安谋科技 arm CHINA × CIX 芯希科技 × radxa 瑞莎计算机

Radxa Orion O6
Product Introduction


安谋科技
arm CHINA
×
CIX
此芯科技
×
radxa®

Excellent Abilities of the Technical Team

Profound Understanding of Open Source

Ambitious Goals

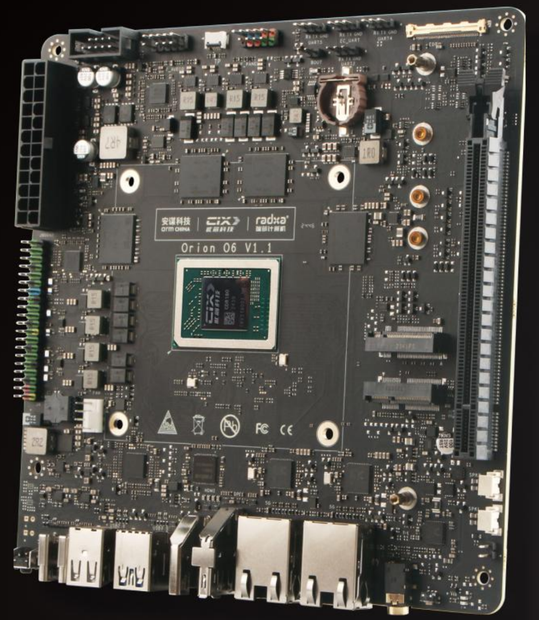
2024.7.30 — Official Project Initiation

2024.9.29 — First Prototype Boot OS

Today — Mass Production

Radxa Orion O6

WORLD'S FIRST



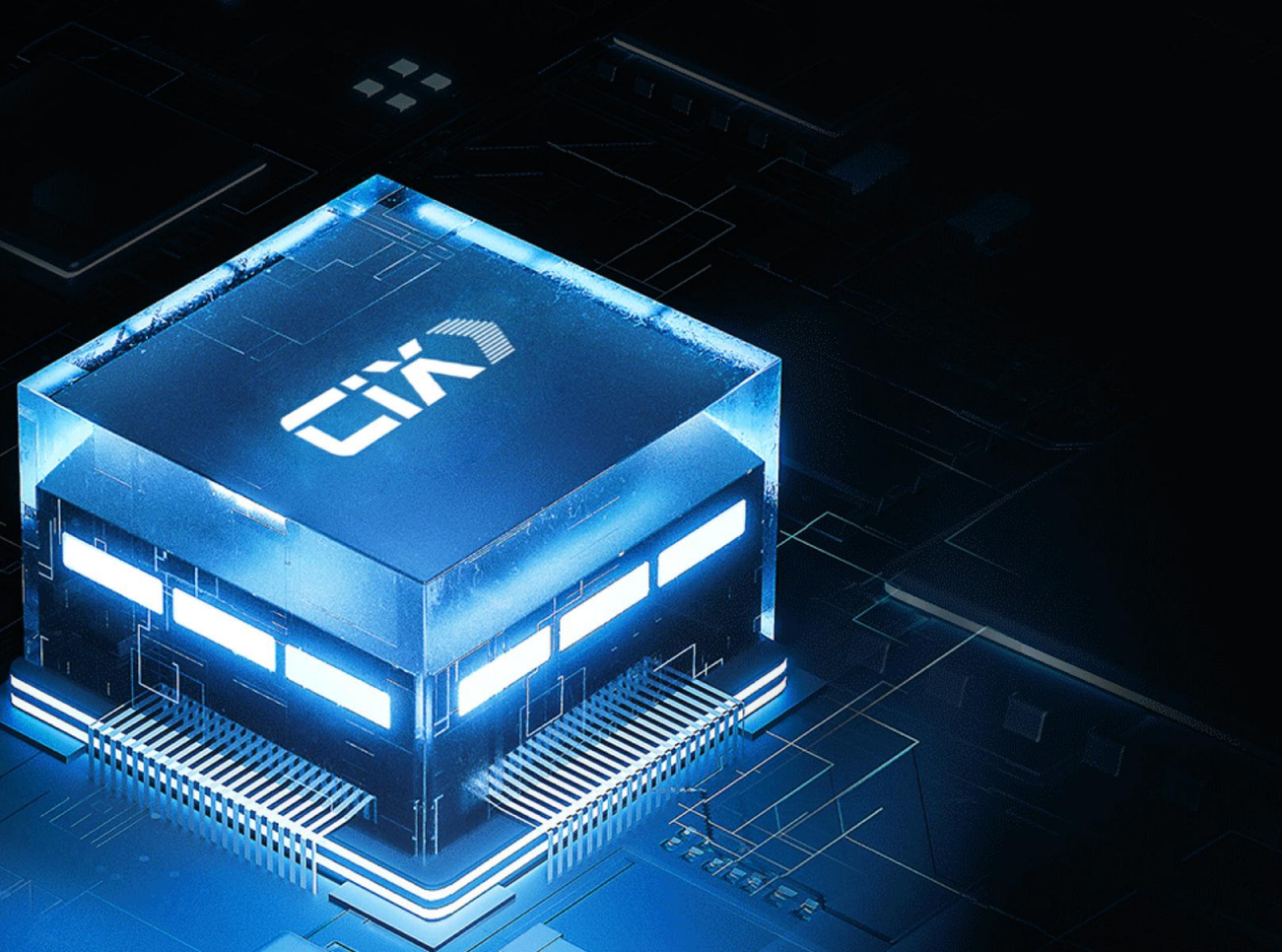
Open Source
ARM V9 Motherboard

RICH INTERFACES
POWERFUL PERFORMANCE

CPU
12 Cores

GPU
Desktop

NPU
30 Tops

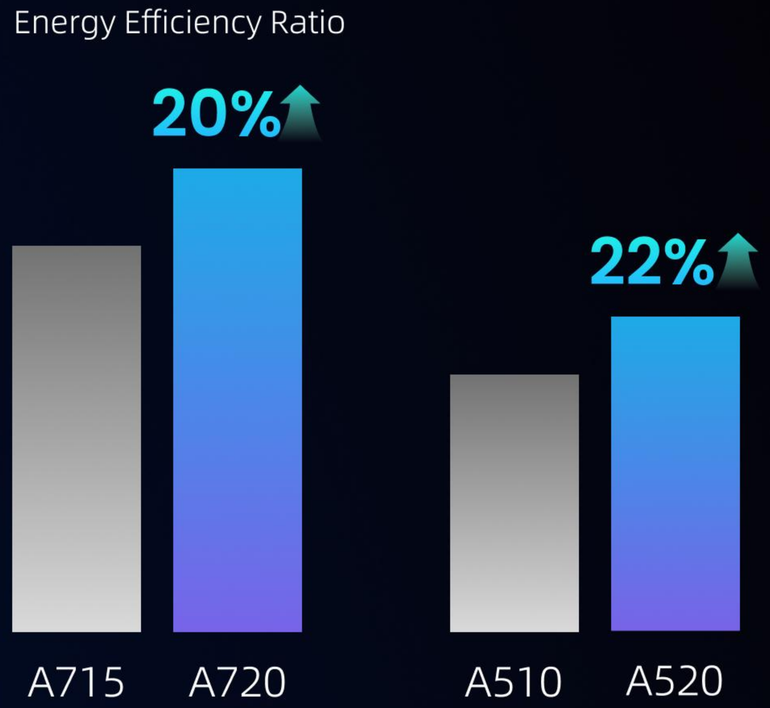


CPU

ARMv9.2 Architecture

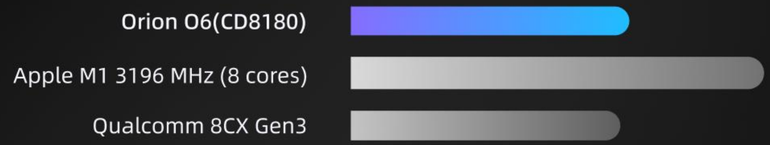
CPU

ARMv9.2 Architecture



CIX P1 VS Apple M1 VS Qualcomm 8CX Gen3

Single Threaded



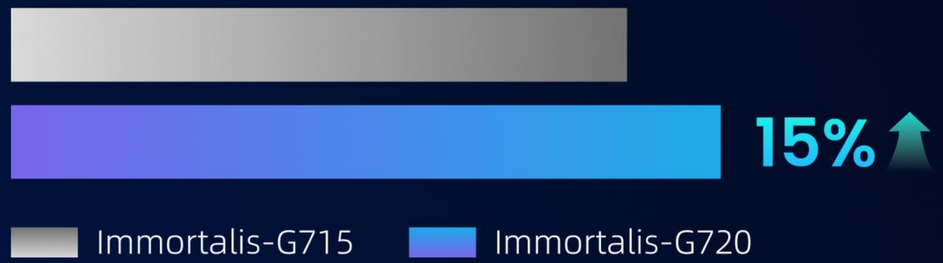
Multi-Core Score

GPU

Immortalis-G720

- High-performance Desktop-grade GPU
- Meet the Demands of Extreme Graphics Rendering and General AI Computing

OpenGL ES · OpenCL · OpenGL · Vulkan



GPU Immortalis-G720

- High-performance Desktop-grade GPU
- Meet the Demands of Extreme Graphics Rendering and General AI Computing

Radxa Orion O6

Heterogeneous AI Computing Power is up to 45 TOPs

Meeting AI PC computing power requirements

Radxa Orion O6

Supported AI Large Models

- Can Successfully Run Large Models within 10 Billion Parameters
- The Maximum Performance Can Reach up to 30 Tokens per Second (Based on Qwen 2 - 1.5B)

Radxa Orion O6

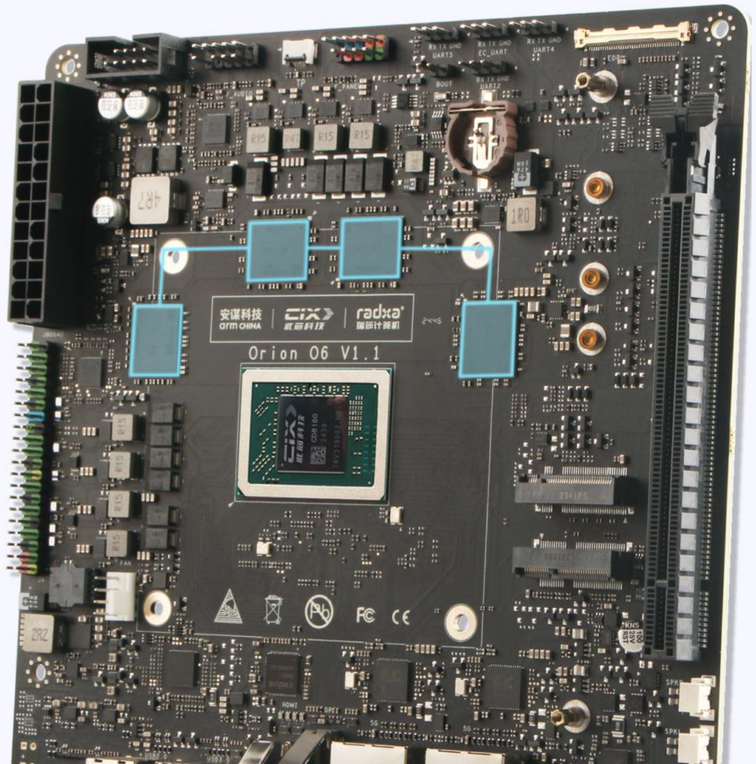
Multimedia

- Hardware Decoder:
  - Resolution: Up to 8K@60fps
  - Formats: AV1, H.265, H.264, VP9, VP8, H.263, MPEG-4, MPEG-2
- Hardware Encoder:
  - Resolution: Up to 8K@30fps
  - Formats: H.265, H.264, VP9, VP8

Radxa Orion O6

LPDDR5

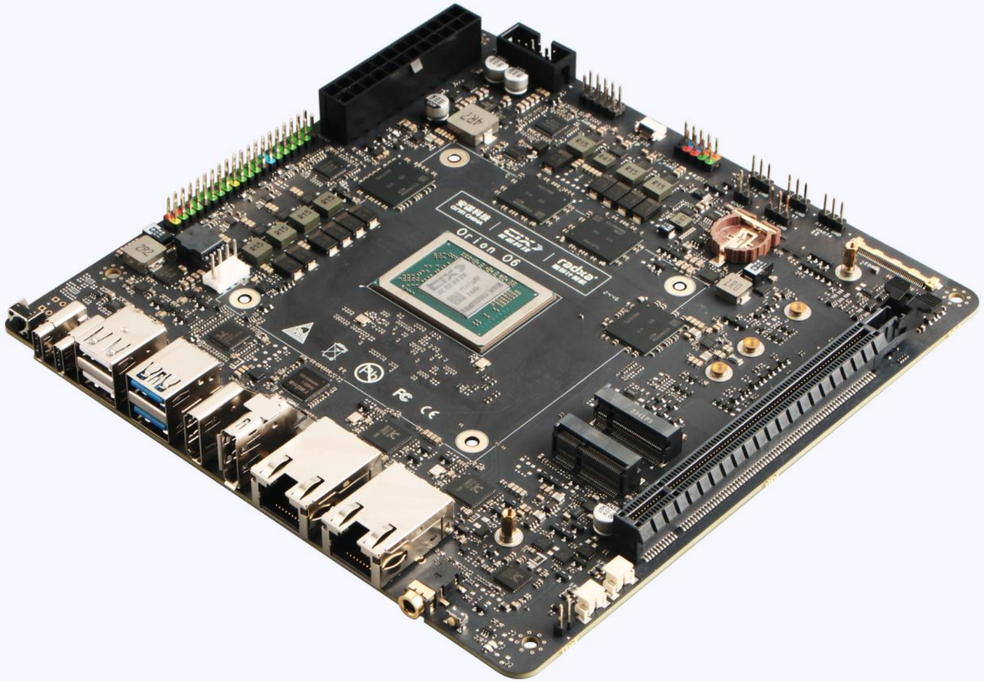
Memory Bus Width: 128 bit
Bandwidth > 100GB/s
Frequency > 5500MT/s
Maximum Capacity of 64GB



Radxa Orion O6

Interfaces

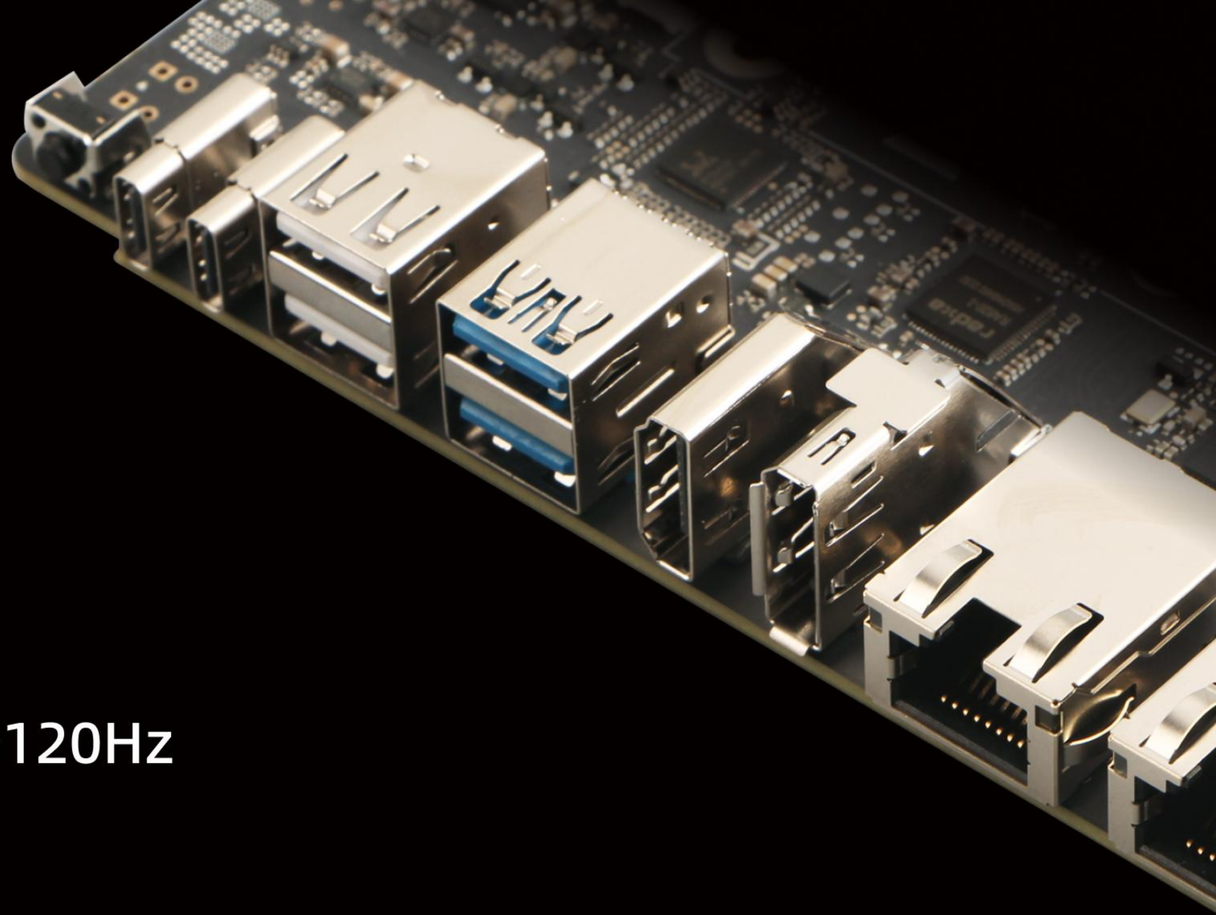
-1 x HDMI 2.0 up to 4K@60Hz
-2 x 5 Gigabit Ethernet Ports
-1 x DP 1.4 up to 4K@120Hz
-1 x PCIe Gen4 X16 Slot with PCIe Gen4x8
-1 x eDP up to 4K@60Hz
-1 x M.2 M KEY Connector with PCIe Gen4x4
-2 x USB Type-C(1xFull-featured)
-1 x M.2 E KEY Connector with PCIe Gen4x2 + USB for Wi-Fi 7
-2 x USB2.0
-2 x USB3.2 Gen2 (10Gbps)
-40 Pin GPIO Header



Display

1 x HDMI 2.0 up to 4K@60Hz
1 x DP 1.4 up to 4K@120Hz
1 x eDP up to 4K@60Hz
1 x USB Type-C

Up to 4x Display, DP Display Up to 4K@120Hz



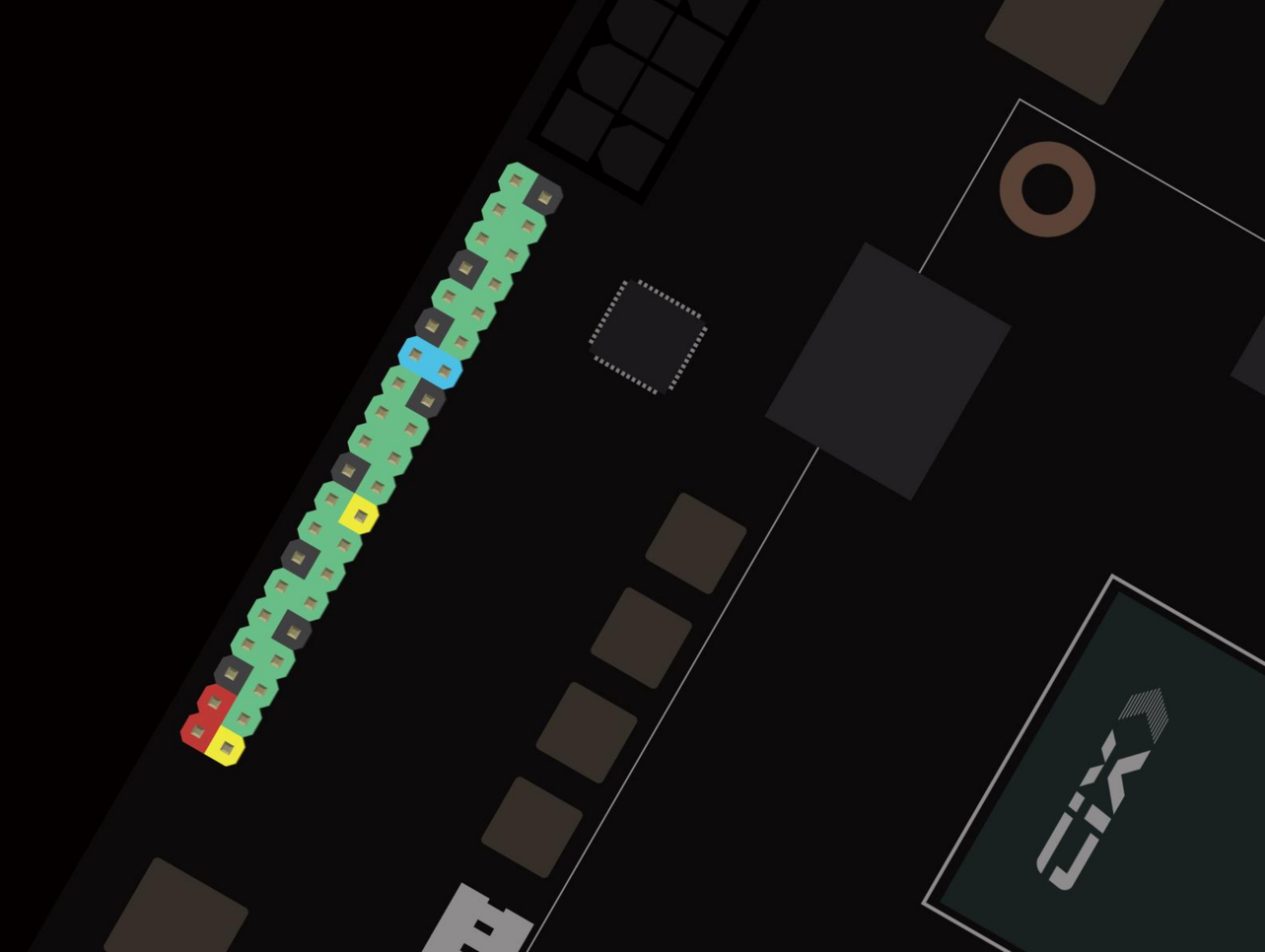
PCIe Expansion

PCIe 4.0

1 x PCIe Gen4 X16 Slot with PCIe Gen4x8
1 x M.2 M KEY Connector with PCIe Gen4x4
1 x M.2 E KEY Connector with PCIe Gen4x2 + USB

40 Pin GPIO Header

3 x UART
3 x I2C
2 x I2S
2 x PWM
1 x SPI
10+ x GPIO
...



Radxa Orion O6

Native Linux / Debian support with UEFI / BIOS

Supported OS:

debian fedora

Upcoming Support OS:

android Ubuntu deepin

Windows openKylin

Power Supply

24-Pin ATX Power Connector

Type C PD Power Supply

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Designing ARM Motherboards with PC Architecture

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How We Build ARM Motherboard with PC Architecture

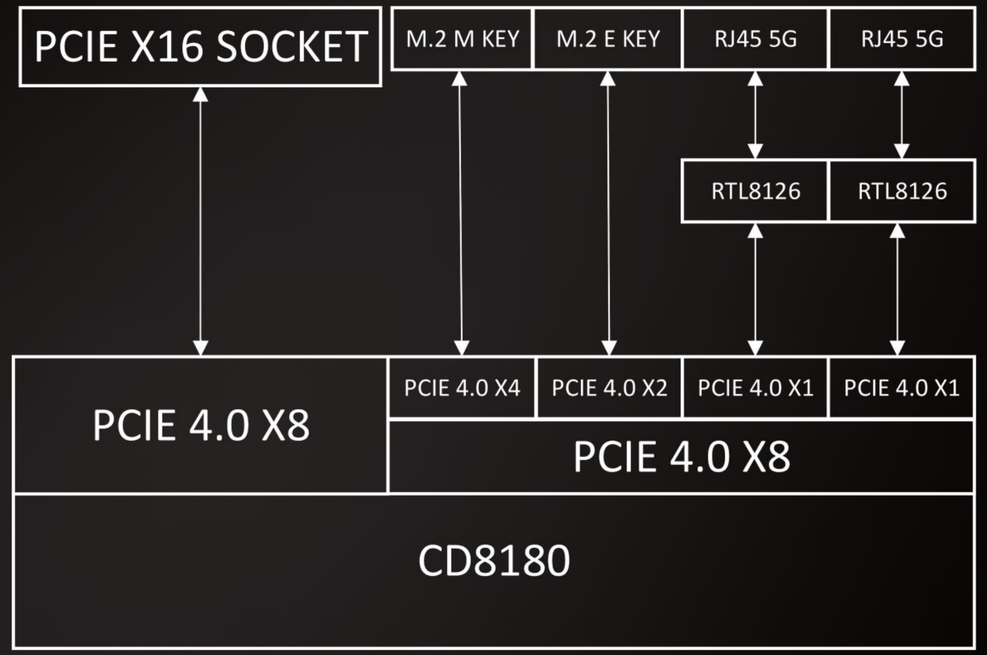
Hardware

Radxa Orion O6

High Speed I/O

PCIe Gen4

X8 + X4 + X2 + X1 + X1

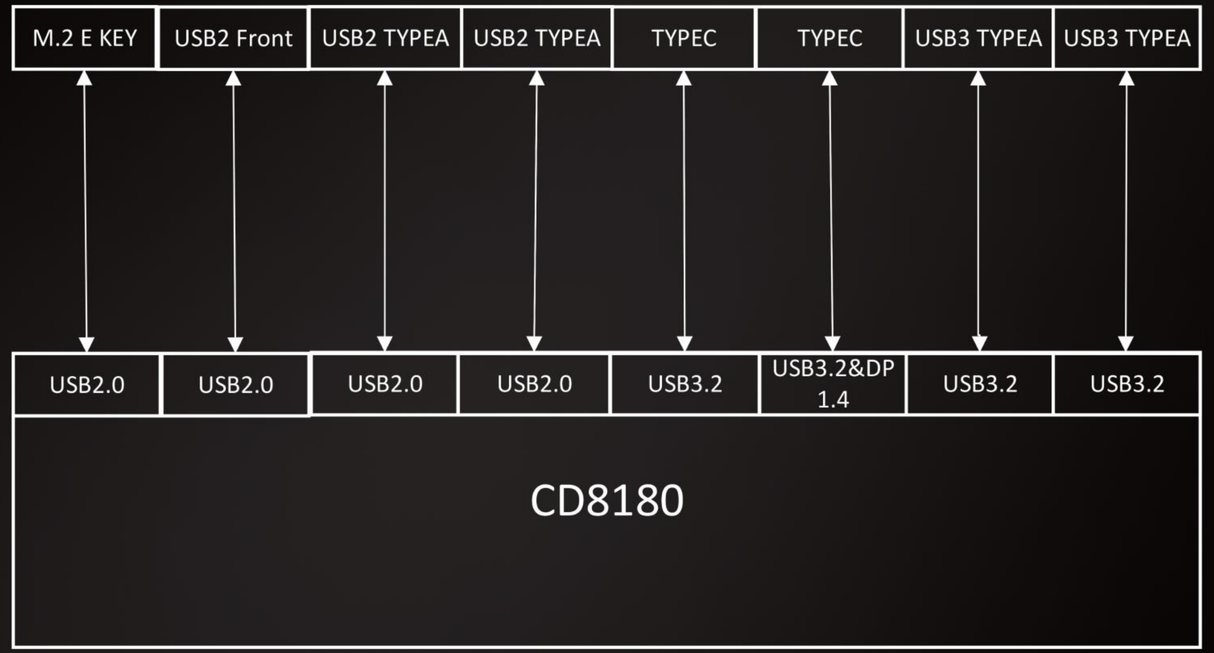


Hardware

Radxa Orion O6

USB

-Front_USB
-USB3.2/2 Type-A
-Full Mode Type-C
-E-Key

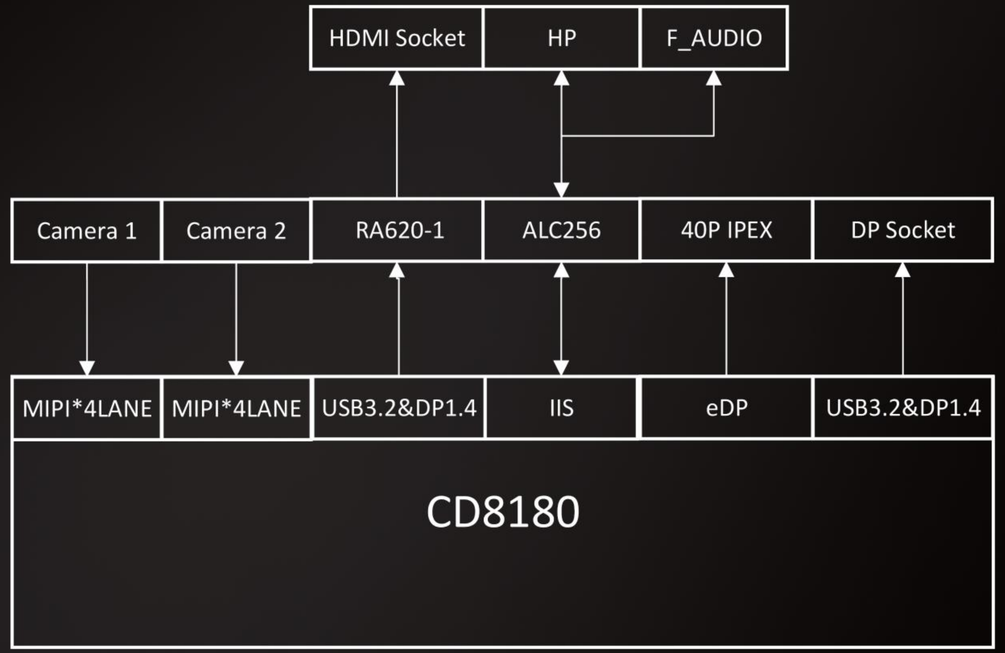


Hardware

Radxa Orion O6

Video Output / Input

-HDMI
-DP
-eDP
-USB-C with DP
-Camera
-F_Audio



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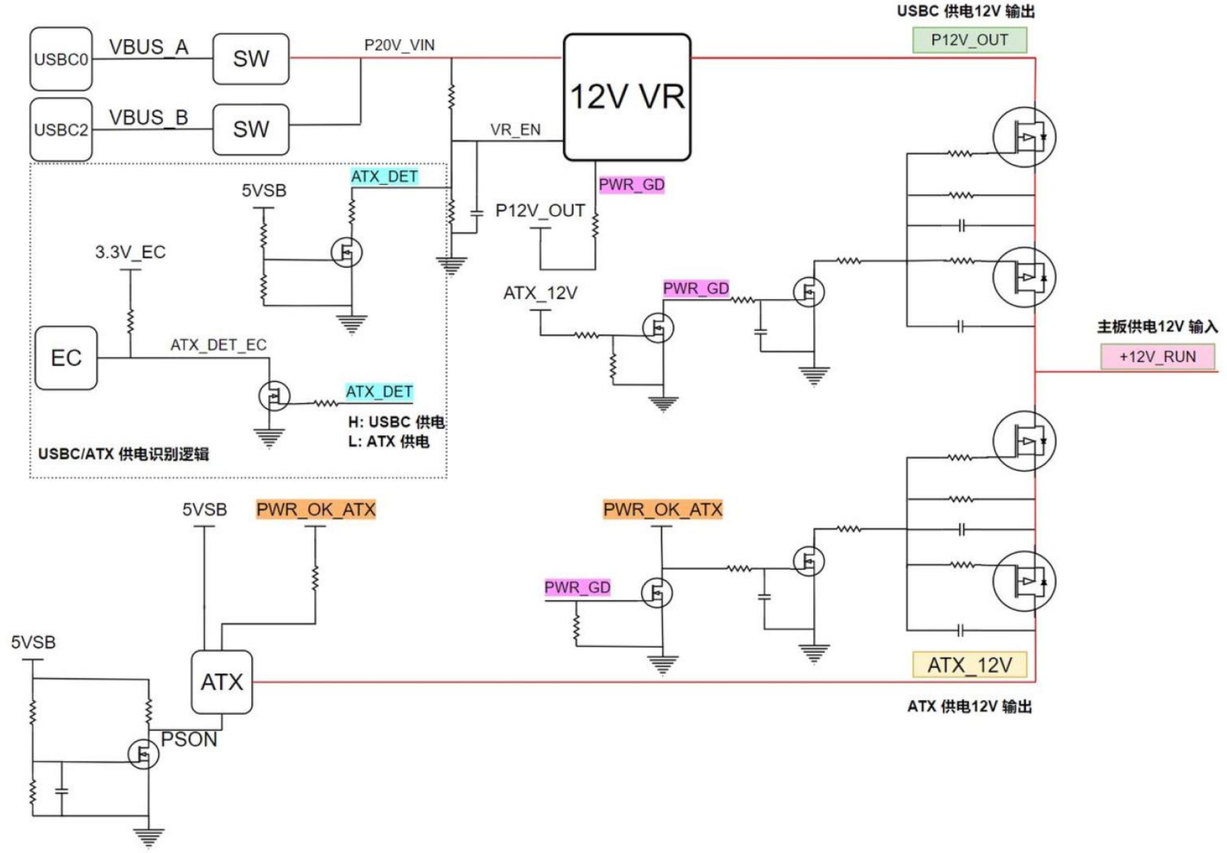
Power Supply Priority Management

ATX > Type-C

Stable Power Supply Without Backflow



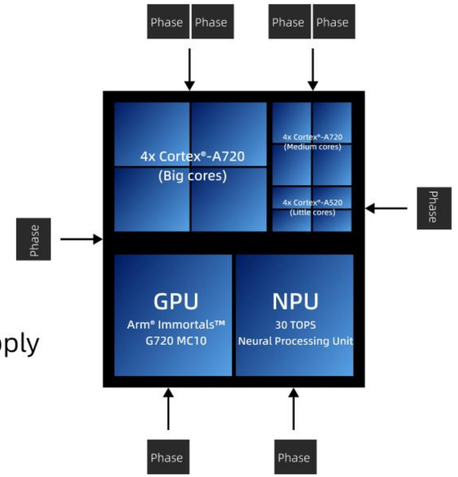
Power Supply Design

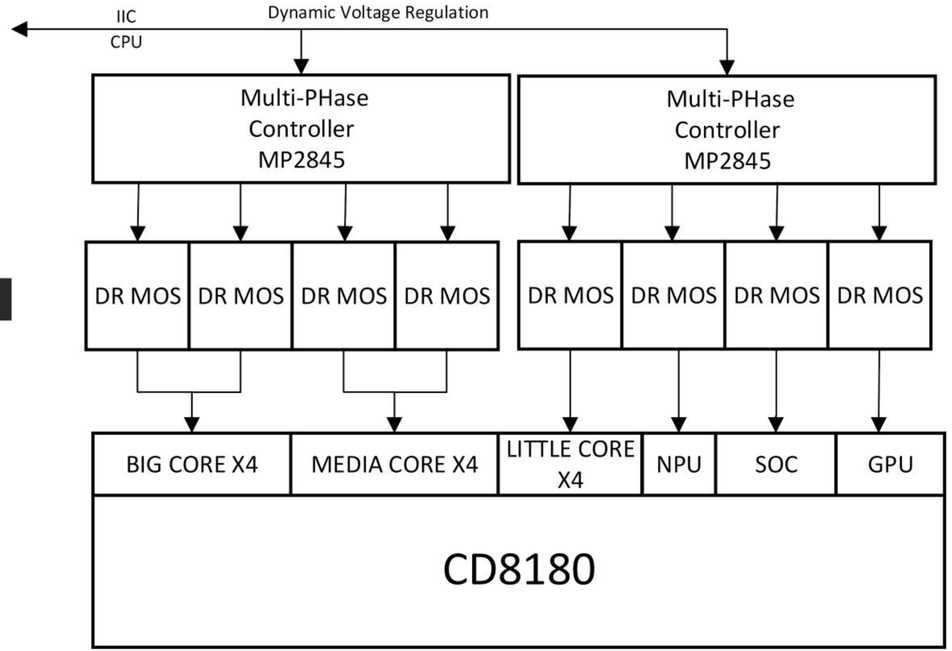
Radxa Orion O6

8-Phase

Peak Current of Up to 37A per Phase
Meet the Transient High Current for Core Power Supply

Dynamic Power Consumption Management





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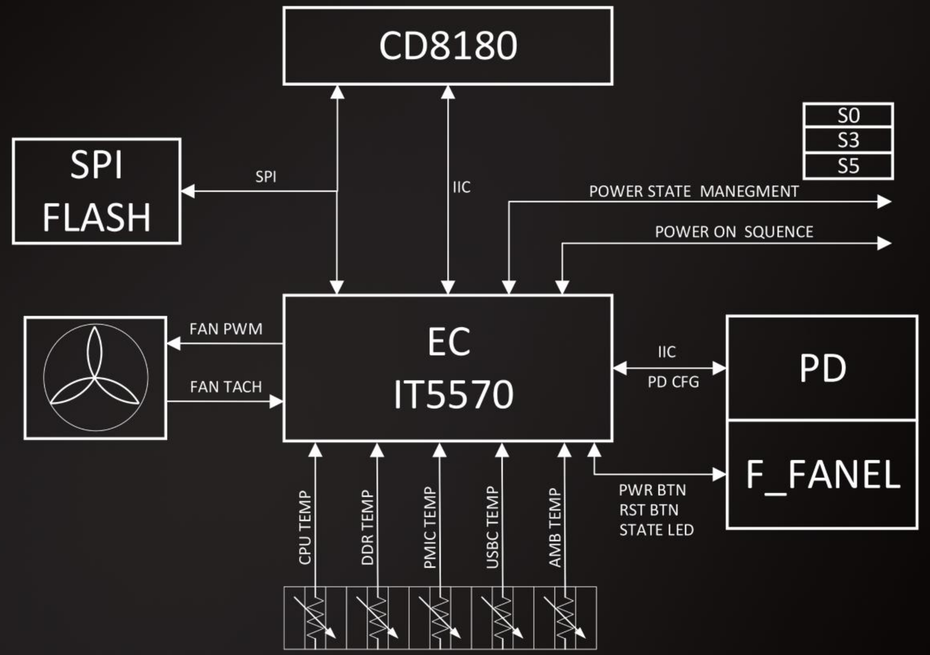
EC Motherboard Manager

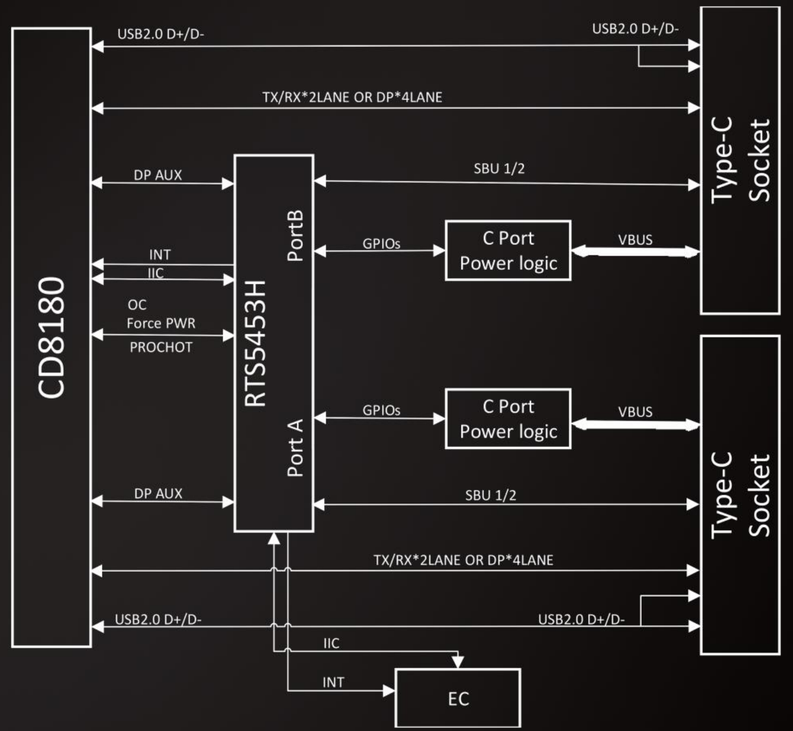
Fan Management, Temperature Detection, Voltage Monitoring of Key Parts, Board ID Management, Power Management, Power-on Sequence Control, Reset Control, S0/S3/S5 State Control



Radxa Orion O6

Full-featured Type-C

- Power Supply and External Power Supply
- Priority Management
- Dual Type-C Design
- USB/DP Switching



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Open Hardware Schematics

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Radxa Orion O6
An Easy-to-Develop Platform

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BSP Development

Radxa Orion O6

We Are the First Users of Our Products


CIX

Radxa Orion O6 Software Development Role Configuration

Embedded Systems Development Role

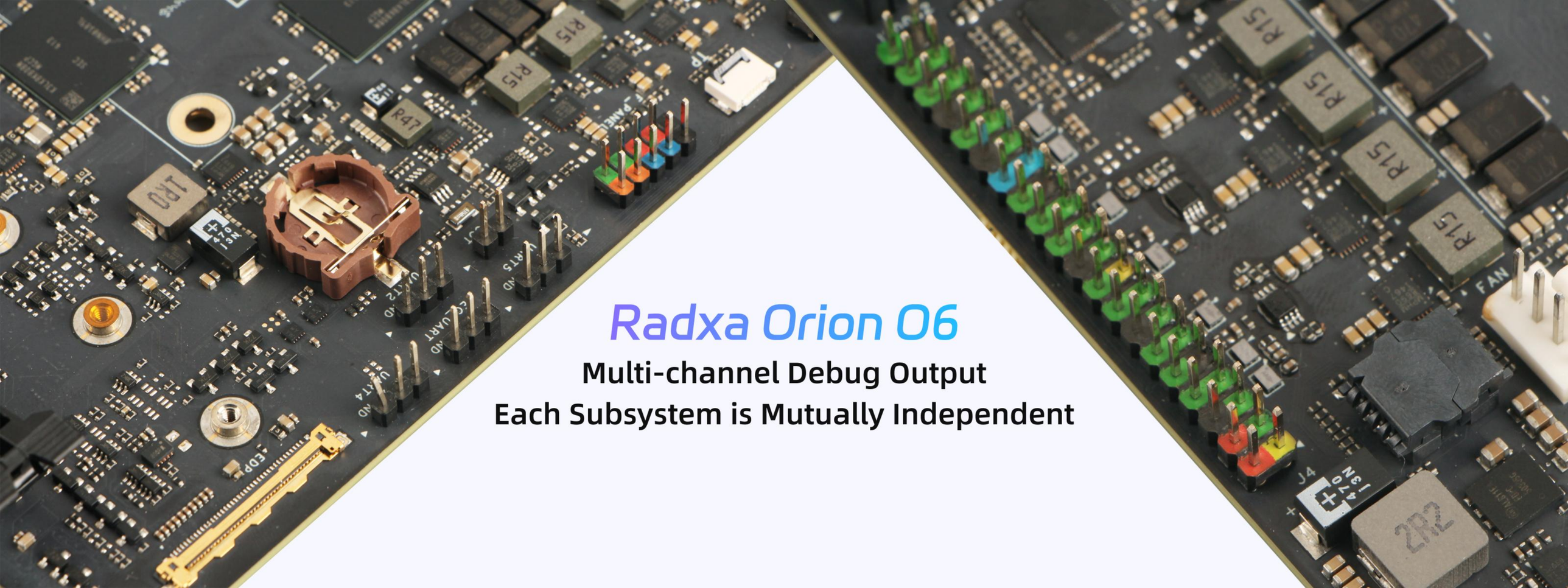
BSP Engineer

Radxa Orion O6 Development Role Configuration

EC Development Engineer

BIOS Development Engineer

OS Development Engineer



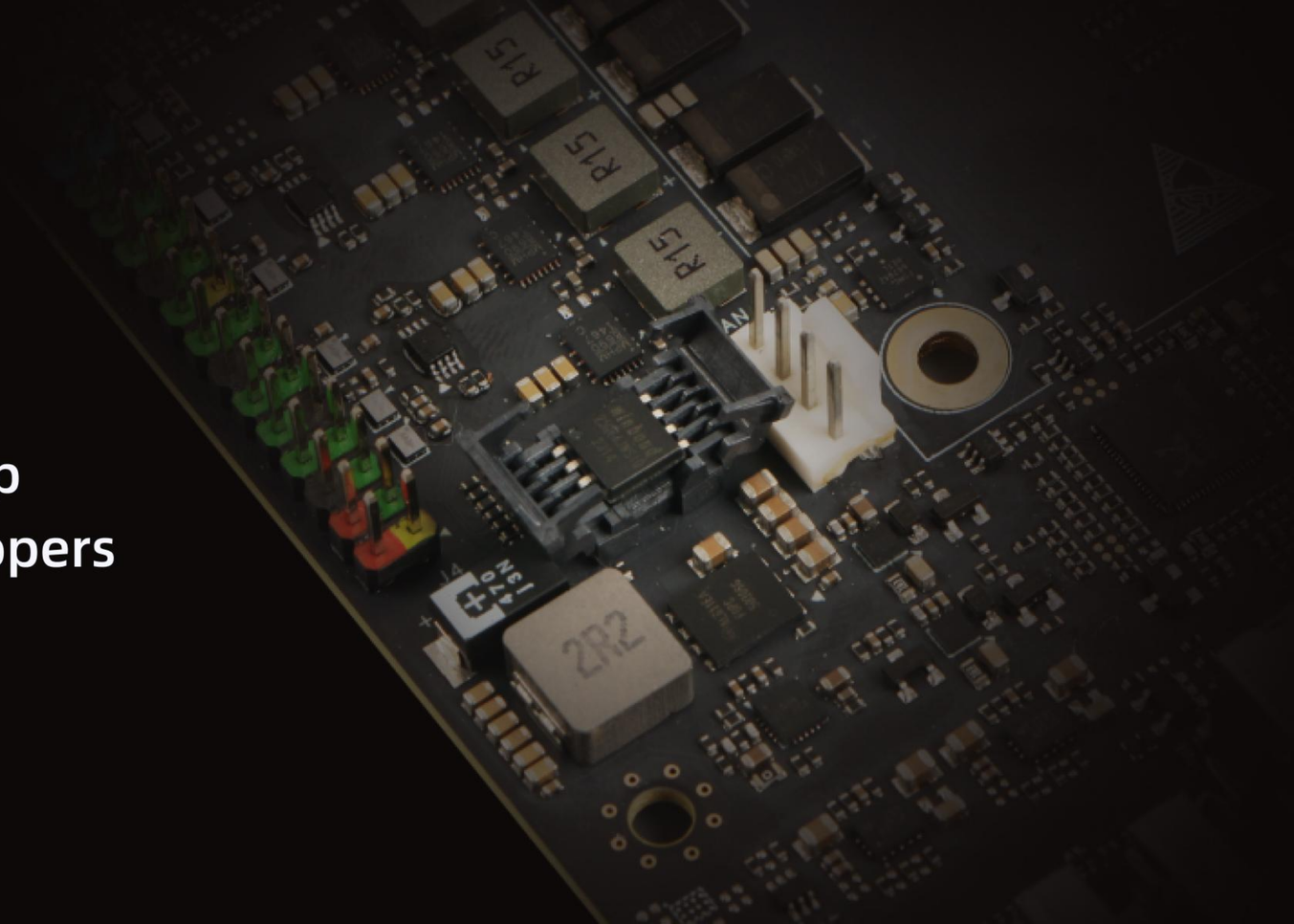
Radxa Orion O6

Multi-channel Debug Output

Each Subsystem is Mutually Independent

Radxa Orion O6

Replaceable BIOS SPI Flash Memory Chip
Reduce the Cost of Trial and Error for Developers



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Operating System Development

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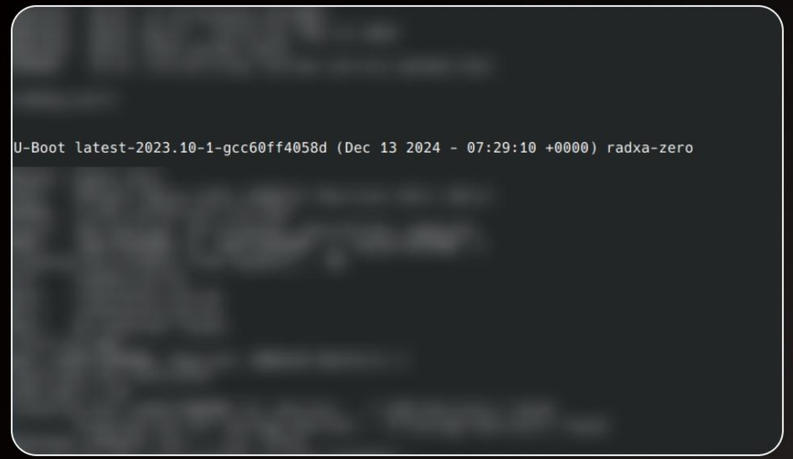
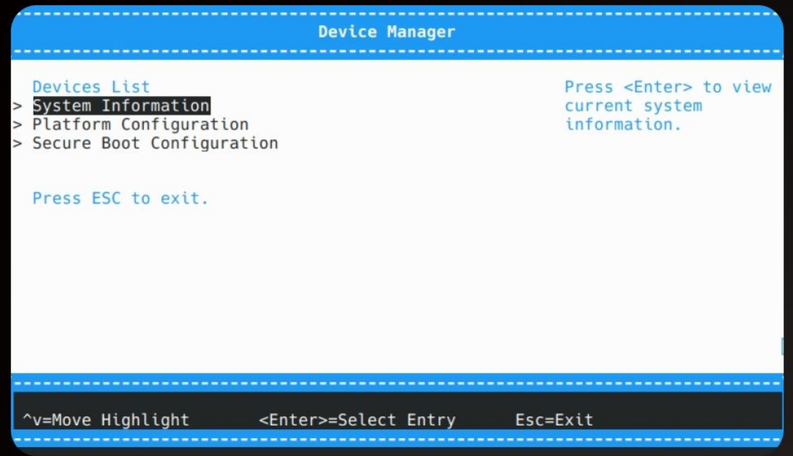
Boot Chain Based on EDK2

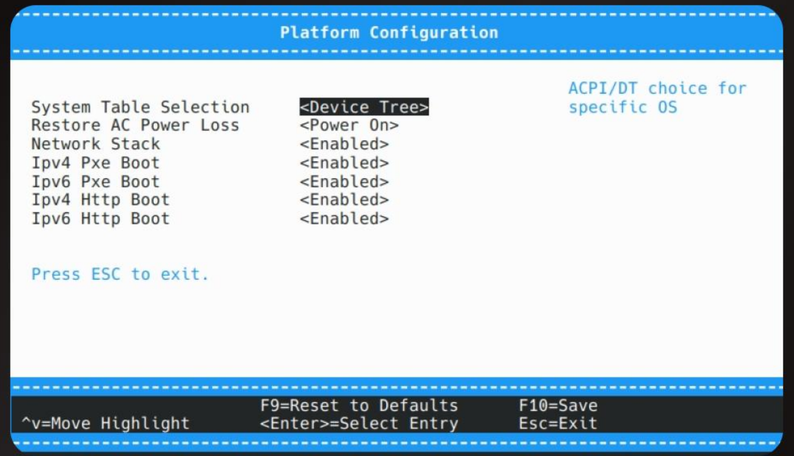

U-Boot latest-2023.10-1-gcc60ff4058d (Dec 13 2024 - 07:29:10 +0000) radxa-zero

U-Boot


Radxa Orion O6
CIX CD8180 Processor
2.60 GHz
0.1.0-1-3e272e3-debug:2024-12-13T07:48:52+00:00
16384 MB RAM
Select Language
<English>
This is the option
one adjusts to cha
the language for t
current system
> Device Manager
> Boot Manager
> Boot Maintenance Manager
Continue
Reset
^v=Move Highlight
<Enter>=Select Entry

EDK2

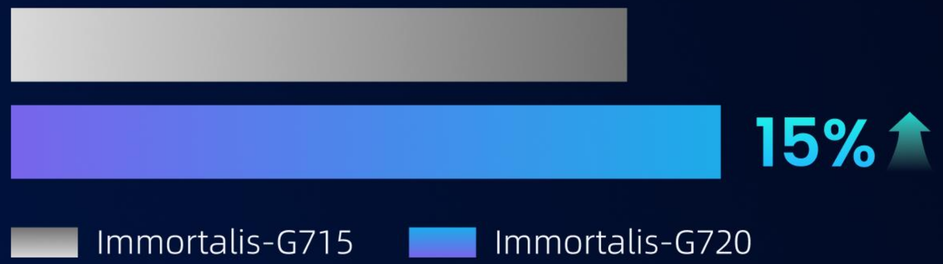




Configuration Options of Orion O6

Radxa Orion O6

Upper-layer Application Development

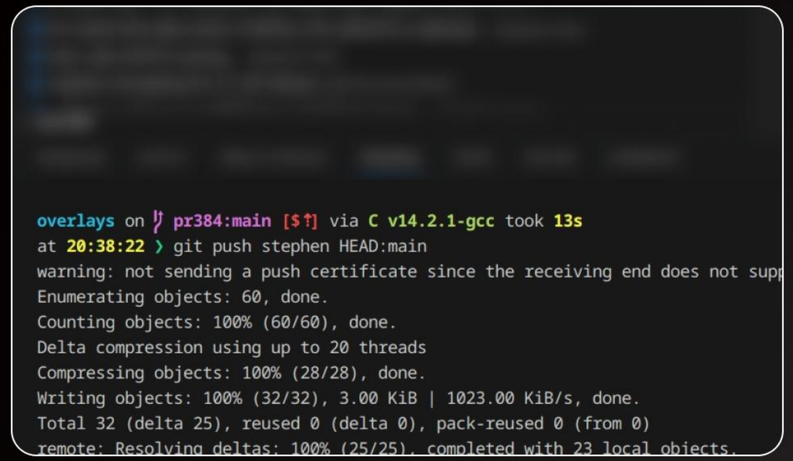


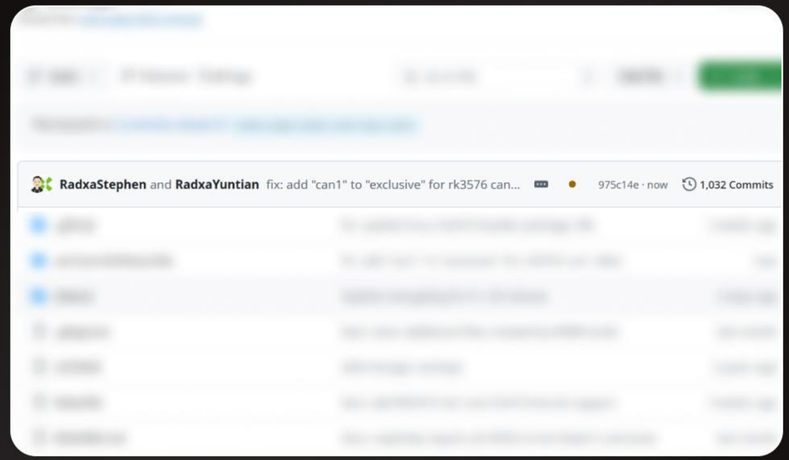
GPU Immortalis-G720

- High-performance Desktop-grade GPU
- Meet the Demands of Extreme Graphics Rendering and General AI Computing

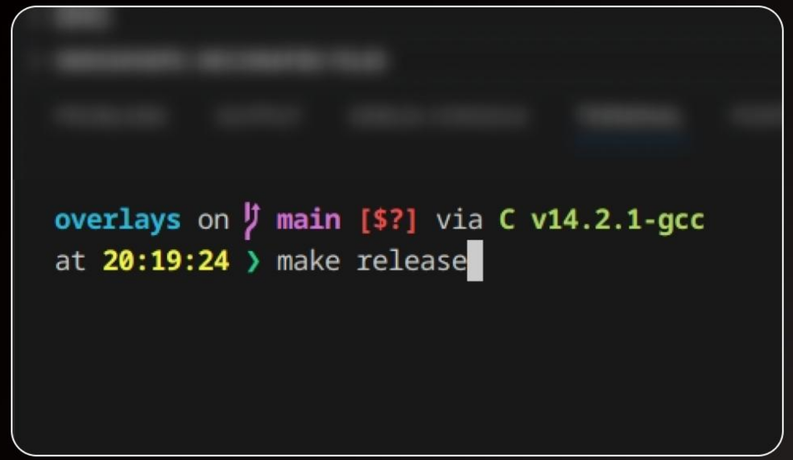
Radxa Orion O6

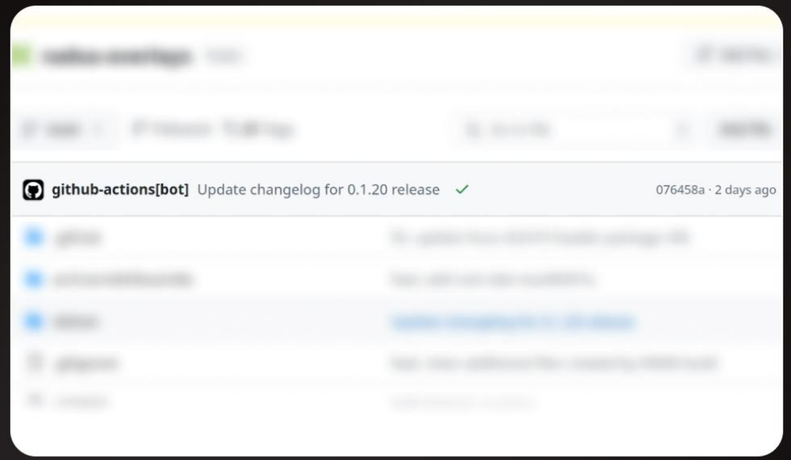
Sustainable Software Delivery



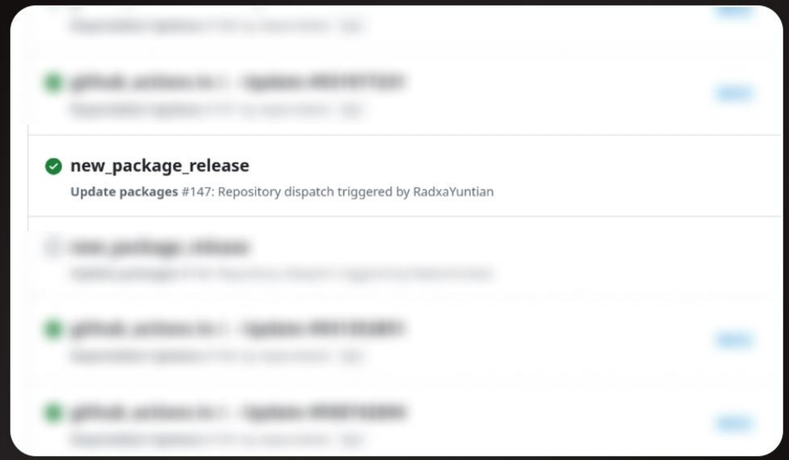


Trigger Code CI for Submission

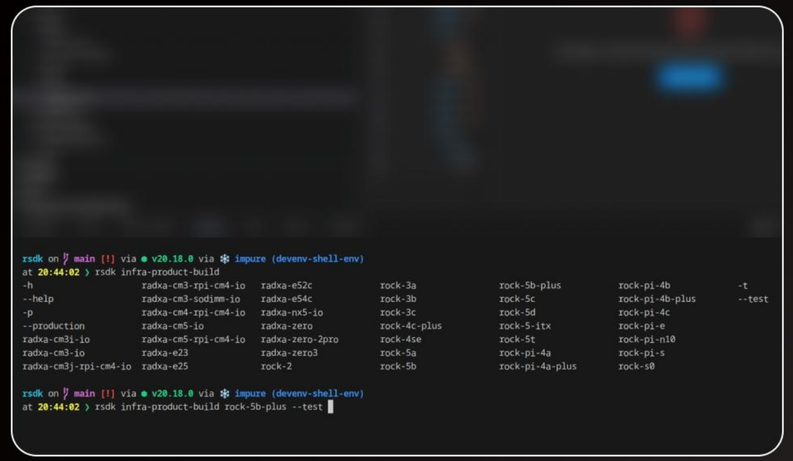


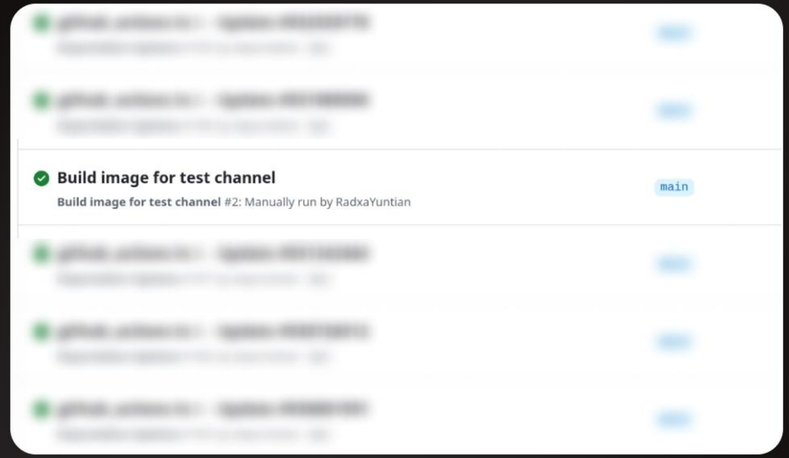


Automatically Complete Version Release via Command Line Locally



Successfully Released Software Triggers Software Source Updates





Generate the Final Image from the Continuously Updated Software Source

Radxa Orion O6

Code Release Schedule

BIOS and Operating System Binary Images

Release on January 15th, 2025

BIOS and Operating System Binary Images

Release on January 15th, 2025

BIOS and Linux Kernel Source Code

Open source in Q1 of 2025.

BIOS and Operating System Binary Images

Release on January 15th, 2025

BIOS and Linux Kernel Source Code

Open source in Q1 of 2025.

Tools for Building Images

Available in Q1 2025.

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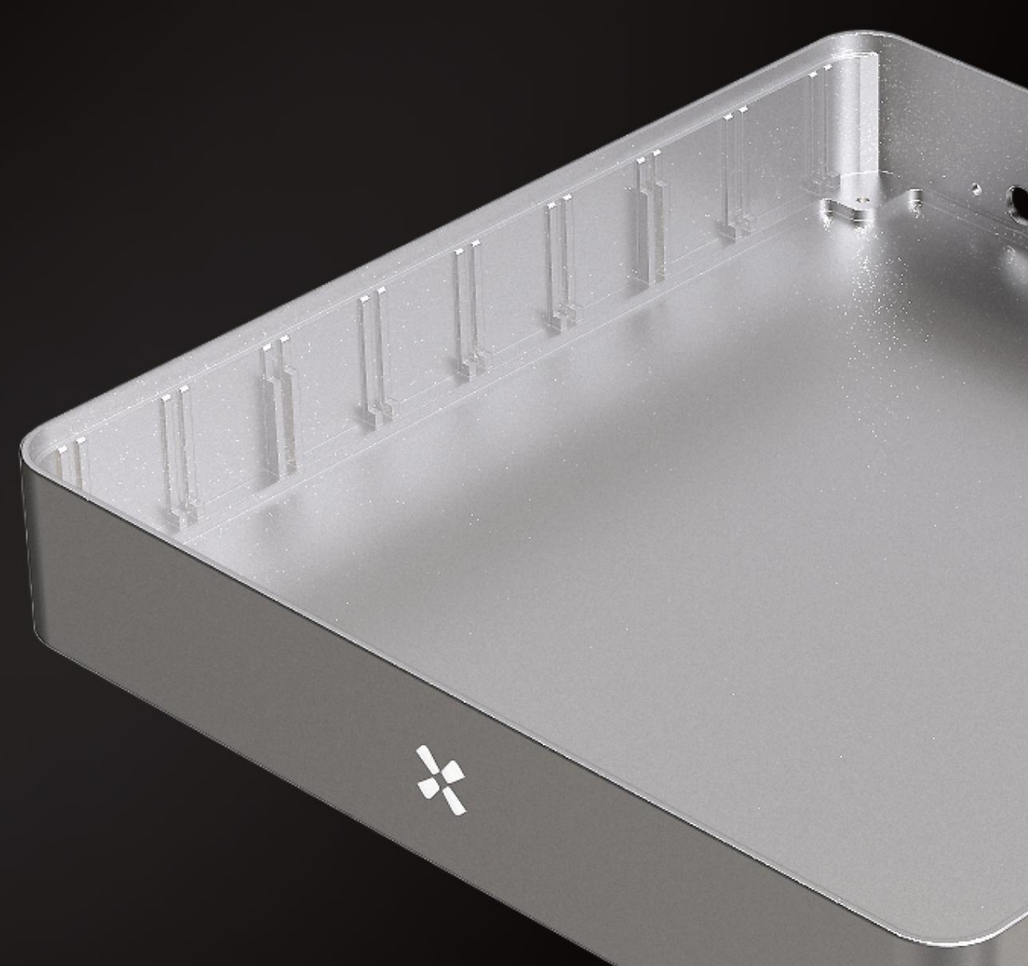
Radxa Orion O6 AI PC Kit

Radxa Orion O6 AI PC Kits


radxa

Radxa Orion O6 AI PC Kits

- Aluminum Alloy Integral Die-Casting
- CNC-Crafted
- Titanium Gold Baking Finish Combined
- Logo Highlight Laser Engraving Technology
- 184mm x 184mm

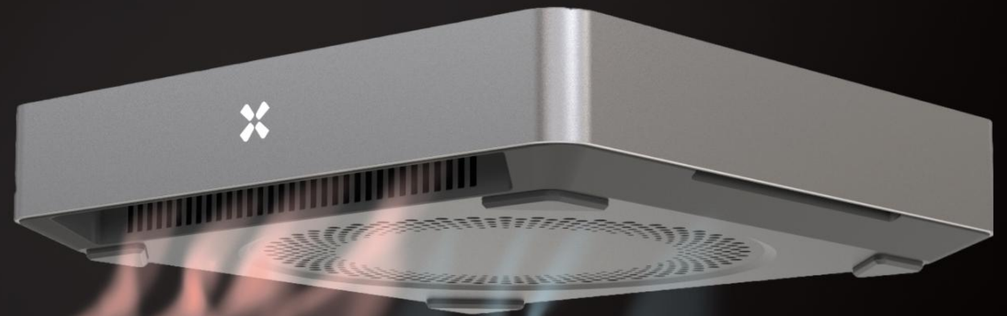


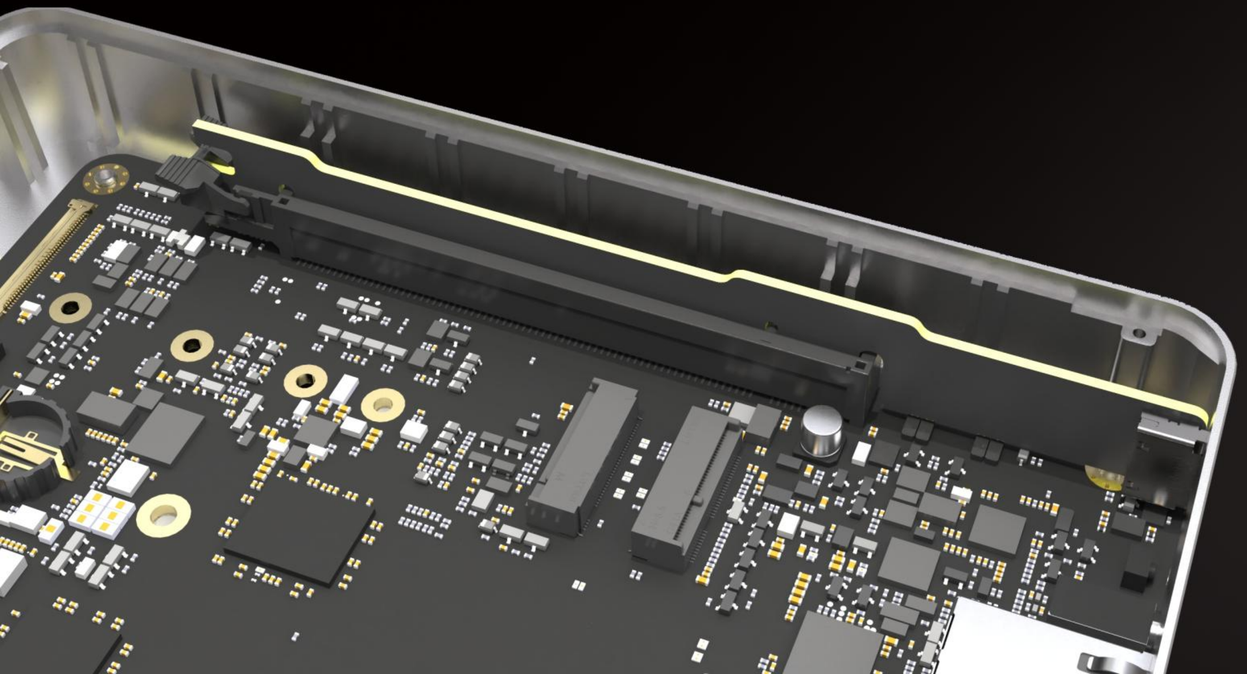
Radxa Orion O6 AI PC Kits

Efficient Heat Dissipation

Customized Integrated High-end
Graphics Card Level Cooling

Fully Concealed Air Outlet Design

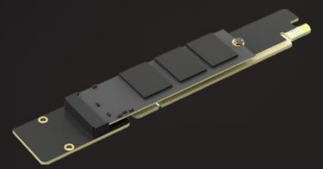




Radxa Orion O6 AI PC Kits

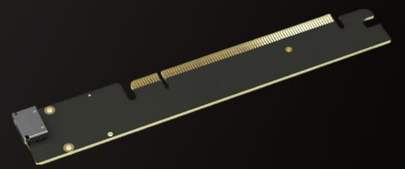
PCIe Expansion

Optional



M.2 2280/110 SSD

Optional



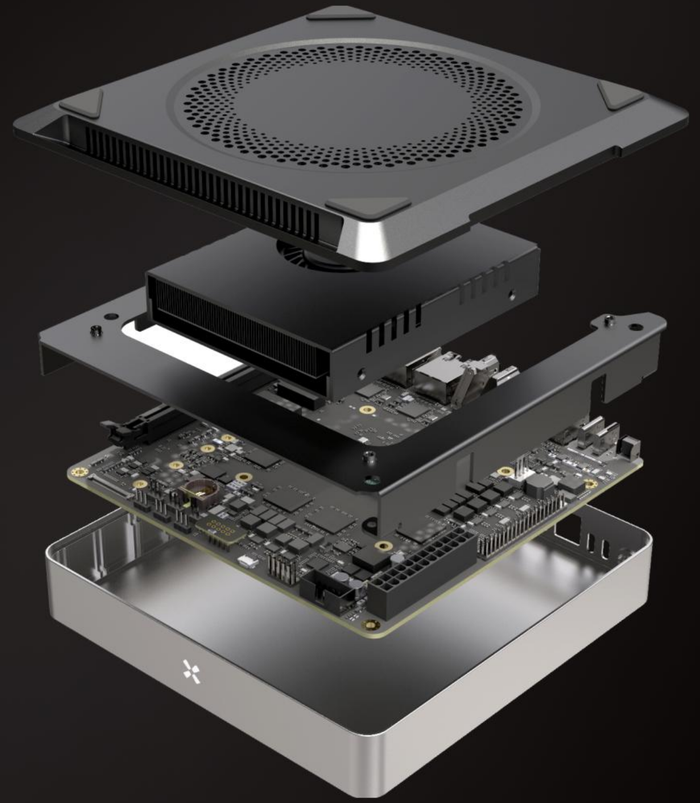
Oculink Adapter

Radxa Orion O6 AI PC 开发套件

Provided in kit form

Enjoy the fun of assembly

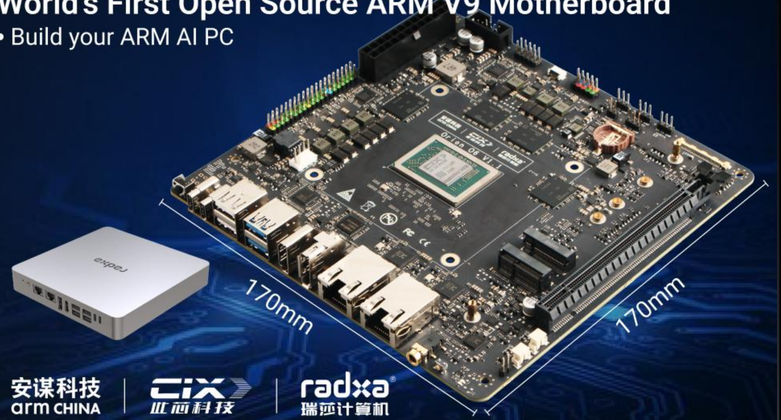
Tutorials provided by the official docs



Radxa Orion O6

World's First Open Source ARM V9 Motherboard

- Build your ARM AI PC



安谋科技 arm CHINA | 芯动科技 CIX | radxa 瑞莎计算机

Powered by the Cix CD8180 SoC

CPU

- Quad Big Cortex®-A720
- Quad Medium Cortex®-A720
- Quad Little Cortex®-A520
- 12MB L3 shared across all cores

GPU

Arm® Immortals™ G720 MC10 GPU

- Hardware-based Ray-Tracing
- OpenGL® ES3.2
- OpenCL® 3.0
- Vulkan® 1.3

OpenGL ES | OpenCL | OpenGL | Vulkan

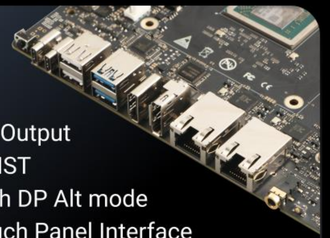
NPU

NPU
30 TOPs

neural.one | arm KleidiAI | LLAMA C++ | ONNX RUNTIME | MNN

Native Linux support with BIOS/UEFI

android | debian | fedora | Ubuntu | Windows | openKylin | deepin | UEFI



- 1x HDMI 2.0 Output
- 1x DP with MST
- 1x USB C with DP Alt mode
- eDP with Touch Panel Interface

Up to 4x Display, Up to 4K@120Hz

Dual 5 Gigabit Ethernet Ports

PCIe x16 Physical Slot with PCIe Gen4 8-lane

128bit LPDDR5

Up to 64GB
> 100GB/s bandwidth

Impressive 8K Video Codec Capabilities

H.265 HEVC | H.264 MPEG-4/AVC | AV1 | VP9

2x MIPI CSI(4-lane)

2x USB 3.2 10Gbps

M.2 E Key Connector

M.2 E Key Connector

M.2 M Key Connector with PCIe Gen4x4

Headphone Jack with Microphone Input

Radxa Orion O6

Official Pre-sale Launch

December 18, 2024

Radxa Orion O6

Starting from

$289

Radxa Orion O6

World's First Open Source ARM V9 Motherboard

Official Retail Price

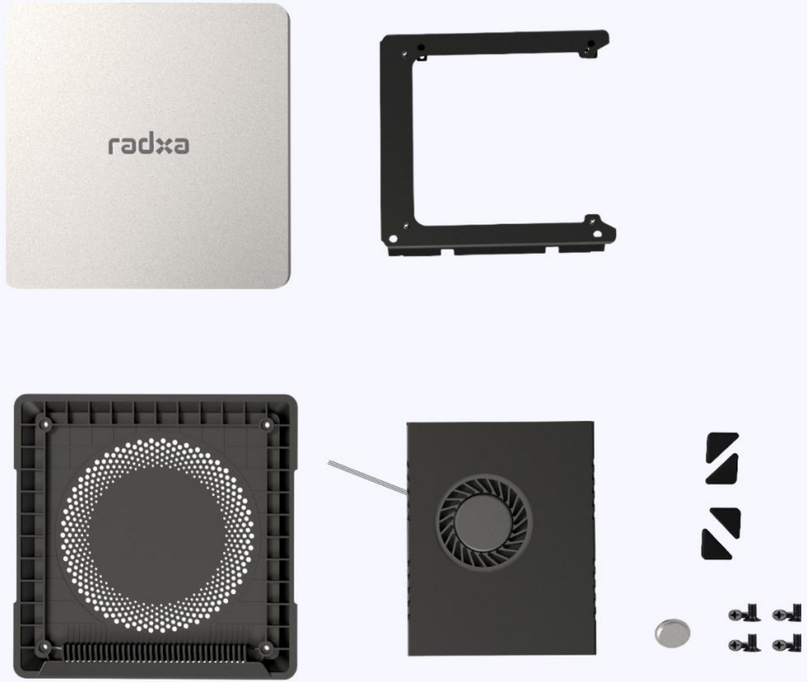
8GB	16GB	32GB	64GB
$289	$329	$389	$539

Radxa Orion O6 *VS* ROCK 5 ITX

Radxa Orion O6 (P1)	ROCK 5 ITX (RK3588)
12-core Arm V9	8-core Arm V8
128bit LPDDR5 Up to 64GB	64bit LPDDR5 Up to 32GB
dual 5GbE	dual 2.5GbE
Desktop-grade GPU	Embedded GPU
8 lane PCIe 4.0 slot	N/A
30Tops NPU	6Tops NPU

Radxa Orion O6

Order before December 31, 2024.
Shipment before January 27, 2025.



Radxa Orion O6 AI PC Kits

$39

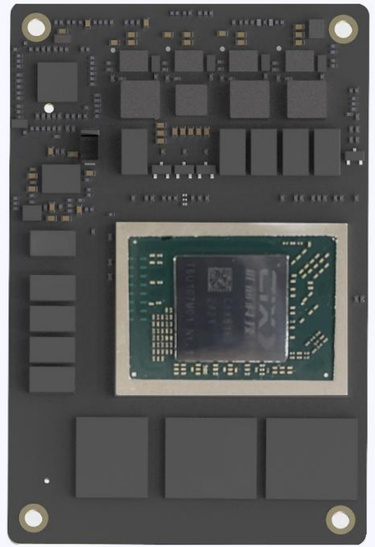
Shipment after February 5, 2025.

Expected before March 18, 2025.

Radxa Orion O6 CoM

- CD8180 Industrial Grade
- 128bit LPDDR5
- 16 lane PCIe 4.0
- Compliant with CoM Express Protocol Specifications

Stay tuned!



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