



Performance Test Report



THOR11-D27

A large, light gray, semi-transparent image of a THOR11-D27 hardware unit, which is a rack-mounted electronic device with various ports and connectors on its front panel.

| Product Manager | R&D Leader | System Engineer | Test Engineer |
|------------------------|-----------------------|------------------------|----------------------|
| Stanley Lo | James Chan | Darren Chen | Mike Chen |

Revision Date: April 9, 2024

Performance Test

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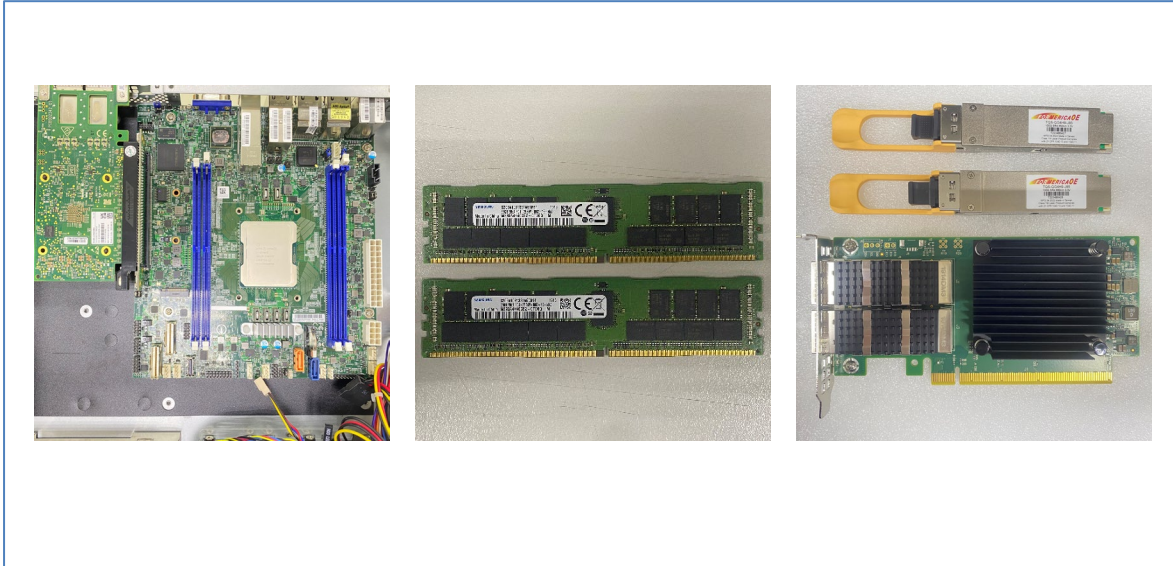
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1. SPECIFICATION

1-1. PHOTO



1-2. SYSTEM CONFIGURATION

| | |
|---------------------|--|
| Motherboard | Intel® Xeon® Processor D-2796NT, CPU TDP 120W, Intel Quick Assist Technology ASPEED AST2600 BMC Dual LAN with 25G SFP28 LAN via SoC Dual LAN with Intel® X550 10GBase-T Ethernet Controller Quad LAN with Intel® i350 Gigabit Ethernet Controller Operating Temperature Range: 0°C - 60°C |
| CPU | Intel® Xeon® D-2796NT Total Cores: 20 Performance: cores20 Total Threads: 40 Max Turbo Frequency: 3.10 GHz Processor Base Frequency: 2.00 GHz Cache: 30 MB TDP: 120 W |
| Memory | SAMSUNG M393A4K40CB2-CTD6Q 32GB *2 pcs |
| Storage | 7StarLake TS128GSSD230S 128GB |
| Power Module | AcBel FLXA4251A Maximum Output Power 250Watt Output Voltage +3.3V, +5V, -12V, +12V, +5Vsb Dimensions 81.5 x 150 x 40.5mm |
| Add-in Card | CX623106A ConnectX-6 DX Dual Port 100Gb PCIe Ethernet Adapter Card |

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2. TEST PLAN

2.1. THERMAL MEASUREMENT PROCESS

| Test Purpose | <p>The purpose of performing thermal profile testing is to identify potential thermal issues with the EUT. Considering that semiconductor failure rates rise rapidly with increasing junction temperature, it can aid product reliability assessment.</p> <p>As the system cools down, the mode will change with stack selection, temperature/heat.</p> <p>Mapping can help develop the best tracking arrangements.</p> | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---|-------------|------------------|---|----|-----|----|-----|----|------|----|------|----|----|----|----|----|------|----|------|----|----|----|
| Test Equipment | 1. KSON THS-B4T-150 Chamber. | | | | | | | | | | | | | | | | | | | | | | |
| Quantity Tested | Minimum 1 Set | | | | | | | | | | | | | | | | | | | | | | |
| Test Software | 1. PassMark Burn-In Test(Ver.9.0) under Windows Server 2022 | | | | | | | | | | | | | | | | | | | | | | |
| Test Procedure | <ol style="list-style-type: none">1. Thermal pre-scan measurement: Temperature: 25°C~60°C/60%RH2. Actual thermal measurement:<ol style="list-style-type: none">2-1. Select the test point based on the infrared photo and connect the thermocouple to the hot spot.2-2. Place the EUT into the hot chamber and set the test temperature curve Specification.2-3. Open the hot cell and power up the EUT, enter the Windows Server 2022 environment and perform a maximum power test + stress application.2-4. After the EUT executes the test software for 8 hours, record the maximum heat generation of each thermocouple point.2-5. Turn off the hot cell and EUT.2-6. Verify and check that the recorded information for each component complies with the operating temperature range listed in the specification/approval sheet for each component being tested. <p>Environment defines for 29 hours.</p> | | | | | | | | | | | | | | | | | | | | | | |
| Test Diagram of Curves | <table border="1"><caption>Temperature Profile Data</caption><thead><tr><th>Time (hour)</th><th>Temperature (°C)</th></tr></thead><tbody><tr><td>0</td><td>25</td></tr><tr><td>3.5</td><td>25</td></tr><tr><td>3.5</td><td>40</td></tr><tr><td>11.5</td><td>40</td></tr><tr><td>11.5</td><td>50</td></tr><tr><td>20</td><td>50</td></tr><tr><td>20</td><td>60</td></tr><tr><td>28.5</td><td>60</td></tr><tr><td>28.5</td><td>25</td></tr><tr><td>29</td><td>25</td></tr></tbody></table> | Time (hour) | Temperature (°C) | 0 | 25 | 3.5 | 25 | 3.5 | 40 | 11.5 | 40 | 11.5 | 50 | 20 | 50 | 20 | 60 | 28.5 | 60 | 28.5 | 25 | 29 | 25 |
| Time (hour) | Temperature (°C) | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 3.5 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 3.5 | 40 | | | | | | | | | | | | | | | | | | | | | | |
| 11.5 | 40 | | | | | | | | | | | | | | | | | | | | | | |
| 11.5 | 50 | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 50 | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 60 | | | | | | | | | | | | | | | | | | | | | | |
| 28.5 | 60 | | | | | | | | | | | | | | | | | | | | | | |
| 28.5 | 25 | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 25 | | | | | | | | | | | | | | | | | | | | | | |

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2.2. TEST RESULT <TEST ITEM>

2.2.1 Temperature Cycle

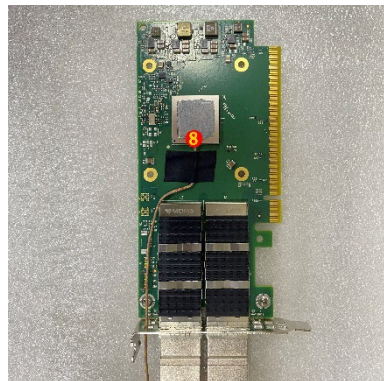
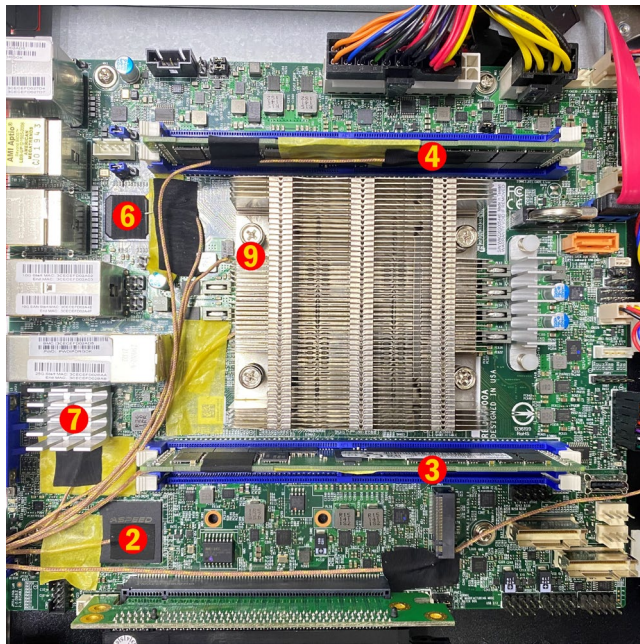
Aging test of various parts at different temperatures under maximum load and full load conditions.

| Test Temperature | Test Result |
|------------------|-------------|
| 25°C | PASS |
| 40°C | PASS |
| 50°C | PASS |
| 60°C | PASS |

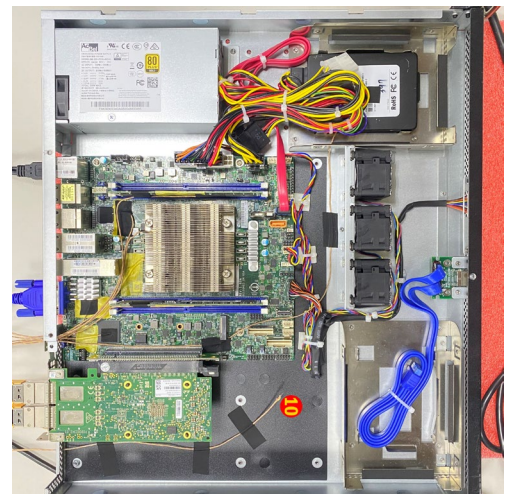
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3. THERMAL TEST POINT



| Test Point No. | Test Point |
|----------------|-------------------------|
| CH1 | CPU |
| CH2 | Aspeed 2600 |
| CH3 | R-DIMM RAM #1 |
| CH4 | R-DIMM RAM #2 |
| CH5 | 2.5 Inch SSD |
| CH6 | Intel I350 Chip |
| CH7 | Intel X550 Chip |
| CH8 | CX623106A ConnectX-6 |
| CH9 | CPU Heat Sink |
| CH10 | Inside Chassis |

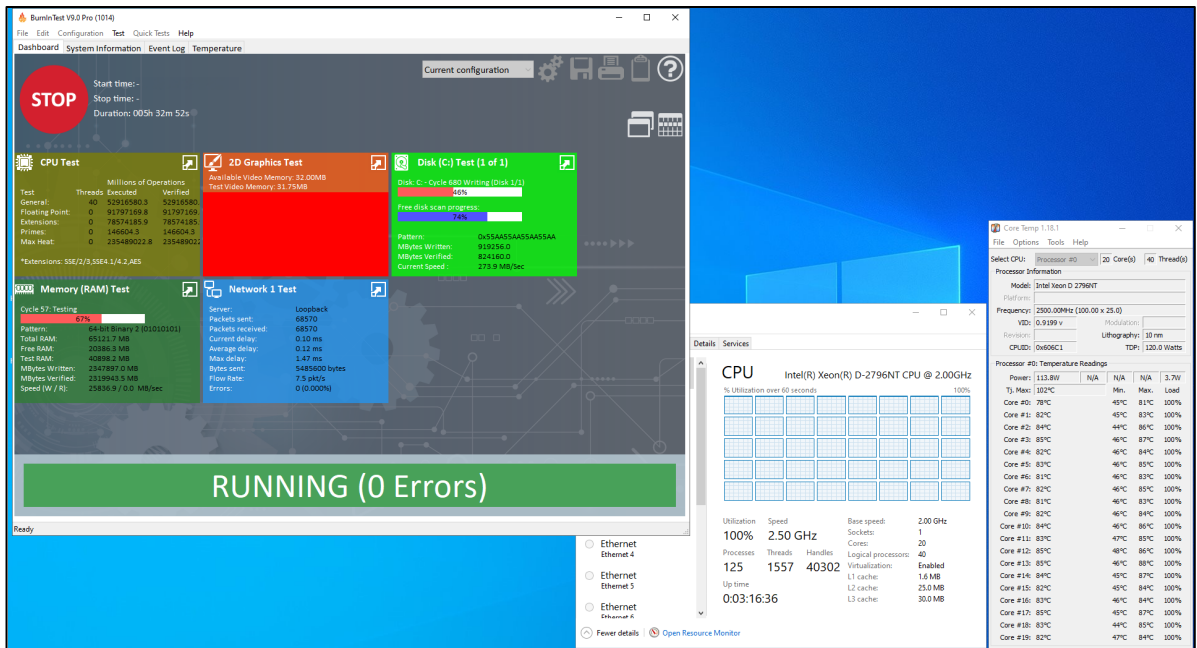


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4. TEST PHOTO IN LAB

- Chamber in 25°C



| 总览 | | | | | |
|----|------|----|-------|-------|-------|
| 1 | 74.2 | 7 | 54.8 | 13 | 19 |
| 2 | 47.3 | 8 | 77.7 | 14 | 20 |
| 3 | 38.3 | 9 | 71.8 | 15 | 21 |
| 4 | 31.3 | 10 | 31.4 | 16 | 22 |
| 5 | 27.8 | 11 | -Over | 17 | 23 |
| 6 | 44.5 | 12 | -Over | 18 | 24 |
| | | | -Over | -Over | -Over |

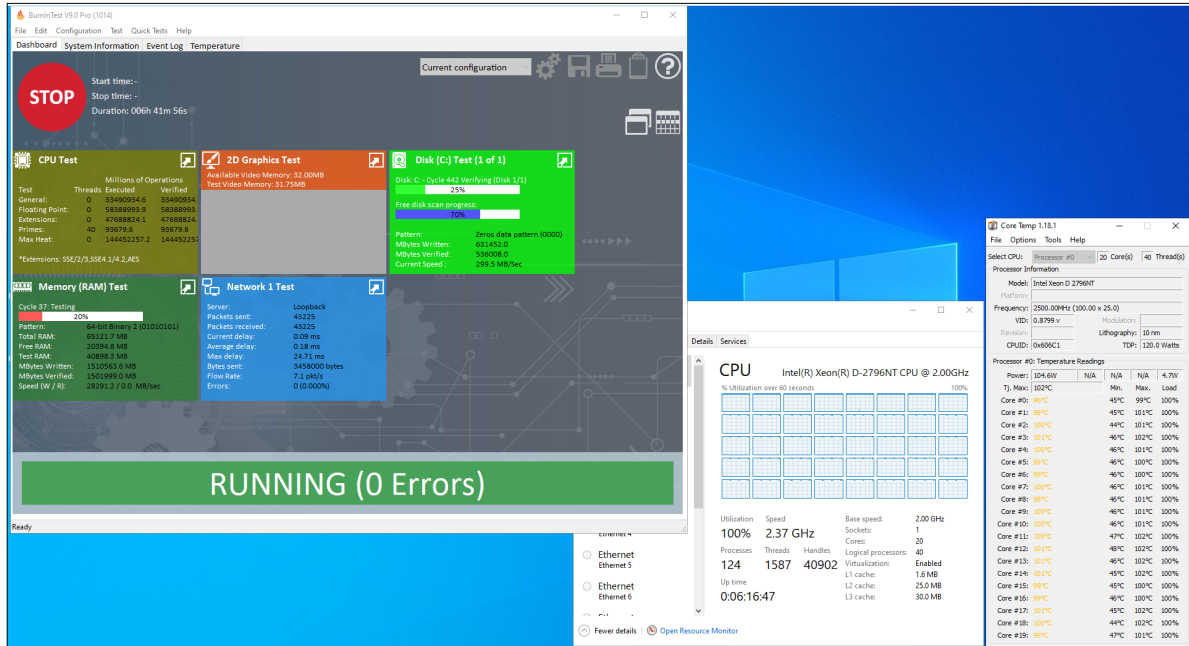
| Test Point | Ambient Temp. | 25°C |
|------------|----------------------|----------|
| | CPU AVG. FRQ. | 2500 MHz |
| | CPU Tj. Temperature | 78.0 °C |
| CH1 | CPU | 74.2 °C |
| CH2 | Aspeed 2600 | 47.3 °C |
| CH3 | R-DIMM RAM #1 | 38.3 °C |
| CH4 | R-DIMM RAM #2 | 31.3 °C |
| CH5 | 2.5 Inch SSD | 27.8 °C |
| CH6 | Intel I350 Chip | 44.5 °C |
| CH7 | Intel X550 Chip | 54.0 °C |
| CH8 | CX623106A ConnectX-6 | 77.7 °C |
| CH9 | CPU Heat Sink | 71.0 °C |
| CH10 | Inside Chassis | 31.4 °C |



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- Chamber in 40°C



| 1 | 7 | 13 | 19 |
|------|-------|-------|-------|
| 98.8 | 70.3 | -Over | -Over |
| 2 | 8 | 14 | 20 |
| 63.7 | 87.8 | -Over | -Over |
| 3 | 9 | 15 | 21 |
| 54.8 | 87.2 | -Over | -Over |
| 4 | 10 | 16 | 22 |
| 46.6 | 46.6 | -Over | -Over |
| 5 | 11 | 17 | 23 |
| 42.8 | -Over | -Over | -Over |
| 6 | 12 | 18 | 24 |
| 68.2 | -Over | -Over | -Over |

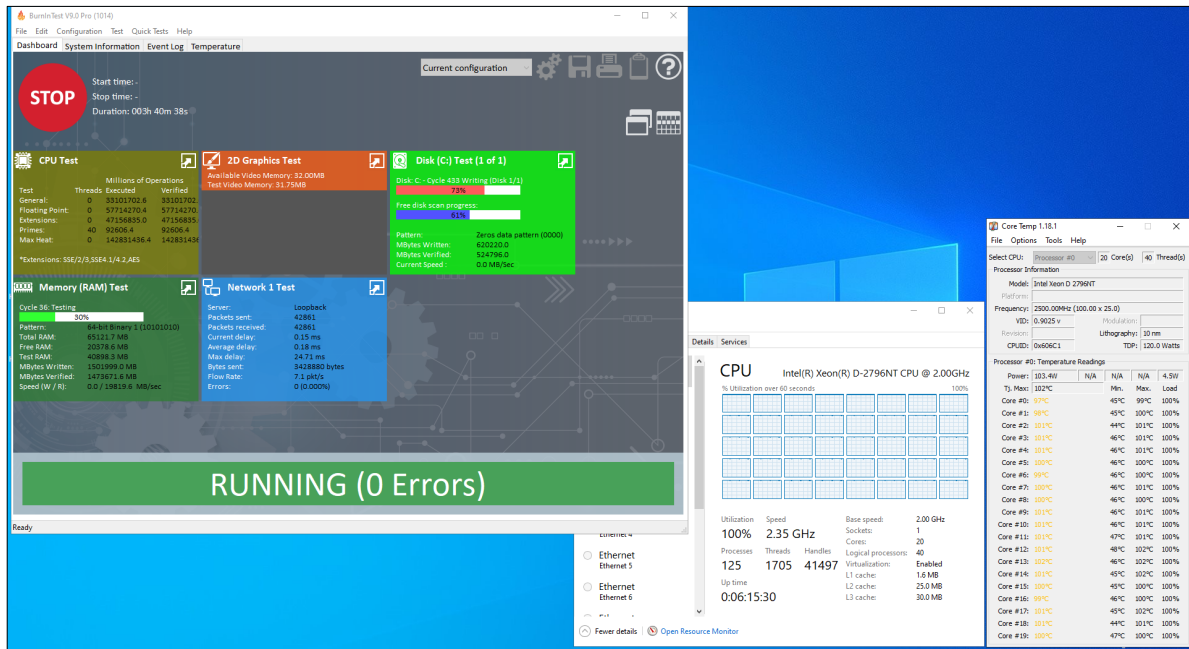
| Test Point | Ambient Temp. | 40°C |
|------------|-----------------------------|----------|
| | CPU AVG. FRQ. | 2370 MHz |
| | CPU Tj. Temperature | 96.0 °C |
| CH1 | CPU | 90.8 °C |
| CH2 | Aspeed 2600 | 63.7 °C |
| CH3 | R-DIMM RAM #1 | 54.0 °C |
| CH4 | R-DIMM RAM #2 | 46.6 °C |
| CH5 | 2.5 Inch SSD | 42.8 °C |
| CH6 | Intel I350 Chip | 60.2 °C |
| CH7 | Intel X550 Chip | 70.3 °C |
| CH8 | CX623106A ConnectX-6 | 87.8 °C |
| CH9 | CPU Heat Sink | 87.2 °C |
| CH10 | Inside Chassis | 46.6 °C |



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- Chamber in 50°C



总览 2024/04/02 16:12:38 1hour

| | | | | | | | |
|---|------|----|-------|----|-------|----|-------|
| 1 | 93.9 | 7 | 79.2 | 13 | -Over | 19 | -Over |
| 2 | 71.4 | 8 | 91.6 | 14 | -Over | 20 | -Over |
| 3 | 62.8 | 9 | 92.5 | 15 | -Over | 21 | -Over |
| 4 | 56.5 | 10 | 55.3 | 16 | -Over | 22 | -Over |
| 5 | 52.7 | 11 | -Over | 17 | -Over | 23 | -Over |
| 6 | 69.2 | 12 | -Over | 18 | -Over | 24 | -Over |

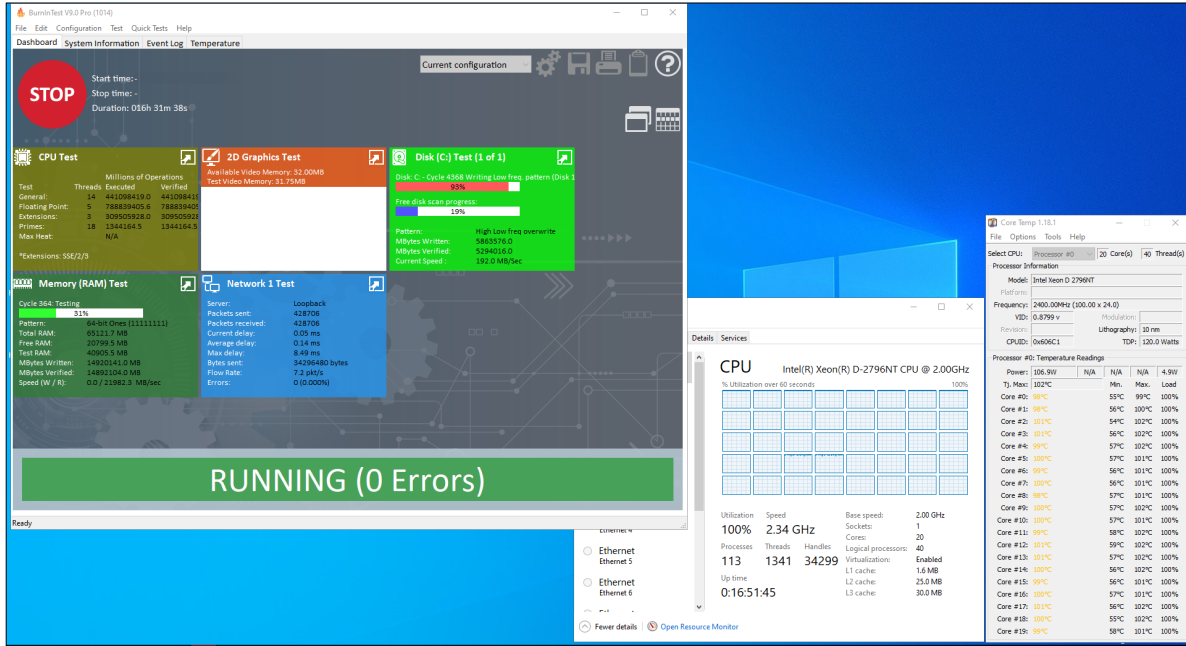
| Test Point | Ambient Temp. | 50°C |
|------------|----------------------|----------|
| | CPU AVG. FRQ. | 2350 MHz |
| | CPU Tj. Temperature | 97.0 °C |
| CH1 | CPU | 93.9 °C |
| CH2 | Aspeed 2600 | 71.4 °C |
| CH3 | R-DIMM RAM #1 | 62.8 °C |
| CH4 | R-DIMM RAM #2 | 56.5 °C |
| CH5 | 2.5 Inch SSD | 52.7 °C |
| CH6 | Intel I350 Chip | 69.2 °C |
| CH7 | Intel X550 Chip | 79.2 °C |
| CH8 | CX623106A ConnectX-6 | 91.6 °C |
| CH9 | CPU Heat Sink | 92.6 °C |
| CH10 | Inside Chassis | 55.3 °C |



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- Chamber in 60°C



| Test Point | Temp (°C) | Temp (°C) | Temp (°C) | Temp (°C) | Temp (°C) |
|------------|-----------|-----------|-----------|-----------|-----------|
| 1 | 95.8 | 7 | 83.4 | 13 | 19 |
| 2 | 77.1 | 8 | 96.1 | -Over | 20 |
| 3 | 65.9 | 9 | 93.9 | -Over | 21 |
| 4 | 64.8 | 10 | 65.6 | -Over | 22 |
| 5 | 62.9 | 11 | -Over | -Over | 23 |
| 6 | 82.6 | 12 | -Over | -Over | 24 |

| Test Point | Ambient Temp. | 60°C |
|------------|----------------------|----------|
| | CPU AVG. FRQ. | 2340 MHz |
| | CPU Tj. Temperature | 98.0 °C |
| CH1 | CPU | 95.8 °C |
| CH2 | Aspeed 2600 | 77.1 °C |
| CH3 | R-DIMM RAM #1 | 65.9 °C |
| CH4 | R-DIMM RAM #2 | 64.8 °C |
| CH5 | 2.5 Inch SSD | 62.9 °C |
| CH6 | Intel I350 Chip | 82.6 °C |
| CH7 | Intel X550 Chip | 83.4 °C |
| CH8 | CX623106A ConnectX-6 | 96.1 °C |
| CH9 | CPU Heat Sink | 93.9 °C |
| CH10 | Inside Chassis | 65.6 °C |



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5. THERMAL TEST RESULT(25°C ~ 60°C)

CPU Temperature and Frequency

| | Core Temp | Ambient Temp | 25°C | 40°C | 50°C | 60°C |
|--|---------------------|--------------|----------|----------|----------|----------|
| | CPU Frequency | | 60% RH | 60% RH | 60% RH | 60% RH |
| | CPU Avg. Frequency | | 2500 MHz | 2370 MHz | 2350 MHz | 2340 MHz |
| | CPU Tj. Temperature | | 78.0 °C | 96.0 °C | 97.0 °C | 98.0 °C |

| | Measurement Point | Ambient Temp | 25°C | 40°C | 50°C | 60°C |
|------|----------------------|--------------|---------|---------|---------|---------|
| | | | 60% RH | 60% RH | 60% RH | 60% RH |
| CH1 | CPU | | 74.2 °C | 90.8 °C | 93.9 °C | 95.8 °C |
| CH2 | Aspeed 2600 | | 47.3 °C | 63.7 °C | 71.4 °C | 77.1 °C |
| CH3 | R-DIMM RAM #1 | | 38.3 °C | 54.0 °C | 62.8 °C | 65.9 °C |
| CH4 | R-DIMM RAM #2 | | 31.3 °C | 46.6 °C | 56.5 °C | 64.8 °C |
| CH5 | 2.5 Inch SSD | | 27.8 °C | 42.8 °C | 52.7 °C | 62.9 °C |
| CH6 | Intel I350 Chip | | 44.5 °C | 60.2 °C | 69.2 °C | 82.6 °C |
| CH7 | Intel X550 Chip | | 54.0 °C | 70.3 °C | 79.2 °C | 83.4 °C |
| CH8 | CX623106A ConnectX-6 | | 77.7 °C | 87.8 °C | 91.6 °C | 96.1 °C |
| CH9 | CPU Heat Sink | | 71.0 °C | 87.2 °C | 92.6 °C | 93.9 °C |
| CH10 | Inside Chassis | | 31.4 °C | 46.6 °C | 55.3 °C | 65.6 °C |
