OrbitLink Consulting

UNLOCKING THE POTENTIAL OF SPACECRAFT CONTROL AND COMMUNICATIONS

PRODUCT BRIEF / ESP32RADIO REV A NETWORKED SDR

A wideband SDR receiver that streams over Wi-Fi.

A single board combining an **RTL2832U and R860** SDR receiver with an **ESP32-P4** host and **ESP32-C6** Wi-Fi. It runs without a PC, serving rtl_tcp and a web UI over Wi-Fi from USB-C power, or switches to a second USB-C port to work as an ordinary PC SDR.

RTL2832U + R860
Receiver chain with a 28.8 MHz TCXO

HF input
Second SMA, direct sampling, flat to 26 MHz

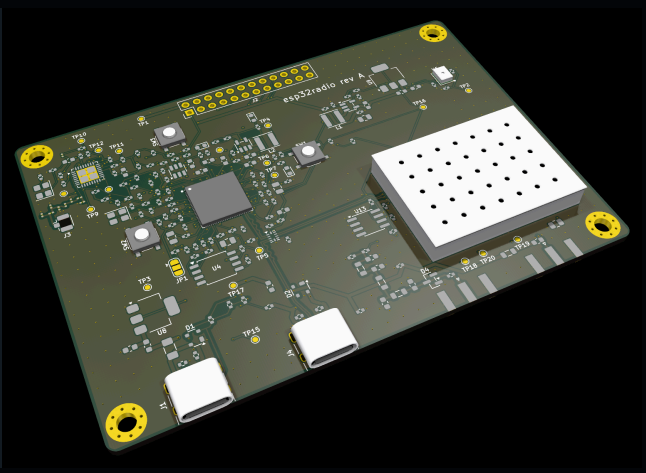
Wi-Fi 6 + BLE
ESP32-C6 over SDIO, external 2.4 GHz antenna

32 MB PSRAM
ESP32-P4 host with 16 MB flash

100 × 70 mm
Four-layer board, USB-C powered

20 GPIO
On a 2 × 12 expansion header

DESIGN RENDERING



01

RF front end

- SMA input with switchable **bias tee**, 192 mA limit
- HF path through a **7th-order low-pass**: −58 dB at 50 MHz, simulated
- ESD protection on both inputs; RF section in a shield

02

Host and streaming

- **ESP32-P4** hosts the SDR over on-board USB 2.0 HS
- Serves **rtl_tcp** and a web UI over Wi-Fi
- Headless: no display or audio output

03

PC mode

- **TS3USB221A** switch moves the SDR to its own USB-C port
- Works with **rtl_test** and SDR++ with the P4 out of the loop

04

Sensing and expansion

- I²S **MEMS microphone**
- 2 × 12 header with I²C pair and ADC channels
- Three LEDs; RESET, BOOT and USER buttons

05

Power

- USB-C sink with ESD protection and a 2 A PTC
- Dedicated regulators for the tuner and demodulator
- About **1.16 A at 5 V** peak estimate; needs a USB-C source advertising 1.5 A

06

Build

- **Impedance-controlled** RF, matched USB HS pairs
- Four-layer board

NOTICES

Figures are design values or estimates, not measurements. Available for US Government use and as evaluation kits for product developers, software developers and system integrators.

Need a networked SDR receiver?

Request a quote and tell us your band, range and quantity.

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