

Android Comparative Benchmarks

Introduction

This page provides comparison among various TI processors running TI's Android-DevKit. Data published here is for the latest version of released Android-DevKit. Items yet to be measured are marked "TBD" and those that are not applicable to a particular platform are marked "N/A".

Platform Benchmarks

This is a collection of benchmarks comparing mainly CPU speed and other data transfer operations.

RowboPerf: ARM

See RowboPERF User Guide ^[1] for more information about these metrics. The RowboPerf application calls native executables compiled with Android's NDK to perform these tests.

	AM3730	AM3517	OMAP3530
Dhrystone	1138 DMIPS	632.39 DMIPS	711.44 DMIPS
Whetstone	500 MIPS	333.3 MIPS	333.3 MIPS
Linpack	36622 Kflops	19532 Kflops	25512 Kflops

RowboPERF: rowboatBench

See RowboPERF User Guide ^[1] for more information about these metrics. rowboatBench measures CPU performance by running Java applications that emulates known C implementations of popular CPU benchmarks like Dhrystone and Whetstone

	AM3730	AM3517	OMAP3530
Dhrystone	133,707 stones/sec	84997.0 stones/sec	85062 stones/sec
Whetstone	128 MWIPS	74787.0 KWIPS	93512 KWIPS
Himeno	0.597000002861023	1.0520000457763672	0.564999
Spectral	561 ms	975.0 ms	759 ms
Normalization			

RowboPERF: 0xBench

See RowboPERF User Guide ^[1] for more information about these metrics.

Linpack	AM3730	AM3517	OMAP3530
Mflops/s	16.710859273788333	9.661605571563705	10.693603659132854
Norm Res	1.7100673392687894E14	1.7100673392687894E14	1.7100673392687894E14
Precision	2.220446049250313E-16	2.220446049250313E-16	2.220446049250313E-16

Scimark2	AM3730	AM3517	OMAP3530
Composite	19.949576011603526	11.51952354683548	13.859260193553363
Fast Fourier Transform	14.202063797102927	8.020529718864642	10.008725487938541
Jacobi Successive Over-relaxation	28.715948458675733	16.967411546712874	20.079140561746915
Monte Carlo integration	5.932537588351684	3.459219861834415	4.153804371723308
Sparse matrix multiply	18.277555176454754	10.526857083928702	12.491613129614269
dense LU matrix factorization	32.61977503743252	18.623599522836763	22.563017416743772

Boot Time

Numbers shown here measure the time from start of loading the kernel image to appearance of Android's Home Screen. These measurements are done using the default (pre-built) images provided with the DevKit. Please note that the very first time you boot your device, the boot time will be significantly higher (approx. 3-4 min).

Time (secs)	AM3730	AM3517	OMAP3530
SD Boot Time	37	55	36

EDMA Test

Need to devise this test.

Memory Bandwidth

Need to devise this test.

Browser Performance

Sunspider

These metrics were collected using the well-known Sunspider performance benchmarks available at <http://www2.webkit.org/perf/sunspider-0.9/sunspider.html>

Sunspider	AM3730	AM3517	OMAP3530
Total	6347.6ms +/-2.2%	11048.8ms +/- 3.2%	9397ms +/- 1.6%
3D	1033.2ms +/- 8.8%	1800.8ms +/- 7.0%	1488.6ms +/- 2.1%
Access	518.6ms +/- 4.3%	1102.0ms +/- 7.0%	874.8ms +/- 2.9%
Bitops	415ms +/-11.6%	650.4ms +/- 2.1%	535ms +/- 2.9%
ControlFlow	20.4ms +/-3.3%	35.0ms +/- 0.0%	30ms +/- 11.7%
Crypto	389.6ms +/-15.8%	702.4ms +/- 4.1%	554.2ms +/- 2.5 %
Date	836ms +/-3.9%	1700.2ms +/- 1.4%	1382.8ms +/- 4.6%
Math	668.4ms +/-12.6%	920.2ms +/- 2.0%	756.0 ms +/- 4.2%
Regex	141ms +/-3.9%	202.8ms +/- 0.7%	205.8ms +/- 8.4%
String	2325.4ms +/-1.2%	4341.0ms +/- 3.0%	3569.8 ms +/- 2.0%

The Man in Blue animation

Browser animation metrics collected using the performance benchmark available at <http://www.themaninblue.com/experiment/AnimationBenchmark/>

Man in Blue	AM3730	AM3517	OMAP3530
Canvas	~15 fps	~7.52	~6.73 fps
Flash	~24 fps	TBD	TBD

JVM Performance

Caffeine Mark

Application to measure Java Virtual Machine (JVM) performance on mobile devices. For more info please see Caffeine Mark page ^[2]

CaffeineMark	AM3730	AM3517	OMAP3530
Sieve Score	2141	1311	1559
Loop Score	10207	6068	7309
Logic Score	12224	7177	7541
String Score	4980	2896	3627
Float Score	3459	2050	2414
Method Score	3946	2327	2807
Overall Score	5126	3039	3581

Sqlite DB Performance

Testindex Benchmark application to measure Sqlite performance. For more information please see TestIndex Home page^[3]

TestIndex	AM3730	AM3517	OMAP3530
	TBD	TBD	TBD

File Storage Performance

These tests were performed using the StorageIO application provided in RoboPerf. The application measures the write and read speed of different storage devices using several block sizes. For these tests the file size chosen was 100 MBytes. In order for the application to run the storage device chosen for the test must be mounted in the Android file system and have read and write access. All the tests were performed on devices with a vfat file system.

MMC/SD Performance

Throughput (MB/s)	AM3730	AM3517	OMAP3530
Write, bs=512	3.545481	3.7559138	4.2310295
Write, bs=4096	4.135742	4.9056185	5.324883
Write, bs=16384	4.165975	4.6939255	5.259975
Write, bs=65536	4.185431	5.4209585	4.947280
Write, bs=524288	3.949885	4.9238165	5.0538655
Write, bs=1048576	4.297619	4.847113	5.466173
Read, bs=512	6.218205	2.031140	5.5677585
Read, bs=4096	6.129514	2.4484565	4.8538445
Read, bs=16384	6.157228	2.6835645	4.7535065
Read, bs=65536	6.311780	2.343815	4.7753710
Read, bs=524288	5.971389	2.890869	5.062894
Read, bs=1048576	5.664916	2.7540475	5.1917415

USB Performance

Throughput (MB/s)	AM3730	AM3517	OMAP3530
Write, bs=512	TBD	9.358108	8.461717
Write, bs=4096	TBD	9.816289	9.994053
Write, bs=16384	TBD	9.990244	10.388112
Write, bs=65536	TBD	10.573520	10.387083
Write, bs=524288	TBD	10.467964	10.299342
Write, bs=1048576	TBD	10.603458	10.498358
Read, bs=512	TBD	9.852260	9.998818
Read, bs=4096	TBD	12.005679	12.221166
Read, bs=16384	TBD	11.730350	12.113863

Read, bs=65536	TBD	11.746119	11.865746
Read, bs=524288	TBD	11.567303	11.599292
Read, bs=1048576	TBD	11.433606	11.750067

Connectivity Performance

These tests provide throughput comparison across commonly used transports/mediums.

Ethernet

Measures TCP Throughput between Server (running on Host PC) and Client (Android Platform) using different buffer sizes (bs in bytes) Both Server and client uses the Netperf utility. For more information about Netperf, please see Netperf Home page ^[4]

TCP Throughput	AM3730	AM3517	OMAP3530
bs=16	31.80 Mb/s	33.82 Mb/s	23.21 Mb/s
bs=1024	32.15 Mb/s	33.6 Mb/s	23.49 Mb/s
bs=4096	52.76 Mb/s	52.33 Mb/s	42.08 Mb/s
bs=8192	57.84 Mb/s	16.71 Mb/s	47.7 Mb/s

ADB

Measure Android Debug Bridge (ADB) throughput between Host PC and Android device by pushing and pulling a 20MB file with random content 10 times. TX and RX numbers are from the Host PC point of view, so TX is measured by doing "adb push" on the Host PC.

ADB USB Throughput	AM3730	AM3517	OMAP3530
TX	4853.0 KB/s	2032.6 KB/s	3278.6 KB/s
RX	6154.4 KB/s	4331.6 KB/s	5144.7 KB/s

Graphics Performance

RowboPERF: 0xBench 2D

See RowboPERF User Guide ^[1] for more information about these metrics.

2D	AM3730	AM3517	OMAP3530
Draw Canvas (fps)	59.0	59.0	57.0
Draw Circle (fps)	50.0	28.0	32.0
Draw Circle2 (fps)	58.0	59.0	54.5
Draw Rect (fps)	34.0	36.33	29.33
Draw Arc (fps)	51.5	49.0	41.5
Draw Image (fps)	58.0	58.0	44.0
Draw Text (fps)	54.67	30.0	36.33

RowboPERF: 0xBench 3D

See RowboPERF User Guide ^[1] for more information about these metrics.

3D	AM3730	AM3517	OMAP3530
OpenGL Cube (fps)	58.0	59.0	58.0
OpenGL Blending (fps)	62.85	64.076	62.70
OpenGL Fog (fps)	62.86	64.17	62.82
OpenGL Teapot (fps)	60.6	60.595	60.58

MultiMedia Performance

Tests to measure video, audio, image and speech processing performance.

Video Display

To measure Video decode and display performance, the Big Buck Bunny clip ^[5] was used. The clip has the following video and audio streams

Stream #0.0(und): Video: mpeg4, yuv420p, 352x288 [PAR 48:11 DAR 16:3], 30 tbr, 30 tbn, 30 tbc

Stream #0.1(und): Audio: aac, 48000 Hz, stereo, s16

DDR2 memory was set to 256M in the boot parameters (Default value)

Video decode	AM3730	AM3517	OMAP3530
Min (fps)	29.59	29.588	29.69
AVG (fps)	30.00	30.006	30.04
Max (fps)	31.17	30.77	30.99

Power Management

Need to devise this test.

Versioning

This is Release DevKit-V2. The release is available from http://software-dl.ti.com/dsps/dsps_public_sw/sdo_tii/TI_Android_DevKit/02_00_00/index_FDS.html

References

- [1] http://processors.wiki.ti.com/index.php/RowboPERF_User_Guide
 - [2] <http://handheld.softpedia.com/get/Benchmark/CaffeineMark-Android-71593.shtml>
 - [3] <http://docs.huihoo.com/perst/docs/tst/android/Benchmark/doc/GettingStarted.html>
 - [4] <http://www.netperf.org/netperf/>
 - [5] <http://www.bigbuckbunny.org/>
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