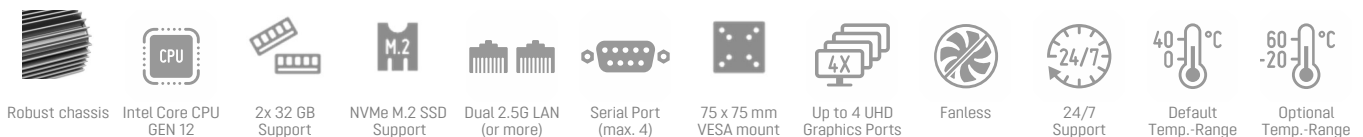## Box-PC Barebone
BPCAL02-i3
Intel Core i3-1215U Processor

FANLESS BOX-PC WITH INTEL CORE PROCESSOR IN A ROBUST CHASSIS

Shuttle's BPCAL02 fanless Box-PC Series is fueled by Intels 12th Generation (Alder Lake) Core processors in a ruggedized box design for high durability. It comes with modular I/O expansion capabilities and various mounting options. With advanced technology and highly flexible design, this industrial PC offers a reliable solution for a wide range of customized requirements in industrial environments.

Rear View

Front View
Delivery state of the barebone:

Example illustration with optional connections:

Images for illustration only

| Robust chassis | Intel Core CPU GEN 12 | 2x 32 GB Support | NVMe M.2 SSD Support | Dual 2.5G LAN (or more) | Serial Port (max. 4) | 75 x 75 mm VESA mount | Up to 4 UHD Graphics Ports | Fanless | 24/7 Support | Default Temp.-Range | Optional Temp.-Range |

ROBUST CHASSIS
- Fanless cooling system ■ Robust aluminium/steel chassis
- Dimensions (LWH): 16.9 x 24.5 x 5.7 cm (2.7 L) ■ Net weight: 2.85 kg
- IP Rating: IP30 ■ Mounting options: VESA, Ear mount and DIN Rail

OPERATING TEMPERATURE RANGE [1]
- **Standard**: 0 – +40 ℃ ■ **Industry**: -20 – +60 ℃ (Optional [1])
- Operating humidity: 20 ~ 80% (non-condensing)

OPERATING SYSTEM SUPPORT
- An operating system is not included.
- Supports Windows 10/11 and Linux (64-bit)

PROCESSOR
- intel Core i3-1215U Gen. 12 "Alder Lake" ULV processor, 15 W TDP
- Integrated Intel UHD graphics supports up to four UHD displays

RAM/SSD SUPPORT
- 2x 262-pin SO-DIMM slot ■ Supports up to 2x 32 GB DDR5-4800
- M.2-2280M slot supports one SSD card (PCIe X4 NVMe or SATA)

BACK PANEL CONNECTORS
- HDMI 2.0b ■ 4x USB 3.2 Gen 2 ■ Dual 2.5G LAN ■ COM Port RS232
- Mic-in and Line-out ■ DC-input (2.5/5.5 mm) ■ Power Button

OTHER FEATURES
- Hardware TPM v2.0 Infineon SLB9670VQ2 onboard

OPTIONAL FRONT PANEL CONNECTORS
- Up to three additional graphics ports:
  HDMI 2.0b, HDMI 1.4, DVI-I, DisplayPort 1.2 or VGA
- Up to three additional COM ports
- Up to 8 (16) additional USB 2.0 ports
- Up to four additional 2.5 Gbps LAN ports
- Up to four Digital I/O expansion kits (each with 4x Input and 4x Output)
- Input for car ignition lock enables delayed on/off switching of the BoxPC

LTE/WLAN OPTIONS
- LTE/4G kit with 2 antennas (LTE card and Nano-SIM not included)
- WLAN kit with 2 antennas Wi-Fi 6 (ax)

POWER SUPPLY
- DC-Input: 19V – optional wide range DC-input 9~36V
- External 90W/19V power adapter [1]

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## Models of the BPCAL02 series

Shuttle Model	Intel Gen12 ULV Processor	Cores (Threads)		Base/Turbo Clock		Smart Cache	Intel Graphics			TDP	UPC Bar Code
		P	E	P	E		Type	Max. Clock	EUs		
BPCAL02-i3	Core i3-1215U	2 (4)	4 (4)	1.2 / 4.4 GHz	0.9 / 3.3 GHz	10 MB	UHD	1.1 GHz	64	15 W	887993006666
BPCAL02-i5	Core i5-1235U	2 (4)	8 (8)	1.3 / 4.4 GHz	0.9 / 3.3 GHz	12 MB	Iris Xe	1.2 GHz	80	15 W	887993006673
BPCAL02-i7	Core i7-1255U	2 (4)	8 (8)	1.7 / 4.7 GHz	1.2 / 3.5 GHz	12 MB	Iris Xe	1.25 GHz	96	15 W	887993602165

[1] For the extended operating temperature range (-20 to +60℃) a special 150W power supply (Order No. PA1501) and industrial-grade RAM/SSD components with an operating temperature range of -40 ... +85 ℃ are required.

Caution: Only suitably trained persons may open the barebone and install optional components!

Shuttle®

PRODUCT SPECIFICATIONS

Front and Back Panel

Front panel

Back panel

Inside View

Front Panel

Back Panel

Dimensions
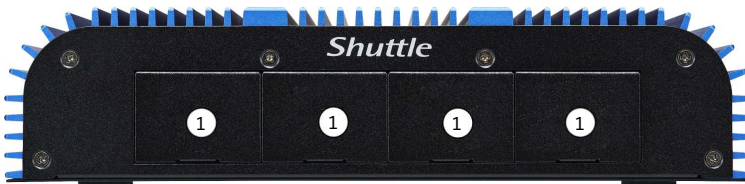
1. The front panel has four sections to support optional I/O expansion kits

   Example for optional I/O ports:

2. Audio Line Out (Headphones output)
3. Microphone input
4. 2.5G LAN Port (Intel i226V, black)
5. 2.5G LAN Port (Intel i226V , yellow)
6. 4x USB 3.2 Gen 2 Type A Port
7. HDMI 2.0b Port
8. COM port (RS232)
9. DC-in connector for power adapter
10. Power button
11. 2x WLAN antenna (optional)

12. Area for optional daughter boards
13. 2x SO-DIMM slot supports DDR5-4800
14. M.2-2280/2242 M slot for SSD card (NVMe/SATA)
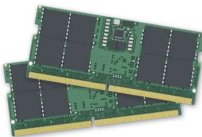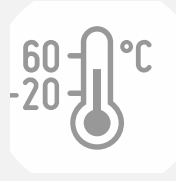15. Screw threads for VESA mount (75x75 mm)
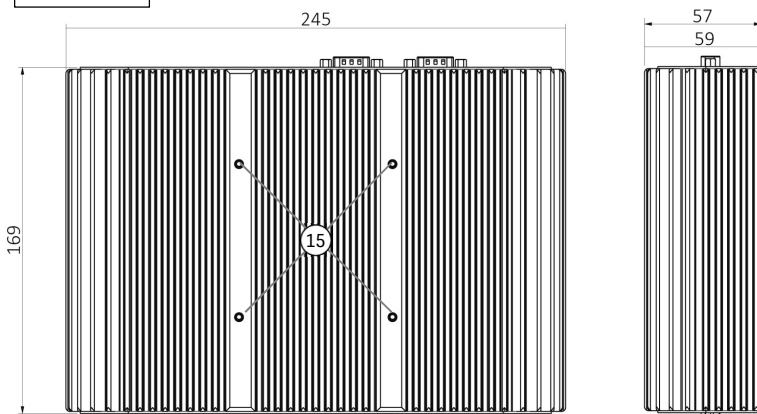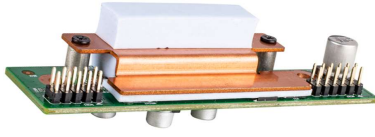
Dimensions:
Width: 245 mm (without optional ear mount)
Depth: 169 mm
Height: 57 mm (59 mm including feet)

Shuttle Computer Handels GmbH · Fritz-Strassmann-Str. 5 · 25337 Elmshorn · Germany
Tel. +49 (0) 4121-47 68 60 · Fax +49 (0) 4121-47 69 00 · sales@shuttle.eu   2 | 9   Date: 2024-06-12   **WWW.SHUTTLE.EU**

Barebone models and optional accessories
Caution: Only suitably trained persons may open the barebone and install optional components

Processor	The processor is permanently soldered onto the mainboard. The desired processor is selected with the barebone version:								
	Shuttle BoxPC Barebone Model	**Processor**	**P-Cores (Threads)**	**P-Cores Clock / GHz**	**E-Cores**	**E- Cores Clock / GHz**	**Cache**	**Graphics**
	BPCAL02-i3	Intel Core i3-1215U	2 (4)	1.0 – 4.4	4	0.9 – 3.3	10 MB	Intel UHD
	BPCAL02-i5	Intel Core i5-1235U	2 (4)	1.3 – 4.4	8	0.9 – 3.3	12 MB	Intel Iris Xe
	BPCAL02-i7	Intel Core i7-1255U	2 (4)	1.7 – 4.4	8	1.2 – 3.5	12 MB	Intel Iris Xe

Storage	Install memory components into the barebone system that you purchase from a specialized dealer: 1) **up to 2x 32 GB DDR5 SO-DIMM** (DDR5-4800 or higher) 2) **one M.2-2280 or M.2242 SSD card** with PCIe/NVMe or SATA interface

SO-DIMM DDR5

M.2-2280 SSD Card

Operating-temperature	The **permissible operating temperature** range with standard components is **0 … +40 ℃**. The **extended temperature range of –20 … +60℃** is only permissible with the following components: 1) **special 150W power adapter** with order no. **PA1501** 2) **industrial-grade RAM/SSD components** with an operating temperature range of **–40 … +85 ℃**

Mounting	The BoxPC can be placed horizontally on its rubber feed or can be mounted in the following three ways: See explanations on the next page

Mounting Method	Accessory Product
VESA-mount, 75x75 mm	from specialised dealers
Ear mount brackets (on both sides)	**MRS01**
Two clips for DIN Rail mounting	2x **MDR01**

MRS01

2x MDR01

WLAN	Perforations provided on the back panel of the BoxPC for mounting the WLAN antennas.

Description	Accessory Product
2x external antenna 2x antenna cable, 2x thermal pad	**CWL01**
M.2-2230 WLAN card	not included

WLAN card

CWL01

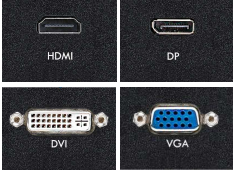| Extended Voltage Range	The DC input connector (2.5 / 5.5 mm) supports 19V input voltage and a suitable 90W power adapter is included in the scope of delivery. To be able to use other power sources, the input voltage range can be extended to 9 … 36 V DC by adding the optional voltage regulator modul with order no. **VOL01**.

VOL01

Optional I/O Ports Front Panel

Expansion concept with optional daughter boards

The front panel is subdivided into four sections to support optional expansion kits in order to add I/O ports.
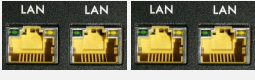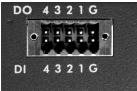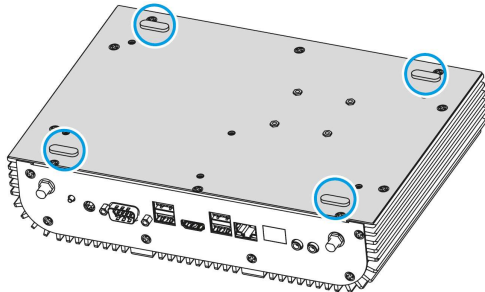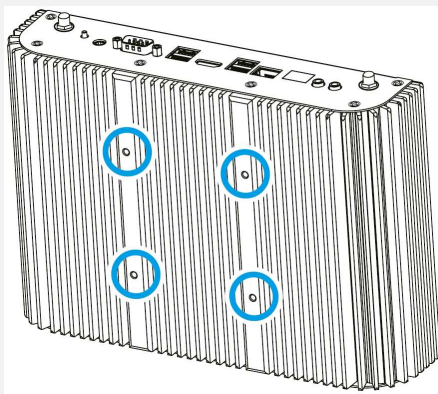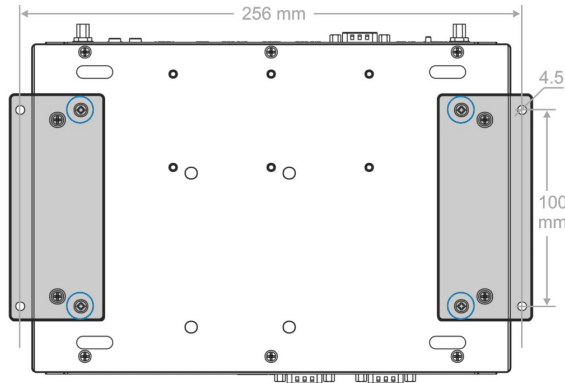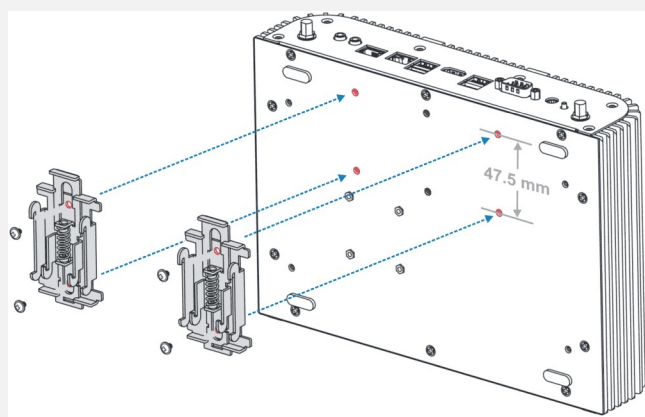
Every optional expansion kit is required to start from Section 1 (on the right) with the second kit occupying Section 2 etc. Some kits occupy two sections.

Front Panel

Expansion options:

PORT	ORDER No.	IMAGE	OCCUPIED SECTIONS	MAXIMUM KITS	NOTE
HDMI 2.0b HDMI 1.4 DP 1.2 DVI-I VGA	DHD11 DHD01 DDP01 DDV01 DVG01	HDMI DP DVI VGA	1	3	1) One HDMI 2.0b port is in the back panel (fix). 2) Three additional graphics ports can be added: HDMI 2.0b, HDMI 1.4, DisplayPort 1.2, DVI-I or VGA. Note: the fourth port is limited to DisplayPort or VGA and is not Plug&Play-capable.
4x USB 2.0	USB01	USB 2.0 USB 2.0	1	2 (4)	USB hub device (USB 2.0 ports allow up to 500mA/2.5W power output, but if only low power devices like mouse/keyboard are connected, then up to 4 USB kits can be used)
Single COM	CRS01	COM	1	1	Supports RS232 only (passive cable adapter)
Dual COM	CSD01	COM COM	2	1	Supports RS232/RS422/RS485 (with additional I/O controller chip)
LTE/4G Kit with 2 antennas	LTE01	OFF ON SIM1 SIM2	2	1	Not included: M.2 LTE/4G card and Nano SIM card Compatible with e.g. Huawei ME906S, Sierra EM7455, Quectel EM06E etc.
4x LAN ports with 2.5 Gbps	IDL01	LAN LAN LAN LAN	2	1	In addition to the existing 2x 2.5G LAN ports you can add four LAN ports with 2.5G speed Note: then only M.2 SSD cards with SATA interface are supported (no more PCIe/NVMe) Not approved for temperatures >40 °C.
Dig. I/O-Kit 4x In / 4x Out	DIO11	DO 4 3 2 1 G DI 4 3 2 1 G	1	4	up to four Digital I/O expansion kits each with 4x Input and 4x Output
Input for car ignition lock	DIO01		1	1	Input for car ignition lock enables delayed on/off switching of the BoxPC
Port for external Power Button	PWR01	REMOTE SW	1	1	Screw terminals for a cable for an external power button

Operating Positions and Mounting

	NOTE	IMAGE
Placed horizontally	The Shuttle Box-PC series BPCAL02 can be operated in horizontal position like a desktop PC standing on its rubber feet.	
VESA-mounted	The Shuttle Box-PC series BPCAL02 features four threaded M4 holes on the upper side for a standard 75 x 75 mm VESA mount, which allows for installation on to walls or large displays. The VESA mount is not included.	
Ear-mounted	The Shuttle Box-PC series BPCAL02 features four threaded M3 holes on the bottom, which allows for it to be attached to two Ear Mount brackets (optional accessory **MRS01**). The Box-PC can then be affixed to a surface with four M4 screws (mounting dimension: 256 mm x 100 mm).	
DIN-Rail-mounted	The Shuttle Box-PC series BPCAL02 features several threaded M3 holes on the bottom, which allows for installation of two DIN-Rail clips to mount this PC on a standard 35 mm DIN-Rail, e.g. inside equipment racks. The matching DIN-Rail clips are an optional accessory (2x **MDR01**) – please use two of them as shown in the picture.	

Shuttle Product Comparison

MODEL	BPCAL02 Series	BPCWL02 Series
Processor	**Intel Gen. 12 "Alder Lake-U"**, TDP= 15W, Intel 7 (10 nm) technology **BPCAL02-i3:** Intel Core i3-1215U **BPCAL02-i5:** Intel Core i5-1235U **BPCAL02-i7:** Intel Core i7-1255U	**Intel Gen. 8 "Whiskey Lake-U"**, TDP= 15W, 14 nm technology **BPCWL02-i3:** Intel Core i3-8145UE **BPCWL02-i5:** Intel Core i5-8365UE **BPCWL02-i7:** Intel Core i7-8365UE
RAM Support	2x SO DIMM, 262 pins max. 2x 32 GB DDR5-4800 (or higher)	2x SO DIMM, 260 pins max. 2x 32 GB DDR4-2400 (or higher)
Graphics	Core i5/i7: Intel Iris Xe Core i3: Intel UHD Graphics	Intel UHD Graphics
BIOS Chip	64 MB	Core i3: 16 MB Core i5/i7: 32 MB (supports Intel vPro/AMT)
TPM	Hardware TPM 2.0 Modul (Infineon SLB9670VQ2)	Hardware TPM 2.0 Modul (Infineon SLB9670VQ2)
M.2-2280 Slot	M.2-2280 slot for M.2 SSD cards Supports M.2 cards with 80 and 42 mm length Supports NVMe/PCIe Gen4 X4 and SATA	M.2-2280 slot for M.2 SSD cards Supports M.2 cards with 80 and 60 mm length Supports NVMe/PCIe Gen3 X4 and SATA
Audio	Realtek ALC888S	Realtek ALC662 or ALC888S
Dual LAN	1) Intel i226V (2.5 Gbps) 2) Intel i226V (2.5 Gbps)	1) Intel i211 (1 Gbps) 2) Intel i219LM (1 Gbps)
WLAN	M.2-2230E slot for optional WLAN module	M.2-2230E slot for optional WLAN module
Optional Connectors Front Panel	1) second and third graphics port: HDMI 2.0b, HDMI 1.4, DP, DVI-I or VGA 2) fourth graphics port: DP or VGA 3) COM port RS232 4) Dual COM-Port RS232/RS422/RS485 5) 4x USB 2.0 6) 4x LAN ports (2.5 Gbit) 7) Digital-I/O ports 8) Input for car ignition lock 9) LTE/4G kit with external antennas 10) Terminal screws for external power button	1) second graphics port: HDMI 1.4, DP, DVI-I or VGA 2) third graphics port: VGA 3) COM port RS232 4) Dual COM-Port RS232/RS422/RS485 5) 4x USB 2.0 6) 4x LAN ports (2.5 Gbit) 7) Digital-I/O ports 8) Input for car ignition lock 9) LTE/4G kit with external antennas 10) Terminal screws for external power button
Connectors Back Panel	HDMI 2.0b 4x USB 3.2 Gen 2 Type A (max. 10 Gbps) 2x Intel 2.5G LAN (i226V) Serial COM Port (RS232) Microphone input (3.5 mm) Audio Line-out / headphones (3.5 mm) Power Button DC input for power adapter (2.5 / 5.5 mm)	HDMI 1.4 4x USB 3.2 Gen 1 Type A (max. 5 Gbps) 2x Intel Gigabit LAN (i211/i219LM) Serial COM Port (RS232) Microphone input (3.5 mm) Audio Line-out / headphones (3.5 mm) Power Button DC input for power adapter (2.5 / 5.5 mm)
DC-Input	Supports 19 V DC-input voltage (optional with extended voltage range: 9-36 V)	Supports 19 V DC-input voltage (optional with extended voltage range: 9-36 V)
Power Adapter	90 W (19V, 4,74 A) with 3-pin AC plug with earth contact (optional 150 W power adapter)	90 W (19V, 4,74 A) with 3-pin AC plug with earth contact (optional 150 W power adapter)
Other optional Accessories	1) Extended DC voltage range: 9-36 V 2) Ear Mount brackets 3) DIN-Rail clip (use two of them) 4) WLAN module with external antennas	1) Extended DC voltage range: 9-36 V 2) Ear Mount brackets 3) DIN-Rail clip 4) WLAN module with external antennas
Temperature Range	0 – +40 °C (optional -20 – +60 °C)	0 – +40 °C (optional -20 – +60 °C)

SHUTTLE Box-PC Barebone BPCAL02-i3 — SPECIFICATIONS
Caution: Only suitably trained persons may open the barebone and install optional components!

FANLESS AND SILENT	Equipped with passive cooling, no fan noise at all Perfect to be used in noise-sensitive environments Fanless, dust-free and thus virtually maintenance-free
24/7 NONSTOP OPERATION	This device is approved for 24/7 permanent operation. Requirement: Free circulation of air amongst the PC must be guaranteed.
CHASSIS	Durable and rugged chassis made of aluminium and steel. Passive cooling system with specially designed fins to maximize heat dissipation. Dimensions: 16,9 x 24,5 x 5,7 cm (LWH) = approx. 2,7 litres Weight: 2.85 kg net (Barebone without RAM/SSD and optional expansions) IP-rating: IP30
OPERATING POSITIONS AND MOUNTING	1) Desktop: The unit can be placed horizontally to stand on its feet. 2) VESA Mount: The unit can be affixed to a 75 mm x 75 mm VESA bracket. For this purpose, four M4x6L screws are required to be screwed into the chassis from the top. 3) Side Brackets (**MRS01** = 2 brackets): The unit can be mounted using two optional 256 mm x 100 mm ear-mount brackets. For this purpose, four M3x6L screws are required to be screwed into the chassis from the bottom. 4) DIN-Rail Clips (**2x MDR01**): Mounted on a standard 35 mm DIN-Rail, e.g. inside equipment racks. This requires two standard DIN rail clips, each of which is attached to the underside of the BoxPC with two M3 screws (hole spacing: 47.5 mm). Notes: VESA bracket, Ear-Mount and DIN-Rail clips are not included. Vertical mounting is permitted in any orientation.
OPERATING SYSTEM	This barebone system comes without operating system. It is compatible with Windows 10/11 (64-bit) and Linux (64-bit).
PROCESSOR	Model: Intel Core i3-1215U (ULV) 12th Generation Intel Core, code name "Alder Lake-U" System-on-a-chip architecture (SoC) with integrated memory and graphics controller FCBGA1744 package - directly soldered onto the mainboard Processor cores: total 6 - Performance Cores: 2 P-Cores (4 Threads) at 1.2 / 4.4 GHz basis/turbo clock - Efficient Cores: 4 E-Cores at 0.9 / 3.3 GHz basis/turbo clock Smart Cache: 10 MB TDP wattage: 15 W maximum Manufacturing process: Intel 7 (10 nm) Maximum Tjunction Temperature: 100 °C
INTEGRATED GRAPHICS	Intel® UHD Graphics with 64 Execution Units (EU) Graphics Max Dynamic Frequency: 1.10 GHz This PC supports up to four independent screens with up to 4K/60Hz (Ultra HD 3840×2160 resolution).

Display	Connector outside	Connector onboard	Note
No. 1	HDMI 2.0b (on the back panel)	—	built-in (fixed)
No. 2	optional: HDMI, DP, DVI-I, VGA	21-pin DDI onboard	
No. 3	optional: HDMI, DP, DVI-I, VGA	21-pin DDI onboard	
No. 4	optional: DP, VGA	31-pin eDP onboard	no PnP *)

*) Note: the fourth connector does not support Plug-and-Play
The following optional accessories are available for additional graphics connections:
1) HDMI 1.4 (**DHD01**)
2) HDMI 2.0b (**DHD11**)
3) DisplayPort 1.2 (**DDP01**)
4) DVI-I (**DDV01**)
5) VGA / D-Sub (**DVG01**)

UEFI BIOS	Supports resume after power failure Supports Wake on LAN (WOL) Supports Power on by RTC Alarm Supports boot from M.2 SSD cards and USB devices AMI BIOS in 64 MB EEPROM with SPI interface Supports hardware monitoring and Watchdog function Supports Unified Extensible Firmware Interface (UEFI) Supports Intel vPro Essential
TPM MODULE	H/W-TPM V2.0: Hardware Trusted Platform Module V2.0 (Infineon SLB9670VQ2)

	Power Adapter	Operating Temperature	Output Wattage	AC Input	DC Output	AC Cable
POWER ADAPTER [1]	Supplied model	0 to +40°C	Max. 90 W	100-240V, 50/60Hz	19V, max. 4.74A	Schuko to IEC 60320 C5
	PA1501 (optional)	-20 to +60°C	Max. 150 W (95W at 60°C)	90-260V, 50/60Hz	19V, max. 7.89A	Schuko to IEC 60320 C13

DC Connector: 5.5/2.5 mm (outer/inner diameter)
AC mains cable: 3 pins, ca. 1.8 m length, with C5/C6 coupler (called "Mickey Mouse" or "Clover-leaf") for the power adapter and CEE-7/7 plug with earth-contact (type E+F) for the power outlet
Note: The DC input voltage range can optionally be extended to support 9-36 V.

MEMORY SUPPORT [1]
2x SO-DIMM slot with 262 pins
Supports DDR5-4800 (PC5-38400) SDRAM at 1.1 V
Supports Dual Channel mode
Supports a maximum of 32 GB per DIMM,
maximum total size: 64 GB

M.2 SLOT FOR SSDs [1]
The M.2 2280 M slot provides the following interfaces:
- PCI-Express Gen. 4.0 X4
- SATA v3.0 (max. 6 Gbps)
It supports M.2 cards with a width of 22 mm
and a length of 42 or 80 mm (type 2242, 2280).
Supports M.2 SATA SSDs (with B+M key) and M.2 PCIe NVMe SSDs (with M key) with auto detect

AUDIO
Audio Realtek® ALC888S High-Definition Audio
Two analog audio connectors (3.5 mm) on the back panel:
1) 2 channel line out (headphones)
2) microphone input
Digital multi-channel audio output: via HDMI and optional DisplayPort

DUAL 2.5G LAN
Dual network with RJ45 ports and Intel i226V network chips
Supports 10 / 100 / 1000 / 2500 MBit/s operation
Supports WAKE ON LAN (WOL)
Supports network boot by Preboot eXecution Environment (PXE)

BACK PANEL CONNECTORS
HDMI 2.0b
4x USB 3.2 Gen 2 Type A (max. 10 Gbps)
2x Intel 2.5G LAN (RJ45, i226V)
Serial COM port (RS232)
Microphone input (3.5 mm)
Audio Line-out / Headphones (3.5 mm)
DC-input connector for external power adapter (2.5 / 5.5 mm)

OPTIONAL FRONT PANEL CONNECTORS
The front panel is subdivided into four sections to support optional expansion kits with daughter boards in order to add I/O ports. Caution: Only suitably trained persons may open the barebone and install optional components!
1) up to three additional graphics ports:
- HDMI 2.0b (**DHD11**)
- HDMI 1.4 (**DHD01**)
- DisplayPort 1.2 (**DDP01**)
- DVI-I (**DDV01**)
- D-Sub/VGA (**DVG01**)
Attention: only two additional HDMI and DVI ports are possible
2) one COM port RS232 (**CRS01**)
3) two COM ports RS232/RS422/RS485 - occupies two sections (**CSD01**)
4) 4x USB 2.0 - can be installed twice (Note: USB 2.0 ports allow up to 500mA/2.5W power output, but if only low power devices like mouse/keyboard are connected, then up to 4 USB kits can be used) (**USB01**)
5) up to four Digital I/O expansion kits, each with 4x Input and 4x Output (**DIO11**) [2]
6) Input for car ignition lock enables delayed on/off switching of the BoxPC (**DIO01**)
7) LTE/4G kit with two external Antennas (**LTE01**). Not included: LTE card in M.2-3042 format (e.g. Huawei ME906S, Sierra EM7455, Quectel EM06E) and Nano-SIM card.
8) Terminal screws to connect a cable for an external Power Button (**PWR01**)

FURTHER OPTIONAL ACCESSORIES
1) Wide range DC-input 9~36 V, instead of only 19 V (**VOL01**)
2) Ear-mount brackets, mounting dimensions: 256 mm x 100 mm (**MRS01**)
3) DIN-Rail clip (special clip has holes without thread) (**2x MDR01**)
4) WLAN module with two external antennas (**WMAX2001+CWL01**)

	Option	Operating temperature	Relative humidity
ENVIRONMENTAL SPECIFICATIONS	Standard	0 to +40°C	20-80 %, non-condensing
	Industrial	-20 to +60°C	20-80 %, non-condensing

Notice the footnote [1]

CONFORMITY AND CERTIFICATIONS	EMI: CE, FCC Class A, VCCI, RCM, BSMI Safety: CB, cTUVus, BSMI Other: RoHS, ErP, CEC This device is classed as a technical information equipment (ITE) in Class A , Class A is for product used in commercial and industrial areas. The CE-mark approves the conformity by the EU directives: (1) 2014/30/EU relating to electromagnetic compatibility (EMC), (2) 2014/35/EU relating to Electrical Equipment designed for use within certain voltage limits (LVD), (3) 2009/125/EC relating to eco design requirements for energy-related products (ErP)

[1] for safe operation in the extended operating temperature range (-20 to +60°C), the optional 150W power supply (**PA1501**) is required and industrial-grade RAM/SSD components with an operating temperature range of -40 ... +85 °C are also required

[2] The DIO expansion kit (DIO11) comes with the appropriate plug connector included. The digital inputs recognize "Low" at 0-3 Volt and "High" at 5-30 Volt (or open). The digital outputs can handle 0-30V (open collector) with up to 30 mA current.