Highly efficient Mini PC platform for cost-conscious users

XPC Barebone SH61R4

The XPC Barebone SH61R4 is based on Intel's H61 Express chipset for Intel Core processors with socket LGA1155 and features energy-efficient technologies and innovative functions like USB 3.0 for the office and home environment. It allows for up to three drives to be installed and can operate up to 16 GB of DDR3 memory at the same time. For expansions, one slot for PCI-E x16 2.0 (graphics cards), PCI-E x1 2.0 and mini PCI-E x1 2.0 (expansion cards) is available. The two digital monitor connectors on the rear can be controlled by the graphics function integrated in the Intel Core processors - without any add-on graphics card required in the PC *). The front panel can be customized by adding individual design motifs for the maximum individuality possible.

*) Integrated graphics dependent on processor type

Images for illustration purposes only.

Feature Highlights

R4 chassis	• Black aluminium chassis (13.3 litre) • Bays: 1x 5.25“ external, 2x 3.5“ internal
CPU	• Supports Socket 1155 Desktop CPUs • Supports Intel Core i3 / i5 / i7 (TDP ≤95W) • Shuttle I.C.E. Heat-pipe cooling system
Slots	• 1x PCIe x16 (v2.0) supports dual-slot PCI-Express X16 graphics cards with 6 pin power connector 1x PCIe X1 (v2.0), 1x Mini-PCIe X1 (v2.0)
Chipset	• Intel H61 Express PCH
Optional: Integrated Graphics	• Intel HD graphics optionally integrated in the Intel Core i3/i5/i7 processor • Video output: 2x DVI (DVI-I und DVI-D) • Supports HDCP, 1080p Full-HD
Memory	• Supports 2x DDR3-1066/1333 • Up to 16 GBytes in total (2x 8GB)
Drive connectors	• 4x SATA 3Gb/s • With UEFI Bios – supports hard disks >2.2TB
Other connectors	• 5.1-ch HD-audio • GigaBit LAN (RJ45) • 2x USB 3.0 (rear) • 8x USB 2.0 (2x front, 6x rear) • optional: RS232 COM-Port (H-RS232)
Power supply	• 250 Watt mini power supply
Application	• Business, Office, Entry-level

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Shuttle order number: **PC-SH61R411**

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Shuttle XPC Barebone SH61R4 – Product Features

The R4 chassis design: a clean and modern look

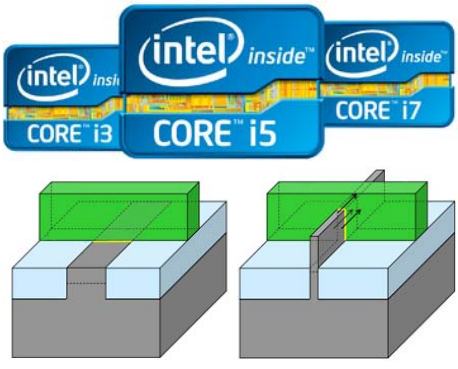
Shuttle has always placed great emphasis on the interior and exterior aesthetics of the XPC with the belief that a good blend of style and form factor allows the XPC to be attractive, versatile, and work well in almost any environment. The construction and cover of the R4 chassis is made of aluminium. This leads to a stylish-robust appearance and makes it a popular design. The drives and media connectors on the front are easy to access in daily use.

Customizable

The front of this XPC can easily be customized by simply changing the mylar behind the acylic front plate. Add your individual design such as a photo, graphics or a company logo to the front panel in just a few steps.

Small, but easy to build

Shuttle XPCs offer the performance of a desktop PC at a third of the size while using standard desktop components. Be ready for the future when banking on Shuttle's new H3 chassis. The meticulously designed internal layout features pre-routed cables to reduce clutter, increase airflow and make the installation of components easy.



Traditional Planar Transistor

22nm Tri-Gate Transistor

Supports the Intel 22nm Ivy Bridge Processor

Ivy Bridge (IVB) is the codename for Intel's new 22nm processor microarchitecture introduced in April 2012. Ivy Bridge is the first chip to use Intel's 22nm tri-gate transistors, which will help scale frequency and reduce power consumption. At a high level Ivy Bridge looks a lot like Sandy Bridge - one monolithic die incorporates up to four CPU cores, the shared L3 cache, the memory controller, PCIe links and the graphics processor. Compared to its predecessor Sandy Bridge, the new design brings some improvements in overall performance, overclocking, power management and also features PCIe v3.0 and DDR3-1600 capability, an updated DirectX 11 graphics, new security features and CPU instructions. Ivy Bridge still uses the known LGA1155 socket - this allows cash conscious users to upgrade their XPC to SZ77R5 immediately and wait to upgrade their Sandy Bridge CPU later on in the year.

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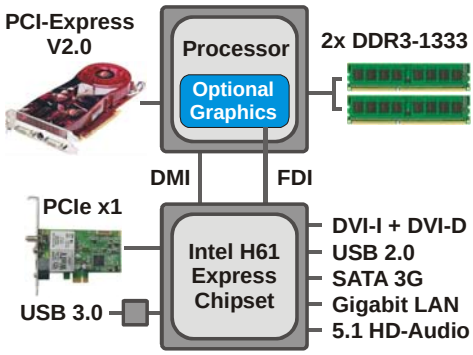

Single-Chip Chipset: Intel H61 Express

The design of the Core i3/i5/i7 processors will eliminate the need for the traditional Northbridge found on previous generation mainboards. Thus the Shuttle XPC Barebone SH61R4 sports Intel's H61 Express Platform Controller Hub (PCH) from the Intel 6-Series "Cougar Point" family which integrates the hard drive controller, network controllers, monitor and physical interfaces, PCIe links and other input/output functionalities.

Integrated Cooling Engine (I.C.E.)

Shuttle XPCs offer the performance of a desktop PC at a third of the size. In order to ensure proper airflow inside such a small case, more advanced cooling technologies have been developed and implemented in the Shuttle XPC. Shuttle's industry-leading I.C.E. heatpipe technology delivers efficient cooling and is exceptionally quiet.

What does “Barebone” mean?

The Shuttle XPC Barebone SH61R4 consists of a stylish case with pre-installed mainboard, power supply unit (PSU) and cables. Despite its small form factor, it offers outstanding connectivity, functionality and performance. For a full PC system, components such as a processor, memory, hard disk and operating system need to be added that can be chosen individually to ideally match personal needs. Some XPC models require a graphics card to be added.

2x USB 3.0

The Shuttle XPC Barebone SH61R4 sports two USB 3.0 ports on the back panel besides eight USB 2.0 ports on both front and rear. USB 3.0 achieves a maximum data rate of up to 5.0Gbps (640MBytes/sec) which is ten times faster than USB 2.0. USB 3.0 is fully compatible to USB 2.0, but not to USB 1.1. At first USB 3.0 connectors seem no different to USB 2.0 connectors, however USB 3.0 connectors have 5 more pins placed inside the connector itself. USB 2.0 can provide a maximum output of 500mA to the USB device while USB 3.0 can provide a maximum output of 900mA which is particularly important for portable hard drives. USB 3.0 also comes with better power saving features to let devices draw less power when idle.

PCI-Express V2.0 for high-performance graphics cards

The Shuttle XPC Barebone SH61R4 is equipped with one PCI-Express x16 Version 2.0 slot delivering a bandwidth of up to 16GB/s which is twice the speed of PCI-E 1.0. Thus there is plenty of potential for the newest graphics cards. It is also downward compatible, allowing for use of most of the current present graphics cards. SH61R4 also features a 6 Pin ATX auxiliary power connector for powerful graphics cards.

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Internal Drives

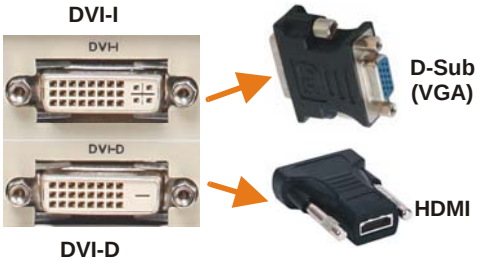
Up to one optical drive and two hard disks can be fitted in the SH61R4. To reduce heat and improve on airflow, the drive rack built into the SH61R4 leaves generous space between the hard disks. Intelligently-engineered airflow mechanics channels cool air to where it is needed most - protecting components and providing optimal performance.

Optional: Built-in Intel® HD Graphics Engine *)

The Intel GMA HD 3000 / 2000 graphics processor has been moved onto the same die as the CPU. It supports HDMI 1.4a standard with 3D stereoscopic playback, hardware encoding for H.264 and MPEG-2 video, full 1080p high-definition video playback - including Blu-ray, DirectX 10.1 and Shader 4.1. HD 2000 has 6 execution units (similar to shader/stream processors) while HD 3000 has 12, the latter is only available on the "K" series, though the i7's allow for a higher maximum dynamic graphics frequency. With all these improvements and changes to the architecture, this GPU is comparable to entry-level discrete graphics cards such as the AMD Radeon HD 5450.

Video outputs *)

With optional adapters (not included) DVI-D devices can be connected to the HDMI port or VGA devices to the DVI-I port, respectively.



D-Sub (VGA) means the connector only outputs analog video signals.
DVI-D means the connector only outputs digital video signals.
DVI-I means digital and analog video signals are put out.
HDMI supports digital video plus multi-channel digital audio output, but the DVI port and the adapter do not provide digital audio signals.

Dual View Technology with two digital video ports *)

Dual View technology offers multiple display support for up to two separate monitors. This helps to improve on productivity by allowing to spread multiple windows across two monitors while working with them simultaneously. The SH61R4 features two digital DVI video outputs.

SH61R4 supports 4 displays in combination with a discrete graphics card *)

With Shuttle SH61R4 the user can support 4 displays in combination with a discrete PCI-Express graphics card, when the initial display is connected to the integrated graphics. For this, you have to enter the BIOS Setup Utility by pressing the "Delete" key after power on the PC. In the "Advanced" BIOS menu please set "Initiate Graphic Adapter" to "Onboard VGA". The Windows Device Manager will show the integrated graphics and the external discrete graphics card as well. Note, that the graphics performance is limited to the integrated graphics engine. This function is based on the Switchable Graphics feature of the 2nd Generation Intel® Core™ Processors with Intel® HD Graphics.

*) Certain processor models do not include the integrated graphics, e.g. Intel Core i5-2380P, Core i5-2450P and Core i5-2550K.

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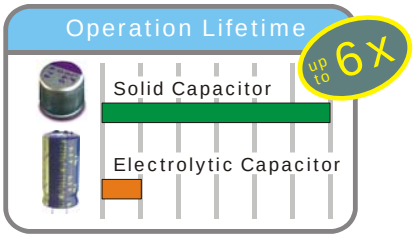
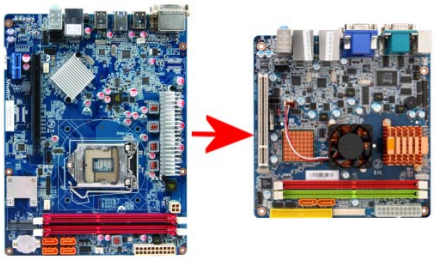
Optional: Serial RS-232 port (COM)

One serial COM port (RS232) can optionally be installed to the back panel (accessory “H-RS232”). This is particularly relevant to professional applications such as electronic POS systems, industrial automation systems and scientific analysis.



Solid Capacitors

By using all-solid capacitors (audio excepted) Shuttle mainboards are long-life and provide industry-leading stability and reliability. The average lifespan of one solid capacitor is more than six times longer compared to the previous generation of electrolytic capacitors.



Mini-ITX Mainboard Support

Shuttle expands the capabilities of its R chassis, adding support for Mini-ITX mainboards (17 x 17cm or 6.7 x 6.7 inches). The Shuttle chassis can go beyond the Shuttle mainboard, so you can easily upgrade or downgrade the mainboard to your desire, without any modifications to the chassis.

Mini PCI Express Slot – e.g. for WLAN expansion

The SH61R4 mainboard features a Mini PCI-Express slot, which can be used for „full size“ or „half size“ cards, e.g. for the optional Shuttle Accessory WLN-C which is an expansion kit for WLAN 802.11n functionality.

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Shuttle XPC Barebone SH61R4 Specifications

R4-Chassis	Black aluminium chassis with acrylic front plate Customizable front panel design: simply change the mylar and add your individual design such as a photo, graphics or a company logo to the front panel. Storage bays: 1 x 5.25" (external), 2 x 3.5" (internal) Dimensions: 32.5 x 21.5 x 19 cm (LWH) = 13.3 liters (without rubber feet) Weight: 3.2 kg net / 5.0 kg gross
Mainboard and Chipset	Shuttle Mainboard FH61, Shuttle form factor, proprietary design for XPC SH61R4 Chipset/Southbridge: Intel® H61 Express (Codename: Cougar Point) Platform Controller Hub (PCH) as Single-Chip-Solution Passive chipset cooling with heatsink 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, 32MBit Flash-ROM Supports PnP, ACPI 3.0, Hardware Monitoring Supports boot up from external USB flash memory Supports Unified Extensible Firmware Interface (UEFI) [3]
Power Supply	250 Watt mini power supply unit Input voltage range: 100~240V Connectors: 20-pin ATX, 4-pin ATX12V Other connectors: 4x SATA, 2x Molex, 1x Floppy Graphics power connector: 6 pins Active PFC (Power Factor Correction)
Processor Support	Socket 1155 (LGA 1155) supports next generation of Intel Core i3 / i5 / i7 desktop processors with up to 95W TDP Codename "Sandy Bridge", 32nm process technology Not compatible with older Socket-1156 processors The processor integrates PCI-Express, memory controller and optionally the graphics engine on the same die Please refer to the support list for detailed processor support information.
Heatpipe Processor Cooling	Shuttle I.C.E. (Integrated Cooling Engine) advanced I.C.E. heatpipe technology, linear controlled 92mm fan SilentX cooling and noise reduction technology with Active Airflow
Memory Support	2 x 240 pin slots Supports DDR3-1066/1333 SDRAM memory (PC3-8500/10600) Supports Dual Channel mode Supports max. 8 GB per DIMM, maximum total size 16 GB

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Integrated Graphics (optional)	Intel® HD Graphics 2000/3000 integrated in processor Supports Pixel Shader 4.1 and DirectX 10.1 Maximum size of Shared Memory: 1692MB Supports DVI, max. resolution 1920x1200 @ 60Hz Supports D-Sub, max. resolution 2048x1536 @ 75Hz (optional VGA-to-DVI adapter required) Supports HDCP through DVI and HDMI (HDMI through optional adapter) Supports full HD 1080p Blu-ray (BD) / HD-DVD playback Supports Dual-Independent-Display through DVI-D and DVI-I [2] Certain processor models do not include the integrated graphics, e.g. Intel Core i5-2380P, Core i5-2450P and Core i5-2550K.
Expansion Slots	1x PCI-Express x16 v2.0 slot (PEG, for graphics cards only) 1x PCI-Express x1 v2.0 slot, open-ended [4] 1x Mini-PCI-Express x1v2.0 half/full-size slot (for optional WLAN module) Supports dual-slot graphics cards (occupies second PCI-Express slot) With 6 pin power connector for the graphics card.
6-Channel Audio	Audio Codec: IDT 92HD89C, 5.1 channel Three analog audio connectors (3.5mm) at the back panel: line-in (blue), line-out (green) and microphone input (pink) shared with 5.1 channel line-out (front, rear, center/bass) Front panel: microphone input and head phone output (line-out)
Gigabit-LAN Controller	Gigabit LAN Realtek RTL 8111E Ethernet network controller PCI Express interface IEEE 802.3u 1000Base-T compliant Supports 10 / 100 / 1.000 MBit/s operation Supports Wake-on-LAN (WOL) Supports boot from LAN (PXE)
Drive Connectors	4x Serial ATA rev. 2.0, max. 3 Gbit/s (onboard)
Front Panel Connectors	Microphone input Headphone output 2x USB 2.0 Power button, Power indicator (Blue LED) Hard disk drive indicator (Yellow LED)
Back Panel Connectors	DVI-D [2] supports HDMI through optional adapter DVI-I [2] supports analog VGA through optional adapter 6x USB 2.0, 2x USB 3.0 GigaBit LAN (RJ45) Audio Line-out Audio Line-in Microphone Input Clear CMOS button optional: Serial RS232 port (Accessory: "H-RS232") Perforation for three optional WLAN antennas

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Other Connectors (onboard)	2x USB 2.0 (2x5 pins) - occupied by front panel 1x RS232 serial interface (2x5 pins) 2x fan connectors (4 pins and 3 pins) Audio AUX input Digital S/PDIF output (3 pins)
Included Accessories	Multi-language XPC Installation Guide 32/64bit driver disk including Adobe Reader Software 2x pre-installed SATA cables Power Cord Screws Heatsink Compound Cable straps
Optional Accessories	Back panel adapter for serial RS232 port (H-RS232) Wireless LAN 802.11n kit with Mini-PCIe card (WLN-C) 300W power supply, 80Plus Bronze (PC61J) 500W power supply, 80Plus Bronze (PC63J)
Environmental criteria	Operating temperature: 0~35°C Humidity: 10~90%
Certifications Compliance	EMI: FCC, CE, BSMI, C-Tick Safety: ETL, CB, BSMI Other: RoHS, Energy Star 5.0, EuP Lot6 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-guidelines: - EMV-guideline 89/336/EWG electromagnetic tolerance - LVD-guideline 73/23/EWG use of electric devices within certain voltage-limits

[1] Overclocking Warning:
Please note there is a certain risk involved with overclocking, including adjusting the settings in the BIOS or using third-party overclocking tools. Overclocking may affect your system stability or even cause damage of the components and devices of your system. It is done at your own risk and expense. Shuttle cannot be held responsible for possible damage caused by overclocking.
[2] The integrated video outputs (DVI-D and DVI-I) cannot be used, if the processor does not integrate a graphics function, e.g. Intel Core i5-2380P, Core i5-2450P and Core i5-2550K.
[3] Unified Extensible Firmware Interface (UEFI) – required when booting from hard disks larger than 2.2 TB under Windows 64 bit operating systems such as Windows 7, Windows Vista SP1 and Windows Server 2008/2003 SP1.
[4] Open-ended PCI-E slot - The X1 slot uses an open-ended socket to permit physically longer cards (e.g. X4 or X8) while the speed is limited to X1.

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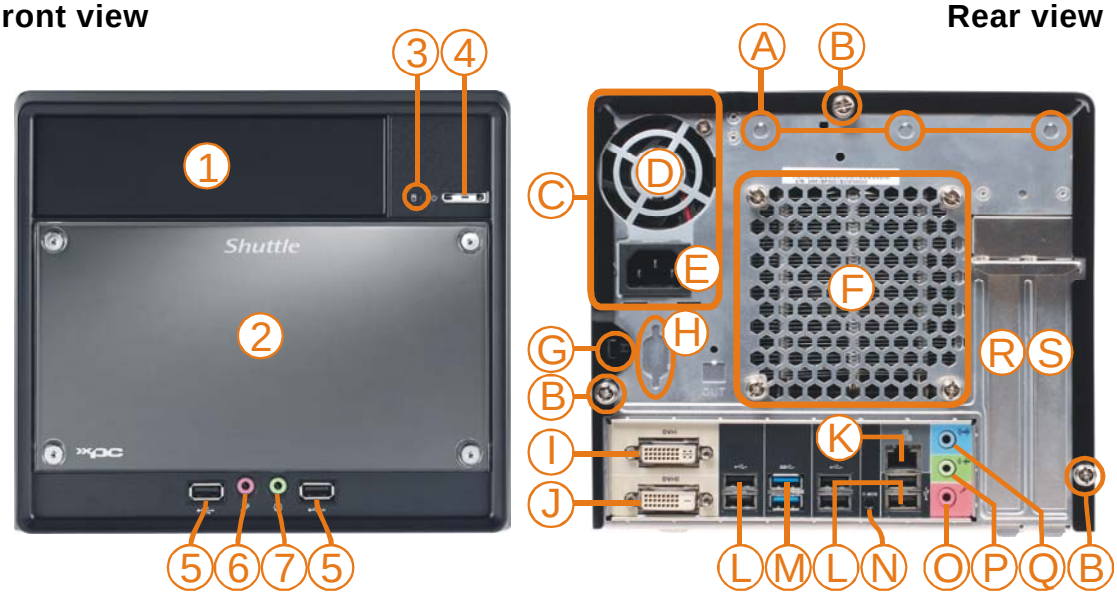
Shuttle XPC SH61R4 – Connectors

Front view

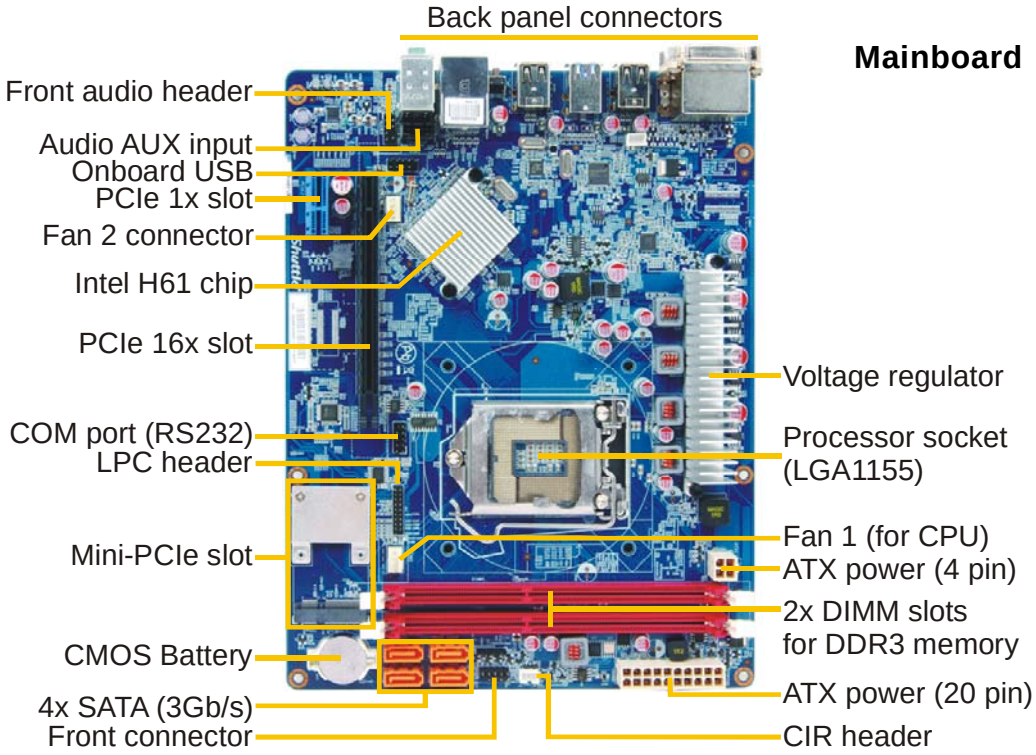
Rear view



1	5.25“ bay for the optical drive	**A**	Perforation for optional WLAN module	**K**	Gigabit LAN (RJ45)
2	Removable acryllic plate	**B**	Three thumbscrews	**L**	6x USB 2.0
3	Hard disk LED indicator	**C**	Power supply	**M**	2x USB 3.0
4	Power switch with LED	**D**	Power supply fan	**N**	Clear-CMOS-Button
5	2x USB 2.0 ports	**E**	AC power connector	**O**	Microphone input
6	Microphone input	**F**	Heatpipe cooling system	**P**	Audio Line-out
7	Headphone output	**G**	Hole for Kensington Lock	**Q**	Audio Line-in
		H	COM / RS232 (optional**)	**R**	PCI-Express X16 slot
		I	DVI-I video output *)	**S**	PCI-Express X1 slot
		J	DVI-D video output *)		

*) Remark: the DVI video outputs cannot be used, if the processor does not integrate a graphics function, e.g. Intel Core i5-2380P, Core i5-2450P and Core i5-2550K. **) Adapter H-RS232

Mainboard



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Shuttle SH61R4 – Mylar Dimensions

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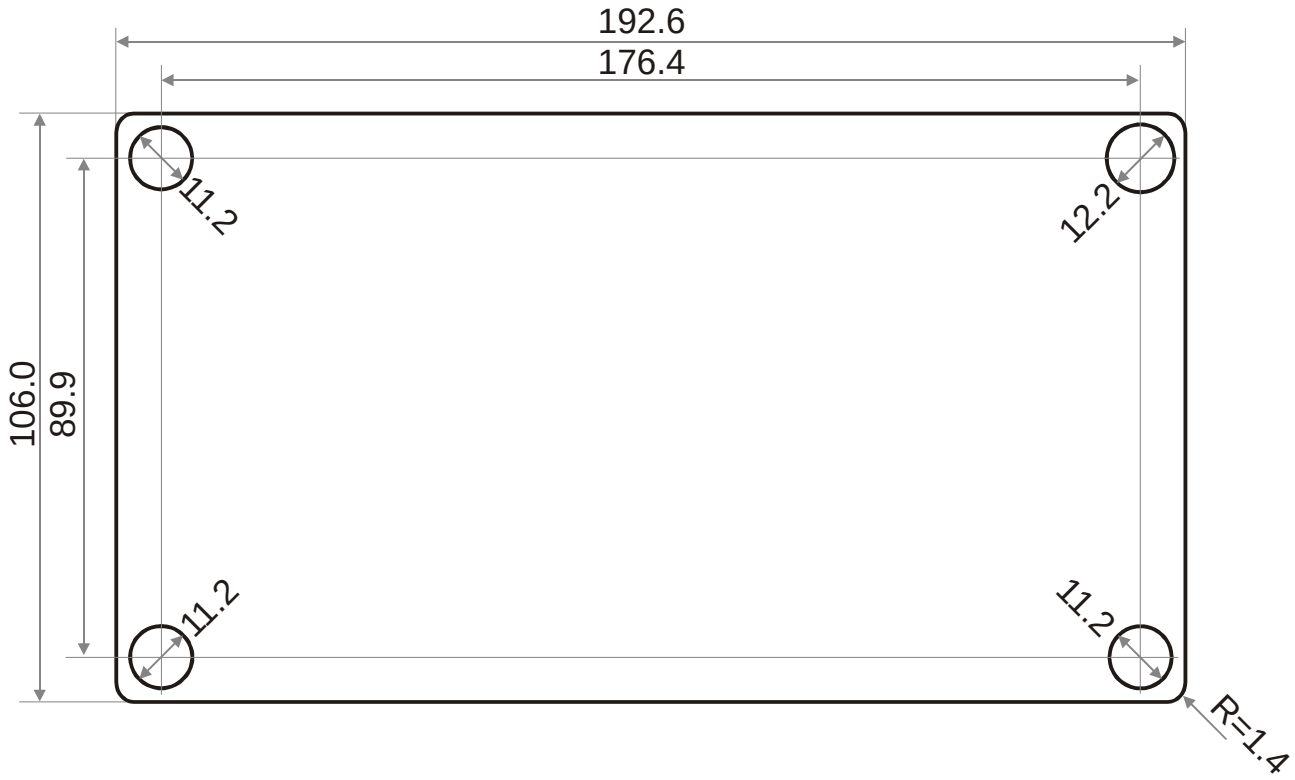

All dimensions in millimeter (mm)

Example

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2rd Generation Intel Core Processor Family

LGA1155 socket "32nm Sandy Bridge" processor overview (Date: April 2013)

Name	Model	Cores	HT	Clock	Turbo	Cache	TDP	Graphics	Graphics clock
Celeron	G440	1	-	1.6 GHz	-	1 MB	35 W	HD	650~1000 MHz
	G460	1	Yes	1.8 GHz	-	1.5 MB	35 W	HD	650~1000 MHz
	G465	1	Yes	1.9 GHz	-	1.5 MB	35 W	HD	650~1000 MHz
	G530	2	-	2.4 GHz	-	2 MB	65 W	HD	850~1000 MHz
	G530T	2	-	2.0 GHz	-	2 MB	35 W	HD	650~1100 MHz
	G540	2	-	2.5 GHz	-	2 MB	65 W	HD	850~1000 MHz
	G540T	2	-	2.1 GHz	-	2 MB	35 W	HD	650~1000 MHz
	G550	2	-	2.6 GHz	-	2 MB	65 W	HD	850~1000 MHz
	G550T	2	-	2.2 GHz	-	2 MB	35 W	HD	850~1000 MHz
	G555	2	-	2.7 GHz	-	2 MB	65 W	HD	850~1000 MHz
Pentium	G620T	2	-	2.2 GHz	-	3 MB	35 W	HD	650~1100 MHz
	G620	2	-	2.6 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G622	2	-	2.6 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G630	2	-	2.7 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G630T	2	-	2.3 GHz	-	3 MB	35 W	HD	650~1100 MHz
	G632	2	-	2.7 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G640	2	-	2.8 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G640T	2	-	2.4 GHz	-	3 MB	35 W	HD	650~1100 MHz
	G645	2	-	2.9 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G645T	2	-	2.5 GHz	-	3 MB	35 W	HD	650~1100 MHz
	G840	2	-	2.8 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G850	2	-	2.9 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G860	2	-	3.0 GHz	-	3 MB	65 W	HD	850~1100 MHz
	G860T	2	-	2.6 GHz	-	3 MB	35 W	HD	650~1100 MHz
	G870	2	-	3.1 GHz	-	3 MB	65 W	HD	850~1100 MHz
Core i3	2100T	2	Yes	2.5 GHz	-	3 MB	35 W	HD 2000	650~1100 MHz
	2100	2	Yes	3.1 GHz	-	3 MB	45 W	HD 2000	850~1100 MHz
	2102	2	Yes	3.1 GHz	-	3 MB	65 W	HD 2000	850~1100 MHz
	2105	2	Yes	3.1 GHz	-	3 MB	65 W	HD 3000	850~1100 MHz
	2120	2	Yes	3.3 GHz	-	3 MB	45 W	HD 2000	850~1100 MHz
	2120T	2	Yes	2.6 GHz	-	3 MB	35 W	HD 2000	650~1100 MHz
	2125	2	Yes	3.3 GHz	-	3 MB	65 W	HD 3000	850~1100 MHz
	2130	2	Yes	3.4 GHz	-	3 MB	65 W	HD 2000	850~1100 MHz
Core i5	2300	4	-	2.8 GHz	3.1 GHz	6 MB	95 W	HD 2000	850~1100 MHz
	2310	4	-	2.9 GHz	3.2 GHz	6 MB	95 W	HD 2000	850~1100 MHz
	2320	4	-	3.0 GHz	3.3 GHz	6 MB	95 W	HD 2000	850~1100 MHz
	2380P	4	-	3.1 GHz	3.4 GHz	6 MB	95 W	-	-
	2390T	2	Yes	2.7 GHz	3.5 GHz	3 MB	35 W	HD 2000	650~1100 MHz
	2400S	4	-	2.5 GHz	3.3 GHz	6 MB	65 W	HD 2000	850~1100 MHz
	2400	4	-	3.1 GHz	3.4 GHz	6 MB	95 W	HD 2000	850~1100 MHz
	2405S	4	-	2.5 GHz	3.3 GHz	6 MB	65 W	HD 3000	850~1100 MHz
	2450P	4	-	3.2 GHz	3.5 GHz	6 MB	95 W	-	-
	2500T	4	-	2.3 GHz	3.3 GHz	6 MB	45 W	HD 2000	650~1250 MHz
	2500S	4	-	2.7 GHz	3.7 GHz	6 MB	65 W	HD 2000	850~1100 MHz
	2500	4	-	3.3 GHz	3.7 GHz	6 MB	95 W	HD 2000	850~1100 MHz
	2500K	4	-	3.3 GHz	3.7 GHz	6 MB	95 W	HD 3000	850~1100 MHz
	2550K	4	-	3.5 GHz	3.8 GHz	6 MB	95 W	-	-

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Core i7	2600S	4	Yes	2.8 GHz	3.8 GHz	8 MB	65 W	HD 2000	850~1100 MHz
	2600	4	Yes	3.4 GHz	3.8 GHz	8 MB	95 W	HD 2000	850~1350 MHz
	2600K	4	Yes	3.4 GHz	3.8 GHz	8 MB	95 W	HD 3000	850~1350 MHz
	2700K	4	Yes	3.5 GHz	3.9 GHz	8 MB	95 W	HD 3000	850~1350 MHz

K = unlocked, S = Performance optimized lifestyle, T = Power optimized lifestyle, HT = Hyper Threading (SMT).
Intel HD graphics HD 3000/2000 supports 12/6 Execution Units (Shader-Quads) and DirectX 10.1.
Certain processor models do not include integrated graphics.
Please refer to the support list for detailed processor support information at global.shuttle.com.

3rd Generation Intel Core Processor Family

LGA1155 socket "22nm Ivy Bridge" processor overview (Date: April 2013)

Name	Model	Cores	HT	Clock	Turbo	Cache	TDP	Graphics	Graphics clock
Celeron	G1610	2	-	2.6 GHz	-	2 MB	55 W	HD	650~1050 MHz
	G1610T	2	-	2.3 GHz	-	2 MB	35 W	HD	650~1050 MHz
	G1620	2	-	2.7 GHz	-	2 MB	55 W	HD	650~1050 MHz
Pentium	G2010	2	-	2.8 GHz	-	3 MB	55 W	HD	650~1050 MHz
	G2020T	2	-	2.5 GHz	-	3 MB	35 W	HD	650~1050 MHz
	G2020	2	-	2.9 GHz	-	3 MB	55 W	HD	650~1050 MHz
	G2100T	2	-	2.6 GHz	-	3 MB	35 W	HD	650~1050 MHz
	G2120	2	-	3.1 GHz	-	3 MB	55 W	HD	650~1050 MHz
	G2130	2	-	3.2 GHz	-	3 MB	55 W	HD	650~1050 MHz
Core i3	3210	2	Yes	3.2 GHz	-	3 MB	55 W	HD 2500	650~1050 MHz
	3220T	2	Yes	2.8 GHz	-	3 MB	35 W	HD 2500	650~1050 MHz
	3220	2	Yes	3.3 GHz	-	3 MB	55 W	HD 2500	650~1050 MHz
	3225	2	Yes	3.3 GHz	-	3 MB	55 W	HD 4000	650~1050 MHz
	3240	2	Yes	3.4 GHz	-	3 MB	55 W	HD 2500	650~1050 MHz
	3240T	2	Yes	2.9 GHz	-	3 MB	35 W	HD 2500	650~1050 MHz
Core i5	3330S	4	-	2.7 GHz	3.2 GHz	6 MB	65 W	HD 2500	650~1100 MHz
	3330	4	-	3.0 GHz	3.2 GHz	6 MB	77 W	HD 2500	650~1100 MHz
	3350P	4	-	3.1 GHz	3.3 GHz	6 MB	69 W	-	-
	3450S	4	-	2.8 GHz	3.5 GHz	6 MB	65 W	HD 2500	650~1100 MHz
	3450	4	-	3.2 GHz	3.5 GHz	6 MB	77 W	HD 2500	650~1100 MHz
	3470T	4	-	2.9 GHz	3.6 GHz	3 MB	35 W	HD 2500	650~1100 MHz
	3470S	4	-	2.9 GHz	3.6 GHz	6 MB	65 W	HD 2500	650~1100 MHz
	3470	4	-	3.2 GHz	3.6 GHz	6 MB	77 W	HD 2500	650~1100 MHz
	3475S	4	-	2.9 GHz	3.6 GHz	6 MB	65 W	HD 4000	650~1100 MHz
	3550S	4	-	3.0 GHz	3.7 GHz	6 MB	65 W	HD 2500	650~1150 MHz
	3550	4	-	3.3 GHz	3.7 GHz	6 MB	77 W	HD 2500	650~1150 MHz
	3570S	4	-	3.1 GHz	3.8 GHz	6 MB	65 W	HD 2500	650~1150 MHz
	3570T	4	-	2.3 GHz	3.3 GHz	6 MB	45 W	HD 2500	650~1150 MHz
	3570	4	-	3.4 GHz	3.8 GHz	6 MB	77 W	HD 2500	650~1150 MHz
	3570K	4	-	3.4 GHz	3.8 GHz	6 MB	77 W	HD 4000	650~1150 MHz
Core i7	3770T	4	Yes	2.5 GHz	3.7 GHz	8 MB	45 W	HD 4000	650~1150 MHz
	3770S	4	Yes	3.1 GHz	3.9 GHz	8 MB	65 W	HD 4000	650~1150 MHz
	3770	4	Yes	3.4 GHz	3.9 GHz	8 MB	77 W	HD 4000	650~1150 MHz
	3770K	4	Yes	3.5 GHz	3.9 GHz	8 MB	77 W	HD 4000	650~1150 MHz

K = unlocked, S = Performance optimized lifestyle, T = Power optimized lifestyle, HT = Hyper Threading (SMT).
Intel HD graphics HD 4000/2500 features 16/6 Execution Units (Shader-Quads) and supports DirectX 11/OpenGL 3.1.
Certain processor models do not include integrated graphics.
Please refer to the support list for detailed processor support information at global.shuttle.com.

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