Radxa ROCK 3A Product Brief

Revision 1.4
2022-12-05
Contents

1 Revision Control Table  
2 Introduction  
3 Features  
  3.1 Hardware  
  3.2 Interfaces  
  3.3 Software  
4 Electrical Specification  
  4.1 Power Requirements  
  4.2 GPIO Voltage  
5 Peripherals  
  5.1 GPIO Interface  
  5.1.1 GPIO Alternate Functions  
  5.2 eMMC Socket  
  5.3 Camera and Display Interfaces  
  5.4 USB  
  5.5 HDMI  
  5.6 Audio Jack  
  5.7 M.2 Connector M Key  
  5.8 M.2 Connector E Key  
  5.9 Operating conditions  
6 Availability  
7 Support  

Radxa Computer
1 Revision Control Table

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<th>Date</th>
<th>Changes from previous version</th>
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<td>Add FCC/CE logo</td>
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2 Introduction

The Radxa ROCK 3 Model A (ROCK 3A) is a Single Board Computer (SBC) in a compact form factor packed with a wide range of class-leading functionality, features and expansion options. The ROCK 3A is an ideal choice for makers, IoT enthusiasts, hobbyists, gamers, PC users and everyone who needs an extremely highly specified platform with outstanding performance and reliability. Radxa offers the ROCK 3A board in various LPDDR4 RAM memory options: - 2GB - 4GB - 8GB
3 Features

3.1 Hardware

- Rockchip RK3568 SoC
- Quad-core Arm® Cortex®-A55 (ARMv8) 64-bit @ 2.0GHz
- Mali™ G52 GPU, supporting:
  - OpenGL® ES 1.1, 2.0 and 3.2
  - OpenCL® 2.0
  - Vulkan® 1.1
- NPU up to 0.8 TOPS
- 32-bit LPDDR4 RAM options:
  - 2GB
  - 4GB
  - 8GB

- Able to provide 2 display outputs via one HDMI® 2.0 and one MIPI DSI
- H.265/H.264 and VP9 video decoder up to 4K@60fps
- H.264/H.265 video encoder up to 1080@60fps

3.2 Interfaces

- 1x M.2 E-key connector for WiFi/BT supports WiFi6™
- 1x M.2 M-key connector for SSD
- 1x Micro SD card slot
- HDMI® 2.0 port supporting displays up to 4K@60fps resolution
- 2x USB 2.0® HOST ports
- 1x USB 3.0® HOST port, 1x USB 3.0® OTG/HOST port
- 1x Gigabit Ethernet port enabling PoE HATs
- 1x Camera port with 2-lane MIPI CSI
- 1x Display port with 2-lane MIPI DSI
- 3.5mm jack with mic
- 40x user GPIO supporting various interface options:
  - 5 x UART
  - 1 x SPI bus
  - 2 x I2C bus
Radxa ROCK 3A Product Brief

- 1 x CAN
- 6 x PWM
- 1 x ADC
- 6 x GPIO
- 2 x 5V DC power in
- 1 x 3.3V power pin

3.3 Software

- Armv8 Instruction Set
- Debian/Ubuntu Linux support
- Android 11 support
- Hardware access/control library for Linux/Android

4 Electrical Specification

4.1 Power Requirements

The ROCK 3A supports various power supply technologies including smart power adapter as well as fixed voltage:

- USB Type-C™ PD V2.0 supporting 9V/2A, 12V/2A, 15V/2A and 20V/2A.
- Qualcomm® Quick Charge™ 2.0 QC3.0/2.0 adapter 9V/2A and 12V/1.5A.
- Power adapter with fixed voltage in 6V to 24V range on the USB Type-C™ port
- 5V Power applied to the GPIO PIN 2 & 4

4.2 GPIO Voltage

<table>
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<tr>
<th>GPIO</th>
<th>Voltage Level</th>
<th>Tolerant</th>
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<td>All GPIO</td>
<td>3.3V</td>
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<td>ADC_IN5</td>
<td>1.8V</td>
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5 Peripherals

5.1 GPIO Interface

ROCK 3A offers 40P GPIO expansion which is compatible with many accessories on the market.

5.1.1 GPIO Alternate Functions

<table>
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<tr>
<th>Function4</th>
<th>Function3</th>
<th>Function2</th>
<th>Function1</th>
<th>Pin#</th>
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<td>GPIO3_A6</td>
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</table>

5.2 eMMC Socket

ROCK 3A offers a high speed eMMC socket for eMMC modules which can be used for OS and data storage. The eMMC socket is compatible with readily available industrial pinout and form factor hardware.

5.3 Camera and Display Interfaces

The ROCK 3A has one 2-lane MIPI CSI Camera and one 2-lane MIPI DSI Display connector. These connectors are backwards compatible with standard industrial camera and display peripherals.
5.4 USB

The ROCK 3A has two USB 2.0 HOST, one USB 3.0 HOST and one USB 3.0 OTG/HOST type-A connectors. The power output across these ports is 2.8A in aggregate over the four connectors. The board has a hardware switch to set the USB 3.0 operation to either HOST or OTG.

5.5 HDMI

The ROCK 3A has one HDMI port supporting CEC and HDMI 2.0 with resolutions up to 4K@60fps.

5.6 Audio Jack

The ROCK 3A supports near-CD-quality analogue audio output via a 4-ring 3.5mm headphone jack. The HD codec supports up to 24 bit at 96Hz. The analog audio output can drive 32 Ohm headphones directly. The headphone jack also supports a mic line input.

5.7 M.2 Connector M Key

The ROCK 3A offers a M.2 M-Key supporting up to 8TB M2 NVME SSD socket with 2-lane PCIe 3.0 interface enabling high speed storage access.

5.8 M.2 Connector E Key

The ROCK 3A offers a M.2 E-Key socket with PCIe 2.0 interface, SDIO interface, UART interface and USB interface enabling high speed WiFi/BT connectivity and other standard M.2 Wireless modules.

5.9 Operating conditions

The recommended ambient operating temperature range is 0°C to 50°C.

The SoC reduces the CPU clock speed and voltage level during low loads to reduce energy use and unnecessary heat dissipation (the dissipation is not a factor of the CPU frequency but rather the temperature itself).
The ROCK 3A is designed to operate without a cooling system under light loads. However, in high performance applications, it may be necessary to use external cooling methods (for example, heat sink, fan, etc.) which will allow the SoC to continue running at maximum clock speed indefinitely below its predefined peak temperature limit.

6 Availability

Radxa guarantee availability ROCK 3A until at least September 2029.

7 Support

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