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RK3399_SDK 性能指标说明文档

（技术部，第二系统产品部）

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V1.0		2017.12.28	初始版本	

目 录

1 简介

本文主要介绍 RK3399 性能相关指标。

2 Antutu v6.3.3 Benchmark

Antutu v6.3.3	Item	RK3399N A72x2+A53x4 LP3：912MHz 2.0GHz/1.5GHz GPU：800MHz Android 7.1 2048x1536	RK3399N A72x2+A53x4 LP3：800MHz 2.0GHz/1.5GHz GPU：800MHz Android 7.1 2048x1536	RK3399N A72x2+A53x4 LP3：800MHz 2.0GHz/1.4GHz GPU：800MHz Android 7.1 2048x1536	RK3399 A72x2+A53x4 LP3：800MHz 1.8GHz/1.4GHz GPU：800MHz Android 7.1 2048x1536
Score	Total Score	**86364**	**85858**	**84561**	**81764**
3D	3D Score	**18355**	**18003**	**17906**	**18054**
	Marooned	11318	11113	11044	11161
	Garden	7037	6890	6862	6893
UX	UX Score	**37692**	**37987**	**37325**	**35191**
	UX Data Secure	7315	7186	7320	6805
	UX Data process	5088	5137	4979	4632
	UX Strategy games	9290	9450	9459	8555
	UX Image process	11431	11555	10905	10762
	UX I/O performance	4568	4659	4662	4437
CPU	CPU Score	**25346**	**25109**	**24516**	**23851**
	CPU Mathematics	8687	8987	8553	7600
	CPU Common Use	6998	6869	6785	6386
	CPU Multi-Core	9661	9253	9178	9865
RAM	RAM	**4971**	**4759**	**4814**	**4668**

3 Antutu v6.3.3 Ranking

V6.3.3	RK3399 EVB RK3399N A72x2+A53x4 Mali T-864 2048x1536	Xiaomi 5 S820 Kryox4 Adreno 530 1920x1080	Huawei Mate8 Kirin950 A72x4+A53x4 Mali T-886 1920x1080	Meizu MX6 Helio X20 A72x2+A53x4x2 Mali T-884 1920x1080	Meizu Pro5 Exynos7420 A57x4+A53x4 Mali T-768 1920x1080
CPU	25346	29238	32240	27831	25416
UX	37692	40795	33110	36700	28666
3D	18355	48103	18751	18347	22335
RAM	4971	10590	6361	7220	7515
Total	**86364**	**128726**	**90462**	**90098**	**83932**

Note：Data of non-RK3399 CPU is from Antutu website.

4 Geekbench 4 v4.0.0 Benchmark

Geekbench V4-4.0.0	RK3399N (A72x2+A53x4) (LP3=912/GPU=800)MHz (A72=2.0/A53=1.5) GHz 2048x1536、Android 7.1		RK3399N (A72x2+A53x0) (LP3=912/GPU=800) MHz (A72=2.0/A53=1.5)GHz 2048x1536、Android 7.1		RK3399N (A72x0+A53x4) (LP3=912/GPU=800) MHz (A72=2.0/A53=1.5)GHz 2048x1536、Android 7.1		RK3399N (A72x0+A53x2) (LP3=912/GPU=800) MHz (A72=2.0/A53=1.5)GHz 2048x1536、Android 7.1	
CPU	Single Core	Multi Core	Single Core	Multi Core	Single Core	Multi Core	Single Core	Multi Core
Total	1405	2935	1400	2181	575	1563	567	899
Compute (RenderScript)	1696		1006		808		413	

5 Geekbench 4 Ranking

Geekbench V4-4.0.0	RK3399 (A72x2+A53x4) (2.0/1.5)GHz Android 7.1		MT8693 (A72x2+A53x4) (2.0/1.6)GHz Android 5.1		Exynos 8890 CUSx4+A53x4 (2.3/1.5)GHz Android 6.0		Qualcomm S835 Kryo280x4+A53x4 (2.45/1.7)GHz Android 7.0		Nvidia K1 A15x4 2.22GHz Android 7.0		RK3288 A17x4 1.8GHz Android 6.0		RK3399 (A72x0+A53x4) (2.0/1.5)GHz Android 7.1	
CPU	Single	Multi	Single	Multi	Single	Multi	Single	Multi	Single	Multi	Single	Multi	Single	Multi
Total	1452	3005	1514	3171	1504	4992	1996	6657	1085	2986	1028	2920	575	1563

Note：Data is from Geekbench website.

6 GFXBench v4.0.12 Benchmark

GFXBench 4.0.12	OpenGL ES	RK3399N (A72x2+A53x4) LP3=912MHz DVFS GPU(800)MHz DVFS CPU(2.0/1.5)GHz 2048x1536、Android 7.1	RK3399N (A72x2+A53x4) LP3=912MHz Fixed GPU(800)MHz DVFS CPU(2.0/1.5)GHz 2048x1536、Android 7.1	RK3399N (A72x2+A53x0) LP3=912MHz DVFS GPU(800)MHz DVFS CPU(2.0/1.5)GHz 2048x1536、Android 7.1	RK3399N (A72x0+A53x4) LP3=912MHz DVFS GPU(800)MHz DVFS CPU(2.0/1.5)GHz 2048x1536、Android 7.1
Car Chase	3.1	3.8	3.8	3.8	3.8
1080P Car Chase Offscreen	3.1	5.2	5.2	5.2	5.0
Manhattan 3.1	3.1	6.9	7.0	7.0	6.9
1080P Manhattan 3.1 offscreen	3.1	10.0	10.0	10.0	10.0
Manhattan	3.0	11.0	11.0	11.0	11.0

1080P Manhattan offscreen	3.0	16.0	16.0	16.0	16.0
T-Rex	2.0	27.0	27.0	26.0	27.0
1080P T-Rex offscreen	2.0	35.0	34.0	35.0	34.0
Tessellation	3.1	18.0	18.0	18.0	18.0
1080P Tessellation offscreen	3.1	25.0	24.0	25.0	25.0
ALU 2	3.0	9.8	9.9	9.9	9.8
1080P ALU 2 offscreen	3.0	14.0	14.0	14.0	14.0
Driver Overhead 2	3.0	7.3	7.4	7.3	4.1
1080P Driver Overhead 2 offscreen	3.0	7.3	7.4	7.3	4.1
Texturing (Mtexel/s)	3.0	2258.0	2257.0	2259.0	2258.0
1080P Texturing offscreen	3.0	2249.0	2246.0	2246.0	2242.0
Render Quality (1080P, mB PSNR)	2.0	3310.0	3310.0	3310.0	3310.0
Render Quality (high precision)	2.0	4045.0	4045.0	4045.0	4045.0

7 PCIe – SATA performance

PCIe-to-SATA （RK3399）			
Chip: ASMedia1061R / SATA HDD: WestDigital 5400rpm			
Tool: Linux dd (bs=1M count=200000) / hdparm			
Mode	**hdparm read MBps**	**dd Read MBps**	**dd Write MBps**
AHCI	145	145	146

RAID0	277	277	277
RAID1	146	147	147
SPAN	146	146	146

8 PCIe – SSD performance

Tool: FIO / Platform: RK3399 EVB3/ PCIe X4 **SSD:Samsung SM961 / payload:256**							
				PCIE 1.0		PCIE 2.0	
Item	iodepth	thread	ioengine	Perf	avg. IOPS	Perf	avg. IOPS
1M sequential-read	4	1	libaio	790MB/s		1.53GB/s	
1M sequential-write	4	1	libaio	780MB/s		1.26GB/s	
4K random-write	64	6	libaio		194K		209K
8K random-write	64	6	libaio		98K		106K
16K random-write	64	6	libaio		49K		48K
4K random-read	64	6	libaio		170K		246K
8K random-read	64	6	libaio		94K		175K
16K random-read	64	6	libaio		45K		81K

Note：Configuration: PCIe V2.1, Gen2, 4x

9 eMMC – performance

eMMC performance （RK3399）		
Tool: dd (bs=1M count=2000)		
Item	eMMC 5.1	eMMC 4.51
dd read	220 MBps	110 MBps
dd write	86 MBps (Toshiba 32G)	86 MBps (Toshiba 32G)

* The write performance depends on eMMC chip very much.

Note：Configuration: eMMC version is 5.1 in RK3399, while 4.51 in RK3288

10 clpeak-R01

RK3399	RK3399
T864	T864
Linux （GPU 变频）	Linux (GPU 定频)
Platform: ARM Platform	Platform: ARM Platform
Device: Mali-T860	Device: Mali-T860
Driver version : 1.2 (Linux ARM64)	Driver version : 1.2 (Linux ARM64)
Compute units : 4	Compute units : 4
Clock frequency : 200~800 MHz	Clock frequency : 800 MHz
Global memory bandwidth (GBPS)	Global memory bandwidth (GBPS)
float : 3.22	float : 3.69
float2 : 6.11	float2 : 5.94
float4 : 7.46	float4 : 7.07
float8 : 6.29	float8 : 5.97
float16 : 5.86	float16 : 5.49
Single-precision compute (GFLOPS)	Single-precision compute (GFLOPS)
float : 25.16	float : 25.11
float2 : 45.37	float2 : 45.65
float4 : 45.68	float4 : 45.69
float8 : 41.67	float8 : 41.69
float16 : 46.44	float16 : 46.41
half-precision compute (GFLOPS)	half-precision compute (GFLOPS)
half : 22.97	half : 23.14
half2 : 50.09	half2 : 50.31
half4 : 98.95	half4 : 98.69
half8 : 93.51	half8 : 93.61
half16 : 92.95	half16 : 92.96
Double-precision compute (GFLOPS)	Double-precision compute (GFLOPS)
double : 5.14	double : 6.47
double2 : 3.28	double2 : 3.28
double4 : 20.98	double4 : 20.98
double8 : 20.66	double8 : 20.66
double16 : 20.41	double16 : 20.41
Integer compute (GIOPS)	Integer compute (GIOPS)

int : 20.16	int : 20.20
int2 : 50.04	int2 : 49.71
int4 : 47.22	int4 : 47.54
int8 : 48.79	int8 : 48.86
int16 : 41.48	int16 : 41.50
Kernel launch latency : 102.36 us	Kernel launch latency : 94.40 us

Note：GPU only