OpenGizmo

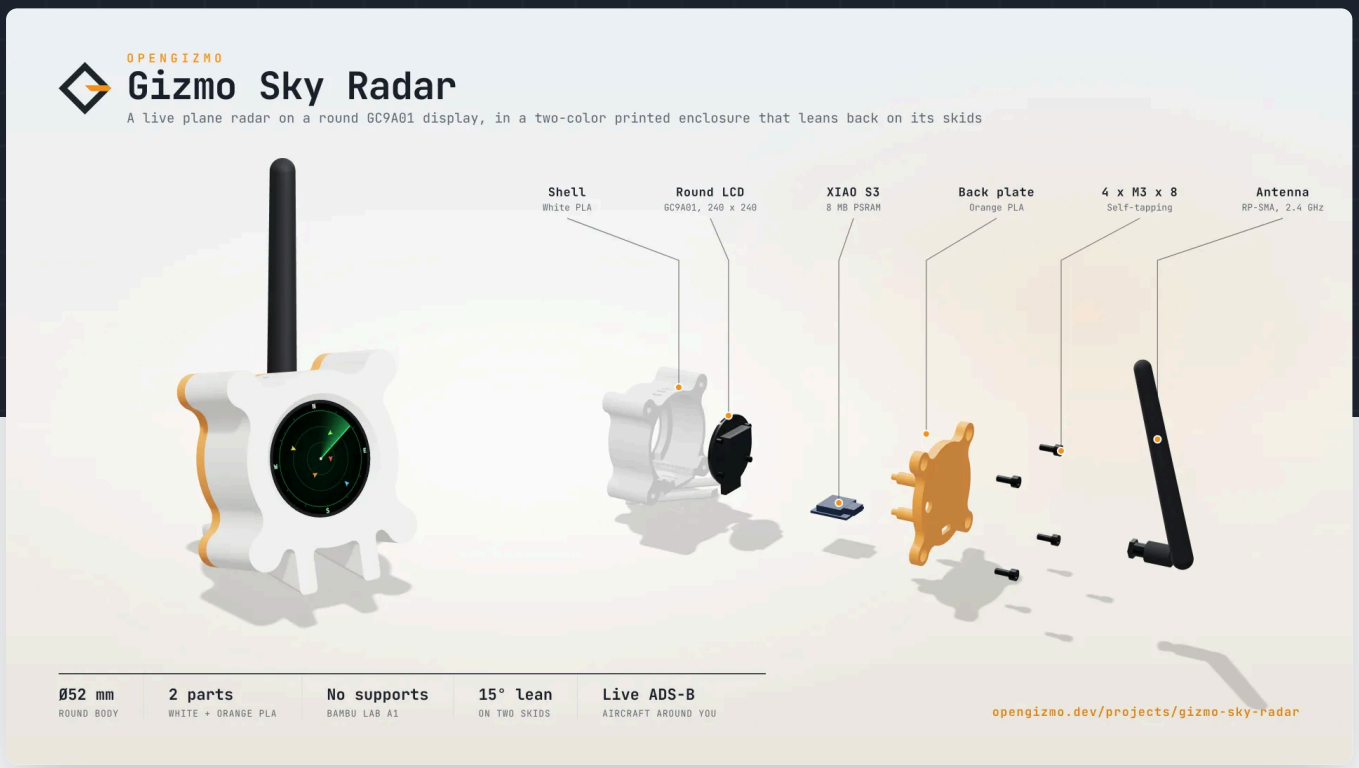
DATASHEET

XIAO ESP32-S3 · ROUND DISPLAY RADAR

Gizmo Sky Radar

A live plane radar for your desk: the aircraft around you on a GC9A01 round display, set up from your phone.

XIAO ESP32-S3 | GC9A01 round display | Live ADS-B data | Wi-Fi setup hotspot | Web app | Open source



BOARD
XIAO ESP32-S3
8 MB PSRAM for the frame and the flights

DISPLAY
GC9A01
Round, 240 × 240, over SPI

FLIGHT DATA
Live ADS-B
From a free community network

SETUP
Browser
Hotspot, then gizmo-sky-radar.local

01 Overview

Gizmo Sky Radar puts the sky above your home on your desk: a round display that shows the aircraft around you, live, like a real radar screen.

Downloads run in a task of their own, so the display never waits for the network, and the aircraft glide between downloads. A web app sets the location, range and look from your phone.

- Aircraft turned to their track and colored by altitude, with callsign and altitude
- Smooth motion between downloads, and marks for aircraft just out of range
- A spotlight on the nearest aircraft, and emergencies blinking in red
- Location, range, units, theme and display set from the web app
- An HTTP API, and a guide for AI agents
- Prebuilt firmware, flashed from the browser on opengizmo.dev

02 Specifications

CONTROLLER

Board	**Seeed Studio XIAO ESP32-S3 (seeed_xiao_esp32s3), 8 MB PSRAM**
Settings	**Kept in flash (Preferences)**

DISPLAY

Panel	**GC9A01, 1.28" round, 240 × 240**
Interface	**SPI**
Look	**Themes, brightness and rotation, set from the web app**

FLIGHT DATA

Source	**Live ADS-B positions, from a free community network**
Range	**Adjustable, set from the web app**
Units	**Aviation, metric or imperial**

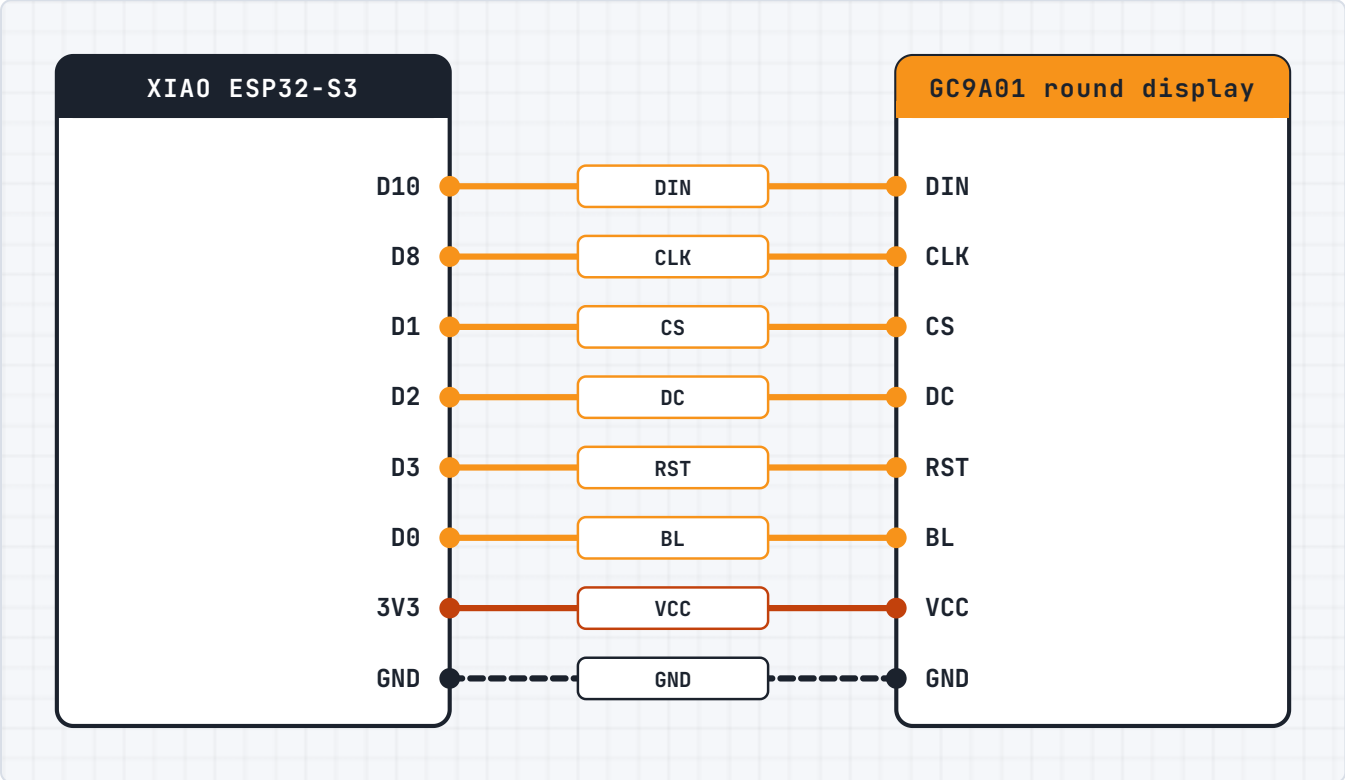
CONNECTIVITY AND SETUP

Wi-Fi	**2.4 GHz (ESP32-S3), with an RP-SMA antenna on the mast**
Setup hotspot	**Gizmo-Sky-Radar**
Web app	**http://gizmo-sky-radar.local**

03 Pinout and wiring

The display takes eight wires: power from 3V3, the SPI data and clock on D10 and D8, and its control pins on D0 to D3. Keep the wires short: the display runs on a fast SPI bus.

Pins checked against the firmware v1.0.1 (commit 7cf21ba) when this datasheet was generated.



SIGNAL	BOARD PIN	MODULE PIN	NOTES
DIN	D10	DIN	Pixel data (MOSI), GPIO9
CLK	D8	CLK	SPI clock, GPIO7
CS	D1	CS	Chip select, GPIO2
DC	D2	DC	Data or command, GPIO3
RST	D3	RST	Reset, GPIO4
BL	D0	BL	Backlight, dimmed with PWM (or wire it to 3V3 for full brightness), GPIO1
VCC	3V3	VCC	3.3 V power supply
GND	GND	GND	Common ground

04 Parts list

QTY	PART	NOTES
1	**Seeed Studio XIAO ESP32-S3**	Its 8 MB of PSRAM are needed
1	**GC9A01 round display, 1.28", 240 × 240**	The common SPI module with VCC, GND, DIN, CLK, CS, DC, RST and BL pins
1	**U.FL to RP-SMA bulkhead pigtail**	From the U.FL connector of the XIAO to the mast
1	**2.4 GHz RP-SMA antenna**	Screws onto the mast; it replaces the flat antenna that comes with the XIAO
8	**Jumper wires**	One for each pin of the display, as short as possible
1	**Printed shell and back plate**	White and orange PLA (the 3MF plates are in gizmo-docs)
4	**M3 × 8 screws**	They cut their own thread in the shell
1	**USB-C data cable and 5 V USB power supply**	To flash and power the radar

05 Setup

01 Wire the display

Connect the eight pins of the display to the XIAO following the pinout, and connect the XIAO over USB.

02 Flash the firmware

Open the project page on opengizmo.dev in Chrome or Edge and press Flash firmware. If it can't connect, hold BOOT, press and release RESET, then release BOOT and try again.

03 Join the setup hotspot

Press RESET when the flashing is done, then join the Gizmo-Sky-Radar Wi-Fi from your phone: the setup page opens by itself.

04 Pick your Wi-Fi

Choose your network and type its password. The radar connects and closes the hotspot.

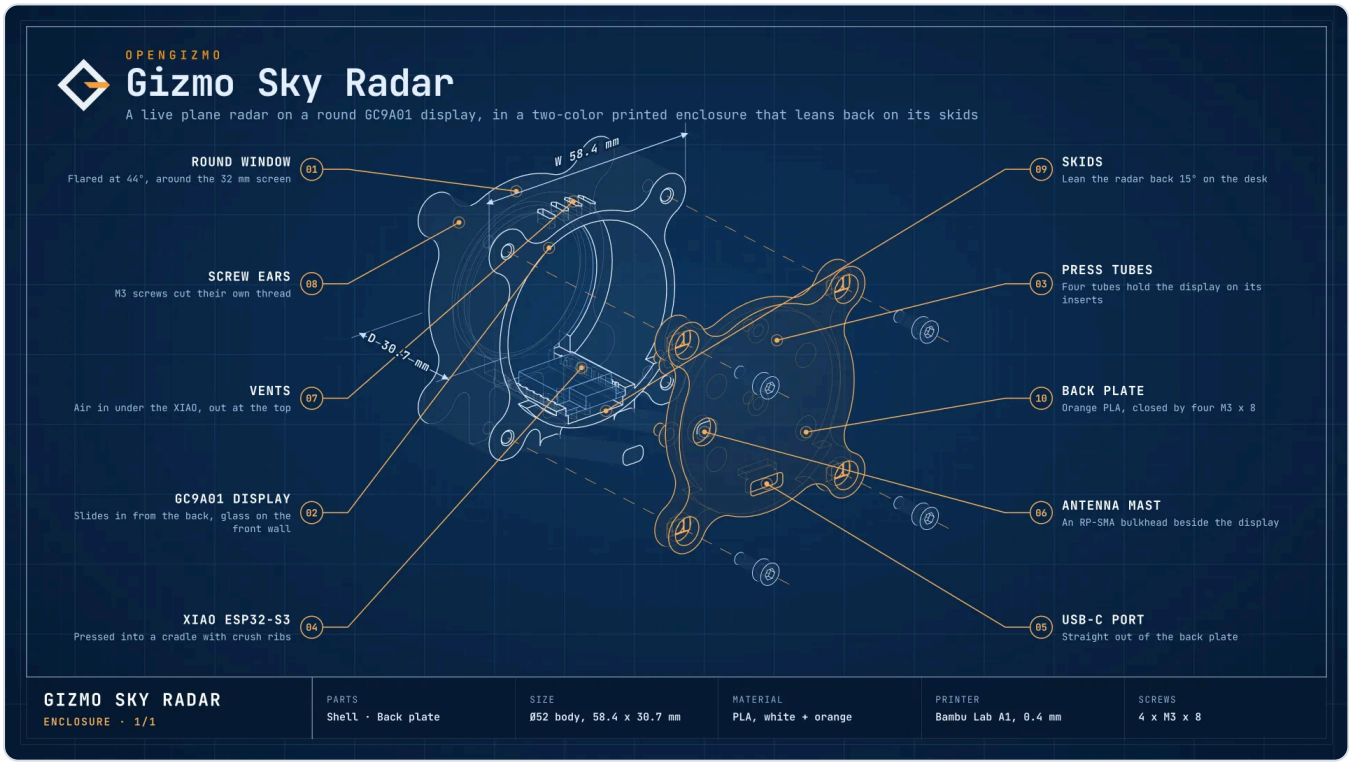
05 Set your location

In Settings at http://gizmo-sky-radar.local, paste the coordinates of your home: the aircraft around you appear.

06 Troubleshooting

The display stays black	Check VCC, GND and BL (or wire BL to 3V3), and that DIN, CLK, CS, DC and RST go to the pads of the pinout.
Lines or noise on the display	Long or loose wires can't carry the fast SPI signal: shorten them, or lower the SPI speed in the firmware (see the README).
The picture is upside down or sideways	Set the rotation in the Settings page of the web app.
The display asks for a location	The radar has no location yet: open gizmo-sky-radar.local and set it in Settings.
The display says there is no flight data	The radar can't reach the flight data service. Check that your network reaches the internet: the radar keeps retrying by itself.

07 Enclosure



Every detail of the enclosure, from the round window to the skids, on a Ø52 mm body, 58.4 mm across the ears.

Gizmo Sky Radar is an open-source OpenGizmo project

Project page: https://opengizmo.dev/projects/gizmo-sky-radar

Source code: https://github.com/open-gizmo/gizmo-sky-radar · MIT license