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

Exynos5 Octa > **ODROID-XU4 [ODROID-XU4]**

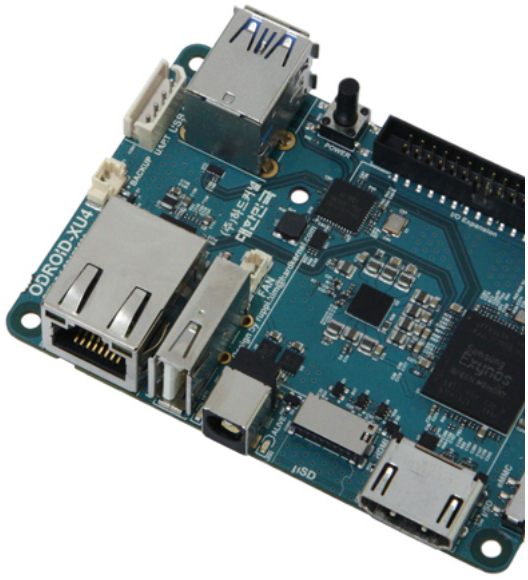
Feature | Technical Detail | FAQs

ODROID-XU4

is powered by ARM® big.LITTLE™ technology, the **Heterogeneous Multi-Processing (HMP)** solution.

ODROID-XU4 is a new generation of computing device with more powerful, more energy-efficient hardware and a smaller form factor.
Offering open source support, the board can run various flavors of Linux, including the latest Ubuntu 15.04 and Android 4.4 KitKat and 5.0 Lollipop.
By implementing the eMMC 5.0, USB 3.0 and Gigabit Ethernet interfaces, the ODROID-XU4 boasts amazing data transfer speeds, a feature that is increasingly advanced processing power on ARM devices.
This allows users to truly experience an upgrade in computing, especially with faster booting, web browsing, networking, and 3D games.

The XU4 is fully software compatible with XU3!
However, the XU4 is more compact, more affordable and more expandable.



* Samsung Exynos5422 Cortex™-A15 2Ghz and Cortex™-A7 Octa core CPUs
* Mali-T628 MP6(OpenGL ES 3.0/2.0/1.1 and OpenCL 1.1 Full profile)
* 2Gbyte LPDDR3 RAM PoP stacked
* eMMC5.0 HS400 Flash Storage
* 2 x USB 3.0 Host, 1 x USB 2.0 Host
* Gigabit Ethernet port
* HDMI 1.4a for display
* Size : 82 x 58 x 22 mm approx.(including cooling fan)

Buy one from your local store : Check your local store

User Manual is available.
http://magazine.odroid.com/odroid-xu4/

Buy Now
$74.00
Worldwide shipping

구매
88,800원(부가세 별도)
한국 배송(Korean only)

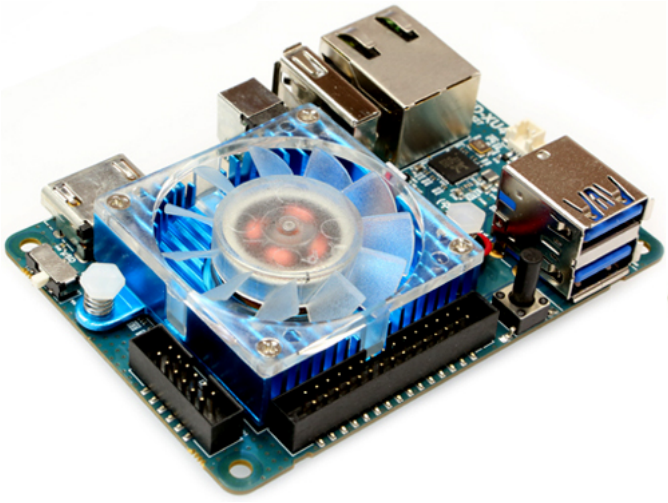
Package include

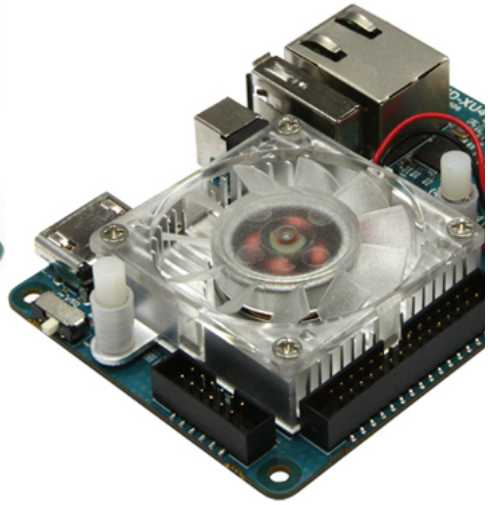
- ODROID-XU4 Board
- Active cooling fan (mounted)
- 5V4A PSU (5.5mm barrel connector) : Choose your country plug type either EU plug, Asia / Korea Round plug or US plug

A MicroSD card or an eMMC module is required to boot the OS. We strongly recommend an eMMC module for faster OS booting, quicker applicatic multi-tasking and efficient access to the cloud.

from end of June, 2016 : the cooling fan is changed to the blue anodised one

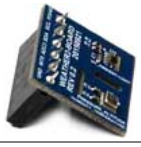
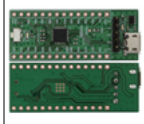
the first version : plain silver cooling fa





NOTE:
1. The active cooling fan is mounted on the XU4 board by default. It spins only when the CPU load is high and the temperature of the CPU hits a minimum thres most fans, a slight hum can be expected when active. The cooling fan is subject to be changed without notice.

OPTIONAL ACCESSORIES(Click the image to the product page)

							
eMMC 5.0 Module XU4 Linux	eMMC 5.0 Module XU4 Android	Micro SD UHS-1 XU4 Linux	XU4 Case Top Half Blue	XU4 Case Top Half Clear	XU4 Case Top Half Black	XU4 Case Base Half Blue	XU4 Case Base Half Clear
							
XU4 Shifter Shield	RTC Backup Battery	Micro USB Cable	USB-CAM 720P	ODROID-VU7 (7inch display + Multi touch)	USB GPS Module	WiFi Module 0	WiFi Module 3
							
30pin and 12pin Header Sockets	ODROID-Show2	Weather Board 2	Expansion Baord	USB IO Board	Universal Motion Joypad	myAHRS+	ODROID-SPDIF
							
DC Plug Cable Assembly 5.5mm	Ethernet Cable CAT6	CloudShell for XU4 SmokyBlue	CloudShell for XU4 SmokyWhite	VuShell for VU7 SmokyBlue	VuShell for VU7 SmokyWhite	USB3.0 to SATA Bridge Board	oCam : 5MP USB 3.0 Camera
							
VU7 Plus: 7inch 1024x600 display with Multi touch	Xprotolab Plain	40x40x25mm Tall Blue Heat Sink	5V/6A Power Supply	USB-UART Module Kit	HDMI Cable (TypeA-A)	oCam-1MGN-U : Global Shutter	M12 Lens Set : 8/6/3/2.65mm
ODROID-VU5 : 5inch 800x480 HDMI display with Multi-touch	WiFi Module 5						

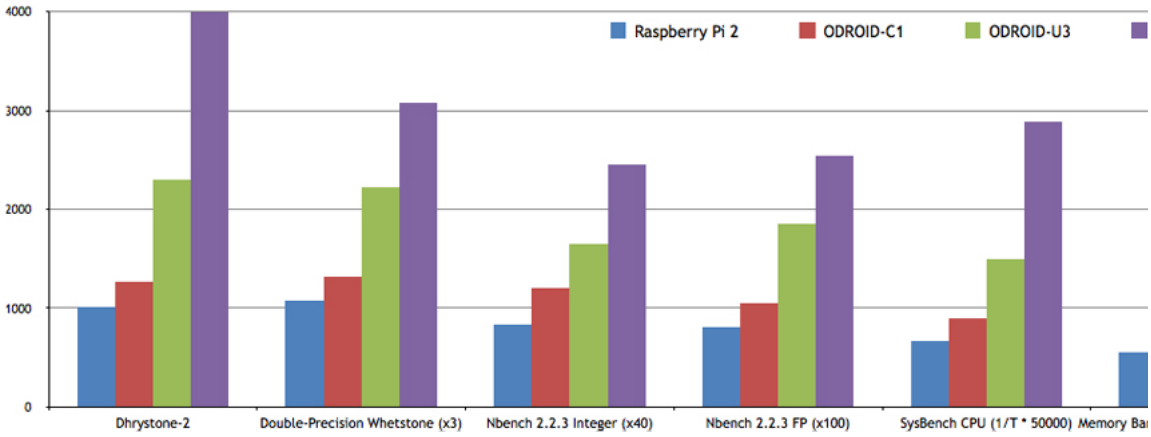
CPU/RAM PERFORMANCE

We ran several benchmarks to measure the computing power on the XU4. The same tests were performed on the Raspberry Pi 2 Model B, ODROID-C1, ODRC XU4.
The values of the test results were scaled uniformly for comparison purposes. The computing power of the XU4 was measured to be ~3-4 times faster than the I thanks to the 2Ghz Cortex-A15 cores and much higher memory bandwidth. Using the XU4 as a computer provides a "desktop like" experience, unlike the slugg single-board computers!
Particularly for developers, compiling code on the XU4 is about 3 to 4 times faster. The high-performance 2GB DDR3 RAM is an additional advantage allowing compiled directly on the XU4.

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

Obsolete products

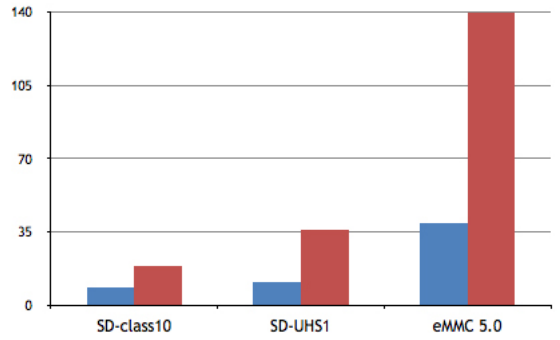
ODROID
ODROID-7 Full Package
ODROID-A4 Full Package
ODROID-PC Full Package
ODROID-S
ODROID-T
ODROID-VU
ODROID-A Full Package
ODROID-U3
ODROID-U2
ODROID-X2
ODROID-E7 Full Package
ODROID-Q2
ODROID-XU3 Lite
ODROID-XU3
ODROID-XU
ODROID-X
ODROID-XU Lite
ODROID-C1
ODROID-Q
ODROID-XU+E
Smart Power
HiFi Shield 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	ODR
Dhrystone-2	1006.6	1262.8	2300.7	3
Double-Precision Whetstone (x3)	1076.1	1318.8	2217.9	3
Nbench 2.2.3 Integer (x40)	840.0	1208.0	1648.0	2
Nbench 2.2.3 FP (x100)	809.0	1050.0	1860.0	2
SysBench CPU (1/T * 50000)	669.3	902.2	1497.0	2
Memory BandWidth (mbw 100: MiB/s)	557.1	1069.6	736.6	3

SD/eMMC PERFORMANCE

The XU4 can boot from a MicroSD card or an eMMC module. An easy-access hardware switch is provided to select the boot interface (MicroSD/eMMC). The Mi
supports the higher performance UHS-1 mode as well.
File access of a 512MB file (read/write) on three 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 MicroSD UHS-1 card is ~2x faster than the MicroSD Class-10 card in rea
UHS-1 card provides a great low-cost option for many applications!



Write command
dd if=/dev/zero of=test oflag=direct bs=8M count=64

Read command
dd if=test of=/dev/null iflag=direct bs=8M

Following eMMC 5.0 test was done with 16GB model.
8GB model is slower than 16GB.

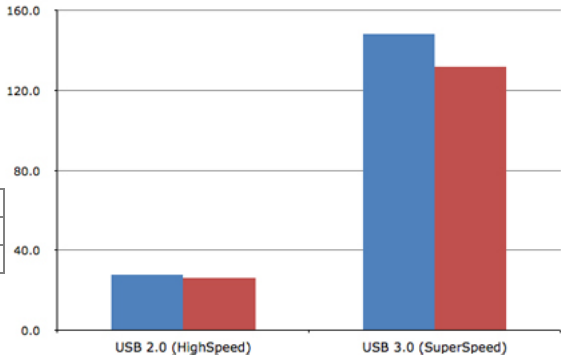
	SD-class10	SD-UH
Write speed (MB/s)	8.5	10.8
Read speed (MB/s)	18.9	35.9

USB 3.0 PERFORMANCE

The XU4 has two standard-sized USB 3.0 SuperSpeed host ports.
To measure the USB 3.0 performance, we connected an SSD via a USB-SATA bridge. We used the Toshiba SSD HDT312 128GB model for this test.

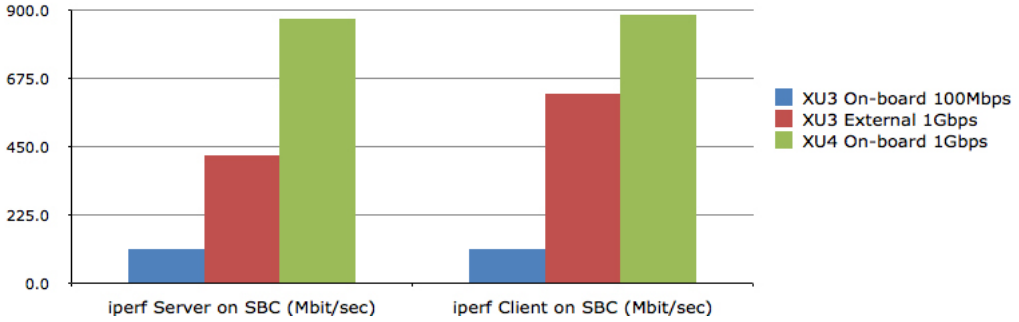
USB 3.0 read access speed is ~5x faster than USB 2.0 on the XU4!

USB storage performance	Read SSD(MB/sec)	Write SSD(MB/sec)
USB2.0 HighSpeed	27.6	26.2
USB3.0 SuperSpeed	148.0	132



ETHERNET PERFORMANCE

The XU4 has an on-board Gigabit Ethernet controller. Our bi-directional streaming speed was measured at ~880Mbps.
Thanks to the advanced technology of the RTL8153 controller, the XU4's Ethernet controller easily outperforms the connectivity solutions of prior generations.



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

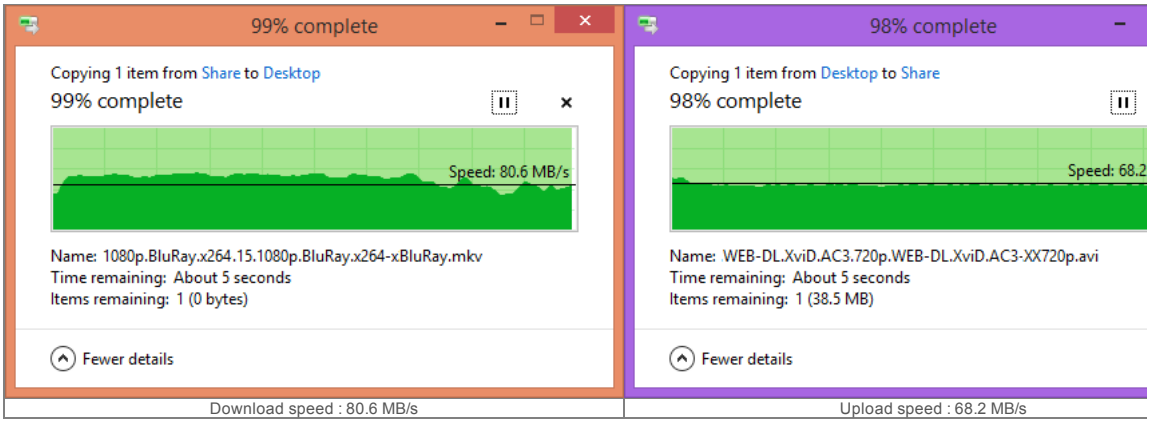
Ethernet performance	XU3 On-board 100Mbps	XU3 External 1Gbps	XU4 On-board 1Gbps
iperf Server on SBC (Mbit/sec)	114.0	419	869.0
iperf Client on SBC (Mbit/sec)	114.0	625	885.0

NETWORK STORAGE PERFORMANCE

These days, network storage applications like NAS and cloud services are popular. We ran the famous OMV (Open Media Vault) OS on the XU4 to measure ne performance.
An SSD was connected to the XU4 via a USB 3.0 to SATA bridge. The Gigabit Ethernet port was connected to a Windows 8 PC via a simple switching hub.

We sent a big 1.6GB file from the XU4 to the PC via a Samba connection. This resulted in a download speed of ~75-85MB/sec.
The upload speed was measured at ~70MB/sec. Even though this performance is great, we are working on optimizing it even further.

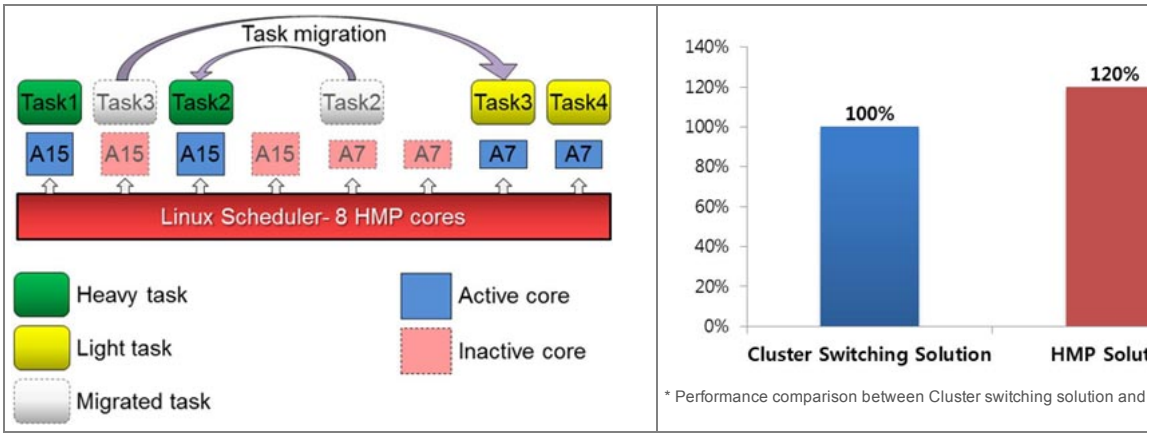
The XU4 is a great solution to make a DIY personal cloud storage server!



Download speed : 80.6 MB/s | Upload speed : 68.2 MB/s

Heterogeneous Multi-Processing (HMP) solution

The ODROID-XU4, equipped with four big cores (ARM® Cortex® -A15™ up to 2.0GHz) and four small cores (ARM® Cortex® -A7™ up to 1.4 GHz), provides im capabilities while maintaining the most efficient power consumption available. With the big.LITTLE™ HMP solution, the Exynos-5422 can utilize a maximum of manage computationally intensive tasks.

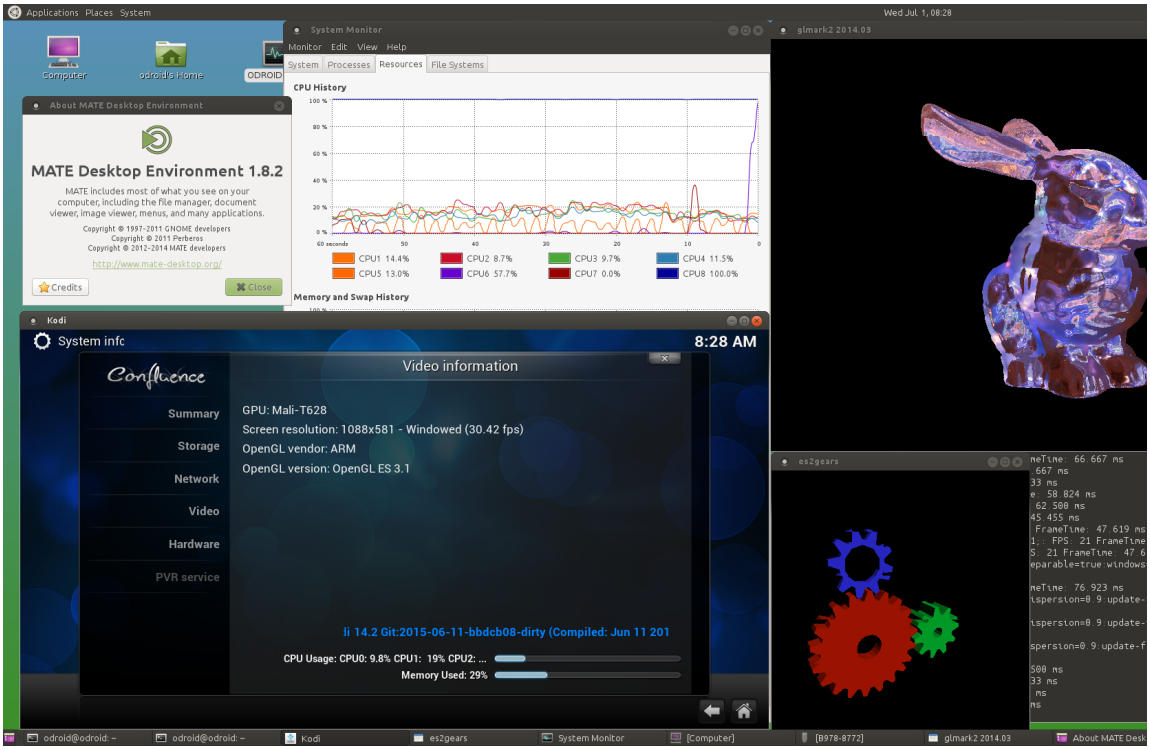


* Performance comparison between Cluster switching solution and

OpenGL ES 3.0 and OpenCL 1.1 for Linux and Android platforms

The ARM® Mali™-T628 MP6 GPU offers key API support for OpenGL ES 1.1, OpenGL ES 2.0 and OpenGL ES 3.0, OpenCL 1.1 Full Profile and Google Rende GPU of choice for use in the next generation of market-leading devices, optimized to bring breathtaking graphical displays to consumer applications such as 3D computing, augmented reality, procedural texture generation and voice recognition. You can download the full featured OpenGL ES and OpenCL SDK from AR website. It's free!

This screen-shot shows OpenGL-ES applications and the Kodi media player with Ubuntu 15.04 Mate desktop on the HMP enabled Kernel 3.10 LTS.



Mainline Kernel boots (Experimental)

The latest Kernel 4.2.0 RC1 runs on the XU4. Look at this booting log. You can scroll the log.

```
[    0.000000] Booting Linux on physical CPU 0x100
[    0.000000] Linux version 4.2.0-rc1+ (tobetter@hkxeon) (gcc version 4.9.2 20140904 (prer
[    0.000000] CPU: ARMv7 Processor [410fc073] revision 3 (ARMv7), cr=10c5387d
[    0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction cache
[    0.000000] Machine model: Hardkernel Odroid XU4
[    0.000000] cma: Reserved 64 MiB at 0xba800000
[    0.000000] Memory policy: Data cache writealloc
[    0.000000] Samsung CPU ID: 0xe5422001
[    0.000000] On node 0 totalpages: 514560
[    0.000000] free_area_init_node: node 0, pgdat c07f12c0, node_mem_map ee81f000
[    0.000000]   Normal zone: 1520 pages used for memmap
[    0.000000]   Normal zone: 0 pages reserved
[    0.000000]   Normal zone: 190464 pages, LIFO batch:31
[    0.000000]   HighMem zone: 324096 pages, LIFO batch:31
[    0.000000] Running under secure firmware.
[    0.000000] PERCPU: Embedded 11 pages/cpu @ee78f000 s14336 r8192 d22528 u45056
[    0.000000] pcpu-alloc: s14336 r8192 d22528 u45056 alloc=11*4096
```

Grab the Kernel source code from our Github if you want to try.
https://github.com/hardkernel/linux/commits/odroidxu4-v4.2-rc1

This experimental Kernel 4.2 support the SMP 4 x A15 cores, USB 3.0, Gigabit Ethernet and some other basic features.
But HDMI, GPU, VPU(MFC), and HMP are not working. So it is useful only for the headless applications probably.
The OMV(Open Media Vault) OS will run on the latest mainline Kernel.

INTRODUCTION VIDEOS

ODROID-XU4 Hardware Introduction

Ubuntu 15.04 (Vivid Vervet) with MATE desktop

Ubuntu 15.04 Mate Desktop for ODROID-XU3

Web Browsing and XMBC on Linux

ODROID-XU3 Performance

Robot OS : OpenNI and OpenCV

ODROID-XU3 : ROS

Make 42inch Tablet

Minecraft on 42-inch Tablet

Android Portrait Mode

ODROID-XU3 : Android Portrait Mode

Video Surveillance System

MotionEye OS(oCam + odroid XU4)

Augmented Reality Using oCam and ODROID-XU4

ARUCO + ogre3D (oCam + odroid XU4)

SPECIFICATIONS

Processor	Samsung Exynos5422 ARM® Cortex™-A15 Quad 2.0GHz/Cortex™-A7 Quad 1.4GHz
Memory	2Gbyte LPDDR3 RAM PoP (750Mhz, 12GB/s memory bandwidth, 2x32bit bus)
3D Accelerator	Mali™-T628 MP6 OpenGL ES 3.0 / 2.0 / 1.1 and OpenCL 1.1 Full profile
Audio	HDMI Digital audio output. Optional SPDIF optical output (USB module)
USB3.0 Host	SuperSpeed USB standard A type connector x 2 port
USB2.0 Host	HighSpeed USB standard A type connector x 1 port
Display	HDMI 1.4a with a Type-A connector
Storage (Option)	eMMC module socket : eMMC 5.0 Flash Storage (up to 64GByte) MicroSD Card Slot (up to 64GByte)
Fast Ethernet LAN	10/100/1000Mbps Ethernet with RJ-45 Jack (Auto-MDIX support)
WiFi (Option)	USB IEEE 802.11b/g/n 1T1R WLAN with Antenna (USB module)
HDD/SSD SATA interface (Optional)	SuperSpeed USB (USB 3.0) to Serial ATA3 adapter for 2.5"/3.5" HDD and SSD storage
Power (included)	5V 4A Power
System Software	Ubuntu 15.04 + OpenGL ES + OpenCL on Kernel LTS 3.10 Android 4.4.2 on Kernel LTS 3.10 Android 5.1 is available as a community driven OS development. Full source code is accessible via our Github.

Size	82 x 58 x 22 mm approx. (weight: 60gram including cooling fan approx. 38gram without cooler)