
Radxa ROCK 3C Product Brief

Well established form factor Single Board Computer

Revision 1.4

2023-3-15



Contents

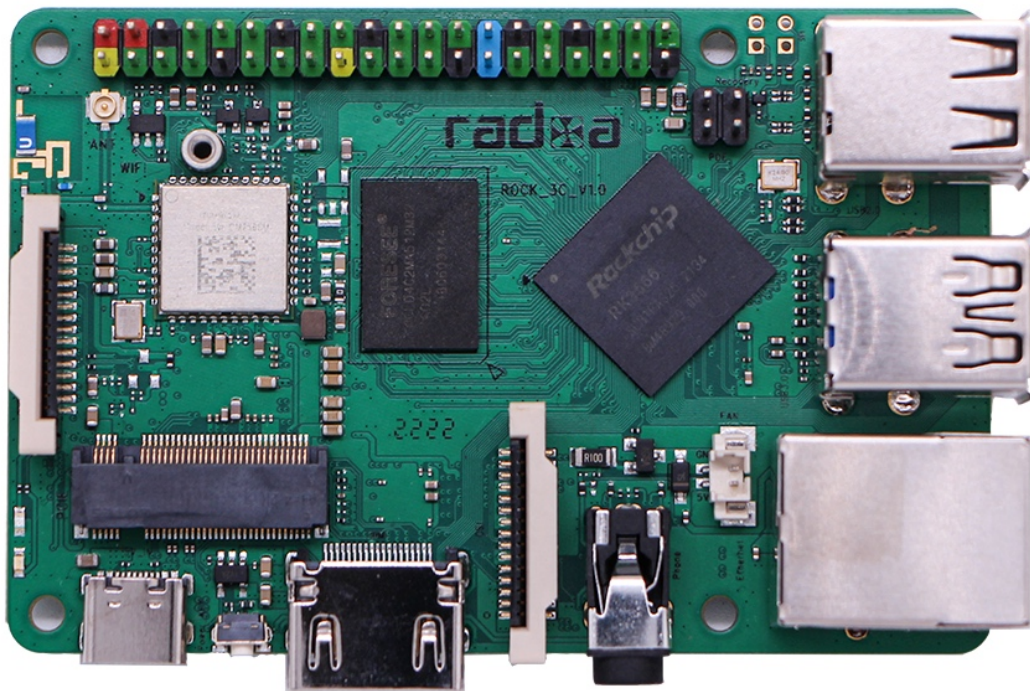
- 1 Revision 2
- 2 Introduction 3
- 3 Features 4
 - 3.1 Hardware 4
 - 3.2 Interfaces 5
 - 3.3 Software 5
- 4 Electrical Specification 5
 - 4.1 Power Requirements 5
 - 4.2 GPIO Voltage 6
- 5 Peripherals 6
 - 5.1 GPIO Interface 6
 - 5.1.1 GPIO Alternate Functions 6
 - 5.2 eMMC Module Connector 6
 - 5.3 Camera and Display Interfaces 7
 - 5.4 USB 7
 - 5.5 HDMI 7
 - 5.6 Audio Jack 7
 - 5.7 M.2 Connector 7
 - 5.8 Operating Conditions 8
 - 5.9 Fan Connector 8
- 6 Availability 8
- 7 Support 8

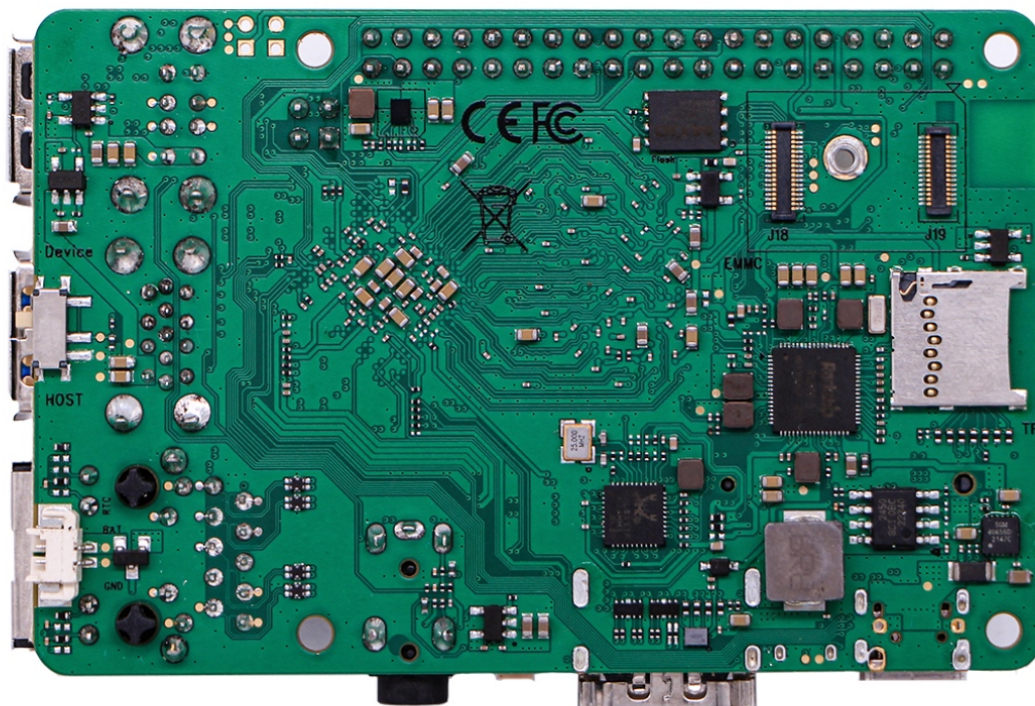
1 Revision

Version	Date	Changes from previous version
1.0	16/11/2022	First version
1.1	19/11/2022	Update GPIO table, remove can bus support Use new product brief cover
1.2	08/12/2022	Improve readability
1.3	19/12/2022	Add USB 2.0 information eMMC maximum size
1.4	14/03/2023	Limit ram size to 1GB and 2GB

2 Introduction

Radxa ROCK 3C is a Single Board Computer (SBC) in an ultra-small form factor that offers class-leading performance while leveraging outstanding mechanical compatibility. Radxa ROCK 3C offers makers, IoT enthusiasts, hobbyists, PC DIY enthusiasts and others a reliable and extremely capable platform for building and tinkering their ideas into reality.





3 Features

3.1 Hardware

- Rockchip RK3566 SoC
- Quad-core Arm[®] Cortex[®]-A55 (ARMv8) 64-bit @ 1.6GHz
- Arm Mali[™]-G52-2EE, OpenGL[®] ES1.1/2.0/3.2, Vulkan[®] 1.1, OpenCL[™] 2.0
- 1GB / 2GB LPDDR4 available
- Storage is supported by eMMC storage, micro SD card and SSD through the M.2 connector
- Display via HDMI or MIPI DSI. They can not work at the same time
- H.264/H.265 decoder up to 4K@60fps
- H.264/H.265 encoder up to 1080P@60fps

3.2 Interfaces

- 802.11 b/g/n/ac Wireless LAN supporting WiFi 5
- BT 5.0
- 1x HDMI 2.0 port supporting displays up to 1080P@60fps resolution
- 1x SD Card slot
- 2x USB2 HOST ports
- 1x USB2 OTG/HOST port
- 1x USB3 HOST port
- 1x Gigabit Ethernet port. It supports PoE with add-on PoE HAT
- 1x M.2 M-Key connector for NVMe SSD or SATA SSD
- 1x camera port supporting 2-lane MIPI CSI
- 1x display port supporting 2-lane MIPI DSI
- 3.5mm jack with microphone. The HD codec supports up to 24-bit/96KHz audio
- 40x user GPIO supporting various interface options:
 - up to 5 x UART
 - 1 x SPI bus
 - up to 2 x I2C bus
 - 1 x PCM/I2S
 - up to 6 x PWM
 - up to 28 x GPIO
 - 2 x 5V DC power in
 - 2 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

Radxa ROCK 3C can only be powered by +5V.

- USB Type-C® 5V
- 5V Power from the GPIO PIN 2 & 4

The recommended power source capacity is at least 5V/3A without M.2 SSD or 5V/4A using with M.2 SSD.

4.2 GPIO Voltage

GPIO	Voltage Level	Tolerance
All GPIO	3.3V	3.63V

5 Peripherals

5.1 GPIO Interface

Radxa ROCK 3C offers 40P GPIO expansion which is compatible with most accessories on the market.

5.1.1 GPIO Alternate Functions

Function5	Function4	Function3	Function2	Function1	Pin#	Pin#	Function1	Function2	Function3	Function4	Function5
				+3.3V	1	2	+5.0V				
		I2C3_SDA_M0	UART3_RX_M0	GPIO1_A0	3	4	+5.0V				
		I2C3_SCL_M0	UART3_TX_M0	GPIO1_A1	5	6	GND				
	PWM14_M0			GPIO3_C4	7	8	GPIO0_D1	UART2_TX_M0			
				GND	9	10	GPIO0_D0	UART2_RX_M0			
				GPIO3_A1	11	12	GPIO3_A3				I2S3_SCLK_M0
	I2S3_MCLK_M0			GPIO3_A2	13	14	GND				
				GPIO3_B0	15	16	GPIO3_B1	UART4_RX_M1	PWM8_M0		
				+3.3V	17	18	GPIO3_B2	UART4_TX_M1	PWM9_M0		
	PWM15_IR_M1	I2S3_SCLK_M1	SPI3_MOSI_M1	GPIO4_C3	19	20	GND				
UART9_TX_M1	PWM12_M1	I2S3_SDO_M1	SPI3_MISO_M1	GPIO4_C5	21	22	GPIO3_C1				I2S1_SDO2_M2
	PWM14_M1	I2S3_MCLK_M1	SPI3_CLK_M1	GPIO4_C2	23	24	GPIO4_C6	SPI3_CS0_M1	PWM13_M1	UART9_RX_M1	I2S3_SDI_M1
				GND	25	26	GPIO4_D1	SPI3_CS1_M1			
	I2C4_SDA_M0	I2S2_SDI_M1		GPIO4_B2	27	28	GPIO4_B3			I2C4_SCL_M0	I2S2_SDO_M1
				GPIO3_B3	29	30	GND				
				GPIO3_B4	31	32	GPIO3_C2	UART5_TX_M1			I2S1_SDO3_M2
UART5_RX_M1		I2S1_SCLK_RX_M2		GPIO3_C3	33	34	GND				
		I2S3_LRCK_M0		GPIO3_A4	35	36	GPIO3_A7				
		I2S1_SCLK_RX_M0		GPIO1_A4	37	38	GPIO3_A6				I2S3_SDI_M0
				GND	39	40	GPIO3_A5				I2S3_SDO_M0

5.2 eMMC Module Connector

ROCK 3C 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. The maximum eMMC size supported is 128GB.

5.3 Camera and Display Interfaces

Radxa ROCK 3C has 1x 2-lane MIPI CSI camera connector and 1x 2-lane MIPI DSI display connector. These connectors are backwards compatible with standard industrial camera and display peripherals.

5.4 USB

Radxa ROCK 3C has two USB2 HOST connectors, one USB3 HOST connector and one USB2 OTG/HOST connector. The board has a hardware switch to set the USB2 operation to either HOST or OTG. The power output across these ports is 2.8A in aggregate over the four connectors.

5.5 HDMI

Radxa ROCK 3C has one HDMI port supporting CEC and HDMI 2.0 with resolutions up to 1080P@60fps.

5.6 Audio Jack

The ROCK 3C 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

Radxa ROCK 3C offers a M.2 M-Key 2230 connector with PCIe 2.1 1-lane and SATA 3.0 combo interfaces, providing high speed storage access. The M.2 M-Key can be configured either to support NVMe SSD or SATA devices, an additional adapter board is required for SATA support.

5.8 Operating Conditions

The ROCK 3C has been designed to operate between 0°C to 50°C.

The ROCK 3C is built on a high-performance mobile chipset which is designed to operate for extended durations on batteries 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 dedicated hardware accelerators to reduce heat generation.

Radxa ROCK 3C limits its SoC maximum internal temperature to 85°C before throttling the clock speeds to maintain reliability within the allowed temperature range. If the ROCK 3C is intended to be used continuously 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 85°C peak temperature limiter.

5.9 Fan Connector

Radxa ROCK 3C has a 2pin 1.25mm header that enables users to connect to a 5V fan (or other peripheral). The fan can be PWM controlled without speed feedback.

6 Availability

Radxa guarantees availability of the ROCK 3C until at least September 2032.

7 Support

For support, please see the hardware documentation section of the [Radxa Wiki](#) website and post questions to the [Radxa forum](#).

