

Affordable 3-litre PC for demanding tasks

The Shuttle XPC slim Barebone XH110 is a real roomster considering its small footprint - one optical drive, two 2.5" storage drives and an M.2 SSD card can be installed into the robust steel chassis. In addition, it supports the powerful Intel Core desktop processors with socket LGA1151. The built-in heatpipe cooling ensures the system runs quietly at maximum stability. Thanks to its great connectivity it meets the requirements of many applications that extends from office PC up to industrial applications. The system supports two displays with Ultra HD resolution, dual Gigabit LAN, four USB 3.0 and four USB 2.0 ports and two serial ports - WLAN and VGA port can be added optionally. With this high level of efficiency and flexibility - who needs a bulky tower PC anyway?

**XPC slim Barebone
XH110**

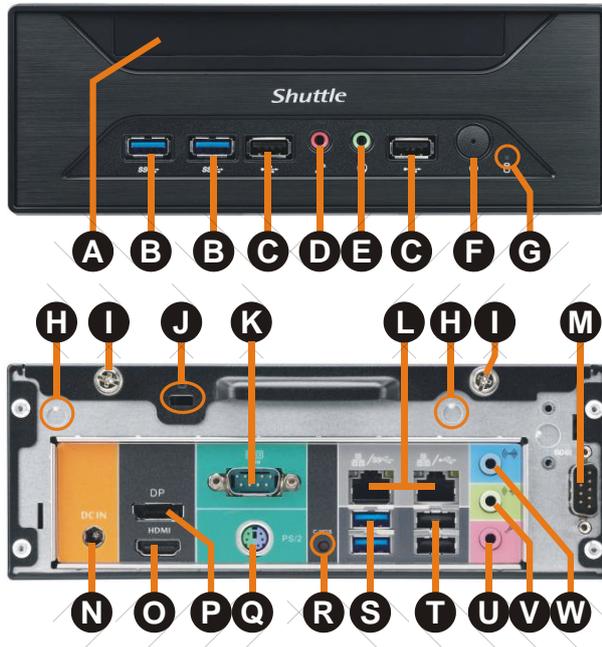


Images for illustration purposes only. The vertical stand and optical drive available separately.

Feature Highlights	
Slim-Design	<ul style="list-style-type: none"> • Slim 3.5-litre chassis, black • Dimensions: 24 x 20 x 7.2 cm (L/W/H) • Bays: 2x 6.35cm/2.5" for hard disks or SSDs and 1x optical slimline drive • Max. operating temperature: 0~50°C
Processor	<ul style="list-style-type: none"> • Supports LGA 1151 Skylake or Kaby Lake processors up to a max. TDP of 65W [13] • Supports Core i7 / i5 / i3, Pentium, Celeron • Including heatpipe cooling system
Operating System	<ul style="list-style-type: none"> • This system comes without operating system. • Supports Windows 7 / 8.1 / 10, Linux 64 bit • Win. 7/8.1 not supported w/ Kaby Lake CPU
Chipset	<ul style="list-style-type: none"> • Intel H110 Chipset
Memory	<ul style="list-style-type: none"> • 2x 204-pin SO-DIMM slots • Supports DDR3L-1333/1600, max. 2x 16 GB
Graphics	<ul style="list-style-type: none"> • Integrated Intel HD graphics supports 4K Ultra HD (Core i3 or higher required) • Supports two independent displays
Drive Connectors	<ul style="list-style-type: none"> • 3x Serial ATA max. 6 Gbps, • Two pre-installed SATA cables (HDD+ODD)
Other Connectors	<ul style="list-style-type: none"> • HDMI + DisplayPort (VGA optional) • 5.1 HD Audio (digital audio via HDMI/DP) • 4x USB 3.0, 4x USB 2.0 (each 2 front, 2 rear) • 2x Gigabit LAN, 2x Serial/COM, PS/2 Combo
Mini-Slots	<ul style="list-style-type: none"> • M.2 2280 BM Slot (supports SATA/PCIe SSDs) • M.2 2230 AE Slot (supports WLAN-cards)
Optional Accessories	<ul style="list-style-type: none"> • Vertical stand (PS01), 3.5" HDD rack (PHD4) • VESA mount (PV02), WLAN kit (WLN-M) • VGA port adapter (PVG01)
Power Supply	<ul style="list-style-type: none"> • 90W/19V adapter (also supports 84W/12V)
Applications	<ul style="list-style-type: none"> • Home, office, vertical market



Shuttle XPC slim Barebone XH110 – Front and Back Panel



Front Panel

- A 5.25" bay for optical slimline drive (DVD or Blu-ray)
- B 2x USB 3.0 port
- C 2x USB 2.0 port
- D Microphone input
- E Headphone output
- F Power on button with LED
- G LED indicator for hard disk activity

Back Panel

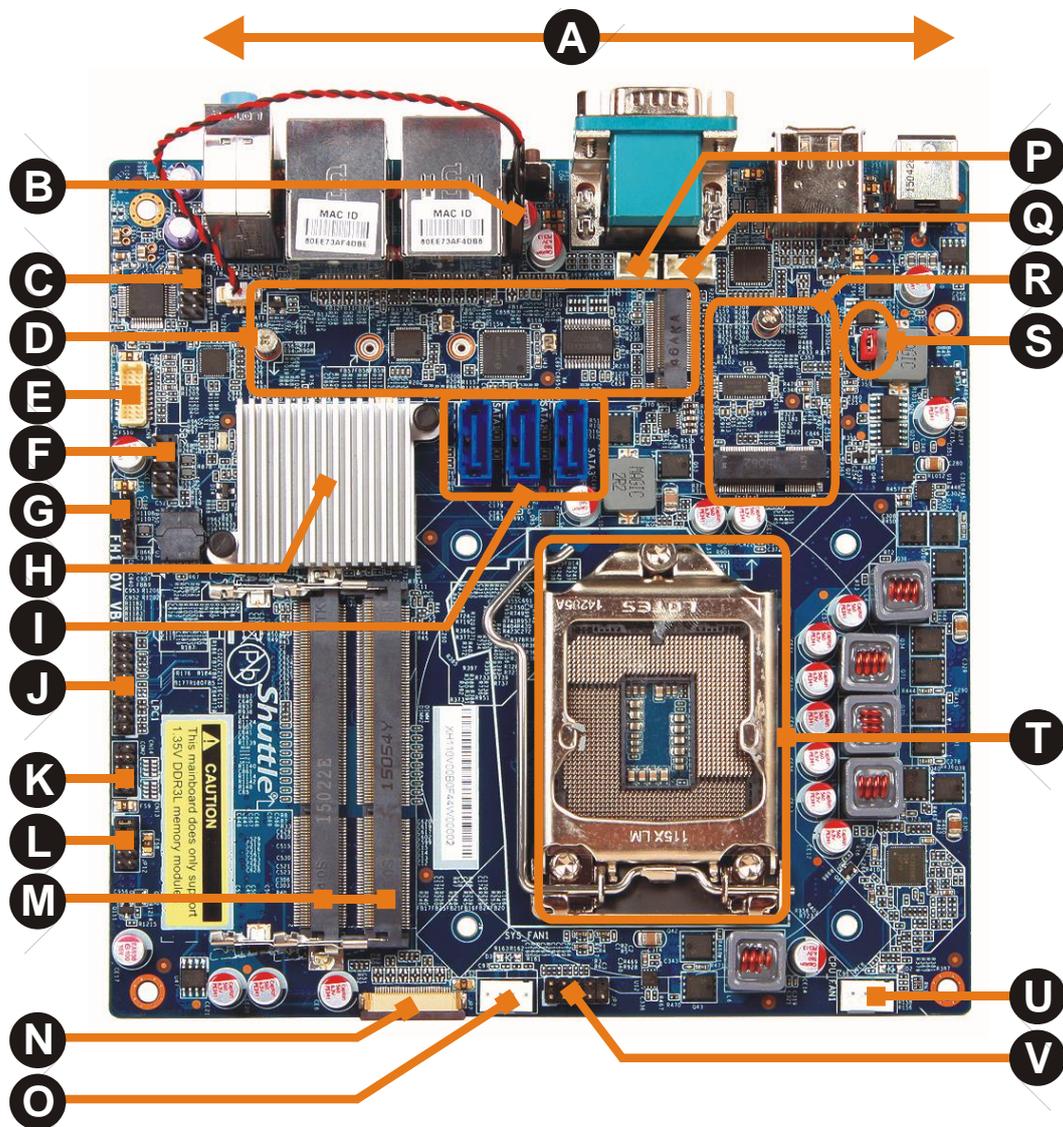
- H 2x perforation for optional WLAN antenna
- I 2x thumbscrew
- J Hole for Kensington Lock
- K RS232/422/485 serial interface (COM port)
- L Dual Gigabit network (RJ45)
- M RS232 serial interface (COM port)
- N DC-in Connector for power adapter
Supports 12V and 19V input voltage
- O HDMI Video/Audio output
- P DisplayPort Video/Audio output
- Q PS/2 Combo
- R Clear CMOS button
- S 2x USB 3.0
- T 2x USB 2.0
- U Microphone input
- V Headphone / line-out
- W Audio line-in

Supports three drives



The Shuttle XPC slim Barebone XH110 supports one optical drive in 5.25" slimline format and two 2.5" drives (e.g. 2.5" hard disk and 2.5" SSD). A second 2.5" drive requires an additional SATA cable and mounting screws which are not included. The storage drives (hard disk and optical drive) are not included in the delivery of the XH110. **Notice:** For high ambient temperatures over 40°C we strongly recommend to use SSDs instead of hard disk drives.

Shuttle XPC slim Barebone XH110 – Mainboard



- | | | |
|--------------------------------|----------------------------------|-------------------------------------|
| A Back Panel Connectors | I 3x SATA 6G Connector | Q SATA-Power 5V |
| B CMOS Battery | J LPC Connector | R M.2 2230 Slot for WLAN |
| C Front Audio Header | K COM Port Header (RS232) | S Always-Power-On Jumper |
| D M.2 2280 Slot for SSD | L COM Port Voltage Jumper | T LGA1151 CPU Socket |
| E VGA Onboard Connector | M 2x SO-DIMM Memory Slot | U CPU FAN Connector |
| F 2x USB 2.0 Header | N Front USB 3.0 Connector | V Front Button/LED Connector |
| G USB 2.0 Header | O System FAN Connector | |
| H Intel H110 Chipset | P SATA-Power 12V | |

Optional Accessories for Shuttle XPC slim Barebone XH110



Vertical Stand (PS01)

The Shuttle XPC slim Barebone XH110 is to be used in horizontal operation by default. The optional stand PS01 allows it to be used in upright position also.



VESA 75/100 mount (PV02)

The optional VESA mount allows it to be installed on to walls or to be attached to the rear side of a monitor.



WLAN-Kit (WLN-M)

Wireless LAN adapter (M.2-2230 card) with two external antennas supports IEEE 802.11ac and Bluetooth 4.0



3.5" Hard Disk Rack (PHD4)

PHD4 allows for installation of one 3.5" hard drive. However doing so means no other drives, such as a slimline DVD drive or one 2.5" HDD/SSD, can be installed.



VGA-Port Adapter (PVG01)

Optional D-Sub VGA Video Output.

Note: Using PVG01 means one serial port (COM2) less can be used at the backpanel.

Connectivity / Applications

The Shuttle XPC slim Barebone XH110's wealth of ports qualifies it for a wide range of applications and external devices.



The XH110 is your powerful 3.5-litre Slim PC solution for high performance driven applications, e.g.:

- Digital Signage (supports 4K resolution)
- In-store Audio/Video entertainment
- Gambling
- Home-Media
- Office
- Call Centre
- Education
- Kiosk
- Point of Sales (POS)
- Medical
- Automation
- Small Server

Shuttle XPC slim Barebone XH110 – Product Features



The 3.5-litre chassis - a clean and modern look

Shuttle has always placed great emphasis on the interior and exterior aesthetics of their Mini-PCs with the belief that a good blend of style and form factor allow the Mini-PC to be attractive, versatile and work well in almost any environment. And the XH110 was designed just like that and shines in a clean and modern appearance. The optical drive and front panel connectors are easy to access in daily use. This tiny tot barely stands 7.3 cm in height with a volume of 3.5 litres.



What does Barebone mean?

The Shuttle XPC slim Barebone XH110 consists of a stylish case with pre-installed mainboard, cooling system and external power adapter. Despite its small form factor, it offers outstanding connectivity, functionality and performance. For a complete Mini-PC system, a few components still need to be added. The Mini-PC is customisable and takes socket LGA1151 processors (TDP max. 65W), DDR3L SO-DIMM memory, one slimline SATA optical drive and one 2.5" hard disk (or SSD). Once the desired operation system is installed, the XH110 is ready to use. Moreover, the system comes with pre-routed cables to reduce clutter, increase airflow and ease component installation.



Supports Intel 14nm Skylake & Kaby Lake Processors

Skylake and Kaby Lake are the codenames for Intel's 6th and 7th Generation of Intel Core Processors introduced in 2015 along with the 100 Series chipsets. The XPC slim Barebone XH110 supports the desktop version with socket LGA1151 (TDP max. 65W), while the previous generation (LGA1150) is not compatible.



Low noise thanks to heatpipe cooling system

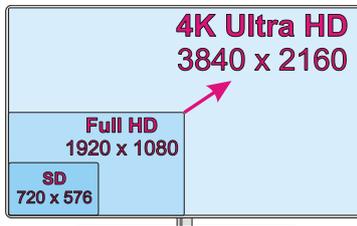
An active dual-fan heatpipe cooling system ensures whisper-quiet operation and system stability. A heatpipe is a hollow tube containing a liquid to transfer heat. As the liquid evaporates, it carries heat to the cool end, where it condenses and then runs back to the hot end. Heatpipes thus have a much higher effective thermal conductivity than solid materials. Please keep the vent holes clear.



Extended temperature range and reliability

The Shuttle XPC slim Barebone XH110 is outstandingly robust thanks to its tough alu chassis, and with an operating temperature range of 0-50°C it is suitable for use in the most demanding environments. Designed entirely with all solid capacitors, XH110 is guaranteed to deliver maximum stability, reliability and longer system lifetime for long-term applications like digital signage.

Notice: for high ambient temperature over 40°C we recommend to use Solid State Disks (SSDs) instead of Hard Disk Drives (HDDs).



Great Connectivity

On the front, elegantly hidden from view behind drive doors, the panel reveals four USB ports two of which are USB 3.0. There are also two 3.5mm jacks for headphones and microphone. In addition, the back panel offers a wide range of I/O connectivity as well.

Dual Display with HDMI and DisplayPort

The Shuttle XPC slim Barebone XH110 features two digital video outputs: one HDMI 1.4 and one DisplayPort 1.2. Dual View technology offers multiple display support on up to two separate monitors. This helps improve on productivity by allowing for spreading multiple windows across two monitors while working with them simultaneously. Optionally you can also add a D-Sub/VGA port to the back panel (accessory PVG01).

Supports 4K Ultra HD at 60Hz

The XH110 supports displays running at 4K (3840 x 2160 / 2160p) high resolution when connected to its DisplayPort video output. As the successor to the Full HD standard, Ultra HD delivers a four times higher resolution with a wider colour space and colour depth. An Intel Core i3 processor or higher is recommended for smooth 4K (2160p) video playback.

Two serial ports

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 industrial applications. The XH110 features two serial RS-232 ports which also support both 5 or 12V auxiliary voltage. The left COM port also supports the RS422 and RS485 standard.

Note: the right COM port can optionally exchanged into a VGA port with the accessory PVG01.

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. Type 2280 means, it supports the usual M.2 cards with a width of 22mm and a length of 80mm, but also 2242 and 2260 standard cards are supported.

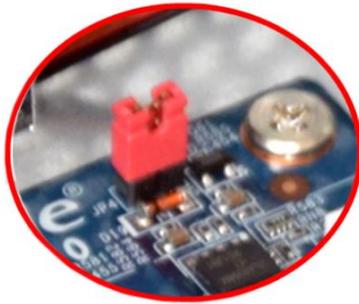
M.2-2230-Slot for optional WLAN

The M.2-2230 AE slot is intended for Wireless LAN (Wifi), Bluetooth, GSM/UMTS cards and other. Shuttle offers the optional accessory „WLN-M“ (see picture on the left), which adds WLAN 802.11ac and Bluetooth 4.0 to your Shuttle XPC slim Barebone XH110.



Kensington Lock

This is a small, metal-reinforced hole as part of an anti-theft system. (Lock and cable not included)



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 Shuttle XPC slim Barebone XH110 also comes with a hardware-based solution. By removing the appropriate Jumper (see image) the system will start unconditionally once power is applied.



Input voltage: 12V or 19V

A 90 Watt power adapter with 19 Volt output voltage is included in scope of delivery. Alternatively, XH110 can also be supplied with a power source of 12 Volt $\pm 5\%$.

Comparison of the 3-litre XPC slim Barebones

Barebone Model	XH81 / XH81V	XH97V	XH110 / XH110V	XH170V
Availability	September 2014	October 2014	Q1 / 2016	September 2015
Supported Processors	4. Gen. Intel Core Processors, LGA1150 "Haswell", TDP max. 65W		6 th /7 th Gen. Intel Core Processors, LGA1151 "Skylake" & "Kaby Lake", TDP max. 65W	
Operating System	Windows 7, 8.1, 10 & Linux – 64 bit		Windows 7, 8.1, 10 & Linux – 64 bit „Kaby Lake“ CPU does not support Windows 7/8.1	
Chipset	Intel H81	Intel H97	Intel H110	Intel H170
Memory (max.)	2x 8 GB DDR3-1600, SO-DIMM (204 pins)		2x 16 GB DDR3L-1600, SO-DIMM (204 pins)	
Multi-Monitoring	max. 2 displays	max. 3 displays	max. 2 displays	max. 3 displays
Mini-Slots	Mini-PCIe (mSATA) Mini-PCIe (for WLAN)	Mini-PCIe (mSATA) Mini-PCIe (for WLAN)	M.2-2280 (PCIe, SATA) M.2-2230 (for WLAN)	M.2-2280 (SATA) Mini-PCIe (for WLAN)
Front Panel Connectors	Power-Button, Power-LED, HDD-LED 2x USB 2.0, 2x USB 3.0, 2x Audio		Power-Button, Power-LED, HDD-LED 2x USB 2.0, 2x USB 3.0, 2x Audio	
Back Panel Connectors	1x HDMI 1.4 1x DisplayPort 1.2	1x HDMI 1.4 2x DisplayPort 1.2	1x HDMI 1.4 1x DisplayPort 1.2	1x HDMI 1.4 2x DisplayPort 1.2
	4x USB2.0	2x USB3.0, 2x USB2.0	2x USB3.0, 2x USB2.0	2x USB3.0, 2x USB2.0
	2x GigaBit LAN	1x GigaBit LAN	2x GigaBit LAN	1x GigaBit LAN
	2x COM (RS232)	1x COM (RS232)	2x COM (RS232)	1x COM (RS232)
	3x Audio	3x Audio	3x Audio	3x Audio
	-	1x eSATA (3G)	PS/2 Port (Combo)	1x eSATA (3G)
	Clear CMOS Button	Clear CMOS Button	Clear CMOS Button	Clear CMOS Button
Perforations	2x WLAN antenna 1x Kensington Lock 1x VGA adapter	2x WLAN antenna 1x Kensington Lock	2x WLAN antenna 1x Kensington Lock 1x VGA adapter	2x WLAN antenna 1x Kensington Lock
Optional Accessories Note: PVG01 and H-RS232 cannot be used simultaneously.	Vertical Stand (PS01)	Vertical Stand (PS01)	Vertical Stand (PS01)	Vertical Stand (PS01)
	VESA mount (PV02)	VESA mount (PV02)	VESA mount (PV02)	VESA mount (PV02)
	WLAN-Kit (WLN-S/-P)	WLAN-Kit (WLN-S/-P)	WLAN-Kit (WLN-M)	WLAN-Kit (WLN-S/-P)
	3.5" HDD rack (PHD4)	3.5" HDD rack (PHD4)	3.5" HDD rack (PHD4)	3.5" HDD rack (PHD4)
	ODD bay cover (MY01) (for XH81V only)	Cover/Mylar for the slimline bay (MY01)	ODD bay cover (MY01) (for XH81V only)	Cover/Mylar for the slimline bay (MY01)
	3x COM-Ports (PCM3) (for XH81 only)	-	-	-
	1x COM-Port (H-RS232)	1x COM-Port (H-RS232)	1x COM-Port (H-RS232)	1x COM-Port (H-RS232)
	VGA adapter (PVG01)	-	VGA adapter (PVG01)	-

← Front Views →

XH81V / XH110V (Cover)



XH81V White



XH81 (Open Front)



← Rear Views →

XH81, XH81V



XH110, XH110V



XH97V, XH170V



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Shuttle XPC slim Barebone XH110 - Specifications

<p><i>Chassis</i></p>	<p>Slim X-type chassis, colour: black Dimensions: 238 x 200 x 72 mm (LWH) = 3.5-litre Weight: 2.2 kg net, 3.5 kg gross Open front - without covers for optical drive and front panel connectors Hole for Kensington Lock at the back panel Operation position horizontal or even vertical with the optional stand PS01</p>
<p><i>Storage Bays</i></p>	<p>This system features three drive bays: 1) supports one optical drive (ODD) in 5.25" slimline format with max. 12.7 mm height - this bay can alternatively be used for a 2.5" drive 2) upper 2.5" bay supports one 2.5" drive with max. 12.7 mm height 3) lower 2.5" bay supports one 2.5" drive with max. 9.5 mm height The system includes the following pre-installed cables: - 2x Power cable for 2.5" drives (5 Volt [9]) - 1x SATA cable for one 2.5" drive - 1x combo connector (SATA and power) for an optical slimline drive (DVD or Blu-ray) <u>Important note:</u> This system is ready for one 2.5" drive (SSD or hard disk) and one DVD/Blu-ray drive in slimline format to be installed. For further 2.5" drives, additional SATA cables and screws are required. For a possible third 2.5" drive also a Y power cable is required. (All not included)</p>
<p><i>Operation System</i></p>	<p>This system comes without operating system. It is compatible with Windows 10 / 8.1 / 7 and Linux.- 64 bit. Note: Windows 7 and 8.1 is only supported in combination with the 6th generation Intel Core processors "Skylake". Additional note on Windows 7 see [11]</p>
<p><i>Mainboard Chipset BIOS</i></p>	<p>Mainboard FH110V, Mini-ITX form factor 17 x 17 cm, 8 layer design Chipset: Intel® H110 Chipset (Intel® GL82H110 PCH, Codename "Sunrise Point") AMI BIOS in 8 Mbit EEPROM with SPI interface All capacitors are high quality solid capacitors Supports hardware monitoring and watch dog functionality Supports Unified Extensible Firmware Interface (UEFI) Supports power on after power failure [1] Supports Firmware TPM v2.0 (fTPM) [14]</p>
<p><i>Power Adapter</i></p>	<p>External 90 W power adapter (fanless) Input: 100~240 V AC, 50/60 Hz Output: 19 V DC, max. 4.74 A, max. 90 W output wattage AC Connector with protective-earth contacts, cable length: 1.7m DC Connector: 5.5 / 2.5mm (outer/inner diameter) Note: This system can also be powered by a power adapter with an output voltage of 12V DC.</p>

<p><i>Processor Support</i></p>	<p>Socket LGA 1151 (H4) supports Intel Core i7 / i5 / i3, Pentium and Celeron processors</p> <ul style="list-style-type: none"> - 6th generation, code name "Skylake" - 7th generation, code name "Kaby Lake" [13] <p>Maximum supported processor power consumption (TDP) = 65W 14nm process technology, up to 8 MB of L3 cache</p> <p>Not compatible with Intel Xeon E3 V5 processors for socket LGA1151 and processors with the older Socket LGA 1150.</p> <p>Does not support the unlock-function of Intel K-Series processors.</p> <p>The processor integrates PCI-Express, memory controller and the graphics engine on the same die (performance features depending on processor type)</p> <p>Please refer to the support list for detailed processor support information at global.shuttle.com.</p>
<p><i>Heatpipe Cooling</i></p>	<p>Processor cooling with heatpipe technology and two fans (6cm)</p>
<p><i>Memory Support</i></p>	<p>2x SO-DIMM slot with 204 pins</p> <p>Supports DDR3L-1333/1600 (PC3-10600/12800) SDRAM at 1.35V [12]</p> <p>Supports Dual Channel mode</p> <p>Supports max. 16 GB per DIMM, maximum total size of 32 GB</p> <p>Supports two unbuffered DIMM modules (no ECC)</p>
<p><i>Integrated Graphics</i></p>	<p>The features of the integrated Intel HD graphics function depend on the processor type used.</p> <p>Supports DirectX 12, OGL 5.x, OCL 2.x</p> <p>The PC features the following video outputs:</p> <ul style="list-style-type: none"> - HDMI v1.4 (supports 1080p/60 and 2160p/30) - DisplayPort v1.2 (supports 1080p/60 and 2160p/60) - optional: VGA / 15-pin D-Sub (supports analog video) <p>Supports displays with 4K Ultra HD resolution at 3840 x 2160</p> <p>Supports two independent displays simultaneously</p> <p>Supports Blu-ray (BD) playback with HDCP content protection [3]</p> <p>DisplayPort and HDMI support multi-channel digital audio over the same cable</p> <p>Maximum shared memory of 1760 MB</p>
<p><i>Audio</i></p>	<p>Audio Realtek® ALC 662 5.1-channel High-Definition Audio</p> <p>Three analog audio connectors (3.5mm) at the back panel:</p> <ol style="list-style-type: none"> 1) Front line-out (headphones) 2) Rear Surround line-out (shared with microphone input) 3) Center line-out (shared with line-in) <p>Digital audio output is provided by HDMI and DisplayPort.</p>

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<p><i>Dual Gigabit LAN Controller</i></p>	<p>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 / 1.000 MBit/s operation Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE) Supports Teaming mode [10]</p>
<p><i>M.2-2280 Slot</i></p>	<p>The M.2 2280 BM slot provides the following interfaces: - PCI-Express v2.0 X4 - SATA v3.0 (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 PCIe interface.</p>
<p><i>M.2-2230 Slot</i></p>	<p>The M.2 2230 AE slot provides the following interfaces: - PCI-Express v2.0 X1 - USB 2.0 It supports M.2 cards with a width of 22 mm and a length of 30 mm. This slot is intended for Wireless LAN (Wifi), Bluetooth, GSM/UMTS cards and other. A SATA interface for SSD cards is not available here.</p>
<p><i>Drive Connectors</i></p>	<p>3x Serial-ATA connector, max. 6 Gbps Supports Intel® Rapid Storage Technology 13 (RST) Supports NCQ and AHCI <u>Note:</u> The package includes pre-installed cables (for SATA and power) and mounting screws for one 2.5" drive and one optical slimline drive.</p>
<p><i>Front Panel Connectors</i></p>	<p>Microphone input Audio Line-out (headphones) 2x USB 3.0 2x USB 2.0 Power button Power LED (blue) HDD LED (yellow)</p>
<p><i>Back Panel Connectors</i></p>	<p>1x DisplayPort 1.2 audio/video output [2] 1x HDMI 1.4 audio/video output 2x USB 3.0 2x USB 2.0 2x GigaBit LAN (RJ45) 1x COM (RS232) 1x COM (RS232/422/485) 3x Audio 3.5mm (Line-in, Line-out, Mic-in) 1x PS/2 Combo port (supports keyboard and mouse) [1 1] 1x Clear CMOS Button 2x Perforation for Wireless LAN antennas 1x Hole for Kensington Lock</p>

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<p><i>Other Onboard Connectors</i></p>	<p>Power on after power fail (hardware solution by jumper) [1] Front connectors for power button, LEDs, USBs, audio ports USB 2.0 headers (5-pin) RS232 COM port (2x10-pin header - occupied) Two 4-pin fan connectors (one occupied by the CPU cooling system) LPC interface (2x10-pin header, 2 mm pitch)</p>
<p><i>Supplied Accessories</i></p>	<p>Multi-language installation guide (EN, DE, FR, ES, JP, KR, SC, TC) Driver DVD Pre-installed SATA and power cables for one 2.5" drive and one slimline drive External power adapter with 1.7m AC power cord (with protective-earth contacts) Protector cap for the CPU socket (do not use if heatpipe or fan is mounted) CPU heatpipe cooling system with heatsink compound Bag with screws</p>
<p><i>Optional Accessories</i></p>	<p>(1) Vertical stand (PS01) (2) VESA mount (PV02) (3) WLAN module (WLN-M) [4] (4) 3.5" Hard Disk Rack (PHD4) [8] (5) D-Sub/VGA port adapter (PVG01) [6]</p>
<p><i>Environmental Specifications</i></p>	<p>Operating temperature range: 0~50°C [7] Relative humidity range: 10~90% (non-condensing)</p>
<p><i>Conformity and Certifications</i></p>	<p>EMI: FCC, CE, BSMI, C-Tick Safety: ETL, CB, BSMI Other: RoHS, Energy Star 5.0, 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)</p>

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Notes:**[1] 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 this PC also comes with a hardware-based solution. By removing the appropriate jumper, the system will start unconditionally once power is supplied.

[2] 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: 1m, DisplayPort (male, 20p) to HDMI-A (male, 19p)
DELOCK 82435: 5m, 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.

[3] For Blu-ray playback appropriate software and a Blu-ray drive is required (not included).

[4] Optional Wireless LAN module:

This Slim PC supports an optional WLAN module which consists of an M.2 expansion card with IEEE 802.11ac, Bluetooth 4.0 functionality and two external antennas with appropriate cables. Shuttle offers its suitable accessory kit "WLN-M".

[5] 4K Ultra-HD resolution

A 4K-display with Ultra HD resolution (3840 x 2160) should be connected via DisplayPort, as only this port supports a higher refresh rate of 60Hz. Certain displays (e.g. Dell UP2414Q) however require MST mode (Multi-Stream Transport) to be enabled which sends two separate images at half resolution each to the display. These two images are then combined and put in correct order by the Intel graphics driver when in Collage mode. Please note that HBR2-mode (High Bit Rate 2) must be supported by each display to have two of them run at 4K resolution.

The video playback performance depends on the video format, bit rate and the processor used. Daily office applications usually won't require the system to run under full load, however for smooth 4K (2160p) video playback requirements are different. An [Intel Core i3 processor or higher is required here](#), since the performance of the integrated graphics engine of a Celeron or Pentium processor does not suffice.

[6] Optional D-Sub/VGA connector

The mainboard features one analog graphics port. This 15-pin D-Sub VGA connector can be lead to the outside of the backpanel by using an optional adapter PVG01. However doing so means one serial port (COM2) less can be used at the backpanel.

[7] High ambient temperature

For high ambient temperature over 40°C we strongly recommend to use SSDs instead of hard disk drives.

[8] The optional accessory PHD4 allows for installation of one 3.5" hard drive. However doing so means no other drives such as a slimline DVD drive or a 2.5" HDD/SSD can be used.

[9] Power connector for SATA drives

The supplied power cables for SATA drives provide a voltage of 5V. Only in very exceptional cases a 2.5" hard disk also requires a 12V line, which is not supported out-of-the-box (only via an optional adapter, included by PHD4).

[10] Teaming Mode

The teaming function allows for grouping both available network adapters to work as one single adapter. The benefit of this approach is that it enables load balancing and failover.

Driver download: <https://downloadcenter.intel.com/download/21642>

[11] Why may the PS/2 port help install Windows 7?

The Intel® 100 chipset series has done away with support for the Enhanced Host Controller Interface (EHCI) which is the driver software for the USB 2.0 ports. The new chipset only supports the updated Extensible Host Controller Interface (xHCI for USB 3.0) which is not supported by the original Windows 7 installation disk. This means, that peripheral devices connected by USB (like keyboard, mouse and external optical drive) will not work during Windows 7 Installation. There are two solutions: (1) use a PS/2 keyboard or a PS/2 mouse and install Windows 7 from an internal Slimline DVD drive or (2) add the required USB 3.0 drivers to the Windows 7 installation files - this procedure is explained in the Shuttle FAQ section at global.shuttle.com.

[12] Memory compatibility

This mainboard supports DDR3L-1333/1600 SO-DIMM memory modules. DDR3L has a lower operation voltage (1.35V) compared to DDR3 (1.5V). However, some modules are approved for both voltages.

Memory modules that are designed for higher frequencies can also be used. The installed modules then run as DDR3L-1600.

An SO-DIMM is a small outline version of a DIMM. These are particularly designed for small PCs and laptops where full-size DIMMs wouldn't fit.

[13] Kaby Lake processor support

The 7th generation Intel Core processors "Kaby Lake" are supported from BIOS version XH110V00.200. Download website: <http://global.shuttle.com/support/download>

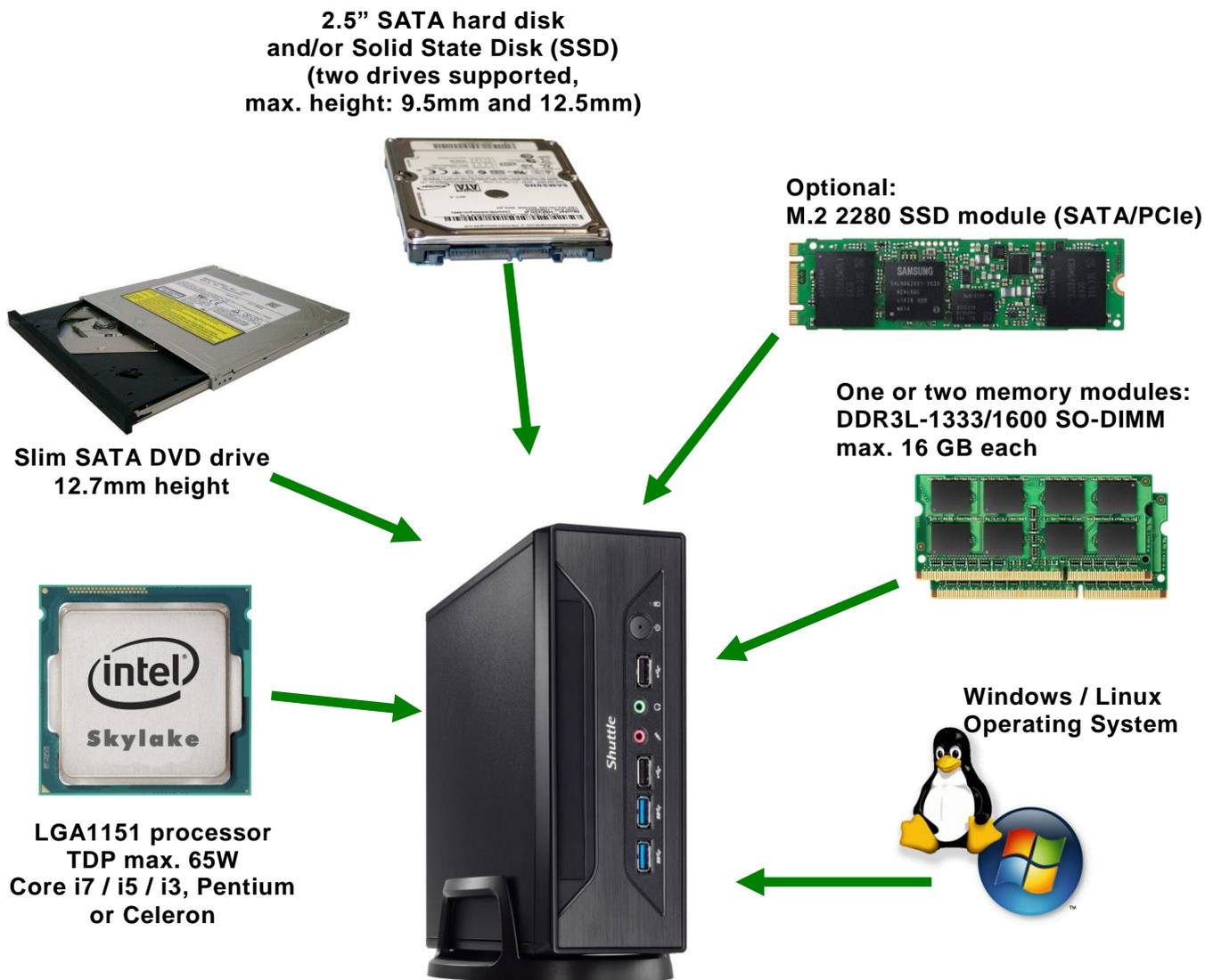
Note: If a Kaby Lake processor is used, this XPC will only support Windows 10 and Linux operating systems. Windows 7 and 8.1 will no longer be supported.

[14] Firmware-TPM

XH110 and XH110V support firmware-TPM v2.0 since BIOS version XH110V00.104 (Datum 2016-10-03).

Shuttle XPC slim Barebone XH110 – Required Components

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



Optional Accessories



6th Generation Intel Core Desktop Processor Family

Socket LGA1151 14nm "Skylake-S" processor overview (Date: September 2015)

Processors with TDP>65W are **not** supported (marked in red)

Name	Model	Cores/ Threads	CPU Clock	Turbo Clock	Cache	TDP	Graphics Engine	Graphics Clock
Core i7	6700K	4 / 8	4.0 GHz	4.2 GHz	8 MB	91 W	HD 530	350~1150 MHz
	6700	4 / 8	3.4 GHz	4.0 GHz	8 MB	65 W	HD 530	350~1150 MHz
	6700T	4 / 8	2.8 GHz	3.6 GHz	8 MB	35 W	HD 530	350~1100 MHz
Core i5	6600K	4 / 4	3.5 GHz	3.9 GHz	6 MB	91 W	HD 530	350~1150 MHz
	6600	4 / 4	3.3 GHz	3.9 GHz	6 MB	65 W	HD 530	350~1150 MHz
	6600T	4 / 4	2.7 GHz	3.5 GHz	6 MB	35 W	HD 530	350~1100 MHz
	6500	4 / 4	3.2 GHz	3.6 GHz	6 MB	65 W	HD 530	350~1150 MHz
	6500T	4 / 4	2.5 GHz	3.1 GHz	6 MB	35 W	HD 530	350~1100 MHz
	6400	4 / 4	2.7 GHz	3.3 GHz	6 MB	65 W	HD 530	350~1150 MHz
Core i3	6400T	4 / 4	2.2 GHz	2.8 GHz	6 MB	35 W	HD 530	350~1100 MHz
	6320	2 / 4	3.9 GHz	-	4 MB	51 W	HD 530	350~1150 MHz
	6300	2 / 4	3.8 GHz	-	4 MB	51 W	HD 530	350~1150 MHz
	6300T	2 / 4	3.3 GHz	-	4 MB	35 W	HD 530	350~1100 MHz
	6100	2 / 4	3.7 GHz	-	4 MB	51 W	HD 530	350~1150 MHz
Pentium	6100T	2 / 4	3.2 GHz	-	4 MB	35 W	HD 530	350~1100 MHz
	G4520	2 / 2	3.6 GHz	-	3 MB	51 W	HD 530	350~1050 MHz
	G4500	2 / 2	3.5 GHz	-	3 MB	51 W	HD 530	350~1050 MHz
	G4500T	2 / 2	3.0 GHz	-	3 MB	35 W	HD 530	350~950 MHz
	G4400	2 / 2	3.3 GHz	-	3 MB	54 W	HD 510	350~1050 MHz
Celeron	G4400T	2 / 2	2.9 GHz	-	3 MB	35 W	HD 510	350~950 MHz
	G3920	2 / 2	2.9 GHz	-	2 MB	47 W	HD 510	350~950 MHz
	G3900	2 / 2	2.8 GHz	-	2 MB	47 W	HD 510	350~950 MHz
	G3900T	2 / 2	2.6 GHz	-	2 MB	35 W	HD 510	350~950 MHz

K = unlocked, **S** = Performance optimized lifestyle, **T** = Power optimized lifestyle

Note: The Shuttle XPC slim Barebone XH110 does not support the unlock-function of Intel K-Series processors.

Please refer to the support list for detailed processor support information at global.shuttle.com.

7th Generation Intel Core Desktop Processor Family

Socket LGA1151 14nm "Kaby Lake-S" processor overview (Date: January 2017)

Processors with a TDP>65W are **not** supported (marked in red)

Name	Model	Cores/ Threads	CPU Clock	Turbo Clock	Cache	TDP	Graphics Engine	Graphics Clock
Core i7	7700K	4 / 8	4.2 GHz	4.5 GHz	8 MB	91 W	HD 630	350~1150 MHz
	7700	4 / 8	3.6 GHz	4.2 GHz	8 MB	65 W	HD 630	350~1150 MHz
	7700T	4 / 8	2.9 GHz	3.8 GHz	8 MB	35 W	HD 630	350~1150 MHz
Core i5	7600K	4 / 4	3.8 GHz	4.2 GHz	6 MB	91 W	HD 630	350~1150 MHz
	7600	4 / 4	3.5 GHz	4.1 GHz	6 MB	65 W	HD 630	350~1150 MHz
	7600T	4 / 4	2.8 GHz	3.7 GHz	6 MB	35 W	HD 630	350~1100 MHz
	7500	4 / 4	3.4 GHz	3.8 GHz	6 MB	65 W	HD 630	350~1100 MHz
	7500T	4 / 4	2.7 GHz	3.3 GHz	6 MB	35 W	HD 630	350~1100 MHz
	7400	4 / 4	3.0 GHz	3.5 GHz	6 MB	65 W	HD 630	350~1000 MHz
	7400T	4 / 4	2.4 GHz	3.0 GHz	6 MB	35 W	HD 630	350~1000 MHz
Core i3	7350K	2 / 4	4.2 GHz	-	4 MB	60 W	HD 630	350~1050 MHz
	7320	2 / 4	4.1 GHz	-	4 MB	51 W	HD 630	350~1050 MHz
	7300	2 / 4	4.0 GHz	-	4 MB	51 W	HD 630	350~1050 MHz
	7300T	2 / 4	3.5 GHz	-	4 MB	35 W	HD 630	350~1100 MHz
	7101E	2 / 4	3.9 GHz	-	3 MB	54 W	HD 610	350~1100 MHz
	7101TE	2 / 4	3.4 GHz	-	3 MB	35 W	HD 610	350~1100 MHz
	7100	2 / 4	3.9 GHz	-	3 MB	51 W	HD 630	350~1100 MHz
	7100T	2 / 4	3.4 GHz	-	3 MB	35 W	HD 630	350~1100 MHz
Pentium	G4620	2 / 4	3.7 GHz	-	3 MB	51 W	HD 630	350~1100 MHz
	G4600	2 / 4	3.6 GHz	-	3 MB	51 W	HD 630	350~1100 MHz
	G4600T	2 / 4	3.0 GHz	-	3 MB	35 W	HD 630	350~1050 MHz
	G4560	2 / 4	3.5 GHz	-	3 MB	54 W	HD 610	350~1050 MHz
	G4560T	2 / 4	2.9 GHz	-	3 MB	35 W	HD 610	350~1050 MHz
Celeron	G3950	2 / 2	3.0 GHz	-	2 MB	51 W	HD 610	350~1050 MHz
	G3930	2 / 2	2.9 GHz	-	2 MB	51 W	HD 610	350~1050 MHz
	G3930T	2 / 2	2.7 GHz	-	2 MB	35 W	HD 610	350~1000 MHz

K = unlocked, T = Power optimized lifestyle, HT = Hyper Threading (SMT).

Note: The Shuttle XPC slim Barebone XH110 does not support the unlock-function of Intel K-Series processors. Please refer to the support list for detailed processor support information at global.shuttle.com.

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