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# Raspberry Pi Model 4 Benchmarks

ARMv7 rev 3 testing with a BCM2835 Raspberry Pi 4 Model B Rev 1.1 and V3D 4.2 2GB by Michael Larabel.

**Automated Executive Summary**

*RPi Model 4 B 2GB had the most wins, coming in first place for 42% of the tests.*

*Based on the geometric mean of all complete results, the fastest (RPi Model 4 B 2GB) was 4.302x the speed of the slowest (RPi Model 3 B+). RPi Model 4 B 4GB was 0.94x the speed of RPi Model 4 B 2GB, ASUS Tinker Board was 0.84x the speed of RPi Model 4 B 4GB, Firefly ROC-RK3328-CC was 0.727x the speed of ASUS Tinker Board, OrangePi One H3 512MB was 0.716x the speed of Firefly ROC-RK3328-CC, Libre Board ALL-H3-CC H5 was 0.733x the speed of OrangePi One H3 512MB, RPi Model 3 B+ was 0.772x the speed of Libre Board ALL-H3-CC H5.*

*The results with the greatest spread from best to worst included:*

*x264 (H.264 Video Encoding) at 35.071x*
*Zstd Compression (Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19) at 28.998x*
*Rust Prime Benchmark (Prime Number Test To 200,000,000) at 22.155x*
*Rust Prime Benchmark (Performance / Cost - Prime Number Test To 200,000,000) at 22.155x*
*PyBench (Total For Average Test Times) at 7.774x*
*FLAC Audio Encoding (WAV To FLAC) at 7x*
*Perl Benchmarks (Performance / Cost - Test: Interpreter) at 6.529x*

*Perl Benchmarks (Test: Interpreter) at 6.458x*
*PyBench (Performance / Cost - Total For Average Test Times) at 6.047x*
*FLAC Audio Encoding (Performance / Cost - WAV To FLAC) at 5.426x.*

# Test Systems:

## RPi Model 3 B+

Processor: ARMv7 rev 4 @ 1.40GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 3 Model B Plus Rev 1.3, Memory: 926MB, Disk: 32GB GB2MW, Graphics: BCM2708

OS: Raspbian 10, Kernel: 4.19.42-v7+ (armv7l), Display Server: X Server 1.20.4, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 656x416

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --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-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

## ASUS Tinker Board

Processor: ARMv7 rev 1 @ 1.80GHz (4 Cores), Motherboard: Rockchip (Device Tree), Memory: 2048MB, Disk: 32GB GB1QT

OS: Debian 9.0, Kernel: 4.4.16-00006-g4431f98-dirty (armv7l), Desktop: LXDE, Display Server: X Server 1.18.4, Compiler: GCC 6.3.0 20170516, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libquadmath --disable-sjlj-exceptions --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv7-a --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-mode=thumb --with-target-system-zlib -v
Processor Notes: Scaling Governor: cpufreq-dt interactive
Python Notes: Python 2.7.13 + Python 3.5.3

## Libre Board ALL-H3-CC H5

Processor: ARMv8 Cortex-A53 (4 Cores), Motherboard: Libre Board ALL-H3-CC H5, Memory: 2048MB, Disk: 32GB GB1QT

OS: Raspbian 9.6, Kernel: 4.18.0-rc3-gfc36def997cf-dirty (aarch64), Display Server: X Server 1.19.2, Compiler: GCC 6.3.0 20170516, File-System: ext4

Compiler Notes: --build=arm-linux-gnueabihf --disable-browser-plugin --disable-libitm --disable-libquadmath --disable-sjlj-exceptions --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,ada,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch-directory=arm --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-target-system-zlib -v
Python Notes: Python 2.7.13 + Python 3.5.3

## Firefly ROC-RK3328-CC

Processor: Rockchip ARMv8 Cortex-A53 @ 1.39GHz (4 Cores), Motherboard: Firefly ROC-RK3328-CC, Memory: 2048MB, Disk: 32GB GB1QT

OS: Ubuntu 18.04, Kernel: 4.4.114 (aarch64), Display Server: X Server 1.18.4, Compiler: GCC 7.4.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=aarch64-linux-gnu --disable-libquadmath --disable-libquadmath-support --disable-werror --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: cpufreq-dt performance
Python Notes: Python 2.7.15rc1 + Python 3.6.7

## RPi Model 4 B 4GB

Processor: ARMv7 rev 3 @ 1.50GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 4 Model B Rev 1.1, Memory: 4096MB, Disk: 16GB SC16G, Graphics: V3D 4.2 4GB, Monitor: DELL P2415Q

OS: Raspbian 10, Kernel: 4.19.50-v7l+ (armv7l), Desktop: LXDE 0.10.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, OpenGL: 2.1 Mesa 19.1.0-devel, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --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-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

## RPi Model 4 B 2GB

Processor: ARMv7 rev 3 @ 1.50GHz (4 Cores), Motherboard: BCM2835 Raspberry Pi 4 Model B Rev 1.1, Memory: 2048MB, Disk: 16GB SC16G, Graphics: V3D 4.2 2GB, Monitor: DELL P2415Q

OS: Raspbian 10, Kernel: 4.19.50-v7l+ (armv7l), Desktop: LXDE 0.10.0, Display Server: X Server 1.20.4, Display Driver: modesetting 1.20.4, OpenGL: 2.1 Mesa 19.1.0-devel, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 1024x768

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --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-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv6 --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfp --with-gcc-major-version-only --with-target-system-zlib -v
Processor Notes: Scaling Governor: BCM2835 Freq ondemand
Python Notes: Python 2.7.16 + Python 3.7.3

## OrangePi One H3 512MB

Processor: ARMv7 Cortex-A7 @ 1.01GHz (4 Cores), Motherboard: Allwinner sun8i Xunlong Orange Pi One, Memory: 491MB, Disk: 16GB SC16G

OS: Ubuntu 20.04, Kernel: 5.10.43-sunxi (armv7l), Display Server: X Server, Compiler: GCC 9.3.0, File-System: ext4

Compiler Notes: --build=arm-linux-gnueabihf --disable-libitm --disable-libquadmath --disable-libquadmath-support --disable-sjlj-exceptions --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-multilib --enable-nls --enable-objc-gc=auto --enable-plugin --enable-shared --enable-threads=posix --host=arm-linux-gnueabihf --program-prefix=arm-linux-gnueabihf- --target=arm-linux-gnueabihf --with-arch=armv7-a --with-default-libstdcxx-abi=new --with-float=hard --with-fpu=vfpv3-d16 --with-gcc-major-version-only --with-mode=thumb --with-target-system-zlib=auto -v

# Raspberry Pi Model 4 Benchmarks

Processor Notes: Scaling Governor: cpufreq-dt performance
Python Notes: Python 3.8.10

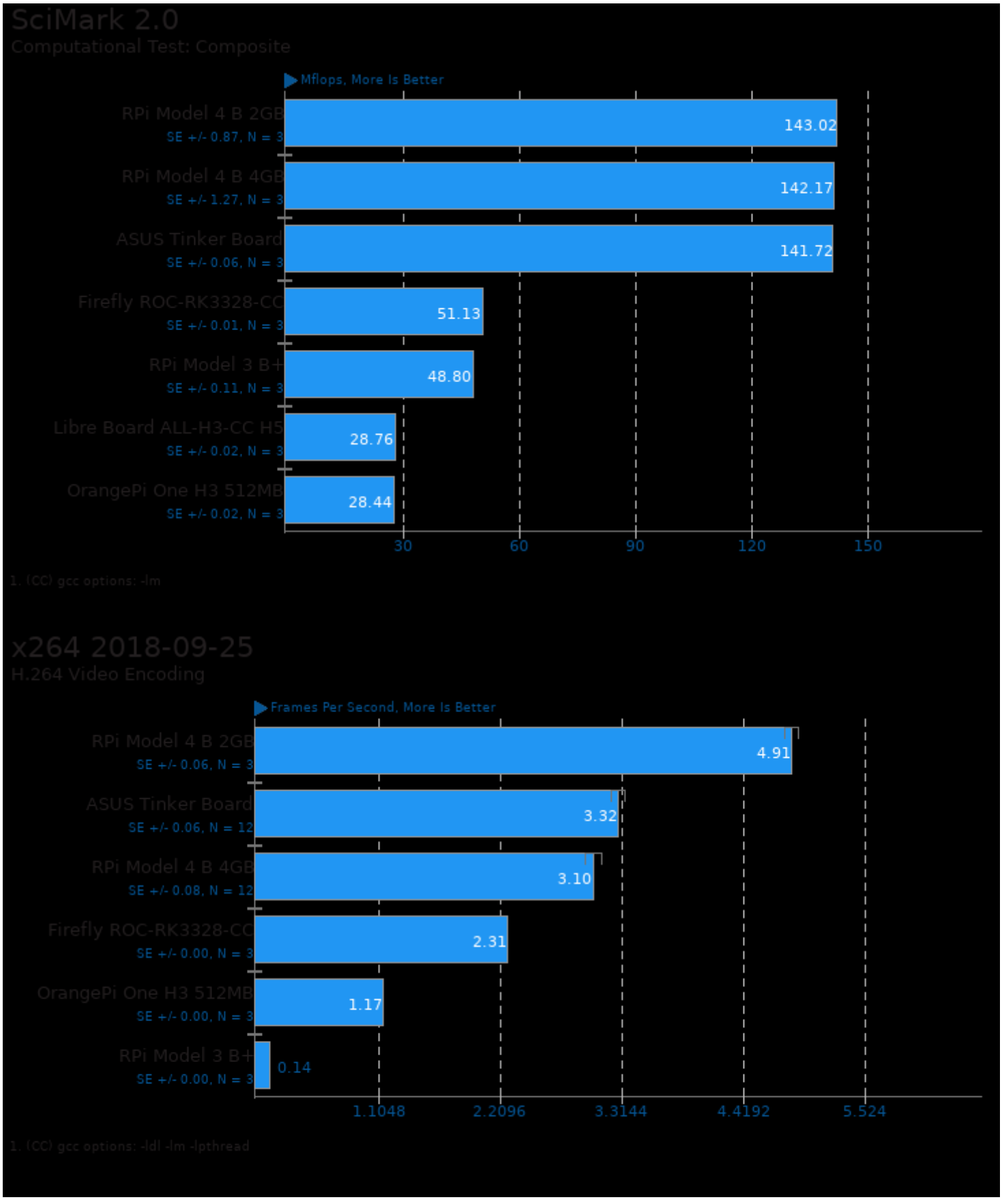
| | RPi Model 3 B+ | ASUS Tinker Board | Libre Board ALL-H3-CC H5 | Firefly ROC-RK3328-CC | RPi Model 4 B 4GB | RPi Model 4 B 2GB | OrangePi One H3 512MB |
|---|---|---|---|---|---|---|---|
| **SciMark - Composite (Mflops)** | 48.80 | 141.72 | 28.76 | 51.13 | 142.17 | **143.02** | **28.44** |
| **Normalized** | 34.12% | 99.09% | 20.11% | 35.75% | 99.41% | 100% | 19.89% |
| **Standard Deviation** | 0.4% | 0.1% | 0.1% | 0% | 1.6% | 1.1% | 0.1% |
| **x264 - H.2.V.E (FPS)** | **0.14** | 3.32 | | 2.31 | 3.10 | **4.91** | 1.17 |
| **Normalized** | 2.85% | 67.62% | | 47.05% | 63.14% | 100% | 23.83% |
| **Standard Deviation** | 0% | 6.3% | | 0.2% | 8.5% | 2.1% | 0% |
| **GraphicsMagick - Rotate (Iterations/min)** | **16** | **66** | 24 | 44 | 63 | 64 | 19 |
| **Normalized** | 24.24% | 100% | 36.36% | 66.67% | 95.45% | 96.97% | 28.79% |
| **Standard Deviation** | | 3.4% | | | 1.8% | | |
| **GraphicsMagick - Resizing (Iterations/min)** | **15** | **53** | 22 | 36 | 45 | **53** | 20 |
| **Normalized** | 28.3% | 100% | 41.51% | 67.92% | 84.91% | 100% | 37.74% |
| **Standard Deviation** | | 3.4% | | | 2.9% | | |
| **Rust Prime Benchmark - P.N.T.T.2.0.0 (sec)** | **3106** | 1052 | | **140.20** | 1104 | 657.76 | 1658 |
| **Normalized** | 4.51% | 13.32% | | 100% | 12.7% | 21.31% | 8.46% |
| **Standard Deviation** | 1.1% | 1% | | 0.3% | 0.6% | 0% | 0% |
| **Smallpt - G.I.R.1.S (sec)** | **744.55** | 273.30 | 424.02 | 251.36 | 260.72 | **145.50** | 533.575 |
| **Normalized** | 19.54% | 53.24% | 34.31% | 57.89% | 55.81% | 100% | 27.27% |
| **Standard Deviation** | 0.1% | 0.9% | 0.3% | 1.1% | 2.3% | 2.9% | 0% |
| **Zstd Compression - C.u.1.0.3.s.i.i.C.L.1 (sec)** | **787.01** | 239.98 | 402.13 | 343.31 | 291.48 | 291.55 | **27.140** |
| **Normalized** | 3.45% | 11.31% | 6.75% | 7.91% | 9.31% | 9.31% | 100% |
| **Standard Deviation** | 0.4% | 0.3% | 3.4% | 0.1% | 1.5% | 1% | 5.3% |
| **FLAC Audio Encoding - WAV To FLAC (sec)** | **777.65** | 135.25 | 566.40 | 288.92 | **111.09** | 111.48 | 502.591 |
| **Normalized** | 14.29% | 82.14% | 19.61% | 38.45% | 100% | 99.65% | 22.1% |
| **Standard Deviation** | 0.9% | 3.4% | 0.3% | 0.7% | 3.1% | 0.7% | 0.1% |
| **LAME MP3 Encoding - WAV To MP3 (sec)** | **658.82** | 162.41 | 518.49 | 295.44 | 125.34 | **125.22** | 470.181 |
| **Normalized** | 19.01% | 77.1% | 24.15% | 42.38% | 99.9% | 100% | 26.63% |
| **Standard Deviation** | 2.4% | 0.6% | 0% | 0.2% | 0.1% | 0.1% | 0% |
| **Perl Benchmarks - Pod2html (sec)** | 2.56511278 | 0.78254268 | **2.57273250** | 1.31659761 | **0.61207402** | 0.62136299 | 2.19861772 |
| **Normalized** | 23.86% | 78.22% | 23.79% | 46.49% | 100% | 98.51% | 27.84% |
| **Standard Deviation** | 5.2% | 2% | 0.6% | 2% | 0.8% | 1.3% | 0.4% |
| **Perl Benchmarks - Interpreter (sec)** | **0.03173653** | 0.01229804 | 0.01091688 | **0.00491447** | 0.00778405 | 0.00826085 | 0.01150105 |
| **Normalized** | 15.49% | 39.96% | 45.02% | 100% | 63.14% | 59.49% | 42.73% |
| **Standard Deviation** | 3.5% | 0.4% | 0.3% | 0.5% | 5.6% | 6.9% | 0.3% |

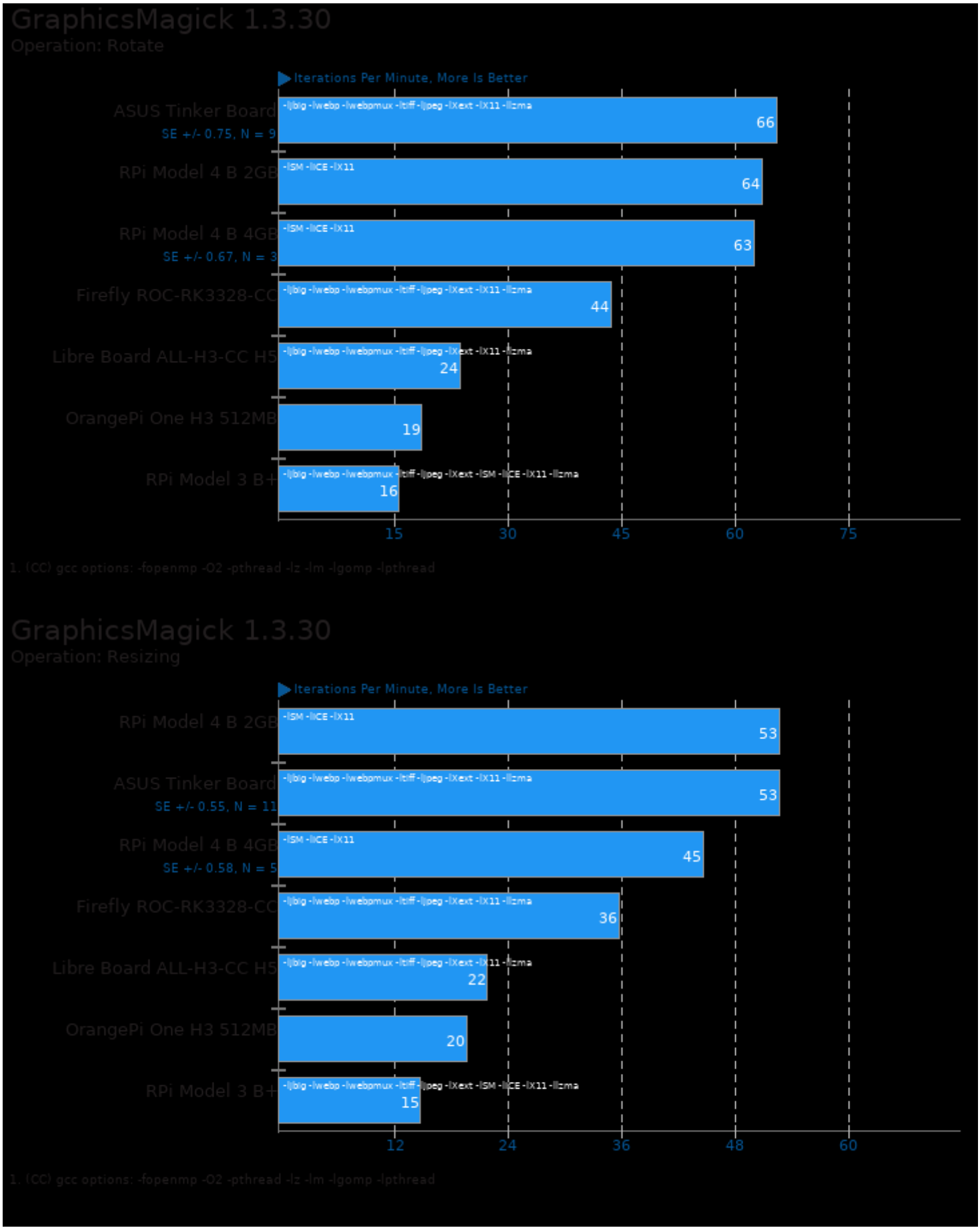
# Raspberry Pi Model 4 Benchmarks

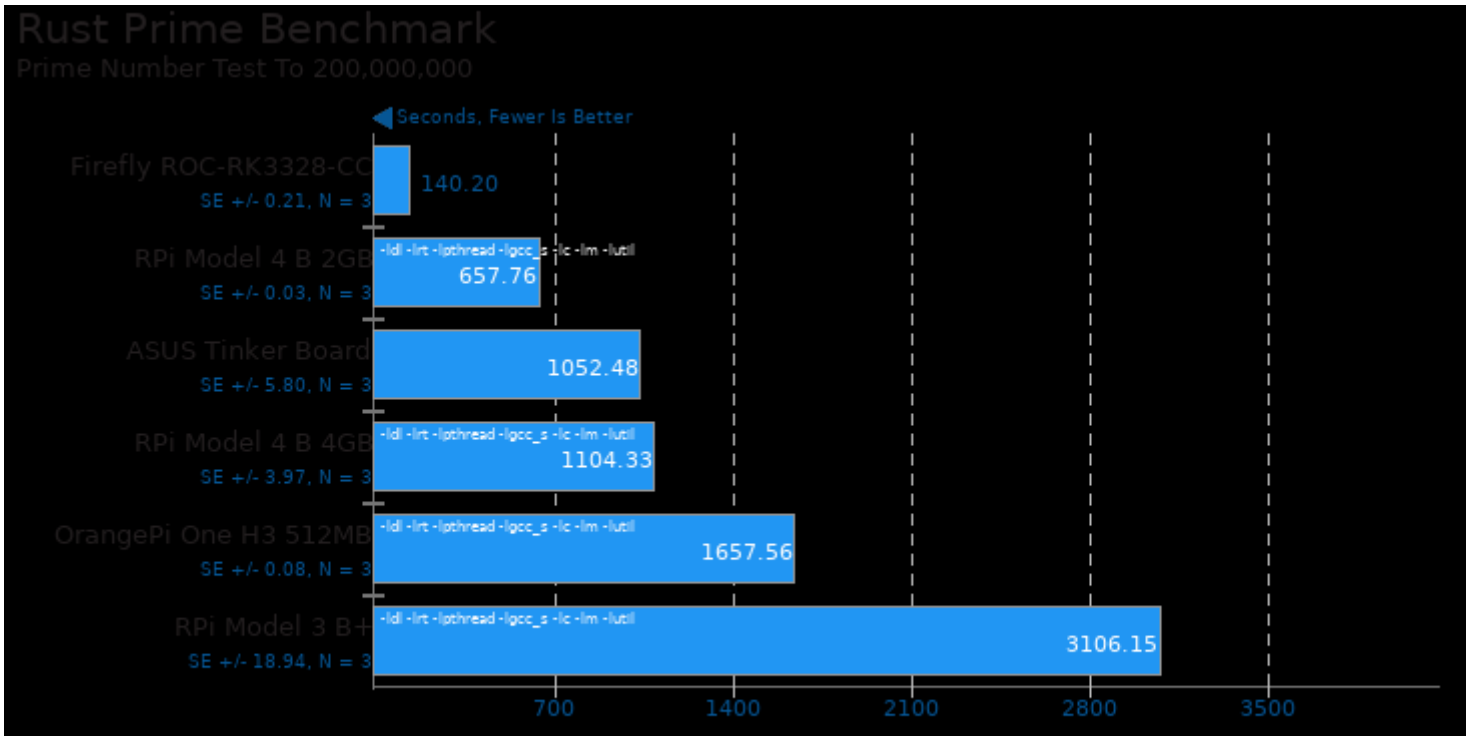
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PyBench - T.F.A.T.T (Milliseconds)** | 29609 | 9312 | **40683** | 13542 | 5249 | **5233** | 21929 |
| **Normalized** | 17.67% | 56.2% | 12.86% | 38.64% | 99.7% | 100% | 23.86% |
| **Standard Deviation** | 0.5% | 0.5% | 0.8% | 0.2% | 0.2% | 0.3% | 0.1% |
| **NGINX Benchmark - S.W.P.S (Reqs/sec)** | **2012** | 3880 | | | 4746 | **5105** | 2309 |
| **Normalized** | 39.41% | 76.01% | | | 92.97% | 100% | 45.24% |
| **Standard Deviation** | 0.7% | 1.6% | | | 3.1% | 0.1% | 0.8% |
| **PHPBench - P.B.S (Score)** | **20275** | 59450 | 21345 | 54131 | **101564** | 100678 | 30138 |
| **Normalized** | 19.96% | 58.53% | 21.02% | 53.3% | 100% | 99.13% | 29.67% |
| **Standard Deviation** | 0.5% | 3.3% | 0.1% | 0.2% | 0.4% | 0.9% | 0.3% |
| **SciMark - Performance / Cost - Composite (Mflops/Dollar)** | 1.39 | 2.00 | **0.82** | 1.46 | 2.58 | **3.18** | |
| **Normalized** | 43.71% | 62.89% | 25.79% | 45.91% | 81.13% | 100% | |
| **GraphicsMagick - Performance / Cost - Rotate** | **0.46** | 0.93 | 0.69 | 1.26 | 1.15 | **1.42** | |
| **Normalized** | 32.39% | 65.49% | 48.59% | 88.73% | 80.99% | 100% | |
| **GraphicsMagick - Performance / Cost - Resizing (Iterations/min/Dollar)** | **0.43** | 0.75 | 0.63 | 1.03 | 0.82 | **1.18** | |
| **Normalized** | 36.44% | 63.56% | 53.39% | 87.29% | 69.49% | 100% | |
| **Rust Prime Benchmark - Performance / Cost - P.N.T.T.2.0.0 (sec x Dollar)** | **108715** | 74726 | | **4907** | 60738 | 29599 | |
| **Normalized** | 4.51% | 6.57% | | 100% | 8.08% | 16.58% | |
| **Smallpt - Performance / Cost - G.I.R.1.S (sec x Dollar)** | **26059** | 19404 | 14841 | 8798 | 14340 | **6548** | |
| **Normalized** | 25.13% | 33.74% | 44.12% | 74.42% | 45.66% | 100% | |
| **Zstd Compression - Performance / Cost - C.u.1.0.3.s.i.i.C.L.1 (sec x Dollar)** | **27545** | 17039 | 14075 | **12016** | 16031 | 13120 | |
| **Normalized** | 43.62% | 70.52% | 85.37% | 100% | 74.95% | 91.59% | |
| **FLAC Audio Encoding - Performance / Cost - WAV To FLAC (sec x Dollar)** | **27218** | 9603 | 19824 | 10112 | 6110 | **5017** | |
| **Normalized** | 18.43% | 52.24% | 25.31% | 49.61% | 82.11% | 100% | |
| **LAME MP3 Encoding - Performance / Cost - WAV To MP3 (sec x Dollar)** | **23059** | 11531 | 18147 | 10340 | 6894 | **5635** | |
| **Normalized** | 24.44% | 48.87% | 31.05% | 54.49% | 81.74% | 100% | |
| **Perl Benchmarks - Performance / Cost - Pod2html (sec x Dollar)** | 89.78 | 55.56 | **90.05** | 46.08 | 33.66 | **27.96** | |
| **Normalized** | 31.14% | 50.32% | 31.05% | 60.68% | 83.07% | 100% | |

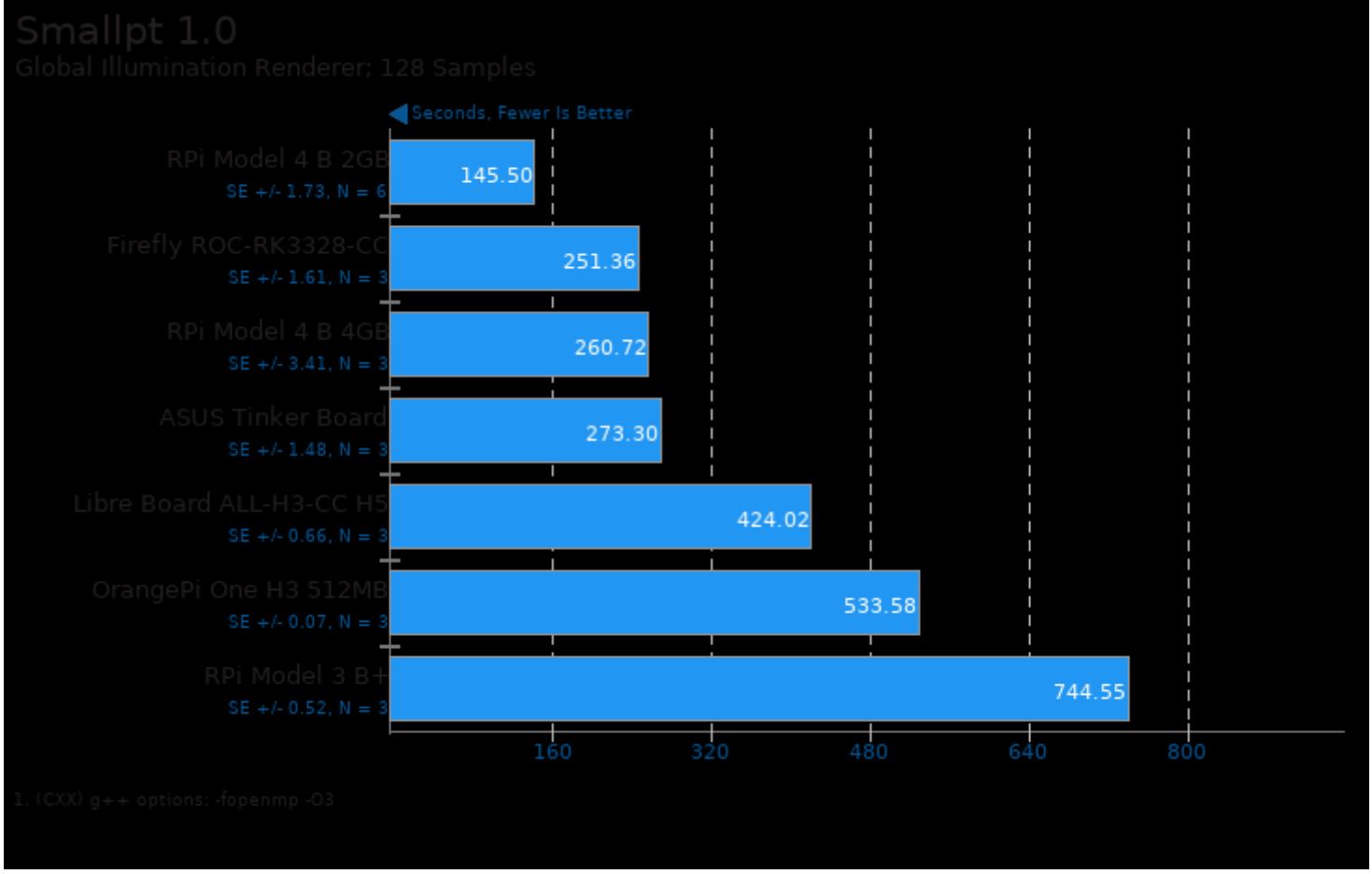
# Raspberry Pi Model 4 Benchmarks

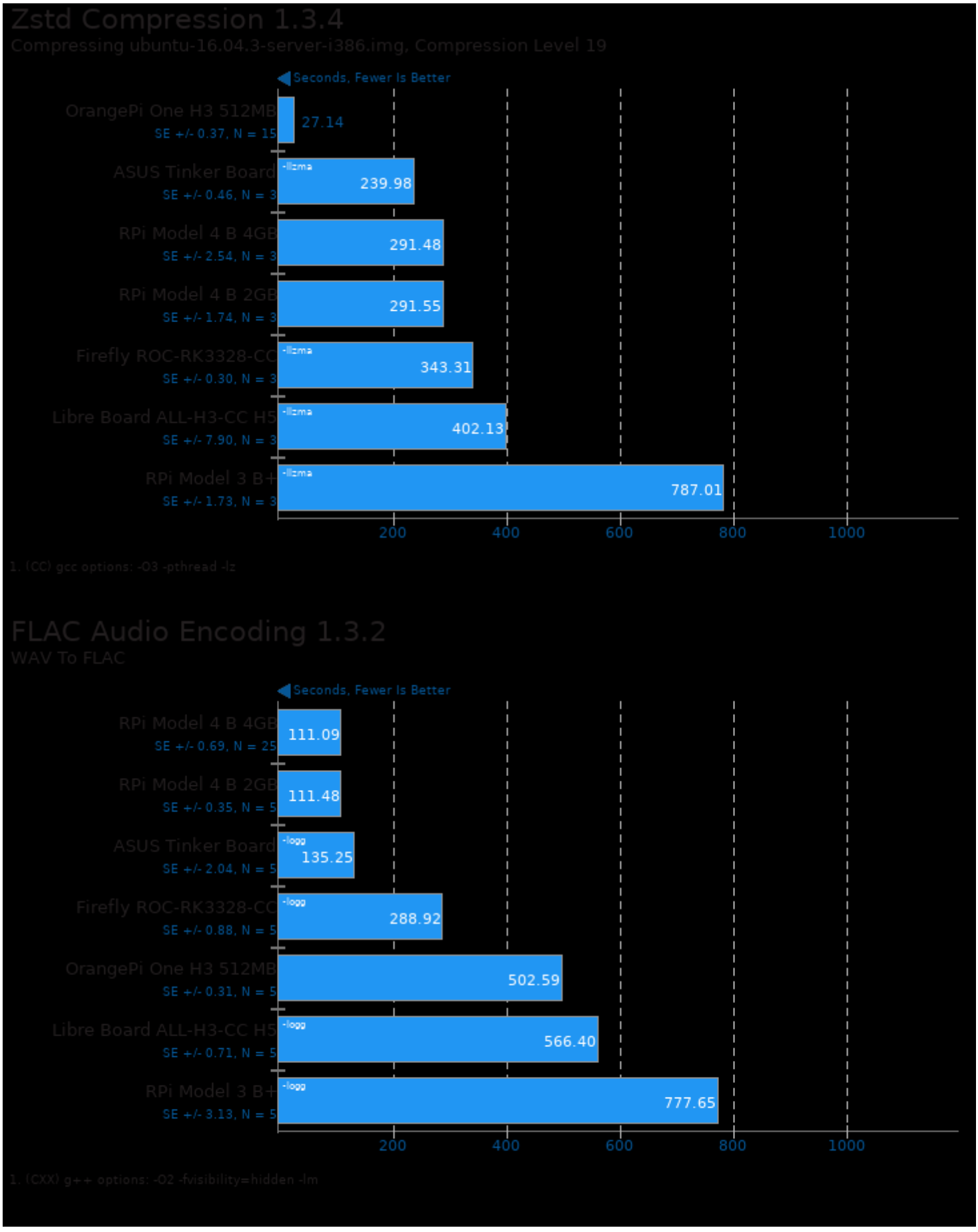
| | | | | | | |
|---|---|---|---|---|---|---|
| **Perl Benchmarks - Performance / Cost - Interpreter (sec x Dollar)** | **1.11** | 0.87 | 0.38 | **0.17** | 0.43 | 0.37 |
| **Normalized** | 15.32% | 19.54% | 44.74% | 100% | 39.53% | 45.95% |
| **PyBench - Performance / Cost - T.F.A.T.T (Milliseconds x Dollar)** | 1036315 | 661152 | **1423905** | 473970 | 288695 | **235485** |
| **Normalized** | 22.72% | 35.62% | 16.54% | 49.68% | 81.57% | 100% |
| **NGINX Benchmark - Performance / Cost - S.W.P.S (Reqs/sec/Dollar)** | 57.49 | **54.65** | | | 86.29 | **113.44** |
| **Normalized** | 50.68% | 48.18% | | | 76.07% | 100% |
| **PHPBench - Performance / Cost - P.B.S** | **579.29** | 837.32 | 609.86 | 1547 | 1847 | **2237** |
| **Normalized** | 25.89% | 37.43% | 27.26% | 69.13% | 82.54% | 100% |
| **x264 - Performance / Cost - H.2.V.E (FPS/Dollar)** | | **0.05** | | 0.07 | 0.06 | **0.11** |
| **Normalized** | | 45.45% | | 63.64% | 54.55% | 100% |

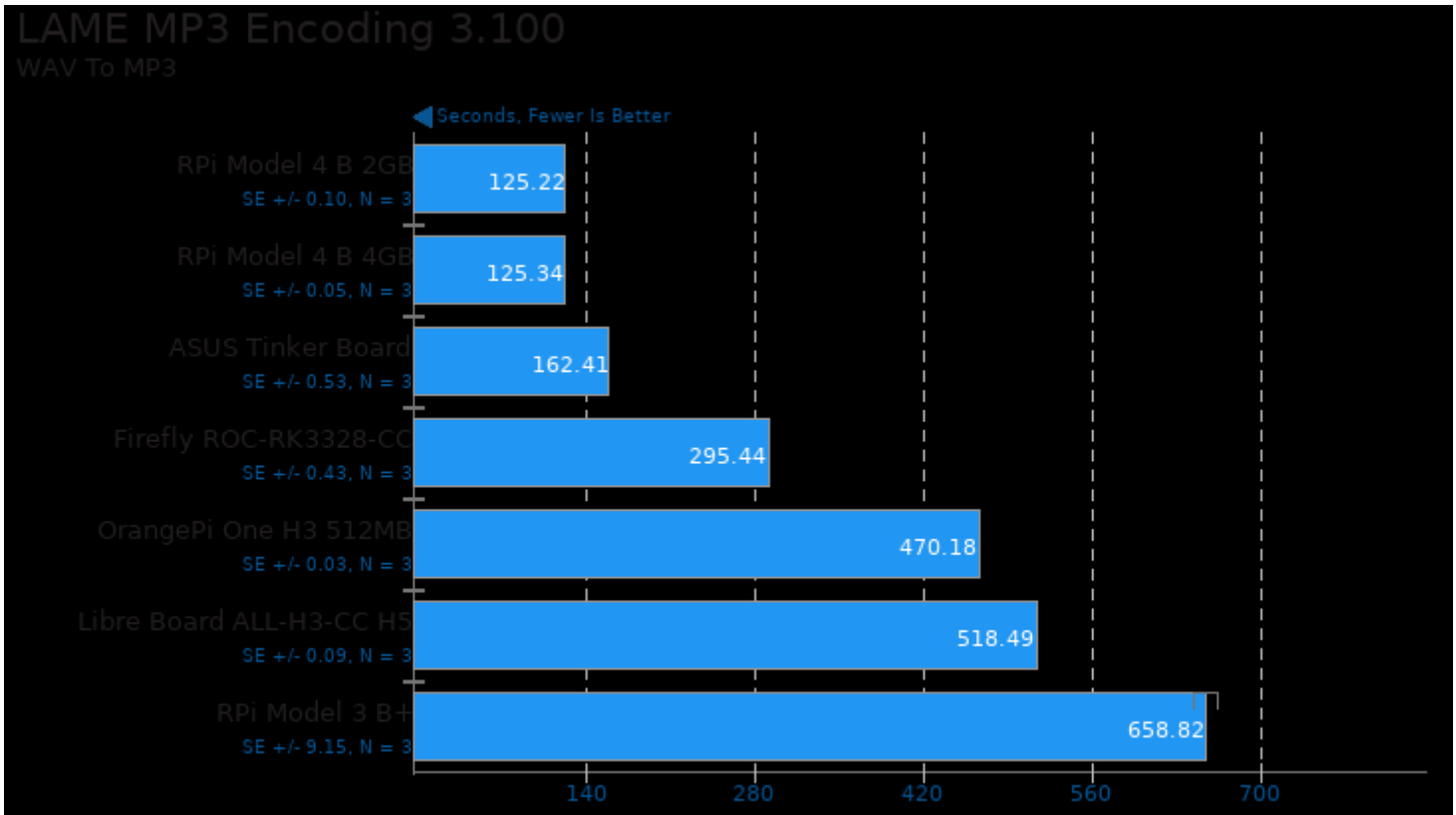

SciMark 2.0
Computational Test: Composite
Mflops, More Is Better
RPi Model 4 B 2GB
SE +/- 0.87, N = 3
143.02
RPi Model 4 B 4GB
SE +/- 1.27, N = 3
142.17
ASUS Tinker Board
SE +/- 0.06, N = 3
141.72
Firefly ROC-RK3328-CC
SE +/- 0.01, N = 3
51.13
RPi Model 3 B+
SE +/- 0.11, N = 3
48.80
Libre Board ALL-H3-CC H5
SE +/- 0.02, N = 3
28.76
OrangePi One H3 512MB
SE +/- 0.02, N = 3
28.44
30
60
90
120
150
1. (CC) gcc options: -lm
x264 2018-09-25
H.264 Video Encoding
Frames Per Second, More Is Better
RPi Model 4 B 2GB
SE +/- 0.06, N = 3
4.91
ASUS Tinker Board
SE +/- 0.06, N = 12
3.32
RPi Model 4 B 4GB
SE +/- 0.08, N = 12
3.10
Firefly ROC-RK3328-CC
SE +/- 0.00, N = 3
2.31
OrangePi One H3 512MB
SE +/- 0.00, N = 3
1.17
RPi Model 3 B+
SE +/- 0.00, N = 3
0.14
1.1048
2.2096
3.3144
4.4192
5.524
1. (CC) gcc options: -ldl -lm -lpthread

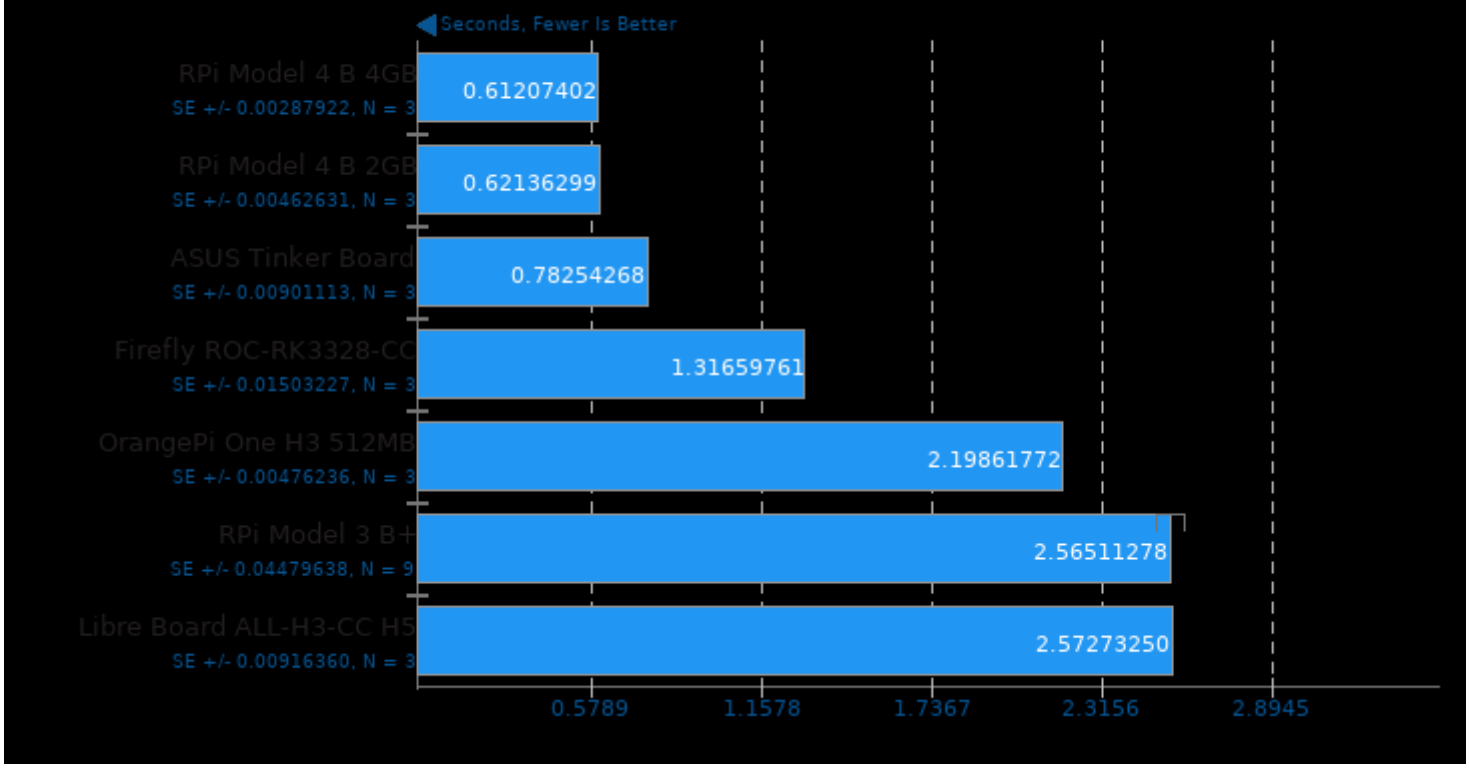

GraphicsMagick 1.3.30
Operation: Rotate
Iterations Per Minute, More Is Better
ASUS Tinker Board
SE +/- 0.75, N = 9
RPi Model 4 B 2GB
RPi Model 4 B 4GB
SE +/- 0.67, N = 3
Firefly ROC-RK3328-CC
Libre Board ALL-H3-CC H5
OrangePi One H3 512MB
RPi Model 3 B+
-ljbig -lwebp -lwebpmux -ltiff -ljpeg -lXext -lX11 -llzma
-lSM -lICE -lX11
66
64
63
44
24
19
16
15
30
45
60
75
1. (CC) gcc options: -fopenmp -O2 -pthread -lz -lm -lgomp -lpthread
GraphicsMagick 1.3.30
Operation: Resizing
Iterations Per Minute, More Is Better
RPi Model 4 B 2GB
ASUS Tinker Board
SE +/- 0.55, N = 11
RPi Model 4 B 4GB
SE +/- 0.58, N = 5
Firefly ROC-RK3328-CC
Libre Board ALL-H3-CC H5
OrangePi One H3 512MB
RPi Model 3 B+
53
53
45
36
22
20
15
12
24
36
48
60
1. (CC) gcc options: -fopenmp -O2 -pthread -lz -lm -lgomp -lpthread


Rust Prime Benchmark
Prime Number Test To 200,000,000
Seconds, Fewer Is Better
Firefly ROC-RK3328-CC
SE +/- 0.21, N = 3
140.20
RPi Model 4 B 2GB
SE +/- 0.03, N = 3
657.76
ASUS Tinker Board
SE +/- 5.80, N = 3
1052.48
RPi Model 4 B 4GB
SE +/- 3.97, N = 3
1104.33
OrangePi One H3 512MB
SE +/- 0.08, N = 3
1657.56
RPi Model 3 B+
SE +/- 18.94, N = 3
3106.15
700
1400
2100
2800
3500
1. (CC) gcc options: -pie -nodefaultlibs

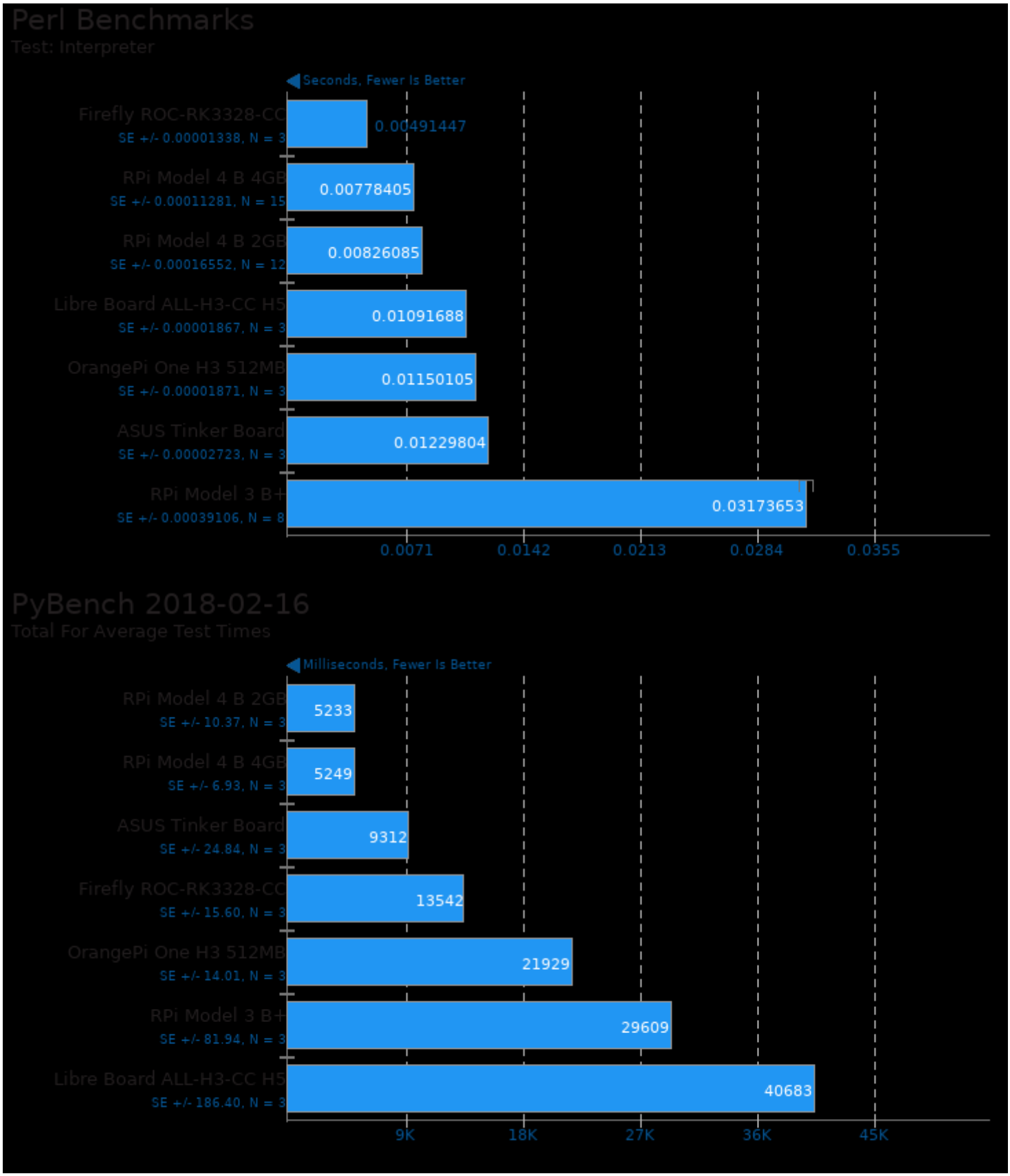

Smallpt 1.0
Global Illumination Renderer; 128 Samples
Seconds, Fewer Is Better
RPi Model 4 B 2GB
SE +/- 1.73, N = 6
145.50
Firefly ROC-RK3328-CC
SE +/- 1.61, N = 3
251.36
RPi Model 4 B 4GB
SE +/- 3.41, N = 3
260.72
ASUS Tinker Board
SE +/- 1.48, N = 3
273.30
Libre Board ALL-H3-CC H5
SE +/- 0.66, N = 3
424.02
OrangePi One H3 512MB
SE +/- 0.07, N = 3
533.58
RPi Model 3 B+
SE +/- 0.52, N = 3
744.55
160
320
480
640
800
1. (CXX) g++ options: -fopenmp -O3


Zstd Compression 1.3.4
Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19
Seconds, Fewer Is Better
OrangePi One H3 512MB
SE +/- 0.37, N = 15
27.14
ASUS Tinker Board
SE +/- 0.46, N = 3
-llzma
239.98
RPi Model 4 B 4GB
SE +/- 2.54, N = 3
291.48
RPi Model 4 B 2GB
SE +/- 1.74, N = 3
291.55
Firefly ROC-RK3328-CC
SE +/- 0.30, N = 3
-llzma
343.31
Libre Board ALL-H3-CC H5
SE +/- 7.90, N = 3
-llzma
402.13
RPi Model 3 B+
SE +/- 1.73, N = 3
-llzma
787.01
200
400
600
800
1000
1. (CC) gcc options: -O3 -pthread -lz
FLAC Audio Encoding 1.3.2
WAV To FLAC
Seconds, Fewer Is Better
RPi Model 4 B 4GB
SE +/- 0.69, N = 25
111.09
RPi Model 4 B 2GB
SE +/- 0.35, N = 5
111.48
ASUS Tinker Board
SE +/- 2.04, N = 5
-logg
135.25
Firefly ROC-RK3328-CC
SE +/- 0.88, N = 5
-logg
288.92
OrangePi One H3 512MB
SE +/- 0.31, N = 5
502.59
Libre Board ALL-H3-CC H5
SE +/- 0.71, N = 5
-logg
566.40
RPi Model 3 B+
SE +/- 3.13, N = 5
-logg
777.65
200
400
600
800
1000
1. (CXX) g++ options: -O2 -fvisibility=hidden -lm

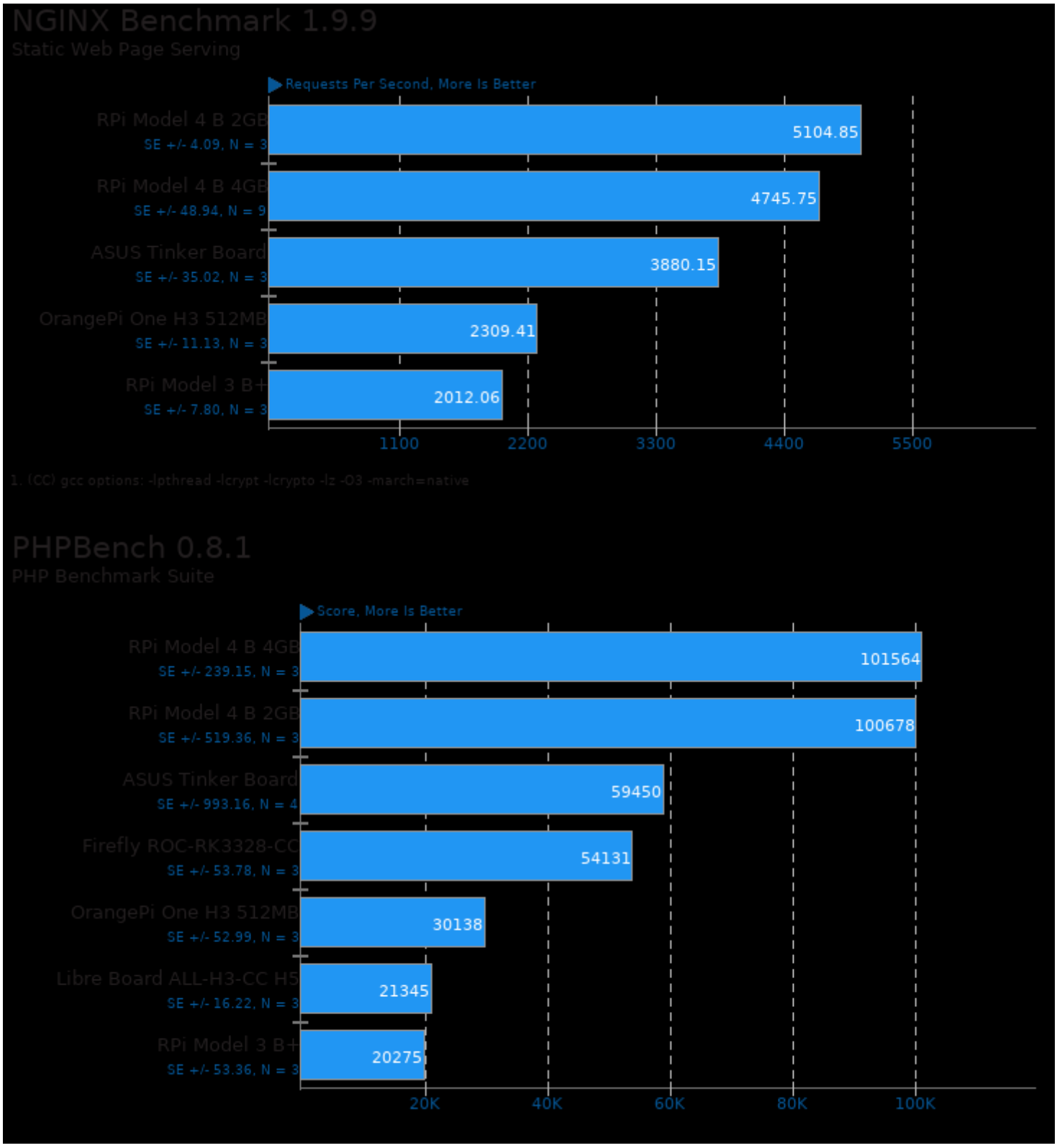

LAME MP3 Encoding 3.100
WAV To MP3
Seconds, Fewer Is Better
RPi Model 4 B 2GB
SE +/- 0.10, N = 3
125.22
RPi Model 4 B 4GB
SE +/- 0.05, N = 3
125.34
ASUS Tinker Board
SE +/- 0.53, N = 3
162.41
Firefly ROC-RK3328-CC
SE +/- 0.43, N = 3
295.44
OrangePi One H3 512MB
SE +/- 0.03, N = 3
470.18
Libre Board ALL-H3-CC H5
SE +/- 0.09, N = 3
518.49
RPi Model 3 B+
SE +/- 9.15, N = 3
658.82
140
280
420
560
700
1. (CC) gcc options: -lm


Perl Benchmarks
Test: Pod2html
Seconds, Fewer Is Better
RPi Model 4 B 4GB
SE +/- 0.00287922, N = 3
0.61207402
RPi Model 4 B 2GB
SE +/- 0.00462631, N = 3
0.62136299
ASUS Tinker Board
SE +/- 0.00901113, N = 3
0.78254268
Firefly ROC-RK3328-CC
SE +/- 0.01503227, N = 3
1.31659761
OrangePi One H3 512MB
SE +/- 0.00476236, N = 3
2.19861772
RPi Model 3 B+
SE +/- 0.04479638, N = 9
2.56511278
Libre Board ALL-H3-CC H5
SE +/- 0.00916360, N = 3
2.57273250
0.5789
1.1578
1.7367
2.3156
2.8945

# Raspberry Pi Model 4 Benchmarks



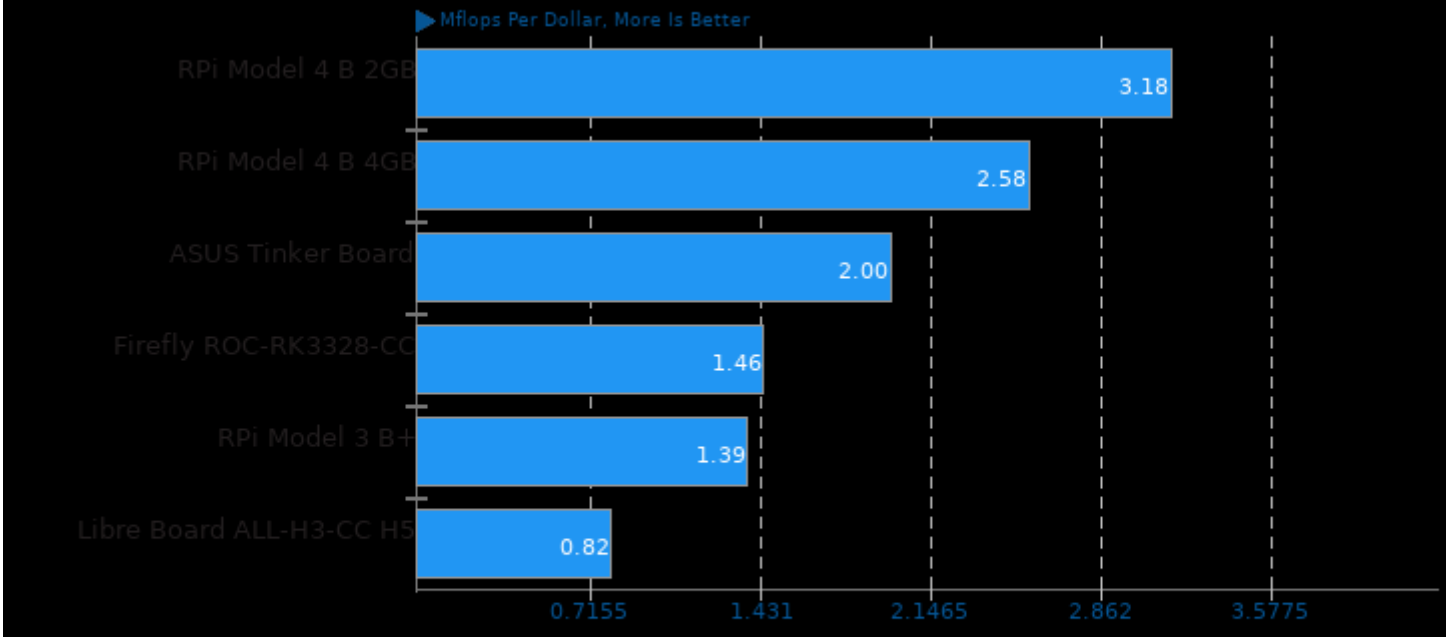
# Raspberry Pi Model 4 Benchmarks



# Raspberry Pi Model 4 Benchmarks

## SciMark 2.0

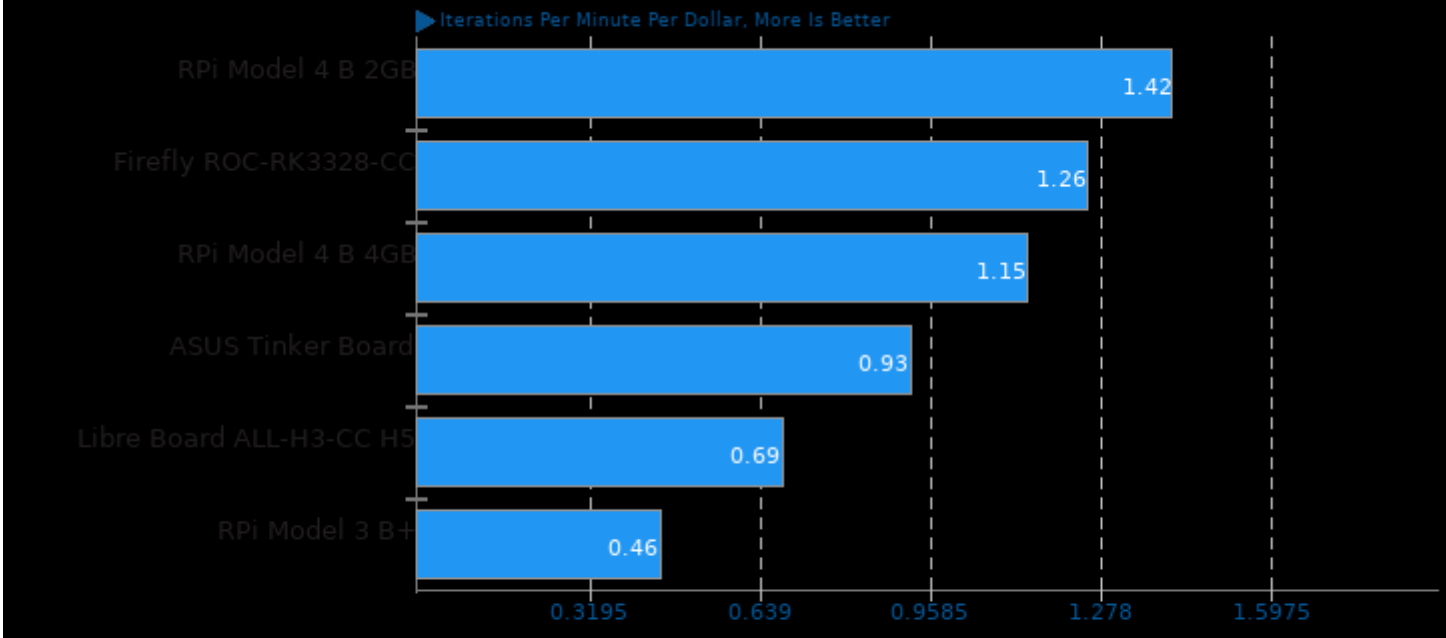
Performance / Cost - Computational Test: Composite




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. ASUS Tinker Board: $71 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. RPi Model 3 B+: $35 reported cost.
6. Libre Board ALL-H3-CC H5: $35 reported cost.

## GraphicsMagick 1.3.30

Performance / Cost - Operation: Rotate

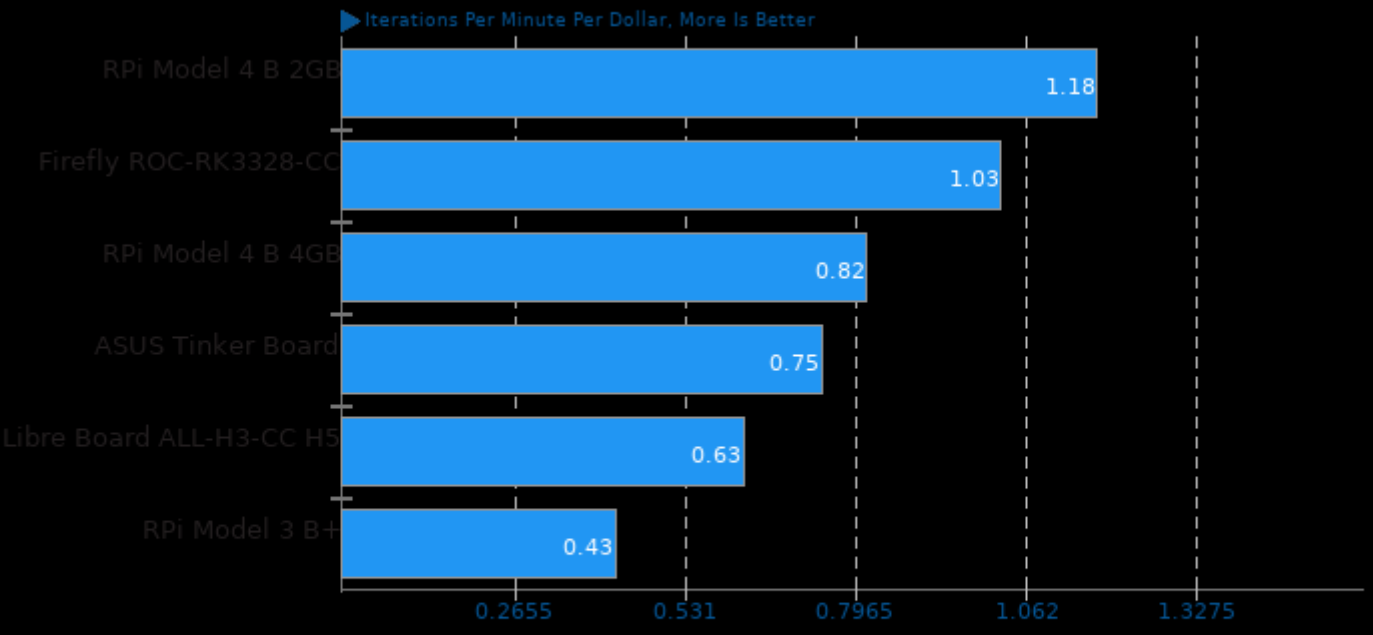



1. RPi Model 4 B 2GB: $45 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. RPi Model 4 B 4GB: $55 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. Libre Board ALL-H3-CC H5: $35 reported cost.
6. RPi Model 3 B+: $35 reported cost.

# Raspberry Pi Model 4 Benchmarks

## GraphicsMagick 1.3.30

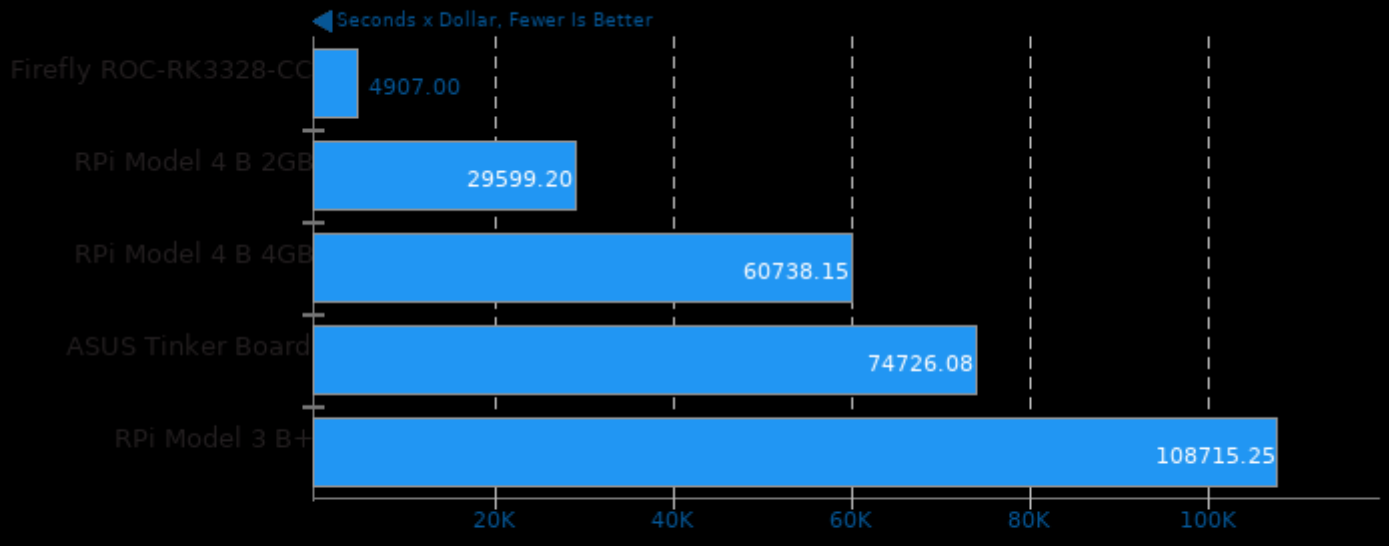
Performance / Cost - Operation: Resizing




1. RPi Model 4 B 2GB: $45 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. RPi Model 4 B 4GB: $55 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. Libre Board ALL-H3-CC H5: $35 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## Rust Prime Benchmark

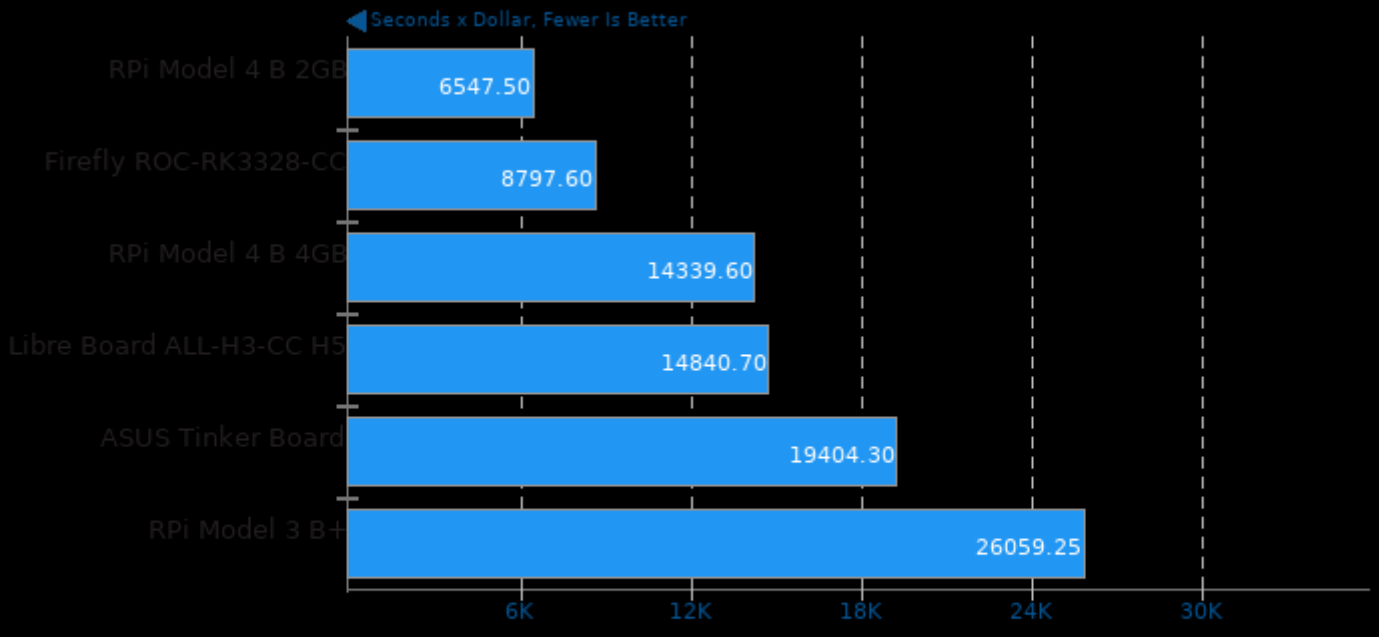
Performance / Cost - Prime Number Test To 200,000,000




1. Firefly ROC-RK3328-CC: $35 reported cost.
2. RPi Model 4 B 2GB: $45 reported cost.
3. RPi Model 4 B 4GB: $55 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. RPi Model 3 B+: $35 reported cost.

## Smallpt 1.0

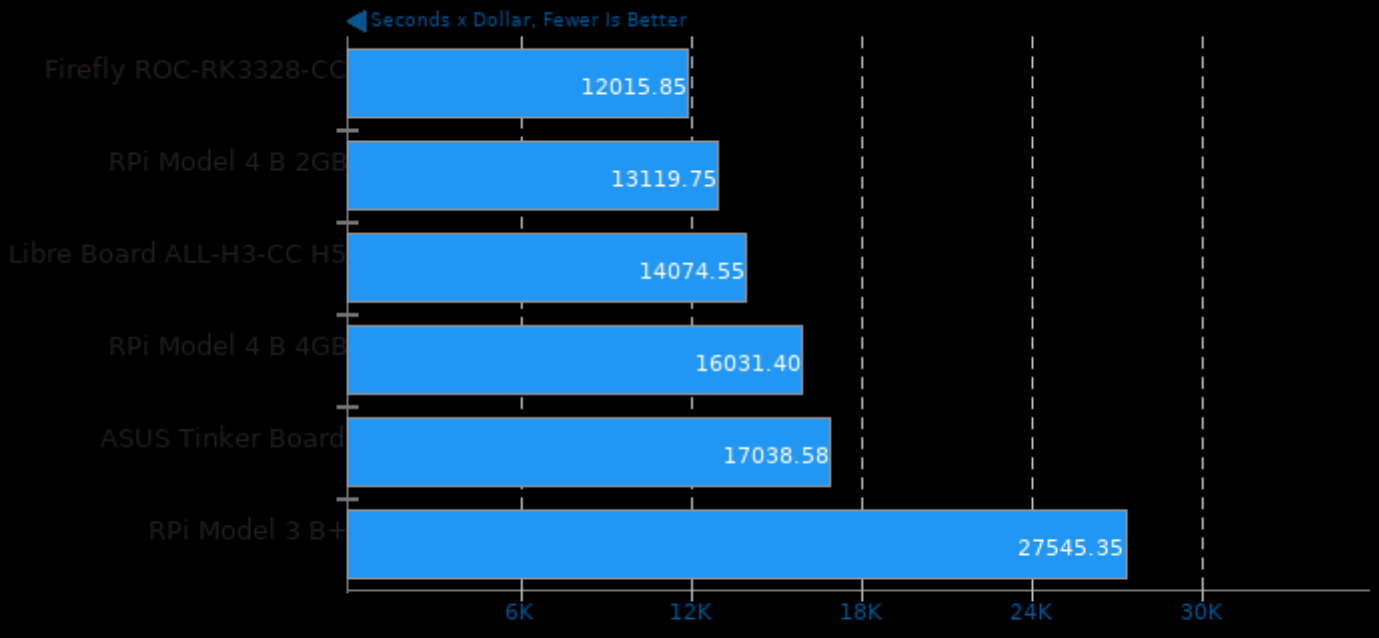
Performance / Cost - Global Illumination Renderer; 128 Samples




1. RPi Model 4 B 2GB: $45 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. RPi Model 4 B 4GB: $55 reported cost.
4. Libre Board ALL-H3-CC H5: $35 reported cost.
5. ASUS Tinker Board: $71 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## Zstd Compression 1.3.4

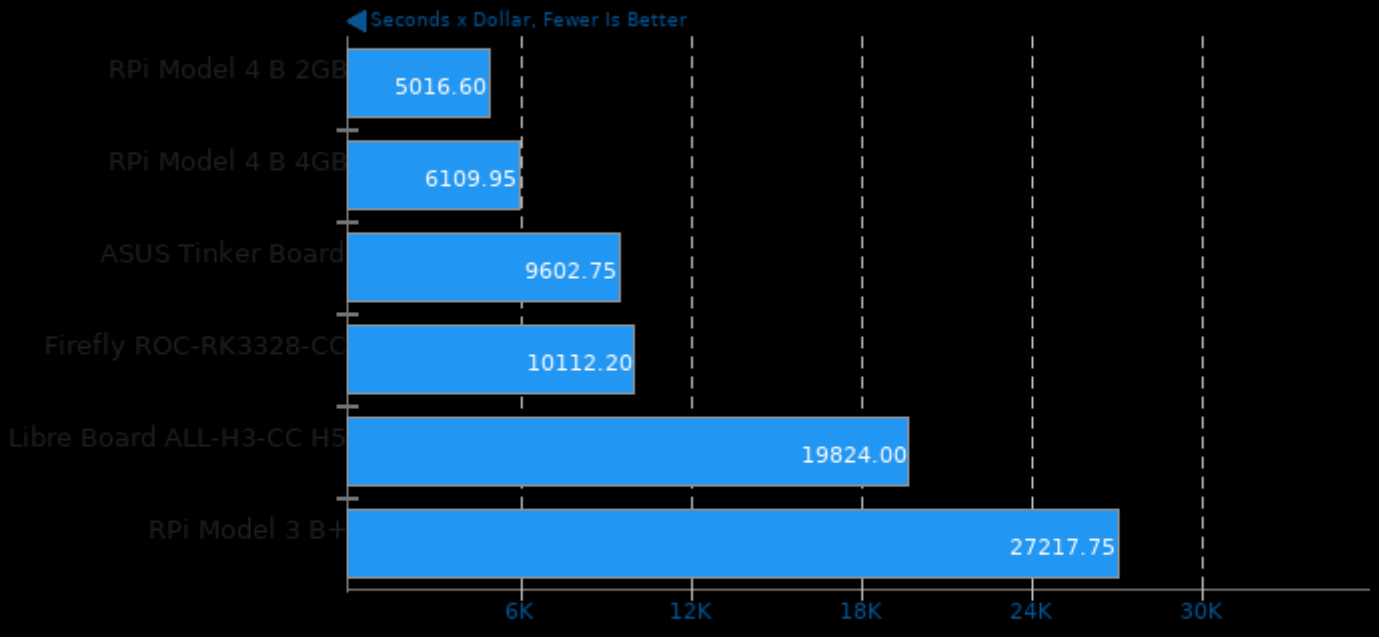
Performance / Cost - Compressing ubuntu-16.04.3-server-i386.img, Compression Level 19




1. Firefly ROC-RK3328-CC: $35 reported cost.
2. RPi Model 4 B 2GB: $45 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. RPi Model 4 B 4GB: $55 reported cost.
5. ASUS Tinker Board: $71 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## FLAC Audio Encoding 1.3.2

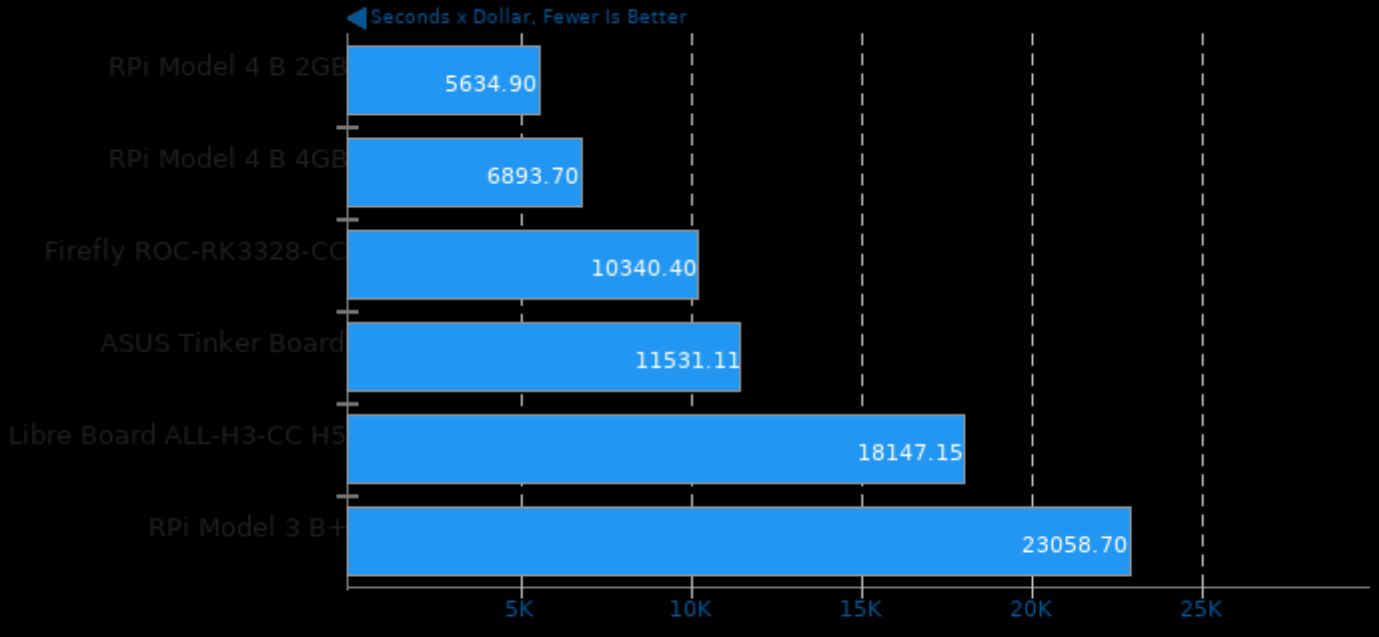
Performance / Cost - WAV To FLAC




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. ASUS Tinker Board: $71 reported cost.
4. Firefly ROC-RK3328-CC: $35 reported cost.
5. Libre Board ALL-H3-CC H5: $35 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## LAME MP3 Encoding 3.100

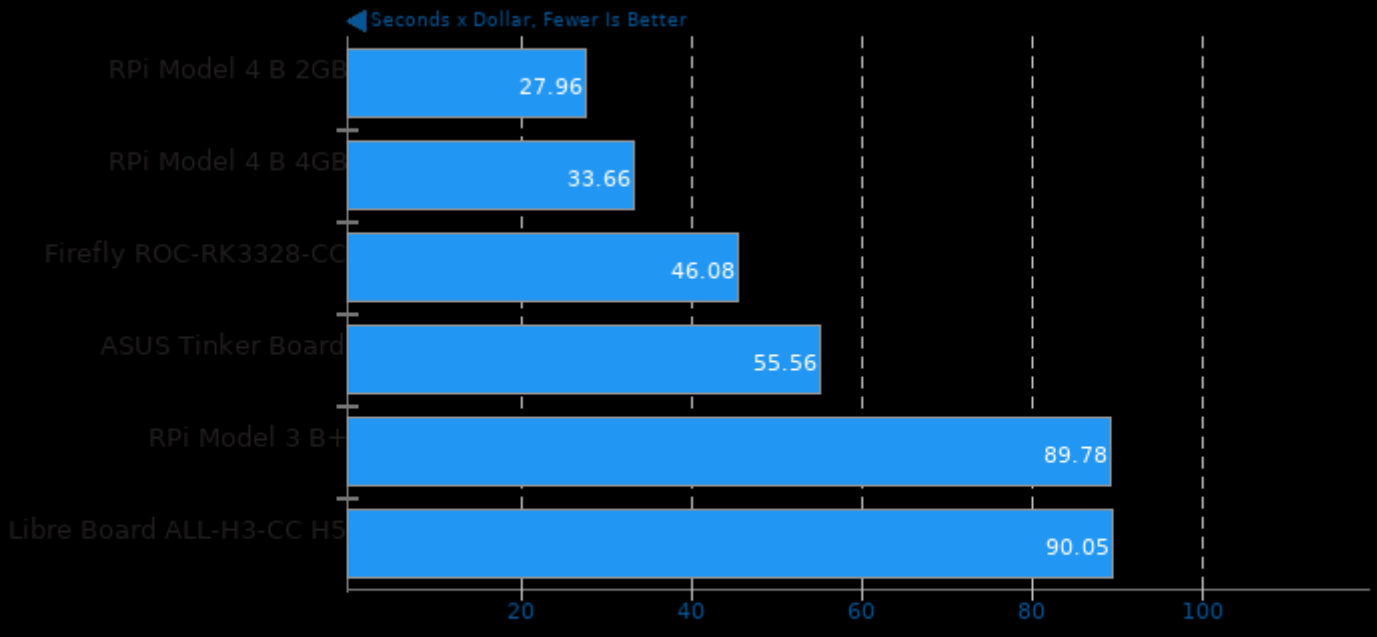
Performance / Cost - WAV To MP3




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. Firefly ROC-RK3328-CC: $35 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. Libre Board ALL-H3-CC H5: $35 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## Perl Benchmarks

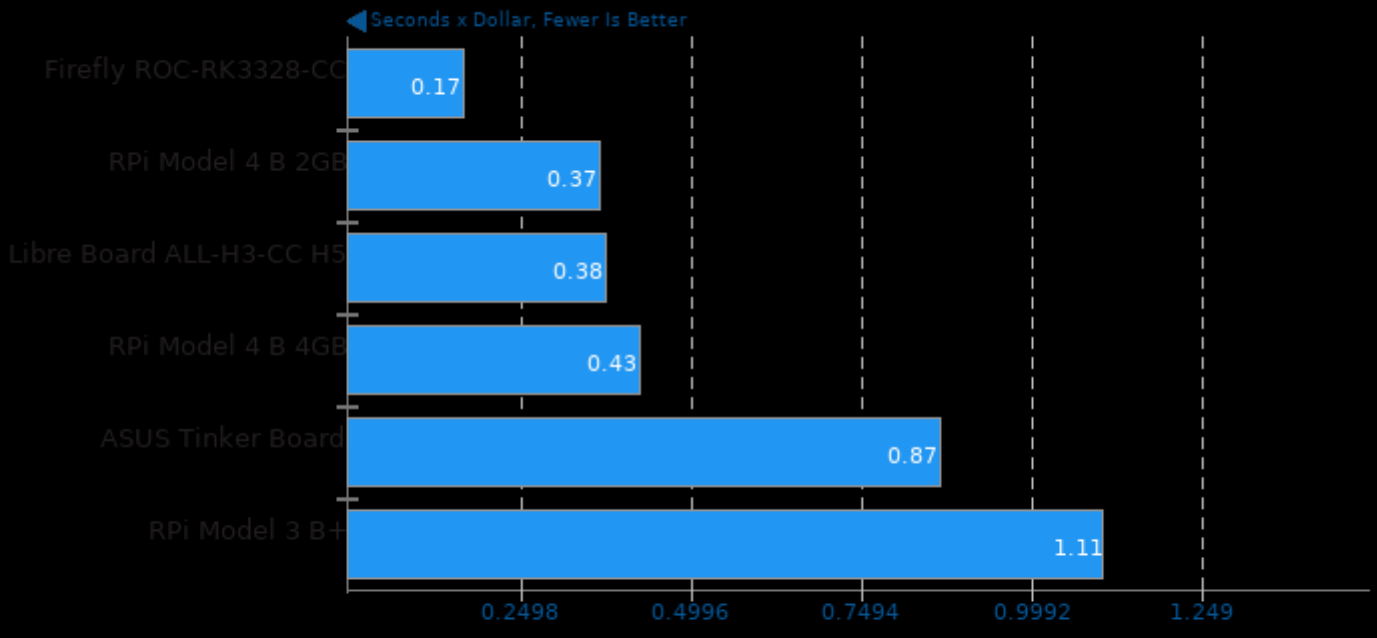
Performance / Cost - Test: Pod2html




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. Firefly ROC-RK3328-CC: $35 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. RPi Model 3 B+: $35 reported cost.
6. Libre Board ALL-H3-CC H5: $35 reported cost.

## Perl Benchmarks

Performance / Cost - Test: Interpreter

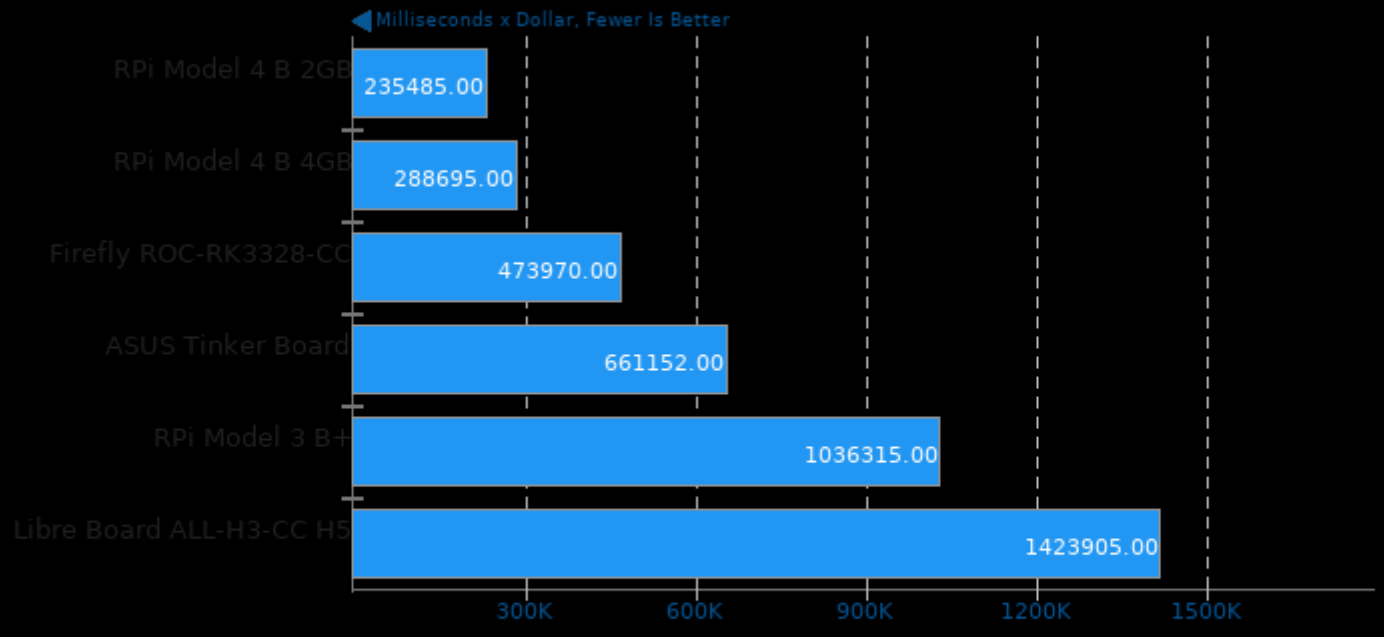



1. Firefly ROC-RK3328-CC: $35 reported cost.
2. RPi Model 4 B 2GB: $45 reported cost.
3. Libre Board ALL-H3-CC H5: $35 reported cost.
4. RPi Model 4 B 4GB: $55 reported cost.
5. ASUS Tinker Board: $71 reported cost.
6. RPi Model 3 B+: $35 reported cost.

# Raspberry Pi Model 4 Benchmarks

## PyBench 2018-02-16

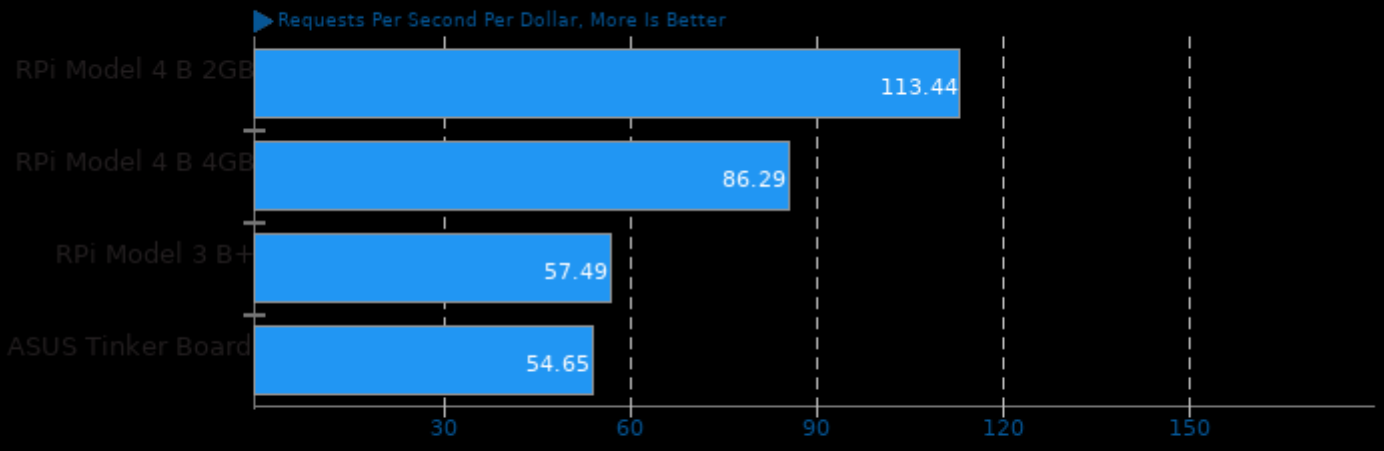
Performance / Cost - Total For Average Test Times




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. Firefly ROC-RK3328-CC: $35 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. RPi Model 3 B+: $35 reported cost.
6. Libre Board ALL-H3-CC H5: $35 reported cost.

## NGINX Benchmark 1.9.9

Performance / Cost - Static Web Page Serving

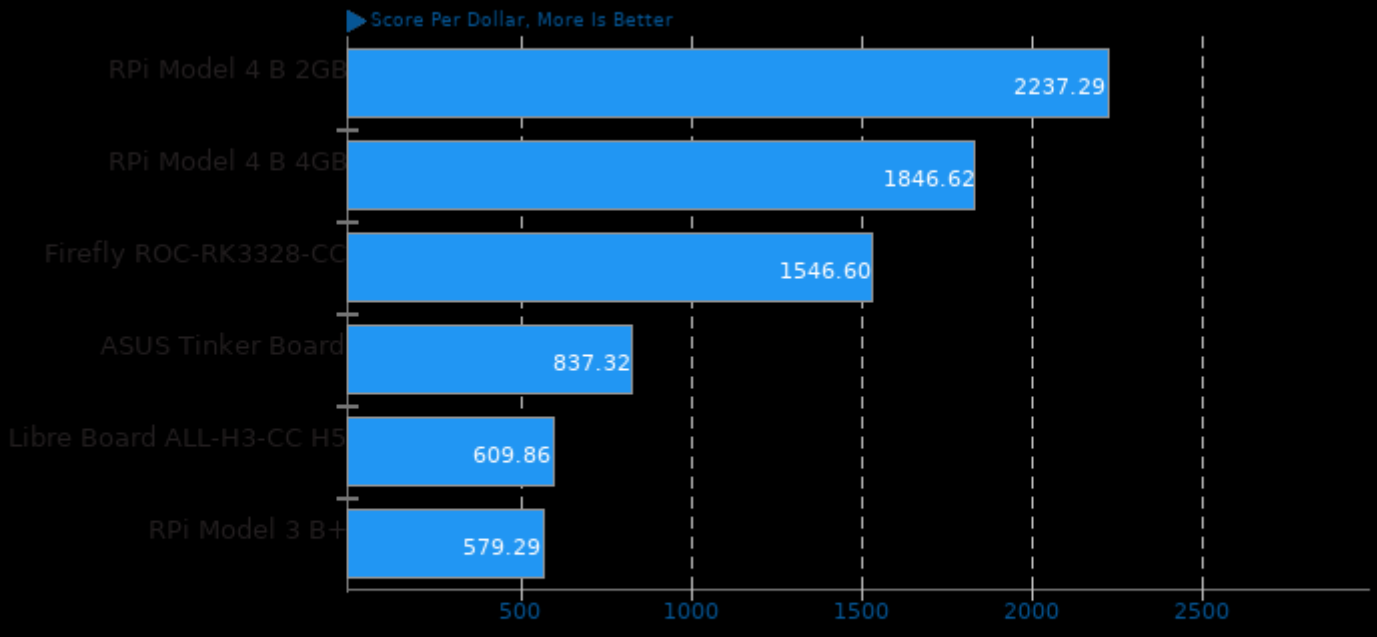



1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. RPi Model 3 B+: $35 reported cost.
4. ASUS Tinker Board: $71 reported cost.

# Raspberry Pi Model 4 Benchmarks

## PHPBench 0.8.1

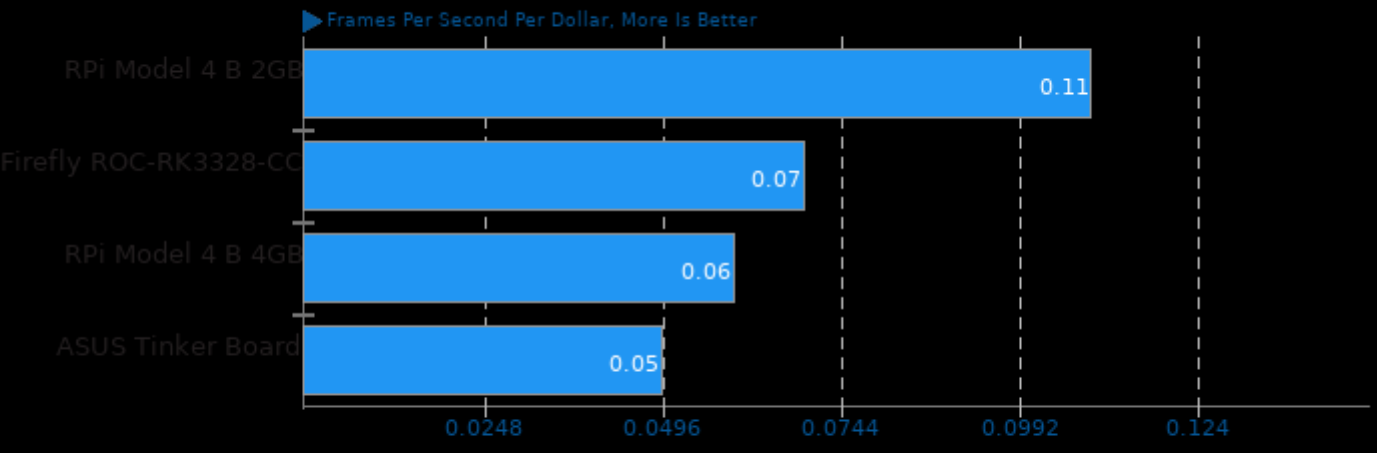
Performance / Cost - PHP Benchmark Suite




1. RPi Model 4 B 2GB: $45 reported cost.
2. RPi Model 4 B 4GB: $55 reported cost.
3. Firefly ROC-RK3328-CC: $35 reported cost.
4. ASUS Tinker Board: $71 reported cost.
5. Libre Board ALL-H3-CC H5: $35 reported cost.
6. RPi Model 3 B+: $35 reported cost.

## x264 2018-09-25

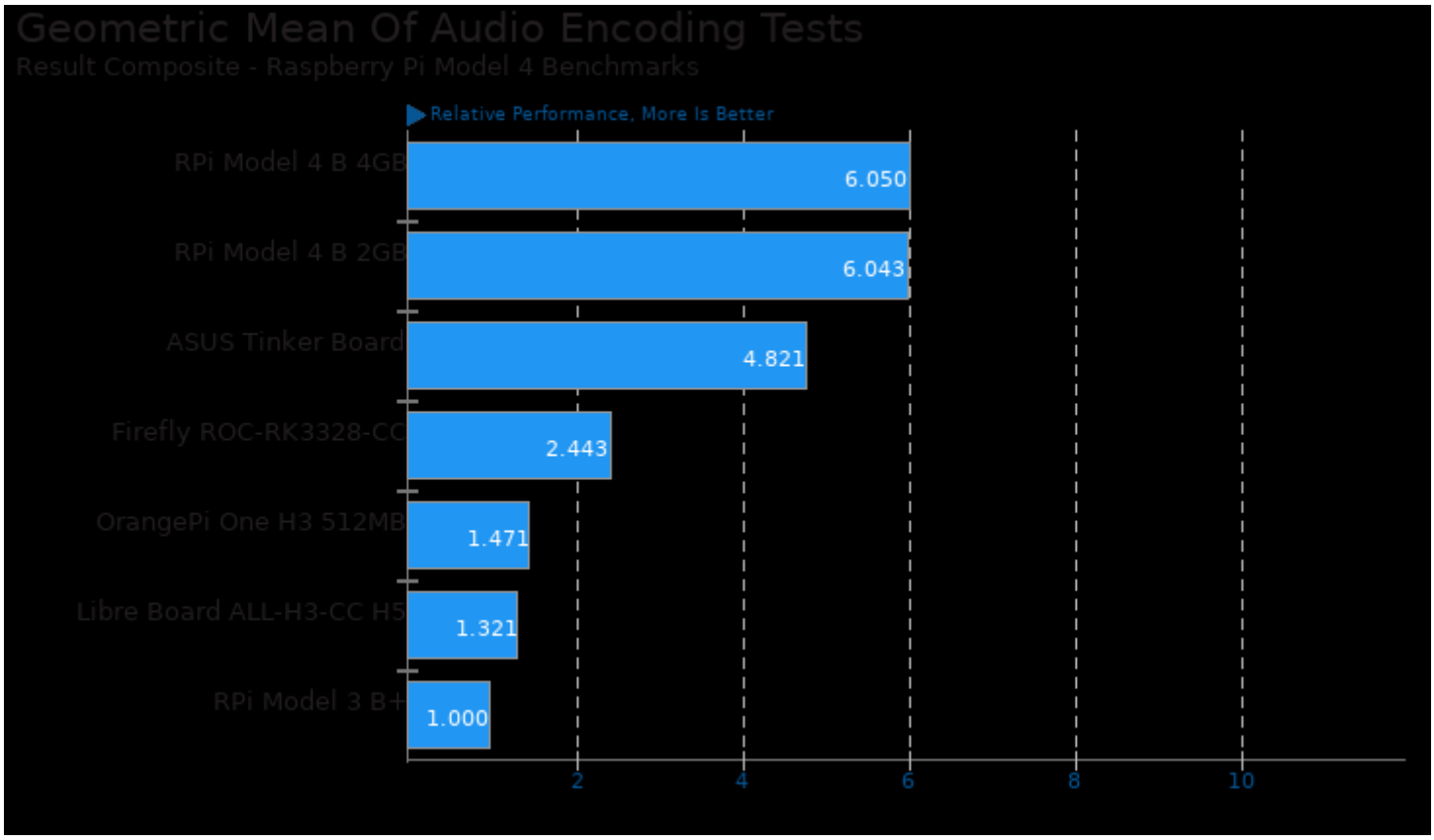
Performance / Cost - H.264 Video Encoding



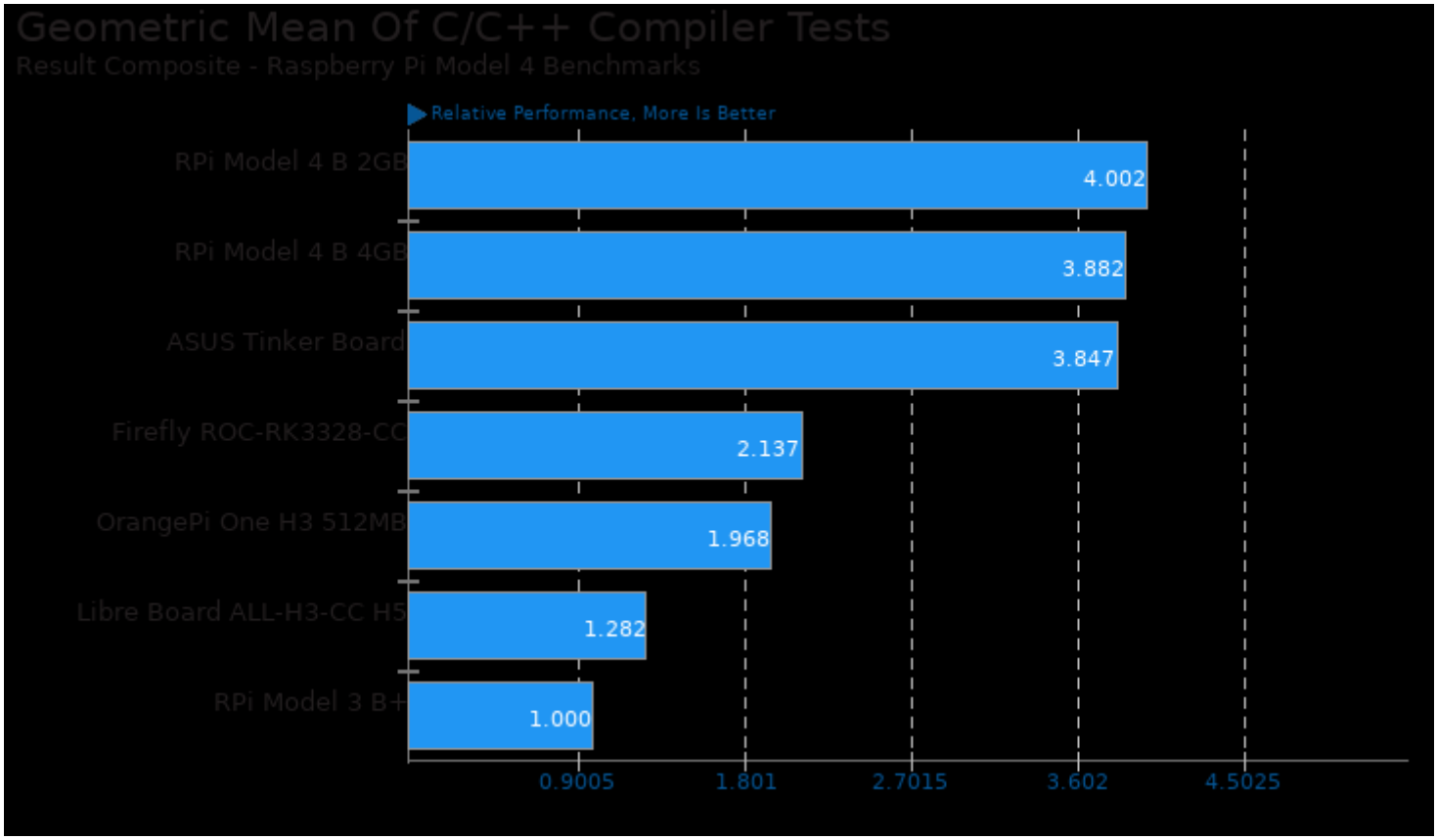

1. RPi Model 4 B 2GB: $45 reported cost.
2. Firefly ROC-RK3328-CC: $35 reported cost.
3. RPi Model 4 B 4GB: $55 reported cost.
4. ASUS Tinker Board: $71 reported cost.

# Raspberry Pi Model 4 Benchmarks

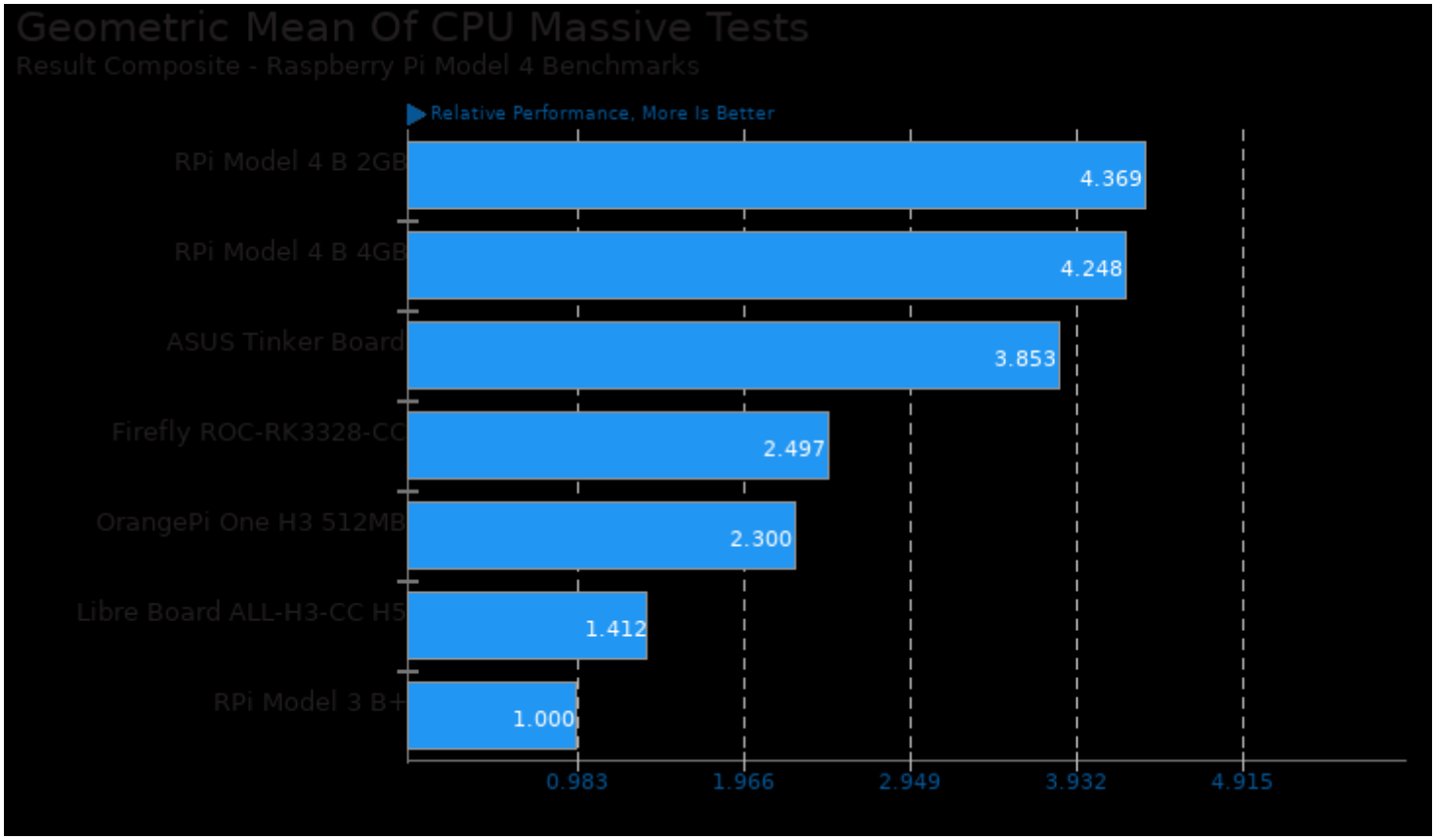
These geometric means are based upon test groupings / test suites for this result file.



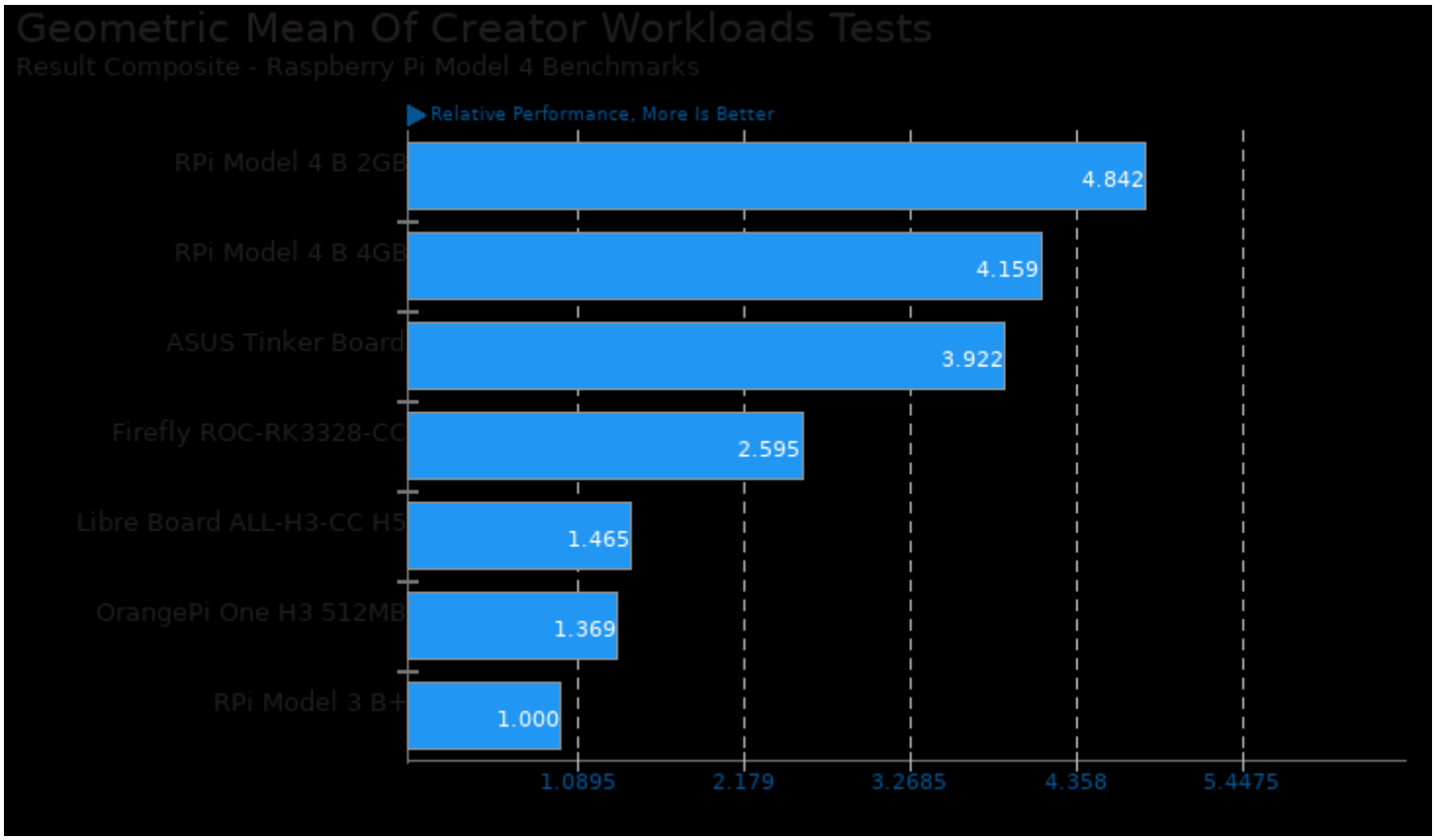

Geometric mean based upon tests: pts/encode-mp3 and pts/encode-flac



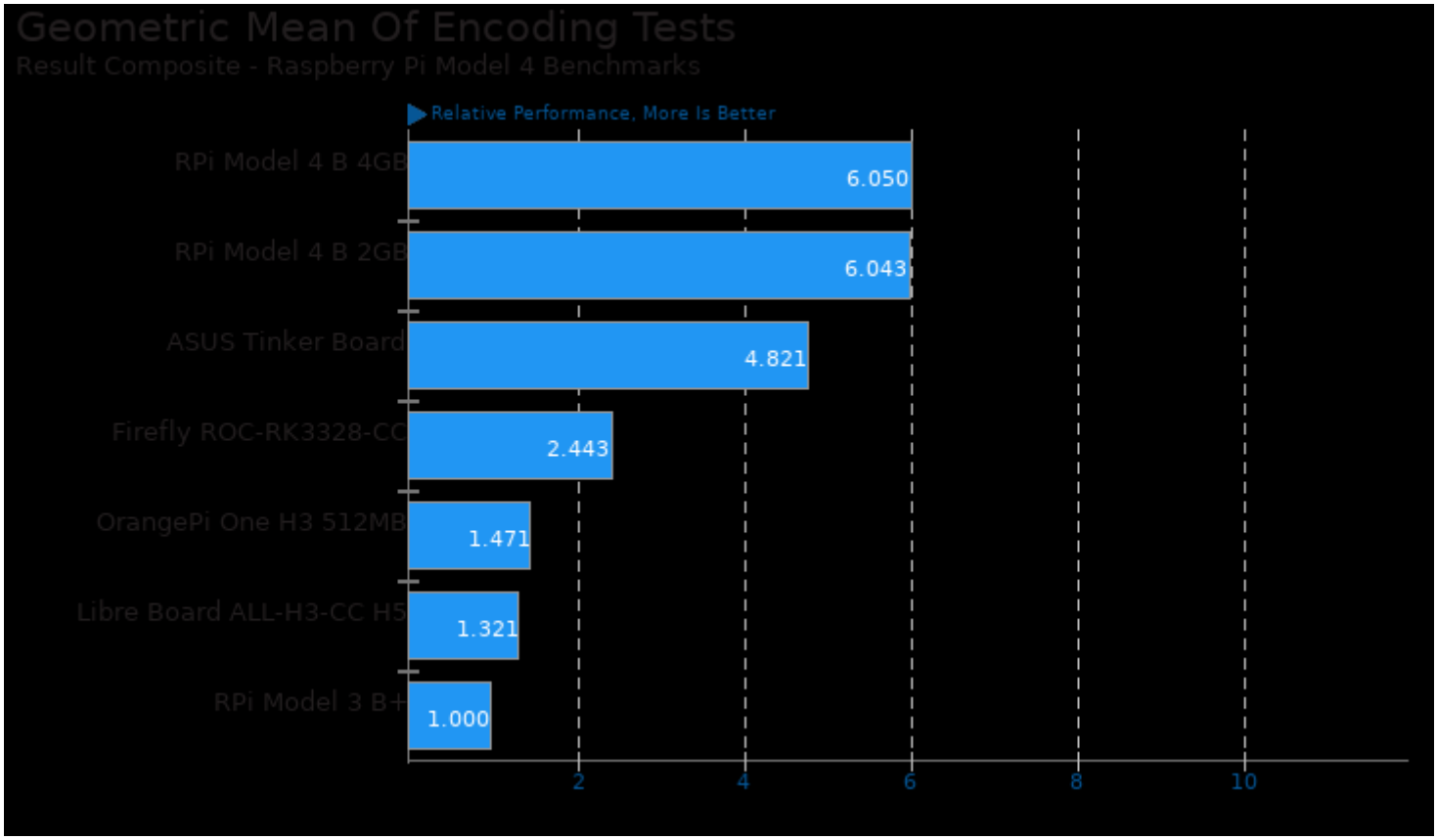
Geometric mean based upon tests: pts/scimark2, pts/graphics-magick, pts/encode-mp3, pts/encode-flac, pts/x264, pts/compress-zstd and pts/nginx



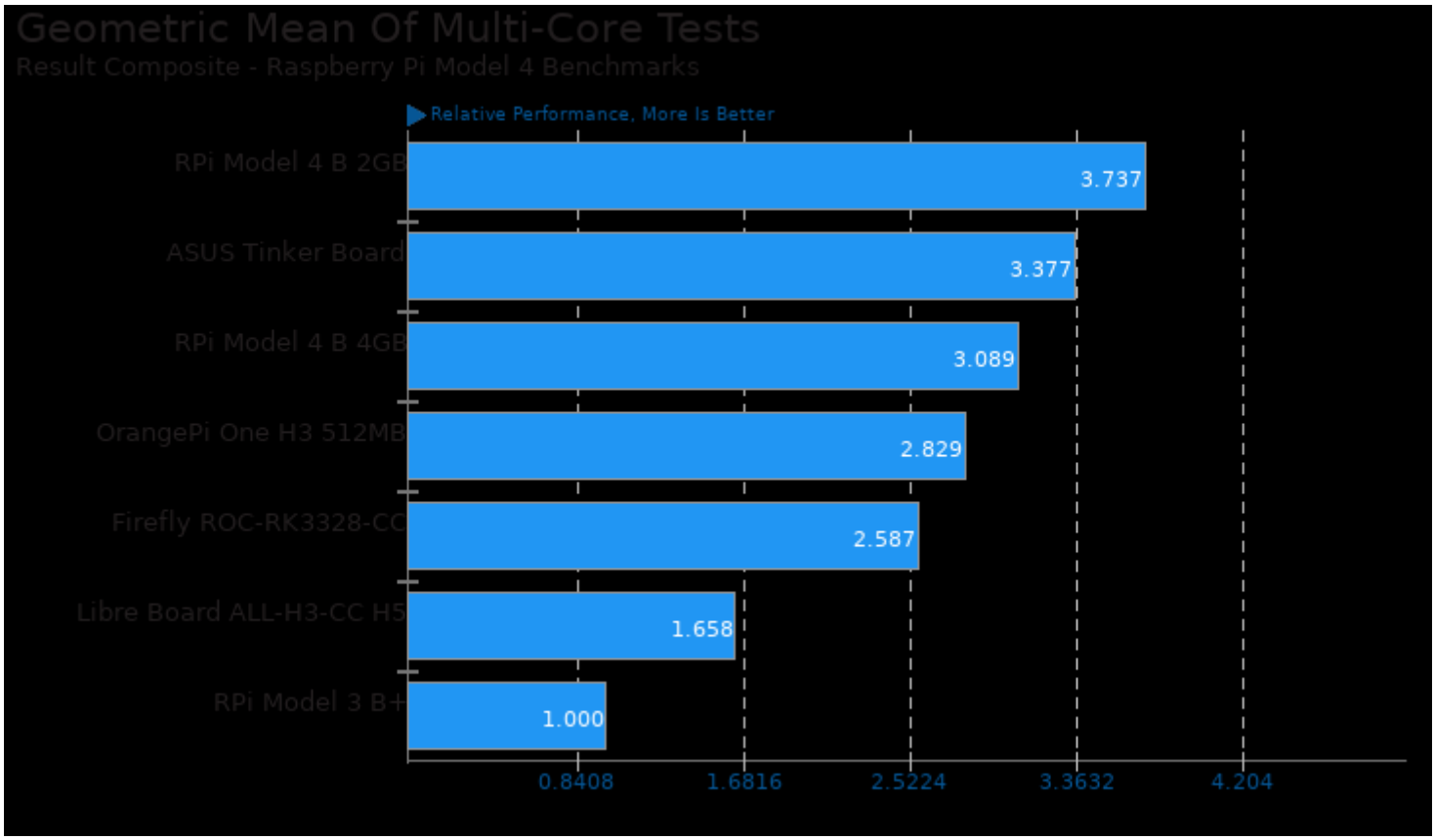

Geometric mean based upon tests: pts/compress-zstd, pts/x264, pts/encode-flac, pts/encode-mp3, pts/graphics-magick, pts/nginx, pts/phpbench and pts/rust-prime



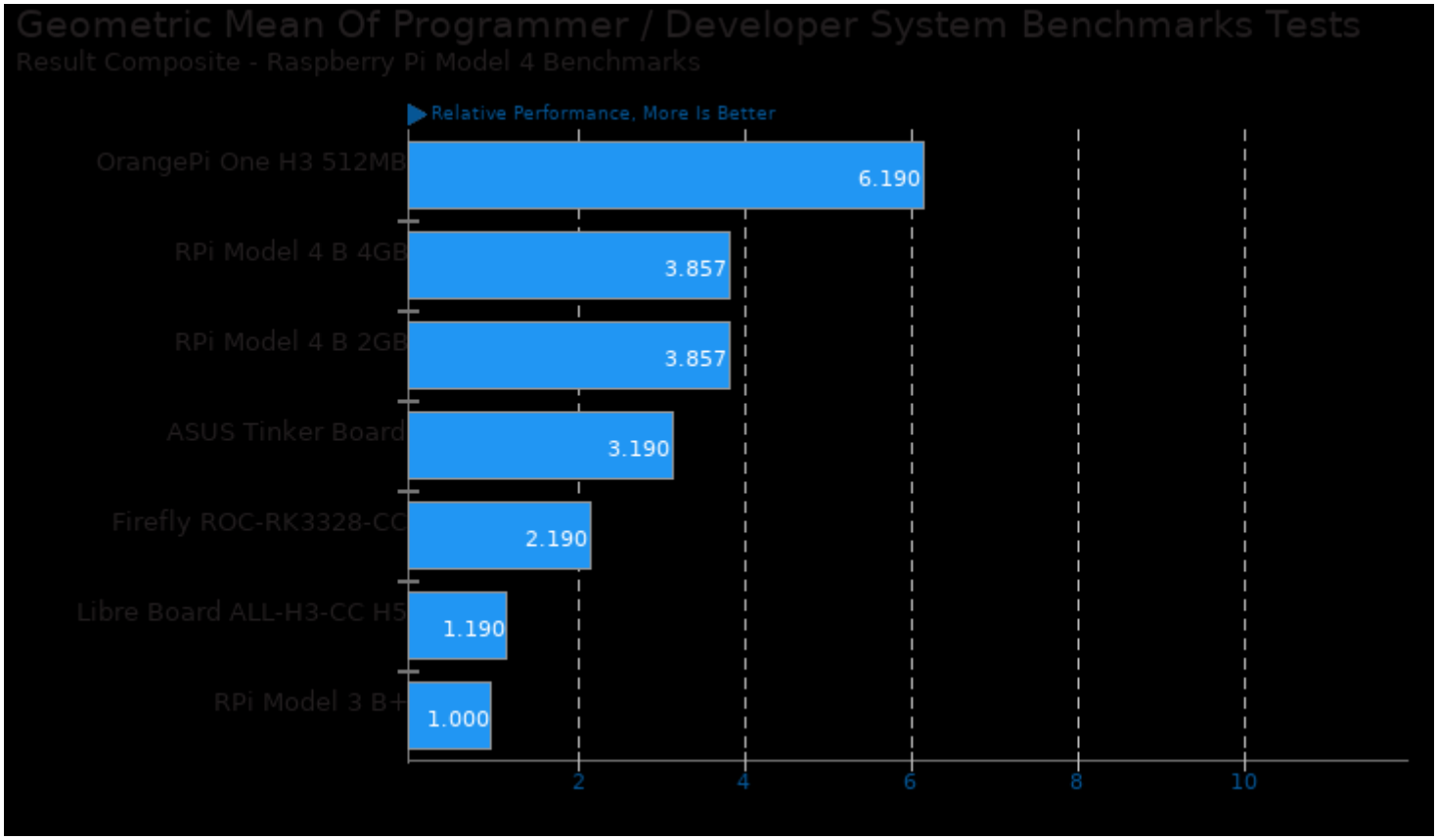

Geometric mean based upon tests: pts/smallpt, pts/x264, pts/encode-mp3, pts/encode-flac and pts/graphics-magick



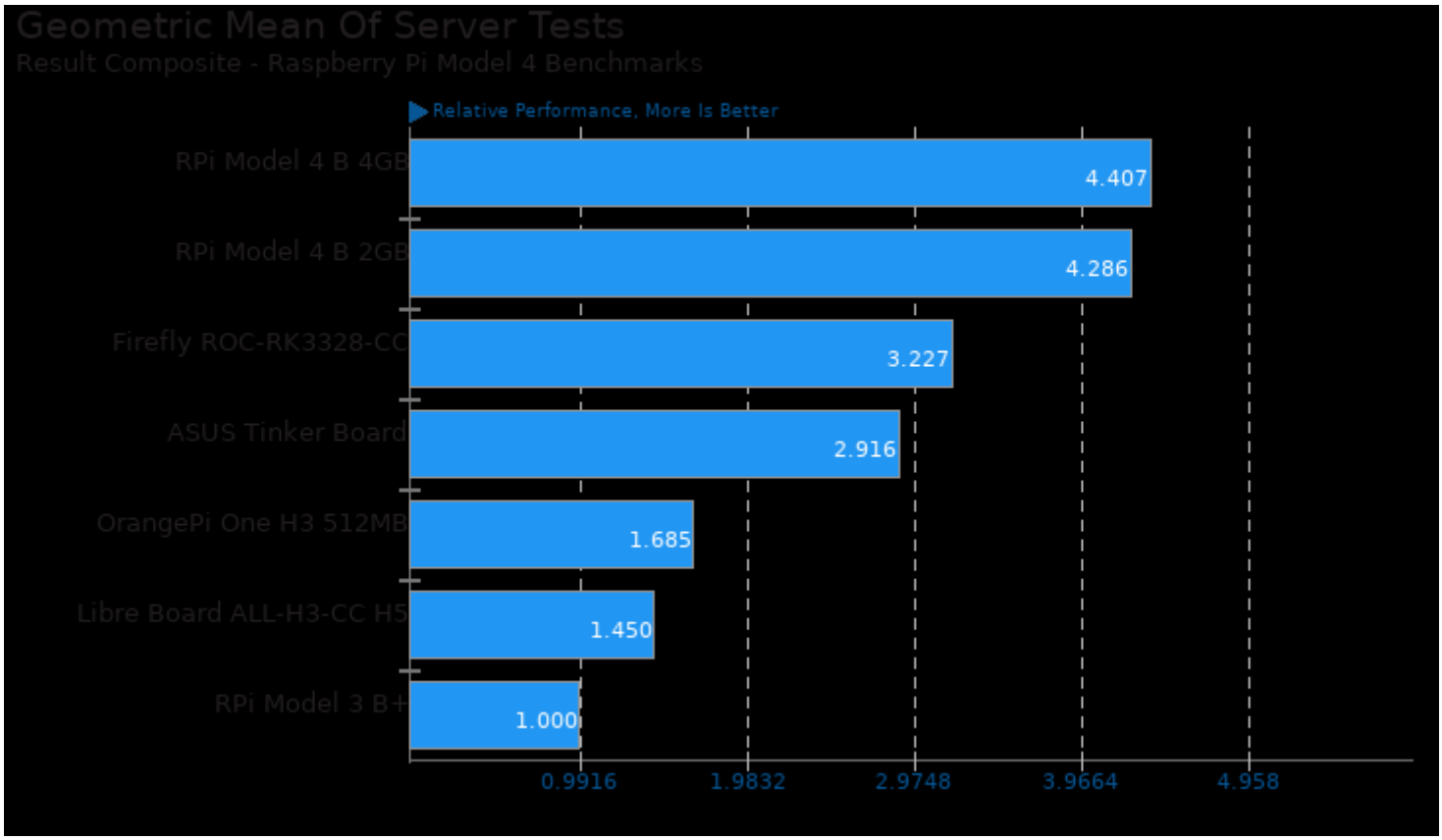

Geometric mean based upon tests: pts/encode-mp3, pts/encode-flac and pts/x264



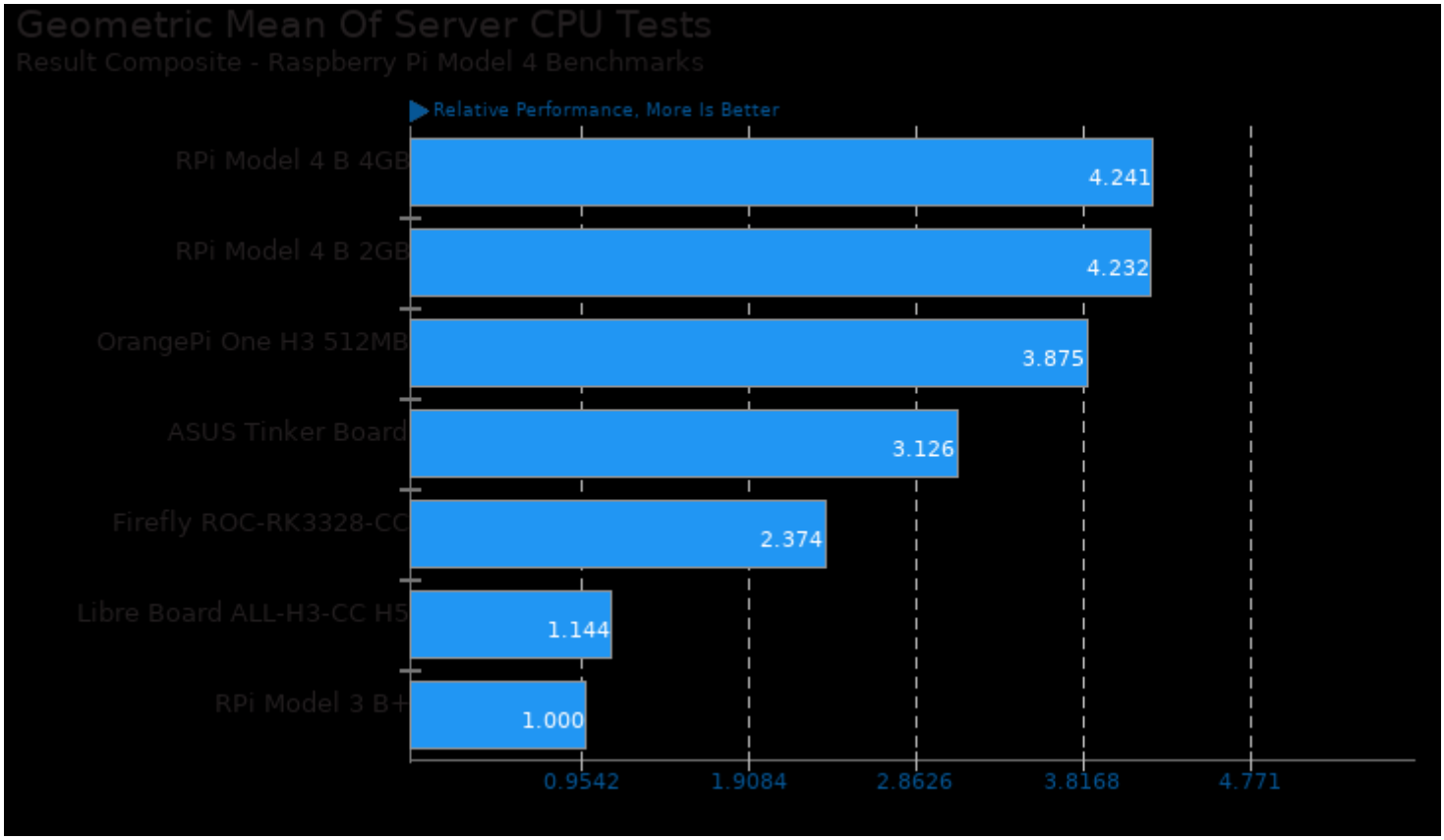

Geometric mean based upon tests: pts/x264, pts/smallpt, pts/graphics-magick, pts/compress-zstd and pts/rust-prime




Geometric mean based upon tests: pts/compress-zstd and pts/pybench

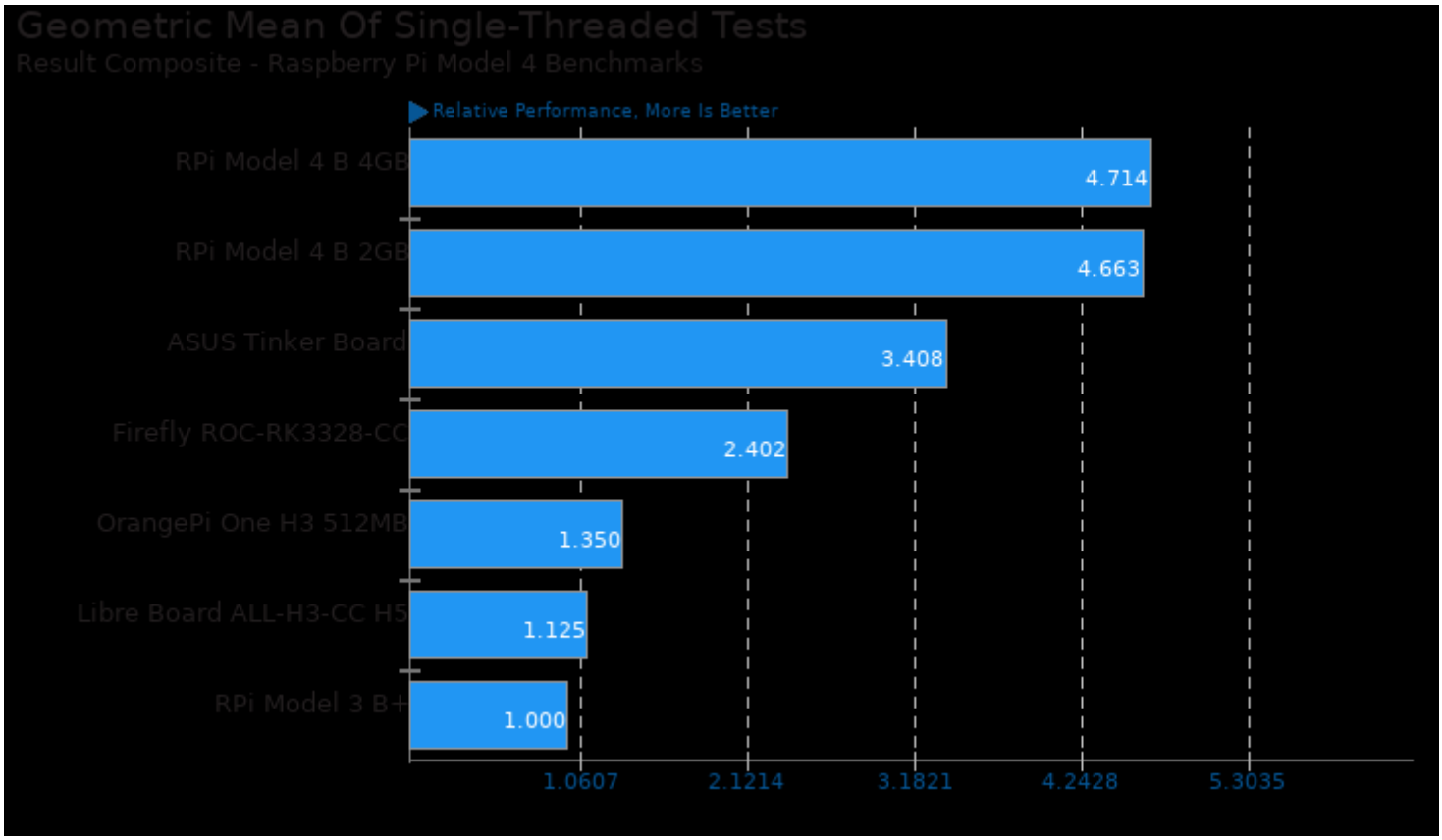



Geometric mean based upon tests: pts/nginx, pts/phpbench and pts/perl-benchmark




Geometric mean based upon tests: pts/x264, pts/compress-zstd, pts/pybench and pts/phpbench

# Raspberry Pi Model 4 Benchmarks




Geometric mean based upon tests: pts/scimark2, pts/encode-flac, pts/encode-mp3, pts/perl-benchmark, pts/pybench, pts/phpbench and pts/nginx

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 20:39.*