Radxa Cubie A7Z Product Brief

Tiny Size, Mighty AI

Revision 1.1

2025-08-26

Radxa Computer

Contents

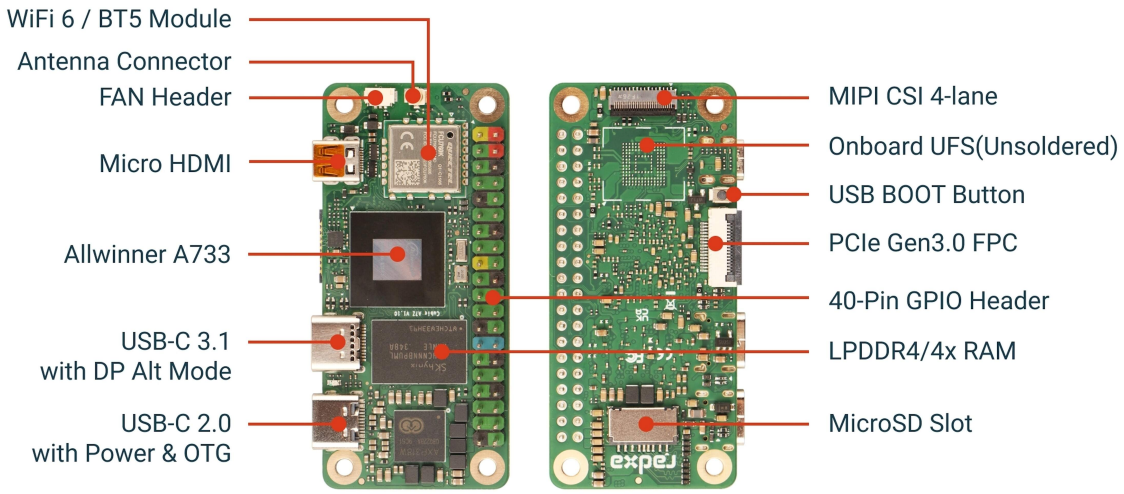
1 Revision Control Table

Version	Date	Changes from previous version
1.0	2025/08/22	First version
1.1	2025/08/26	Fix CPU architecture error, thanks user Mr. Lok report

2 Introduction

Radxa Cubie A7Z is an ultra-tiny Single Board Computer (SBC) that redefines compactness in the industry. Measuring just 65 × 30 mm, the Cubie A7Z delivers class-leading performance and advanced features in a remarkably small form factor. Its ultra-compact size allows for seamless integration into space-constrained projects, portable devices, and embedded applications where every millimeter counts, while still providing exceptional mechanical compatibility and reliability.

Equipped with a powerful Neural Processing Unit (NPU) delivering up to 3 TOPS of AI acceleration, the Cubie A7Z is well-suited for edge AI applications such as image recognition, smart vision, voice processing, robotics, and intelligent IoT devices. Its NPU enables efficient on-device inference, reducing latency and enhancing privacy for AI workloads at the edge.



3 Key Features

3.1 Hardware

- **Processor:** Allwinner A733 (Dual-core Cortex-A76 up to 2.0GHz + Hexa-core Cortex-A55 up to 1.8GHz)
- **GPU:** Imagination BXM-4-64 MC1 (OpenGL ES 3.2, Vulkan 1.3, OpenCL 3.0)
- **NPU:** 3 TOPS AI acceleration
- **Memory:** 1GB / 2GB / 4GB / 8GB / 16GB LPDDR4/4x
- **Storage:** Optional 64GB / 128GB / 256GB / 512GB high-performance 2-lane UFS 3.0 onboard chip
- **Wireless:** WiFi 6 & Bluetooth 5.4 with external antenna

- **Display:** 4K output via Micro HDMI
- **Video Decode:** H.265/VP9/AVS2 (up to 8Kp24)
- **Video Encode:** H.264/H.265 (up to 4Kp30)

3.2 Interfaces

- 1 × TF Card Slot
- 1 × Micro HDMI port (up to 4Kp60)
- 1 × USB 2.0 OTG Type-C port (power & data)
- 1 × USB 3.1 OTG Type-C port (DP Alt mode)
- 1 × PCIe Gen3 x1 FPC connector
- 40-pin GPIO header

3.3 Software

- **Debian Linux®** support
- **Android™ 13** support
- Hardware access/control library for Linux/Android

Combined with support for both Android 13 and Debian Linux, the Cubie A7Z enables a flexible software environment for prototyping and deployment across diverse use cases.

4 Electrical Specifications

4.1 Power Requirements

Radxa Cubie A7Z supports DC +5V input:

- 5V/1A power adapter via USB Type-C power port
- 5V power supplied through GPIO pins 2 & 4

5 Peripherals

5.1 GPIO Interface

Radxa Cubie A7Z provides a 40-pin GPIO expansion header, compatible with most market accessories.

5.1.1 GPIO Alternate Functions

Pin#	FUNC1	FUNC2	FUNC3	FUNC4	FUNC5	FUNC6	FUNC7	FUNC8
1	3.3V							
3	PJ23	PWM1-5	UART3-RX	UART2-CTS	TWI7-SDA	TWI3-SDA	TWI11-SDA	PJ-EINT23
5	PJ22	PWM1-4	UART3-TX	UART2-RTS	TWI7-SCK	TWI3-SCK	TWI11-SCK	PJ-EINT23
7	PB0	UART2-TX	UART0-TX	SPI2-CS0			JTAG-MS	PB-EINT1
9	GND							
11	PB1	UART2-RX	UART0-RX	SPI2-CLK		JTAG-CK		PB-EINT1
13	PL6	S-JTAG-DO	S-UART0-TX	S-SPI0-MOSI	S-IR-RX	S-PWM0-4		PL-EINT6
15	PL7	S-JTAG-DI	S-UART0-RX	S-SPI0-MISO	S-PWM0-5			PL-EINT7
17	3.3V							
19	PD12		LVDS1-D1P	DSI1-D1P	EINK-D12	SPI1-MOSI	PWM1-2	PD-EINT12
21	PD13		LVDS1-D1N	DSI1-D1N	EINK-D13	SPI1-MISO	PWM1-3	PD-EINT13
23	PD11		LVDS1-D0N	DSI1-D0N	EINK-D11	SPI1-CLK	PWM1-1	PD-EINT11
25	GND							
27	PD17		LVDS1-CKN	DSI1-D2N	EINK-LEH	TWI2-SDA	UART3-RX	PD-EINT17
29	PB2	UART2-RTS	SPI2-MOSI	HDMI-SCL		JTAG-DO	TWI0-SCK	PB-EINT2
31	PB3	UART2-CTS	SPI2-MISO	HDMI-SDA		JTAG-DI	TWI0-SDA	PB-EINT3
33	PM3	S-JTAG-DI	S-SPI0-MISO	S-UART0-RX	S-UART1-RX	S-PWM0-5		PM-EINT3
35	PB6	CLK-FANOUT1	I2S0-LRCK	SPI2-CS3	PWM0-2	PWM0-8	PB-EINT6	
37	PM4	S-UART0-TX	S-TWI2-SCK	S-TWI1-SCK	S-UART1-TX	S-PWM0-0	S-IR-RX	PM-EINT4
39	GND							

Pin#	FUNC1	FUNC2	FUNC3	FUNC4	FUNC5	FUNC6	FUNC7	FUNC8	FUNC9
2	5V								
4	5V								
6	GND								
8	PB9	UART0-TX	I2S0-DIN2	I2S0-DOUBT2	PWM1-1	WATCHDOG-SIG	TWI8-SCK	TWI0-SCK	PB-EINT9
10	PB10	UART0-RX	I2S0-DIN3	I2S0-DOUBT3	PWM1-2	PLL-LOCK-DBG	TWI8-SDA	TWI0-SDA	PB-EINT10
12	PB5	I2S0-BCLK	SPI2-CS2	PWM0-1	TWI1-SDA	PB-EINT5			
14	GND								
16	PJ24	PWM1-6	UART4-TX	TWI4-SCK	SPI3-CLK	PJ-EINT24			
18	PJ25	PWM1-7	UART4-RX	TWI4-SDA	SPI3-MOSI	PJ-EINT25			
20	GND								
22	PL5	S-JTAG-CK	S-TWI2-SDA	S-SPI0-CLK	S-PWM0-3	PL-EINT5			
24	PD10	LVDS1-D0P	DSI1-D0P	EINK-D10	SPI1-CS0	PWM1-0	PD-EINT10		
26	PD14	LVDS1-D2P	DSI1-CKP	EINK-D14	SPI1-HOLD	UART3-RTS	PD-EINT14		
28	PD16	LVDS1-CKP	DSI1-D2P	EINK-OEH	TWI2-SCK	UART3-TX	PD-EINT16		
30	GND								
32	PM5	S-UART0-RX	S-TWI2-SDA	S-TWI1-SDA	S-UART1-RX	S-PWM0-1	S-IR-RX	PM-EINT5	
34	GND								
36	PB4	PWM0-0	I2S0-MCLK	SPI2-CS1	HDMI-CEC		TWI1-SCK	PB-EINT4	
38	PB8	CLK-FANOUT3	I2S0-DIN0	I2S0-DOUBT1	PWM1-0	OWA0-OUT	TWI1-SDA	PB-EINT8	
40	PB7	CLK-FANOUT2	I2S0-DOUBT0	I2S0-DIN1	PWM0-9	OWA0-IN	TWI1-SCK	PB-EINT7	

> **Note:** Certain pin functions (SPI, I2C, UART, PWM, etc.) might be mutually exclusive depending on software Device Tree configurations. Users should verify the required pin multiplexer settings.

5.2 USB

Radxa Cubie A7Z features a type-c USB 3.1 OTG port with DP Alt mode available, with a downstream current limit of approximately 1A. It also includes a USB 2.0 OTG port (Type-C), which can be powered by a 5V PSU or a PC/laptop USB port, supporting both power

and data transfer.

5.3 HDMI

Radxa Cubie A7Z provides 1 × Micro HDMI port with CEC and HDMI 2.0 support, allowing for resolutions up to 4Kp60.

5.4 FPC Connector

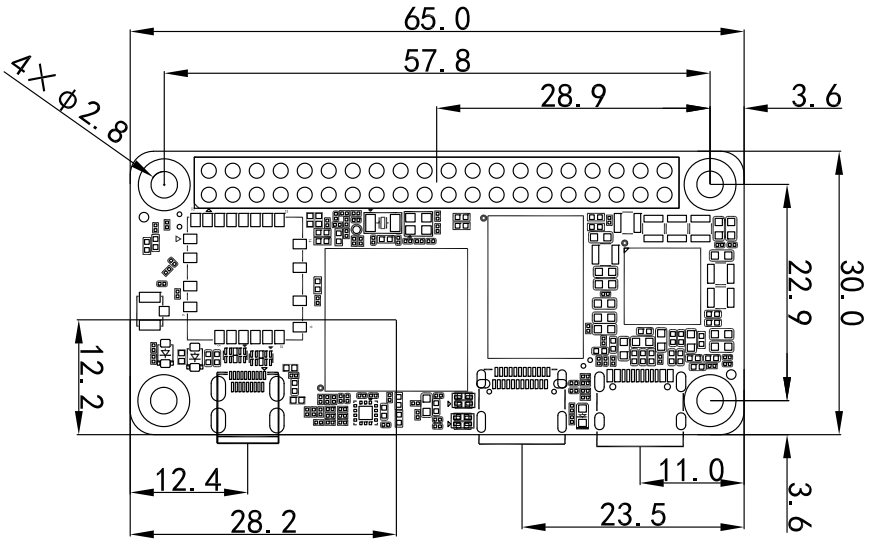
The Cubie A7Z offers a FPC connector providing PCIe 3.0 one-lane signal, supporting expansion of SSD, SATA, 2.5G Ethernet ports and other devices, This requires additional expansion board / HAT.

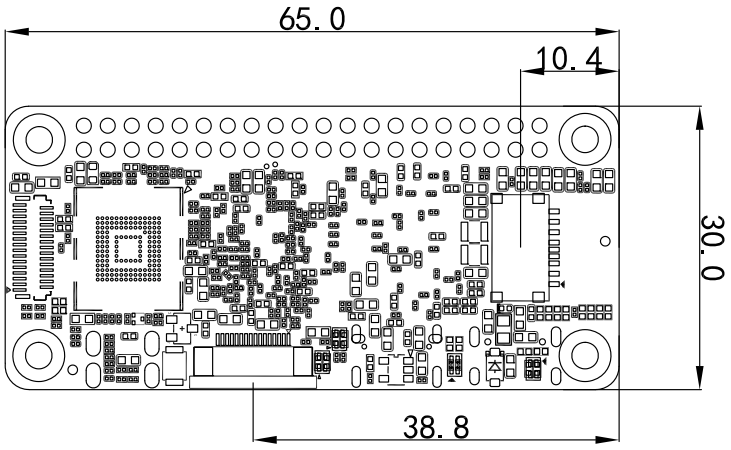
6 Temperature Range and Thermals

- Recommended ambient operating temperature: 0°C to 50°C
- The board dynamically adjusts CPU clock speed and voltage to minimize thermal output during idle or light load, and increases them under heavy load. The internal governor ensures the CPU temperature does not exceed 85°C.
- The Cubie A7Z operates reliably without additional cooling for typical use. For sustained heavy workloads or operation in high-temperature environments, additional cooling may be required.

7 Mechanical Specification

Note: All dimensions are in millimeters (mm).





8 Models and SKUs

Name	CPU	RAM	UFS	WiFi / BT	GPIO Header	SKU Code
Cubie A7 Zero	A733MX-HN3	1GB	N/A	FCU760K WiFi 6 / BT 5.4	Not Soldered	RS503-D1U0H0R43W28
		2GB	N/A	FCU760K WiFi 6 / BT 5.4	Not Soldered	RS503-D2U0H0R43W28
		4GB	N/A	FCU760K WiFi 6 / BT 5.4	Not Soldered	RS503-D4U0H0R43W28
		8GB	64GB	FCU760K WiFi 6 / BT 5.4	Not Soldered	RS503-D8U1H0R43W28
		16GB	128GB	FCU760K WiFi 6 / BT 5.4	Not Soldered	RS503-D16U2H0R43W28
		1GB	N/A	FCU760K WiFi 6 / BT 5.4	Soldered	RS503-D1U0H1R43W28
		2GB	N/A	FCU760K WiFi 6 / BT 5.4	Soldered	RS503-D2U0H1R43W28
		4GB	N/A	FCU760K WiFi 6 / BT 5.4	Soldered	RS503-D4U0H1R43W28
		8GB	64GB	FCU760K WiFi 6 / BT 5.4	Soldered	RS503-D8U1H1R43W28
		16GB	128GB	FCU760K WiFi 6 / BT 5.4	Soldered	RS503-D16U2H1R43W28

9 Availability

Radxa guarantees availability of the Radxa Cubie A7Z until at least September 2034.

10 Support

For support, please refer to the hardware documentation section of the Radxa Documentation Center and post questions to the Radxa Forum.

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