Products
Amlogic S905
ODROID-C2
Exynos5 Octa
ODROID-XU4
Amlogic S805
ODROID-C1+
ODROID-C0
Display
ODROID-VU5
ODROID-VU7 Plus
ODROID-VU7
16x2 LCD + IO Shield
C1 3.2inch TFT+Touchsc
LED Matrix Shield
ODROID-SHOW2
3.5inch Touchscreen Sh
Power Supply & Battery
RTC Backup Battery
RTC Shield
UPS2 for C1
UPS3
5V/2A Power Supply
5V/2A Power Supply EU
5V/2A Power Supply US
5V/4A Power Supply EU
5V/4A Power Supply Rou
5V/4A Power Supply US
5V/6A Power Supply
3000mAh Battery
750mAh Battery
Cases
ODROID-C2/C1+ Cases
ODROID-XU4 Cases
VuShell for VU7
3.5inch LCD Shield Cas
Connectivity
IR Remote Controller
WiFi Module 0
WiFi Module 3
WiFi Module 4
WiFi Module 5
Bluetooth Module 2
Ethernet Cable CAT6
USB GPS Module
Camera
USB-CAM 720P

Products

Amlogic S905 > **ODROID-C2 [ODROID-C2]**

Feature | Technical Detail | FAQs

ODROID-C2

The ODROID-C2 is a 64-bit quad-core single board computer(SBC) that is one of the most cost-effective 64bit development boards available in the ARM world. home theater set-top box, a general purpose computer for web browsing, gaming and socializing, a compact tool for college or office work, a prototyping device tinkering, a controller for home automation, a workstation for software development, and much more.

Some of the modern operating systems that run on the ODROID-C2 are Ubuntu, Android, ARCHLinux, Debian, with thousands of free open-source software pa ODROID-C2 is an ARM device -- the most advanced architecture for mobile devices and embedded 64-bit computing. The ARM processor's small size, reduce power consumption makes it very suitable for miniaturized devices such as wearables and embedded controllers.

* Amlogic ARM® Cortex®-A53(ARMv8) 1.5Ghz quad core CPUs
* Mali™-450 GPU (3 Pixel-processors + 2 Vertex shader processors)
* 2Gbyte DDR3 SDRAM
* Gigabit Ethernet
* HDMI 2.0 4K/60Hz display
* H.265 4K/60FPS and H.264 4K/30FPS capable VPU
* 40pin GPIOs + 7pin I2S
* eMMC5.0 HS400 Flash Storage slot / UHS-1 SDR50 MicroSD Card slot
* USB 2.0 Host x 4, USB OTG x 1 (power + data capable)
* Infrared(IR) Receiver
* Ubuntu 16.04 or Android 5.1 Lollipop based on Kernel 3.14LTS

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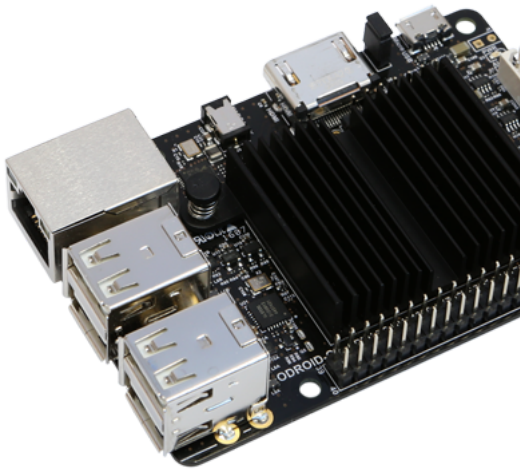
48,000원(부가세 별도)
한국 배송(Korean only)



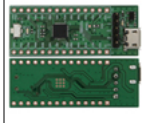
(Click enlarge the image)

OS Image files and BSP source code are available in our WiKi : http://odroid.com/dokuwiki/doku.php?id=en:odroid-c2

* An additional MicroSD card or an eMMC module is required to install the OS. We recommend the eMMC module as it has much higher performance than star

* ARM 64bit is a very new platform and some system specific Linux softwares are not working stably at this moment.
So there might be the compatibility issues frequently and we may need longer time to fix the issues.

OPTIONAL ACCESSORIES(Click the image to the product page)

							
5V/2A Power Supply	HDMI 1.4 Cable (TypeA-A)	High Speed 4K HDMI 2.0 Cable (Type A-A)	USB-DC Plug Cable 2.5mm	eMMC Module C2 Linux	Micro SD UHS-1 C2 Linux	eMMC Module C2 Android	Micro SD UHS-1 C2 Android
							
ODROID-C2 / C1+ Case Black	ODROID-C2 / C1+ Case Clear	ODROID-C2 / C1+ Case Blue	WiFi Module 0	WiFi Module 3	WiFi Module 4	USB3.0 to SATA Bridge Board	USB2.0 OTG Cable
							
HiFi Shield Plus	Bluetooth Module2	USB GPS Module	Micro USB Cable	USB IO Board	Universal Motion Joypad	USB-UART Module Kit	DC Plug and Cable 2.5mm

oCam : 5MP USB 3.0 Cam
oCam-1MGN-U : Global S
M12 Lens Set : 8/6/3/2
Tripod mount for oCam

Development

C Tinkering Kit
USB-UART Module Kit
Xprotolab Plain

Sound

HiFi Shield 2
HiFi Shield Plus
USB Audio Adapter
USB-SPDIF

Connector

Micro USB-DC Power Bri
Connector Pack for ODR
30pin and 12pin Header

Add-on Boards

CloudShell for XU4
Expansion Board
USB IO Board
XU4 Shifter Shield
Universal Motion Joypa
USB3.0 to SATA Bridge
U3 IO Shield
U3 Shield Tinkering Ki

Sensor

myAHRS+
Weather Board 2

Cooler

40x40x25mm Tall Blue H
C1 Heat Sink
Cooling Fan U2
Cooling Fan U3
Cooling Fan X
Cooling Fan XU4 Blue

Cables

HDMI 2.0 Cable (Type A
HDMI Cable (Micro, Typ
HDMI Cable (Type A-A)
USB3.0 Micro-A to Stan
Micro USB Cable
DC Plug Cable Assembly
DC Plug Cable Assembly
DC Plug Cable Assembly
DC Plug Cable Assembly
USB-DC Plug Cable 2.5m
USB2.0 OTG Cable

OS Preinstalled Flash Memory

eMMC Module C2 Linux B
eMMC Module C2 Android
MicroSD C2 Linux
MicroSD C2 Android
eMMC Module XU4 Linux
eMMC Module XU4 Androi
MicroSD XU4 Linux
eMMC Module C1+/C0 Lin
eMMC Module C1+/C0 And

							
Ethernet Cable CAT6	C Tinkering Kit	16x2 LCD + IO Shield	myAHRS+	Weather Board 2	USB Audio Adapter	VuShell for VU7 SmokyBlue	VuShell for VU7 SmokyWhite
							
VU7 Plus: 7inch 1024x600 display with Multi touch	Xprotolab Plain	UPS3	RTC Shield	3.5inch Touchscreen Shield	3.5inch LCD Shield Cases	ODROID-VU5 : 5inch 800x480 HDMI display with Multi-touch	WiFi Module 5
							
oCam-1MGN-U : Global Shutter	M12 Lens Set : 8/6/3/2.65mm	Tripod mount for oCam camera					

STORY ABOUT THE ODROID-C2

Here is the comparisons to give you better understanding of ODROID-C2.

ODROID-C2 vs ODROID-C1 vs Raspberry Pi2

Both are Linux-friendly ARM® single-board computers for various applications and purposes.

Hardware Comparison

The ODROID-C2 has many advantages over the Raspberry Pi2.

The processor is an S905 1.5GHz Quad-core from Amlogic with 2GByte DDR3 RAM, Gigabit-Ethernet and IR-receiver. The size of this computer is still only 85 x of 40g, and offers silent operation, 2~5W average power usage, and instant portability, since it fits in a shirt pocket.

One powerful feature of the ODROID-C2 is an SD 3.01 standard compatible UHS-1 MicroSD card, as well as the faster eMMC module, can be ordered with the arrives with the popular Ubuntu operating system already installed. Insert the MicroSD card into the slot, connect a monitor, a keyboard, a mouse, Ethernet and that's all you need to do to use the ODROID-C2! Browse the web, play games, run office programs, edit photos, develop software, and watch videos right away.

The ODROID-C2 also has a 40+7pin GPIO header to make a physical interface between the board and the outside world. The 40+7pin interface headers inclu UART, ADC and GPIO function.

The IR receiver and ADC features on the ODROID-C2 offer many options for building great DIY projects.

	ODROID-C2	ODROID-C1+	RPi 2 Mo
CPU	**Amlogic S905 SoC 4 x ARM Cortex-A53 1.5GHz 64bit ARMv8 Architecture @28nm**	Amlogic S805 SoC 4 x ARM Cortex-A5 1.5GHz 32bit ARMv7 Architecture @28nm	Broadcom B 4 x ARM Cortex- 32bit ARMv7 Archit
GPU	**3 x ARM Mali-450 MP 700MHz**	2 x ARM Mali-450 MP 600MHz	1 x VideoCore I
RAM	**2GB 32bit DDR3 912MHz**	1GB 32bit DDR3 792MHz	1GB 32bit LP-DD
Flash Storage	**Micro-SD UHS-1 @83Mhz/SDR50 or eMMC5.0 storage option**	Micro-SD UHS-1 @78Mhz/SDR50 or eMMC4.5 storage option	Micro-SD @ 50M No eMMC stora
USB2.0 Host	**4 Ports**	4 Ports	4Port
USB2.0 Device / OTG	**1 Port for Linux USB Gadget device or USB host**	1 Port for Linux USB Gadget device or USB host	No
Ethernet / LAN	**10 / 100 / 1000 Mbit/s**	10 / 100 / 1000 Mbit/s	10 / 100 M
Video Output	**HDMI 2.0 4K / 60Hz**	HDMI 1.4	HDMI 1.4 / R
Audio Output	**HDMI / I2S**	HDMI / I2S	MDMI / 3.5mm
Camera Input	**USB 720p**	USB 720p	MIPI CSI 1
Real Time Clock	**No (unless using an add-on module)**	Yes (on-board RTC)	No (unless using an
IR Receiver	**Yes (on-board IR sensor)**	Yes (on-board IR sensor)	No (unless using an
IO Expansion	**40 + 7 pin port GPIO / UART / I2C / I2S / ADC**	40 + 7 pin port GPIO / UART / SPI / I2C / I2S / ADC	40 pin p GPIO / UART /
ADC	**10bit SAR 2 channels**	10bit SAR 2 channels	No (unless using an
Heat sink	**Included**	Included	Option
Size	**85 x 56 mm (3.35 x 2.2 inch)**	85 x 56 mm (3.35 x 2.2 inch)	85 x 56 mm (3.35
Weight	**40g (1.41oz)**	40g (1.41oz)	42g (1.48
Price	**$40**	$37	$35

CPU and RAM performance comparison

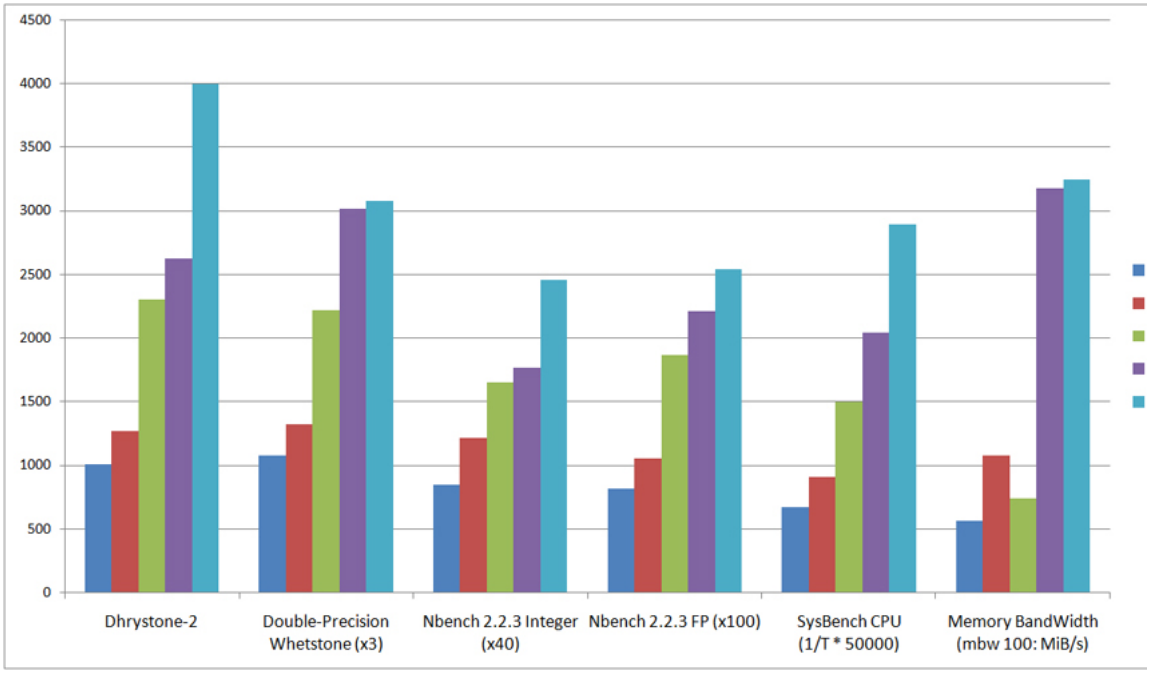
We ran several different benchmarks to measure the computing power on the ODROID-C2. The same tests were performed on the Raspberry Pi 2, ODROID-C1 ODROID-XU4 for easier comparison.

The values of the test results were scaled uniformly for comparison purposes. The computing power of the C2 was measured to be ~2-3 times faster than the la thanks to the 1.5Ghz Cortex-A53 cores and much higher memory bandwidth. The high-performance 2GB DDR3 RAM is an additional advantage allowing most smoothly on the C2. The best performance that we can archive is the below.

MicroSD C1+/C0 Linux
MicroSD C1+/C0 Android
eMMC Module Reader

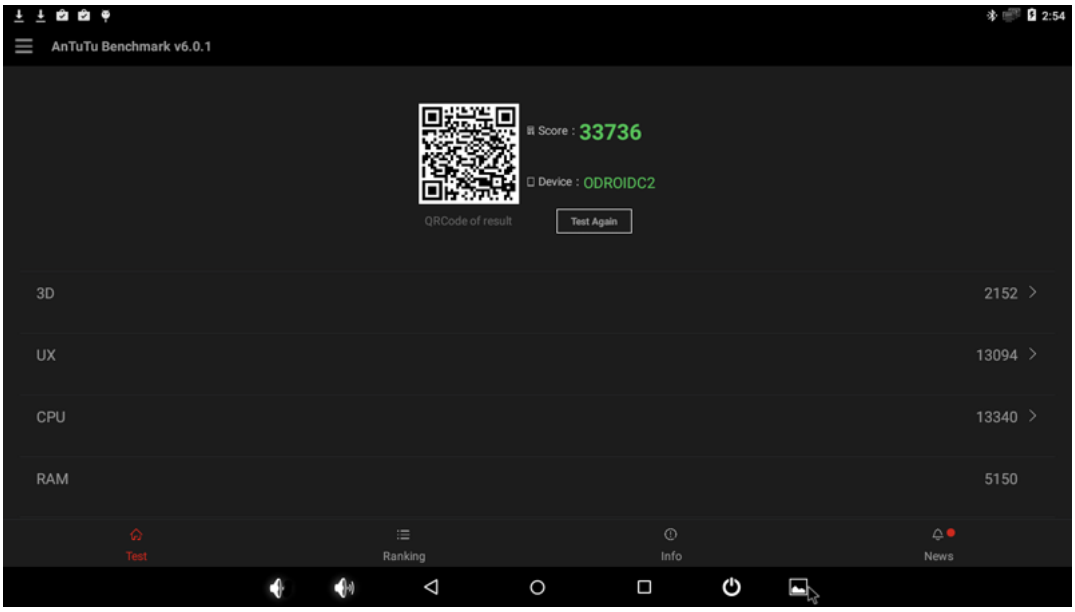
Obsolete products

ODROID
ODROID-7 Full Package
ODROID-A4 Full Package
ODROID-PC Full Package
ODROID-S
ODROID-T
ODROID-VU
ODROID-A Full Package
ODROID-U3
ODROID-U2
ODROID-X2
ODROID-E7 Full Package
ODROID-Q2
ODROID-XU3 Lite
ODROID-XU3
ODROID-XU
ODROID-X
ODROID-XU Lite
ODROID-C1
ODROID-Q
ODROID-XU+E
Smart Power
HiFi Shield for C2/C1+
ODROID-Show
ODROID-UPS
ODUINO One
UPS2 for U3
Weather Board
ODROID-W



Benchmarks (Index Score)	Raspberry Pi 2	ODROID-C1	ODROID-U3	**ODROID-C2**
Dhrystone-2	1006.6	1262.8	2300.7	**2623.9**
Double-Precision Whetstone (x3)	1076.1	1318.8	2217.9	**3015.6**
Nbench 2.2.3 Integer (x40)	840.0	1208.0	1648.0	**1764.0**
Nbench 2.2.3 FP (x100)	809.0	1050.0	1860.0	**2210.1**
SysBench CPU (1/T * 50000)	6669.3	902.2	1497.0	**2040.8**
Memory BandWidth (mbw 100 : MiB/s)	557.1	1069.6	736.6	**3171.6**

Antutu Scores on Android5.1 Lollipop



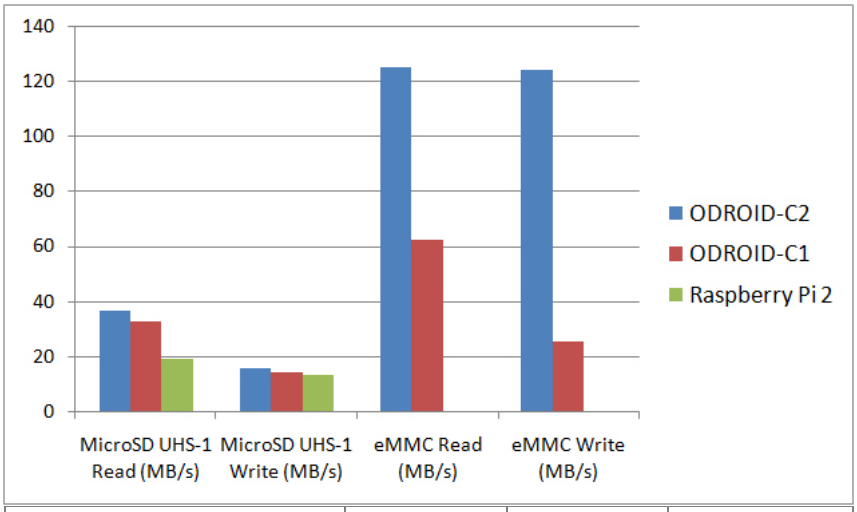
ODROID-C2 shows around 33,700pts while ODROID-C1+ shows around 21,200pts. So you can run Android OS more smoothly. Note that the XU4 shows a thanks to the much faster A15 cores and Mali-T628 MP6 GPU cores. But the ODROID-C2 has higher rate of the “Performance per Dollar” probably.

Storage I/O comparison

The C2 can boot from a MicroSD card or an eMMC module. The MicroSD interface supports the higher performance UHS-1 mode as well. File access of a 512I two different storage options shows distinct performance differences. The eMMC 5.0 storage is ~7x faster than the MicroSD Class-10 card in read tests. The Mic ~2x faster than the MicroSD Class-10 card in read tests. The MicroSD UHS-1 card provides a great low-cost option for many applications!

To obtain the results in the storage I/O comparison graph, type the following lines at a command prompt.
Write speed command :
$ dd if=/dev/zero of=test.tmp oflag=direct bs=8M count=64

Read speed command :
$ dd if=test.tmp of=/dev/null iflag=direct bs=8M count=64



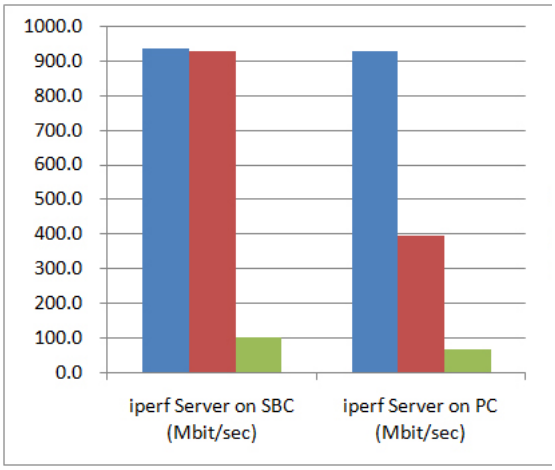
	ODROID-C2	ODROID-C1	Raspberry Pi2
MicroSD UHS-1 Read(MB/s)	36.7	32.5	19.2
MicroSD UHS-1 Write(MB/s)	15.5	14.2	13.2
eMMC Read(MB/s)	125.0	62.2	NA
eMMC Write(MB/s)	124.0	25.2	NA

Ethernet Performance Comparison

The ODRID-C2 has an on-board Gigabit Ethernet controller. Our bi-directional streaming speed was measured at ~900Mbps.
Thanks to the doubled Tx buffer in S905, the upload speed is twice faster than C1.

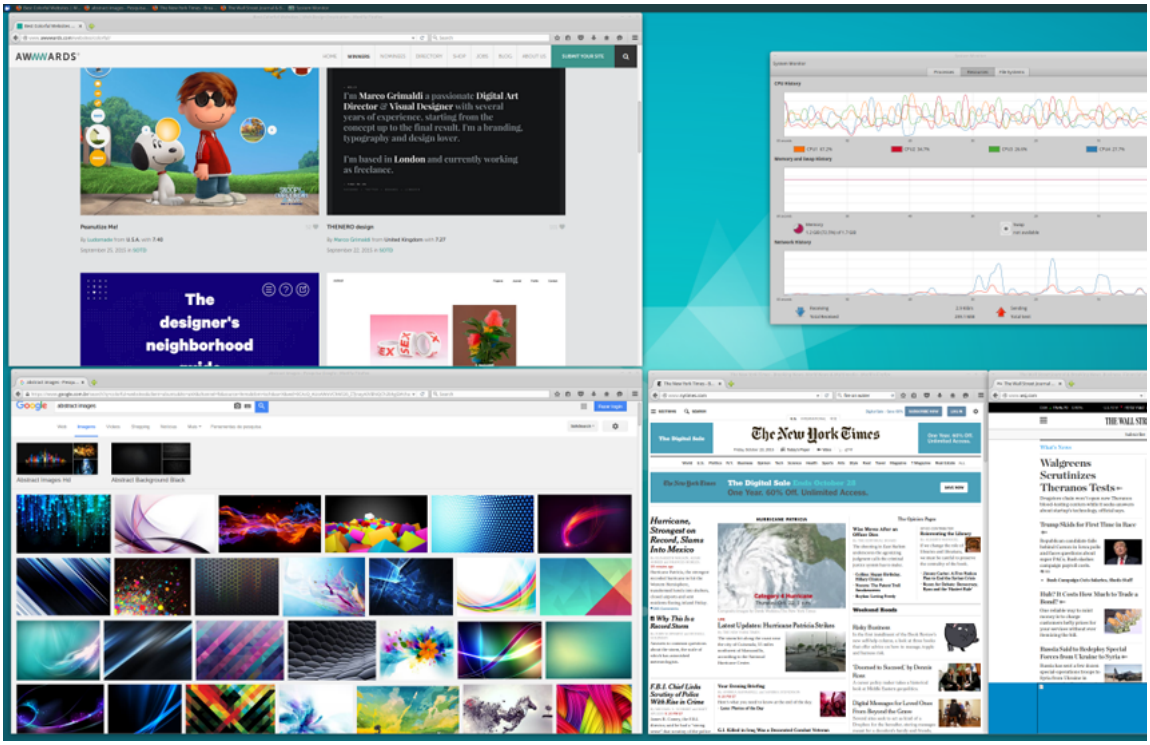
	ODROID-C2	ODROID-C1	Raspberry Pi2
iperf Server on SBC (Mbit/sec)	935.0	9280	98.6
iperf Server on PC (Mbit/sec)	928.0	392.0	66.5

Test condition
Server mode : iperf -s
Client Mode : iperf -c [ip address] -P 10 -W 32k



The 4K HDMI output shows gorgeous desktop screen on 3840 x 2160 UHD resolution.
But the rendering speed is not good due to the limited performance.

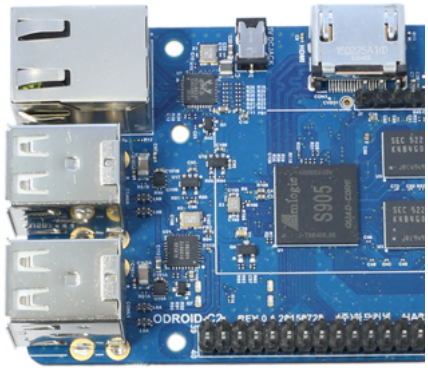
4K video playback on the Android OS is quite stable and fast for 4K/HEVC playback on a real 4K display.



SPECIFICATIONS

Processor	Amlogic S905 SoC ARM® Cortex®-A53 (ARMv8) 1.5GHz Quad Core ARMv8 architecture @28nm wafer
Memory	2Gbyte DDR3 SDRAM
3D Accelerator	ARM® Mali™-450 OpenGL ES 2.0 / 1.1 (3 x Pixel processors and 2 x Vertex shader processors)
Flash Storage	eMMC 5.0 Module Socket : 8~64GB eMMC module (option) MicroSD Card Slot : 8 ~128GB MicroSD UHS-1 (option)
USB2.0 Host	High speed standard A type connector x 4 ports
USB2.0 Device/OTG	High Speed USB standard A type connector x 1 port
Ethernet/LAN	10/100/1000Mbps Ethernet with RJ-45 Jack (Auto-MDIX support)
Video Output	HDMI2.0
Audio Output	HDMI / I2S
Camera Input	USB 720p(option)
IO Expansion	40pin port (GPIO / UART / I2C / ADC) 7pin port (I2S)
WiFi	USB IEEE 802.11b/g/n WLAN with Antenna (USB module) (option)
Power	5V 2A Power (option)
System Software	Ubuntu 16.04 on Kernel 3.14 Android 5.1.x on Kernel 3.14 Full source code is accessible via our Github.
Board Size	85 x 56 x 18 mm approx. (Weight : 40 gram w/o heat sink, 56 gram with heat sink) PCB Thickness : 1.0mm

BOARD REVISION HISTORY



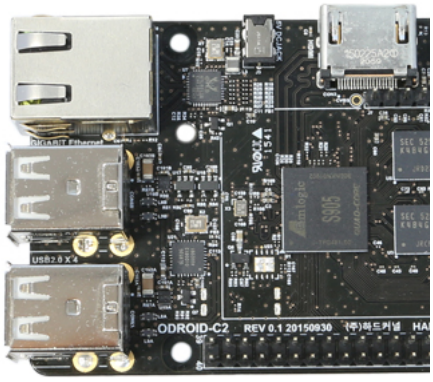
Board Revision 0.0

When we first got the information of S905 and its price, we were so amazed. We had started outlining the product concept. It was rather simple. The ODROID-C1+ fulfils the most of customers' requirement.

The hardware design of the ODROID-C2 was started from May 2015. The performance of the S905 is twice faster than S805, and it support HS400 eMMC Mode which also increase the data transfer speed two time faster. The RAM is also doubled to 2GB on C2 while the C1+ has 1GB. There are 4 x 512MB RAMs, two on top and two on bottom.

The first revision had same blue color as C1+.

This revision was used only for internal software development and evaluation.

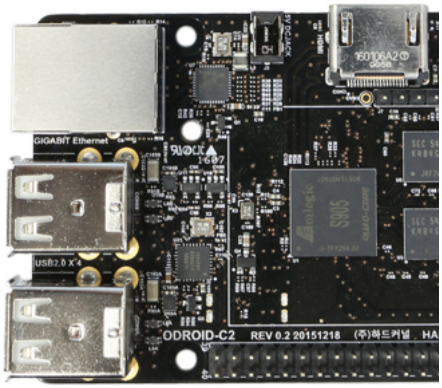


Board Revision 0.1

It took around two months to evaluate and update the hardware design. The first revision board was on our hands in September 2015. The color of the C2 PCB is changed to black from this revision for easier distinguish from the C1+ board.

ARMv8 64bit processor requires more optimization work than our expectation. After 9months software work, we could send around 40 units of this revision to forum members in January 2016. http://forum.odroid.com/viewtopic.php?f=135&t=18683
We give special thanks to our valuable forum members for the feedback and support on this project.

We officially announced this project via our forum in February 2016.



Board Revision 0.2

This is the first mass production version.
A few missing/wrong GPIO pins on the 40pin header are corrected.