Intel Core Performance goes XPC nano

The NC02U series is the new product family of Shuttle's smallest ever Mini PCs. Power-saving Intel ULV (ultra-low-voltage) processors of the current Skylake generation bring higher clock frequencies and enhanced graphics performance. Further improvements include support of up to 32 GB of DDR3L SO-DIMM memory, one 2.5" drive up to 15 mm in height as well as M.2-2280 NVMe SSD cards can be installed. The DisplayPort connector has grown from mini to full-size and delivers video resolutions of up to 4K with 60 frames per second. Peripherals are connected using the USB 3.0 port which is, for the first time, supplied as type C. Professional users will appreciate Intel Gigabit-LAN and one serial port which indicates what purposes the NC02U series is mainly intended for: Digital Signage, POS, control, office or even multimedia.

XPC nano Barebone
NC02U3 (Core i3)

Images for illustration purposes only.
This product does include the stand and VESA mount, but does not include memory, storage and operating system.

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Feature Highlights

Slim Design	• Slim plastic chassis, black, 835 ml • Dimensions: 142 x 142 x 42 mm (LWH), 835ml • Incl. Stand & VESA mount (75/100 mm) • Hole for Kensington Lock • Operating temperature: max. 40 °C
Operating System	• An operating system is not included • Supports Windows 7/8.1/10, Linux (64-bit)
Processor	• Intel Core i3-6100U, 2.3 GHz "Skylake" • Intel HD520 Graphics, DX 12, supports 4K
Memory	• Supports up to 2x16 GB DDR3L-1600 SO-DIMM
Drive Bay	• One 6.35 cm / 2.5" bay, 15 mm height supports one SATA hard disk or SSD
M.2 Slot	• M.2-2280 slot supports SSD card (SATA+PCIe)
Connectors	• HDMI 1.4, DisplayPort 1.2 supports 2160p/60 • 2x USB 3.0 (Type A/C), 2x USB 2.0, Gigabit LAN • SD card reader, Audio Combo, COM port
WLAN	• Wireless LAN 802.11n, internal antenna
Power Supply	• External 65 W fanless power adapter
Applications	• Home Media, Office, Digital Signage, etc

Products of the Shuttle XPC nano Barebone NC02U Series

Product	UPC-Code	Processor	Cores	Threads	CPU Clock	Cache	Graphics	EUs	GPU Clock
NC02U	887993000**961**	Celeron 3855U	2	2	1.6 GHz	2 MB	HD 510	12	300~900 MHz
NC02U3	887993000**978**	Core i3-6100U	2	4	2.3 GHz	3 MB	HD 520	24	300~1000 MHz
NC02U5	887993000**985**	Core i5-6200U	2	4	2.3~2.8 GHz	3 MB	HD 520	24	300~1000 MHz
NC02U7	887993000**992**	Core i7-6500U	2	4	2.5~3.1 GHz	4 MB	HD 520	24	300~1050 MHz

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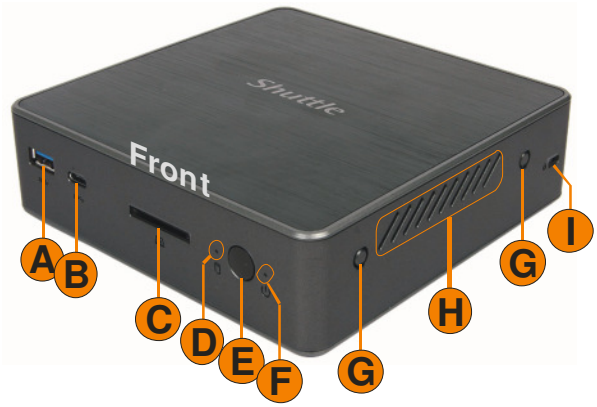
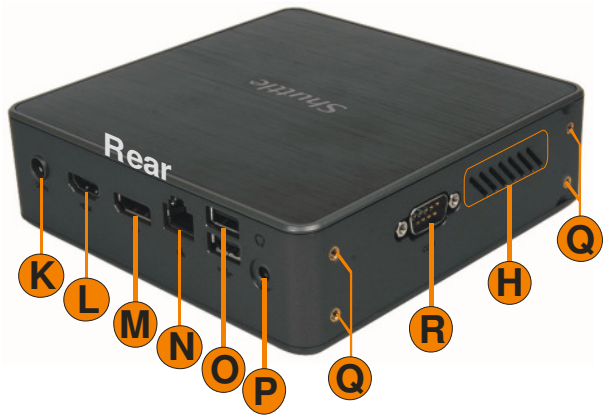
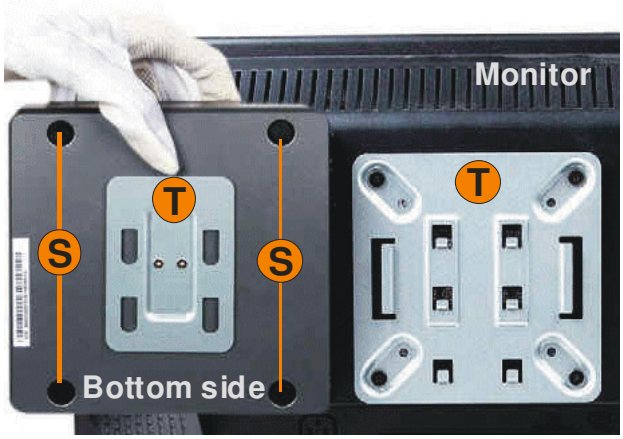
Shuttle XPC nano Barebone NC02U3 – Product Views







A	USB 3.0 Type A	**K**	DC input for power adapter
B	USB 3.0 Type C	**L**	HDMI
C	SD Card reader	**M**	DisplayPort
D	Hard disk LED indicator	**N**	Gigabit LAN (RJ45)
E	On/Off Button	**O**	2x USB 2.0
F	Power-on LED indicator	**P**	Audio Combo (Headphones & Mic)
G	2x perforation for optional WLAN antenna	**Q**	4x Mounting hole for vertical stand
H	Vents	**R**	RS232/422/485 COM port *)
I	Hole for Kensington Lock	**S**	4x Rubber foot
J	2x Vertical stand	**T**	VESA mounting kit (2 pieces)

*) Note: The serial connector (COM port) cannot be used, if NC02U3 is operated in vertical position.

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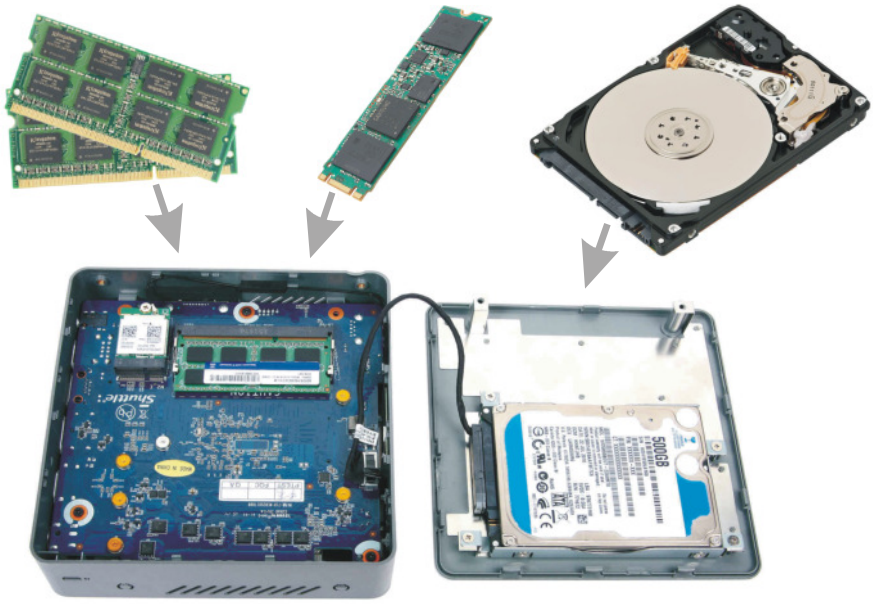
Required Components

1~2 memory modules
up to 2x 16 GB DDR3L-1600
in SO-DIMM format

One M.2 SSD storage
M.2-2242/2260/2280
SATA or PCIe interface

One 2.5“ drive
SSD or HDD with SATA connector
(up to 15 mm height)



Operating Positions

1. **Horizontal**
2. **Vertical with Stand**
3. **VESA-mounted behind a monitor**

Stand and VESA mount with screws are included.

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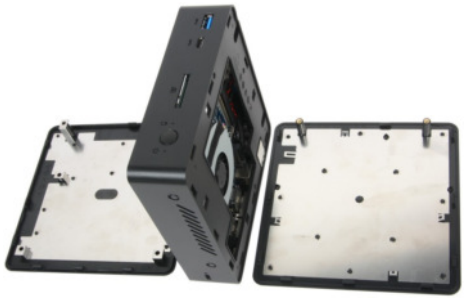
Product Features

Stylish and absolutely small

The black plastic case with its curves and coppery elements is certain to be the eyecatcher on your desk. Its volume of barely 850 ml makes it hardly noticable as a PC, particularly when it is hidden behind monitors thanks to the supplied VESA mount. Despite its dinky dimensions, it provides generous connectivity options and even room for one 2.5 inch drive which can be an SSD or HDD.



Easy installation

Remove just two screws to unmount the two chassis covers.

SD Card Reader

The built-in SD card reader at the front side makes file transfer from and to a digital camera easy. It takes SD, SDHC and SDXC memory flash cards in standard size format and also supports booting from bootable SD cards.

M.2-2280-Slot for SSD cards

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

Serial Port

Many PCs do not have these legacy ports any longer, since they have been superseded and replaced by USB for most consumer applications, but they are still commonly used for applications such as industrial automation systems, scientific analysis, POS systems and other such fields. The Shuttle XPC nano Barebone NC02U3 features one serial RS-232 interface with the traditional 9-pin D-Sub connector for easy connection of appropriate components. Note: The serial connector (COM port) cannot be used, if NC02U3 is operated in vertical position.

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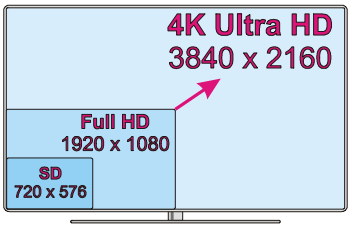
Dual Monitoring via HDMI and DisplayPort

The NC02U3 can connect two digital displays through its HDMI and DisplayPort. Dual monitoring helps improve on productivity by allowing for spreading multiple windows across two monitors while working with them simultaneously.
Note: Dual channel memory (two identical modules) is required to support 4K Ultra-HD resolution (2160p).



Supports 4K Ultra HD at 60Hz

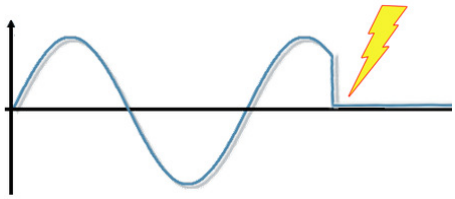
The NC02U3 supports displays running at 4K (3840 x 2160 / 2160p) high resolution at 60Hz frames per second when connected to its DisplayPort video output. Being the successor to the Full HD standard, Ultra HD delivers a four times higher resolution with a wider colour space and colour depth. Note: dual channel memory (two identical modules) is required.

USB 3.0 type A and type C

The Shuttle XPC nano Barebone NC02U3 has four USB ports, two of which are USB 3.0. USB 3.0 "SuperSpeed" provides a significant performance increase over previous USB generations making it the ideal interface for demanding, external peripherals. USB 3.0 supports up to 5Gb/s full duplex which means an up to 10 times greater performance than USB 2.0. One of the USB 3.0 connectors is a "type-C" connector with reversible plug orientation. This type of connector is especially intended to connect new-generation mobile devices.

Supports high-capacity drives

The NC02U3 supports 2.5 inch drives up to a maximum height of 15 mm. This makes overall capacities of up to 4 TB possible, while many other PCs in a similar form factor are limited to drives with a maximum height of 7 to 9.5 mm.



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. As a matter of the nature of this function, it may fail after short power failures. This is why the NC02U3 also comes with a hardware-based solution. By removing Jumper JP1 (see Quick Installation Guide) the system will start unconditionally once power is applied.

Kensington Lock

This is a small, metal-reinforced hole as part of an anti-theft system. The Shuttle XPC nano Barebone NC02U3 provides an appropriate hole on both sides of its chassis. The lock-and-cable is not included.

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Shuttle XPC nano Series – Comparison

	NC01U Series	NC02U Series
Chassis	Black, **glossy** 141 x 141 x **29** mm (577 ml)	Black, **matt** 142 x 142 x **42** mm (835 ml)
Processor	Celeron, Core i3, Core i5 or Core i7 **Intel "Broadwell-U" (5th Gen)**, ULV Technology: 14 nm, TDP: 15 W	Celeron, Core i3, Core i5 or Core i7 **Intel "Skylake-U" (6th Gen)**, ULV Technology: 14 nm, TDP: 15 W
Graphics	**Intel HD / HD 5500** Gen. 8, DirectX 11.2, Dual Display	**Intel HD510 / HD520** Gen. 9, DirectX 12, Dual Display
Operation System	Windows 7/8.1/10. Linux, **32 + 64-bit**	Windows 7/8.1/10. Linux, **64-bit only**
4K/UHD Support	Yes (except Celeron)	Yes
Memory Support	2x SO-DIMM, max. 2x **8 GB** DDR3L-1600	2x SO-DIMM, max. 2x **16 GB** DDR3L-1600
Audio	**Realtek ALC269Q-VC3**	**Realtek ALC662**
Ethernet LAN	**Intel i218LM** Gigabit	**Intel i211** Gigabit
Drive Bay	2.5" / **7 mm** SATA	2.5" / **15 mm** SATA
SSD card slot	**M.2-2242** supports SATA	**M.2-2280** supports SATA and **PCIe X4**
WLAN	M.2-2230 card Realtek **RTL8821AE** supports 802.11**n/ac** (1T1R) + **BT 4.0**	M.2-2230 card Realtek **RTL8188EE** supports 802.11**n** (1T1R)
Connectors Front Panel	Power button, 2x LED, SD card reader 2x USB 3.0 (Type A)	Power button, 2x LED, SD card reader 2x USB 3.0 (Type A and **Type C**)
Connectors Back Panel	**Mini-DisplayPort 1.2**, HDMI 1.4a 2x USB 2.0, Gigabit LAN, Audio Combo DC input	**DisplayPort 1.2**, HDMI 1.4b 2x USB 2.0, Gigabit LAN, Audio Combo DC input, **2x perforation for opt. antenna**
Left Side	1x RS232 COM port	1x RS232 COM port
Jumper	--	**Always-on-Jumper**, Clear CMOS Jumper
Supplied Accessories	Vertical Stand (**plastic**) VESA mounting kit	Vertical Stand (**aluminium with screws**) VESA mounting kit
Operation Temp.	max. 50 °C	max. 40 °C
Power Adapter	65 W / 19 V	65 W / 19 V
Front View		
Rear View		

Product models and processor features:

Shuttle Product	Processor Model	Cores / Threads	Clock / Turbo	L3-Cache	Intel Graphics	EUs	GPU Clock	TDP
NC01U	Celeron 3205U	2 / 2	1.5 / – GHz	2 MB	HD	12	300 / 800 MHz	15 W
NC01U3	Core i3-5005U	2 / 4	2.0 / – GHz	3 MB	HD 5500	24	300 / 850 MHz	15 W
NC01U5	Core i5-5200U	2 / 4	2.2 / 2.7 GHz	3 MB	HD 5500	24	300 / 900 MHz	15 W
NC01U7	Core i7-5500U	2 / 4	2.4 / 3.0 GHz	4 MB	HD 5500	24	300 / 950 MHz	15 W
NC02U	Celeron 3855U	2 / 2	1.6 / – GHz	2 MB	HD 510	12	300 / 800 MHz	15 W
NC02U3	Core i3-6100U	2 / 4	2.3 / – GHz	3 MB	HD 520	24	300 / 1000 MHz	15 W
NC02U5	Core i5-6200U	2 / 4	2.3 / 2.8 GHz	3 MB	HD 520	24	300 / 1000 MHz	15 W
NC02U7	Core i7-6500U	2 / 4	2.5 / 3.1 GHz	4 MB	HD 520	24	300 / 1050 MHz	15 W

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Shuttle XPC nano Barebone NC02U3 - Specifications

Chassis	Barebone PC with a black plastic chassis Dimensions: 142 x 142 x 42 mm (LWH) = 835 ml Weight: 0.4 kg net, 1.2 kg gross Hole for Kensington Lock Includes vertical stand and 75 / 100 mm VESA mount
Low Power Consumption	Power consumption in idle mode: 6.7~7.8 W, full load: 15,7 / 33,8 W (without/with graphics) (measured with 2x 4 GB DDR3L SO-DIMM, 120 GB 2.5" SSD, Windows 10-1607 64 bit)
Operation Position	1) Horizontal 2) Vertical with stand 3) VESA-mounted behind an appropriate monitor
Operation System	This barebone system comes without operating system. It is compatible with: - Windows 7, 64-bit - Windows 8.1, 64-bit - Windows 10, 64-bit - Linux (e.g. Ubuntu, OpenSUSE, Fedora), 64-bit
Processor	Model: Intel Core i3-6100U (ULV) System-on-a-chip architecture (SoC): no chipset required BGA1356 package - directly soldered onto the mainboard Code name: Skylake-U (6th Generation Intel Core) Cores / Threads: 2 / 4 Clock rate: 2.3 GHz L1/L2/L3 Cache: 128 kB / 512 kB / 3072 kB Memory controller: DDR3L-1600 Dual Channel (1.35 V) TDP wattage: 15 W maximum Manufacturing process: 14 nm Maximum Tjunction Temperature: 100 °C Supports 64-bit, VT-x (EPT), VT-d, Enhanced SpeedStep, NX bit, AES-NI, SSE 4.1/4.2 Integrated graphics engine
Cooling fan	Built-in CPU cooling fan with 4 pin connector Supports temperature-controlled RPM fan speed

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Integrated Graphics	Intel HD graphics 520 (Intel HD Gen. 9) Two digital audio/video ports support two independent screens: 1) DisplayPort 1.2 [1] supports 3840 x 2160 @ 60 Hz 2) HDMI 1.4b supports 3840 x 2160 @ 24 Hz Supports Ultra HD / 4K resolution GPU clock rate: 300~1000 MHz Execution Units (EU): 24 Supports DirectX 12, OpenGL 4.4 Supports full H264, H265 8/10-bit, VP8/9, VC-1, AVC hardware decoding Supports Quick Sync Video and Clear Video HD technology Supports HD video plus multi-channel digital audio via a single cable Dynamic, shared memory: up to 1.7 GB Note: dual channel memory (two identical modules) is required for 4K Ultra-HD (2160p) support.
Mainboard & BIOS	AMI BIOS in 8 MByte EEPROM with SPI interface Supports resume after power failure Supports Wake on LAN (WOL) Supports Power on by RTC Alarm Supports booting from USB devices and SD card reader Supports hardware monitoring and watch dog function Supports Unified Extensible Firmware Interface (UEFI) Supports Firmware TPM v2.0 (fTPM) since BIOS version NC02U000.103
Power Adapter	External 65 W power adapter (fanless) Input: 100~240 V AC, 50/60 Hz, max. 1.6 A Output: 19 V DC, max. 3.42 A, max. 65 W DC Connector: 5.5/2.5 mm (outer/inner diameter)
Memory support	2x 204-pin SO-DIMM slot Supports DDR3L-1600 (PC3-12800) SDRAM at 1.35 V Supports Dual Channel mode Supports a maximum of 16 GB per DIMM, maximum capacity: 32 GB Supports two unbuffered DIMM modules (no ECC) Note: This mainboard does only support 1.35 V DDR3L memory modules. DDR3L has a lower operation voltage as DDR3.
2.5" Drive Bay	Supports one Serial ATA hard disk or one SATA SSD drive in 6.35 cm / 2.5" format Device height: 15 mm (max.) Supports Serial-ATA III, 6 Gb/s (600 MB/s) bandwidth
Card Reader	Integrated SD card reader Supports SD, SDHC and SDXC memory flash cards Supports booting from SD card

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M.2 Slot for SSDs	The M.2 2280 BM slot provides the following interfaces: - PCI-Express Gen. 2.0 X4 with up to 32 Gbps Data Transfer Speed - 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 SATA SSDs (with B+M key) and M.2 PCIe SSDs (with M key)
Audio	Audio Realtek® ALC 662 High-Definition Audio Codec 3.5 mm / 4-pole combo audio connector for headphones and microphone [2] Digital multi-channel audio output: via HDMI and DisplayPort
Gigabit LAN	Ethernet Controller Intel i211 Supports 10 / 100 / 1.000 MBit/s operation (Gigabit) Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE) IEEE 802.3az Energy Efficient Ethernet (EEE) Interface: PCIe v2.1
Wireless Network (WLAN)	Built-in M.2-2230-A/E WLAN card and internal antenna Single-Chip 1T1R WLAN Controller Realtek RTL8188EE Supports IEEE 802.11b/g/n, max. 150Mbps up-/downstream Security: WPA/WPA2(-PSK), WEP 64/128-bit, IEEE 802.11x/i
Front Panel connectors	USB 3.0 type A USB 3.0 type C SD card reader (supports SD, SDHC, SDXC) Power button Power LED (blue, blinking when in suspend mode) HDD LED (orange)
Back Panel connectors	DisplayPort 1.2 [1] HDMI 1.4b 2x USB 2.0 Gigabit LAN (RJ45) Audio Combo Port for headphones and microphone (3.5 mm jack, 4-pole) [2] DC-input connector for external power adapter 2x perforation for optional external WLAN antennas
Left Side connectors	Serial RS232 COM port (D-Sub, 9-pin) This port is switchable to RS422 and RS485 in the BIOS setup Note: The serial connector (COM port) cannot be used, if NC02U3 is operated in vertical position.
Always-On Jumper	By removing Jumper JP1 (please refer to the Quick Installation Guide) the system will start unconditionally once power is applied. [4]
Clear CMOS Jumper	Short Jumper JP2 for about 10 seconds in order to reset all BIOS configuration setting to factory default.

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Supplied Accessories	Multi-language Quick Installation Guide Driver DVD for Windows VESA mount set (two parts, made of steel, with 6 screws) 2x aluminium stand with screws for vertical operation Bracket for a 2.5" drive with 8 screws Power adapter with AC power cord
Environ-mental Spec	Operating temperature range: 0~40°C [3] Relative humidity range: 10~90% (non-condensing)
Conformity & Certifications	EMI: FCC, CE, BSMI, C-Tick Safety: ETL, CB, BSMI Other: RoHS, Energy Star, ErP 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), (4) 1999/5/EC related to Radio and Telecommunications Terminal Equipment (R&TTE)

[1] How to convert DisplayPort into HDMI/DVI
The DisplayPort outputs 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 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. In this case an active adapter like Delock 62496 is required.
Connecting a UHD/4K display via the present HDMI port means the refreshing rate is limited to 24 Hz. 60 Hz can only be achieved by using the DisplayPort port. Should your display have a HDMI 2.0 connector, a refreshing rate of 60 Hz can be achieved by using an active adapter such as the Club 3D CAC-1070 for example.

[2] Audio connector
The 3.5 mm audio jack at the back panel of this device supports both a 4-pole connector for headphones and microphone and headphones with only a 3-pole connector. Headsets with separate connectors for headphones and microphone, though, require an appropriate adapter, if also the microphone should be used.

[3] Caution: for high ambient temperatures over 35 °C we strongly recommend to use SSDs (supporting at least 70 °C) instead of hard disks.

[4] Power on after power fail:
The BIOS setup provides a "Power-On after Power Fail" function that can be found under "Power Management Configuration". This function determines the PC's behaviour after power failure. As a matter of the nature of this function, it may fail after short power failures. This is why this PC also comes with a hardware-based solution. By removing Jumper JP1 (please refer to the Quick Installation Guide) the system will start unconditionally once power is applied.

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