
Radxa Zero Product Brief

A Ultra Tiny Single Board Computer

Revision 1.1

2023-09-06



Contents

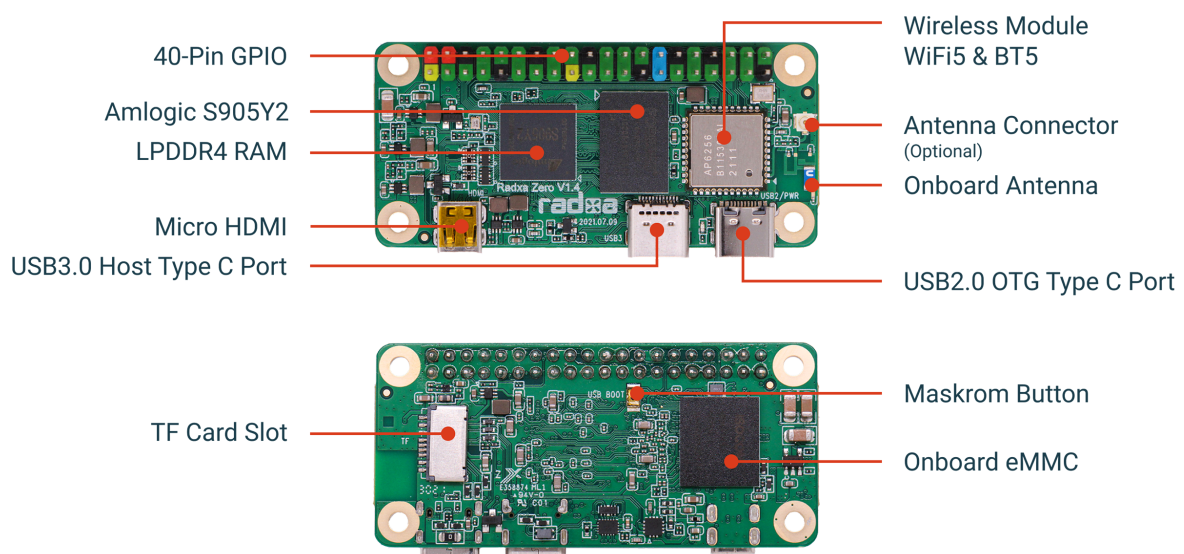
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1 Revision Control Table

Version	Date	Changes from previous version
1.0	24/07/2022	First version
1.1	06/09/2022	Update Information

2 Introduction

Radxa Zero is a Single Board Computer (SBC) in an ultra-tiny form factor that offers class-leading performance while leveraging outstanding mechanical compatibility. The Radxa Zero 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

- Amlogic S905Y2 with Quad core Cortex-A53 (ARM v8) 64-bit SoC @ 1.8GHz
- ARM G31 MP2 GPU, supporting OpenGL ES 3.2, Vulkan 1.0, and OpenCL 2.0.
- 1GB / 2GB / 4GB LPDDR4
- 8GB / 16GB / 32GB / 64GB / 128GB high performance eMMC

- WiFi4 & BT5(512MB/1GB RAM Model) or WiFi5 & BT5(2GB / 4GB RAM Model) with On-board or External Antenna
- 4K display via Micro HDMI
- H.265/VP9 (HEVC) hardware decode (up to 4Kp60)
- H.264 hardware decode (up to 4Kp30)

3.2 Interfaces

- 1x TF Card Slot
- 1x Micro HDMI ports supporting displays up to 4Kp60 resolution
- 1x USB2 OTG Type C Port for power and data
- 1x USB3 HOST Type C Port
- 40x user GPIO supporting various interface options:
 - 3 x UART
 - 2 x SPI bus
 - 3 x I2C bus
 - 3 x PWM
 - 2 x ADC
 - up to 22 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 9 support
- Hardware access/control library for Linux/Android

4 Electrical Specification

4.1 Power Requirements

The Radxa Zero support DC +5V voltage:

- Power adapter with 5V/1A on the USB C power port

- 5V Power from the GPIO PIN 2 & 4

5 Peripherals

5.1 GPIO Interface

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

5.1.1 GPIO Alternate Functions

Function4	Function3	Function2	Function1	Pin#	Pin#	Function1	Function2	Function3	Function4
			+3.3V	1	2	+5.0V			
		I2C_EE_M3_SDA	GPIOA_14	3	4	+5.0V			
		I2C_EE_M3_SCL	GPIOA_15	5	6	GND			
I2C_AO_S0_SDA	UART_AO_B_RX	I2C_AO_M0_SDA	GPIOAO_3	7	8	GPIOAO_0	UART_AO_A_TXD		
			GND	9	10	GPIOAO_1	UART_AO_A_RXD		
I2C_AO_S0_SCL	UART_AO_B_TX	I2C_AO_M0_SCL	GPIOAO_2	11	12	GPIOX_9	SPI_A_MISO		
	I2C_EE_M1_SCL	SPI_A_SCLK	GPIOX_11	13	14	GND			
			SARADC_CH1	15	16	GPIOX_10	SPI_A_SS0	I2C_EE_M1_SDA	
			+3.3V	17	18	GPIOX_8	SPI_A_MOSI	PWM_C	
	SPI_B_MOSI	UART_EE_C_RTS	GPIOH_4	19	20	GND			
PWM_F	SPI_B_MISO	UART_EE_C_CTS	GPIOH_5	21	22	GPIOC_7	-		
I2C_EE_M1_SCL	SPI_B_SCLK	UART_EE_C_TX	GPIOH_7	23	24	GPIOH_6	UART_EE_C_RX	SPI_B_SS0	I2C_EE_M1_SDA
			GND	25	26	SARADC_CH2			
I2C_AO_S0_SDA	UART_AO_B_RX	I2C_AO_M0_SDA	GPIOAO_3	27	28	GPIOAO_2	I2C_AO_M0_SCL	UART_AO_B_TX	I2C_AO_S0_SCL
			NC	29	30	GND			
			NC	31	32	GPIOAO_4	PWMAO_C		
			NC	33	34	GND			
		UART_AO_B_TX	GPIOAO_8	35	36	GPIOH_8	-		
		UART_AO_B_RX	GPIOAO_9	37	38	GPIOAO_10	PWMAO_D		
			GND	39	40	GPIOAO_11	PWMAO_A		

5.2 USB

The Radxa Zero features a single USB3 HOST port in a type-C socket, offering a downstream USB current limit of approximately 1A. Additionally, the Radxa Zero is equipped with a USB2 OTG port in a type-C socket, which can be powered either by a 5V PSU or a PC/laptop USB port, allowing for data access.

5.3 HDMI

The Radxa Zero features 1x Micro HDMI port that supports CEC and HDMI 2.0, allowing for resolutions of up to 4Kp60.

5.4 Temperature Range and Thermals

The recommended ambient operating temperature range is 0 to 50 degrees Celcius.

To reduce thermal output when idling or under light load, the Radxa Zero reduces the CPU clock speed and voltage. During heavier load the speed and voltage (and hence thermal output) are increased. The internal governor will throttle back both the CPU speed and voltage to make sure the CPU temperature never exceeds 85 degrees C.

The Radxa Zero will operate perfectly well without any extra cooling and is designed for sprint performance - expecting a light use case on average and ramping up the CPU speed when needed (e.g. when loading a webpage). If a user wishes to load the system continually or operate it at a high temperature at full performance, further cooling may be needed.

6 Availability

Radxa guarantees availability of the Radxa Zero until at least September 2029.

7 Support

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