MINISFORUM

HM90

Introduction Presentation

Rev 1.0, Sept 2021

About MinisForum

- 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 Sept 2021, MinisForum designed and released the HM90 with AMD Ryzen™ 9 4900H, 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

MINISFORUM

MINISFORUM HM90	
Processor	AMD Ryzen™ 9 4900H , 8 Cores/16 Threads (Total L2 Cache 4MB , Total L3 Cache 8MB , Base Clock 3.3 GHz , up to 4.4 GHz)
GPU	AMD Radeon™ Graphics (Graphics Frequency 1750 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 (Dual-Band Wi-Fi , BlueTooth)
Ethernet	① 1000Mbps LAN ② 2500Mbps LAN
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), Clear CMOS ×1, COM PIN ×1(internal)
Power	DC 19V(adapter included) , via USB-C(power port)
System	Windows 10 Pro
Product Dimension	149.6*149.6*55.5mm

Features of HM90

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

Small size, beautiful appearance

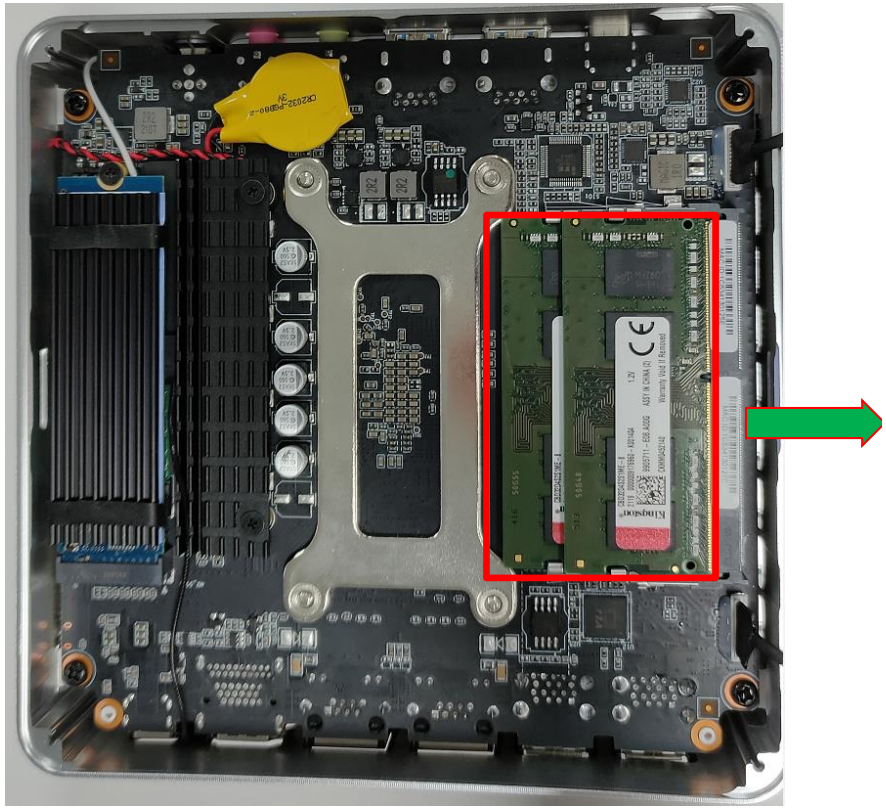
Measures
149.6*149.6*55.5mm

Metal frame design

International brand equipment installed

MINISFORUM

Kingstion DDR4 Inside



Kingston TECHNOLOGY

Memory Module Specifications

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

Description

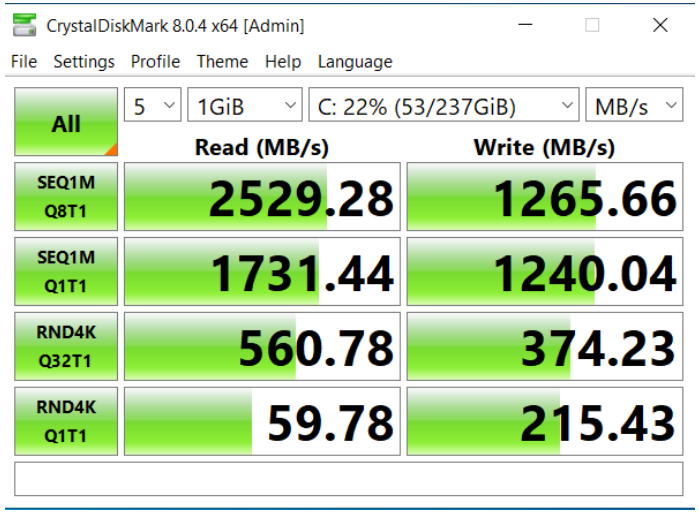
This document describes Kingston's 1G x 64-bit (8GB) DDR4-3200 CL22 SDRAM (Synchronous DRAM) 1Rx16, memory module, based on four 1G x 16-bit SDRAMs. This 260-pin SODIMM uses gold contact fingers and requires +1.2V. The electrical and mechanical specifications are as follows:

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

M.2 2280 PCIE 3.0 4X 256G SSD Inside



Kingston TECHNOLOGY

2.2 Fundamental Specification

- Capacity – supporting unformatted capacities[1] 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.
- Performance[2] –

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 consumption[3] –

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

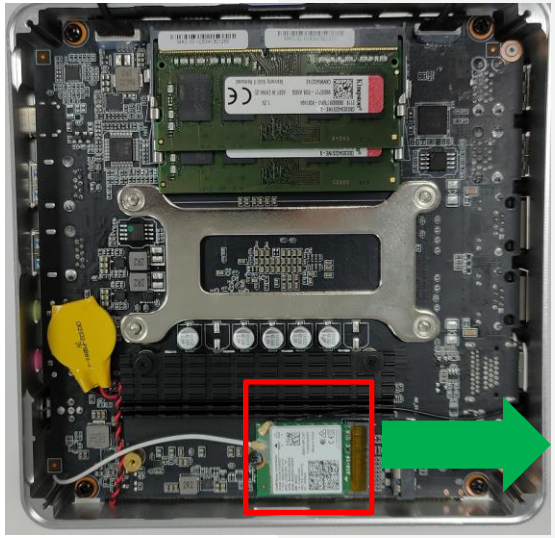
[1] 1 GB = 1,000,000,000 bytes and not all of the memory can be used for storage.
[2] Performance data reveal the Max. performance consequence, based on CrystalDiskMark test result. TT (at SSD SMART 70°C) enable performance will reduce to Seq. R/W = 1200/200 MB/s, and will down to 120/30 MB/s at most .
[3] Maximum Power bases on MobileMark2014 workload. Avg. consumption bases on MobileMark2014 workload.

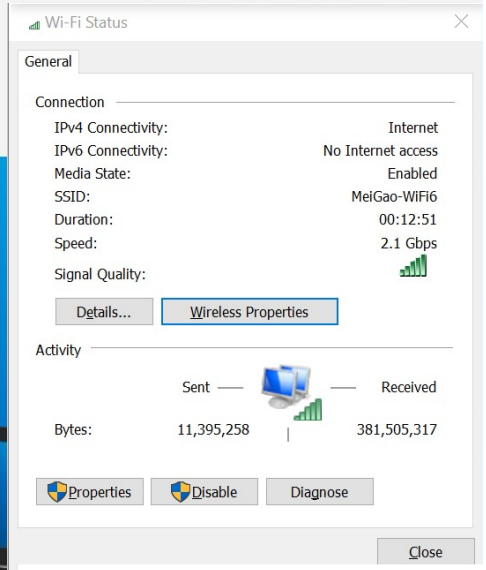
International brand equipment installed

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

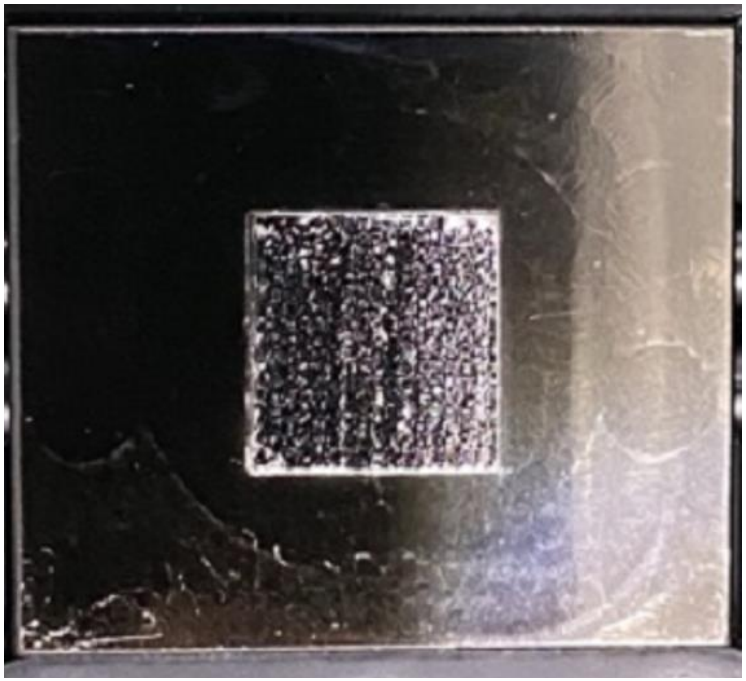
Data comes from intel : https://www.intel.com/content/www/us/en/products/docs/wireless-products/get-wi-fi-smart.html

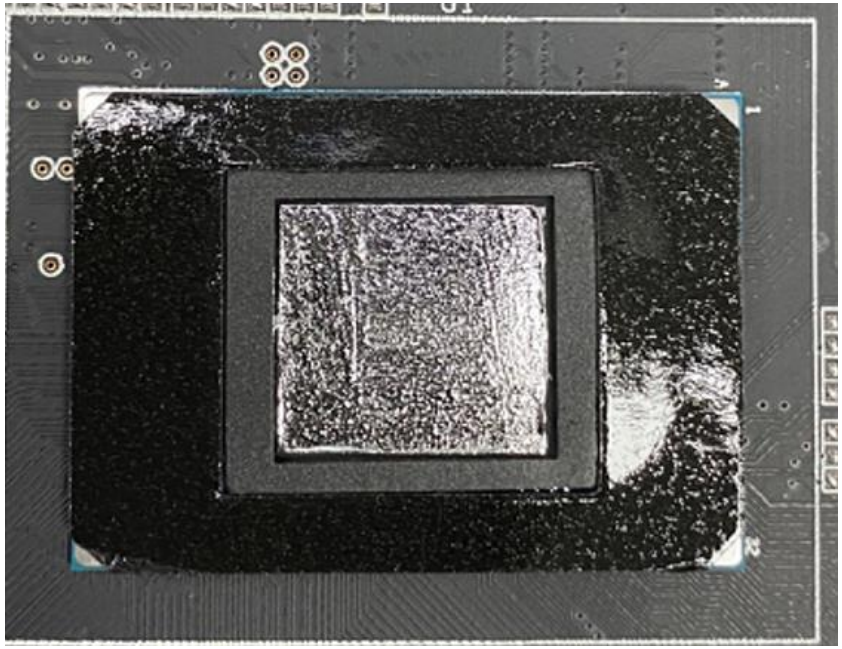
With super cooling system

- Large turbo fan, 100% CPU load, low speed and silent operation, large air inlet;
- The large air outlet allows the machine to fully dissipate heat and exert higher performance;
- Copper pipe heat dissipation is more even.

With super cooling system

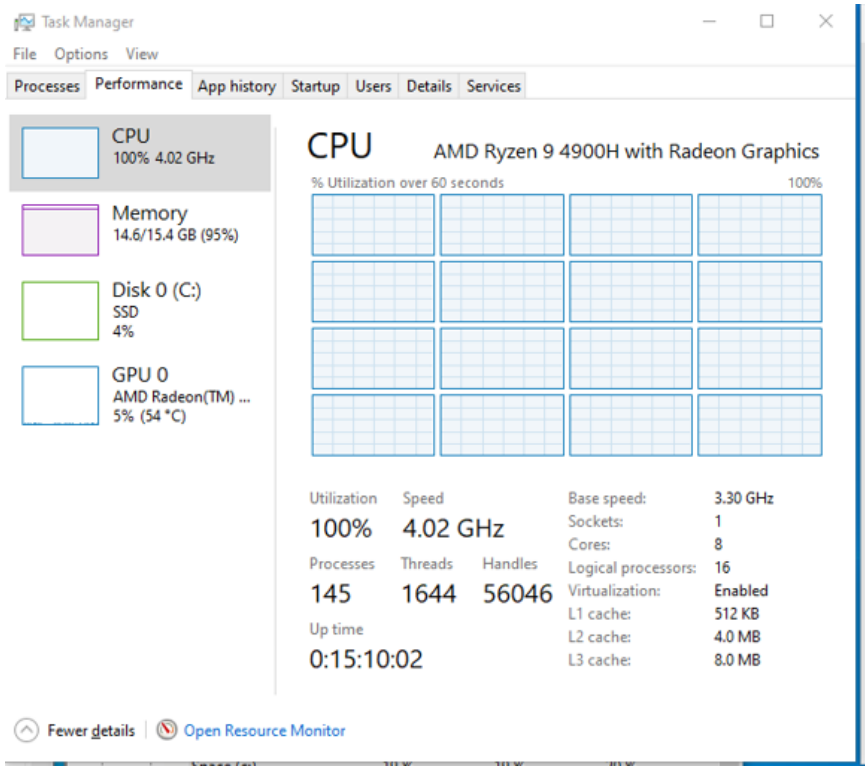
- Note: Because HM90 uses a liquid gold heat dissipation solution. Liquid gold is a conductor. Once the liquid gold flows to the motherboard, it will easily cause a short circuit and not boot, so please do not remove the radiator. The following is the liquid gold picture of HM90 for users' reference.

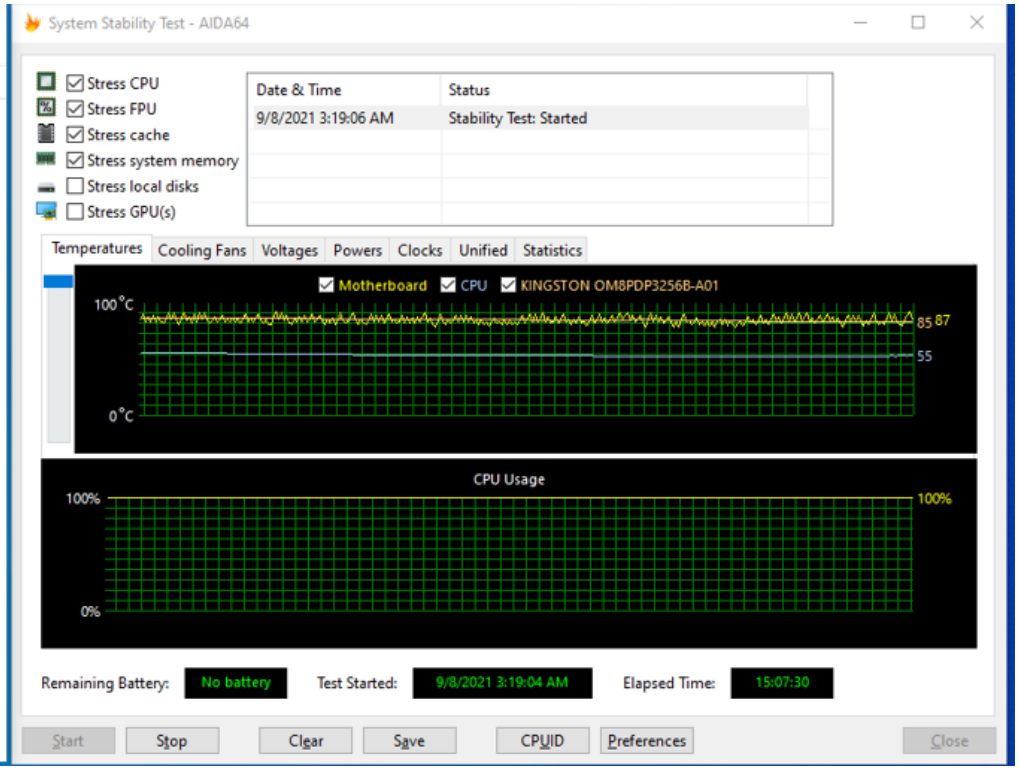




With super cooling system

- AIDA64 test : Stress CPU/FPU/Mem..... load 100% monitoring for 15 hours, temperature is maintained at about 87 degrees.
- In this case, the CPU frequency can still reach 4.02 GHz and remain stable.
- When CPU loading is 100%, the fan keeps running stably and super silent.

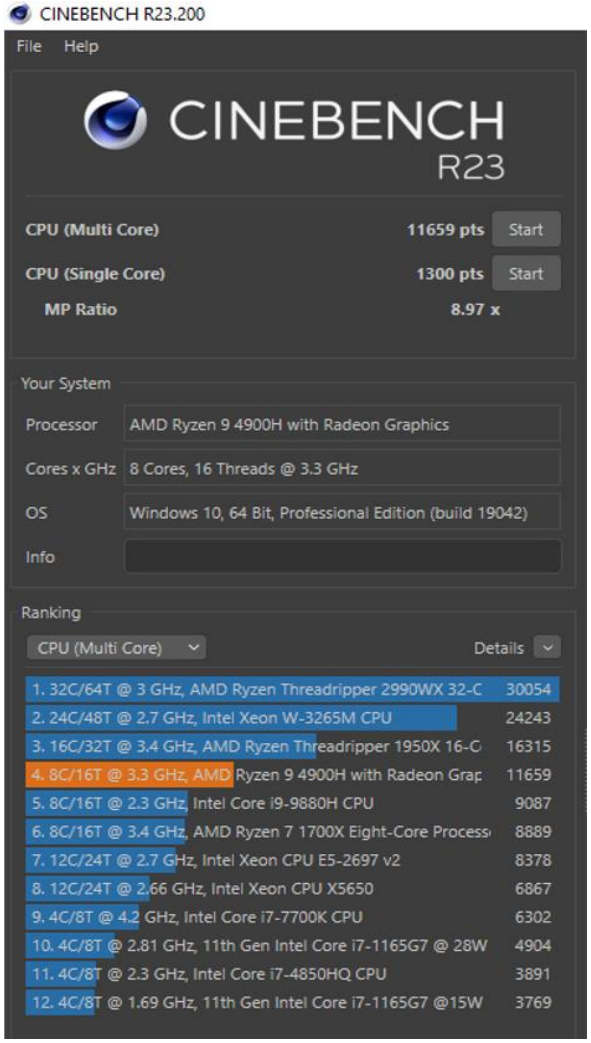


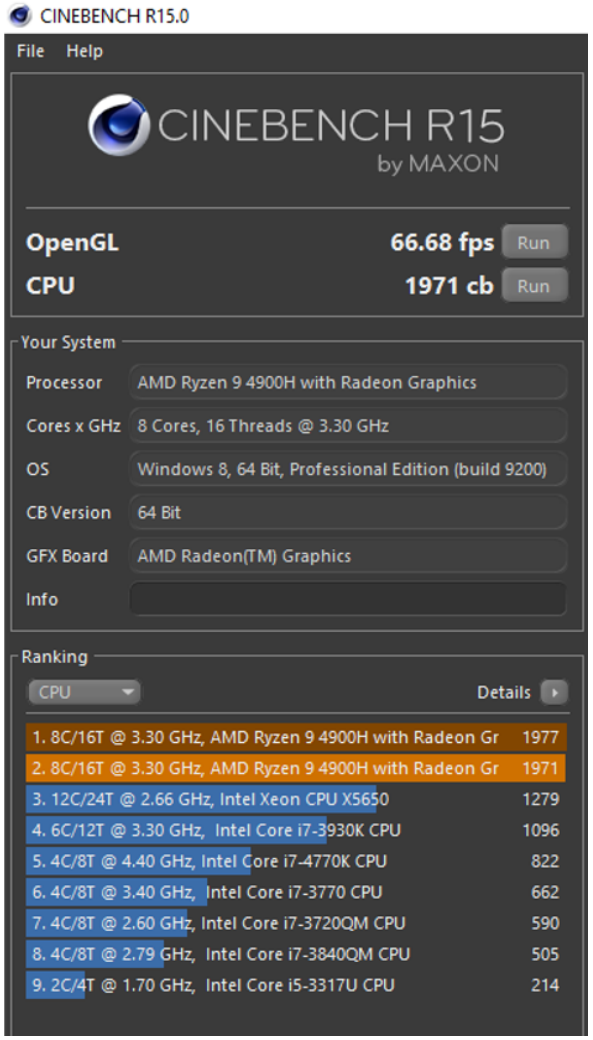


GPU Performance

MINISFORUM

- CINEBENCH R23 CPU(Multi Core):11659pts CPU(Single Core):1300pts
- CINEBENCH R15 OpenGL:66.68fps CPU:1971cb





GPU Performance

- Geekbench 5 : OpenGL/Single and Multi-Core performance

BESSTAR TECH LIMITED HM90

Geekbench 5 Score

14499

OpenCL Score

Geekbench 5.4.1 Tryout for Windows x86 (64-bit) — Valid

Result Information

User	minisforum
Upload Date	September 9th 2021, 12:41am
Views	1

System Information

System Information	
Operating System	Microsoft Windows 10 Pro (64-bit)
Model	BESSTAR TECH LIMITED HM90
Motherboard	BESSTAR TECH LIMITED HM90
Power Plan	High performance
CPU Information	
Name	AMD Ryzen 9 4900H
Topology	1 Processor, 8 Cores, 16 Threads
Base Frequency	3.30 GHz
Maximum Frequency	4441 MHz
Package	Socket FP5
Codename	Renoir
L1 Instruction Cache	32.0 KB x 8
L1 Data Cache	32.0 KB x 8
L2 Cache	512 KB x 8
L3 Cache	4.00 MB x 2
Memory Information	
Memory	16.00 GB DDR4 SDRAM 1596 MHz

BESSTAR TECH LIMITED HM90

Geekbench 5 Score

1227	7209
Single-Core Score	Multi-Core Score

Geekbench 5.4.1 Tryout for Windows x86 (64-bit) — Valid

Result Information

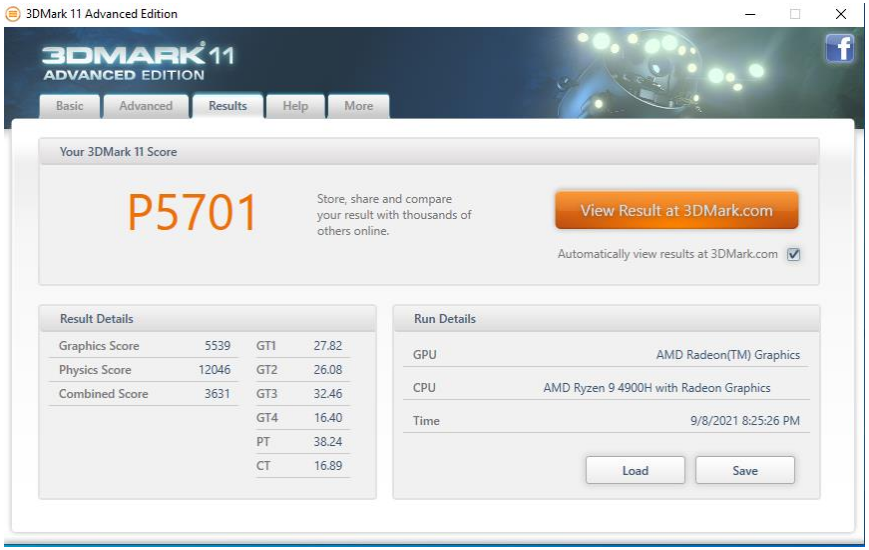
User	minisforum
Upload Date	September 9th 2021, 12:35am
Views	1

System Information

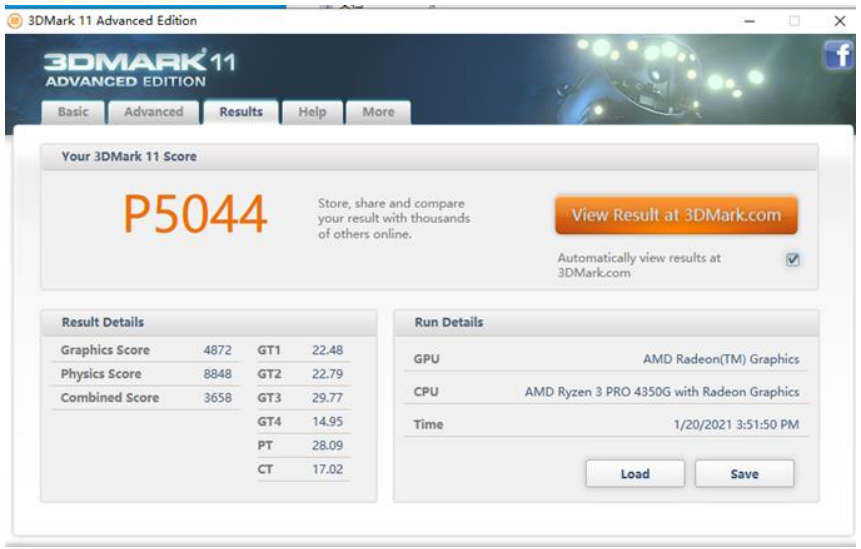
System Information	
Operating System	Microsoft Windows 10 Pro (64-bit)
Model	BESSTAR TECH LIMITED HM90
Motherboard	BESSTAR TECH LIMITED HM90
Power Plan	High performance
CPU Information	
Name	AMD Ryzen 9 4900H
Topology	1 Processor, 8 Cores, 16 Threads
Base Frequency	3.30 GHz
Maximum Frequency	4441 MHz
Package	Socket FP5
Codename	Renoir
L1 Instruction Cache	32.0 KB x 8
L1 Data Cache	32.0 KB x 8
L2 Cache	512 KB x 8
L3 Cache	4.00 MB x 2
Memory Information	
Memory	16.00 GB DDR4 SDRAM 1596 MHz

GPU Performance

- 3DMARK11 overall performance test results;



AMD Ryzen™ 9 4900H



AMD Ryzen™ 3 PRO 4350G

CPU Performance

Ludashi overall performance test result:

AMD Ryzen™ 9 4900H (385060)

AMD Ryzen™ 3 PRO 4350G (271074)

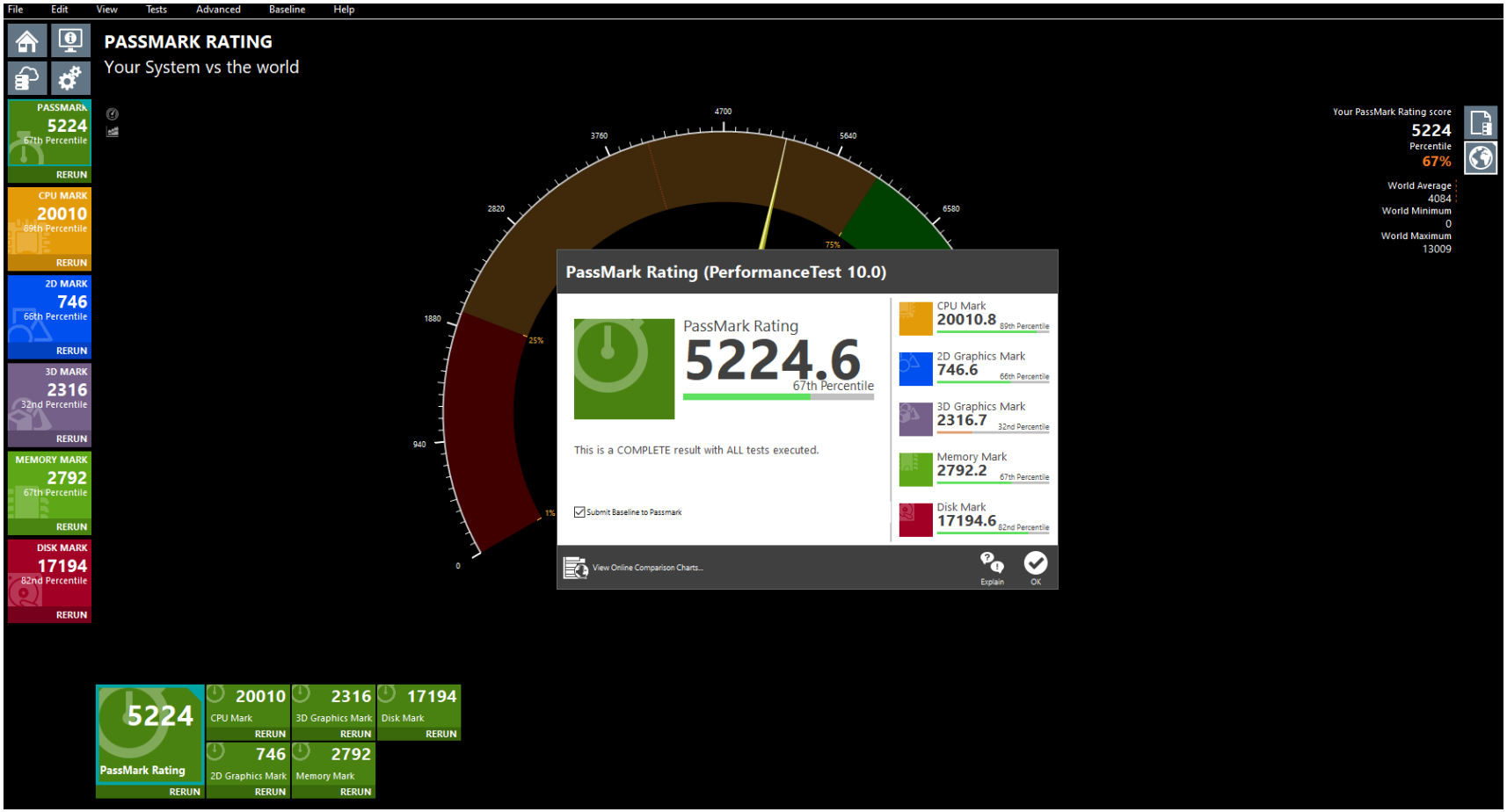
AMD Ryzen™ 9 4900H

AMD Ryzen™ 3 PRO 4350G

CPU Performance

MINISFORUM

PerformanceTest test result:

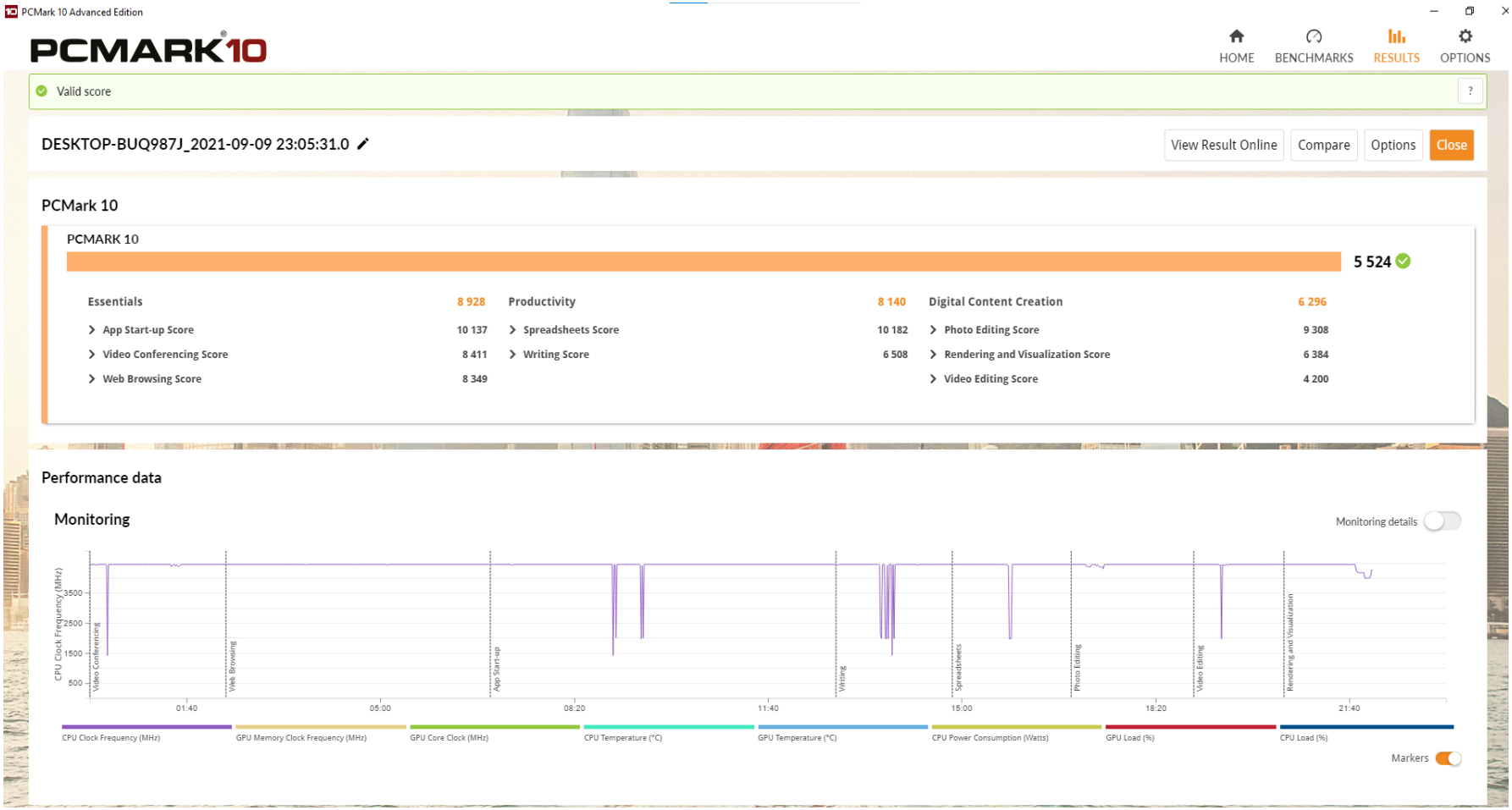


PCMARK 10 Test

PCMARK 10 test result:

Overall running score: 5524

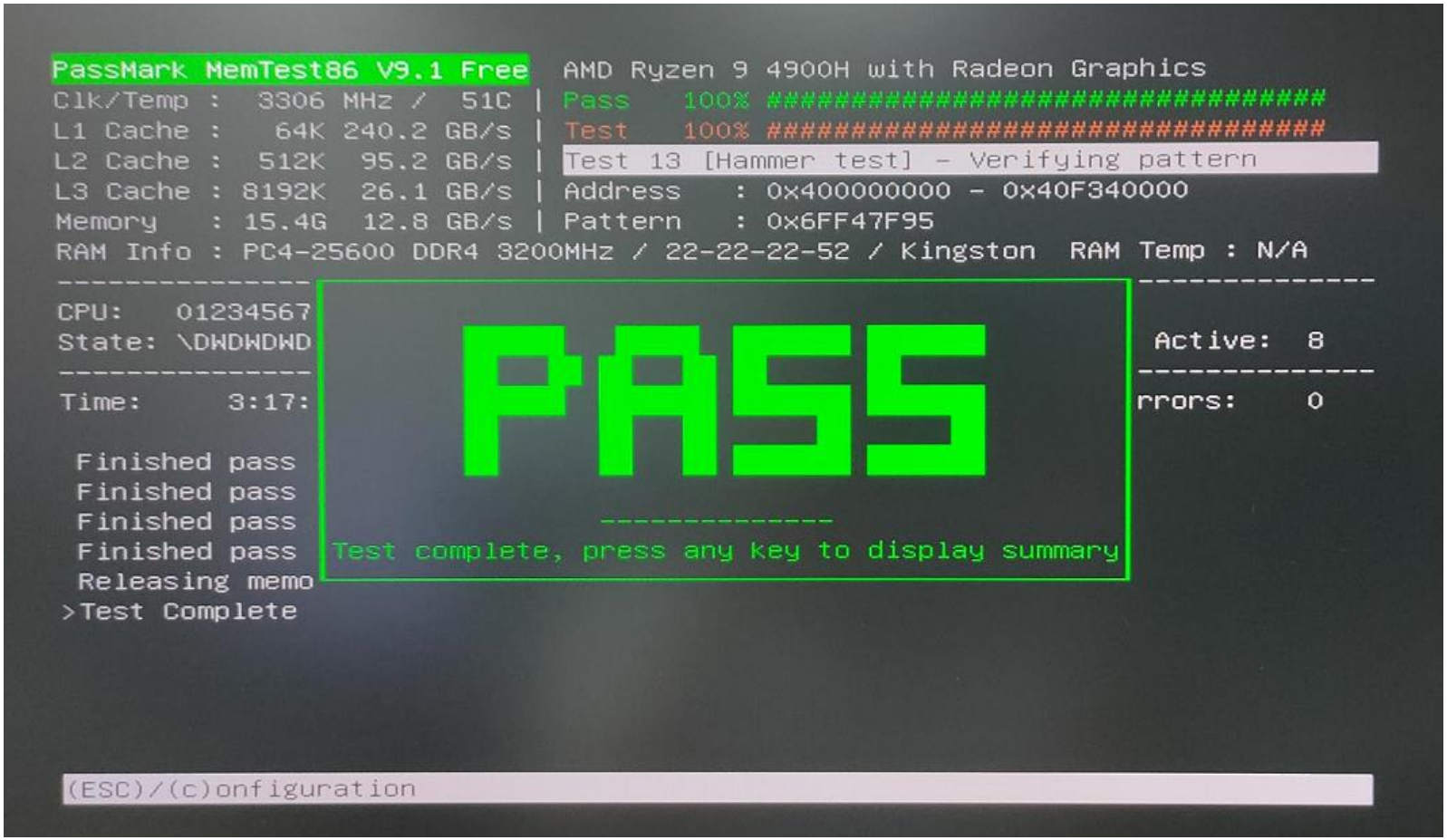
Essential:8928 Productivity:8140 Digtal Content Creation:6296



Memory Test

PassMark MemTest86 V9.1 test memory Address (Write/Read)

→All passed, NO error.



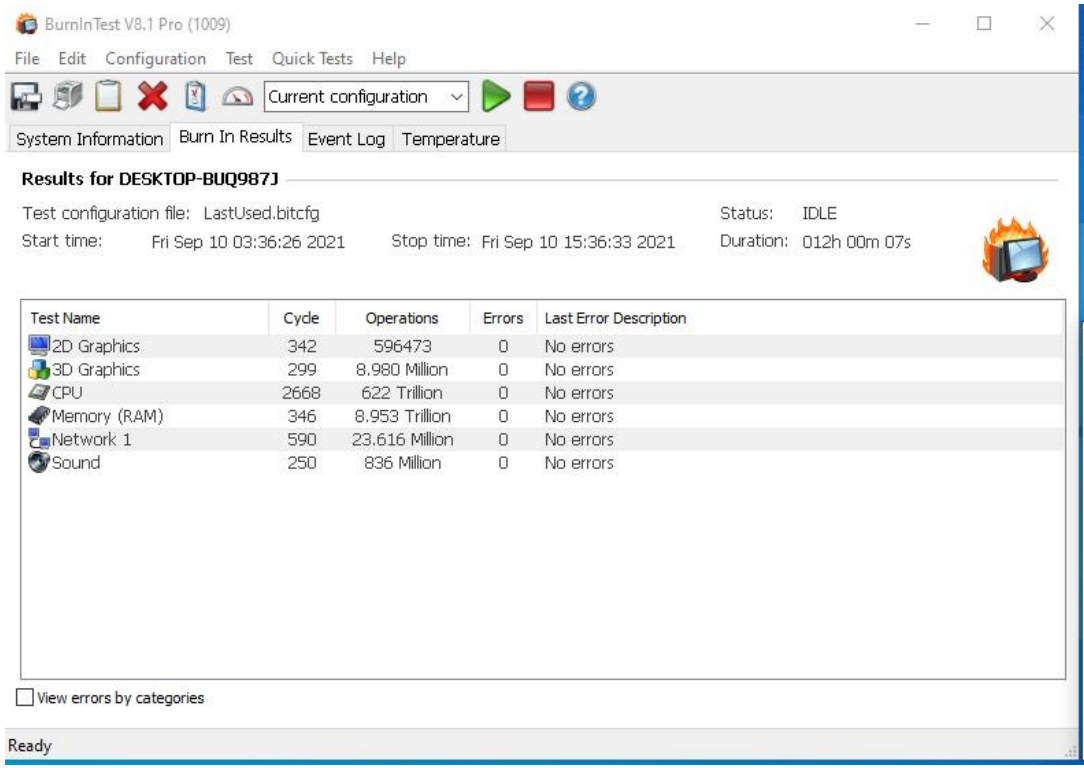
Burn in Test(PASSED)

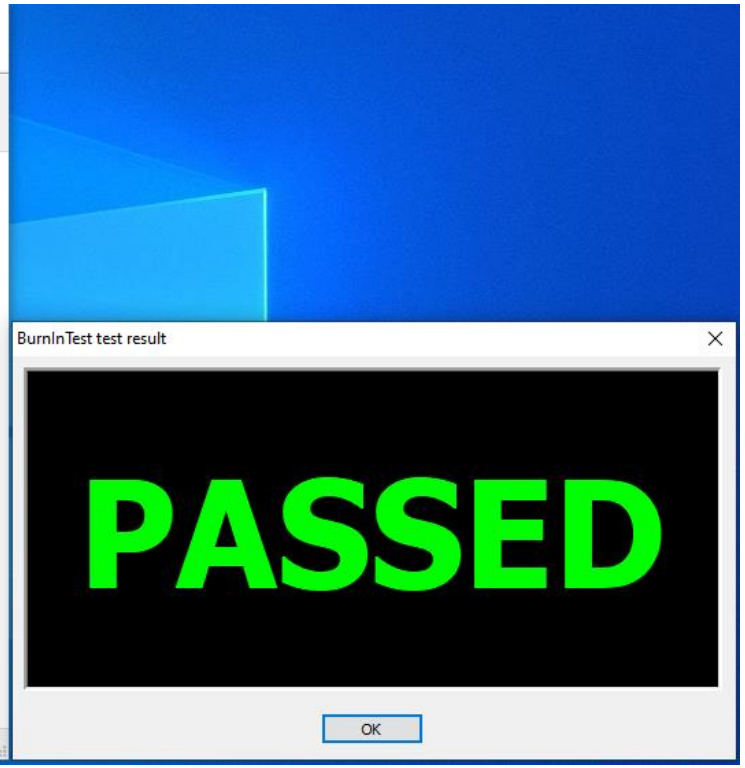
Setting parameters:

Test time:720minute (12H)

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

Test loading:100%

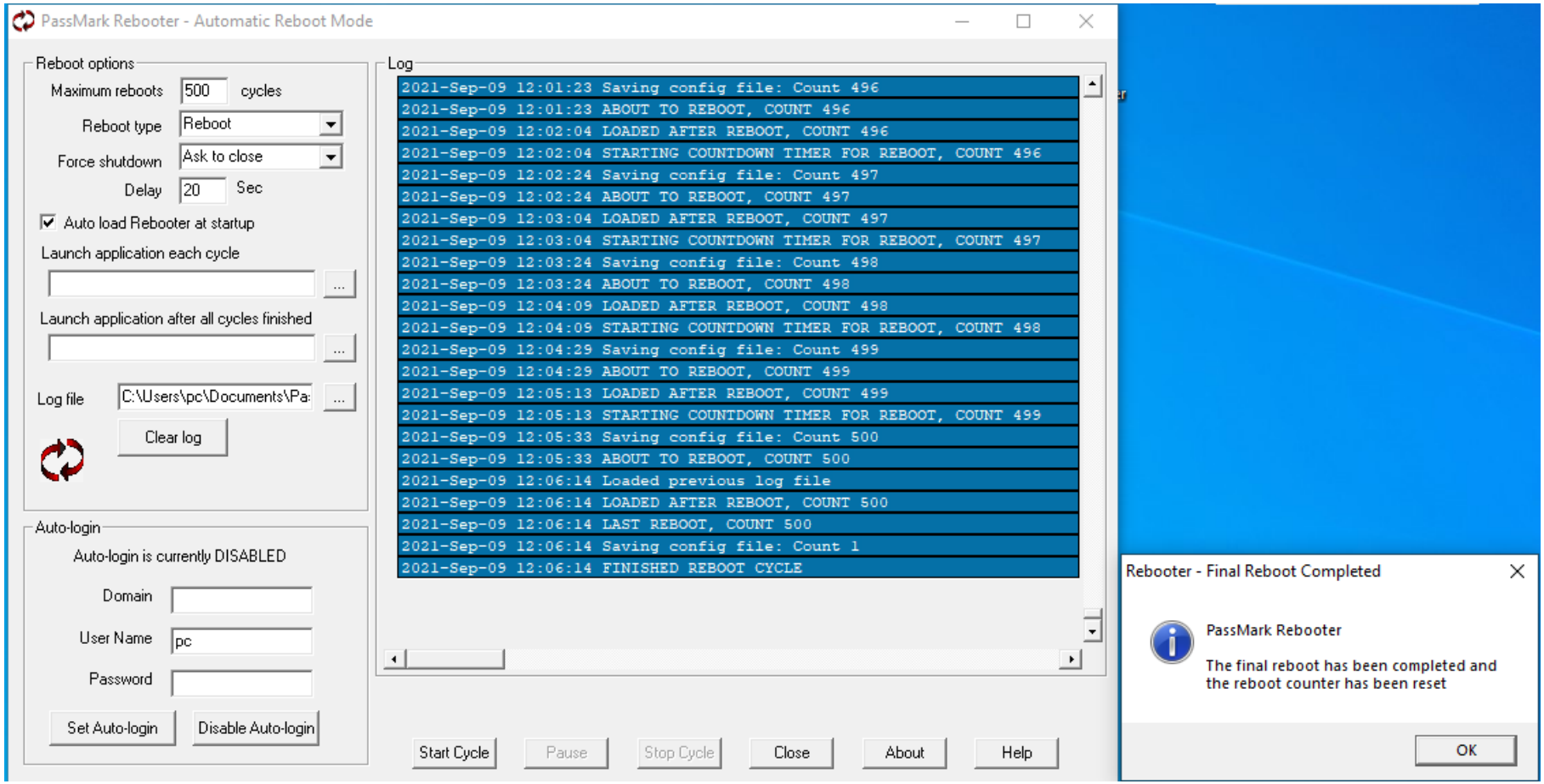




Windows Reboot cycle test

MINISFORUM

Windows reboot 500 cycles test passed



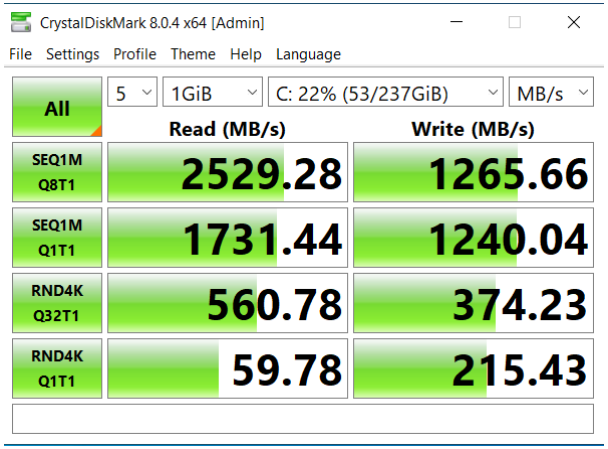
SSD & HDD Test

- CrytalDiskMark8.0.4 test Result:

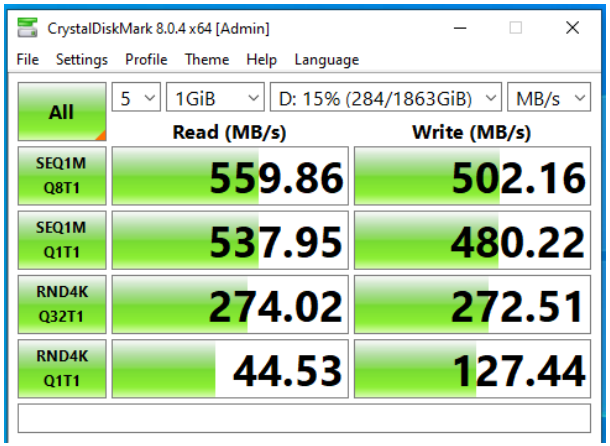
  M.2 2280 PCIe 256G (PCIe x4 Read:2529MB/s Write:1265MB/s)

  2.5” 2TB Crucial MX500 SSD (SATA3.0 6Gb/s Read:559MB/s Write:502MB/s)

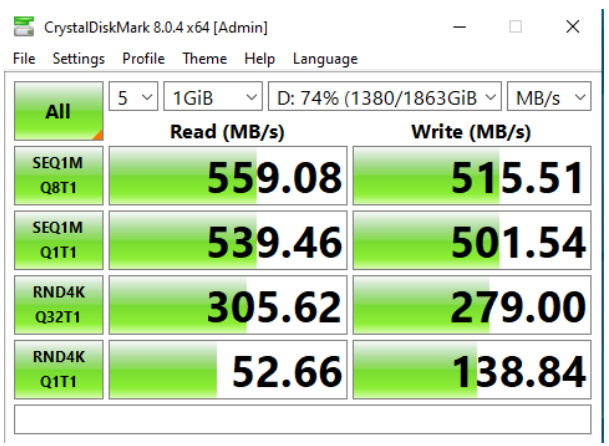
  2.5” 2TB Samsung 860EVO SSD (SATA3.0 6Gb/s Read:559MB/s Write:515MB/s)



M.2 2280 PCIe 256G



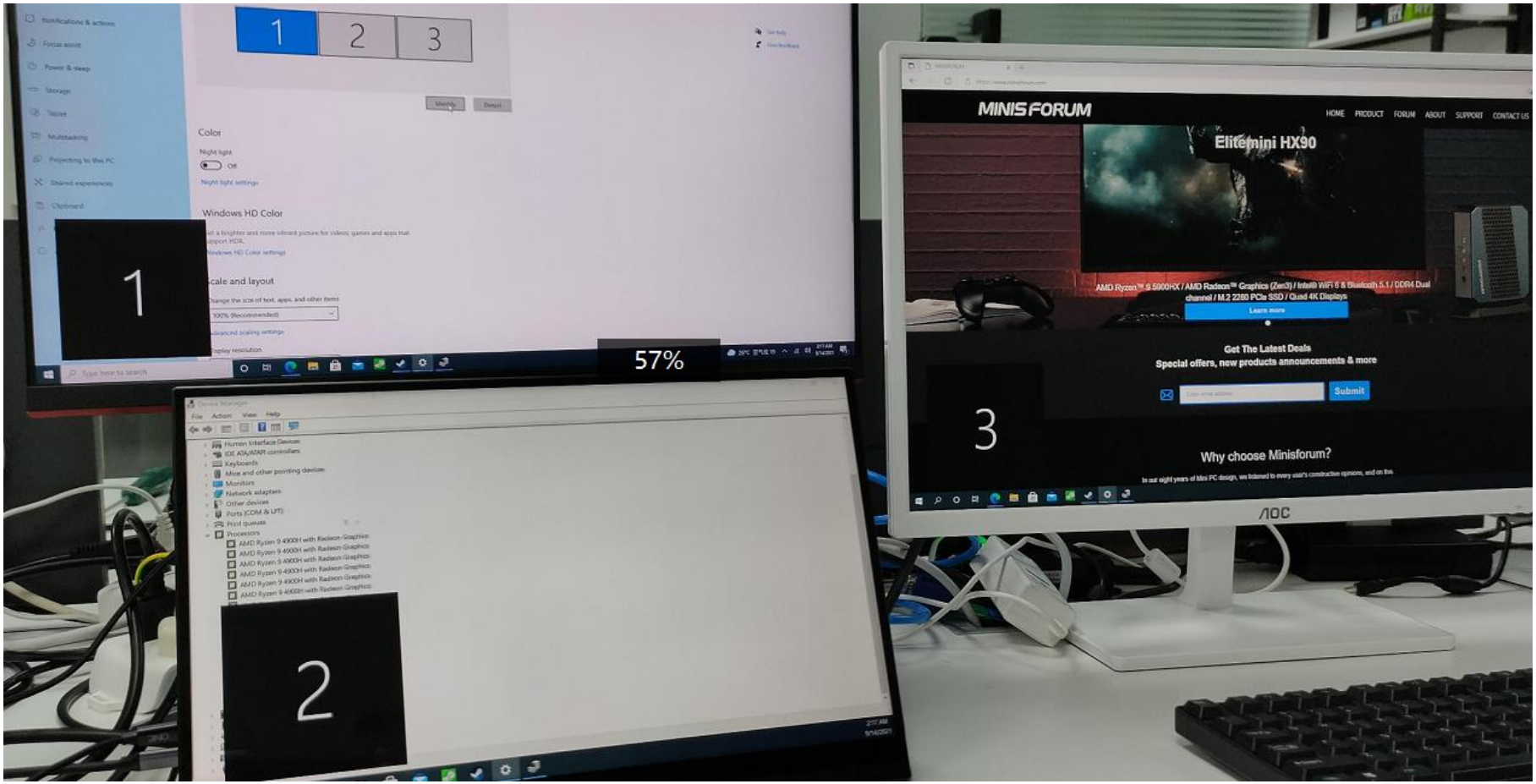
2.5” 2TB Crucial MX500 SSD



2.5” 2TB Samsung 860EVO SSD

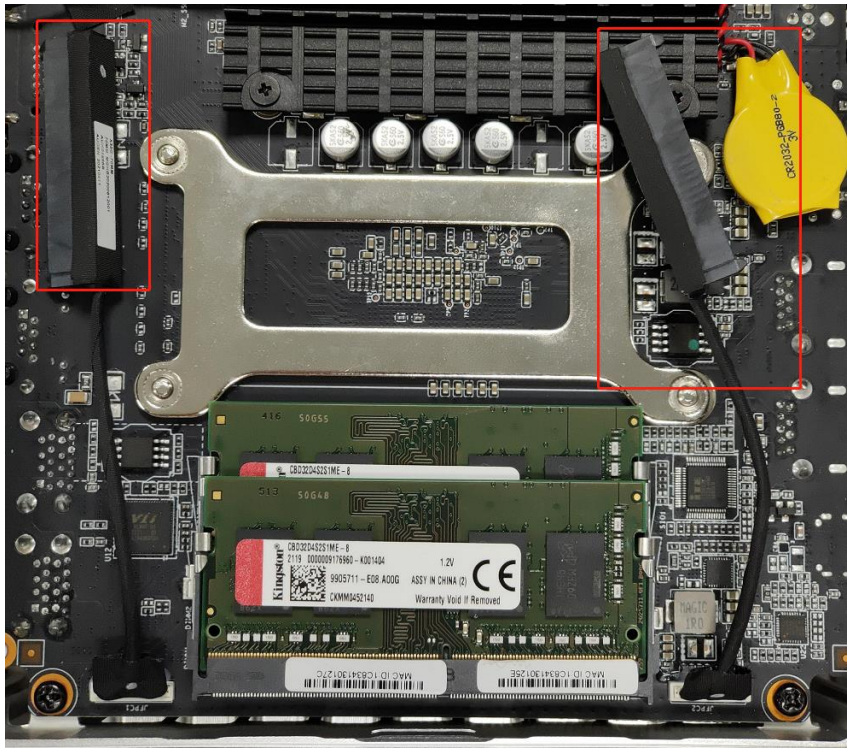
HDMI/DP/USB-C output display

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



Input / Output Strong Scalability

- With 4*USB 3.0 Ports(The Back)
- With 2*USB 3.1 Ports(Gen2, In Front)
- With 1 * RJ45 2.5 Gigabit Ethernet Port (Intel® Ethernet Controller I225-V 2.5G Ethernet)
- With 1 * RJ45 Gigabit Ethernet Port
- 3.5mm Audio Jack
- With 2*2.5 inch SATA Port



MINISFORUM

Thank you !