Radxa ROCK 4D Product Brief

Industrial AI Single Board Computer

Revision 1.3

2026-06-26

Radxa Computer

Contents

1 Revision Control Table

Version	Date	Changes from previous version
0.1	2024-12-24	First version
0.5	2025-03-09	Added Industrial grade ROCK 4D based on RK3576J
1.0	2025-04-16	Updated to final specifications
1.1	2025-04-22	Added SKU codes, updated table formatting, and clarified storage specifications
1.2	2025-04-25	Change PDF fonts to avoid CJK characters
1.3	2026-06-26	Update availability information

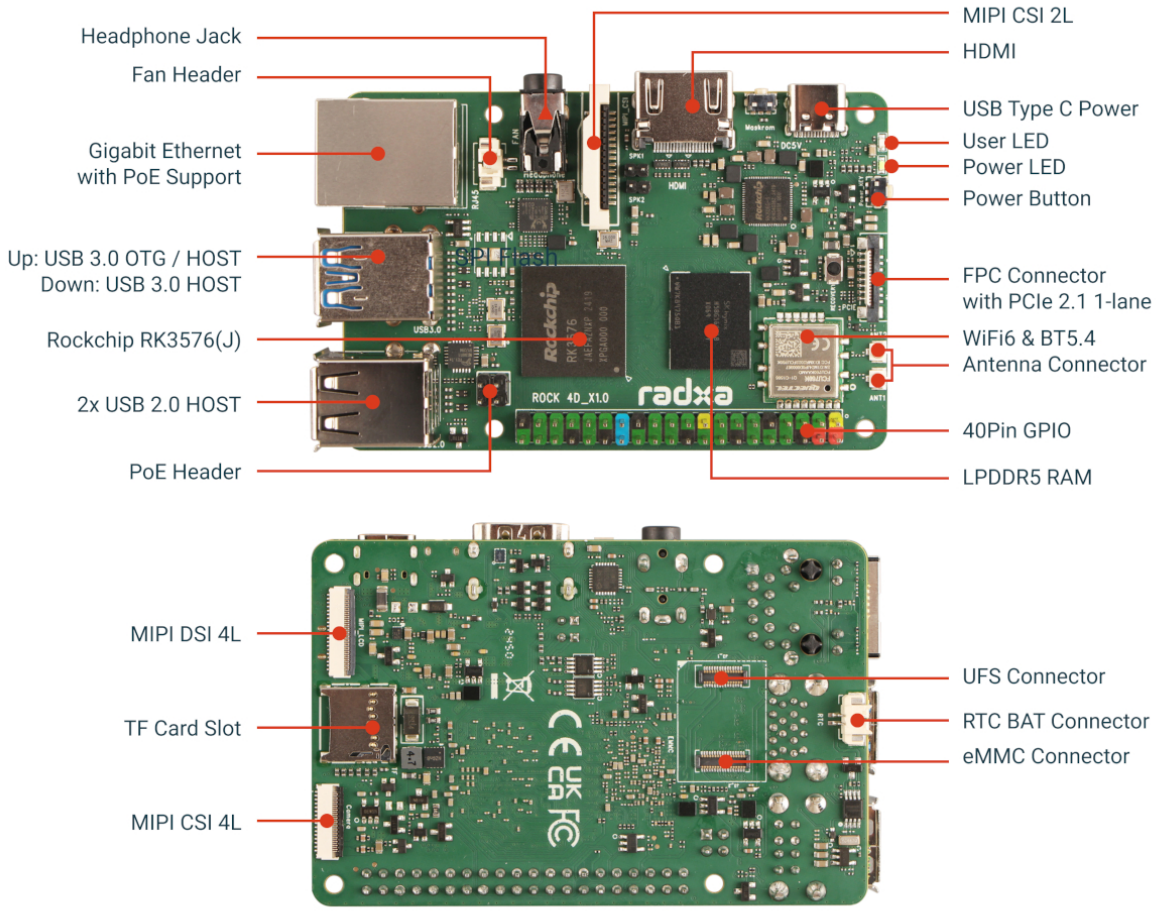
2 Introduction

Industrial AI Single Board Computer

The Radxa ROCK 4D is a Single Board Computer (SBC) in a compact form factor packed with a wide range of class-leading functionality, features and expansion options. Powered by the Rockchip RK3576 or RK3576J SoC, ROCK 4D features an octa-core CPU (4× Cortex-A72 + 4× Cortex-A53), Mali-G52 GPU, and a powerful 6 TOPS NPU, making it well-suited for AI and multimedia tasks.

The ROCK 4D is an ideal choice for makers, IoT enthusiasts, hobbyists, gamers, PC users, OEMs, industrial applications and everyone who need an extremely highly specified platform with outstanding performance and reliability.

Radxa ROCK 4D offers two versions: commercial grade ROCK 4D based on RK3576, and industrial grade ROCK 4D based on RK3576J.



> *Note:* The actual board layout or components location may change during the time but the main connectors type and location will remain the same

3 Features

3.1 Hardware

- Rockchip RK3576 / RK3576J SoC
  - Quad-core Cortex-A72 (1MB L2) and Quad-core Cortex-A53 (512KB L2)
  - ARMv8-A, TrustZone, Cryptography Extensions
- ARM Mali G52 MC3 GPU, supporting:
  - OpenGL® ES1.1, 2.0 and 3.2
  - OpenCL™ 2.0
  - Vulkan® 1.1
- NPU: 6 TOPS (INT8), supports INT4/INT8/INT16/FP16/BF16/TF32
  - Compatible with TensorFlow, PyTorch, ONNX, etc.
- LPDDR5 (up to 4800MT/s) RAM options:
  - 2GB
  - 4GB
  - 8GB
  - 16GB
- Able to provide 2 display outputs via one HDMI 2.1 and one MIPI DSI
- AV1 / AVS2 / VP9 / H.265 multivideo decoder up to 8K@30fps or 4K@120fps
- H.264 multivideo decoder up to 4K@60fps
- H.265 multivideo encoder up to 4K@60fps

3.2 Interfaces

- 1x eMMC or UFS Connector
- 1x microSD Card Slot
- 1x Headphone Jack with Microphone Input
- 1x HDMI 2.1 supporting up to 4Kp120
- 1x MIPI DSI supporting up 2K
- 1x 4-lane MIPI CSI or 2x 2-lane MIPI CSI
- 1x 2-lane MIPI CSI

- 2x USB 2.0 Type-A HOST ports
- 1x USB 3.0 Type-A HOST port
- 1x USB 3.0 Type-A OTG / HOST port
- 1x Gigabit Ethernet port with PoE support(Additional PoE HAT Required)
- 1x FPC Connector with PCIe 2.1 1-lane
- 1x IEEE 802.11 a/b/g/n/ac/ax (WiFi 6) and BT 5.4 with BLE with External Antenna Connector
- 1x 2-Pin 1.25mm Fan Header
- 1x Power Button
- 40-Pin 0.1″ (2.54mm) header supporting a wide range of interface options:
  - Up to 5 x UART(2x with flow control)
  - Up to 3 x SPI bus
  - Up to 6 x I2C bus
  - Up to 1 x PCM/I2S
  - Up to 2 x SPDIF
  - Up to 7 x PWM
  - Up to 1 x CAN
  - Up to 1 x ADC
  - Up to 27 x GPIO
  - 2 x 5V DC power in/out
  - 2 x 3.3V power out

3.3 Software

- ArmV8 Instruction Set
- Debian Linux support
- Yocto Linux support
- Buildroot support
- Android 14 support
- Rockchip RKNN SDK for AI model deployment
- Hardware access/control library for Linux/Android

4 Electrical Specification

4.1 Power Requirements

The ROCK 4D supports various power supply technologies including smart power adapter as well as fixed voltage:

- Power adapter with fixed voltage in 5V range on the USB Type-C port
- 5V Power applied to the GPIO PIN 2 & 4

The recommended power source should be able to produce, at least, 10W without power consuming devices on USB 3 or 25W with full USB ports and PCIe 2.1 load.

4.2 GPIO Voltage

GPIO	Voltage Level	Tolerance
All GPIO	3.3V	3.63V
SARADC_IN5	3.3V	3.3V

5 Operating Conditions

The ROCK 4D is available in two temperature grade variants:

- Commercial Grade (RK3576): Designed to operate between 0°C to 60°C
- Industrial Grade (RK3576J): Designed to operate between -40°C to 85°C

This temperature range was defined based on typical usage where the efficient use of Arm big.LITTLE technology can automatically select which processor core to utilise for a given task, the result of which is minimal heat generation and responsive user experience.

The ROCK 4D is built on a high-performance mobile chipset which is designed to operate for extended durations with efficiency at its core. As with all electronic devices heat is a by-product of operation which increases with performance and workload; during basic use cases such as web browsing, editing text or listening to music the SoC will automatically select the smallest processors available or dedicated hardware accelerators to reduce heat generation thus reserving the higher performance processors and thermal window for demanding tasks as and when required.

6 Peripherals

6.1 GPIO Interface

The ROCK 4D offers a 40 pin GPIO expansion header which provides extensive compatibility with a wide range of accessories developed for the SBC market.

6.1.1 GPIO Alternate Functions

Function5	Function4	Function3	Function2	Function1	PIN	PIN	Function1	Function2	Function3	Function4	Function5
				+3.3V	1	2	+5.0V				
		I2C8_SDA_M1	UART2_RX_M0	GPIO1_C7	3	4	+5.0V				
		I2C8_SCL_M1	UART2_TX_M0	GPIO1_C6	5	6	GND				
	SPI2_CSN0_M1			GPIO1_C3	7	8	GPIO0_D4	UART0_TX_M0			
				GND	9	10	GPIO0_D5	UART0_RX_M0			
	SPI2_MOSI_M1		UART4_TX_M1	GPIO1_C4	11	12	GPIO1_D1	UART10_RX_M1			
PWM1CH0_M2				GPIO2_C0	13	14	GND				
	SPI2_MISO_M1		UART4_RX_M1	GPIO1_C5	15	16	GPIO2_B6	UART7_TX_M0	I2C8_SCL_M2		
				+3.3V	17	18	GPIO2_B7	UART7_RX_M0	I2C8_SDA_M2		
PWM1CH1_M1	SPI1_MOSI_M0	I2C9_SCL_M1		GPIO1_B5	19	20	GND				
	SPI1_MISO_M0			GPIO1_B6	21	22	GPIO2_D7				PWM2CH7_M2
PWM1CH0_M1	SPI1_CLK_M0	I2C9_SDA_M1		GPIO1_B4	23	24	GPIO1_B7			SPI1_CSN0_M0	
				GND	25	26	GPIO1_C0	UART3_TX_M2		SPI1_CSN1_M0	PWM0CH0_M1
PWM2CH3_M1				GPIO4_C7	27	28	GPIO4_C6				PWM2CH2_M1
			CAN1_TX_M3	GPIO3_A2	29	30	GND				
			UART3_RX_M2	GPIO1_C1	31	32	GPIO1_D5		I2C5_SDA_M1	SPI2_CLK_M1	
PWM1CH2_M1	SPI2_CSN1_M1			GPIO1_C2	33	34	GND				
PWM1CH3_M1				GPIO1_D2	35	36	GPIO1_D4		I2C5_SCL_M1		
			CAN1_RX_M3	GPIO3_A3	37	38	GPIO1_D3				PWM1CH4_M1
				GND	39	40	GPIO1_D0	UART10_TX_M1			

6.2 Network

ROCK 4D offers a 10/100/1000Mbps RJ45 connector for wired networking. With additional PoE module/HAT, ROCK 4D can be powered by ethernet cable via RJ45 port by a PoE capable switch/router.

6.3 eMMC / UFS Module Connector

The ROCK 4D offers a high speed eMMC / UFS module connector for eMMC or UFS modules which can be used for OS and data storage. The eMMC / UFS module connector is compatible with readily available industrial pinout and form factor hardware.

The eMMC connector offer eMMC 5.1 high speed interface for small capacity storage(8GB to 128GB) and UFS connector offer UFS 2.0 2-lane up to gear 3 high speed interface for large capacity storage(64G to 1TB).

6.4 Camera and Display Interfaces

The ROCK 4D has one 4-lane(can be split into 2x two-lane) and one 2-lane MIPI CSI Camera and one 4-lane MIPI DSI Display connector. These connectors are designed for

Radxa Camera and Display accessories and also backwards compatible with standard industrial camera and display peripherals with adapter FPC cables by Radxa.

6.5 USB

The ROCK 4D has two USB2 HOST, one USB3 HOST and one USB3 OTG/HOST type-A connectors. The power output across these ports is 2.8A in aggregate over the four connectors.

6.6 HDMI Output

The ROCK 4D has one Standard HDMI output ports, both support CEC and HDMI 2.1 with resolutions of 8Kp60.

6.7 Audio Jack

The ROCK 4D supports high quality analogue audio output via a 4-ring 3.5mm headphone jack. The analog audio output can drive 32 Ohm headphones directly. The audio jack also supports microphone input as default.

6.8 FPC Connector

The ROCK 4D offers a FPC connector providing PCIe 2.1 one-lane signal, supporting expansion of SSD, SATA, 2.5G Ethernet ports and other devices, This requires additional expansion board / HAT.

6.9 Fan Connector

The ROCK 4D has a 2pin 1.25mm header that enables users to connect a 5V fan (or other peripheral). The fan can be PWM controlled without speed feedback.

7 Models and SKUs

Name	CPU	RAM LPDDR5	SPI Flash	WiFi / BT	SKU Code
ROCK 4D 2GB	RK3576	2GB	16MB	FCU760K WiFi 6 / BT 5.4	RS140-D2J0S16R35W28
ROCK 4D 4GB		4GB	16MB		RS140-D4J0S16R35W28
ROCK 4D 8GB		8GB	16MB		RS140-D8J0S16R35W28
ROCK 4D 16GB		16GB	16MB		RS140-D16J0S16R35W28

8 Availability

Radxa guarantees availability of the ROCK 4D until at least September 2034.

9 Support

For support please see the hardware documentation section of the Radxa Documentation website and post questions to the Radxa forum.

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