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# R32_5_1_Xavier_AX720_1

ARMv8 rev 0 testing with a Jetson-AGX and NVIDIA Tegra Xavier on Ubuntu 18.04 via the Phoronix Test Suite.

**Automated Executive Summary**

*M.2 SSD had the most wins, coming in first place for 62% of the tests.*

## Test Systems:

### eMMC

Processor: ARMv8 rev 0 @ 2.27GHz (8 Cores), Motherboard: Jetson-AGX, Memory: 16GB, Disk: 62GB Ultra USB 3.0 + 31GB HBG4a2, Graphics: NVIDIA TEGRA, Monitor: PHL 247E6, Network: 2 x Intel I210

OS: Ubuntu 18.04, Kernel: 4.9.201-tegra (aarch64), Desktop: Unity 7.5.0, Display Server: X Server 1.19.6, Vulkan: 1.2.131, Compiler: GCC 7.5.0 + CUDA 10.2, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release

--enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Disk Notes: CFQ / data=ordered,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: tegra_cpufreq schedutil

## M.2 SSD

## USB 3.0

## USB2.0

## Micro SD Card

Processor: ARMv8 rev 0 @ 2.27GHz (8 Cores), Motherboard: Jetson-AGX, Memory: 16GB, Disk: 256GB INTEL SSDPEKKW256G8 + 62GB Ultra USB 3.0 + 31GB HBG4a2, Graphics: NVIDIA Tegra Xavier, Monitor: PHL 247E6, Network: 2 x Intel I210

OS: Ubuntu 18.04, Kernel: 4.9.201-tegra (aarch64), Desktop: Unity 7.5.0, Display Server: X Server 1.19.6, Display Driver: NVIDIA 32.5.1, OpenGL: 4.6.0, Vulkan: 1.2.131, Compiler: GCC 7.5.0 + CUDA 10.2, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: always
Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Disk Notes: none / data=ordered,relatime,rw / Block Size: 4096
Processor Notes: Scaling Governor: tegra_cpufreq schedutil

## Type C

## CPU Stress

Processor: ARMv8 rev 0 @ 2.27GHz (8 Cores), Motherboard: Jetson-AGX, Memory: 16GB, Disk: 256GB INTEL SSDPEKKW256G8 + 256GB Tech + 62GB Ultra USB 3.0 + 31GB HBG4a2 + 15GB i-TF, Graphics: NVIDIA Tegra Xavier, Monitor: PHL 247E6, Network: 2 x Intel I210

OS: Ubuntu 18.04, Kernel: 4.9.201-tegra (aarch64), Desktop: Unity 7.5.0, Display Server: X Server 1.19.6, Display Driver: NVIDIA 32.5.1, OpenGL: 4.6.0, Vulkan: 1.2.131, Compiler: GCC 7.5.0 + CUDA 10.2, File-System: ext4, Screen Resolution: 1920x1080

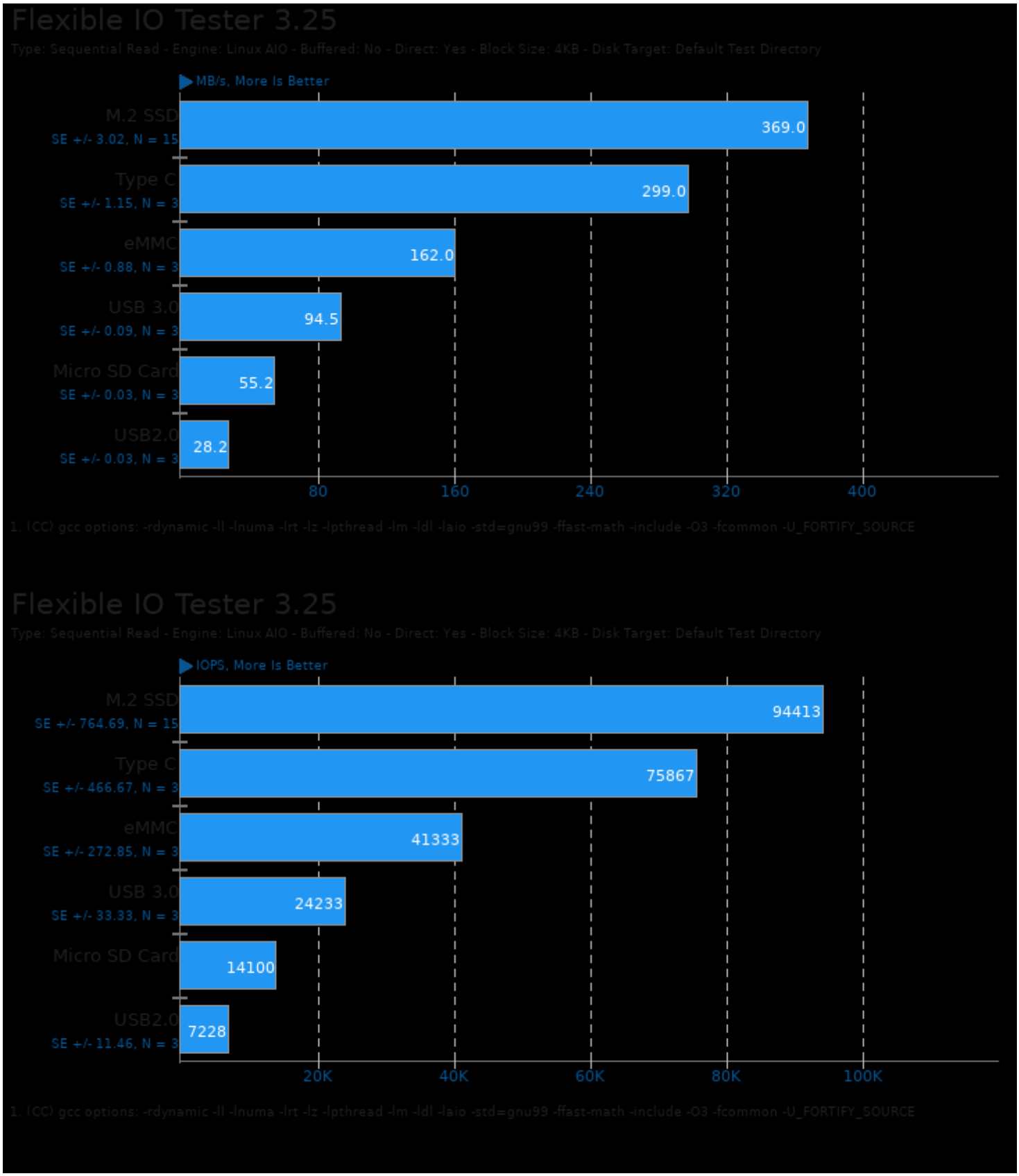
Kernel Notes: Transparent Huge Pages: always
Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-fix-cortex-a53-843419 --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-plugin --enable-shared --enable-threads=posix --host=aarch64-linux-gnu --program-prefix=aarch64-linux-gnu- --target=aarch64-linux-gnu --with-default-libstdcxx-abi=new --with-gcc-major-version-only -v
Processor Notes: Scaling Governor: tegra_cpufreq schedutil

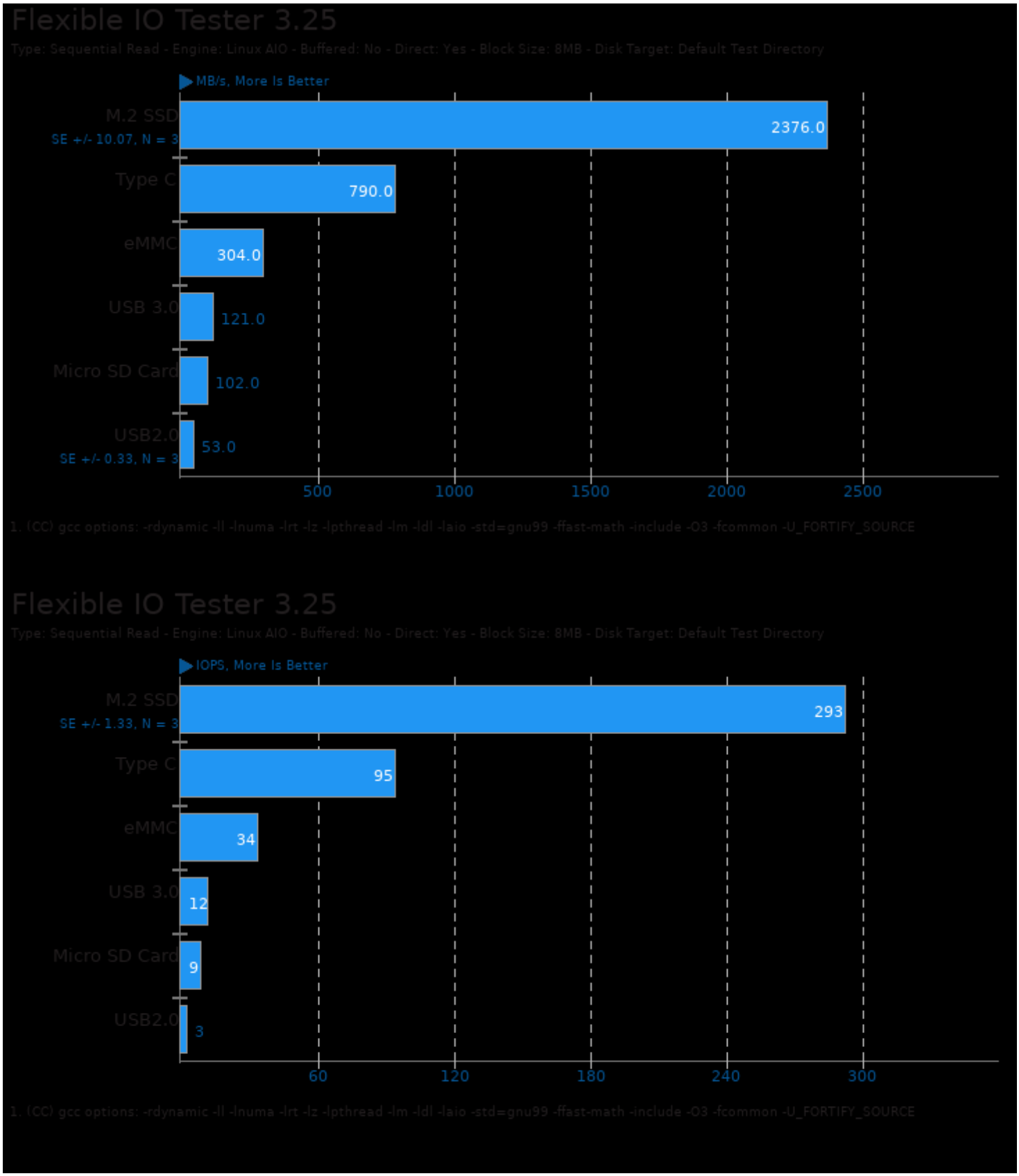
| | eMMC | M.2 SSD | USB 3.0 | USB2.0 | Micro SD Card | Type C | CPU Stress |
|---|---|---|---|---|---|---|---|

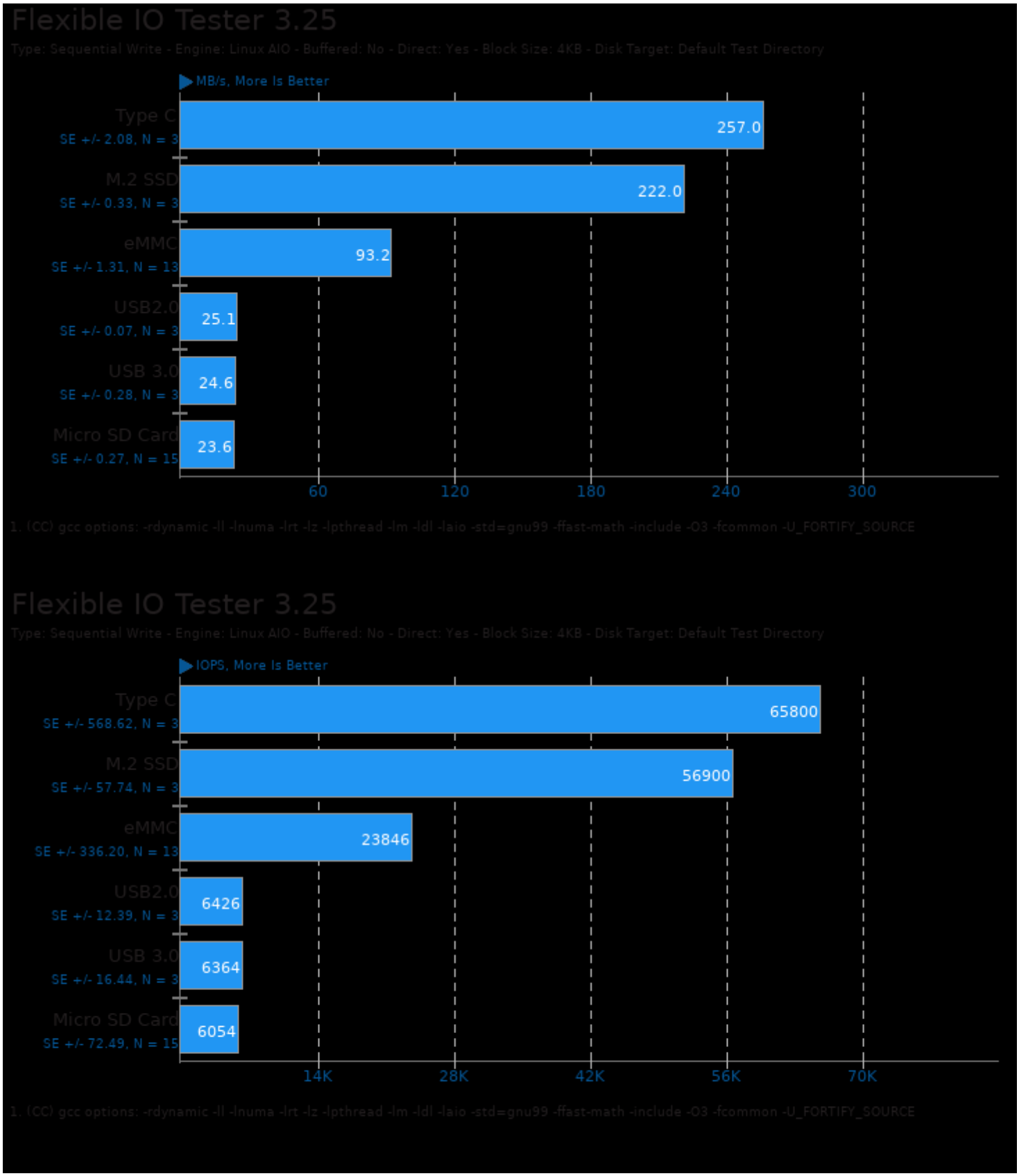
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (MB/s)** | 162 | **369** | 94.5 | **28.2** | 55.2 | 299 | |
| **Normalized** | 43.9% | 100% | 25.61% | 7.64% | 14.96% | 81.03% | |
| **Standard Deviation** | 0.9% | 3.2% | 0.2% | 0.2% | 0.1% | 0.7% | |
| **Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 4KB (IOPS)** | 41333 | **94413** | 24233 | **7228** | 14100 | 75867 | |
| **Normalized** | 43.78% | 100% | 25.67% | 7.66% | 14.93% | 80.36% | |
| **Standard Deviation** | 1.1% | 3.1% | 0.2% | 0.3% | | 1.1% | |
| **Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 8MB (MB/s)** | 304 | **2376** | 121 | **53.0** | 102 | 790 | |
| **Normalized** | 12.79% | 100% | 5.09% | 2.23% | 4.29% | 33.25% | |
| **Standard Deviation** | | 0.7% | | 1.1% | | | |
| **Flexible IO Tester - Seq Read - Linux AIO - No - Yes - 8MB (IOPS)** | 34 | **293** | 12 | **3** | 9 | 95 | |
| **Normalized** | 11.6% | 100% | 4.1% | 1.02% | 3.07% | 32.42% | |
| **Standard Deviation** | | 0.8% | | | | | |
| **Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (MB/s)** | 93.2 | 222 | 24.6 | 25.1 | **23.6** | **257** | |
| **Normalized** | 36.26% | 86.38% | 9.57% | 9.77% | 9.18% | 100% | |
| **Standard Deviation** | 5.1% | 0.3% | 2% | 0.5% | 4.4% | 1.4% | |
| **Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 4KB (IOPS)** | 23846 | 56900 | 6364 | 6426 | **6054** | **65800** | |
| **Normalized** | 36.24% | 86.47% | 9.67% | 9.77% | 9.2% | 100% | |
| **Standard Deviation** | 5.1% | 0.2% | 0.4% | 0.3% | 4.6% | 1.5% | |
| **Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 8MB (MB/s)** | 137 | 282 | **38.6** | 48.4 | 66.8 | **285** | |
| **Normalized** | 48.07% | 98.95% | 13.54% | 16.98% | 23.44% | 100% | |
| **Standard Deviation** | 1.5% | | 0.5% | 1% | 0.2% | | |
| **Flexible IO Tester - Seq Write - Linux AIO - No - Yes - 8MB (IOPS)** | 14 | **32** | **2** | 3 | 5 | **32** | |
| **Normalized** | 43.75% | 100% | 6.25% | 9.38% | 15.63% | 100% | |
| **Stress-NG - Crypto (Bogo Ops/s)** | | | | | | | 1190 |
| **Standard Deviation** | | | | | | | 1.1% |
| **Stress-NG - Forking (Bogo Ops/s)** | | | | | | | 6591 |
| **Standard Deviation** | | | | | | | 1.5% |
| **Stress-NG - CPU Stress (Bogo Ops/s)** | | | | | | | 766.00 |
| **Standard Deviation** | | | | | | | 29.2% |
| **Stress-NG - Matrix Math (Bogo Ops/s)** | | | | | | | 6288 |
| **Standard Deviation** | | | | | | | 0.4% |

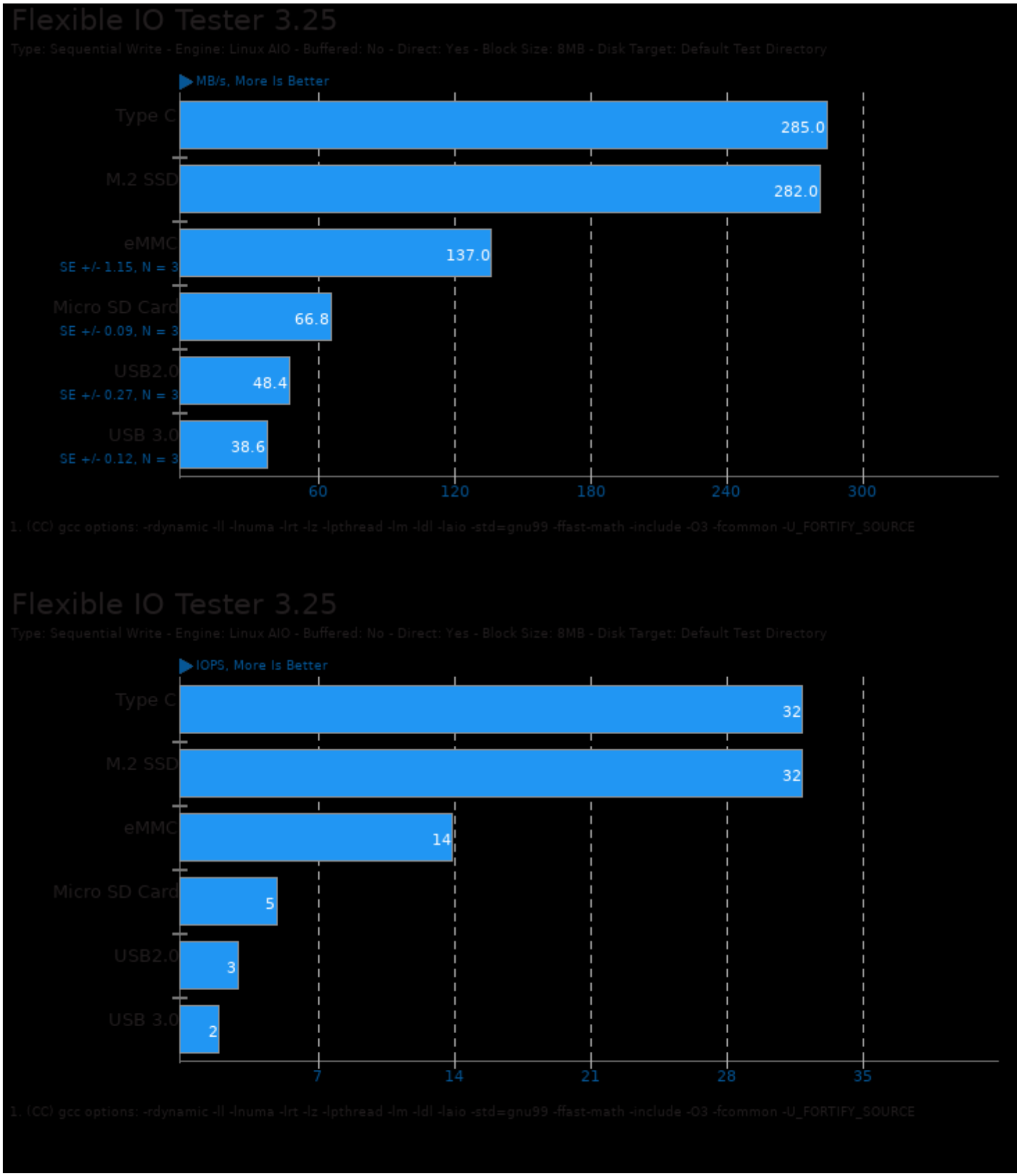
# R32_5_1_Xavier_AX720_1

| | |
|---|---|
| **Stress-NG - Vector Math (Bogo Ops/s)** | 24875 |
| **Standard Deviation** | 0.4% |
| **Stress-NG - Memory Copying (Bogo Ops/s)** | 1761 |
| **Standard Deviation** | 0.2% |
| **Stress-NG - G.C.S.F (Bogo Ops/s)** | 115612 |
| **Standard Deviation** | 3.2% |
| **Stress-NG - G.Q.D.S (Bogo Ops/s)** | 20.34 |
| **Standard Deviation** | 3% |


Flexible IO Tester 3.25
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
M.2 SSD
SE +/- 3.02, N = 15
369.0
Type C
SE +/- 1.15, N = 3
299.0
eMMC
SE +/- 0.88, N = 3
162.0
USB 3.0
SE +/- 0.09, N = 3
94.5
Micro SD Card
SE +/- 0.03, N = 3
55.2
USB2.0
SE +/- 0.03, N = 3
28.2
80
160
240
320
400
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE
Flexible IO Tester 3.25
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
M.2 SSD
SE +/- 764.69, N = 15
94413
Type C
SE +/- 466.67, N = 3
75867
eMMC
SE +/- 272.85, N = 3
41333
USB 3.0
SE +/- 33.33, N = 3
24233
Micro SD Card
14100
USB2.0
SE +/- 11.46, N = 3
7228
20K
40K
60K
80K
100K
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE

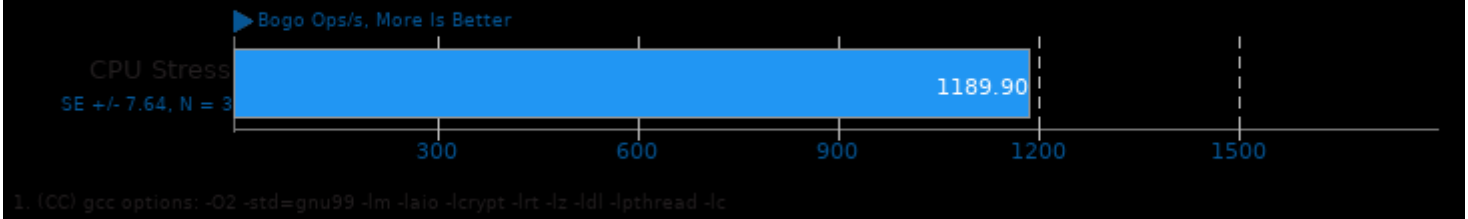

Flexible IO Tester 3.25
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
M.2 SSD
SE +/- 10.07, N = 3
2376.0
Type C
790.0
eMMC
304.0
USB 3.0
121.0
Micro SD Card
102.0
USB2.0
SE +/- 0.33, N = 3
53.0
500
1000
1500
2000
2500
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE
Flexible IO Tester 3.25
Type: Sequential Read - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
IOPS, More Is Better
M.2 SSD
SE +/- 1.33, N = 3
293
Type C
95
eMMC
34
USB 3.0
12
Micro SD Card
9
USB2.0
3
60
120
180
240
300
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE


Flexible IO Tester 3.25
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
MB/s, More Is Better
Type C
SE +/- 2.08, N = 3
257.0
M.2 SSD
SE +/- 0.33, N = 3
222.0
eMMC
SE +/- 1.31, N = 13
93.2
USB2.0
SE +/- 0.07, N = 3
25.1
USB 3.0
SE +/- 0.28, N = 3
24.6
Micro SD Card
SE +/- 0.27, N = 15
23.6
60
120
180
240
300
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE
Flexible IO Tester 3.25
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 4KB - Disk Target: Default Test Directory
IOPS, More Is Better
Type C
SE +/- 568.62, N = 3
65800
M.2 SSD
SE +/- 57.74, N = 3
56900
eMMC
SE +/- 336.20, N = 13
23846
USB2.0
SE +/- 12.39, N = 3
6426
USB 3.0
SE +/- 16.44, N = 3
6364
Micro SD Card
SE +/- 72.49, N = 15
6054
14K
28K
42K
56K
70K
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE


Flexible IO Tester 3.25
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
MB/s, More Is Better
Type C
285.0
M.2 SSD
282.0
eMMC
137.0
SE +/- 1.15, N = 3
Micro SD Card
66.8
SE +/- 0.09, N = 3
USB2.0
48.4
SE +/- 0.27, N = 3
USB 3.0
38.6
SE +/- 0.12, N = 3
60
120
180
240
300
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE
Flexible IO Tester 3.25
Type: Sequential Write - Engine: Linux AIO - Buffered: No - Direct: Yes - Block Size: 8MB - Disk Target: Default Test Directory
IOPS, More Is Better
Type C
32
M.2 SSD
32
eMMC
14
Micro SD Card
5
USB2.0
3
USB 3.0
2
7
14
21
28
35
1. (CC) gcc options: -rdynamic -ll -lnuma -lrt -lz -lpthread -lm -ldl -laio -std=gnu99 -ffast-math -include -O3 -fcommon -U_FORTIFY_SOURCE

## Stress-NG 0.11.07

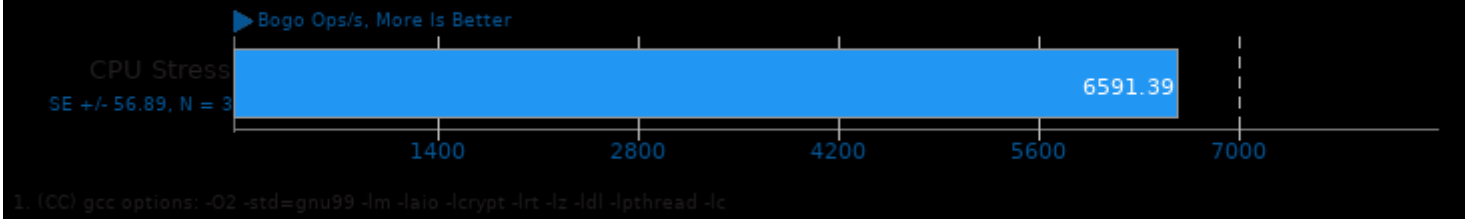
Test: Crypto




1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

## Stress-NG 0.11.07

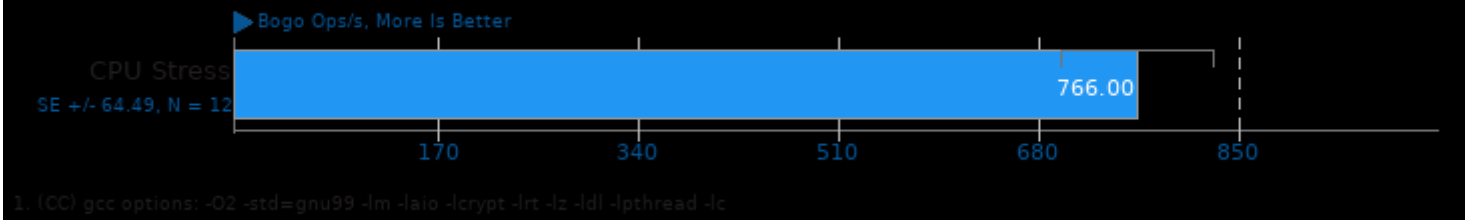
Test: Forking




1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

## Stress-NG 0.11.07

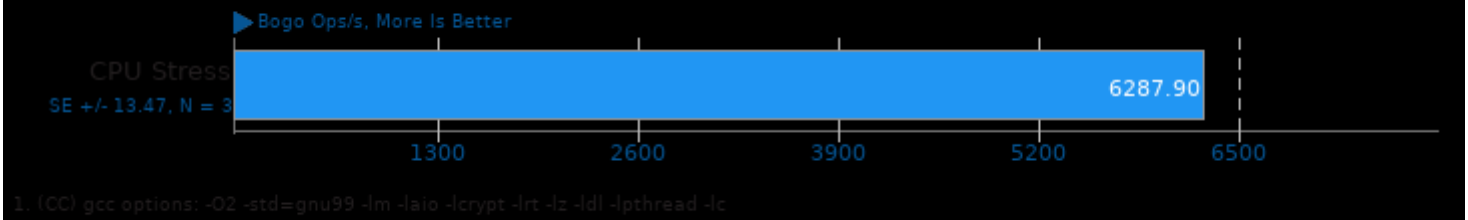
Test: CPU Stress




1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

## Stress-NG 0.11.07

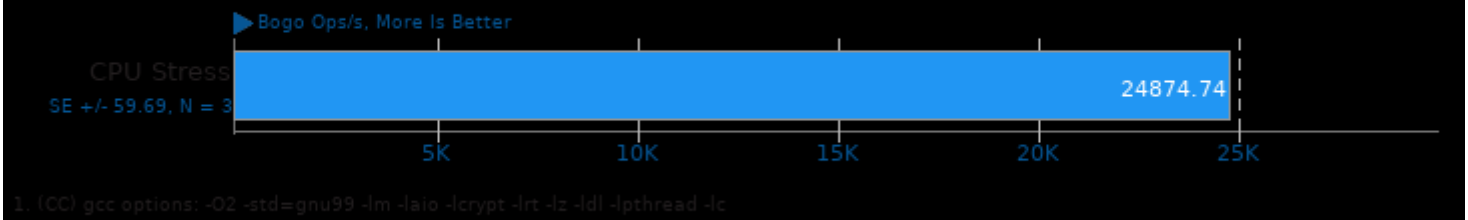
Test: Matrix Math



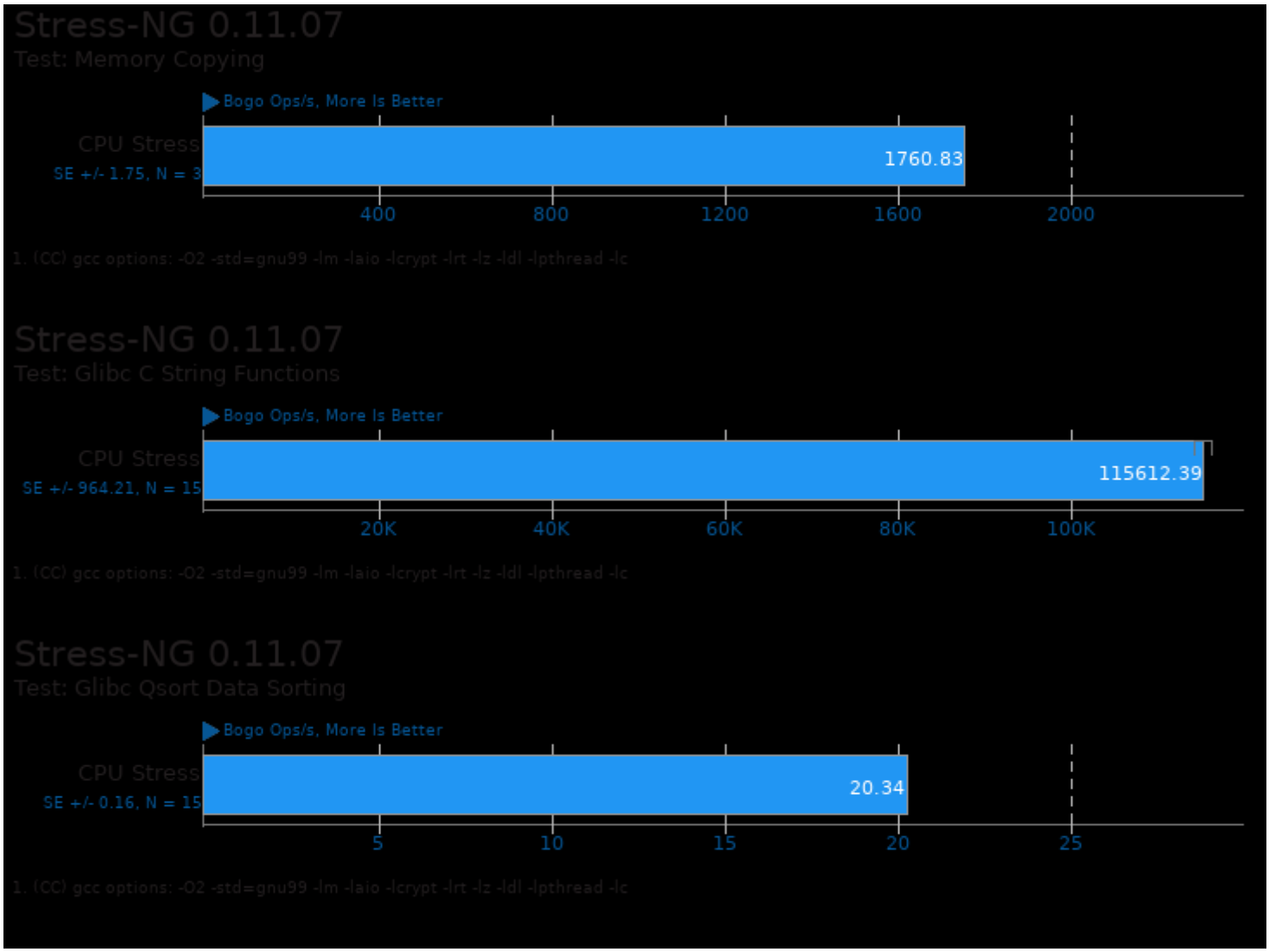

1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc

## Stress-NG 0.11.07

Test: Vector Math




1. (CC) gcc options: -O2 -std=gnu99 -lm -laio -lcrypt -lrt -lz -ldl -lpthread -lc




*This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 11:36.*