

MINIS FORUM

H31

**Introduction Presentation
Rev 1.1, August 2020**

- MINISFORUM was born among a group of computer engineers who are passionate about advanced technology and design. Since its inception in 2012, MINISFORUM has been committed to innovation and production of outstanding products.
- Through these products, we can provide consumers with unparalleled satisfaction and reliability.
- We listen to every user's constructive opinions and understand customer needs. On this basis, a large number of innovations have been carried out, and innovative ideas have been injected into every product of the company. Through these products, people really benefit from the convenience of daily life.
- Each of our products is carefully crafted, when we choose materials, we pursue excellent quality. Pursue the ultimate perfection of product design. We do not simply stack hardware, but do a lot of optimization and integration to achieve the best performance of the product.
- In August 2020, MinisForum designed and released the EliteMiniPC H31 with Intel® Pentium® Gold G5420 desktop processor, providing advanced desktop PC functions in an ultra-compact, space-saving design, suitable for small businesses, industrial automation, offices, and homes Theater and living room.

Specifications

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MINISFORUM EliteMini H31

Processor	Intel® Pentium® Gold G5420 Processor, 2 Cores/4 Threads (4M Cache, 3.80 GHz)
GPU	Intel® UHD Graphics 610
Memory	DDR4 8GB×1 Dual channel (SODIMM Slots×2)
Storage	M.2 2280 128GB PCIe SSD 2.5 inch 1TB SATA 3.0 HDD
Storage Expansion	1×M.2 2242 SATA SSD Slot (up to 1TB, SATA 3.0 6.0Gb/s) 1×TF Card Slot (up to 128GB)
Wireless Connectivity	M.2 2230 WIFI Support (Intel® WIFI6 AX200, BT5.1 pre-install)
Video Output	① HDMI(4K@30Hz) , ② Mini DisplayPort(4K@60Hz)
Audio Output	HDMI , Mini DisplayPort , 3.5mm Audio Jack , LINE IN , HP OUT
Peripherals Interface	RJ45 Gigabit Ethernet Port×1 , USB 3.0 Port×4 , TF Card Slot×1 , MIC×1
Power	DC 19V/4.73A (adapter included)
System	Windows 10
Launch Date	July-20
Product Dimension	154×153×62mm
Package Dimension	192×192×160mm
Net Weight	1083g
Gross Weight	2.02/KGS

- Small size, beautiful appearance (Page 5)
- International brand equipment installed (Page 6~8)
- Support replacement and upgrade CPU(Page 9)
- With super cooling system (Page 10~11)
- Comprehensive stability test (Page 12-20)
- Support high quality 7.1 channel audio playback (Page 21)
- Dual-screen display support (Page 22~23)
- Input/Output strong scalability (Page 24)

Small size, beautiful appearance

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Measures $154 \times 153 \times 62\text{mm}$
Weighs only 1.08 kg.



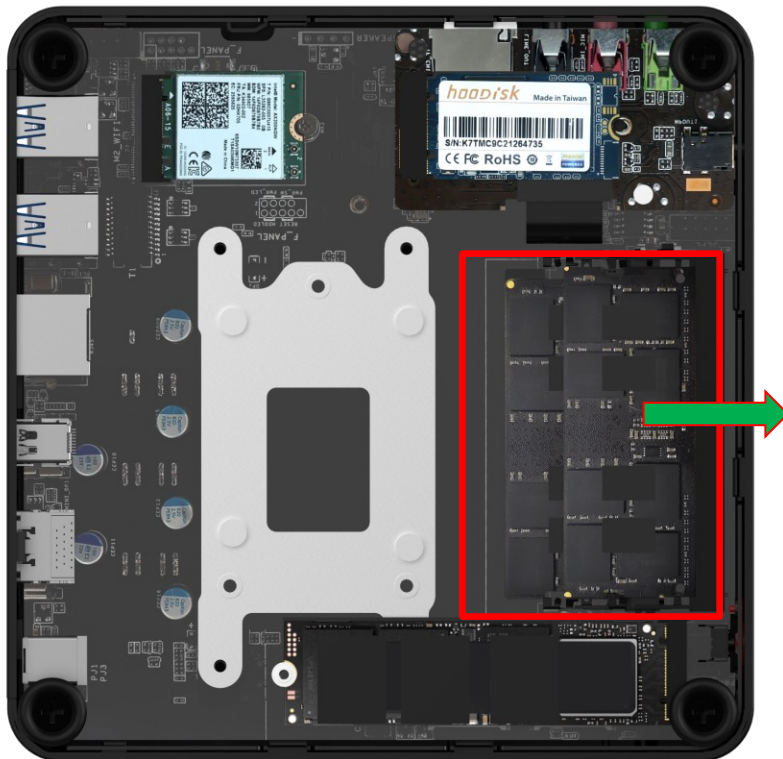
Metal frame design





Memory Module Specifications

Kingston DDR4 Inside



8GB 1G x 64-Bit DDR4-2400 CL17 1Rx8 260-Pin SODIMM (CBD24D4S7S8K1A-8)

Description

This document describes Kingston's 1G x 64-bit (8GB) DDR4-2400 CL17 SDRAM (Synchronous DRAM) 1Rx8, memory module, based on eight 1G x 8-bit SDRAMs. This 260-pin SODIMM uses gold contact fingers and requires +1.2V. The electrical and mechanical specifications are as follows:

Feature

- Power Supply: VDD = 1.2V
- VDDQ = 1.2V
- VPP = 2.5V
- VDDSPD = 2.20V to 3.60V
- Functionality and operations comply with the DDR4 SDRAM datasheet
- 16 internal banks (x4, x8): 4 groups of 4 banks each
- 8 internal banks (x16): 2 groups of 4 banks each
- Bank Grouping is applied, and CAS to CAS latency (tCCD_L, tCCD_S) for the banks in the same or different bank group accesses are available
- Data transfer rates: PC4-2400, PC4-2133, PC4-1866, PC4-1600
- Bi-Directional Differential Data Strobe
- 8 bit pre-fetch
- Burst Length (BL) switch on-the-fly BL8 or BC4(Burst Chop)
- On-Die Termination (ODT)
- Per DRAM Addressability is supported
- Internal Vref DQ level generation is available
- Write CRC is supported at all speed grades
- DBI (Data Bus Inversion) is supported(x8)
- CA parity (Command/Address Parity) mode is supported
- RoHS Compliant and Halogen-Free
- Gold Finger Plating Au 0.076um (Min)
- Operating Temperature 0° C to +85° C

International brand equipment installed

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M.2 2280 PCIE 3.0 4X 512G SSD Inside



Product Overview

- **Capacities**
 - 512GB
- **Form Factor**
 - M.2 2280-S2-M
- **PCIe Interface**
 - PCIe Gen 3 x 4
- **Compliance**
 - NVMe 1.3
 - PCI Express Base 3.1
- **Flash Interface**
 - Transfer rate up to 800MT/s
 - Up to 4pcs of BGA132 flash
- **Performance¹**
 - Read: up to 2500 MB/s
 - Write: up to 2100 MB/s
- **Reliability**
 - Mean Time Between Failure (MTBF) 1,500,000 hours
 - Uncorrectable Bit Error Rate (UBER) < 1 sector per 10¹⁶ bits read
- **Advanced Flash Management**
 - Static and Dynamic Wear Leveling
 - Bad Block Management
 - TRIM
 - SMART
 - Over-Provision
 - Firmware Update
- **Power Management**
 - Support APST
 - Support ASPM
 - Support L1.2
- **Power Consumption²**
 - Idle < 70 mW
 - L1.2 < 2 mW
- **Temperature Range³**
 - Operation: 0°C ~ 70°C
 - Storage: -40°C ~ 85°C
- **RoHS-Compliant**
- **Features Support List:**
 - End to end data path protection
 - Thermal throttling
 - SmartZIP™
 - SmartRefresh™
 - Drive log
 - Support HMB (Host Memory Buffer)
 - Support of TCG OPAL⁴
 - Support of TCG Pyrite

CrystalDiskMark 7.0.0 x64 [ADMIN]

File Settings Profile Theme Help Language

All 1 1GiB F: 6% (31/476GiB) MB/s

	Read [MB/s]	Write [MB/s]
SEQ1M Q8T1	1578.75	1208.83
SEQ1M Q1T1	1254.03	1169.70
RND4K Q32T16	903.79	1059.53
RND4K Q1T1	36.87	68.71

NOTES:

1. Refer to Chapter 2 for more details
2. Refer to Chapter 4, Section 4.2 Power Consumption for more details.
3. The operation temperature means the case temperature, in which can be decided via the S.M.A.R.T.
4. Supported by a separate firmware version. Further information available upon request.

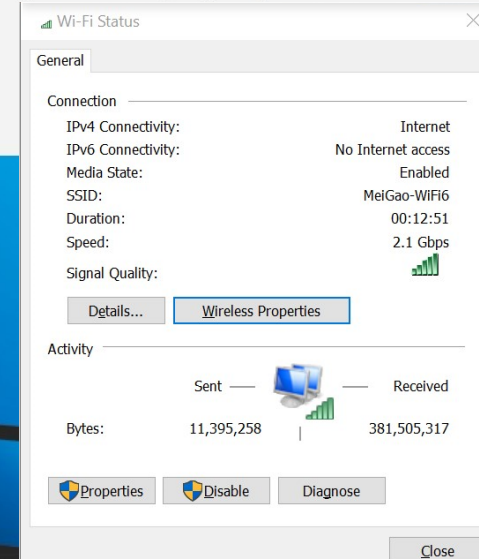
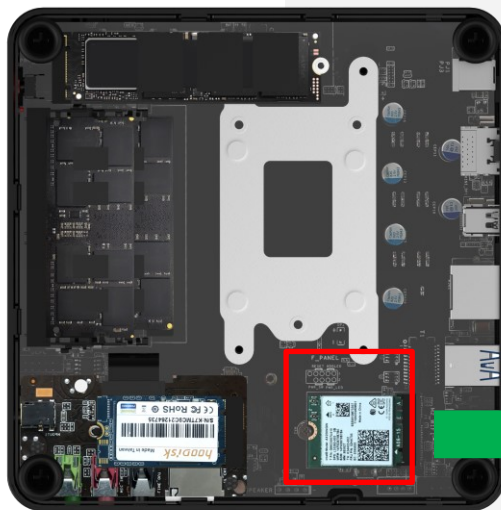
International brand equipment installed

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With the right solution from Intel, your Wi-Fi performs just as remarkably as you do—easily keeping pace with your entertainment, business, and super-connected lifestyle. For instance, a PC equipped with Gigabit Wi-Fi achieves speeds up to 1733Mbps.¹ That's nearly twice as fast as 802.11ac 2x2 with speeds of 867Mbps, allowing you to download an HD movie in less than a minute.^{1 2 3} At Intel, we've been creating technology to improve life at home, work, and on-the-go since the very beginning. Innovation is what we do.

Find your system now

Intel Wi-Fi6 AX200 Inside



Wi-Fi That Smashes Through the Gigabit Barrier

Experience faster Wi-Fi with Intel® Wireless-AC 2X2 160 MHz (1733 Mbps) inside your devices, featuring smooth gaming and 4K UHD video streaming, faster file transfers and backups, and two antennas for reliable connections throughout your home.¹

View the infographic

Data comes from intel : <https://www.intel.com/content/www/us/en/products/docs/wireless-products/get-wi-fi-smart.html>

Support replacement and upgrade CPU

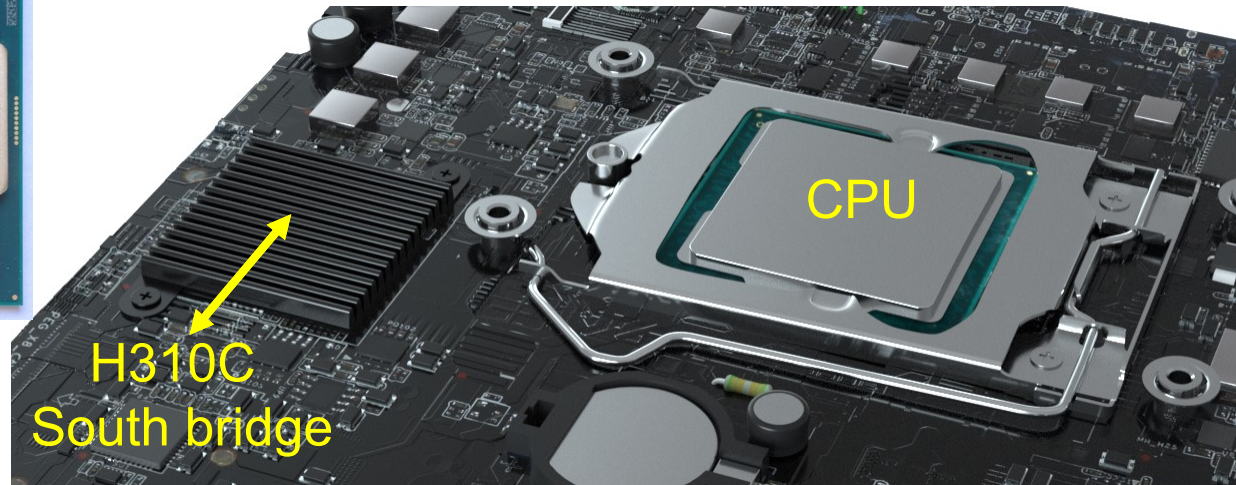
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Intel® Pentium® Gold G5420 Processor, 2 Cores/4 Threads
(4M Cache, 3.80 GHz)

Using Intel's Pentium Gold G5420, this is a dual-core CPU that provides powerful processing capabilities at a low price, especially in daily applications, such as web browsing and word processing.

* In this report, only the performance of low-profile G5420 2 Cores is used as a reference *

*The motherboard is installed with Intel® LGA1151 Socket. You can upgrade the CPU to maximize performance. It supports intel 8/9th generation Processors.

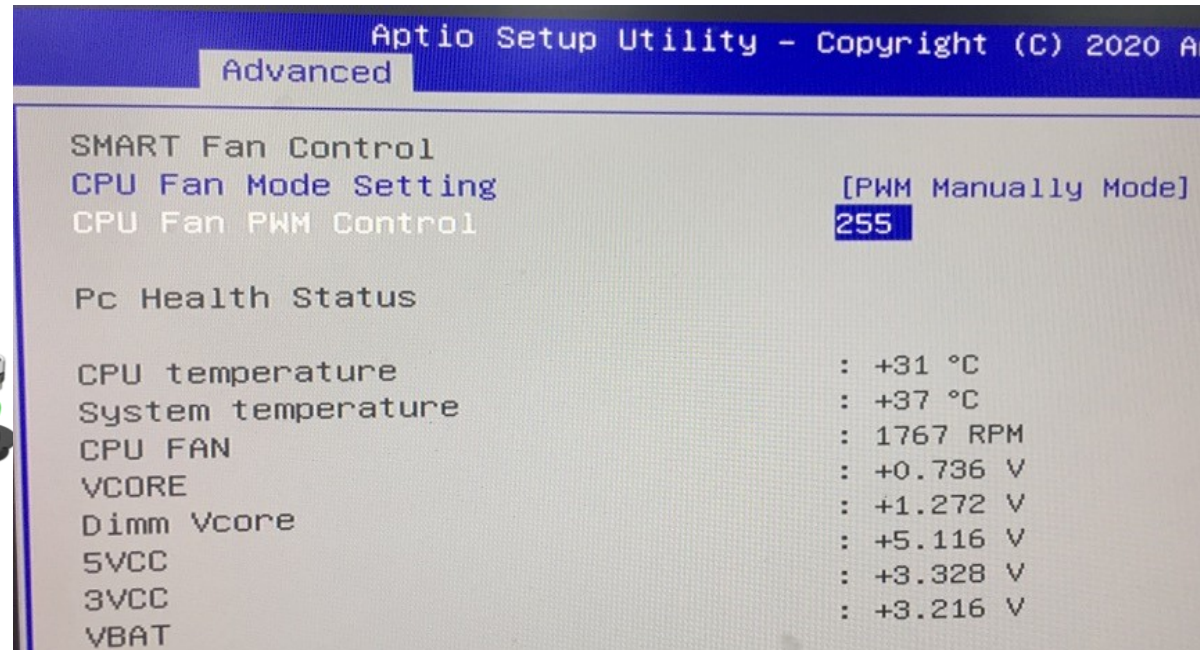


With super cooling system

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- Super large turbo fan, low speed silent operation at 100% CPU load , < 30db & Super large air inlet;
- Super large air outlet, allowing the machine to fully dissipate heat and play a higher performance.
- Design ready to handle 65W TDP CPU
- Adjust the BIOS settings to change the fan speed

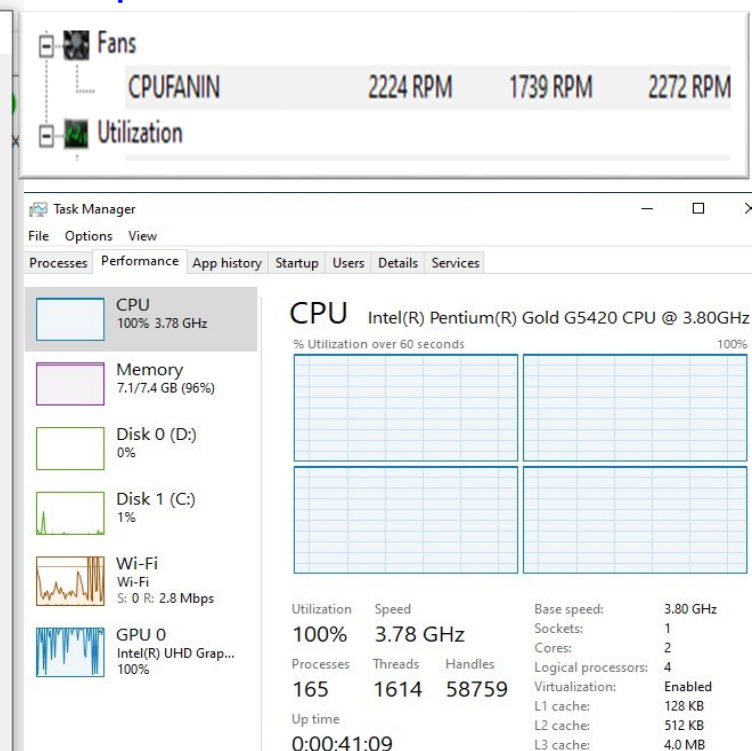
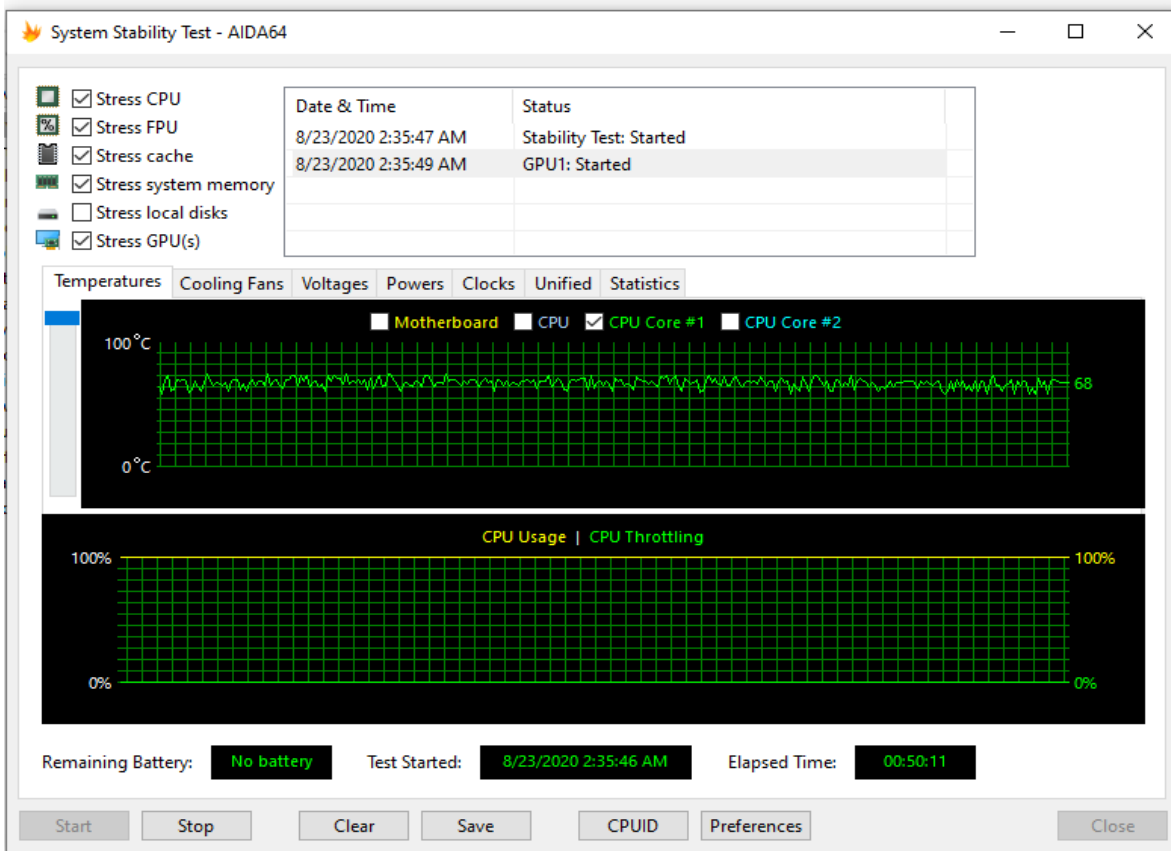
(A:press the DEL key to access BIOS B: [Advanced]--[H/W Monitor]--[CPU Fan Mode Setting]--[SMART FAN Mode] change to [PWM Manually Mode] C:and then change the value of CPU Fan PWM Control [0-255] ,the larger the value, the faster the speed D: Press F4 to save the settings)



With super cooling system

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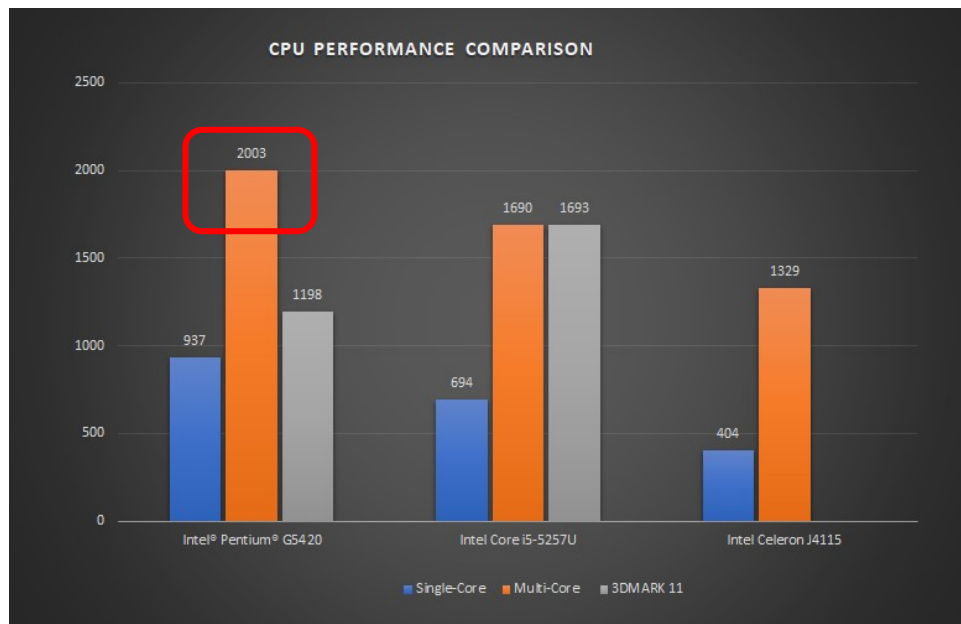
- AIDA64 test : Stress CPU/GPU/Mem..... load 100% monitoring for 15 hours, temperature is maintained at about 65 degrees.
- In this case, the CPU frequency can still reach 3.78GHz And remain stable.
- CPU loading is 100%, fan speed is still at 2200 RPM, super silent.



GPU Performance

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- The following results were tested using Geekbench5.1 and 3DMARK 11.



Geekbench Browser Geekbench 5 ▾ Geekbench 4 ▾ Benchmark Charts ▾ 🔍 Search

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Geekbench 5 Score

937 Single-Core Score	2003 Multi-Core Score
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Geekbench 5.1.0 Tryout for Windows x86 (64-bit)

Result Information

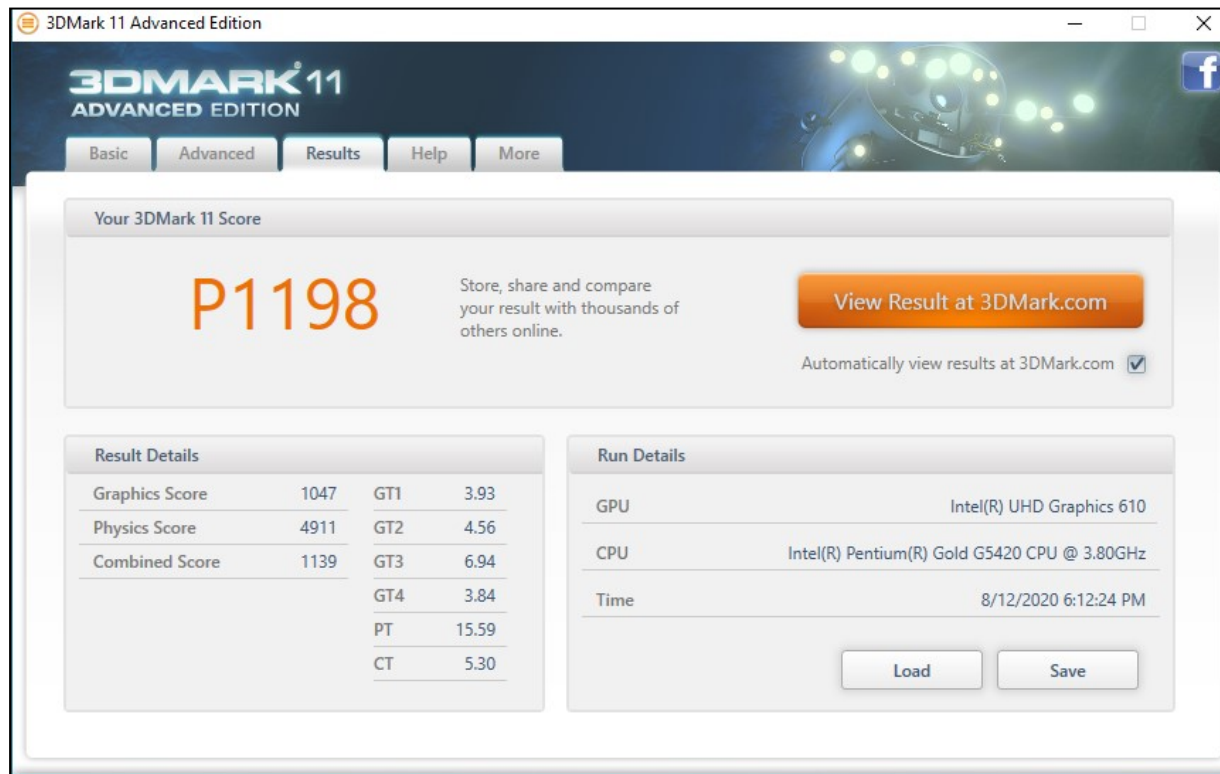
User	minisforum
Upload Date	August 18th 2020, 9:20am
Views	3

System Information

System Information	
Operating System	Microsoft Windows 10 Home (64-bit)
Model	BESSTAR TECH LIMITED H31
Motherboard	BESSTAR TECH LIMITED H31
Processor Information	
Name	Intel Pentium Gold G5420
Topology	1 Processor, 2 Cores, 4 Threads

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- 3DMARK11 overall performance test results;



G5420

CPU Performance

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Ludashi overall performance test result:

Intel® Pentium® G5420 (95133)

Intel® core i5-5257U(80627).



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i5-5257U

Memory Test

PassMark MemTest86 v7.5 test memory Address (Write/Read)

→ All passed, NO error.

```
PassMark MemTest86 V7.5 Free Intel Pentium Gold G5420 @ 3.80GHz
Ck/Temp : 3831 MHz / 36C | Pass 100% #####
L1 Cache : 64K 87.00 GB/s | Test 100% #####
L2 Cache : 256K 33.83 GB/s | Test 13 [Hammer test] - Verifying pattern
L3 Cache : 4096K 15.84 GB/s | Address : 0x420000000 - 0x43EF00000
Memory : 15.4G 7639 MB/s | Pattern : 0x1E42FFB8
RAM Info : PC4-19200 DDR4 2400MHz / 17-17-17-39 / Kingston CBD24D4S7S8K1A-8
-----
CPU: 0123 | CPUs Found: 4
State: -DWD | CPUs Started: 2 CPUs Active: 2
-----
Time: 8:43: Test complete, press any key to display summary rrors: 0

Finished pass #1 (of 4) (Cumulative error count: 0)
Finished pass #2 (of 4) (Cumulative error count: 0)
Finished pass #3 (of 4) (Cumulative error count: 0)
Finished pass #4 (of 4) (Cumulative error count: 0)
>Test Complete

(ESC)/(c)onfiguration
```

Burn in Test(PASSED)

Setting parameters:

Test time:720minute (12H)

Test Item: 2D/3D Graphics ;CPU;Memory(RAM);Network ;Sound

Test loading:100%

BurnInTest V8.1 Pro (1009)

File Edit Configuration Test Quick Tests Help

Current configuration

System Information Burn In Results Event Log Temperature

Results for DESKTOP-RR15SGM

Test configuration file: LastUsed.bitcfg Status: IDLE

Start time: Sun Jun 28 03:52:28 2020 Stop time: Sun Jun 28 15:52:36 2020 Duration: 012h 00m 08s

Test Name	Cycle	Operations	Errors	Last Error Description
2D Graphics	3501	945480	0	No errors
3D Graphics	153	4.601 Million	0	No errors
CPU	2752	110 Trillion	0	No errors
GPGPU	1437	1.7 Quadrillion	0	No errors
Memory (RAM)	852	9.301 Trillion	0	No errors
Network 1	445	17.801 Million	0	No errors
Sound	230	769 Million	0	No errors

BurnInTest test result

PASSED

OK

Windows Reboot cycle test

Windows reboot 500 cycles test passed

The screenshot displays the PassMark Rebooter application window. The 'Reboot options' section on the left is configured with 'Maximum reboots' set to 500 cycles, 'Reboot type' set to 'Reboot', 'Force shutdown' set to 'Ask to close', and a 'Delay' of 20 seconds. The 'Auto load Rebooter at startup' checkbox is checked. The 'Launch application each cycle' and 'Launch application after all cycles finished' fields are empty. The 'Log file' is set to 'C:\Users\myf\Documents\Pe...'. The 'Auto-login' section shows 'Auto-login is currently DISABLED' with fields for 'Domain', 'User Name' (myf), and 'Password'. The 'Log' window on the right shows a detailed log of the 500 reboot cycles, including timestamps, file saving, and countdowns. The log ends with 'FINISHED REBOOT CYCLE'. At the bottom of the application window are buttons for 'Start Cycle', 'Pause', 'Stop Cycle', 'Close', 'About', and 'Help'. To the right of the application window is a blue background with a white box containing the text 'Rebooter - Final Reboot Completed' and a message from 'PassMark Rebooter' stating 'The final reboot has been completed and the reboot counter has been reset'.

Reboot options:

- Maximum reboots: 500 cycles
- Reboot type: Reboot
- Force shutdown: Ask to close
- Delay: 20 Sec
- ☒ Auto load Rebooter at startup
- Launch application each cycle:
- Launch application after all cycles finished:
- Log file: C:\Users\myf\Documents\Pe...
- Clear log

Auto-login:

Auto-login is currently DISABLED

Domain:

User Name: myf

Password:

Set Auto-login Disable Auto-login

Log:

```
2020-7月-22 23:19:06 Saving config file: Count 496
2020-7月-22 23:19:06 ABOUT TO REBOOT, COUNT 496
2020-7月-22 23:20:21 LOADED AFTER REBOOT, COUNT 496
2020-7月-22 23:20:21 STARTING COUNTDOWN TIMER FOR REBOOT, COUNT 496
2020-7月-22 23:20:41 Saving config file: Count 497
2020-7月-22 23:20:41 ABOUT TO REBOOT, COUNT 497
2020-7月-22 23:21:56 LOADED AFTER REBOOT, COUNT 497
2020-7月-22 23:21:56 STARTING COUNTDOWN TIMER FOR REBOOT, COUNT 497
2020-7月-22 23:22:17 Saving config file: Count 498
2020-7月-22 23:22:17 ABOUT TO REBOOT, COUNT 498
2020-7月-22 23:23:31 LOADED AFTER REBOOT, COUNT 498
2020-7月-22 23:23:31 STARTING COUNTDOWN TIMER FOR REBOOT, COUNT 498
2020-7月-22 23:23:51 Saving config file: Count 499
2020-7月-22 23:23:51 ABOUT TO REBOOT, COUNT 499
2020-7月-22 23:25:08 LOADED AFTER REBOOT, COUNT 499
2020-7月-22 23:25:08 STARTING COUNTDOWN TIMER FOR REBOOT, COUNT 499
2020-7月-22 23:25:28 Saving config file: Count 500
2020-7月-22 23:25:28 ABOUT TO REBOOT, COUNT 500
2020-7月-22 23:26:43 Loaded previous log file
2020-7月-22 23:26:43 LOADED AFTER REBOOT, COUNT 500
2020-7月-22 23:26:43 LAST REBOOT, COUNT 500
2020-7月-22 23:26:43 Saving config file: Count 1
2020-7月-22 23:26:43 FINISHED REBOOT CYCLE
```

Rebooter - Final Reboot Completed

PassMark Rebooter

The final reboot has been completed and the reboot counter has been reset

The Game FPS Testing(I)

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PUBG 9FPS



Fortnite 26FPS

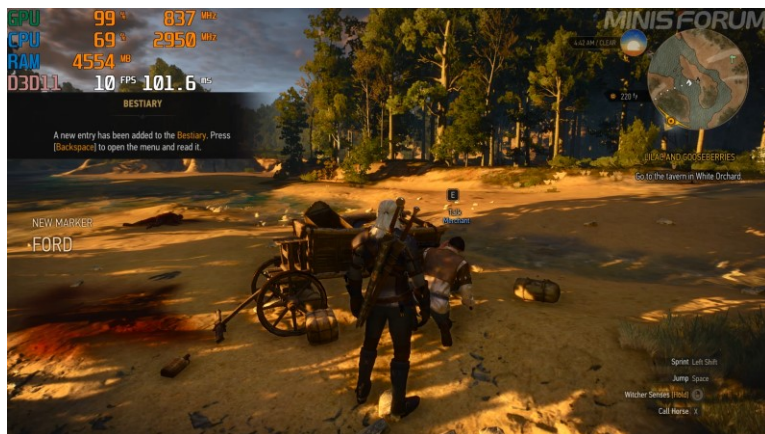


CS GO 19FPS



Borderlands 2 24FPS

The Game FPS Testing(II)



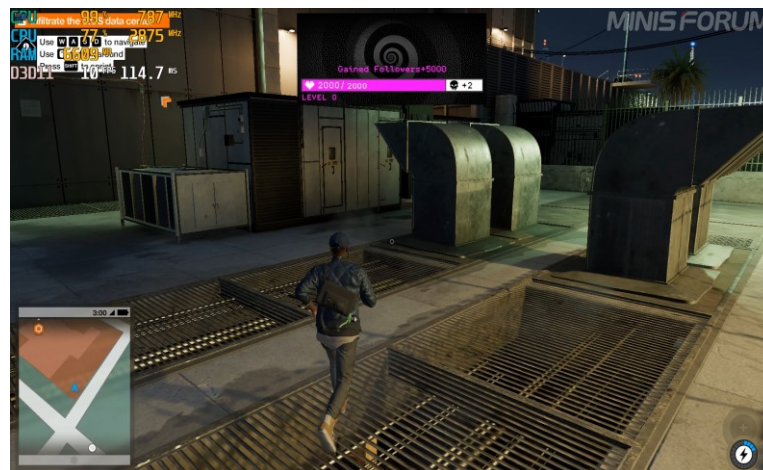
The Witcher 3 Wild Hunt 10FPS



Tomb Raider 22FPS



GAT5 18 FPS



Watch_Dogs 2 10FPS

SSD & HDD Test

- CrystalDiskMark7.0.0 test Result:
M.2 2280 PCIe 512G (PCIe x4 Read:1578MB/s Write:1208MB/s)
M.2 2280 SATA 128G (SATA3.0 Read:445MB/s Write:457MB/s)
2.5" 2TB HDD (SATA3.0 6Gb/s Read:559MB/s Write:513MB/s)
- The computer starts up only 10 seconds, no need to wait patiently

CrystalDiskMark 7.0.0 x64 [ADMIN]				
File	Settings	Profile	Theme	Help Language
All	1	1GiB	F: 6% (31/476GiB)	MB/s
	Read [MB/s]		Write [MB/s]	
SEQ1M Q8T1	1578.75		1208.83	
SEQ1M Q1T1	1254.03		1169.70	
RND4K Q32T16	903.79		1059.53	
RND4K Q1T1	36.87		68.71	

M.2 2280 PCIe 512G

CrystalDiskMark 7.0.0 x64 [ADMIN]				
File	Settings	Profile	Theme	Help Language
All	1	1GiB	G: 92% (109/119GiB)	MB/s
	Read [MB/s]		Write [MB/s]	
SEQ1M Q8T1	445.54		457.47	
SEQ1M Q1T1	448.62		400.05	
RND4K Q32T16	236.04		159.15	
RND4K Q1T1	29.16		91.95	

M.2 2242 SATA 128G

CrystalDiskMark 7.0.0 x64 [ADMIN]				
File	Settings	Profile	Theme	Help Language
All	1	1GiB	D: 84% (1350/1607GiB)	MB/s
	Read [MB/s]		Write [MB/s]	
SEQ1M Q8T1	559.22		513.85	
SEQ1M Q1T1	500.54		461.23	
RND4K Q32T16	380.20		320.02	
RND4K Q1T1	46.28		107.87	

2.5" 2TB HDD

Support high quality 7.1 channel audio playback

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The H31 has designed an independent audio sound card, using Realtek ALC892 chip, supporting 7.1 channels.

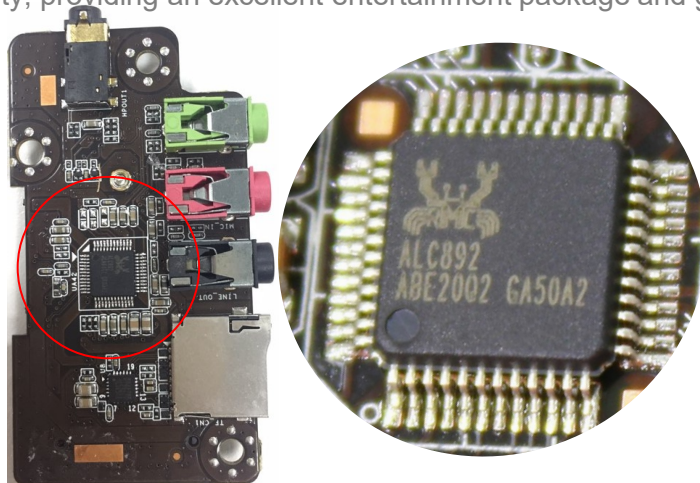
The following content is taken from the official website

<https://www.realtek.com/en/products/computer-peripheral-ics/item/alc892>

The ALC892-CG/ALC892-DTS-CG is a high-performance multi-channel High Definition Audio Codec with Realtek proprietary lossless content protection technology that protects pre-recorded content while still allowing full-rate audio enjoyment from DVD audio, Blu-ray DVD, or HD DVD discs.

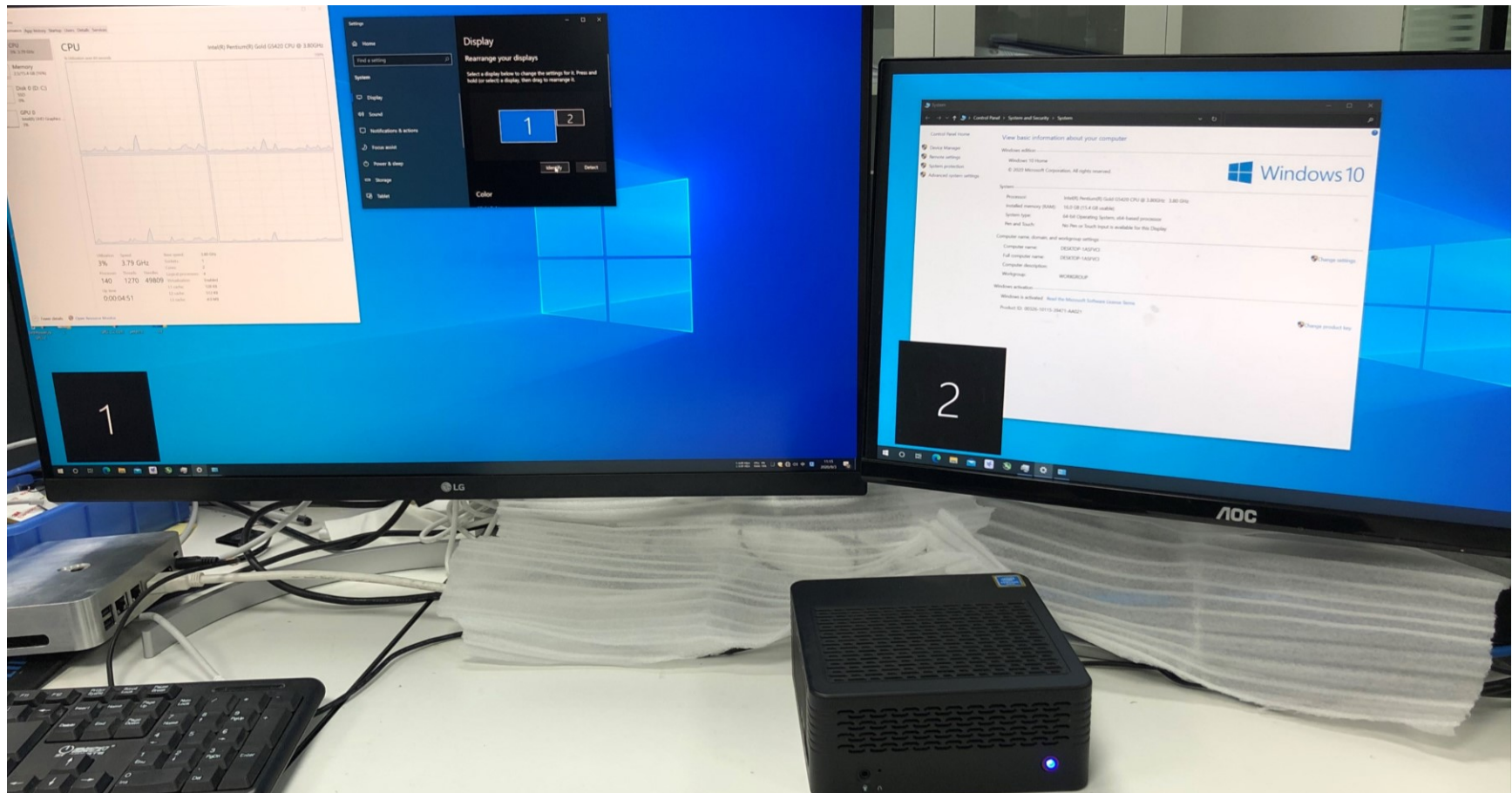
The ALC892 provides ten DAC channels that simultaneously support 7.1 channel sound playback, plus 2 channels of independent stereo sound output (multiple streaming) through the front panel stereo outputs. Two stereo ADCs and one stereo digital microphone converter are integrated and can support a microphone array with Acoustic Echo Cancellation (AEC), Beam Forming (BF), and Noise Suppression (NS) technologies.

The ALC892 supports host audio from the Intel chipsets, and also from any other HDA compatible audio controller. With various software utilities like environment sound emulation, multiple-band and independent software equalizer, dynamic range compressor and expander, optional Dolby PCEE program, SRS TruSurround HD, SRS Premium Sound, Fortemedia SAM, Creative Host Audio, Synopsys Sonic Focus, DTS Surround Sensation | UltraPC, and DTS Connect licenses, the ALC892 offers the highest sound quality, providing an excellent entertainment package and game experience for PC users.



HDMI / Mini DP output display

- Support multi-tasking operation, you can work while watching the home theater.



HDMI / MINI DP 4K output display

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Video ID / sCPN VnLdOcDNTe0 / EJYP WKTR X5AH [x]
Viewport / Frames 1280x720*1.50 / 0 dropped of 3479
Current / Optimal Res 3840x2160@60 / 3840x2160@60
Volume / Normalized 100% / 100% (content loudness -6.6dB)
Codecs vp9 (315) / opus (251)
Color bt709 / bt709
Connection Speed 44683 Kbps
Network Activity 1048 KB
Buffer Health 19.78 s
Mystery Text s:8 t:70.81 b:35.502-59.351,59.361-90.439

MiniDP: 3840*2160 @60Hz



Video ID / sCPN 7ePaVx7TKGM / 1GC2 PPYB BYZX [x]
Viewport / Frames 1280x720*1.50 / 0 dropped of 1559
Current / Optimal Res 1920x1080@30 / 3840x2160@30
Volume / Normalized 100% / 81% (content loudness 1.9dB)
Codecs vp9 (248) / opus (251)
Color bt709 / bt709
Connection Speed 4721 Kbps
Network Activity 0 KB
Buffer Health 2.08 s
Mystery Text s:8 t:51.89 b:48.101-53.731,53.741-64.351,64.361-69.402

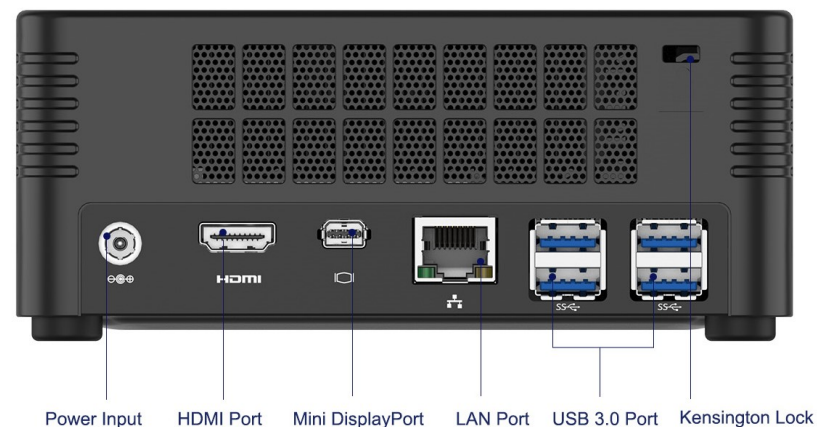
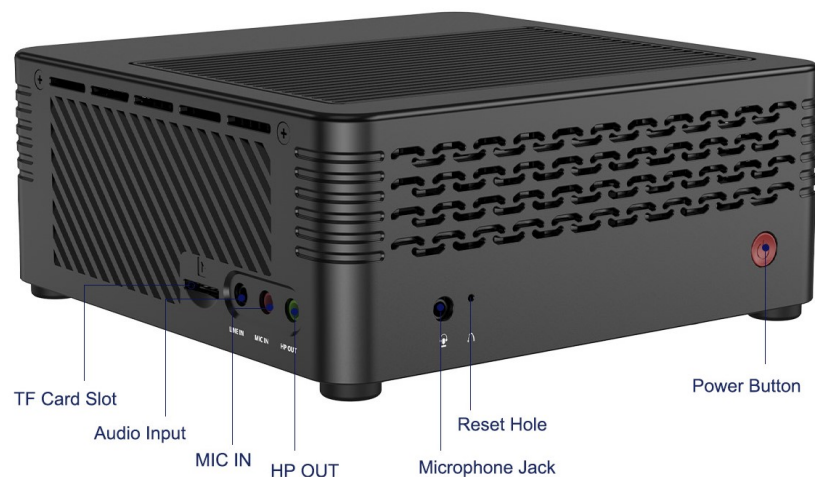
HDMI: 3840*2160 @30Hz



Input / Output Strong Scalability

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- With 4*USB 3.1 Ports (Gen 2, 10GB/s , output :5V/2A up and down)
- With 1*LAN Ports (RTL8111 Gigabit Ethernet)
- 3.5mm Audio Jack , LINE IN ,MIC IN, HP OUT.



Thank you !