



Introduction

MBx-ES32S31 is an embedded MCU board powered by Espressif ESP32-S31, featuring a dual-core RISC-V processor running at up to 320 MHz. Equipped with 16MB of on-board PSRAM and 16 MB of NOR Flash, it is suitable for developing smart appliance panels, smart home control panels, compact equipment controllers and functional test fixtures. Developers can create multiple operation screens and multilingual menus to make devices easier to use.

Running FreeRTOS with LVGL, MBx-ES32S31 combines real-time control with touch GUI development and supports a 3.5-inch touch panel at 320 × 480 resolution. A camera interface enables image capture for equipment viewing, photo documentation and visual records of fixture test results. Two digital microphone inputs, one analog microphone input and one speaker output support audio input and playback. Wireless connectivity, 10/100M Ethernet, UART, Micro SD and two USB-C ports—one for USB HS and one for debugging only—provide network communication, peripheral connectivity and storage expansion.

With compatible display interfaces and driver integration, MBx-ES32S31 can also be used to develop e-paper applications such as room signage, equipment status boards and electronic notices application. FusionTech offers a PK300-ES31 evaluation kit with an integrated 3.5-inch touch panel to support development and application evaluation.

Features

- Dual-core 32-bit RISC-V microprocessor, up to 320 MHz
- 16 MB Flash and 16 MB PSRAM
- Support 2.4 GHz Wi-Fi 6 (IEEE 802.11b/g/n/ax) and Bluetooth 5.4 LE
- Rich I/O interfaces, including LCD, touch, camera, audio, Ethernet, UART, Micro SD and USB are for flexible peripheral integration.
- Convenient USB-C PD power input, design supporting 5–12V.
- Suitable for smart home controls, appliance panels, industrial HMI and compact test fixtures.

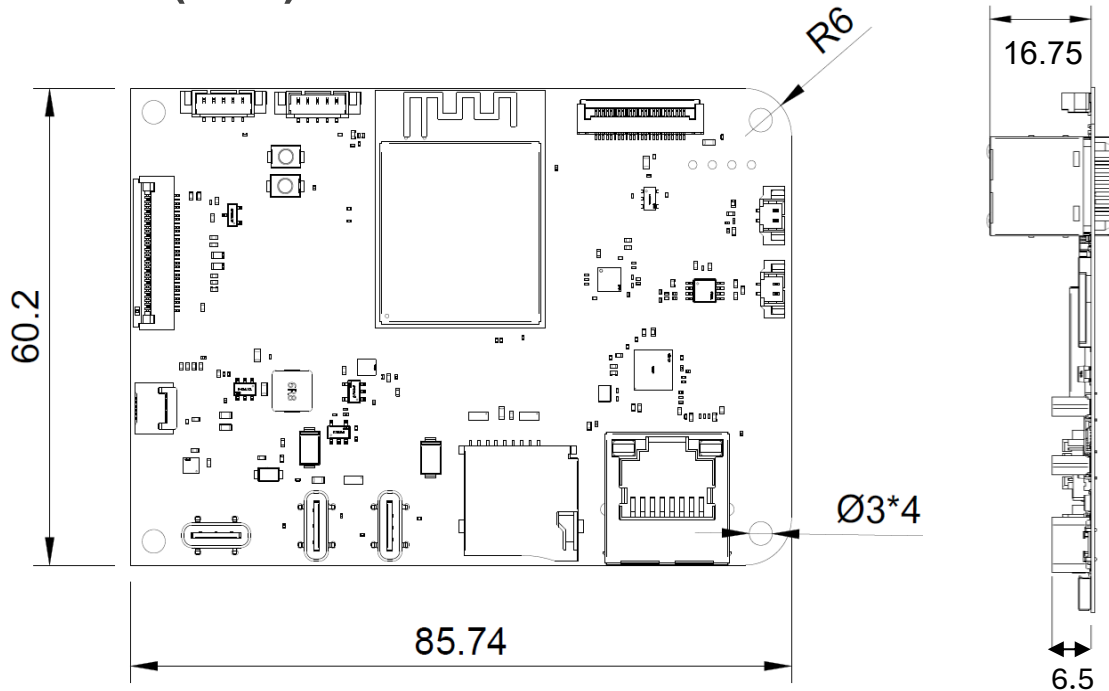


Specification

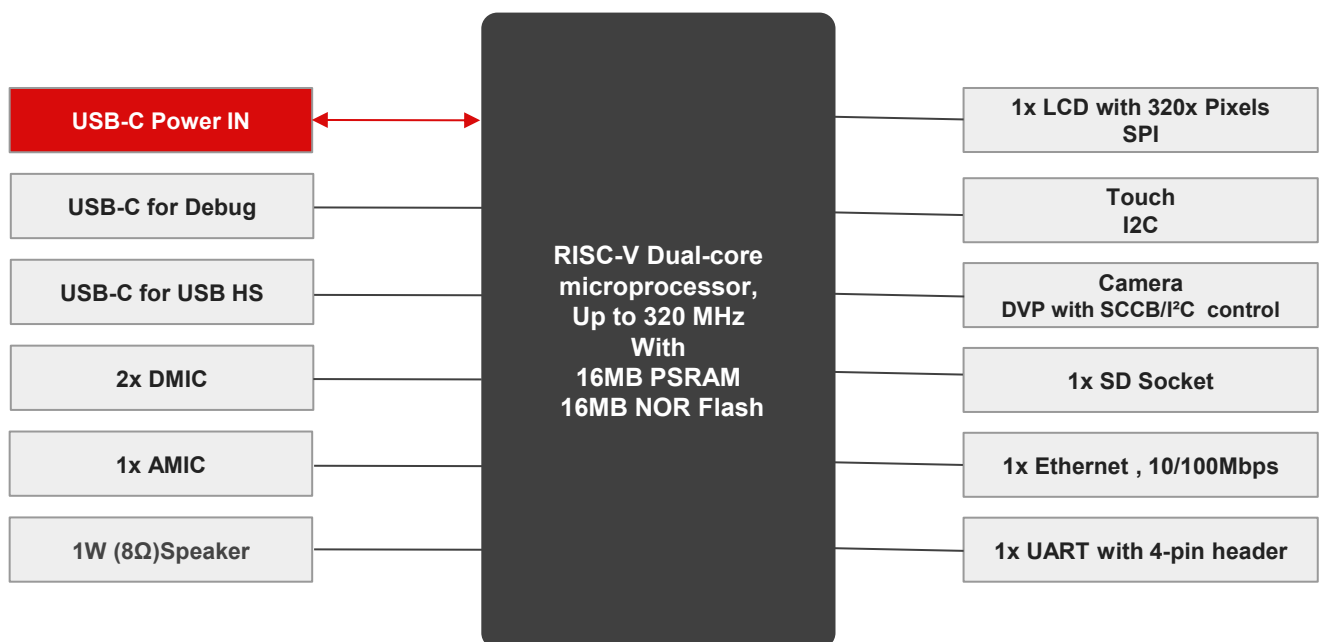
System	Processor	Dual-core RISC-V Microprocessor, up to 320 MHz
	Memory	16MB PSRAM
	Storage	16MB NOR Flash
	Wi-Fi & BT	2.4 GHz Wi-Fi 6, IEEE 802.11b/g/n/ax; Bluetooth 5.4 LE
	Ethernet	1x GbE Ethernet, 10/100 Mbps
	Display	Support 320x480 resolution Display via SPI interface
	Touch	1x touch FPC connector via I2C Interface
I/O Interface	Camera	1x DVP camera interface with SCCB/I ² C control
	Ethernet	1x RJ45 connector
	USB	2x USB-C, 1for USB HS and 1for Debug only
	Audio	2x DMIC, 1x AMIC and 1x 1W (8Ω)Speaker
	UART	1x 4-Pin Header
	SD Socket	1x Micro SD slot
	Others	1x Boot Button, 1x Reset Button
Power Input		USB-C Power Input, 5~12V
Form Factor		100x 72mm, Pico-ITX
Operating Temperature		-10°C ~ 70°C
Operating System		FreeRTOS



Dimension(mm)



Block Diagram



Ordering Information:

MBx-ES32S31	2.5" MCU Board w/ 16MB PSRAM & 16MB NOR Flash/Wi-Fi 6/BLE
PK300-ES31	3.5" Touch Panel Kit w/ 3MP Camera/DMIC/ 8Ω1W Speaker

