BAREBONE
XPC slim
DH670

ROBUST 1.3-LITRE SLIM PC SUPPORTS INTEL CORE GEN. 12 PROCESSORS "ALDER LAKE-S" AND FOUR UHD DISPLAYS

The Shuttle XPC slim Barebone DH670 with H670 chipset houses the performance of Intel's 12th generation Core desktop processors (codenamed Alder Lake-S) for socket LGA1700 in a compact 1.3-litre format. The DH670 allows for four Ultra HD displays to be operated at the same time via 2x HDMI and 2x DisplayPort. It also offers Dual Intel LAN, four USB 3.2 Gen 2 and COM ports. The slim metal chassis comes with a VESA mount included, provides versatile connectivity and reliable operation in environments with ambient temperatures of up to 50 °C. This platform is targeted at professional applications such as Digital Signage, POS, POI, gambling machines, office, healthcare and industry.

2x 32 GB SUPPORT | 2x HDMI 2.0b | 2x DISPLAY-PORT 1.4 | QUAD 4K UHD | NVMe SSD SUPPORT | 2.5" HDD/SSD SUPPORT | DUAL LAN | DUAL COM | VESA MOUNT | WLAN / LTE OPTIONAL | Max. 50 °C | 24/7 SUPPORT

SLIM DESIGN
■ Slim 1.35-litre metal chassis, black ■ Dimensions: 190 x 165 x 43 mm (LWH) ■ Including VESA mount (75/100 mm) ■ Supports 24/7 Nonstop Operation ■ Operating temperature: 0~50 °C (non-condensing)

OPERATING SYSTEM
■ An operating system is not included
■ Supports Windows 10, Windows 11 and Linux (64-bit)

PROCESSOR SUPPORT
■ Socket LGA1700 supports Intel Core i9/i7/i5/i3, Pentium Gold und Celeron processors Gen. 12, codename "Alder Lake-S", max. 65W TDP
■ Includes heatpipe cooling system

GRAPHICS
■ Integrated Intel HD graphics, 4K support (features depend on processor) ■ Supports four independent UHD displays

CHIPSET
■ Intel H670 Chipset

MEMORY SUPPORT
■ 2x 260-pin SO-DIMM slot ■ Supports DDR4-3200/2666/2400
■ max. 2x 32 GB

STORAGE – SATA / M.2
■ 1x 2.5" bay for SATA hard disk or SSD ■ 1x M.2-2280M slot (supports PCIe 4.0 x4 NVMe or SATA) ■ 1x M.2-2230E for optional WLAN module

CONNECTORS
■ 2x HDMI 2.0b ■ 2x DisplayPort 1.4 ■ optional VGA ■ SD card reader ■ 2x audio (line out, mic) ■ 4x USB 3.2 Gen2 ■ 4x USB 3.2 Gen1 (1x Type-C) ■ 2x Intel Gigabit LAN (RJ45) ■ 2x COM port (1x RS232/422/485) ■ Connector for external power button ■ "Always on" Jumper

POWER SUPPLY
■ External 120W/19V power adapter

OPTIONAL ACCESSORIES
■ WLAN Module (WLN-M (ac)/WLN-M1 (ax)) ■ Vertical Stand (PS02) ■ VGA Port (PVG01) ■ Rackmount kit (PRM01) ■ Cable for external power button (CXP01) ■ DIN-Rail mounting kit (DIR01) ■ LTE-kit (WWN03)

MODELS OF THE DH6xx SERIES

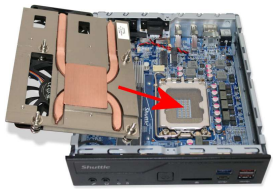
Product	Chip	Graphics Ports	Displays	LAN	M.2-2280 Slot	COM	DC-In	VESA Mount	UPC Code
DH610S	H610	HDMI 2.0b + DP 1.4	max. 2 *)	1G (Intel)	PCIe v3.0 X4	–	19V	–	887993005126
DH610	H610	HDMI 2.0b + 2x DP 1.4	max. 3	1G+2.5G (Intel)	PCIe v3.0 X4	2	12V + 19V	included	887993005119
DH670	H670	2x HDMI 2.0b + 2x DP 1.4	max. 4	2x 1G (Intel)	PCIe v4.0 X4	2	19V	included	887993004983

*) max. 3 displays with optional VGA port (accessory PVG01)

PRODUCT FEATURES

Robust, stylish and particularly small

You should have held it in your own hands to see how small it actually is. At barely a volume of 1.35 litres, its steel chassis gives it the appropriate stability required for professional applications such as digital signage. Despite its dimensions of 19 x 16.5 x 4.3 cm (LWH), the overall system performance is very high thanks to support of Intel Core desktop processors. The interior of the DH670 is very tidy too so that it won't take long to set up. Its sleek and stylish looks let it easily find a place in both home and office environments.



Low noise thanks to heatpipe cooling system

An active dual-fan heatpipe cooling system ensures whisper-quiet operation and system stability.

Supports extended temperature range and 24/7 operation

The Shuttle XPC slim Barebone DH670 is officially approved for 24/7 permanent operation. Thanks to its efficient cooling, this PC runs highly reliably making it perfectly suitable for digital signage and POI/POS applications - even at ambient temperatures of up to 50 °C (non-condensing).
Caution: For high ambient temperatures over 40 °C we strongly recommend to use SSDs.

Supports 12th Generation Intel® Core™ processors

"Alder Lake-S" is the codename for Intel's 12th Generation of Intel® Core™ Desktop Processors for socket LGA1700 introduced in 2021/2022 along with the 600-Series chipsets. The 12000 series processors feature a new hybrid design combining a number of performance cores (P-cores) and efficiency cores (E-cores). Get the performance you need, where you need it – whether you're a gamer, creator, streamer, or everyday user.

Quad 4K Display support

The DH670 features four digital video outputs: two HDMI 2.0b and two DisplayPorts (DP 1.4) which all can run at 4K (3840 x 2160 / 2160p) high resolution at 60 Hz frames per second. Furthermore, the DH670 supports an optional D-Sub/VGA port. The PC supports a maximum of four displays.

One M.2-Slot for SSD cards

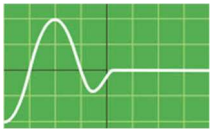
The M.2-2280 slot supports one M.2 SSD storage card with NVMe PCIe 4.0 X4 or SATA interface. Type 2280 means, it supports the usual M.2 cards with a width of 22 mm and a length of 80 mm, but also 2242 and 2260 standard cards are supported.

Dual Intel Gigabit LAN Network

The Shuttle XPC slim Barebone DH670 supports Dual Gigabit LAN with Intel network adapters, which are popular for their excellent performance and driver compatibility and are the preferred choice for professional environments.

VESA mount

The supplied 75/100mm VESA mount allows for installation on to walls or monitors which is particularly interesting for the industry segment, company buildings and public institutions. Other than this, the chassis bears numerous threaded holes (M3) enabling it to be fitted almost anywhere.



Power on after Power fail

The BIOS setup provides a "Power-On after Power Fail" function that can be found under "Power Management Configuration". As the name indicates, this function determines the PC's behaviour after power failure: (1) unconditional power on, (2) restore former status (3) keep system turned off (4) Power-On by LAN or (5) Power-On by Real-Time-Clock. As a matter of the nature of this function, it may fail after short power failures. This is why the DH670 also comes with a hardware-based solution. By removing Jumper JP2 (see image) the system will start unconditionally once power is applied.

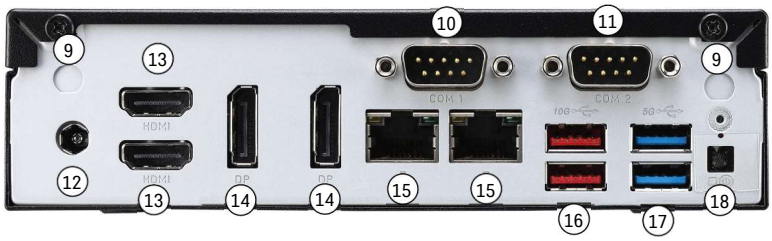
External power button by separate remote line

If, because of space constraints (e.g. in case of fixed installation), the machine cannot be switched on by pressing the front power button, it can be powered on by a separate remote line. You will find an appropriate four-pin connector at the back panel of the DH670 (pitch 2.54 mm). Furthermore, this connector provides a Clear CMOS function and +5V DC voltage supply for external devices.

Front and Back Panel

Front panel

Back panel



Right side

Left side

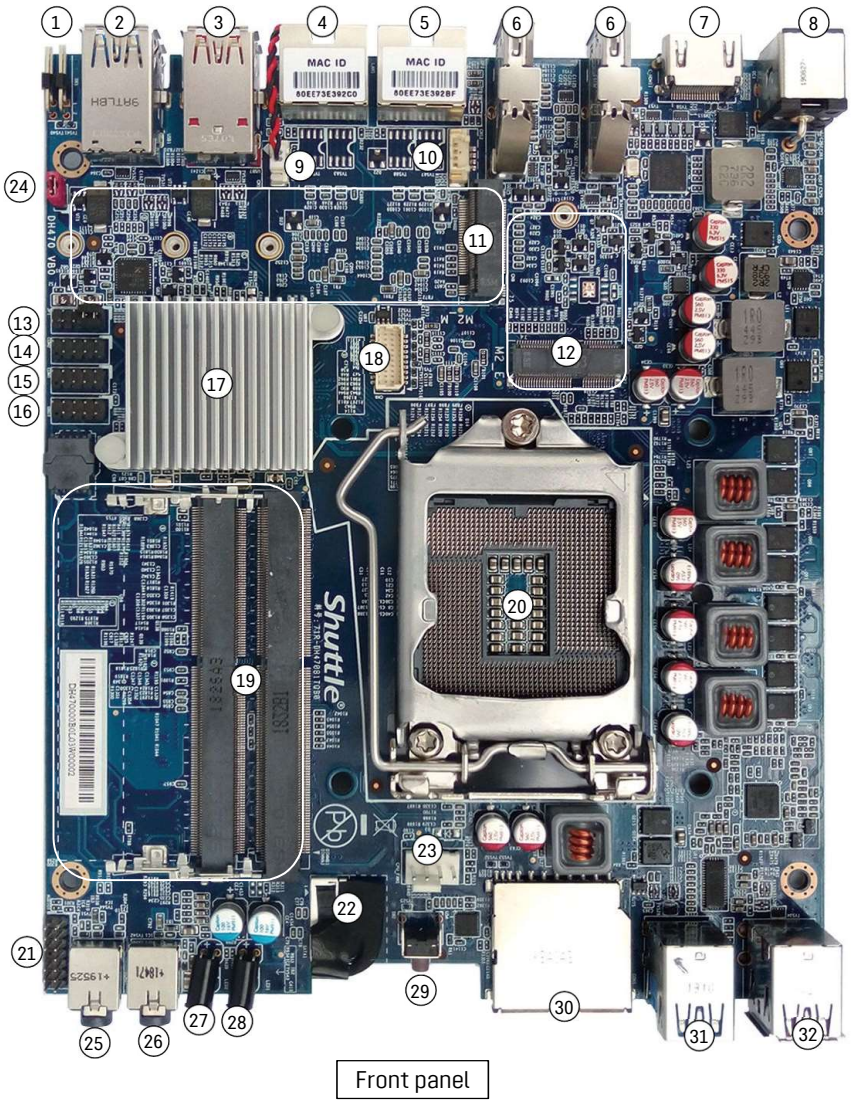
1. Microphone input
2. Headphones output
3. LED indicator for power state
4. LED indicator for storage activity
5. Power button
6. SD card reader
7. 2x USB 3.2 Gen 1 port (1x Type-C)
8. 2x USB 3.2 Gen 2 port
9. 2x WLAN perforation
10. COM 1 port supports RS232/RS422/RS485
11. COM 2 port supports RS232
    (or optional VGA port for analog displays)
12. DC-in connector for power adapter
13. 2x HDMI 2.0b port
14. 2x DisplayPort 1.4
15. 2x RJ45 Gigabit LAN port
16. 2x USB 3.2 Gen 2 port
17. 2x USB 3.2 Gen 1 port
18. 4-pin connector (2.54 mm pitch)
    for external power button, Clear CMOS button and 5V DC voltage

19. Threaded holes (M3)
20. 2x hole for Kensington Lock

21. VESA mount (two parts)

Mainboard

Back panel



Front panel

Back view

Front view

1. 4-pin connector (2.54 mm pitch) for external power button, Clear CMOS button and 5V DC voltage
2. 2x USB 3.2 Gen 1 port (1x Type-C)
3. 2x USB 3.2 Gen 2 port
4. RJ45 Gigabit LAN port
5. RJ45 Gigabit LAN port
6. 2x DisplayPort 1.2
7. HDMI 2.0a port
8. DC-in connector for power adapter
9. Connector for CMOS battery
10. Onboard USB 2.0 connector (4-pin)
11. M.2-2280M slot for SSD card
12. M2-2230E slot for WLAN card
13. Jumper for COM 1/2 auxiliary voltage setting (0/5/12 V)
14. Onboard COM 1 port supports RS232/RS422/RS485
15. Onboard COM 2 port supports RS232
16. Debug header (reserved)
17. Intel H670 chipset with heat sink
18. Onboard VGA connector
19. 2x SO-DIMM memory slot
20. LGA1700 processor socket
21. Audio connector (optional)
22. SATA v3.0 connector
23. 4-pin connector for cooling fan
24. Always-Power-On jumper
25. Microphone input
26. Headphones output
27. LED indicator for power state
28. LED indicator for storage activity
29. Power button
30. SD card reader
31. 2x USB 3.2 Gen 1 port
32. 2x USB 3.2 Gen 2 port

REQUIRED COMPONENTS

The following components need to be added to make it a fully-configured Mini PC

Shuttle XPC slim Barebone DH670

LGA1700 Processor

Intel Core Gen 12 "Alder Lake-S"
Core i9 / i7 / i5 / i3, Pentium Gold or Celeron
TDP max. 65 W

Memory Modules

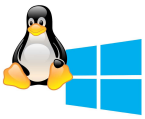
Up to two DDR4-3200/2666/2400
SO-DIMM memory modules
max. 32 GB each

2.5" Storage Drive

SATA hard disk or Solid State Disk (SSD)
(max. height: 12.5 mm)

M.2 SSD (optional)

M.2-2280/2260/2242
SSD storage (SATA or PCIe/NVMe)



Operating System

Windows 10/11 or Linux (64-bit only)

OPTIONAL ACCESSORIES FROM SHUTTLE

VGA port adapter **PVG01**

Installing PVG01 means one serial port (COM) less can be used on the backpanel.

WLAN-Accessory

WLN-M (802.11ac / Wifi 5)
WLN-M1 (802.11ax / Wifi 6)
M.2-2230 card supports WLAN and Bluetooth including 2 antennas

LTE Adapter Kit **WWN03**

allows the installation of an M.2 LTE card and nano SIM card
(occupies the 2.5" bay)

Cable **CXP01**

Cable for external push button switch (without button)

Vertical Stand **PS02**

for vertical operation

DIN-Rail Kit **DIR01**

This mounting kit allows the installation on a standard 35 mm DIN-Rail

Rack Mount Kit **PRM01**

2U front plate to install two 1.3L Shuttle XPCs in a 19" cabinet.

Shuttle Product Comparison: DH4xx versus DH6xx

MODEL	DH410S	DH410(C)	DH470(C)	DH610S	DH610	DH670
PROCESSOR SUPPORT	Socket LGA1200, TDP max. 65 W Code name "Comet Lake-S" – Gen 10			Socket LGA1700, TDP max. 65 W Code name "Alder Lake-S" – Gen 12		
CHIPSET	Intel H410	Intel H410	Intel H410	Intel H610	Intel H610	Intel H670
OS SUPPORT	Windows 10/11 and Linux (64-bit)			Windows 10/11 and Linux (64-bit)		
MULTI-DISPLAY	max. 2	max. 2	max. 3	max. 2 **)	max. 3	max. 4
RAM MEMORY	max. 2x 32 GB DDR4-2933/2666 SO-DIMM			max. 2x 32 GB DDR4-3200/2666 SO-DIMM		
2.5" BAY	1x 2.5" drive bay, SATA connector, max. height 12.5 mm			1x 2.5" drive bay, SATA connector, max. height 12.5 mm		
M.2-2280 SSD SLOT	M.22280M supports PCIe 3.0 x4 or SATA			supports PCIe 3.0 x4 or SATA	supports PCIe 3.0 x4 or SATA	supports PCIe 4.0 x4 or SATA
WLAN SLOT	M.2-2230E			M.2-2230E		
BUTTONS / LEDS	Power-Button, Power LED, HDD LED			Power-Button, Power LED, HDD LED		
SD CARD READER	Yes, but not with DH410C and DH470C			No	No	Yes
GRAPHICS PORTS	HDMI 1.4b DP 1.2	HDMI 2.0a DP 1.2	HDMI 2.0a 2x DP 1.2	HDMI 2.0b DP 1.4	HDMI 2.0b 2x DP 1.4	2x HDMI 2.0b 2x DP 1.4
USB 3.2 GEN. 2	–	–	4	–	–	4
USB 3.2 GEN. 1	4 (1x Type-C)	4	4 (1x Type-C)	4 (1x Type-C)	4 (1x Type-C)	4 (1x Type-C)
USB 2.0	4	4	–	4	4	–
COM PORTS	–	2	2	–	2	2
GIGABIT NETWORK	Single LAN Realtek 8111H (1G)	Dual LAN 2x Intel 210 (1G)	Dual LAN 2x Intel 210 (1G)	Single LAN Intel 219V/LM (1G)	Dual LAN Intel 225 (2.5G) Intel 219V/LM (1G)	Dual LAN 2x Intel 210/211 (1G)
AUDIO	Mic-Input, Line-Out (Realtek ALC662)			Mic-Input, Line-Out (Realtek ALC662/897/888S)		
OPTIONAL ACCESSORIES	WLAN Kit: **WLN-M/WLN-M1** Vertical Stand: **PS02** Rackmount Kit: **PRM01** VGA Port: **PVG01** Power Button Cable: **CXP01** DIN-Rail Mount: **DIR01** LTE-Kit: **WWN03**			WLAN Kit: **WLN-M/WLN-M1** Vertical Stand: **PS02** Rackmount Kit: **PRM01** VGA Port: **PVG01** Power Button Cable: **CXP01** DIN-Rail Mount: **DIR01** LTE-Kit: **WWN03**		
VESA MOUNT	optional **PV04**	supplied	supplied	optional **PV04**	supplied	supplied
POWER ADAPTER	90 W / 19 V			120 W / 19 V		
DC-IN 12V SUPP.	–	Yes	–	–	Yes	–

Product Images

DH410*

DH410S / DH610 / DH610S

DH470 / DH670

DH410S

DH410

DH470

DH610S

DH610

DH670

*) The DH410**C** and DH470**C** have no Card Reader. **) The DH610S supports 3 displays, if equipped with VGA port (accessory PVG01)

SHUTTLE XPC SLIM BAREBONE DH670 — SPECIFICATIONS

CHASSIS	Slim PC with black chassis made of metal Dimensions: 190 x 165 x 43 mm (LWH) = 1.35-litre Weight: 1.3 kg net and 2.1 kg gross Two holes for Kensington Locks and numerous threaded holes (M3) on both sides of the chassis
POWER ADAPTER	External 120 W power adapter (fanless) Input: 100~240 V AC, 50/60 Hz Output: 19 V DC, 6.32 A, max. 120 W DC Connector: 5.5/2.5 mm (outer/inner diameter) Remark: The DC-input of the computer supports an external power source with 19V±5%. AC mains cable: 3 pins, ca. 1.7 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
OPERATING SYSTEM	This system comes without an operating system. It is compatible with Windows 10/11 and Linux (64-bit).
PROCESSOR SUPPORT	Processor Socket LGA1700 Supports Intel Core i9 / i7 / i5 / i3, Pentium Gold and Celeron processors Supports 12th generation Intel Core processors, codename "Alder Lake-S" in "Intel 7" process technology (previously Intel 10 nm Enhanced SuperFin) Supports processors with integrated graphics only [10] Maximum supported processor power consumption (TDP) = 65 W Does not support the unlock-function of Intel K-Series processors. The processor integrates PCI-Express, memory controller and the graphics engine on the same die. (Performance features depend on processor type) Please refer to the support list for detailed processor support information at global.shuttle.com.
PROCESSOR COOLING	Heatpipe processor cooling with two 60 mm fans on the upper side of the chassis
MAINBOARD / CHIPSET	Mainboard in a Shuttle form factor proprietary design for the XPC DH670 Chipset/Southbridge: Intel® H670 Passive chipset cooling with heat sink The Northbridge is integrated in the processor. Solid Capacitors for sensitive areas provide excellent heat resistance for enhanced system durability.
BIOS	AMI BIOS, SPI Interface, 16 MB Flash-EPROOM Supports Hardware Monitoring and watch dog functionality Supports Firmware-TPM (fTPM) v2.0 [9] Supports boot up from external USB flash memory Supports Unified Extensible Firmware Interface (UEFI) Supports power on after power failure [7]
MEMORY SUPPORT	2x SO-DIMM slot with 260 pins Supports DDR4-3200/2933/2666/2400/2133 (PC4-25600/23466/21300/19200/17000) 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)
INTEGRATED GRAPHICS	The features of the integrated Intel UHD graphics function depend on the processor type used. [10] The PC features four video outputs which support 1080p/60 and 2160p/60: - 2x HDMI v2.0b - 2x DisplayPort v1.4 Supports displays with 4K Ultra HD resolution at 3840 x 2160 Supports four independent displays with the integrated graphics function DisplayPort and HDMI support multi-channel digital audio over the same cable. Optional analog D-Sub/VGA video output [4]
DRIVE BAY	1x 6.35 cm / 2.5" storage bay supports one hard disk or SSD drive with SATA connector Device height: 12.5 mm (max.)
SATA CONNECTORS	1x Serial-ATA III, 6 Gb/s (600 MB/s) bandwidth With Serial-ATA power connector (onboard)

M.2-2280M SSD SLOT	The M.2 2280M slot provides the following interfaces: - PCI-Express Gen. 4.0 X4, supports NVMe - SATA v3.0 (max. 6 Gbps) It supports M.2 cards with a width of 22 mm and a length of 42, 60 or 80 mm (type 2242, 2260, 2280). Supports M.2 SSDs with SATA or PCI-Express interface
M.2-2230E SLOT FOR WLAN CARDS	Interfaces: PCI-Express Gen. 2.0 X1 und USB 2.0 Supports M.2 cards with a width of 22 mm and a length of 30 mm (type 2230) Supports WLAN expansion cards (optional Shuttle accessory: WLN-M/M1)
AUDIO	Audio Realtek® ALC 897/662/888S High-Definition Audio Two analog audio connectors (3.5 mm) on the front panel: 1) 2-channel line-out (headphones) 2) microphone input Digital multi-channel audio output: by HDMI and DisplayPort
DUAL GIGABIT LAN CONTROLLER	Dual network with two RJ45 ports with two status LEDs each Used network chips: 2x Intel i210/i211 Ethernet Controller (MAC, PHY) PCIe interface Supports Windows 10 Desktop OS and Windows Server OS Supports 10 / 100 / 1.000 MBit/s operation Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE) Supports Teaming mode [5]
CARD READER	Integrated card reader Supports SD, SDHC and SDXC up to v3.01 memory flash cards UHS-I interface supports up to 104 MB/s (SDR104) transfer speed PCIe chipset interface
FRONT PANEL CONNECTORS	Microphone input Audio Line-out (headphones) 2x USB 3.2 Gen 2 Type A (red) 1x USB 3.2 Gen 1 Type A (blue) 1x USB 3.2 Gen 1 Type C SD card reader Power button Power LED (blue) HDD LED (yellow)
BACK PANEL CONNECTORS	2x HDMI 2.0b connector [1] 2x DisplayPort 1.4 connector (DP) [2] Optional: 1x D-Sub VGA connector (Accessory PVG01 [4]) 2x USB 3.2 Gen 2 Type A (red) 2x USB 3.2 Gen 1 Type A (blue) 2x Gigabit LAN (RJ45) 2x RS232 serial port, 9-pin D-Sub (5/12V, 1x RS422/RS485) [3] 1x DC-input connector for external power adapter (supports 19V±5%) 1x 4-pin connector (2.54 mm pitch) supports: - external power on button - Clear CMOS function - +5V DC voltage for external components 2x perforation for optional Wireless LAN antennas 2x hole for Kensington Lock
OTHER ONBOARD CONNECTORS	1x jumper for power-on-after-power-fail (hardware solution) [7] 1x analog VGA graphics output CN6 (2x 10-pin, 1 mm pitch) [4] 2x serial interface (COM) occupied by back panel connectors 1x USB 2.0 (4-pin) for optional accessory WWN03 (LTE kit) 1x fan connector (4-pin) occupied by the cooling system 1x connector for CMOS battery (occupied)

SUPPLIED ACCESSORIES	Multi-language user guide (EN, DE, FR, ES, JP, KR, SC, TC) VESA mount for 75/100 mm standard (two metal brackets) Four screws M3 x 5 mm (screws together VESA mount and PC) Four screws M4 x 10 mm (to affix VESA mount on the PC) Four screws M3 x 4 mm (to mount a 2.5" storage device into the bay) Two screws M3 x 5 mm (silver colour, to mount two M.2 cards) Driver DVD (Windows 64-bit) Serial ATA cable for 2.5" drive including power cable External 120 W power adapter with power cord Protection cap for CPU socket (do not use if heatpipe or fan is mounted) Heatsink compound
OPTIONAL ACCESSORIES	**PVG01:** optional D-Sub VGA video output [4] **WLN-M/WLN-M1:** WLAN module in M.2-2230 format supports WLAN and Bluetooth with two external antennas. **WWN03:** LTE adapter kit with antennas, but without LTE card **PS02:** Stand for vertical operation **CXP01:** adapter cable for external power button **PRM01:** 2U rack mount front plate for two Shuttle XPC slim PCs **DIR01:** DIN-Rail mounting kit
ENVIRONMENTAL SPECIFICATIONS	Operating temperature range: 0~50 °C [6] Relative humidity, non-condensing: 10~90 %
CERTIFICATIONS / COMPLIANCE	EMI: FCC, CE, BSMI, RCM, VCCI Safety: ETL, CB, BSMI Other: RoHS, Energy Star, ErP
CONFORMITY	This device is classed as a technical information equipment (ITE) in class B and is intended for use in living room and office. The CE-mark approves the conformity by the EU directives: (1) 2004/108/EC relating to electromagnetic compatibility (EMC), (2) 2006/95/EC relating to Electrical Equipment designed for use within certain voltage limits (LVD), (3) 2009/125/EC relating to ecodesign requirements for energy-related products (ErP)

[1] HDMI output supports DVI-D with optional adapter

[2] How to convert DisplayPort into HDMI/DVI
The DisplayPort output can be converted to HDMI or DVI by an additional, passive adapter cable. For example:
DELOCK 82590: 1 m, DisplayPort (male, 20p) to HDMI-A (male, 19p)
DELOCK 82435: 5 m, DisplayPort (male, 20p) to DVI-D (male, 24p)
The integrated graphics automatically detects the connected display and puts out the appropriate electric signal - either through DisplayPort (without an adapter) or HDMI/DVI (with an adapter).
However, a monitor with a DisplayPort connector cannot be connected to the HDMI port with a simple, passive adapter.

[3] Serial Ports
This PC features two serial RS232 ports with 9-pin D-Sub connectors at the back panel. The left COM port (COM1) can also be configured as RS422 and RS485 in BIOS.
Pin 9 of the D-Sub COM-Port is a multi-functional signal. Based on the Jumper JP1 configuration on the mainboard, it can be configured as Ring Indicator (RI) or external power supply with a voltage level of either 5 V or 12 V. Each COM port can be configured separately. The maximum current is 500 mA per connector.

[4] Optional D-Sub/VGA connector
The mainboard features one analog graphics port CN6 on the mainboard. This signal can be lead to the outside as a 15-pin D-Sub VGA connector on the backpanel by using the optional adapter PVG01. However doing so means one serial port (COM) less can be used on the backpanel. The integrated graphics supports a maximum of four displays simultaneously.

[5] Teaming Mode
The teaming function allows you to group both available network adapters together to function as a single adapter. The benefit of this approach is that it enables load balancing and failover.
Driver download: https://downloadcenter.intel.com/download/22283/

[6] Operating temperature
For high ambient temperatures over 40 °C we strongly recommend to use SSDs (supporting at least 70 °C) and rugged SO-DIMM memory modules with a temperature range of up to 95 °C.

[7] Power on after power fail
The BIOS setup provides a "Power-On after Power Fail" function that can be found under "Power Management Configuration". As the name indicates, this function determines the PC's behaviour after power failure: (1) unconditional power on, (2) restore former status or (3) keep system turned off. As a matter of the nature of this function, it may fail after short power failures. This is why the DH670 also comes with a hardware-based solution. By removing Jumper JP2 (on the mainboard behind the power button) the system will start unconditionally once power is supplied.

[8] Optional Accessory WWN03 (LTE kit)
The Shuttle XPC accessory WWN03 allows this PC to be upgraded with an LTE/4G function for mobile network. The LTE card will occupy the 2.5" bay, so you will have to use an M.2 SSD as a mass storage device. The required LTE/4G card in M.2-3042 format and an activated Nano SIM card is not included in the scope of delivery.

[9] TPM Function
This product features Firmware-TPM (fTPM) v2.0. Besides this, it is prepared for a hardware TPM chip which can be fitted by factory on request, if required.

[10] Intel processors without integrated graphics (ID ends with "F", e.g. Core i7-12700F) are not compatible.

12TH GENERATION INTEL CORE DESKTOP PROCESSOR FAMILY

Socket LGA1700 10 nm "Alder Lake S" processor overview (Date: January 2022)
Processors with a TDP of more than 65W and processors without graphics function (ID ends with "F") are not supported (marked in red).

PROCESSOR	MODEL	P-CORES/ THREADS	P-CORES CLOCK/Turbo	E-CORES	E-CORES CLOCK/Turbo	SMART CACHE	BASE TDP	MEMORY SUPPORT	GRAPHICS ENGINE (MAX. CLOCK)
Core™ i9	12900K	8 / 16	3.2 – 5.1 GHz	8	2.4 – 3.9 GHz	30 MB	125 W	DDR4-3200	UHD 770 (1.55 GHz)
	12900KF	8 / 16	3.2 – 5.1 GHz	8	2.4 – 3.9 GHz	30 MB	125 W	DDR4-3200	None
	12900	8 / 16	2.4 – 5.0 GHz	8	1.8 – 3.8 GHz	30 MB	65 W	DDR4-3200	UHD 770 (1.55 GHz)
	12900F	8 / 16	2.4 – 5.0 GHz	8	1.8 – 3.8 GHz	30 MB	65 W	DDR4-3200	None
	12900T	8 / 16	1.4 – 4.8 GHz	8	1.0 – 3.6 GHz	30 MB	35 W	DDR4-3200	UHD 770 (1.55 GHz)
Core™ i7	12700K	8 / 16	3.6 – 4.9 GHz	4	2.7 – 3.8 GHz	25 MB	125 W	DDR4-3200	UHD 770 (1.50 GHz)
	12700KF	8 / 16	3.6 – 4.9 GHz	4	2.7 – 3.8 GHz	25 MB	125 W	DDR4-3200	None
	12700	8 / 16	2.1 – 4.9 GHz	4	1.6 – 3.6 GHz	25 MB	65 W	DDR4-3200	UHD 770 (1.50 GHz)
	12700F	8 / 16	2.1 – 4.9 GHz	4	1.6 – 3.6 GHz	25 MB	65 W	DDR4-3200	None
	12700T	8 / 16	1.4 – 4.6 GHz	4	1.0 – 3.4 GHz	25 MB	35 W	DDR4-3200	UHD 770 (1.50 GHz)
Core™ i5	12600K	6 / 12	3.7 – 4.9 GHz	4	2.8 – 3.6 GHz	20 MB	125 W	DDR4-3200	UHD 770 (1.45 GHz)
	12600KF	6 / 12	3.7 – 4.9 GHz	4	2.8 – 3.6 GHz	20 MB	125 W	DDR4-3200	None
	12600	6 / 12	3.3 – 4.8 GHz	–	–	18 MB	65 W	DDR4-3200	UHD 770 (1.45 GHz)
	12600T	6 / 12	2.1 – 4.6 GHz	–	–	18 MB	35 W	DDR4-3200	UHD 770 (1.45 GHz)
	12500	6 / 12	3.0 – 4.6 GHz	–	–	18 MB	65 W	DDR4-3200	UHD 770 (1.45 GHz)
	12500T	6 / 12	2.0 – 4.4 GHz	–	–	18 MB	35 W	DDR4-3200	UHD 770 (1.45 GHz)
	12400	6 / 12	2.5 – 4.4 GHz	–	–	18 MB	65 W	DDR4-3200	UHD 730 (1.45 GHz)
	12400F	6 / 12	2.5 – 4.4 GHz	–	–	18 MB	65 W	DDR4-3200	None
	12400T	6 / 12	1.8 – 4.2 GHz	–	–	18 MB	35 W	DDR4-3200	UHD 730 (1.45 GHz)
Core™ i3	12300	4 / 8	3.5 – 4.4 GHz	–	–	12 MB	60 W	DDR4-3200	UHD 730 (1.45 GHz)
	12300T	4 / 8	2.3 – 4.2 GHz	–	–	12 MB	35 W	DDR4-3200	UHD 730 (1.45 GHz)
	12100	4 / 8	3.3 – 4.3 GHz	–	–	12 MB	60 W	DDR4-3200	UHD 730 (1.45 GHz)
	12100F	4 / 8	3.3 – 4.3 GHz	–	–	12 MB	58 W	DDR4-3200	None
	12100T	4 / 8	2.2 – 4.1 GHz	–	–	12 MB	35 W	DDR4-3200	UHD 730 (1.40 GHz)
Pentium® Gold	G7400	2 / 4	3.7 GHz	–	–	6 MB	46 W	DDR4-3200	UHD 710 (1.35 GHz)
	G7400T	2 / 4	3.1 GHz	–	–	6 MB	35 W	DDR4-3200	UHD 710 (1.35 GHz)
Celeron®	G6900	2 / 2	3.4 GHz	–	–	4 MB	46 W	DDR4-3200	UHD 710 (1.30 GHz)
	G6900T	2 / 2	2.8 GHz	–	–	4 MB	35 W	DDR4-3200	UHD 710 (1.30 GHz)

K = unlocked, T = Power optimized lifestyle, F = without integrated graphics, Base TDP = Base Thermal Design Power (max. Base Power Consumption).

Note: The Shuttle XPC slim Barebone DH670 does not support the Unlock-function of Intel K-Series processors.
P-Cores: Performance-Cores, E-Cores: Efficient-Cores
Core Clock: the listed core frequency ranges from Base Frequncy to Turbo Frequency (Turbo Boost 3.0 Frequency is not mentioned here)
Base TDF: Processor Base Power dissipation that the processor is validated to not exceed at Base Frequency (Max. Turbo Power is not mentioned here)
Please refer to the support list for detailed processor support information at global.shuttle.com.