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RK3399_SDK 性能指标说明文档

RK3399_SDK_Performance_Instruction

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V1.0	黄国椿 Huang Guochun	2017.12.28	初始版本 Initial version release.	
V2.0	黄国椿 Huang Guochun	2018.08.23	更新 antutu7.1.3 跑分和千兆以太网测试数据 Update the test data of antutu7.1.3 and Gigabit Ethernet.	

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1 简介 Overview

本文主要介绍 RK3399 性能相关指标。

This document mainly introduces RK3399 performance related indicators.

2 Antutu v7.1.3 Benchmark

Antutu v7.1.3	Item	RK3399	RK3399
		A72x2+A53x4	A72x2+A53x4
		LP3 : 800MHz	LP4 : 800MHz
		1.8GHz/1.4GHz	1.8GHz/1.4GHz
		GPU : 800MHz	GPU : 800MHz
Score	Total Score	Android 8.1	Android 8.1
		2048x1536	1920x1200
		110995	104357
GPU	GPU Score	23816	22956
	Marooned	3814	3744
	Coastline	6553	6624
	Refinely	13449	12588
UX	UX Score	40146	38785
	UX Data Secure	5305	4946
	UX Data process	6228	6037
	UX Image processs	15850	15210
	UX User Experience	12763	12592
CPU	CPU Score	41623	35094

	CPU Mathematics	10606	9716
	CPU Common Use	4724	4890
	CPU Multi-Core	26293	20488
MEM	MEM Score	5410	7522
	Ram	1762	1917
	Rom	3648	5605

3 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	
	Single Core	Multi Core	Single Core	Multi Core	Single Core	Multi Core	Single Core	Multi Core
	1405	2935	1400	2181	575	1563	567	899
	1696		1006		808		413	

4 Geekbench 4 Ranking

	RK3399		MT8693		Exynos 8890		Qualcom m S835		Nvidia K1		RK3288		RK3399	
Geekbench V4-4.0.0	(A72x2+A53x4) (2.0/1.5)GHz Android 7.1		(A72x2+A53x4) (2.0/1.6)GHz Android 5.1		(Cortex-A72x4+A53x4) (2.3/1.5)GHz Android 6.0		(Kryo280x4+A53x4) (2.45/1.7)GHz Android 7.0		A15x4 2.22GHz Android 7.0		A17x4 1.8GHz Android 6.0		(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.

5 GFXBench v4.0.12 Benchmark

		RK3399N	RK3399N	RK3399N	RK3399N
		(A72x2+A53x4)	(A72x2+A53x4)	(A72x2+A53x0)	(A72x0+A53x4)
		LP3=912MHz	LP3=912MHz	LP3=912MHz	LP3=912MHz
GFXBench 4.0.12	OpenGL ES	DVFS	Hz	Hz	Hz
		GPU(800)MHz	Fixed	DVFS	DVFS
		z	GPU(800)MHz	GPU(800)MHz	GPU(800)MHz
		DVFS	Hz	Hz	Hz
		CPU(2.0/1.5)	DVFS	DVFS	DVFS
		GHz	CPU(2.0/1.5)	CPU(2.0/1.5)	CPU(2.0/1.5)

		2048x1536、 Android 7.1)GHz 2048x1536、 Android 7.1)GHz 2048x1536、 Android 7.1)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

6 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

7 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

8 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.

9 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 ARM 64)
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

10 Gigabit Ethernet rate

Upstream rate	Downstream rate
784 Mbits/sec	851Mbits/sec