

**Robust Slim PC for powerful Skylake processors**

The Shuttle XPC slim Barebone DH110 is a robust 1.3l Barebone PC with H110 chipset for Intel LGA1151 desktop processors, codenamed "Skylake". It allows Dual Display and offers Dual Intel LAN and COM ports. Its 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.

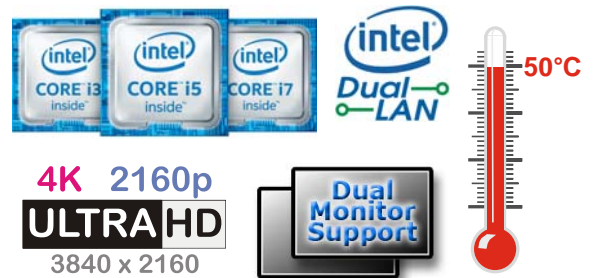
**XPC slim Barebone  
DH 110**



Images for illustration only. Processor, memory, storage and operating system not included.

**Feature Highlights**

<b>Slim Design</b>	<ul style="list-style-type: none"> <li>• Slim 1.3 litre metal chassis, black</li> <li>• 190 x 165 x 43 mm (LWH)</li> <li>• Operating temperature: 0~50°C</li> <li>• Including VESA mount (75/100 mm)</li> </ul>
<b>Operating System</b>	<ul style="list-style-type: none"> <li>• The operating system is not included</li> <li>• Supports Windows 7 / 8.1 / 10, Linux 64 bit</li> </ul>
<b>Processor</b>	<ul style="list-style-type: none"> <li>• Supports LGA 1151 "Skylake" processors up to a max. TDP of 65W</li> <li>• Supports Core i7 / i5 / i3, Pentium, Celeron</li> <li>• Heatpipe cooling system with two fans</li> </ul>
<b>Chipset</b>	<ul style="list-style-type: none"> <li>• Intel H110 Chipset</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>• 2x 204-pin SO-DIMM slots</li> <li>• Supports DDR3L-1600 (1.35V), max. 2x16GB</li> </ul>
<b>Graphics</b>	<ul style="list-style-type: none"> <li>• Integrated Intel HD graphics, 4K support [4] (features depend on processor)</li> <li>• HDMI, DisplayPort, optional VGA [5]</li> <li>• Supports zwei independent displays</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>• 1x 2.5" bay for SATA hard disk or SSD</li> </ul>
<b>M.2 slots</b>	<ul style="list-style-type: none"> <li>• 1x M.2 2260 BM slot (PCIe x4, SATA)</li> <li>• 1x M.2 2230 AE for optional WLAN (WLN-M)</li> </ul>
<b>Other Connectors</b>	<ul style="list-style-type: none"> <li>• SD card reader, 2x audio (line out, mic)</li> <li>• 4x USB 3.0, 2x USB 2.0, 1x eSATA/USB</li> <li>• 2x Intel Gigabit LAN (RJ45), supports WOL</li> <li>• 2x COM port (RS232 + RS232/RS422/RS485)</li> <li>• 1x PS/2-Combo (supports mouse/keyboard)</li> <li>• Connector for external power button</li> <li>• "Always on" Jumper, DC-input 12V+19V</li> </ul>
<b>Power Supply</b>	<ul style="list-style-type: none"> <li>• External 90W/19V fanless power adapter</li> </ul>
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Digital Signage, POS, control device, etc.</li> </ul>

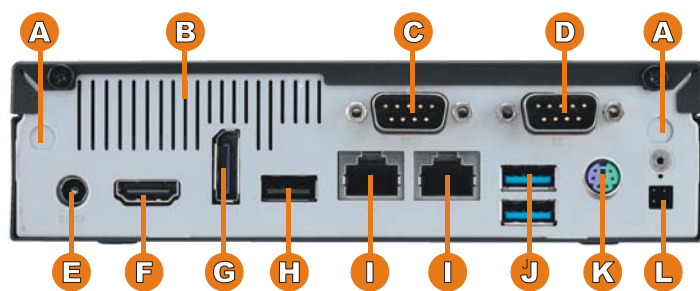


Shuttle XPC slim Barebone DH110 – Front and Back Panel

Front view



Rear view



Right side



Left side



- 1 Microphone input
- 2 Headphone output
- 3 Power LED
- 4 Hard disk LED
- 5 Power Button
- 6 SD Card Reader
- 7 2x USB 3.0
- 8 2x USB 2.0

- A 2x WLAN perforation
- B Ventilation grille
- C COM1 supports RS232 (or optional VGA port for analog displays [5])
- D COM2 supports RS232/RS422/RS485
- E DC power input
- F HDMI video output
- G DisplayPort (DP) video outputs
- H eSATA/USB 2.0 Combo
- I 2x RJ45 Gigabit LAN
- J 2x USB 3.0
- K PS/2-Combo supports keyboard and mouse
- L Connector for external power button, Clear CMOS and 5V DC voltage (4-pin, 2.54 mm pitch)
- M 2x hole for Kensington Lock
- N VESA mount (two parts)

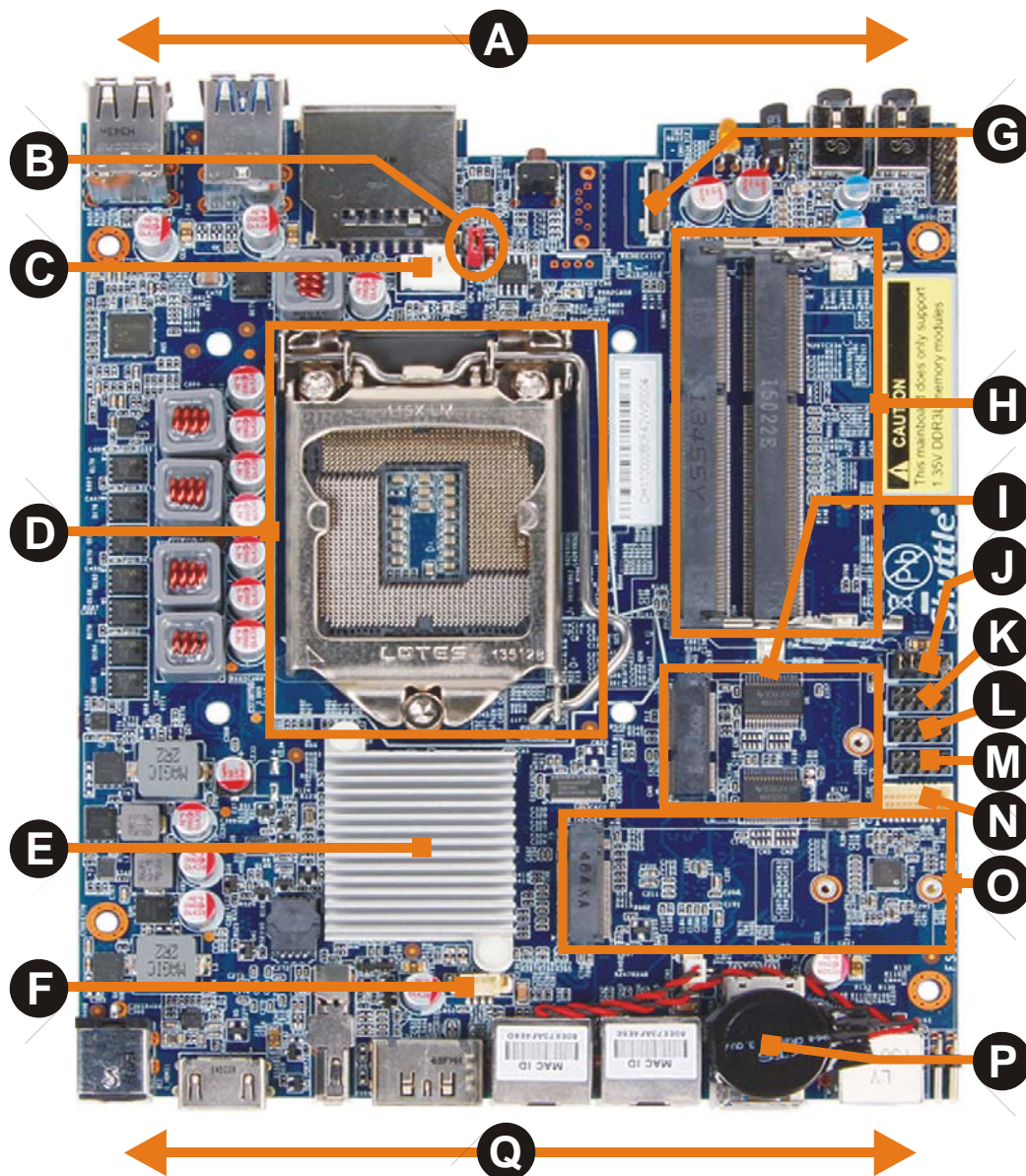


COM port Pin 9 Configuration

Pin 9 is a multi-functional signal. Based on jumper JP1 configuration on the mainboard, it can be configured as Ring Indicator (RI) or external power supply with either 5V or 12V voltage level (each COM port separately).

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Shuttle XPC slim Barebone DH110 – Mainboard



<b>A</b>	Front Panel
<b>B</b>	Always Power-On Jumper
<b>C</b>	Fan Connector
<b>D</b>	LGA1151 Processor Socket
<b>E</b>	Intel H110 Chipset
<b>F</b>	USB 2.0 Header
<b>G</b>	SATA 3.0 (6 Gbps) Connector
<b>H</b>	SO-DIMM Socket for DDR3L Memory
<b>I</b>	M.2-2230 Slot for an optional WLAN module (WLN-M)

<b>J</b>	COM1/COM2 Pin 9 Configuration
<b>K</b>	COM 1 serial port header
<b>L</b>	COM 2 serial port header
<b>M</b>	Debug Interface
<b>N</b>	VGA port (analog video)
<b>O</b>	M.2-2260 BM Slot for SSDs
<b>P</b>	CMOS Battery
<b>Q</b>	Back Panel

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## Shuttle XPC slim Barebone DH110 – Required Components

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

LGA1151 processor “Skylake”  
TDP max. 65W  
Core i7 / i5 / i3, Pentium  
or Celeron



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

Windows / Linux  
Operating System



Up to two DDR3L-1600  
SO-DIMM memory modules  
max. 16 GB each

**Optional:**  
M.2-2230 WLAN-Card (WLN-M)



**Optional:**  
M.2 2260 SSD storage  
(SATA or PCIe)



**Optional:** VGA port Accessory PVG01  
Installing PVG01 means one serial port  
(COM) less can be used at the backpanel.



## Connectivity / Applications

The Shuttle XPC slim Barebone DH110's wealth of ports makes it well-suited for a wide field of applications and external devices.



The DH110 is your powerful 1.3-litre Slim PC solution for particularly:

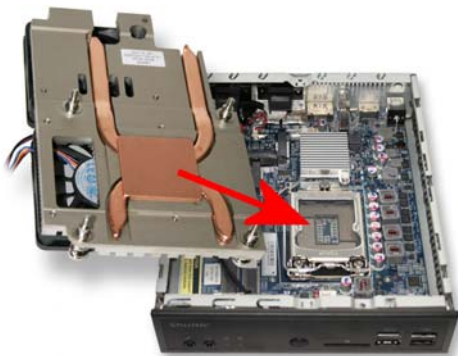
- Digital Signage with up to two displays simultaneously
- In-store Audio/Video entertainment
- Gambling
- Home-Media
- Office
- Call Centre
- Education
- Kiosk
- Point of Sales (POS)
- Medical
- Automation
- Small Server

## Shuttle XPC slim Barebone DH110 – Product Features



### Robust, stylish and particularly small

You should have held it in your own hands to see how small it actually is. Barely measuring a volume of 1.35 litre, its steel chassis gives it the appropriate stability required for professional applications in 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 of the Skylake generation. The interior of the DH110 is very tidy too so that it won't take long to set it 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.



### Extended temperature range and reliability

The DH110 is outstandingly robust thanks to its rugged chassis. With an ambient temperature range from 0-50 °C it is suitable for use in the most demanding environments. Solely designed with all solid capacitors, the DH110 is guaranteed to deliver maximum stability, reliability and longer system lifetime for long-term applications like digital signage.

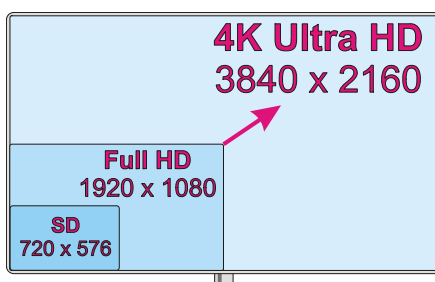
**Caution:** for high ambient temperatures over 40°C we strongly recommend to use SSDs (supporting at least 70°C) and rugged SO-DIMM memory with a wider temperature tolerance (up to 95°C).



### Dual Display with HDMI and DisplayPort (optional VGA)

The DH110 features two digital video outputs: HDMI and DisplayPort (DP). 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.

Furthermore, the DH110 supports an optional D-Sub/VGA port. [5]



### Supports 4K Ultra HD at 60Hz

The DH110 supports displays running at 4K (3840 x 2160 / 2160p) high resolution at 60Hz frames per second when connected to its DisplayPort video outputs. Being the successor to the Full HD standard, Ultra HD delivers a four times higher resolution with a wider colour space and colour depth.



**M.2-2260-Slot for SSD cards**

The M.2-2260 BM slot supports M.2 SSD storage cards with SATA or with the more advanced PCIe interface. Type 2260 means, it supports the usual M.2 cards with a width of 22mm and a length of 60mm, but also 2242 standard cards are supported. Cards with 80mm in length (2280) are not 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 others. Shuttle offers the optional accessory „WLN-M“ (see picture), which provides WLAN 802.11ac and Bluetooth 4.0 functionality and can be installed into your Shuttle XPC slim Barebone XH110.



**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.



**Kensington Lock**

This is a small, metal-reinforced hole as part of an anti-theft system. The DH110 provides an appropriate hole on both side of its chassis. The lock and cable are not included.



**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 DH110 (pitch 2.54 mm). Furthermore, this connector provides a Clear CMOS function and +5V DC voltage supply for external devices.

- +5V voltage (2) (4) Power Button
- Clear CMOS (1) (3) Ground









**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 DH110 also comes with a hardware-based solution. By removing Jumper JP2 (see image) the system will start unconditionally once power is applied.

- Front Panel -



Product Comparison

	DS81	DS87	DH110	DH170
Availability	from Mar'14	from Oct'14	from Q1'16	from Oct'15
Chassis	1.35L, 19 x 16.5 x 4.3 cm		1.35L, 19 x 16.5 x 4.3 cm	1.35L, 19 x 16.5 x 4.3 cm
Processor Support	<b>Socket LGA1150</b> Haswell TDP max. 65W		<b>Socket LGA1151</b> Skylake TDP max. 65W	<b>Socket LGA1151</b> Skylake TDP max. 65W
Chipset	<b>Intel H81</b>	<b>Intel H87</b>	<b>Intel H110</b>	<b>Intel H170</b>
Operation System Support	Windows 7, 8.1, 10 and Linux 32 + 64 bit		Windows 7, 8.1, 10 and Linux 64 bit	Windows 7, 8.1, 10 and Linux 64 bit
Multi-Display Support	2 Displays	3 Displays	2 Displays	3 Displays
UHD Support	HDMI: 2160p/30 DisplayPort: 2160p/60		HDMI: 2160p/30 DisplayPort: 2160p/60	HDMI: 2160p/30 DisplayPort: 2160p/60
Memory Support	2x SO-DIMM max. 2x 8GB DDR3-1600		2x SO-DIMM <b>max. 2x 16 GB DDR3L-1600</b>	2x SO-DIMM <b>max. 2x 16 GB DDR3L-1600</b>
Audio	Realtek ALC662-VC		Realtek ALC662	Realtek ALC662
Network	2x Realtek 8111G		<b>Intel i211 + Intel i219LM</b>	<b>Intel i211 + Intel i219LM</b>
Drive Bays	1x 2.5" / 12.5mm SATA		1x 2.5" / 12.5mm SATA	1x 2.5" / 12.5mm SATA
Mini-Slots	1x mSATA 1x Mini-PCIe Half Size		<b>1x M.2-2260 SATA/PCIe</b> <b>1x M.2-2230 supports WLAN</b>	<b>1x M.2-2260 SATA/PCIe</b> 1x Mini-PCIe Half Size
Front Panel	Power button Power LED, HDD LED SD card reader Head phone, Microphone 4x USB 2.0		Power button Power LED, HDD LED SD card reader Head phone, Microphone <b>2x USB 3.0, 2x USB 2.0</b>	Power button Power LED, HDD LED SD card reader Head phone, Microphone <b>2x USB 3.0, 2x USB 2.0</b>
Back Panel	HDMI, <b>2x DisplayPort</b> 2x USB 3.0, <b>2x USB 2.0</b> 2x Gigabit LAN RS232 + RS232/422/485 2x Kensington Lock 2x WLAN antenna (opt.) External power button (opt.)		HDMI, <b>DisplayPort</b> 2x USB 3.0, <b>USB2.0/eSATA</b> <b>1x PS/2 Combo</b> 2x Gigabit LAN ( <b>Intel</b> ) RS232 + RS232/422/485 2x Kensington Lock 2x WLAN antenna (opt.) External power button (opt.)	HDMI, <b>2x DisplayPort</b> 2x USB 3.0, <b>2x USB 2.0</b> 2x Gigabit LAN ( <b>Intel</b> ) RS232 + RS232/422/485 2x Kensington Lock 2x WLAN antenna (opt.) External power button (opt.)
Accessories	VESA mount		VESA mount	VESA mount
Optional Accessories	WLAN kit (WLN-S, WLN-P) D-Sub VGA port (PVG01)		WLAN kit (WLN-M) D-Sub VGA port (PVG01)	WLAN kit (WLN-S, WLN-P) D-Sub VGA port (PVG01)
Operation Temperature	max. 50°C		max. 50°C	max. 50°C
Power Adapter	<b>DS81/DS87:</b> 90W / 19V <b>DS81L:</b> 84W / 12V		90W / 19V (also supports 84W / 12V power adapters)	90W / 19V
Front View				
Rear View				

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## Shuttle XPC slim Barebone DH110 - Specifications

<p><i>Chassis</i></p>	<p>Nettop 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) at both sides of the chassis</p>
<p><i>Storage Bay</i></p>	<p>1x 6.35 cm / 2.5" storage bay supports one hard disk or SSD drive                  Device height: 12.5 mm (max.)</p>
<p><i>Operation System</i></p>	<p>This system comes without operating system.                  It is compatible with Windows 7 [6] / 8.1 / 10 and Linux – 64 bit.</p>
<p><i>Mainboard Chipset BIOS</i></p>	<p>Chipset: Intel® H110 Chipset (Intel® DH82H110 PCH, code name "Sunrise Point")                  Platform Controller Hub (PCH) as Single-Chip-Solution                  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 [8]</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, 4.74 A, max. 90 W                  DC Connector: 5.5/2.5mm (outer/inner diameter)                  Remark: the DC-input of the computer supports an external power source with either 12V±5% or 19V±5%.</p>
<p><i>Processor Support</i></p>	<p>Socket LGA 1151 (H4) supports the sixth generation of Intel Core i7 / i5 / i3, Pentium and Celeron processors                  Maximum supported processor power consumption (TDP) = 65W                  Codename "Skylake", 14nm process technology, up to 8 MB of L3 cache                  Not compatible with Intel Xeon E3 V5 processors for socket LGA1151 and processors with the older Socket LGA 1150. 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 depending on processor type). Please refer to the support list for detailed processor support information at <a href="http://global.shuttle.com">global.shuttle.com</a>.</p>
<p><i>Processor Cooling</i></p>	<p>Heatpipe processor cooling with two 60 mm fans on the upper side of the chassis</p>
<p><i>Memory Support</i></p>	<p>2x SO-DIMM slots with 204 pins                  Supports DDR3L-1333/1600 (PC3-10600/12800) SDRAM at 1.35V                  Supports Dual Channel mode                  Supports max. 16 GB per DIMM, maximum total size of 32 GB                  Supports two unbuffered DIMM modules (no ECC)                  Notice: This mainboard does only support 1.35V DDR3L memory modules.                  Note: DDR3L has a lower operation voltage compared to DDR3.</p>

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<p><i>Integrated Graphics</i></p>	<p>The features of the integrated graphics function depend on the processor type used.  <u>Two digital video outputs:</u> DisplayPort 1.2 and HDMI 1.4          - supports two independent Full HD displays simultaneously [3]          - supports Full HD resolution at 1920x1200 (1080p/60Hz)          - supports 4K UHD resolution at 3840 x 2160 (max. 2160p/60Hz on DP or max. 30Hz on HDMI) [4]          - supports Blu-ray (BD) playback with HDCP          - supports HD video plus multi-channel digital audio via a single cable.          Optional analog D-Sub/VGA video output [5]</p>
<p><i>M.2-2260-Slot</i></p>	<p>The M.2 2260 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 or 60 mm (type 2242, 2260). Cards with 80mm length (2280) are not supported.          Supports M.2 SSD cards with PCIe or SATA interface.</p>
<p><i>M.2-2230-AE-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 others. A SATA interface for SSD cards is not available here.</p>
<p><i>Audio</i></p>	<p>Audio Realtek® ALC 662 5.1 channel High-Definition Audio          Two analog audio connectors (3.5mm) at the front panel:          1) 2-channel line out (headphones)          2) microphone input          Digital multi-channel audio output: by HDMI and DisplayPort</p>
<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 [9]</p>
<p><i>Drive Connectors</i></p>	<p>1x Serial-ATA III, 6 Gb/s (600 MB/s) bandwidth          With Serial-ATA power connector (onboard)</p>
<p><i>Card Reader</i></p>	<p>Integrated card reader supports SD, SDHC and SDXC memory flash cards          Supports boot up from SD card</p>
<p><i>Front Panel Connectors</i></p>	<p>Microphone input, Audio Line-out (headphone)          2x USB 3.0, 2x USB 2.0          SD card reader          Power button, Power LED (blue), HDD LED (yellow)</p>

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<p><i>Back Panel Connectors</i></p>	<p>1x HDMI connector [1]                  1x DisplayPort connector (DP) [2]                  Optional 1x D-Sub VGA connector (Accessory PVG01 [5])                  2x USB 3.0                  1x eSATA/ USB 2.0 combo                  2x Gigabit LAN (RJ45)                  2x RS232 serial port, 9-pin D-Sub (5/12V, 1x RS422/RS485) [3]                  DC-input connector for external power adapter (supports 12V±5% or 19V±5%)                  4-pin connector (2.54 mm pitch) supports                  - external power on button                  - Clear CMOS function                  - +5V DC voltage for external components                  1x PS/2 Combo supports keyboard or mouse                  2x Perforation for optional Wireless LAN antennas                  2x hole for Kensington Locks</p>
<p><i>Other Onboard Connectors</i></p>	<p>1x jumper for power on after power fail (hardware solution) [8]                  1x analog VGA graphics output CN6 (2x1-pin, 1mm pitch) [5]                  2x serial interface (COM) occupied by back panel connectors                  1x fan connector (4-pin) occupied by the cooling system                  1x connector for CMOS battery (occupied)</p>
<p><i>Supplied Accessories</i></p>	<p>Multi-language user guide (EN, DE, FR, ES, JP, KR, SC, TC)                  VESA mount for 75/100mm standard (two metal brackets)                  Four thumbscrews M3 x 5 mm (to affix VESA mount on the PC)                  Four screws M4 x 10 mm (to fix the VESA mount to the external device)                  Four screws M3 x 4 mm (to mount a 2.5" storage device into the bay)                  Driver DVD (Windows 32-/64-bit)                  Serial ATA cable for 2.5" drive including power cable                  External 90W power adapter with power cord                  Protection cap for CPU socket (do not use if heatpipe or fan is mounted)                  Heatsink compound</p>
<p><i>Optional Accessory</i></p>	<p><b>PVG01:</b> optional D-Sub VGA video output [5]  <b>WLN-M.</b> WLAN module in M.2-2230 format supports IEEE 802.11ac and Bluetooth 4.0</p>
<p><i>Environmental Specifications</i></p>	<p>Ambient temperature range: 0~50°C [7]                  Relative humidity, non-condensing: 10~90%</p>
<p><i>Geringer Stromverbrauch</i></p>	<p>Beispielhafte Messung der Verlustleistung:                  - S3-Modus: 0,81W                  - Leerlauf: 9,9W                  - Vollast: 61,5W / 79,6W (ohne/mit Grafik)                  Gemessen mit Core i5-6600, 2x 4GB DDR3L-1600, 500GB SSD, Windows 7 64 Bit</p>
<p><i>Conformity Certifications</i></p>	<p>EMI: FCC, CE -- Safety: CB, ETL                  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-guidelines:                  - EMV-guideline 89/336/EWG electromagnetic tolerance                  - LVD-guideline 73/23/EWG use of electric devices within certain voltage-limits</p>

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**Footnotes:**

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

**[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 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 the BIOS setup. The COM ports are protected by black plastic caps. 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 5V or 12V. Each COM port can be configured separately. The maximum current is 500 mA per connector.

**[4] 4K Ultra-HD resolution**

A 4K-display with Ultra-HD resolution (3840 x 2160) should only 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 more than one of them run at 4K resolution.

**[5] 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 at the backpanel by using an optional adapter PVG01. However doing so means one serial port (COM) less can be used at the backpanel.

**[6] Why may PS/2 and eSATA ports help install Windows 7?**

The Intel® 100 chipset series has done away with support of the Enhanced Host Controller Interface (EHCI) which is the driver software for the USB 2.0 ports. This 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 a keyboard, a mouse or an 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 connect an external DVD drive via eSATA 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](http://global.shuttle.com).

**[7] Notice - 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.

**[8] 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 DH110 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.

**[9] 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/21642>

## 6<sup>th</sup> Generation Intel Core Desktop Processor Family

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

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	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
	6400T	4 / 4	2.2 GHz	2.8 GHz	6 MB	35 W	HD 530	350~1100 MHz
Core i3	6320	2 / 4	3.9 GHz	-	4 MB	65 W	HD 530	350~1150 MHz
	6300	2 / 4	3.8 GHz	-	4 MB	65 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	65 W	HD 530	350~1150 MHz
	6100T	2 / 4	3.2 GHz	-	4 MB	35 W	HD 530	350~1100 MHz
Pentium	G4520	2 / 2	3.6 GHz	-	3 MB	51 W	HD 530	350~1150 MHz
	G4500	2 / 2	3.5 GHz	-	3 MB	51 W	HD 530	350~1150 MHz
	G4500T	2 / 2	3.0 GHz	-	3 MB	35 W	HD 530	350~1100 MHz
	G4400	2 / 2	3.3 GHz	-	3 MB	51 W	HD 530	350~1150 MHz
	G4400T	2 / 2	2.9 GHz	-	3 MB	35 W	HD 530	350~1100 MHz
Celeron	G3920	2 / 2	2.9 GHz	-	2 MB	51 W	HD 530	350~1050 MHz
	G3900	2 / 2	2.8 GHz	-	2 MB	51 W	HD 530	350~1050 MHz
	G3900T	2 / 2	2.6 GHz	-	2 MB	35 W	HD 530	350~950 MHz

K = unlocked, S = Performance optimized lifestyle, T = Power optimized lifestyle, HT = Hyper Threading (SMT).  
 Note: The Shuttle XPC slim Barebone DH110 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](http://global.shuttle.com).

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