Box-PC
BPCWL02

FANLESS SHUTTLE BOX-PC WITH INTEL ULV PROCESSOR IN A ROBUST CHASSIS

Shuttle's new generation BPCWL02 IPC Series in a ruggedized box design for high durability consists of compact fanless IPC systems with modular expansion for wide-range industrial applications.
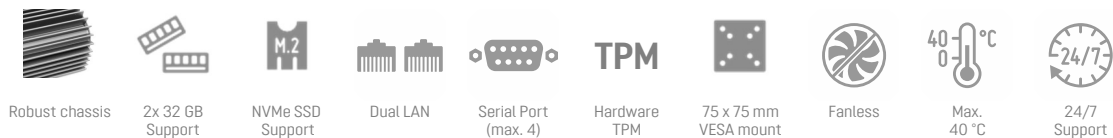
Images for illustration only.
Illustration shows optional accessories.

Front View
(with optional I/O ports)

Rear View

| Robust chassis | 2x 32 GB Support | NVMe SSD Support | Dual LAN | Serial Port (max. 4) | Hardware TPM | 75 x 75 mm VESA mount | Fanless | Max. 40 °C | 24/7 Support |

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 (barebone) ■ Operating temperature: 0 ~ 40 °C (-20 ~ 60 °C on request) ■ Operating humidity: 0 ~ 90% ■ IP Rating: IP30 ■ Mounting options: VESA 75x75 mm, Ear mount 256x100 mm and DIN Rail

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

PROCESSOR
■ Intel "Whiskey Lake" ULV processor, 15 W TDP
■ Available processor models: Core i7-8665UE, Core i7-8565U, Core i5-8365UE, Core i5-8265U, Core i3-8145UE, Celeron 4305UE

GRAPHICS
■ Integrated Intel UHD graphics, 4K support (features depending on processor) ■ Optionally supports up to three independent displays

MEMORY SUPPORT
■ 2x 260-pin SO-DIMM slot
■ Supports Dual Channel, up to 2x 32 GB DDR4-2400

STORAGE
■ M.2-2280/2260 M slot supports one SSD card (supports PCIe X1 NVMe and SATA interface)

BACK PANEL CONNECTORS
■ HDMI 1.4 ■ 4x USB 3.2 Gen 1 ■ Dual Gigabit LAN (Intel i219LM/i211) ■ RS232 serial COM (D-Sub) ■ Mic-in and Line-out (Realtek ALC662) ■ DC-input 19V ■ Power Button

OTHER FEATURES
■ Hardware TPM v2.0 Infineon SLB9670VQ2 onboard
■ AMI BIOS
■ Embedded I/O controller: ITE IT8528E/FX

OPTIONAL FRONT PANEL CONNECTORS
■ Up to two additional graphics ports:
   HDMI 2.0/1.4, DVI-I, DisplayPort 1.2 or D-Sub/VGA
■ Up to three additional COM ports
■ Up to eight additional USB 2.0 ports

POWER SUPPLY
■ External 90W/19V power adapter
■ AC input 100~240V 50~60 Hz, 3-pin connector
■ Optional wide range DC-input 9~36V
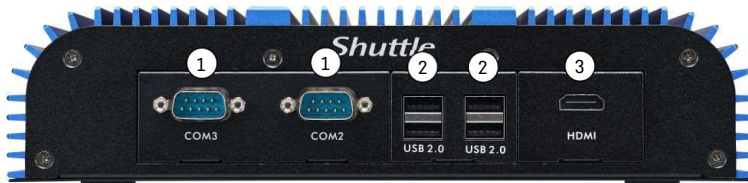
First models available from stock in EU:

Product	Type	Processor	UPC Codes
BPCWL02 (Core i3)	BTO System	Intel Core i3-8145UE	887993002729 887993003474
BPCWL02 (Core i5)	BTO System	Intel Core i5-8265U Intel Core i5-8265UE	887993002743 887993003481

Operating Temperature Range:

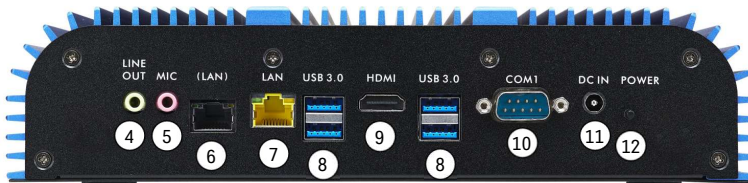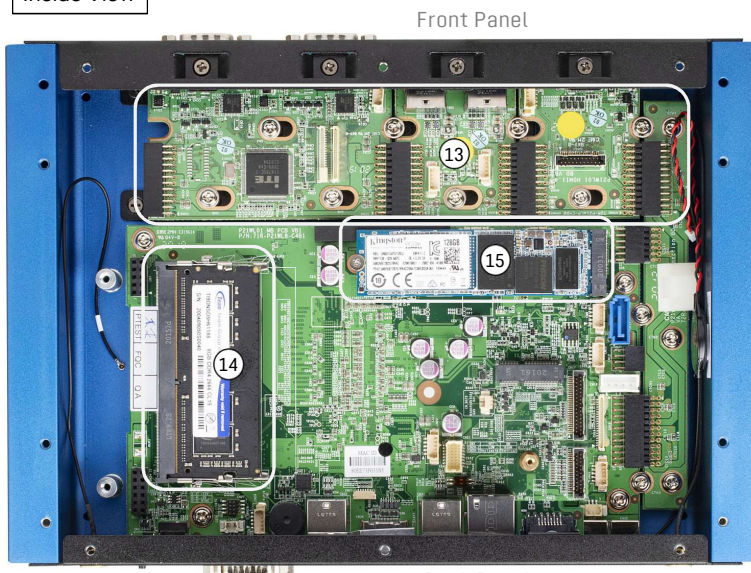| Product	Temp.-Range	Key Components
BPCWL02	0 ~ +40 °C	90 W power adapter Standard RAM and SSD
BPCWL03	-20 ~ +60 °C	150 W power adapter RAM/SSD for wide range temp.

Front and Back Panel

Front panel

1. Optional: Dual COM ports support RS232/RS422/RS485
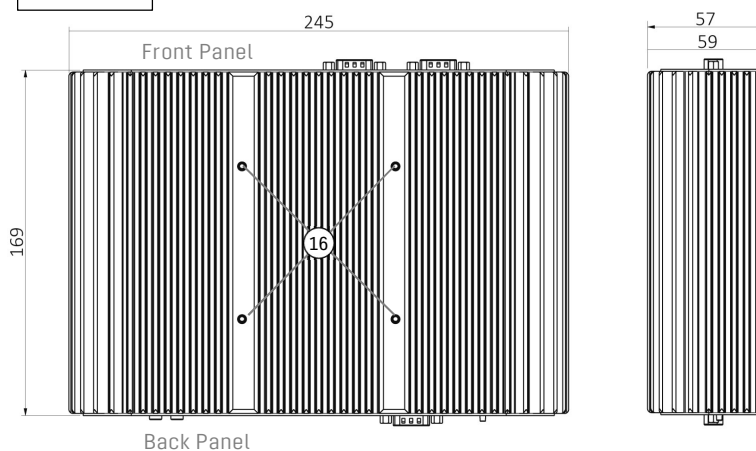2. Optional: 4x USB 2.0 port
3. Optional: HDMI 1.4/2.0

Back panel

4. Audio Line Out (Headphones output)
5. Microphone input
6. Gigabit LAN port (Intel i211)
7. Gigabit LAN port (Intel i219LM)
8. 4x USB 3.2 Gen 1 Type A port
9. HDMI 1.4 port
10. COM port (RS232)
11. DC-in connector for power adapter
12. Power button

Inside View

Front Panel

Back Panel

13. Area for optional daughter boards
14. 2x SO-DIMM slot supports DDR4-2400
15. M.2-2280/2260 M slot for SSD card (NVMe/SATA)
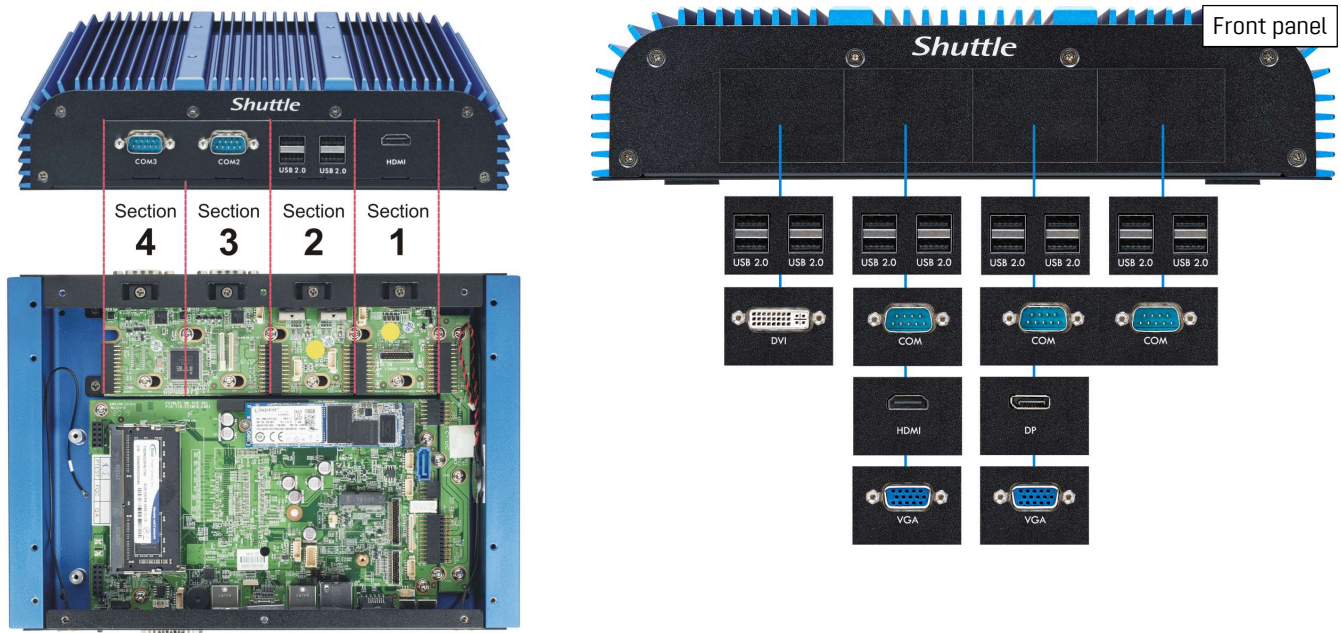16. Screw threads for VESA mount (75x75 mm)

Dimensions

Front Panel

245

169

16

57

59

Back Panel

Dimensions:
Width: 245 mm (without optional ear mount)
Depth: 169 mm
Height: 57 mm (59 mm including feet)

Optional Accessories

Expansion concept with optional daughter boards

The front panel is subdivided into four sections to support optional expansion kits with daughter boards in order to add I/O ports. Every expansion is required to start from Section 1 with the second kit occupying Section 2 etc.
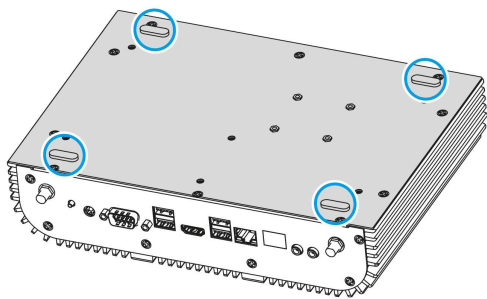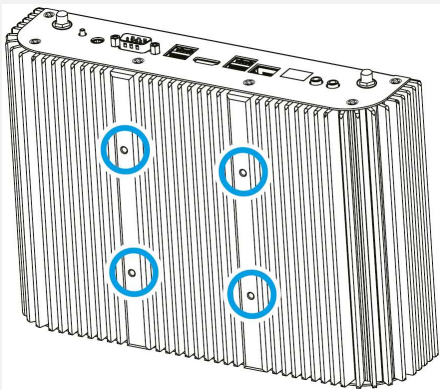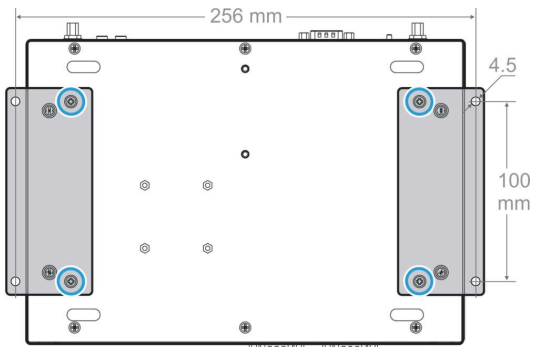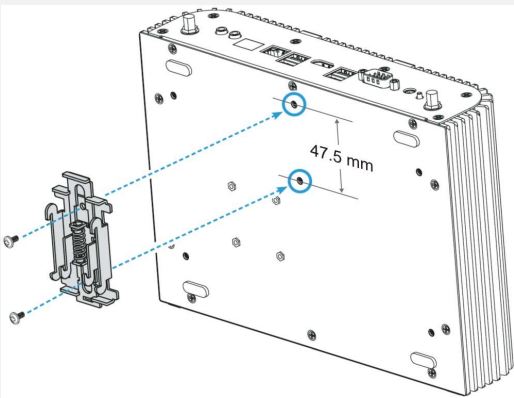

Optional Expansion Kits

PORT	IMAGE	OCCUPIED SECTIONS	MAXIMUM KITS	NOTE	
HDMI 1.4 HDMI 2.0	DP	1	1	DDI Interface	The mainboard provides two onboard connectors for optional expansion kits with graphics ports: - one 21-pin DDI and - one 31-pin eDP interface. The eDP interface does not support audio and PnP.
DisplayPort 1.2	DP	1	1	DDI Interface	
DVI-I	DVI	1	1	DDI Interface	
D-Sub/VGA	VGA	1	2	DDI or eDP Interface	
4x USB 2.0	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	COM	1	1	Supports RS232 only	
Dual COM	COM COM	2	1	Supports RS232/RS422/RS485	
Wide range DC-Input	DC IN	—	1	DC-Input supports 9~36V (instead of only 19V)	
WLAN + BT		—	1	Supports WLAN-n/ac and BT 4.0	
2x Ear Mount Bracket		—	1	Allows the BoxPC to be attached to surfaces	

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Operating Positions and Mounting

	NOTE	IMAGE
Placed horizontally	The Shuttle Box-PC BPCWL02 can be operated in horizontal position like a desktop PC standing on its rubber feet.	
VESA-mounted	The Shuttle Box-PC BPCWL02 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 BPCWL02 features four threaded M3 holes on the bottom, which allows for it to be attached to two Ear Mount brackets (optional accessory). The Box-PC can then be affixed to a surface with four screws (mounting dimension: 256 mm x 100 mm).	
DIN-Rail-mounted	The Shuttle Box-PC BPCWL02 features two threaded M3 holes on the bottom, which allows for installation on a standard 35 mm DIN-Rail, e.g. inside equipment racks. The DIN-Rail clip is not included.	

SHUTTLE Box-PC PBCWL02 — SPECIFICATIONS

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) The unit can be placed horizontally to stand on its feet. 2) 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) 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) Mounted on a standard 35 mm DIN-Rail, e.g. inside equipment racks Notes: VESA bracket, Ear-Mount and DIN-Rail clip 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 (64-bit) and Linux (64-bit).
PROCESSOR	8th Gen. Intel Core ULV processor "Whiskey Lake",15W TDP

Available processors	Cores/ Threads	Cache	Clock (Turbo)	vPro	Intel UHD Graphics
Intel Core i7-8665UE	4 / 8	8 MB	1.7~4.4 GHz	Yes	UHD 620, 300~1150 MHz
Intel Core i7-8565U	4 / 8	8 MB	1.8~4.6 GHz	-	UHD 620, 300~1150 MHz
Intel Core i5-8365UE	4 / 8	6 MB	1.6~4.1 GHz	Yes	UHD 620, 300~1050 MHz
Intel Core i5-8265U	4 / 8	6 MB	1.6~3.9 GHz	-	UHD 620, 300~1100 MHz
Intel Core i3-8145UE	2 / 4	4 MB	2.2~3.9 GHz	-	UHD 620, 300~1000 MHz
Intel Celeron 4305UE	2 / 2	2 MB	2.0 GHz	-	UHD 610, 300~1000 MHz

	System-on-a-chip architecture (SoC) with integrated memory and graphics controller FCBGA1528 package - directly soldered onto the mainboard Supports 64-bit, VT-x (EPT), VT-d, Enhanced SpeedStep, NX bit, AES-NI, SSE 4.1/4. Note: the UE processors support Intel vPro and offer long-life availability
INTEGRATED GRAPHICS	Intel UHD Graphics 610/620 (features depending on processor model) Supports up to three independent screens: 1) HDMI 1.4 on the back panel 2) optional HDMI 1.4/2.0, DisplayPort 1.2 or DVI-I (DDI interface) 3) optional D-Sub/VGA (eDP interface, limitations: PnP support)
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 EEPROM with SPI interface - Non-vPro version (Consumer) – SPI ROM size is 16MB - vPro version (Corporate) – SPI ROM size is 32MB Supports hardware monitoring and watch dog function Supports Unified Extensible Firmware Interface (UEFI) Supports Firmware-TPM (fTPM) Version 2.0
TPM MODULE	Hardware Trusted Platform Module (Infineon SLB9670VQ2 TPM 2.0)
POWER ADAPTER	External 90 W power adapter (fanless) Input: 100~240 V AC, 50/60 Hz Output: 19 V DC, 4.74 A, max. 90 W 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 DC Input Connector: 5.5 / 2.5 mm (outer/inner diameter) Note: The DC input voltage range can optionally be extended to support 9-36 V. Note: for 150W / 7.89A power adapter for -20 ~ +60 °C temperature range on request (BPCWL03)

MEMORY SUPPORT	2x SO-DIMM slot with 260 pins Supports DDR4-2400 (PC4-19200) SDRAM at 1.2 V Supports Dual Channel mode Supports a maximum of 32 GB per DIMM, maximum total size: 64 GB Supports two unbuffered DIMM modules (no ECC or registered)
M.2 SLOT FOR SSDs	The M.2 2280 M slot provides the following interfaces: - PCI-Express Gen. 2.0 X1 - SATA v3.0 (max. 6 Gbps) It supports M.2 cards with a width of 22 mm and a length of 60 or 80 mm (type 2260, 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® ALC 662 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 GIGABIT LAN	Dual network with two RJ45 ports Used network chips: 1) Intel i211 Ethernet Controller with MAC, PHY and PCIe interface 2) Intel i219LM PHY connected to the MAC of the processor Supports 10 / 100 / 1000 MBit/s operation Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE) Supports Teaming mode
BACK PANEL CONNECTORS	Power Button HDMI 1.4 4x USB 3.2 Gen 1 Type A (max. 5 Gbps) 2x Intel Gigabit LAN (RJ45, i211/i219LM) Serial COM port (RS232) Microphone input (3.5 mm) Audio Line-out / Headphones (3.5 mm) DC-input connector for external power adapter
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. The following optional accessory kits are available: 1) second graphics port: HDMI 1.4/2.0, DisplayPort 1.2 or D-Sub/VGA 2) third graphics port: D-Sub/VGA 3) 4x USB 2.0 (can be installed twice) 4) one COM port RS232 5) two COM ports RS232/RS422/RS485 (occupies two sections)
FURTHER OPTIONAL ACCESSORIES	1) Wide range DC-input 9~36 V (instead of only 19 V) 2) Ear-mount brackets (mounting dimensions: 256 mm x 100 mm) 3) WLAN 802.11n/ac and BT 4.0 (RTL8821CE) with two external antennas
ENVIRONMENTAL SPECIFICATIONS	Operating temperature range: 0~40 °C Relative humidity, non-condensing: 0~90 % Industrial grade temperature range: -20 ~ +60 °C on request only (Model BPCWL03)
CONFORMITY AND CERTIFICATIONS	EMI: CE, FCC Class A, VCCI, RCM, BSMI* Safety: CB, cTUVus, BSMI* Other: RoHS, ErP, CEC * BSMI only available for standard operating temperature (0 ~ 40 °C) 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)