

MINIS FORUM

HM50

Introduction Presentation

Rev 1.1, February 2021

- 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 February 2021, MinisForum designed and released the HM50 with AMD Ryzen™ 5 4500U, 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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Processor	AMD Ryzen™ 5 4500U , 6 Cores/6 Threads (Total L2 Cache 3MB , Total L3 Cache 8MB , Base Clock 2.3 GHz , up to 4.0 GHz)
GPU	AMD Radeon™ Graphics (Graphics Frequency 1500 MHz)
Memory	DDR4 8GB×2 Dual channel (SODIMM Slots×2)
Storage	M.2 2280 256GB PCIe SSD
Storage Expansion	2.5 inch SATA HDD Slot×2 (SATA 3.0 6.0Gb/s)
Wireless Connectivity	M.2 2230 WIFI Support (Intel® WIFI6 AX200 , BT5.1 pre-install)
Video Output	① HDMI (4K@60Hz) , ② DisplayPort(4K@60Hz) , ③ USB-C Port(4K@60Hz , In Front)
Audio Output	HDMI , DisplayPort , 3.5mm Audio Jack (Green)
Peripherals Interface	RJ45 Gigabit Ethernet Port×1, RJ45 2.5 Gigabit Ethernet Port×1 , USB 3.0 Port×4(The Back) , USB 3.1 Port×2(Gen2, In Front) , Digital MIC ×2 , Clear CMOS ×1
Power	DC 19V/3.42A (adapter included) , via USB-C(power port)
System	Windows 10 Pro
Product Dimension	127×127×53.1mm

- Small size, beautiful appearance (Page 5)
- International brand equipment installed (Page 6~8)
- With super cooling system (Page 9~10)
- Comprehensive stability test (Page 11-19)
- Dual Ethernet Chip (Page 20)
- HDMI/DP/USB-C output display (Page 21)
- Input / Output Strong Scalability (Page 22)
- Clear CMOS (Page 23)

Small size, beautiful appearance

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Measures $127 \times 127 \times 53.1\text{mm}$

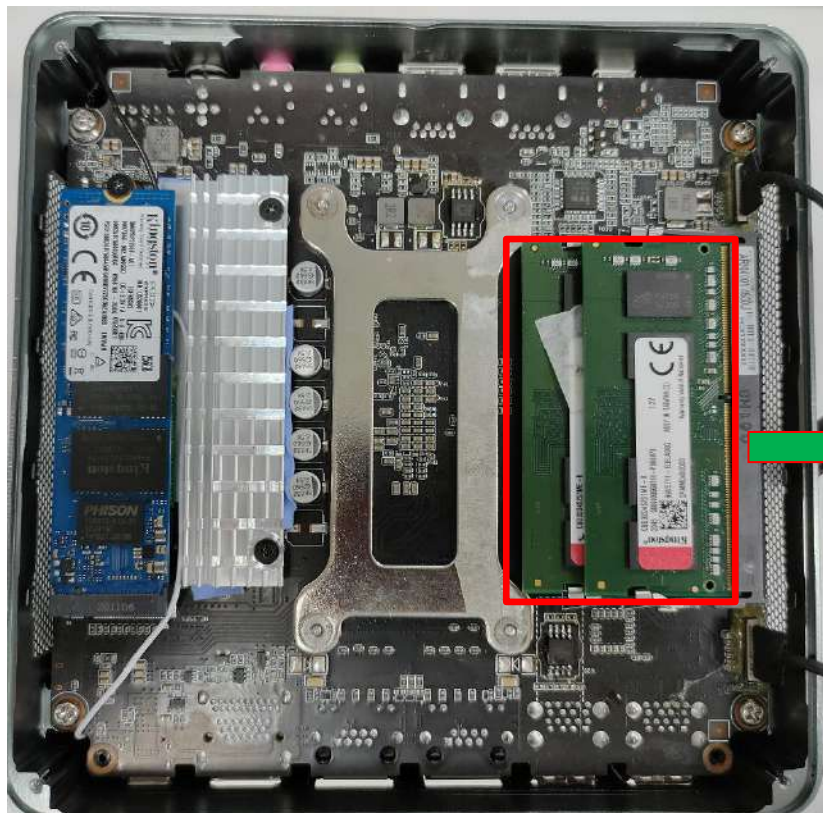


Metal frame design

International brand equipment installed

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Kingston DDR4 Inside



Memory Module Specifications

**8GB 1G x 64-Bit DDR4-3200
CL22 1Rx16 260-Pin SODIMM
(CBD32D4S2S1ME-8)**

Description

This document describes Kingston's 1G x 64-bit (8GB) DDR4-3200 CL22 SDRAM (Synchronous DRAM) 1Rx16, memory module, based on four 1G x 16-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: PC4-3200, PC4-2666, 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 256G SSD Inside



NVme

- ◆ Capacity – supporting unformatted capacities¹ of 128GB, 256GB, 512GB and 1024GB
- ◆ Form-Factor –NGFF-2280, M.2 type
- ◆ Interface – PCIe Gen.3 x4
- ◆ Based on out-of-box performance, speed may vary due to host hardware, software configuration and usage.

◆ Performance² –

Capacity	128 GB	256 GB	512 GB	1024GB
■ Sequential Read	2200 MB/s	2400 MB/s	2400 MB/s	2400MB/s
■ Sequential Write	530 MB/s	1100 MB/s	1100 MB/s	1800MB/s
■ 4K Random Read (QD32)	100,000 IOPs	150,000 IOPs	150,000 IOPs	150,000 IOPS
■ 4K Random Write (QD32)	90,000 IOPs	100,000 IOPs	100,000 IOPs	120,000 IOPS

◆ Power consumption³ –

Capacity	128 GB	256 GB	512 GB	1024GB
■ Maximum Read	2.30 W	2.50 W	2.50 W	2.50W
■ Maximum Write	2.30 W	2.50 W	2.50 W	3.00W
■ Avg. consumption	0.18 W	0.20 W	0.20 W	0.20W
■ L1.2 Substate	5 mW	5 mW	5 mW	5mW

CrystalDiskMark 8.0.1 x64 [Admin]

File Settings Profile Theme Help Language

All 5 1GiB C: 19% (46/238GiB) MB/s

	Read (MB/s)	Write (MB/s)
SEQ1M Q8T1	2517.20	1255.92
SEQ1M Q1T1	1713.60	1215.86
RND4K Q32T1	479.00	337.17
RND4K Q1T1	58.95	214.46

¹ 1 GB = 1,000,000,000 bytes and not all of the memory can be used for storage.

² Performance data reveal the Max. performance consequence, based on CrystalDiskMark test result. TT (at SSD SMART 70°C) enable performance will reduce to Seq. R/W = 1200/200 MB/s, and will down to 120/30 MB/s at most.

³ Maximum Power bases on MobileMark2014 workload. Avg. consumption bases on MobileMark2014 workload.

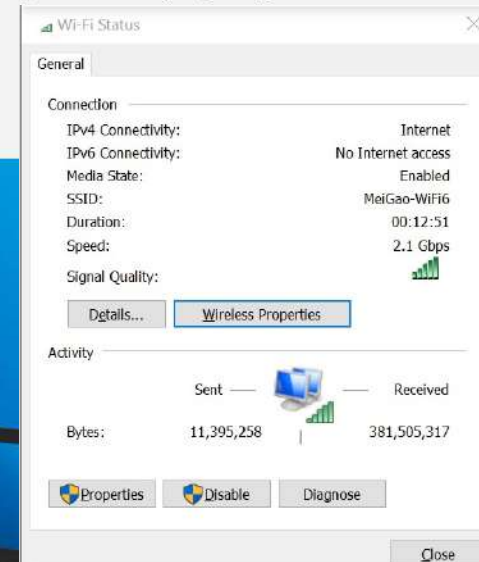
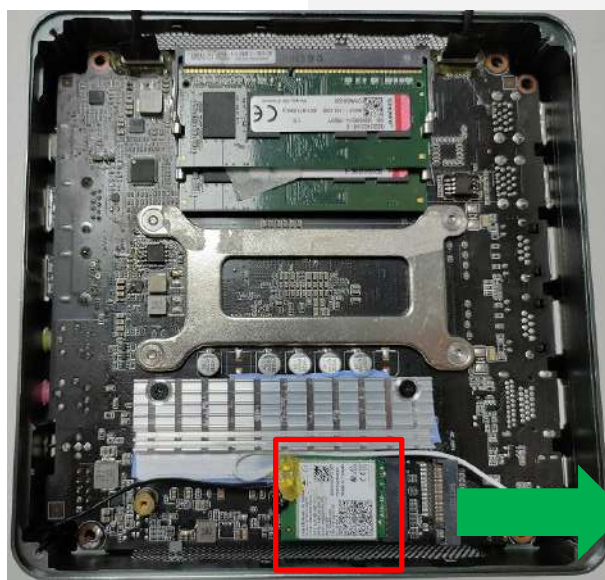
International brand equipment installed

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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>

With super cooling system

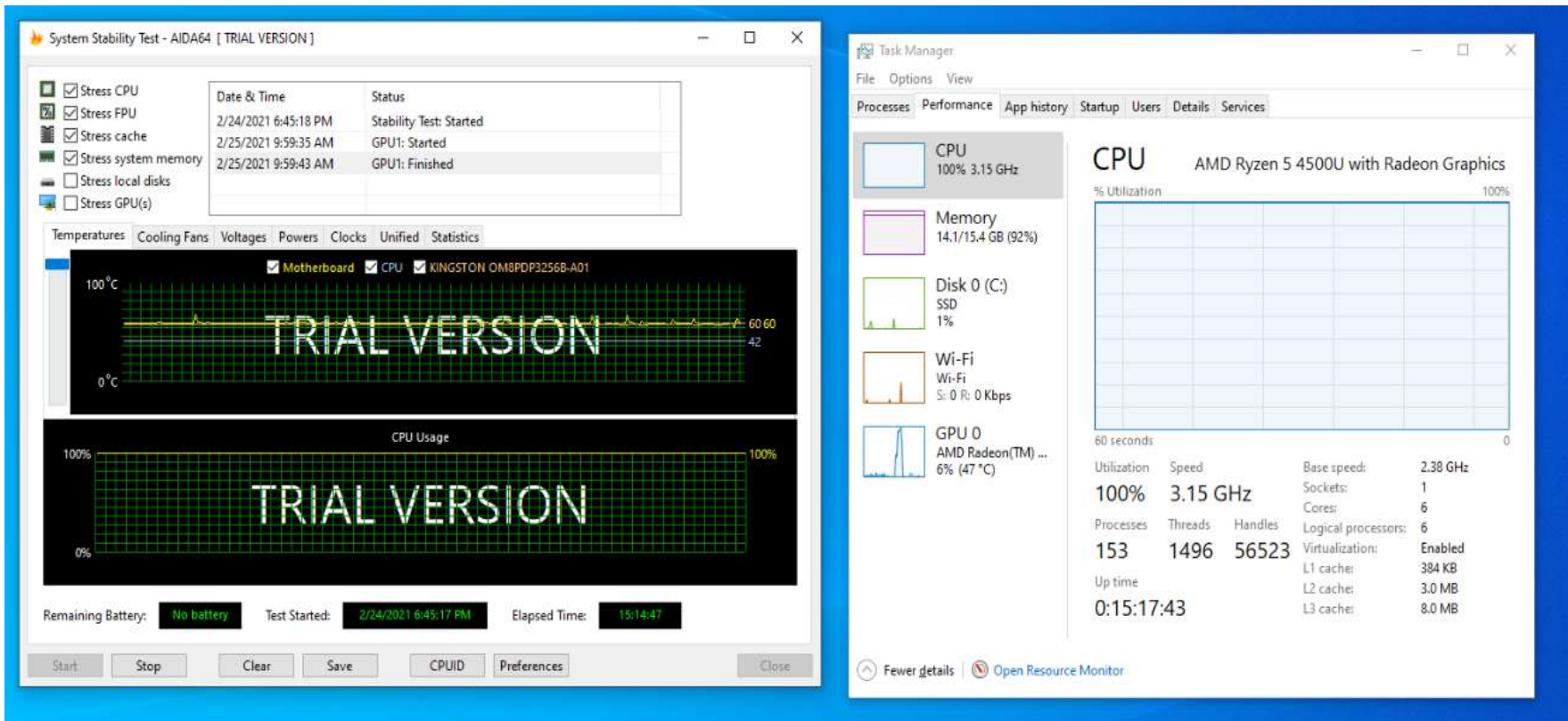
- Super large turbo fan, low speed silent operation at 100% CPU load , < 30db & Super large air inlet;
- Super large air outlet, allowing the machine to fully dissipate heat and play a higher performance.
- Design ready to handle 65W TDP CPU



With super cooling system

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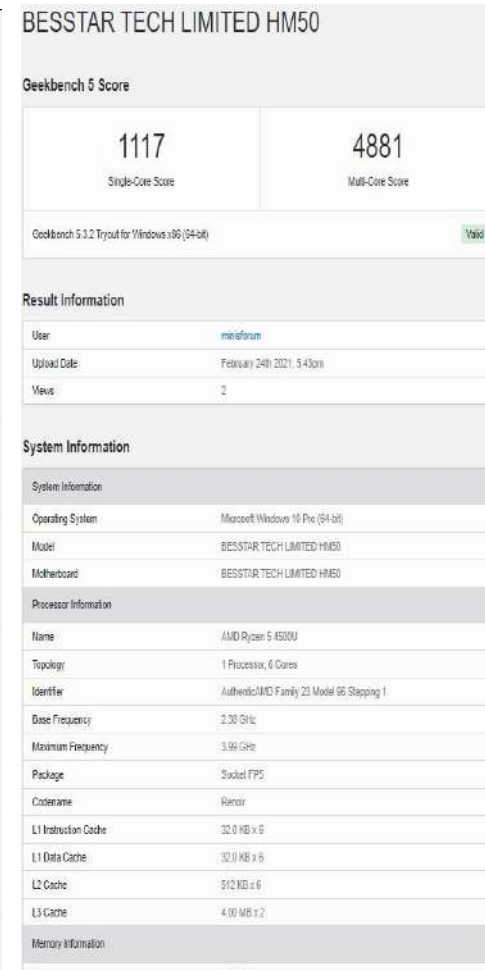
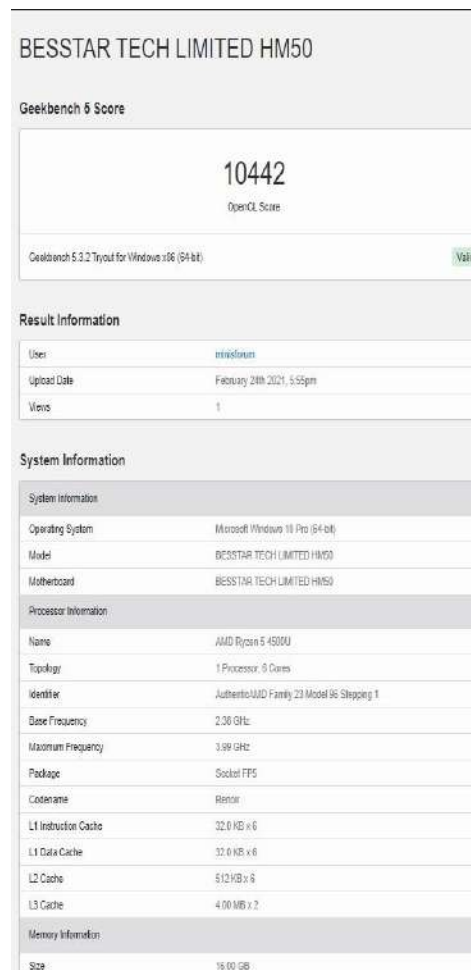
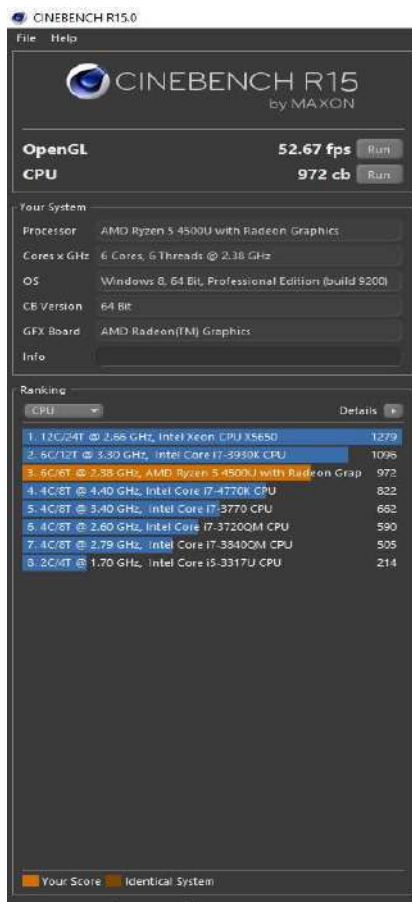
- AIDA64 test : Stress CPU/GPU/Mem..... load 100% monitoring for 15 hours, temperature is maintained at about 61degrees.
- In this case, the CPU frequency can still reach 3.15 GHz and remain stable.
- The CPU load is 100%, the fan speed is stable and silent.



GPU Performance

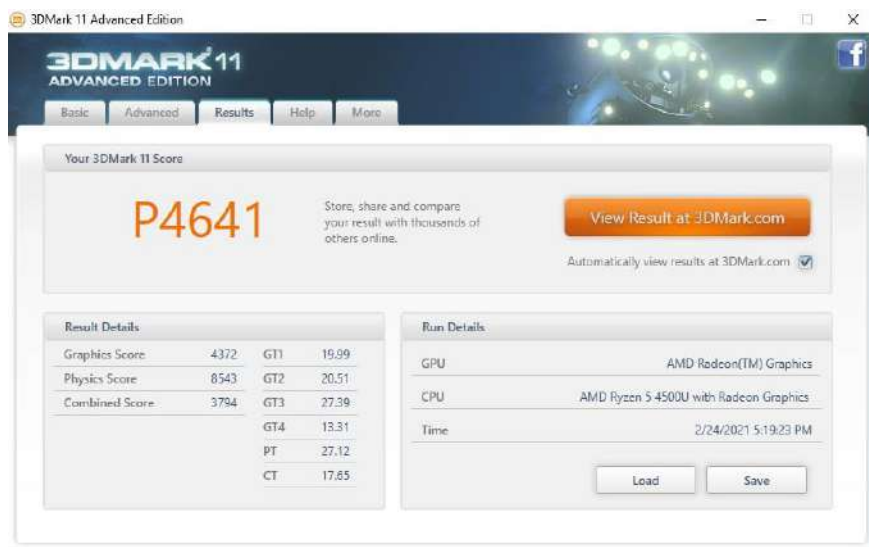
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- CINEBENCH R20 CPU: 2440 cb
- CINEBENCH R15 CPU: 972 cb OpenGL:52.67fps
- Geekbench 5 : OpenGL/Single and Multi-Core performance



GPU Performance

- 3DMARK11 overall performance test results;



AMD Ryzen™ 5 4500U



AMD Ryzen™ 7 3750H

CPU Performance

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Ludashi overall performance test result:

AMD Ryzen™ 5 4500U (256596)

AMD Ryzen™ 5 PRO 3400GE (252384)

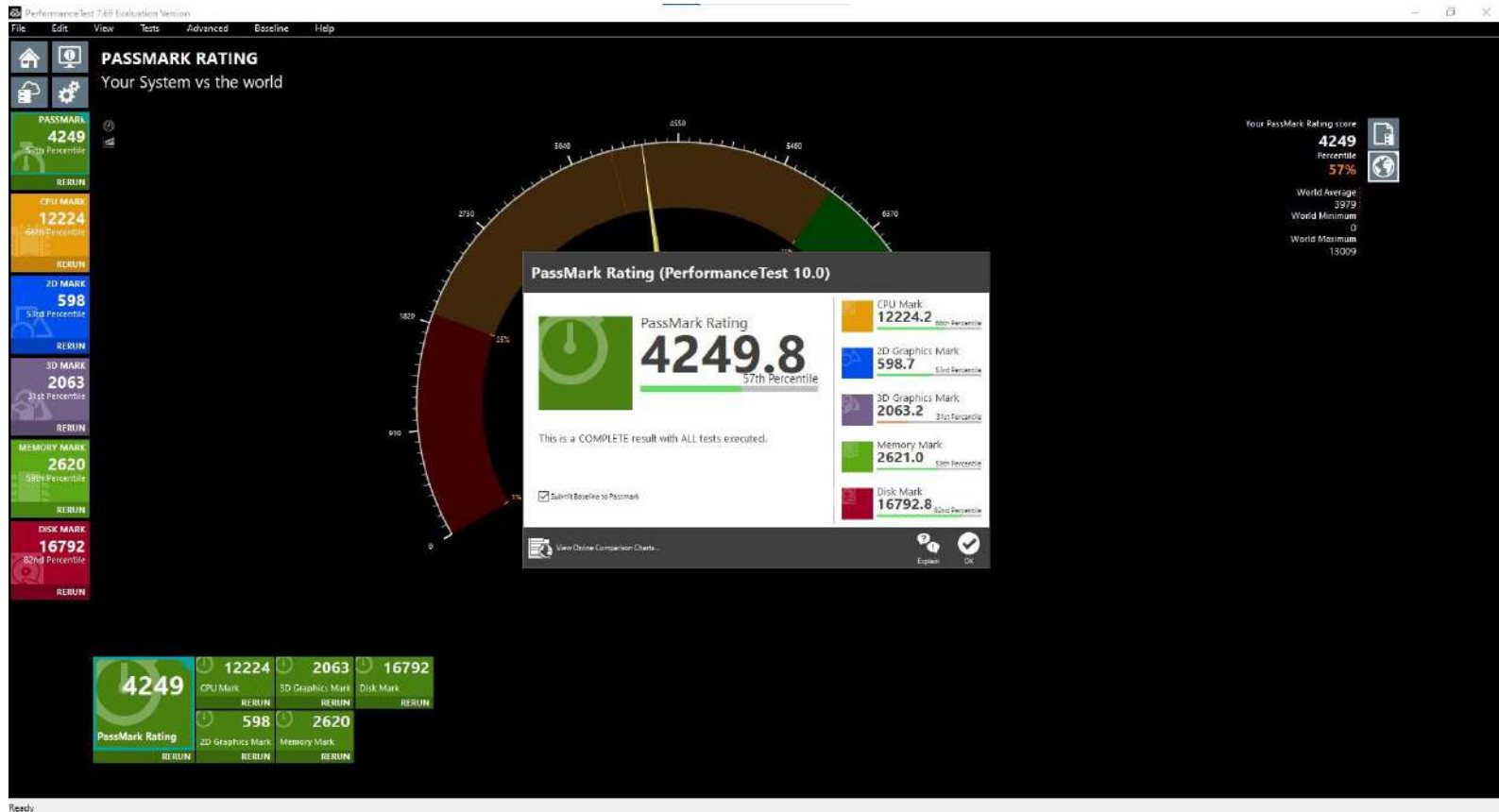


AMD Ryzen™ 5 4500U



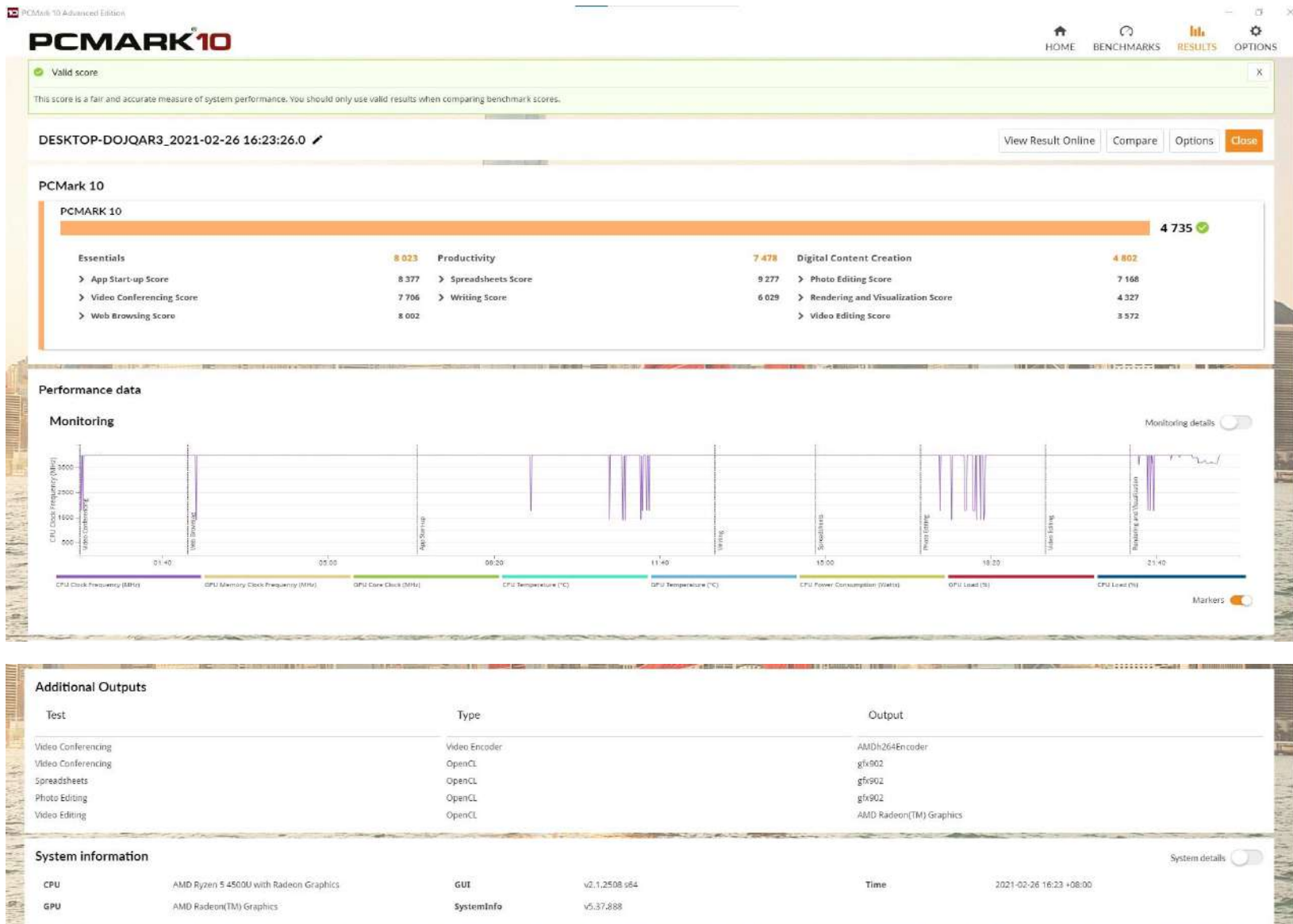
AMD Ryzen™ 5 PRO 3400GE

PerformanceTest test result:



PCMARK 10 Test

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Memory Test

PassMark MemTest86 v8.4 test memory Address (Write/Read)

→ All passed, NO error.

```
PassMark MemTest86 V8.4 Free AMD Ryzen 5 4500U with Radeon Graphics
Clk/Temp : 2380 MHz / 102C | Pass 100% #####
L1 Cache : 64K 215.76 GB/s | Test 100% #####
L2 Cache : 512K 79.23 GB/s | Test 13 [Hammer test] - Verifying pattern
L3 Cache : 8192K 24.81 GB/s | Address : 0x400000000 - 0x40F340000
Memory : 15.4G 11.97 GB/s | Pattern : 0x994810F0
RAM Info : PC4-25600 DDR4 3200MHz / 22-22-22-52 / Kingston CBD32D4S2S1ME-8
-----
CPU: 012345 | CPUs Found: 6
State: -WWWWW | CPUs Started: 6 CPUs Active: 6
-----
Time: 3:43: 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)
Releasing memory - this may take some time
>Test Complete
```


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

System Information Burn In Results Event Log Temperature

Results for DESKTOP-DOJQAR3

Test configuration file: LastUsed.bitcfg Status: IDLE

Start time: Thu Feb 25 19:06:34 2021 Stop time: Fri Feb 26 07:06:41 2021 Duration: 012h 00m 07s

Test Name	Cycle	Operations	Errors	Last Error Description
2D Graphics	252	439849	0	No errors
3D Graphics	74	2.250 Million	0	No errors
CPU	2657	246 Trillion	0	No errors
Memory (RAM)	226	5.956 Trillion	0	No errors
Network 1	622	24.885 Million	0	No errors
Sound	202	678 Million	0	No errors

☐ View errors by categories

Ready

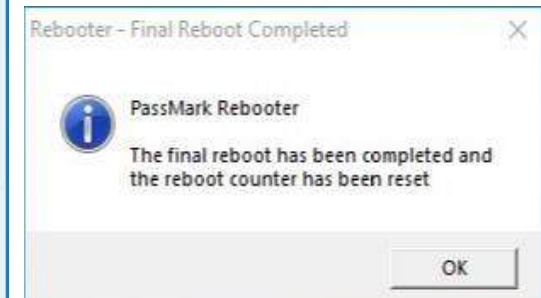
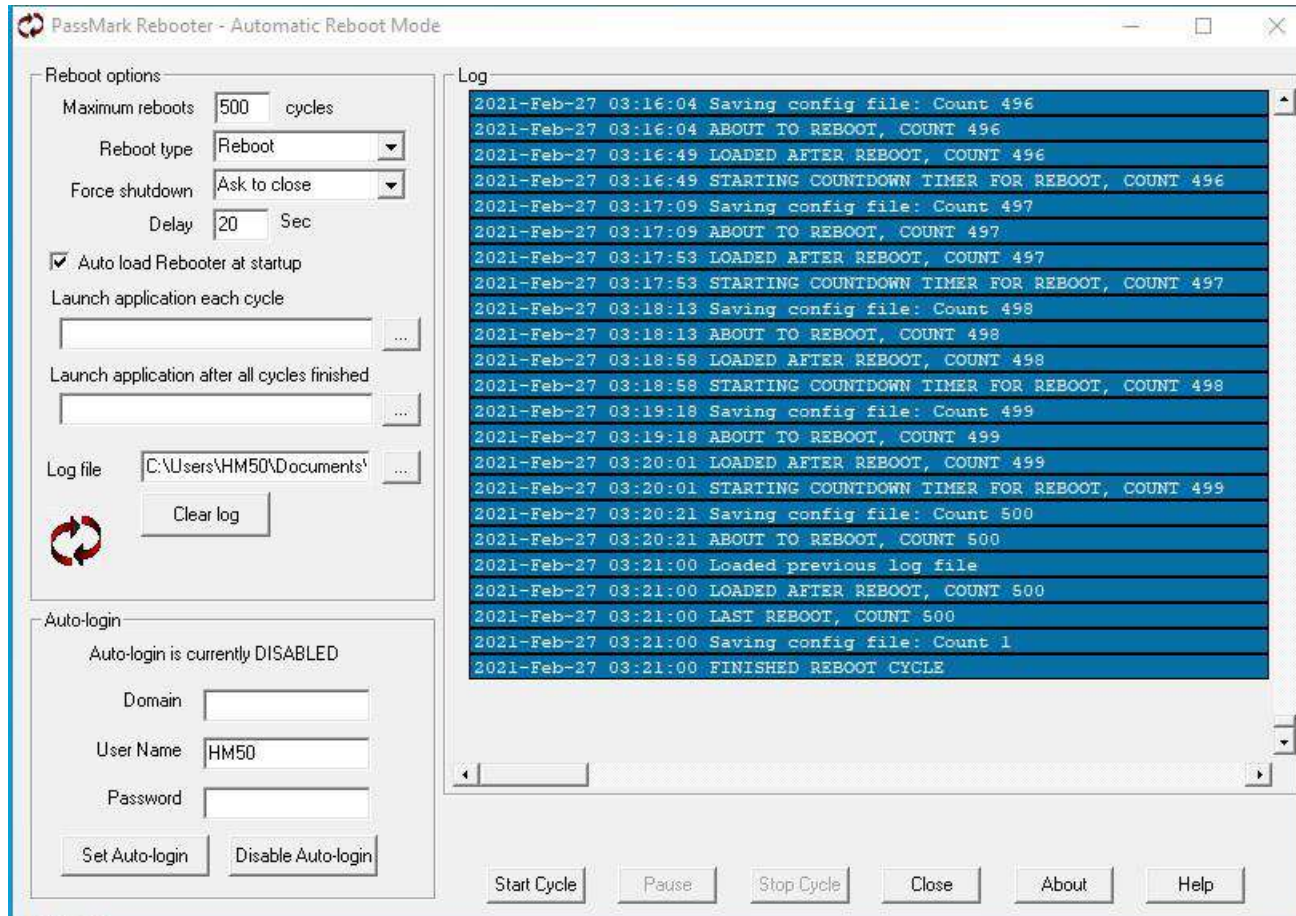
BurnInTest test result

PASSED

OK

Windows Reboot cycle test

Windows reboot 500 cycles test passed



SSD & HDD Test

- CrystalDiskMark 8.0.1 test Result:
M.2 2280 PCIe 256G (PCIe x4 Read:2517MB/s Write:1256MB/s)
2.5 inch SATA SSD 2TB (SATA3.0 Read:555 MB/s Write: 513MB/s)
2.5 inch SATA SSD 2TB (SATA3.0 Read:555 MB/s Write: 513MB/s)
- The computer starts up only 20 seconds, no need to wait patiently

CrystalDiskMark 8.0.1 x64 [Admin]				
File	Settings	Profile	Theme	Help Language
All	5	1GiB	C: 19% (46/238GiB)	MB/s
	Read (MB/s)		Write (MB/s)	
SEQ1M Q8T1	2517.20		1255.92	
SEQ1M Q1T1	1713.60		1215.86	
RND4K Q32T1	479.00		337.17	
RND4K Q1T1	58.95		214.46	

M.2 2280 PCIe 256G

CrystalDiskMark 8.0.1 x64 [Admin]				
File	Settings	Profile	Theme	Help Language
All	5	1GiB	D: 73% (1362/1863GiB)	MB/s
	Read (MB/s)		Write (MB/s)	
SEQ1M Q8T1	555.17		513.11	
SEQ1M Q1T1	530.82		498.76	
RND4K Q32T1	293.24		269.55	
RND4K Q1T1	51.96		132.28	

2.5 inch SATA SSD 2TB

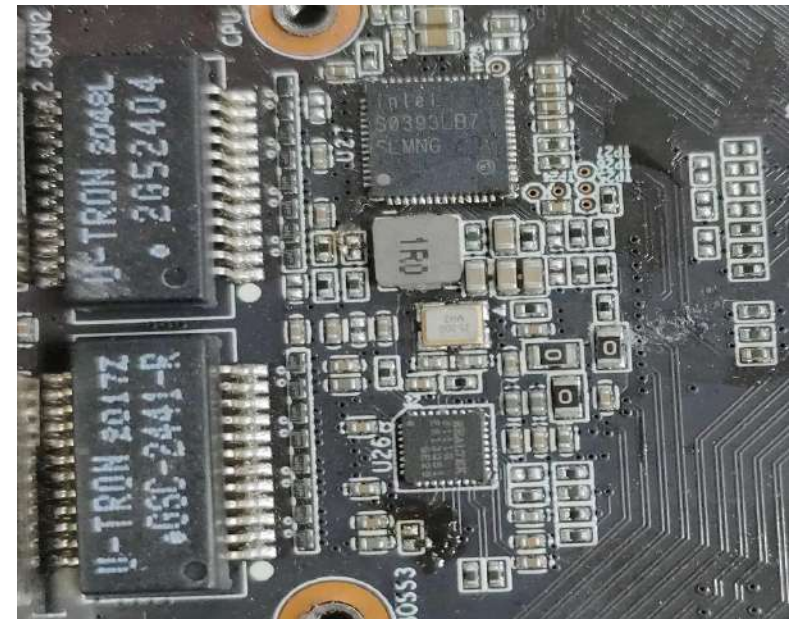
CrystalDiskMark 8.0.1 x64 [Admin]				
File	Settings	Profile	Theme	Help Language
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RND4K Q32T1	293.24		269.55	
RND4K Q1T1	51.96		132.28	

2.5 inch SATA SSD 2TB

Dual Ethernet Chip

HM50 adopts dual Ethernet design, one of the Ethernet ports uses Realtek 8111G Ethernet chip with 1GbE. The other Ethernet port uses Intel® Ethernet Controller I225-V Ethernet chip with 2.5GbE.

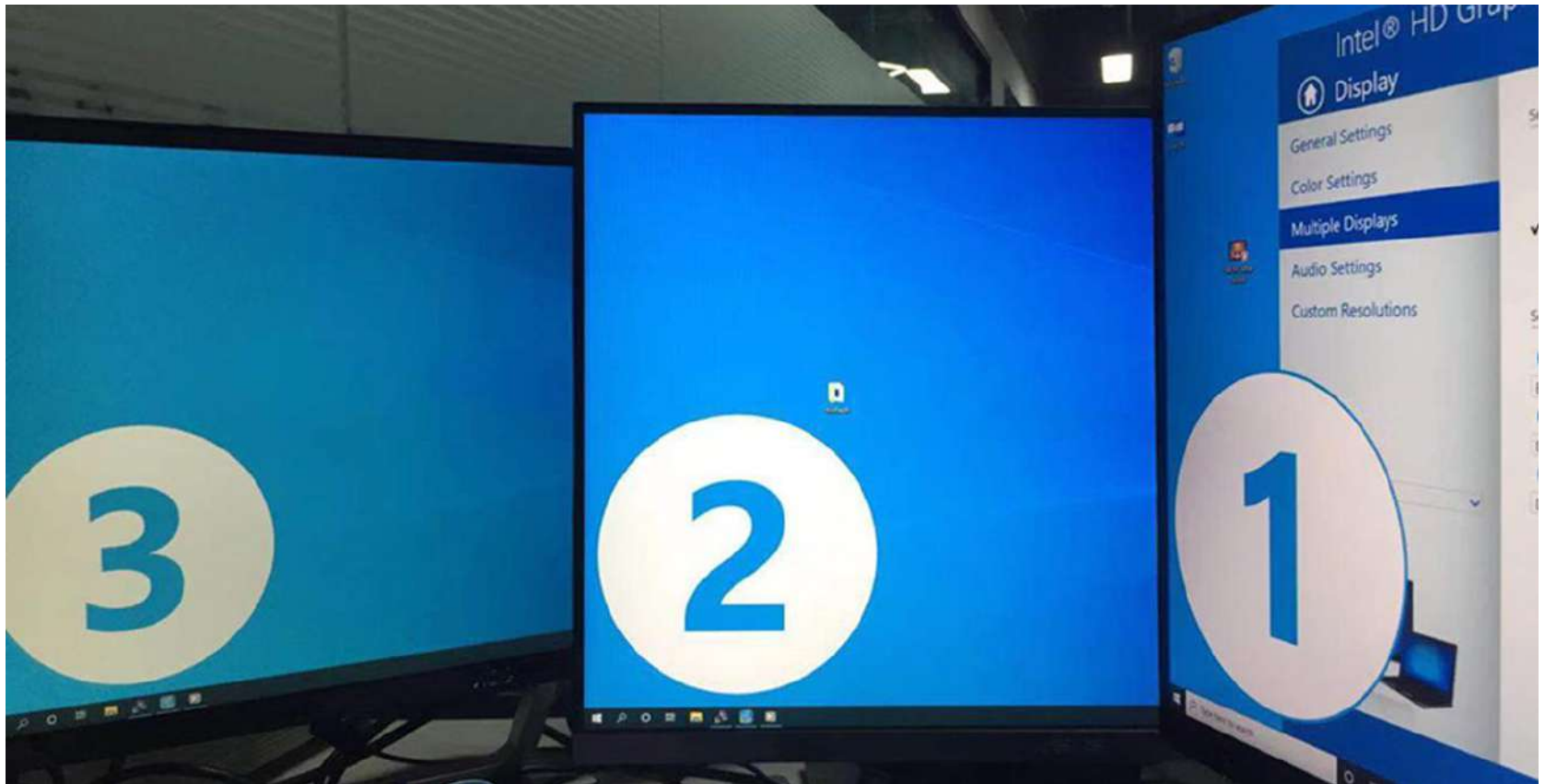
- Using two independent Ethernet chips, the transmission rate is 1Gbps and 2.5Gbps respectively.
- There are two different MAC addresses (support Wake On Lan)
- With two network connection status indicators
- The two network ports can easily form independent WAN and LAN, and transfer data between two computers, etc.



HDMI/DP/USB-C output display

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- Support multi-tasking operation, You can enjoy multi-screen operation



Input / Output Strong Scalability

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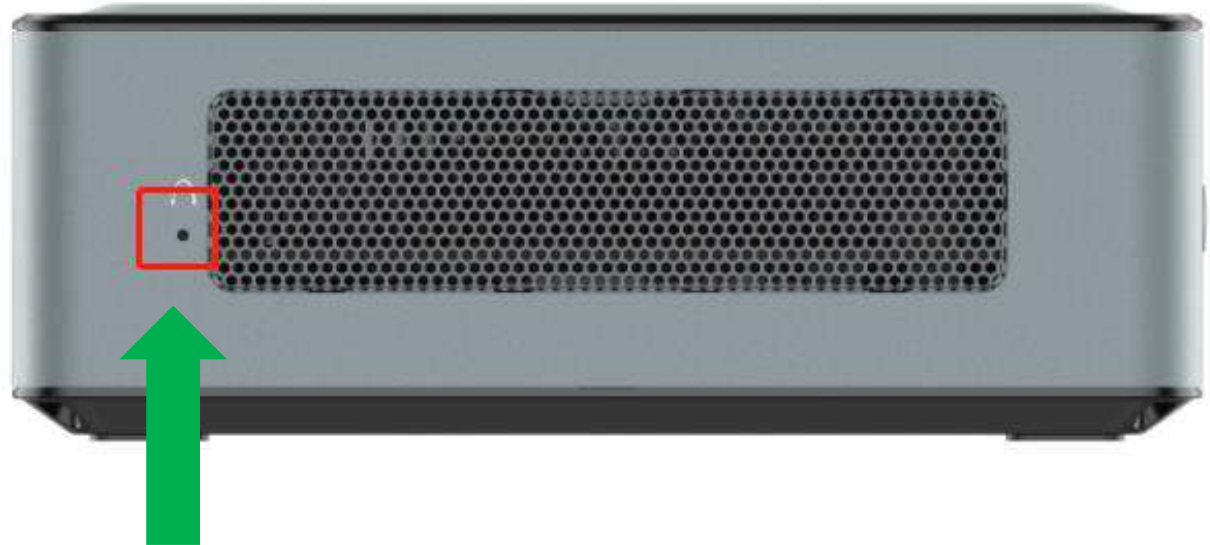
- With 6*USB 3.1 Ports (Gen 2, 10Gbps)
- With 1*LAN Port (RTL8111G Gigabit Ethernet)
- With 1*LAN Port (Intel® Ethernet Controller I225-V 2.5G Ethernet)
- With 2*DMIC
- 3.5mm Audio Jack
- With 2*2.5 inch SATA Port



Clear CMOS easily

Clear CMOS in a convenient way, do not disassemble the device to short-circuit the pin.

In the case of charging, long press the reset hole for 30 seconds to clear CMOS and restore HM50.



Reset hole

Thank you !