# MXM IPC-Q370/ Q370-12V

Micro-STX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset
- 2 x 260-pin SO-DIMM up to 64GB DDR4 2666 MHz (32GB per DIMM)
- 1 x MXM with PCIe x16 Lanes (Gen3), 4 x USB 3.1 Gen1, 3 x USB 2.0, 2 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 2 x SATA3
- 2 x Intel Gigabit LAN
- Supports Hexa Display, 5 x DP 1.2, 1 x VGA, 1 x eDP
- TPM Header
- Supports Intel® vPro, AMT, RAID 0/1
- 19 DC-In (MXM IPC-Q370)
- 12V DC-In (4-pin plug PWR cable for maximum 200 watt DC input) (MXM IPC-Q370-12V)



MXM IPC-Q370

MXM IPC-Q370-12V

## SPECIFICATIONS

### Form Factor

Dimensions	Micro-STX (5.8-in x 7.4-in)
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### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors
Chipset	Intel® Q370
Socket	LGA1151
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2666 MHz
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 11/12
HDMI	N/A
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	N/A
eDP	eDP 1.4 Max resolution up to 4096 x 2304@60Hz
DVI	N/A
MultiDisplay	Hexa Display

### Expansion Slot

MXM	1 x MXM with PCIe x16 Lanes (Gen3) Supports NVIDIA Quadro P5000 & GTX Series (Type A/Type B/ Type B+)
PCI	N/A
mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, CNVi and shared USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC233, High Definition Audio.
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### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	2 x RJ-45

### Front I/O

HDMI	N/A
DisplayPort	1 x DP 1.2
USB	1 x USB 2.0
Audio	1 (Mic-in, Line-out)

### Rear I/O

	MXM IPC-Q370	MXM IPC-Q370-12V
HDMI	N/A	
DisplayPort	4 x DP 1.2	
VGA	N/A	
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	N/A	
COM	N/A	
PS2	N/A	

### Internal Connector

USB	2 x USB 2.0 (2 x 2.54 pitch header)
COM	COM1(RS-232)
Parallel	N/A
GPIO	N/A
TPM	TPM Header
LVDS	N/A
eDP	1
VGA	1
SATA PWR Output	N/A
Speaker Header	N/A

### Storage

M.2	2 x M.2 (Key M, 2242/2260/2280) with PCIe x4 & SATA3 for SSD
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	19V DC-In (4-pin DC Jack) (220W for Quadro P5000)	12V DC-In (4-pin plug PWR cable for maximum 200 watt DC input)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready	

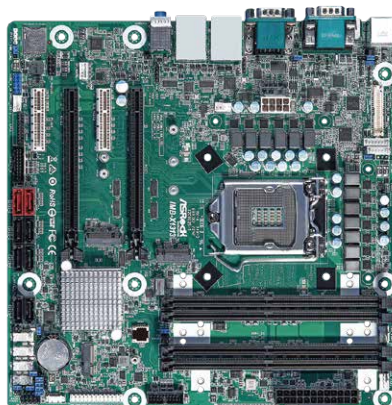
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-X1313

Micro-ATX Motherboard



## KEY FEATURES

- Intel® Xeon® W-1200 series & Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with W480E chipset
- 4 x 288-pin Long-DIMM, Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 128GB
- Support ECC Long DIMM memory modules
- 1 x PCIe x16 Gen3, 1 x PCIe x8 Gen3, 2 x PCIe x4 Gen3
- 4 x USB 3.2 Gen2, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 8 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x LVDS (eDP1.4 optional), 1 x HDMI 2.0a
- TPM 2.0 onboard
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+8-pin)

## SPECIFICATIONS

### Form Factor

Dimensions	Micro ATX (9.6-in x 9.6-in)
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### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 125 W
Chipset	Intel® W480E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz, (ECC memory supported by CPU) - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	128GB (32GB per DIMM)
Socket	4 x 288-pin Long-DIMM

### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	2 x PCIe Gen3 Slots (PCIe1/PCIe2: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3)) (PCIe1: Support riser card x8/x8, x8/x4/x4) 2 x PCIe x4 (Gen3)
PCI	N/A
Mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-In/ Line-Out/ Mic-In
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### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP 1.2
VGA	1
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen2), 2 x USB2.0
Audio	3 ( Line-In, Line-Out, Mic-In )
COM	2 x COM (RS-232/422/485)
PS2	1

### Internal Connector

USB	4 x USB 3.2 Gen1 (2 x USB 3.2 Gen1 header) 2 x USB 2.0 (1x2.54 pitch header)
COM	4 x COM (RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO, (shared with LPT header)
TPM	TPM 2.0 onboard
LVDS	1
eDP	1 (BOM Option support)
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD * Shared with SATA3_5/ SATA3_6 Ports - When using M.2 PCIe x4 SSD, both SATA3_5 and SATA_6 Ports are disabled - When using M.2 SATA SSD, only SATA3_5 Port is disabled, and SATA3_6 Port is available
mSATA	N/A
SATA	8 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

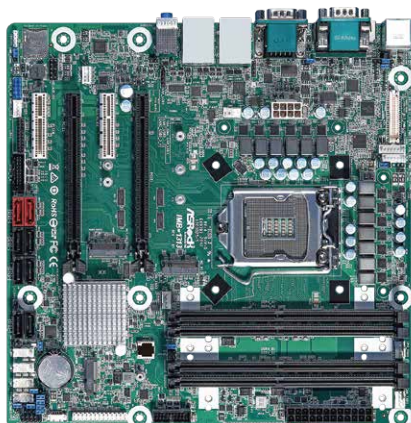
Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# IMB-1313

Micro-ATX Motherboard



## KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Cometlake-S) Core™ Processors with Q470E chipset
- 4 x 288-pin Long-DIMM, Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 128GB
- 1 x PCIe x16 Gen3, 1 x PCIe x8 Gen3, 2 x PCIe x4 Gen3  
4 x USB 3.2 Gen2, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 8 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x LVDS (eDP1.4 optional), 1 x HDMI 2.0a
- TPM 2.0 onboard
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+8-pin)

## SPECIFICATIONS

### Form Factor

Dimensions	Micro ATX (9.6-in x 9.6-in)
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### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 125 W
Chipset	Intel® Q470E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	128GB (32GB per DIMM)
Socket	4 x 288-pin Long-DIMM

### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160 @60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI-D	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	2 x PCIe Gen3 Slots (PCIe1/PCIe2: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3)) (PCIe1: Support riser card x8/x8, x8/x4/x4) 2 x PCIe x4 (Gen3)
PCI	N/A
Mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC887/ALC897 HD , High Definition Audio. Line-In/ Line-Out/ Mic-In
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### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2
VGA	1
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen2), 2 x USB2.0
Audio	3 ( Line-In, Line-Out, Mic-In )
COM	2 x COM (RS-232/422/485)
PS2	1

### Internal Connector

USB	4 x USB 3.2 Gen1 (2 x USB 3.2 Gen1 header) 2 x USB 2.0 (1x2.54 pitch header)
COM	4 x COM (RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO, (shared with LPT header)
TPM	TPM 2.0 onboard
LVDS	1
eDP	1 (BOM Option support)
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA and PCIe x4 for SSD * Shared with SATA3_5/ SATA3_6 Ports - When using M.2 PCIe x4 SSD, both SATA3_5 and SATA_6 Ports are disabled - When using M.2 SATA SSD, only SATA3_5 Port is disabled, and SATA3_6 Port is available
mSATA	N/A
SATA	8 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

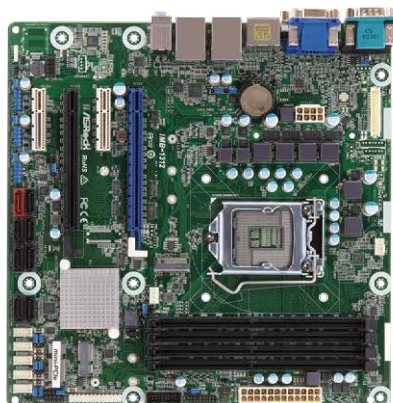
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1312

Micro-ATX Motherboard



## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset
- 4 x 288-pin Long-DIMM up to 128GB\* DDR4 2666 MHz
- 1 x PCIe x16 (Gen3), 1 x PCIe x8 (Gen3), 2 x PCIe x4 (Gen3),  
6 x USB 3.1 Gen1, 6 x USB 2.0, 1 x M.2 Key E, 1 x mini-PCIe, 1 x M.2 Key M,  
6 x COM, 8 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 1 x DP 1.2, 1 x VGA, 1 x LVDS, 1 x DVI-D
- TPM 2.0 onboard IC
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX PWR

## SPECIFICATIONS

### Form Factor

Dimensions	Micro ATX (9.6-in x 9.6-in)
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### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 95W
Chipset	Intel® Q370
Socket	LGA1151
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2666 MHz
Capacity	128GB* * Intel Core i9/i7/i5 CPUs support up to 128GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 64GB (16GB per DIMM)
Socket	4 x 288-pin Long-DIMM

### Graphics

Controller	Coffee Lake integrated graphics
HDMI	HDMI 1.4 Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI-D	Max resolution up to 1920x1200@60Hz
MultiDisplay	Triple Display

### Expansion Slot

PCIe	- 2 x PCIe 3.0 x16 Slots (PCIe1/PCIe3: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3) ) - 2 x PCIe 3.0 x4 Slots (PCIe2) (PCIe4)
PCI	N/A
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless

### Audio

Interface	Realtek ALC887/ALC897, High Definition Audio. Line-out, Mic-in, Line-in
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### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	1 x DP 1.2
VGA	1
DVI-D	1
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.1 (Gen1)
Audio	3 (Mic-in, Line-in, Line-out)
COM	COM1(RS-232/422/485)
PS2	1

### Internal Connector

USB	2 x USB 3.1 (Gen1) (1 x USB3.1 header) 6 x USB 2.0 (3 x 2.54 pitch header)
COM	COM2, 3, 4, 5, 6 (RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO (shared with LPT header)
TPM	TPM 2.0 onboard IC
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and shared SATA3 for SSD
mSATA	N/A
SATA	8 x SATA3 (6Gb/s), SATA3_1 shared with M.2 Key M
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



## IMB-1311-L/ IMB-1311-D

## Micro-ATX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset
- 4 x 288-pin Long-DIMM up to 128GB\* DDR4 2666MHz
- 1 x PCIe x16 (Gen3), 1 x PCIe x4 (Gen3), 2 x PCI, 6 x USB 3.1 Gen1, 6 x USB 2.0, 1 x M.2 Key E, 1 x mini-PCIe, 1 x M.2 Key M, 6 x COM, 6 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 1 x DP 1.2, 1 x VGA, 1 x LVDS, 1 x DVI-D (IMB-1311-L)
- Supports triple display, 1 x HDMI 1.4, 1 x DP 1.2, 1 x eDP, 1 x DVI-D (IMB-1311-D)
- TPM 2.0 onboard IC
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX PWR



IMB-1311-L



IMB-1311-D

## SPECIFICATIONS

Form Factor	IMB-1311-L	IMB-1311-D
Dimensions	Micro ATX (9.6-in x 9.6-in)	
Processor System		
CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 65W	
Chipset	Intel® Q370	
Socket	LGA1151	
BIOS	AMI SPI 128 Mbit	
Memory		
Technology	Dual Channel DDR4 2666 MHz	
Capacity	128GB* * Intel Core i9/i7/i5 CPUs support up to 128GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 64GB (16GB per DIMM)	
Socket	4 x 288-pin Long-DIMM	
Graphics		
Controller	Coffee Lake integrated graphics	
HDMI	HDMI 1.4 Max resolution up to 4096x2160@24Hz	
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz	
VGA	Max resolution up to 1920x1200@60Hz	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	N/A
eDP	N/A	eDP 1.4 Max resolution up to 4096x2304@60Hz
DVI-D	Max resolution up to 1920x1200@60Hz	
MultiDisplay	Triple Display	

## Expansion Slot

PCIe	1 x PCIe x16 (Gen3, Support riser card x8/x8, x8/x4/x4) 1 x PCIe x4 (Gen3)
PCI	2
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless

## Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in, Line-in
-----------	--

## Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	2 x RJ-45

Rear I/O	IMB-1311-L	IMB-1311-D
HDMI	1 x HDMI 1.4	
DisplayPort	1 x DP 1.2	
VGA	1	N/A
DVI-D	1	
Ethernet	2 x 1 Gigabit LAN	
USB	4 x USB 3.1 (Gen1)	
Audio	3 (Mic-in, Line-in, Line-out)	
COM	COM3(RS-232/422/485)	
PS2	1	

## Internal Connector

USB	2 x USB 3.1 (Gen1) (1 x USB3.1 header) 6 x USB 2.0 (3 x 2.54 pitch header)	
COM	COM1, 2, 4, 5, 6(RS232)	
Parallel	1 (shared with GPIO)	
GPIO	8 x GPI, 8 x GPO (shared with LPT header)	
TPM	TPM 2.0 onboard IC	
LVDS	1	N/A
eDP	N/A	1
VGA	N/A	
SATA PWR Output	N/A	
Speaker Header	1	

## Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and shared SATA3 for SSD
mSATA	N/A
SATA	6 x SATA3 (6Gb/s), SATA3_1 shared with M.2 Key M
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

## Watchdog Timer

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

## Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

## Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# IMB-1310

Micro-ATX Motherboard

## KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with H310 chipset
- 2 x 288-pin Long-DIMM up to 64GB\* DDR4 2666 MHz
- 1 x PCIe x16 (Gen3), 1 x PCIe x4 (Gen2), 2 x PCI, 4 x USB 3.1 Gen1, 4 x USB 2.0, 1 x M.2 Key M, 4 x COM, 4 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports dual display, 1 x HDMI 1.4, 1 x DP 1.2, 1 x VGA, 1 x LVDS, 1 x DVI-D
- TPM Header
- ATX PWR



## SPECIFICATIONS

### Form Factor

Dimensions	Micro ATX (9.6-in x 9.6-in)
------------	-----------------------------

### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 95W *For cooling the CPU exceeding 90W and its surrounding components, please install a CPU cooler with a top-down blowing design.
Chipset	Intel® H310
Socket	LGA1151
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2666 MHz
Capacity	64GB* * Intel Core i9/i7/i5 CPUs support up to 64GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 32GB (16GB per DIMM)
Socket	2 x 288-pin Long-DIMM

### Graphics

Controller	Coffee Lake integrated graphics
HDMI	HDMI 1.4 Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI-D	Max resolution up to 1920x1200@60Hz
MultiDisplay	Dual Display

### Expansion Slot

PCIe	1 x PCIe x16 (Gen3) 1 x PCIe x4 (Gen2)
PCI	2
mini-PCIe	N/A
M.2	N/A

### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in, Line-in
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### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	1 x DP 1.2
VGA	1
DVI-D	1
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.1 (Gen1)
Audio	3 (Mic-in, Line-in, Line-out)
COM	COM3(RS-232/422/485)
PS2	1

### Internal Connector

USB	4 x USB 2.0 (2 x 2.54 pitch header)
COM	COM1, 2, 4(RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO (shared with LPT header)
TPM	TPM Header
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with shared SATA3 for SSD
mSATA	N/A
SATA	4 x SATA3 (6Gb/s), SATA3_1 shared with M.2 Key M
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

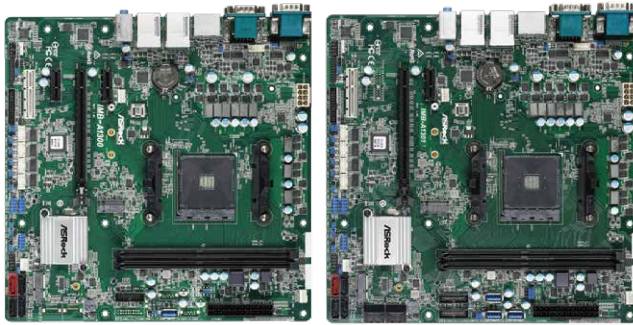
Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# IMB-A1300 / A1301

Micro-ATX Motherboard



## KEY FEATURES

- AMD Ryzen 7th/5th/3th Gen (Raven Ridge/Matisse) Core™ Processors with B450 chipset (IMB-A1300)
- AMD Ryzen 7th/5th/3th Gen (Raven Ridge/Matisse) Core™ Processors with X470 chipset (IMB-A1301)
- 2 x 288-pin Long-DIMM up to 32GB DDR4 3200 MHz with Matisse (16GB per DIMM)
- 2 x 288-pin Long-DIMM up to 32GB DDR4 2933 MHz with Raven Ridge (16GB per DIMM)
- 1 x PCIe x16 (Gen3), 3 x PCIe x1 (Gen3), 4 x USB 3.1 Gen2, 3 x USB 3.1 Gen1, 6 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 6 x COM, 4 x SATA3 (IMB-A1300)
- 1 x PCIe x16 (Gen3), 1 x PCIe x1 (Gen3), 1 x PCIe x1 (Gen3), 4 x USB 3.1 Gen2, 7 x USB 3.1 Gen1, 6 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 6 x COM, 8 x SATA3 (IMB-A1301)
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 2 x DP++ 1.2, 1 x VGA
- TPM 2.0 onboard IC
- Support RAID 0/1/10
- ATX PWR (24+8-pin)

## SPECIFICATIONS

Form Factor		IMB-A1300	IMB-A1301
Dimensions		Micro-ATX (9.6-in x 9.6-in)	
Processor System			
CPU	AMD Ryzen 7th/5th/3th Gen (Raven Ridge/Matisse) Core™ Processors Ryzen 7th:Matisse (3700X,8cores,3.6GHz,65W) Ryzen 5th:Raven Ridge (2400G, QC, 3.6GHz,65W);Matisse (3600,6cores,3.6GHz,65W) Ryzen 3th:Raven Ridge (2200G, QC,3.5GHz,65W )		
Chipset	AMD Promontory B450 (IMB-A1300)	AMD Promontory X470 (IMB-A1301)	
Socket	AM4		
BIOS	AMI SPI 256Mbit		
Memory			
Technology	Dual Channel DDR4 3200 MHz (Matisse) Dual Channel DDR4 2933 MHz (Raven Ridge)		
Capacity	32 GB (16 GB per DIMM)		
Socket	2 x 288-pin Long-DIMM		
Graphics			
Controller	AMD Radeon™ HD Vega DirectX 12		
HDMI	N/A		
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz		
VGA	Max resolution up to 4096x2160@60Hz		
LVDS	N/A		
eDP	N/A		
DVI	N/A		
MultiDisplay	Triple Display		
Expansion Slot			
PCIe	1 x PCIe x16 (PCIe Gen3 x8 for Raven Ridge);(PCIe Gen3 x16 for Matisse) 3 x PCIe x1 (Gen3)	1 x PCIe x16 (PCIe Gen3 x8 for Raven Ridge);(PCIe Gen3 x16 for Matisse) 1 x PCIe x4 (Gen3) 1 x PCIe x1 (Gen3)	
PCI	0		
mini-PCIe	0		
M.2	1 x Key E (2230)with PCIe x1 and USB 2.0 for Wireless		
SIM Socket	N/A		
Audio			
Interface	Realtek ALC887, High Definition Audio. Line-out,Mic-in		
Ethernet			
Controller/ Speed	2 x Intel® I210-AT with 10/100/1000 Mbps		
Connector	2 x RJ-45		

Rear I/O	IMB-A1300	IMB-A1301
HDMI	N/A	
DisplayPort	2 x DP1.2++	
VGA	1	
DVI	N/A	
Ethernet	2 x 1 Gigabit LAN	
USB	Matisse: 4 x USB 3.1 (Gen2) Raven Ridge: 4 x USB 3.1 (Gen1)	
Audio	3 (Mic-in, Line-in, Line-out)	
COM	2 x COM(RS-232/422/485)	
PS2	1 x PS/2 combo	

## Internal Connector

USB	3 x USB 3.1 (Gen1) (1 x USB 3.1 header, 1 x Type A) 6 x USB 2.0 (3 x 2.54 pitch header)	7 x USB 3.1 (Gen1) (2 x USB 3.1 header, 3 x Type A) 6 x USB 2.0 (3 x 2.54 pitch header)
COM	4 x COM (RS-232)	
Parallel	1 (shared with GPIO)	
GPIO	8 x GPI, 8 x GPO (shared with LPT header)	
TPM	TPM 2.0 onboard IC	
LVDS	N/A	
eDP	N/A	
VGA	N/A	
SATA PWR Output	1	
Speaker Header	1	

## Storage

M.2	1 x Key M (2242/2260/2280)with PCIe x4 and SATA3 for SSD	
mSATA	N/A	
SATA	4 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M	8 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
RAID	Support RAID 0/1/10	
eMMC	N/A	

## Watchdog Timer

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

## Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

## Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

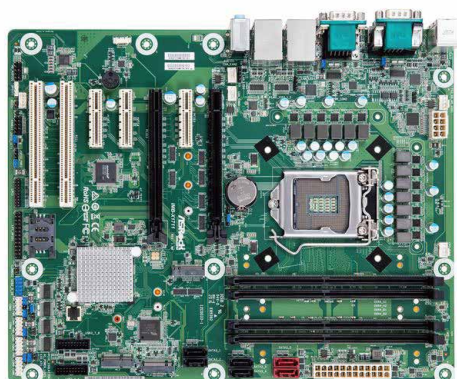


# IMB-X1711

ATX Motherboard

## KEY FEATURES

- Intel® Xeon® W-1200 series & Intel® 10<sup>th</sup> Gen (Comet lake-S) Core™ Processors with W480E chipset
- 4 x 288-pin Long-DIMM, Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 128GB
- Support ECC Long DIMM memory modules
- 1 x PCIe x16 Gen3, 1 x PCIe x8 Gen3, 3 x PCIe x4 Gen3, 2 x PCI 4 x USB 3.2 Gen2, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 6 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x HDMI 2.0a
- TPM 2.0 onboard
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+8-pin)



## SPECIFICATIONS

### Form Factor

Dimensions	ATX (12-in x 9.6-in)
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### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 125 W
Chipset	Intel® W480E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz, (ECC memory supported by CPU) - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	128GB (32GB per DIMM)
Socket	4 x 288-pin Long-DIMM

### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	3 x PCIe Gen3 Slots (PCIe1/PCIe2/PCIe3: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3); triple at x8 (PCIe1) / x4 (PCIe2) / x4 (PCIe3)) 2 x PCIe x4 (Gen3)
PCI	2 x PCI
Mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1, USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

### Audio

Interface	Realtek ALC887/ALC897 HD, High Definition Audio. Line-In/ Line-Out/ Mic-In
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### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP 1.2
VGA	1
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen2), 2 x USB2.0
Audio	3( Line-In, Line-Out, Mic-In )
COM	2 x COM (RS-232/422/485)
PS2	1

### Internal Connector

USB	4 x USB 3.2 Gen1 (2 x USB 3.1 header) 2 x USB2.0 (1x2.54 pitch header)
COM	4 x COM (RS-232)
Parallel	1
GPIO	8 x GPI, 8 x GPO, (shared with LPT header)
TPM	TPM 2.0 onboard
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD * Shared with SATA3_5/ SATA3_6 Ports - When using M.2 PCIe x4 SSD, both SATA3_5 and SATA_6 Ports are disabled - When using M.2 SATA SSD, only SATA3_5 Port is disabled, and SATA3_6 Port is available
mSATA	N/A
SATA	6 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

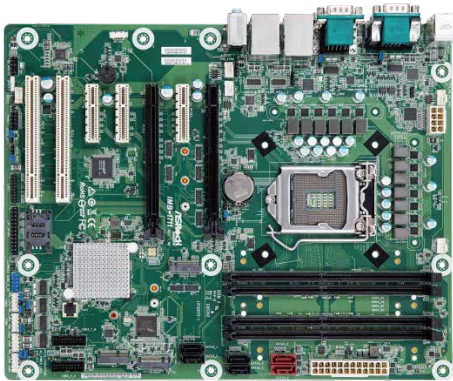


# IMB-1711

## ATX Motherboard

### KEY FEATURES

- Intel® 10<sup>th</sup> Gen (Cometlake-S) Core™ Processors with Q470E chipset
- 4 x 288-pin Long-DIMM, Support Dual Channel DDR4 2933 (i9/i7 CPU) / 2666 (i5/i3 CPU) / 2400 (Pentium/ Celeron CPU), up to 128GB
- 1 x PCIe x16 Gen3, 1 x PCIe x8 Gen3, 3 x PCIe x4 Gen3, 2 x PCI 4 x USB 3.2 Gen2, 4 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 6 x COM, 6 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Triple display, 1 x DP1.2, 1 x VGA, 1 x HDMI 2.0a
- TPM 2.0 onboard
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX-PWR (24+8-pin)



### SPECIFICATIONS

#### Form Factor

Dimensions	ATX (12-in x 9.6-in)
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#### Processor System

CPU	Intel® 10 <sup>th</sup> Gen (Cometlake-S) Core™ Processors, up to 125 W
Chipset	Intel® Q470E
Socket	LGA1200
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 2933/2666/2400 MHz - Intel Core i9/i7 CPUs support DDR4 up to 2933 MHz - Intel Core i5/i3 CPUs support DDR4 up to 2666 MHz - Intel Pentium/Celeron CPU support DDR4 up to 2400 MHz
Capacity	128GB (32GB per DIMM)
Socket	4 x 288-pin Long-DIMM

#### Graphics

Controller	Intel® UHD Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	3 x PCIe Gen3 Slots (PCIe1/PCIe2/PCIe3: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3); triple at x8 (PCIe1) / x4 (PCIe2) / x4 (PCIe3)) 2 x PCIe x4 (Gen3)
PCI	2 x PCI
Mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1, USB 3.0/USB2.0 and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC887 HD , High Definition Audio. Line-In/ Line-Out/ Mic-In
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#### Ethernet

Controller/ Speed	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP 1.2
VGA	1
DVI	N/A
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	4 x USB 3.2 (Gen2), 2 x USB2.0
Audio	3( Line-In, Line-Out, Mic-In )
COM	2 x COM (RS-232/422/485)
PS2	1

#### Internal Connector

USB	4 x USB 3.2 Gen1 (2 x USB 3.1 header) 2 x USB2.0 (1x2.54 pitch header)
COM	4 x COM (RS-232)
Parallel	1
GPIO	8 x GPI, 8 x GPO, (shared with LPT header)
TPM	TPM 2.0 onboard
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD * Shared with SATA3_5/ SATA3_6 Ports - When using M.2 PCIe x4 SSD, both SATA3_5 and SATA_6 Ports are disabled - When using M.2 SATA SSD, only SATA3_5 Port is disabled, and SATA3_6 Port is available
mSATA	N/A
SATA	6 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

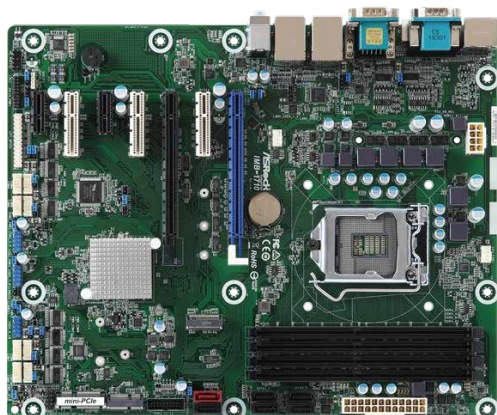
Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# IMB-1710

## ATX Motherboard



### KEY FEATURES

- Intel® 9<sup>th</sup>/ 8<sup>th</sup> Gen (Coffee Lake-S) Core™ Processors with Q370 chipset
- 4 x 288-pin Long-DIMM up to 128GB\* DDR4 2666 MHz
- 1 x PCIe x16 (Gen3), 1 x PCIe x8 (Gen3), 3 x PCIe x4 (Gen3), 2 x PCIe x1 (Gen3), 6 x USB 3.1 Gen1, 6 x USB 2.0, 1 x M.2 Key E, 1 x mini-PCIe, 1 x M.2 Key M, 10 x COM, 6 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 2 x DP 1.2, 1 x VGA
- TPM 2.0 onboard IC
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX PWR

### SPECIFICATIONS

#### Form Factor

Dimensions	ATX (12-in x 9.6-in)
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#### Processor System

CPU	Intel® 9 <sup>th</sup> / 8 <sup>th</sup> Gen (Coffee Lake-S) Core™ Processors, up to 95W
Chipset	Intel® Q370
Socket	LGA1151
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2666 MHz
Capacity	128GB*
	* Intel Core i9/i7/i5 CPUs support up to 128GB (32GB per DIMM) Intel Core i3/Pentium/Celeron CPUs support up to 64GB (16GB per DIMM)
Socket	4 x 288-pin Long-DIMM

#### Graphics

Controller	Coffee Lake integrated graphics
HDMI	HDMI 1.4 Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2304@60Hz
VGA	Max resolution up to 1920x1200@60Hz
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	-3 x PCIe 3.0 Slots (PCIe1/PCIe2/PCIe3: single at x16 (PCIe1); dual at x8 (PCIe1) / x8 (PCIe3); triple at x8 (PCIe1) / x4 (PCIe2) / x4 (PCIe3)) -2 x PCIe 3.0 x4 Slots (PCIe4) (PCIe6) -2 x PCIe 3.0 x1 Slots (PCIe5) (PCIe7)
PCI	N/A
mini-PCIe	1 x Full/Half size with PCIe x1 and USB 2.0
M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless

#### Audio

Interface	Realtek ALC887/ALC897, High Definition Audio. Line-out, Mic-in, Line-in
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#### Ethernet

Controller/ Speed	LAN1: 1 x Intel® I210 with 10/100/1000 Mbps LAN2: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	2 x DP 1.2
VGA	1
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.1 (Gen1)
Audio	3 (Mic-in, Line-in, Line-out)
COM	COM1, 2(RS-232/422/485)
PS2	1

#### Internal Connector

USB	2 x USB 3.1 (Gen1) (1 x USB 3.1 header) 6 x USB 2.0 (3 x 2.54 pitch header)
COM	COM3, 4, 5, 6, 7, 8, 9, 10 (RS-232)
Parallel	1 (shared with GPIO)
GPIO	8 x GPI, 8 x GPO (shared with LPT header)
TPM	TPM 2.0 onboard IC
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	N/A
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x4 and shared SATA3 for SSD
mSATA	N/A
SATA	6 x SATA3 (6Gb/s), SATA3_1 shared with M.2 Key M
RAID	Intel® SATA RAID 0/1/5/10
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX PWR (24+8-pin)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# SBC-360

SBC Motherboard

## Coming Soon

### KEY FEATURES

- Intel® 11<sup>th</sup> Gen (Tiger Lake-UP3) Core™ Processors
- 2 x 260-pin SO-DIMM DDR4 3200 MHz, up to 64GB
- 4 x USB 3.2 Gen2, 1 x USB 3.2 Gen1, 4 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key M, 1 x M.2 Key B, 4 x COM, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Support Quad display, 1 x LVDS or eDP, 3 x DP1.4 (2 from Type-C), 1 x HDMI 2.0
- TPM Header
- Supports Intel® vPro/AMT (For i7/i5 SKU)
- 9~36V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions(LxWxH)	3.5" SBC (5.8-in x 4.0-in)
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#### Processor System

CPU	Intel® 11 <sup>th</sup> Gen (Tiger Lake-UP3) Core™ Processors, up to 28W -SBC-360P (i7-1185G7E, QC, Max Speed up to 4.4GHz) -SBC-360M (i5-1145G7E, QC, Max Speed up to 4.1GHz) -SBC-360V (i3-1115G4E, DC, Max Speed up to 3.9GHz)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

#### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3/Celeron CPU
HDMI	1 x HDMI 2.0 Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.4, DP++ Max resolution up to 4096x2160@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP Max resolution up to 1920x1080@60Hz
MultiDisplay	Quad display

#### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042/3052) with PCIe x1/USB 3.2/USB2.0/SATA and SIM for 4G/5G
SIM Socket	1x SIM socket connected to M.2 key B

#### Audio

Interface	Realtek ALC233 HD, High Definition Audio. Mic-In / Line-Out
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#### Ethernet

Controller/ Speed	SBC-360P/SBC-360M: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT/vPro SBC-360V: LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219V with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 2.0
DisplayPort	1 x DP1.4++
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 Gen2 2 x USB 3.2 Gen2 (Type-C, Supports DP1.4 display output)

#### Internal Connector

USB	1x USB 3.2 Gen1 (Vertical Type-A) 4 x USB 2.0 (2x2.54 pitch header)
COM	3 x COM (RS-232) 1 x COM (RS-232/422/485)
GPIO	8 x GPI, 8 x GPO
TPM	TPM 2.0 header
LVDS	1 (shared with eDP, by jumper setting)
eDP	1 (shared with LVDS, by jumper setting)
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	9~36V DC-In with 4-pin wafer PWR cable
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# SBC-350

## 3.5" SBC Motherboard

### KEY FEATURES

- Intel® 8<sup>th</sup> Gen (Whiskey lake-U) Core™ Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 4 x USB 3.2 Gen2, 2 x USB 3.2 Gen1, 2 x USB 2.0, 2 x M.2 Key M, 1 x M.2 Key E, 4 x COM, 1 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 2 x DP1.2 ++, 1 x LVDS
- TPM 2.0 onboard IC (SBC-350P/SBC-350M)
- TPM 2.0 with Bios setting (SBC-350V/SBC-350E)
- 9~36V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions	3.5" SBC (6.3-in x 4.0-in)
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#### Processor System

CPU	Intel® 8 <sup>th</sup> Gen (Whiskey lake-U) Core™ Processors SBC-350P (i7-8665UE, QC, 1.7 GHz, 15 W) SBC-350M (i5-8365UE, QC, 1.6GHz, 15W) SBC-350V (i3-8145UE, DC, 2.2GHz, 15W) SBC-350E (CELERON-4305UE, DC, 2.0GHz, 15W)
Chipset	MCP
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	N/A
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230) with PCIe x1, CNVI and USB 2.0 for Wireless

#### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out, Mic-in
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#### Ethernet

Controller/ Speed	SBC-350P/M LAN1: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro LAN2: 1 x Intel® I210AT with 10/100/1000 Mbps SBC-350V/SBC-350E LAN1: 1 x Intel® I219V with 10/100/1000 Mbps LAN2: 1 x Intel® I210AT with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	N/A
DisplayPort	2 x DP1.2 ++
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	4 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

#### Internal Connector

USB	2 x USB 3.2 Gen1 (1 x USB 3.2 Gen1 header) 2 x USB 2.0 (1 x 2.54 pitch header)
COM	1 x COM (RS232/422/485), 3 x COM (RS232)
Parallel	N/A
GPIO	4 x GPI, 4 x GPO
TPM	TPM 2.0 onboard IC (SBC-350P/SBC-350M) TPM 2.0 with Bios setting (SBC-350V/SBC-350E)
LVDS	1
eDP	N/A
VGA	N/A
Audio	2 (Mic-in, Line-out)
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x Key M (2242/2280) with PCIe x4 and SATA3 for SSD 1 x Key M (2242) with SATA3 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	9~36V DC-In (DC Jack)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

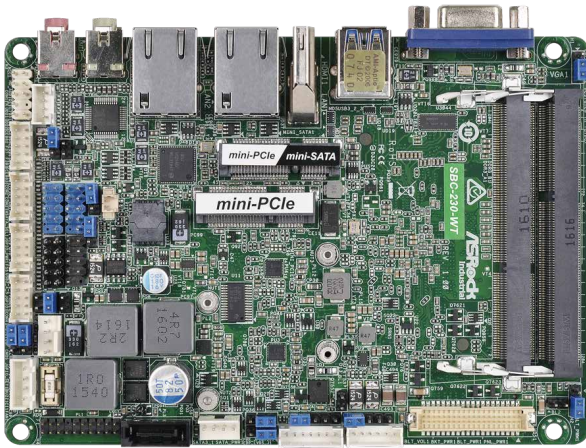
#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# SBC-230

3.5" SBC Motherboard



## KEY FEATURES

- Intel® Apollo Lake/Apollo Lake-I SoC Processors
- 2 x 204-pin SO-DIMM up to 16 GB DDR3L 1866 MHz (8GB per DIMM)
- 2 x USB 3.1 Gen1, 4 x USB 2.0, 1 x mini-PCIe, 1 x mSATA/mini-PCIe, 4 x COM, 1 x SATA3
- 2 x Intel 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4b, 1 x VGA, 1 x LVDS or eDP
- TPM Header
- 9~36V DC-In

## SPECIFICATIONS

### Form Factor

Dimensions	3.5" SBC (5.8-in x 4.0-in)
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### Processor System

CPU	Intel® Apollo Lake/Apollo Lake-I SoC Processors - SBC-230D (N4200, QC, 1.10 GHz, 6W) - SBC-230L (N3350, DC, 1.10 GHz, 6W) - SBC-230J (J3455, QC, 1.50 GHz, 10W)
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	16 GB (8 GB per DIMM)
Socket	2 x 204-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096x2160@24Hz
DisplayPort	N/A
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	Max resolution up to 4096x2160@60Hz
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	1 x Full size with PCIe x1 and USB 2.0
mSATA/mini-PCIe	1 x Full size with USB 2.0
M.2	N/A
SIM Socket	N/A

### Audio

Interface	Realtek ALC887/ALC897, High Definition Audio. Line-out, Mic-in
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### Ethernet

Controller/ Speed	2 x Intel® I210 with 10/100/1000 Mbps
Connector	2 x RJ-45

### Rear I/O

HDMI	1 x HDMI 1.4b
DisplayPort	N/A
VGA	1
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.1 Gen1
Audio	2 (Mic-in, Line-out)
COM	N/A
PS2	N/A

### Internal Connector

USB	4 x USB 2.0 (2x 2.54 pitch header)
COM	1 x COM (RS-232/422/485), 3 x COM (RS-232)
Parallel	N/A
GPIO	4 x GPI + 4 x GPO
TPM	TPM Header
LVDS	1 (shared with eDP, by jumper setting)
eDP	1 (shared with LVDS, by jumper setting)
VGA	N/A
SATA PWR Output	1
Speaker Header	1

### Storage

M.2	N/A
mSATA	1 x Half size with USB 2.0 colay with mini-PCIe
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

### Watchdog Timer

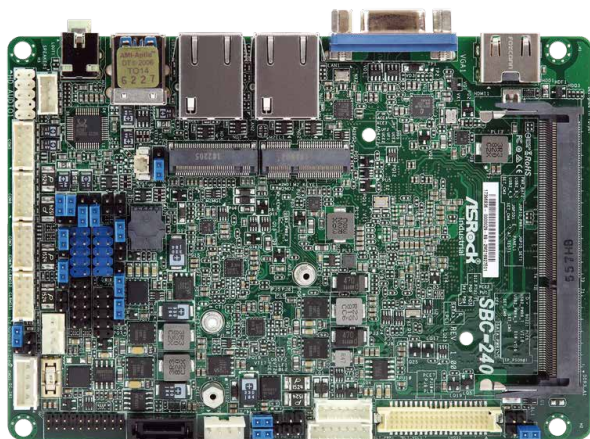
Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

### Power Requirements

Input PWR	9~36V (DC In)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# SBC-240

## 3.5" SBC Motherboard

### KEY FEATURES

- Intel® Apollo Lake/Apollo Lake-I SoC Processors
- 1 x 204-pin SO-DIMM up to 16 GB DDR3L 1866 MHz
- 2 x USB 3.1 Gen1, 4 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 4 x COM, 1 x SATA3
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4b, 1 x VGA, 1 x LVDS
- TPM Header
- 12V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions	3.5" SBC (5.8-in x 4.0-in)
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#### Processor System

CPU	Intel® Apollo Lake/Apollo Lake-I SoC Processors - SBC-240L (N3350, DC, 1.10 GHz, 6W) - SBC-240J (J3455, QC, 1.50 GHz, 10W)
Chipset	SoC
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	16 GB
Socket	1 x 204-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096x2160@24Hz
DisplayPort	N/A
VGA	Max resolution up to 1920x1200@60Hz
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
mSATA/mini-PCIe	N/A
M.2	1 x M.2 (Key E, 2230) with PCIe x1 and shared USB 2.0 for Wireless
SIM Socket	N/A

#### Audio

Interface	Realtek ALC887, High Definition Audio. Line-out
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#### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Rear I/O

HDMI	1 x HDMI 1.4b
DisplayPort	N/A
VGA	1
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.1 Gen1
Audio	1 (Line-out)
COM	N/A
PS2	N/A

#### Internal Connector

USB	4 x USB 2.0 (2x 2.54 pitch header)
COM	1 x COM(RS-232/422/485), 3 x COM(RS-232)
Parallel	N/A
GPIO	4 x GPI + 4 x GPO
TPM	TPM Header
LVDS	1
eDP	N/A
VGA	N/A
SATA PWR Output	1
Speaker Header	1

#### Storage

M.2	1 x M.2 (Key M, 2242/2260) with PCIe x1 and SATA3 for SSD
mSATA	N/A
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V (DC In)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# NUC 1100 Motherboard Series

NUC Motherboard



## KEY FEATURES

- Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors
- 2 x 260-pin SO-DIMM DDR4 3200 MHz, up to 64GB
- 6 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Intel 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.4 (2 from Type-C)
- TPM onboard
- 12V~19V DC-In

## SPECIFICATIONS

### Form Factor

Dimensions	NUC (4.09-in x 4.02-in)
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### Processor System

CPU	Intel® 11th Gen (Tiger Lake-UP3) Core™ Processors NUC-1165G7 (I7-1165G7, QC, Max Speed up to 4.7GHz) NUC-1135G7 (I5-1135G7, QC, Max Speed up to 4.2GHz) NUC-1115G4 (I3-1115G4, DC, Max Speed up to 4.1GHz) NUC-1185G7E (I7-1185G7E QC, Max Speed up to 4.4GHz) NUC-1145G7E (I5-1145G7E QC, Max Speed up to 4.1GHz) NUC-1115G4E (I3-1115G4E DC, Max Speed up to 3.9GHz) NUC-6305E (Celeron 6305E, DC, 1.8GHz)
Chipset	MCP
BIOS	AMI SPI 256 Mbit

### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Iris® Xe Graphics for i7/i5 CPU Intel® UHD Graphics for i3/Celeron CPU
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.4, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Max 4 display (Included 2 outputs from Type-C)

### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless
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### Audio

Interface	Realtek ALC233, High Definition Audio.
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### Ethernet

Controller/ Speed	NUC-1185G7E/ NUC-1145G7E: LAN1: Intel® I219LM with 10/100/1000 Mbps LAN2: Intel® I225LM with 10/100/1000/2500 Mbps NUC-1165G7/ NUC-1135G7/ NUC-1115G4/ NUC-1115G4E/ NUC-6305E: LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Intel® I225LM with 10/100/1000/2500 Mbps
Connector	2 x RJ-45

### Front I/O

USB	2 x USB 3.2 Gen2 (Type-A) 2 x USB 3.2 Gen2 (Type-C, Supports DP1.4 display output) * USB4™ Compliance Test is pending for certification
Audio	1 (headphone & microphone jack)

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.4
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 3.2 Gen2 (Type A)
DC Jack	1

### Internal Connector

USB	2 x USB 2.0 (1 x 2.00 pitch header)
COM	1 x COM(RS-232)
TPM	Infineon SLB9670VQ2.0

### Storage

M.2	1 x M.2 (KEY M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

### Watchdog Timer

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

### Power Requirements

Input PWR	12V~19V DC-In Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

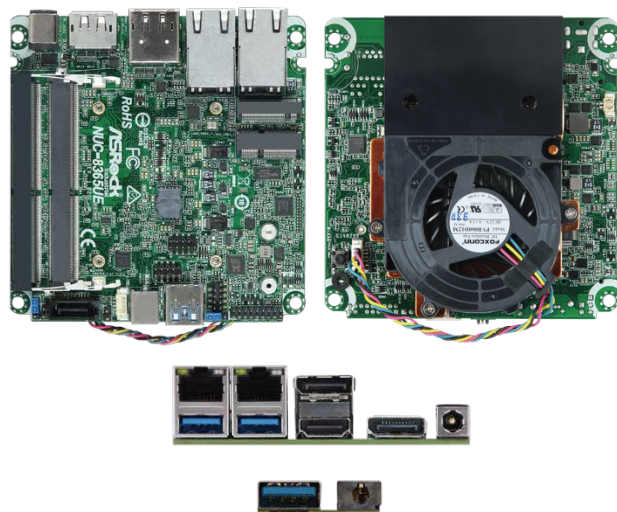
### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# NUC-8665UE/8365UE/8145UE

NUC Motherboard



## KEY FEATURES

- Intel® 8<sup>th</sup> Gen (Whiskey lake-U) Core™ Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 1 x Intel 1 Gigabit LAN, 1 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 1.4, 2 x DP 1.2a
- TPM 2.0 onboard IC
- Supports Intel® vPro/AMT(NUC-8365UE / NUC-8665UE), RAID 0/1
- 12V DC-In

## SPECIFICATIONS

### Form Factor

Dimensions	NUC (4.09-in x 4.02-in)
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### Processor System

CPU	Intel® 8 <sup>th</sup> Gen (Whiskey lake-U) Core™ Processors NUC-8145UE (I3-8145UE DC, 2.2GHz, 15 W) NUC-8365UE (I5-8365UE QC, 1.6GHz, 15 W) NUC-8665UE (I7-8665UE QC, 1.8GHz, 15 W)
Chipset	MCP
Socket	N/A
BIOS	AMI SPI 128 Mbit

### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4 Max resolution up to 4096x2160@24Hz
DisplayPort	DisplayPort 1.2a Max resolution up to 4096x2160@60Hz
VGA	N/A
LVDS	N/A
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230)with PCIe x1, and USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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### Ethernet

Controller/ Speed	NUC-8365UE / NUC-8665UE: LAN1: Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro LAN2: Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps NUC-8145UE: LAN1: Intel® I219V with 10/100/1000 Mbps LAN2: Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen2)
Audio	1 (Mic-in or Line-out)

### Rear I/O

HDMI	1 x HDMI 1.4
DisplayPort	2 x DP 1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

### Internal Connector

USB	2 x USB 2.0 (1 x 2.00 pitch header)
COM	1 x COM (RS232/422/485)
Parallel	N/A
GPIO	N/A
TPM	TPM 2.0 onboard IC
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	1
Speaker Header	N/A

### Storage

M.2	1 x Key M (2242/2260)with PCIe4 and SATA3 for SSD *M.2 Key M 2280 (optional support)
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
RAID	Intel® SATA RAID 0/1
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC-In (DC Jack)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

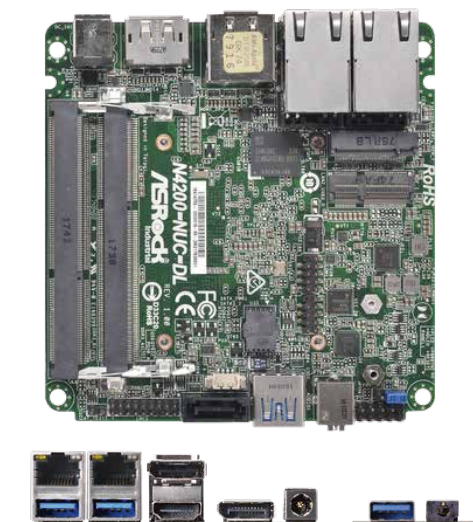


# J3455-NUC-DL

NUC Motherboard

## KEY FEATURES

- Intel® Apollo Lake SoC Processor
- Supports Dual Channel DDR3L SO-DIMM 1867 MT/s up to 16GB
- 32GB EMMC (Optional)
- 1 x HDMI, 2 x DisplayPort,
- 3 x USB 3.0, 2 x USB 2.0, 1 x SATA3
- 1 x M.2 2230, Key E (PCIe x1 +USB)
- 2 x RJ45 Realtek RTL8111G /RTL8111H-CG
- 1 x TPM on board



## SPECIFICATIONS

### Form Factor

Dimensions	NUC 4.09" x 4.02"
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### Processor System

CPU	Intel® Apollo Lake J3455 SoC
Chipset	Intel SoC

### Memory

Technology	Dual Channel DDR3L 1867
MAX	16GB
Socket	2 x SO-DIMM

### Graphics

Controller	Intel® Gen9 Graphics DX 11/12, OGL4.3/4.4
VGA	N/A
LVDS	N/A
eDP	N/A
HDMI	Supports HDMI 1.4b, Max. resolution 3840 x 2160@30Hz
DVI	N/A
DisplayPort	Supports DP 1.2, Max. resolution 4096 x 2160@60Hz
MultiDisplay	Triple Display

### Expansion Slot

PCIe	N/A
mini-PCIe	N/A
M.2	1 x M.2 2230, Key E (PCIe x1 +USB2.0), 1x M.2 2242/2260, Key M
mSATA	N/A

### Audio

Interface	Realtek ALC897 HD , High Definition Audio. Mic-In / Line-Out
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### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

### Rear I/O

VGA	N/A
DVI	N/A
HDMI	1
DisplayPort	2
Ethernet	2
USB	2 x USB 3.0
Audio Jack	1 x (Mic-in. Line-out)
Serial	N/A
PS/2	N/A

### Internal Connector

USB	2 x USB 2.0
LVDS	N/A
eDP	N/A
VGA	N/A
Serial	1
SATA	1x SATA3 (6.0 Gb/s)
Parallel	N/A
GPIO	N/A
SATA PWR Output Con	1
Speaker Header	N/A
TPM	SPI TPM on-board design (optional)

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with SATA3 and PCIe x4 for SSD * Shared with SATA3_0
mSATA	N/A
SATA	2 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC-In (DC Jack)
Power On	AT/ATX Supported AT : Directly PWR on as Power input ready ATX: Press Button to PWR on after Power input ready

### Environment

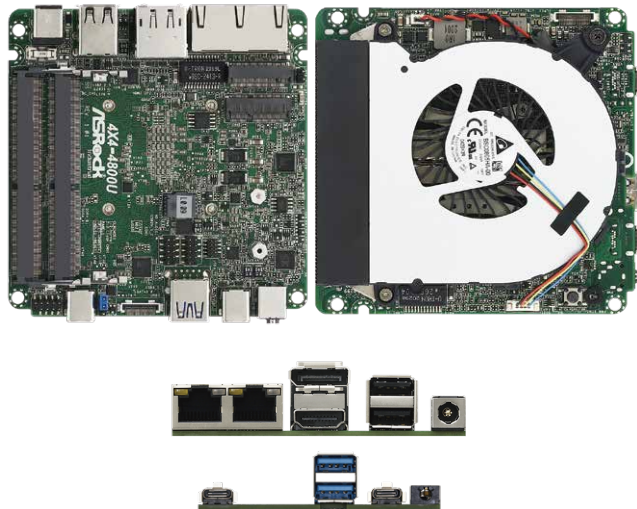
Operating Temperature	0°C ~ 60°C
Storage Temperature	-40° C ~ 85° C



# 4X4-4800U/ 4X4-4500U/ 4X4-4300U

## 4X4 Motherboard

### KEY FEATURES



- AMD Ryzen™ 7 4800U/ Ryzen™ 5 4500U/ Ryzen™ 3 4300U
- 2 x 260-pin SO-DIMM up to 64GB DDR4 3200 MHz
- 4 x USB 3.2 Gen2, 4 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E,
- 1 x COM, 1 x SATA3
- 1 x Realtek 1 Gigabit LAN, 1 x Realtek 2.5 Gigabit LAN (support DASH)
- Supports Quad display, 1 x HDMI 2.0, 3 x DP 1.2a (2 from Type C)
- TPM onboard
- 12V~19V DC-In

### SPECIFICATIONS

#### Form Factor

Dimensions	4X4 (4.09-in x 4.02-in)
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#### Processor System

CPU	AMD Ryzen™ 7 4800U (Max Speed up to 4.2GHz) AMD Ryzen™ 5 4500U (Max Speed up to 4.0GHz) AMD Ryzen™ 3 4300U (Max Speed up to 3.7GHz)
Chipset	SoC
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Max 4 display (Included 2 outputs from type C)

#### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless
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#### Audio

Interface	Realtek ALC233, High Definition Audio.
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#### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN2: Realtek R8111FPV (DASH) with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Front I/O

USB	2 x USB 3.2 Gen2 (Type A) 2 x USB 3.2 Gen2 (Type C) (Supports DP1.2a display output)
Audio	1 (headphone & microphone jack)

#### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2a
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 2.0
DC Jack	1

#### Internal Connector

USB	2 x USB2.0 (1 x 2.54 pitch header)
COM	1 x COM(RS-232/422/485)
TPM	Infintion SLB9670VQ2.0

#### Storage

M.2	1 x M.2 (KEY M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V~19V DC-In Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



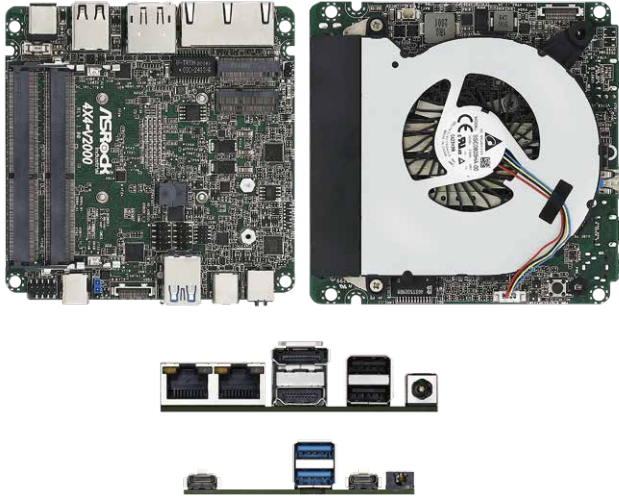


# 4X4-V2000M/ 4X4-V2000V

## 4X4 Motherboard

### KEY FEATURES

- AMD Ryzen™ Embedded V2718/V2516
- 2 x 260-pin non-ECC/ECC SO-DIMM up to 64GB DDR4 3200 MHz
- 4 x USB 3.2 Gen2, 4 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E,
- 1 x COM, 1 x SATA3
- 1 x Realtek 1 Gigabit LAN, 1 x Realtek 2.5 Gigabit LAN
- Supports Quad display, 1 x HDMI 2.0a, 3 x DP 1.2a (2 from Type C)
- TPM onboard
- 12V~19V DC-In



### SPECIFICATIONS

#### Form Factor

Dimensions	4X4 (4.09-in x 4.02-in)
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#### Processor System

CPU	4X4-V2000M (V2718, 8C, Max Speed up to 4.15GHz) 4X4-V2000V (V2516, 6C, Max Speed up to 3.95GHz)
Chipset	SoC
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel non-ECC/ECC DDR4 3200 MHz
Capacity	64GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	AMD Radeon™ Graphics
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
DisplayPort	DisplayPort 1.2a, DP++ Max resolution up to 4096x2160@60Hz
MultiDisplay	Max 4 display (Included 2 outputs from Type C)

#### Expansion Slot

M.2	1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 for Wireless
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#### Audio

Interface	Realtek ALC233, High Definition Audio.
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#### Ethernet

Controller/ Speed	LAN1: Realtek RTL8125BG with 10/100/1000/2500 Mbps LAN1: Realtek R8111FPV with 10/100/1000 Mbps, support DASH function
Connector	2 x RJ-45

#### Front I/O

USB	2 x USB 3.2 Gen2 (Type A) 2 x USB 3.2 Gen2 (Type C, Supports DP1.2a display output)
Audio	1 (headphone & microphone jack)

#### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP1.2a
Ethernet	1 x 1 Gigabit LAN, 1 x 2.5 Gigabit LAN
USB	2 x USB 2.0
DC Jack	1

#### Internal Connector

USB	2 x USB2.0 (1 x 2.54 pitch header)
COM	1 x COM(RS-232/422/485)
TPM	Infintion SLB9670VQ2.0

#### Storage

M.2	1 x M.2 (KEY M, 2242/2260/2280) with PCIe x4 and SATA3 for SSD *M.2 Key M 2280(Supported by bracket)
SATA	1 x SATA3.0 (6.0 Gb/s)

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V~19V DC-In Jack
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

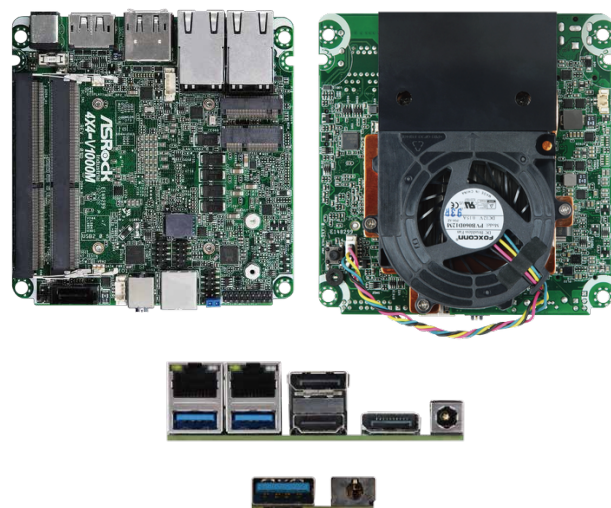
#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# 4X4-R1000/ 4X4-V1000M

4X4 Motherboard



## KEY FEATURES

- AMD Ryzen™ Embedded R1000 SoC processors (4X4-R1000M, 4X4-R1000V)
- AMD Ryzen™ Embedded V1000 SoC processors (4X4-V1000M)
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz with ECC support (16GB per DIMM)
- 3 x USB 3.2 Gen2, 2 x USB 2.0, 1 x M.2 Key M, 1 x M.2 Key E, 1 x COM, 1 x SATA3
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 1 x HDMI 2.0, 2 x DP 1.2a
- TPM Header
- 12V DC-In

## SPECIFICATIONS

Form Factor	4X4-R1000	4X4-V1000M
Dimensions	4X4 (4.09-in x 4.02-in)	

### Processor System

CPU	AMD Ryzen™ Embedded R-Series 4x4-R1000M (R1606G, DC, 2.6GHz, 12-25W) 4x4-R1000V (R1505G, DC, 2.4GHz, 12-25W)	AMD Ryzen™ Embedded V-Series (V1605B, QC, 2GHz, 12-25W)
Chipset	SoC	
Socket	N/A	
BIOS	AMI SPI 64 Mbit	

### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

### Graphics

Controller	AMD Radeon™ Vega 3 Graphics	AMD Radeon™ Vega 8 Graphics
HDMI	HDMI 2.0 Max resolution up to 4096x2160@60Hz	
DisplayPort	DisplayPort 1.2a Max resolution up to 3840*2160@60Hz	
VGA	N/A	
LVDS	N/A	
eDP	N/A	
DVI	N/A	
MultiDisplay	Triple Display	

### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230)with PCIe x1 and USB 2.0 for Wireless
SIM Socket	N/A

### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out,Mic-in
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### Ethernet

Controller/ Speed	2 x Realtek RTL8111G-CG/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

### Front I/O

HDMI	N/A
DisplayPort	N/A
USB	1 x USB 3.2 (Gen2)
Audio	1 (Mic-in, Line-out)

### Rear I/O

HDMI	1 x HDMI 2.0
DisplayPort	2 x DP1.2a
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	2 x USB 3.2 (Gen2)
Audio	N/A
COM	N/A
PS2	N/A

### Internal Connector

USB	2 x USB 2.0 (1 x 2.00 pitch header)
COM	1 x COM(RS-232/422/485)
Parallel	N/A
GPIO	N/A
TPM	TPM Header
LVDS	N/A
eDP	N/A
VGA	N/A
SATA PWR Output	1
Speaker Header	N/A

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe4 and SATA3 for SSD *M.2 Key M 2280(optional support, by bracket)
mSATA	N/A
SATA	1 x SATA3 (6Gb/s), SATA3_1 shared with M.2_Key M
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC-In (DC Jack)
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# UTX-115

## UTX Motherboard

### KEY FEATURES

- Intel® Apollo Lake SoC Processor
- 2 x 204-pin SO-DIMM up to 16GB DDR3L 1866 MHz (8GB per DIMM)
- 2 x USB 3.1 Gen1, 3 x USB 2.0, 1 x M.2 Key E, 1 x M.2 Key B, 1 x SIM slot, 1 x COM
- 2 x Realtek 1 Gigabit LAN
- Supports triple display, 2 x HDMI 1.4b, 1 x LVDS
- TPM header
- 12V DC-In/ 4-pin ATX PWR Con

### SPECIFICATIONS

#### Form Factor

Dimensions	UTX (4.4-in x 4.6-in)
------------	-----------------------

#### Processor System

CPU	Intel® Apollo Lake SoC Processor UTX-115J (J3455, QC, 1.5 GHz, 10 W) UTX-115D (N4200, QC, 1.1 GHz, 6 W) UTX-115L (N3350, DC, 1.1 GHz, 6 W)
Chipset	MCP
Socket	FCBGA1296
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR3L 1866 MHz
Capacity	16 GB (8 GB per DIMM)
Socket	2 x 204-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 12
HDMI	HDMI 1.4b Max resolution up to 4096 x 2160@24Hz
DisplayPort	N/A
VGA	N/A
LVDS	Dual channel 24 bit up to 1920x1200@60Hz
eDP	N/A
DVI	N/A
MultiDisplay	Triple Display

#### Expansion Slot

PCIe	N/A
PCI	N/A
mini-PCIe	N/A
M.2	1 x Key E (2230) with PCIe x1 and shared USB 2.0 for Wireless
SIM Socket	1 x Socket connected to M.2 Key_B

#### Audio

Interface	Realtek ALC233, High Definition Audio. Line-out, Mic-in
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#### Ethernet

Controller/ Speed	2 x Realtek RTL8111G/RTL8111H-CG with 10/100/1000 Mbps
Connector	2 x RJ-45

#### Front I/O

HDMI	2 x HDMI 1.4b
DisplayPort	N/A
USB	2 x USB 3.1 (Gen1)
Audio	1 (Mic-in or Line-out)

#### Rear I/O

HDMI	N/A
DisplayPort	N/A
VGA	N/A
DVI	N/A
Ethernet	2 x 1 Gigabit LAN
USB	1 x USB 2.0
Audio	1 (Mic-in, Line-out)
COM	N/A
PS2	N/A

#### Internal Connector

USB	1 x USB 2.0 (2 x 2.54 pitch header)
COM	1 x COM (RS232)
Parallel	N/A
GPIO	N/A
TPM	TPM Header
LVDS	1
eDP	0
VGA	N/A
SATA PWR Output	N/A
Speaker Header	N/A

#### Storage

M.2	1 x M.2 (KEY B, 3042) with USB 2.0 + SATA/PCIe x2 + SIM for 4G
mSATA	N/A
SATA	N/A
eMMC	32GB/64GB

#### Watchdog Timer

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

#### Power Requirements

Input PWR	12V DC-In/ 4-pin ATX PWR Con
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

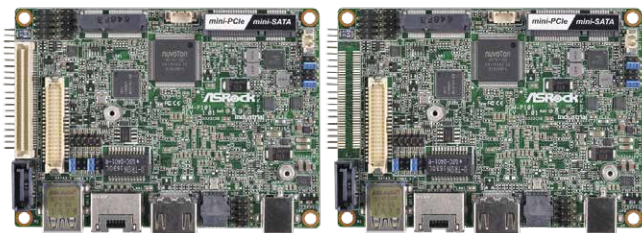


# SOM-P101 / SOM-P102

Pico-ITX Motherboard

## KEY FEATURES

- Intel® Apollo Lake SoC Processor
- 1 x 204-pin SO-DIMM up to 8GB DDR3L 1866 MHz
- 1 x USB 3.1 Gen1, 2 x USB 2.0, 1 x M.2 Key E, 2 x COM, 1 x mSATA/mini-PCle, 1 x SATA3
- 1 x MIO slot (SOM-P101)
- 1 x Intel 1 Gigabit LAN
- Supports dual display, 1 x HDMI 1.4b, 1 x LVDS
- 12V DC-In



## SPECIFICATIONS

Form Factor	SOM-P101	SOM-P102
Dimensions	PICO-ITX (3.9-in x 2.8-in)	
Processor System		
CPU	Intel® Apollo Lake SoC Processor SOM-P101J (J3455, QC, 1.5 GHz, 10 W) SOM-P101D (N4200, QC, 1.1 GHz, 6 W) SOM-P101L (N3350, DC, 1.1 GHz, 6 W)	Intel® Apollo Lake SoC Processor SOM-P102J (J3455, QC, 1.5 GHz, 10 W) SOM-P102D (N4200, QC, 1.1 GHz, 6 W) SOM-P102L (N3350, DC, 1.1 GHz, 6 W)
Chipset	SoC	
Socket	FCBGA1296	
BIOS	AMI SPI 128 Mbit	
Memory		
Technology	Dual Channel DDR3L 1866 MHz	
Capacity	8 GB	
Socket	1 x 204-pin SO-DIMM	
Graphics		
Controller	Intel® Gen9 Graphics DX 12	
HDMI	HDMI 1.4b Max resolution up to 4096 x 2160@24Hz	
DisplayPort	N/A	
VGA	N/A	
LVDS	Dual channel 24 bit up to 1920x1200@60Hz	
eDP	N/A	
DVI	N/A	
MultiDisplay	Dual Display	
Expansion Slot		
PCIe	N/A	
PCI	N/A	
mSATA/mini-PCIe	1	
M.2	1 x Key E (2230)with PCIe x1 and shared USB 2.0 for Wireless	
MIO	1, (HDMI or DP, 1 x USB3.0, 1 x USB2.0, 3 x PCIe x1 , Line out, LPC bus, SMBus)	N/A
Audio		
Interface	Realtek ALC887, High Definition Audio. Line-out,Mic-in	
Ethernet		
Controller/ Speed	1 x Intel® I210IT with 10/100/1000 Mbps	1 x Intel® I210AT with 10/100/1000 Mbps
Connector	1 x RJ-45	

Rear I/O	SOM-P101	SOM-P102
HDMI	1 x HDMI 1.4b	
DisplayPort	N/A	
VGA	N/A	
DVI	N/A	
Ethernet	1 x 1 Gigabit LAN	
USB	1 x USB 3.1 Gen1	
Audio	N/A	
COM	N/A	
PS2	N/A	

### Internal Connector

USB	1 x USB 2.0 (2 x 2.54 pitch header)
COM	1 x COM1 (RS-232/422/485), 1 x COM2 (RS232)
Parallel	N/A
GPIO	4 x GPI + 4 x GPO
TPM	N/A
LVDS	1
eDP	0
VGA	N/A
SATA PWR Output	1
Speaker Header	1

### Storage

M.2	N/A
mSATA	1 x Full size with SATA3 and USB 2.0
SATA	1 x SATA3 (6Gb/s)
eMMC	N/A

### Watchdog Timer

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

### Power Requirements

Input PWR	12V DC-In
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





Preliminary

# SOM-QMX101-WT

QSeven Module

## KEY FEATURES

- NXP® i.MX8MQ
- Supports onboard LPDDR4 3200 MHz, up to 4GB
- Supports 32GB eMMC
- 1 x HDMI 2.0a, 2 x PCIe Gen2, 1 x Gigabit LAN, 2 x USB 3.2 Gen1, 2 x USB 2.0, 1 x USB 2.0 OTG, 2 x Audio, 1 x COM
- 1 x MIPI-DSI



## SPECIFICATIONS

### Form Factor

Dimensions (LxWxH)	QSeven (2.8-in x 2.8-in)
--------------------	--------------------------

### Processor System

CPU	NXP® i.MX8MQ
-----	--------------

### Memory

Technology	Onboard LPDDR4 3200 MHz
Capacity	4 GB

### Graphics

Controller	SoC
HDMI	HDMI 2.0a Max resolution up to 4096x2160@60Hz
MIPI	1 x MIPI-DSI 2 x MIPI-CSI (By Carrier Board)

### Expansion Slot

PCIe	By Carrier Board
M.2	By Carrier Board
SIM Socket	1 (By Carrier Board)

### Audio

Interface	1 x I2S (By Carrier Board)
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### Ethernet

Controller/ Speed	1 x RTL8211FDI-CG with 10/100/1000 Mbps
Connector	By Carrier Board

### Golden Finger

HDMI	1
PCIe	2 x PCIe Gen2
Ethernet	1
USB	2 x USB 3.2 Gen1, 2 x USB 2.0, 1 x USB 2.0 OTG
Audio	2
COM	1

### Internal Connector

MIPI	1 x MIPI-DSI
------	--------------

### Storage

M.2	1 (By Carrier Board)
eMMC	32GB
SD	1 (By Carrier Board)

### Watchdog Timer

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

### Power Requirements

Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready
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### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



# CAB-IVI701

QSeven Carrier Motherboard

## KEY FEATURES

- Supports QSeven Module
- 1 x PCIe x2 (Gen3), 1 x USB 3.2 Gen1, 2, USB 2.0, 1 x USB 2.0 OTG, 1 x M.2 Key B, 1 x M.2 Key M, 1 x M.2 Key E, 2 x COM, 2 x SATA3
- 1 x Realtek Gigabit LAN
- 1 x HDMI 2.0a or 1 x DP 1.2, 1 x LVDS or 1 x eDP, 2 x MIPI-CSI (By CPU Board)
- 1 x SIM Socket
- 1 x SD Slot
- 20V, 3A with USB Type-C

# Coming Soon

## SPECIFICATIONS

### Form Factor

Dimensions (LxWxH)	Micro ATX (9.6-in x 9.6-in)
--------------------	-----------------------------

### Processor System

CPU	By CPU Board
Chipset	By CPU Board
BIOS	AMI SPI 128 Mbit (For x86 CPU)

### Memory

Technology	By CPU Board
Capacity	By CPU Board

### Graphics

Controller	By CPU Board
HDMI	By CPU Board (shared with internal Display Port, by CPU Board)
DisplayPort	By CPU Board (shared with internal HDMI, by CPU Board)
LVDS	By CPU Board, up to Dual channel 24 bit up to 1920x1080 (shared with internal eDP, by CPU Board)
eDP	By CPU Board (shared with internal LVDS, by CPU Board)
MIPI	2 x MIPI-CSI (By CPU Board)

### Expansion Slot

PCIe	1 x PCIe x2 (Gen3)
M.2	1 x M.2 (Key B, 3042 / 3052) (PCIe x1 Gen3 + 1 x USB 3.2 Gen1 + 1 x USB 2.0) 1 x M.2 (Key M, 2242/2260/2280) (PCIe x1) 1 x M.2 (Key E, 2230) (PCIe x1 + 1 x USB 2.0)
SIM Socket	1 x Socket connected to M.2 Key B

### Audio

Interface	Nuvoton NAU88U22A, High Definition Audio Mic-In, Line-Out
-----------	---

### Ethernet

Controller/ Speed	By CPU Board
Connector	1 x RJ-45

### Rear I/O

HDMI	1 x HDMI 2.0a
DisplayPort	1 x DP 1.2
Ethernet	1 x 1 Gigabit LAN
USB	1 x USB 3.2 (GEN1) 2 x USB 2.0 1 x USB 2.0 OTG
Audio	2 (Mic-in, Line-out)
COM	2 x COM (RS485)

### Internal Connector

LVDS	1
eDP	1
SATA PWR Output	1
Speaker Header	1
Audio Header	1
MIPI	2 x MIPI-CSI

### Storage

M.2	1 x M.2 (Key M, 2242/2260/2280) with PCIe x1 Gen3
SATA	2 x SATA3 (6Gb/s)
SD Slot	1

### Power Requirements

Input PWR	20V, 3A with USB Type-C connector
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### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%

# SPECIFICATIONS



Model	SOM-QA101		SOM-Q101		CAB-701	
Chipset/ CPU	AMD G series GX-412HC		Intel® Apollo Lake SOM-Q101D (N4200) SOM-Q101L (N3350)		N/A	
Socket	BGA-769		FCBGA1296		N/A	
Form Factor	Qseven		Qseven		Micro ATX	
Memory	DDR3L 1867MHz		Single / Dual / Quad Channel LPDDR4 2400		By CPU Board	
DIMM Slot	By Carrier Board		By Carrier Board		By CPU Board	
PCIe	3 x PCIe x1 Lane		4 x PCIe x1 Lane		3 x PCIe x1, 1 x PCIe x8	
PCI	N/A		N/A		N/A	
DP	By Carrier Board		By Carrier Board		1	
HDMI	By Carrier Board		By Carrier Board		1	
DVI	NA		NA		N/A	
D-Sub	NA		NA		N/A	
LVDS/ Edp	NA	N/A	NA	N/A	1	N/A
mPCIe	By Carrier Board		By Carrier Board		1	
mSATA	By Carrier Board		By Carrier Board		1	
EMMC	N/A		32GB (optional)		N/A	
M.2 (SSD)	N/A		N/A		N/A	
M.2 (WiFi)	N/A		N/A		N/A	
SATA	1 x SATA3 (6.0 Gb/s)		2 x SATA3 (6.0 Gb/s)		2	
RAID	N/A		N/A		N/A	
USB 3.1	0		N/A		2	
USB 2.0	2		N/A		6	
GPIO	4 x GPI, 4 x GPO		4 x GPI, 4 x GPO		4 x GPI, 4 x GPO	
LAN	1 x Intel I210		1 x Intel LAN I210IT		2 x RJ45 connector	
COM Port	I/O:N/A	Internal Connector: 1 x COM (COM1 supports RS-232/422/ 485)	I/O: NA	Internal Connector: 2(RX/TX only)	I/O:N/A	Internal Connector: 1 x COM (COM1 supports RS-232/422/ 485)
Parallel	N/A		N/A		N/A	
TPM	N/A		N/A		Y	
PS/2	By Carrier Board		By Carrier Board		1	
Power	By Carrier Board		By Carrier Board		12V DC-in	
Operating Temperature	0~60° C		0~60° C		0~60° C	



# COM-653

## COM Express Motherboard

### KEY FEATURES

- COM Express Type 6 Module with Intel® 8<sup>th</sup> Generation Intel® Core™ Processor
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2666 MHz (16GB per DIMM)
- 4 x USB 3.1 Gen1, 8 x USB 2.0, 4 x SATA3
- 1 x Intel 1 Gigabit LAN
- Supports triple display, 3 x DDI, 1 x eDP or LVDS
- TPM 2.0 onboard IC
- Supports Intel® vPro, AMT, RAID 0/1/5/10
- ATX: 12V±5%/5Vsb±5%  
AT: 12V±5%



### SPECIFICATIONS

#### Form Factor

Dimensions	COM Express Basic(4.92-in x 3.74-in)
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#### Processor System

CPU	Intel® 8 <sup>th</sup> Generation Intel® Core™ Processor COM-653P (i7-8850H, 6C, 2.6G, 45W) COM-653M (i5-8400H, QC, 2.5G, 45W) COM-653V (i3-8100H, QC, 3G, 45W)
Chipset	Intel® QM370
Socket	N/A
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® UHD Graphics 630
HDMI	HDMI 1.4b Max resolution up to 4096 x 2160@ 24Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096 x 2304@60Hz
VGA	Max resolution up to 1920 x 1200@60Hz
LVDS	Dual channel 24 bit up to 1920 x 1200@60Hz
eDP	eDP 1.4 Max resolution up to 3840 x 2160@60Hz
DVI	Max resolution up to 4096 x 2304@60Hz
MultiDisplay	Triple Display

#### Expansion

PCIe	1 x PCIe x16 (Gen3) 1 x PCIe x8 (Gen3)
PCI	N/A
mini-PCIe	N/A
M.2	N/A

#### Ethernet

Controller/ Speed	COM-653P/ COM-653M: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro COM-653V: 1 x Intel® I219V with 10/100/1000/Mbps
Connector	N/A

#### I/O

HDMI	3 DDI ports support DVI/HDMI/DP
DisplayPort	3 DDI ports support DVI/HDMI/DP
DVI	3 DDI ports support DVI/HDMI/DP
VGA	1 (optional)
LVDS	1 (shared with eDP)
eDP	1 (shared with LVDS)
GPIO	4 x GPI, 4 x GPO
Ethernet	1 x 1 Gigabit LAN
USB	4 x USB 3.1 (Gen1), 8 x USB2.0
Audio	Intel HD Audio
Serial Port	Two UART Ports (SoC)
PS2	N/A

#### Storage

M.2	N/A
mSATA	N/A
RAID	Intel® SATA RAID 0/1/5/10
SATA	4 x SATA3 (6Gb/s)
eMMC	N/A

#### Watchdog Timer

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

#### Power Requirements

Input PWR	ATX: 12V±5%/5Vsb±5% AT: 12V±5%
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40°C ~ 85°C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%





# COM-652

## COM Express Motherboard

### KEY FEATURES

- Intel® 8<sup>th</sup> Gen (Whiskey Lake-U) Core™ Processors
- 2 x 260-pin SO-DIMM up to 32GB DDR4 2400 MHz (16GB per DIMM)
- 8 x PCIe x1 (Gen3), 4 x USB 3.2 Gen1, 8 x USB 2.0, 2 x COM, 3 x SATA3
- 1 x Intel Gigabit LAN
- Supports Triple Display, 2x DDI, 1x eDP ( or LVDS)
- TPM 2.0 onboard IC (optional)
- Supports Intel® vPro, AMT, RAID 0/1
- ATX: 12V±5%/5Vsb±5%  
AT: 12V±5%



### SPECIFICATIONS

#### Form Factor

Dimensions	COM Express Type6 (3.74-in x 3.74-in)
------------	---------------------------------------

#### Processor System

CPU	COM Express Compact Size Type 6 Module with Intel® 8 <sup>th</sup> Gen (Whiskey Lake-U) Core™ Processors -COM-652P (i7-8665UE, QC, 1.7GHz, 15 W) -COM-652M (i5-8365UE, QC, 1.6GHz, 15 W) -COM-652V (i3-8145UE, DC, 2.2GHz, 15 W)
Chipset	SoC
Socket	BGA1528
BIOS	AMI SPI 128 Mbit

#### Memory

Technology	Dual Channel DDR4 2400 MHz
Capacity	32 GB (16 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

#### Graphics

Controller	Intel® Gen9 Graphics DX 11/12
HDMI	HDMI 1.4b Max resolution up to 4096x2160p 24Hz
DisplayPort	DisplayPort 1.2, DP++ Max resolution up to 4096x2160@60Hz
VGA	1920x1200@60Hz
LVDS	Dual channel 48 bit up to 1920x1200@60Hz
eDP	eDP 1.4 Max resolution up to 3840 x 2160@60Hz
DVI	N/A
MultiDisplay	Triple Display

#### Expansion

PCIe	8 x PCIe x1 (Gen3)
PCI	N/A
mini-PCIe	N/A
M.2	N/A
SIM Socket	N/A

#### Ethernet

Controller/ Speed	COM-652P/COM-652M: 1 x Intel® I219LM with 10/100/1000 Mbps, supports AMT/vPro COM-652V: 1 x Intel® I219V with 10/100/1000 Mbps
Connector	N/A

#### I/O

HDMI	3 DDI ports support HDMI/DP/VGA/LVDS
DisplayPort	3 DDI ports support HDMI/DP/VGA/LVDS
USB	4 x USB 3.1 Gen1, 8 x USB 2.0
VGA	3 DDI ports support HDMI/DP/VGA/LVDS
LVDS	3 DDI ports support HDMI/DP/VGA/LVDS
eDP	1(shared with LVDS , optional)
TPM	TPM 2.0 onboard IC (optional)
GPIO	4 x GPI, 4 x GPO
Ethernet	1
Serial Port	Two UART Ports (SoC)
Audio	N/A

#### Storage

M.2	N/A
mSATA	N/A
SATA	3 x SATA3 (6Gb/s)
RAID	Intel® SATA RAID 0/1
eMMC	32GB (Optional)

#### Watchdog Timer

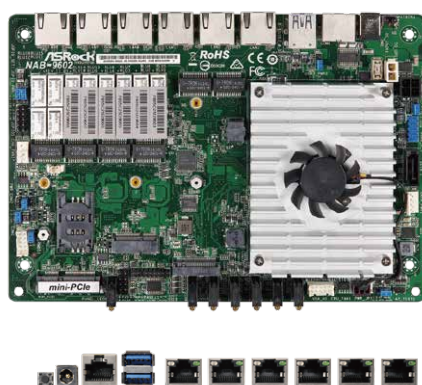
Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

#### Power Requirements

Input PWR	ATX: 12V±5%/5Vsb±5% AT: 12V±5%
Power On	AT/ATX Supported - AT : Directly PWR on as power input ready - ATX : Press button to PWR on after power input ready

#### Environment

Operating Temp	0°C ~ 60°C
Storage Temp	-40° C ~ 85° C
Operating Humidity	5% ~ 90%
Storage Humidity	5% ~ 90%



Model	NAB-9602		NAS-9602	
Form Factor	200x140mm (7.9-in x 5.5-in)		Networking BB	
Chipset/ CPU	Intel® Apollo Lake SoC Processor		Intel® Apollo Lake SoC Processor	
Socket	SoC		SoC	
Memory	Single Channel DDR3L 1866 MHz		Single Channel DDR3L 1866 MHz	
DIMM Slot	1		1	
PCI	N/A		N/A	
DP	N/A		N/A	
HDMI	N/A		N/A	
DVI	N/A		N/A	
D-Sub	1 x Header		N/A	
LVDS/ eDP	N/A	N/A	N/A	N/A
mini-PCle	1		1	
mSATA	N/A		N/A	
M.2 (SSD)	N/A		1	
M.2 (WiFi)	N/A		1	
SIM slot	1		1	
SATA	1 x SATA3 (6Gb/s)		1 x SATA3 (6Gb/s)	
RAID	N/A		N/A	
USB 3.1	2		2	
USB 2.0	2		N/A	
GPIO	4 x GPI, 4 x GPO		4 x GPI, 4 x GPO	
LAN	6 x Intel I211		6 x Intel I211 AT	
Serial	1 x console		1 x console	
Parallel	N/A		N/A	
TPM	1 x TPM Header		N/A	
PS/2	N/A		N/A	
Power	12V DC-in Jack 4-pin ATX PWR		12V DC-in Jack	
Operating Temperature	0 ~ 60° C		0 ~ 60° C	

## STORAGE



### MPCIE-M2

#### KEY FEATURES

- PCI Express x1 to M.2 port
- Supports M.2 Key-M 2242
- Supports AHCI, Port-Multiplier
- Supports Native Command Queuing



### M2X4-SATA-4P

#### KEY FEATURES

- [ASRock Industrial Exclusive]
- Only apply on ASRockind Comet Lake (W480E/Q470E) or future motherboards
  - PCI Express 3.0 to four SATA III ports
  - Supports AHCI, Port-Multiplier
  - Supports error reporting, recovery and correction
  - Supports Native Command Queuing



### M2-SATA-4P

#### KEY FEATURES

- PCI Express 3.0 to four SATA III ports
- Upstream PCIe Gen3 x1
- Downstream 4 SATA Gen3
- Supports AHCI, Port-Multiplier
- Supports error reporting, recovery and correction
- Supports Native Command Queuing
- Power consumption max to 0.847W

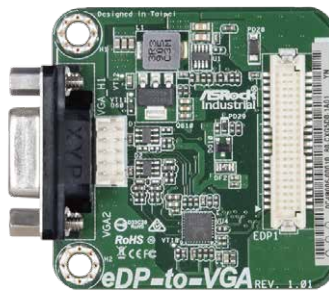
## DISPLAY



### M2-VGA-IPC

#### KEY FEATURES

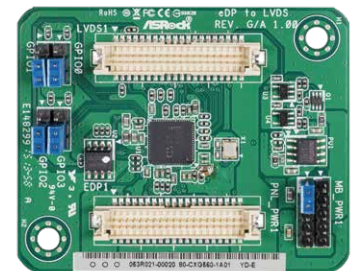
- Adopt AST1400 IC to support M.2 to VGA
- Support VGA resolution up to 1920 x 1200@60Hz



### eDP to VGA

#### KEY FEATURES

- Adopt RTD2168 IC to support eDP function to VGA
- Support VGA resolution up to 1920 x 1200@60Hz



### eDP-LVDS

#### KEY FEATURES

- Supported 16 types of panel
  - CH7511B IC to support eDP function to LVDS
  - Support LVDS resolution up to 1920x1080
  - Select and Set LVDS resolution by jumper
- \*Chrontel Flash limitation
- \*The Chrontel FW only can be flashed via ASRock Industrial MB

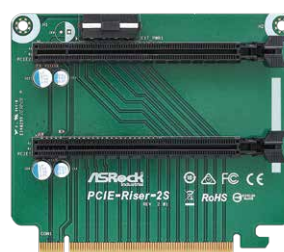
## BIFURCATION



### PCIe-Riser-3S

#### KEY FEATURES

- [ASRock Industrial Exclusive]
- Only apply on ASRockind motherboards
- PCIe x16 to one PCIe x8 and two PCIe x4
- Easy to install and use
- Upgradeability, flexibility and serviceability



### PCIe-Riser-2S

#### KEY FEATURES

- [ASRock Industrial Exclusive]
- Only apply on ASRockind motherboards
- PCIe x16 to two PCIe x8 slots
- Easy to install and use
- Upgradeability, flexibility and serviceability

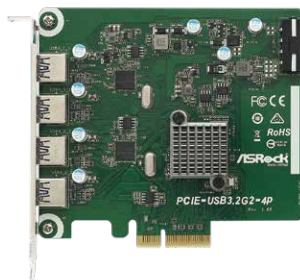
## OTHERS



### PCIe-2.5G PoE-4P

#### KEY FEATURES

- Intel® Gigabit Ethernet Controllers (up to 2.5GbE)
- PCI Express® x4 compliant
- Supports 4 Gigabit Ethernet MAC Controller and PHY ports
- Supports Power Con 4 pin input power boost up to 60W
- Supports 12V power Con input power boost up to 15W at 50V DC per PoE port
- Supports PoE (Power over Ethernet), IEEE 802.3af compliant per PoE port
- Powered Device (PD) auto detection and classification
- Supports IEEE 802.3u Auto-Negotiation



### PCIe-USB3.2G2-4P

#### KEY FEATURES

- PCI Express 2.0 x4 Compliant
- Four Independent USB 3.2 Gen2 Host Controllers
- Supports Bandwidth 10 Gb/s for Each Port



### MPCIE-CAN

#### KEY FEATURES

- Support two CANBus port module
- PCI Express base spec 1.1 compliant
- Compliant with CAN2.0A and CAN2.0B identifiers



# SUCCESSFUL CASES



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**Surveillance System**

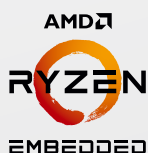
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# BUSINESS ALLIANCES

ASRock Industrial partners with the world leading CPU and software manufactures to co-develop advanced, reliable products and meet market needs.



**IoT Solutions  
Alliance**



**qualified  
device**  
internet of things



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