

SCAN FOR THE  
FULL GUIDE

## Set up your Radio Sensor Listener: CC1101, Ecowitt (Build 5)

A CC1101 radio sold for 868/915 MHz hears Ecowitt and Ambient Weather WH31, WH51 and WN34 sensors directly, with no Ecowitt gateway, and sends every reading to a place you own, or into Home Assistant. Heard a WH31B, two WH51 and a WN34 on our bench, 2026-10-04.

### BEFORE YOU START

Have these on hand:

- A classic **ESP32** devkit and a **CC1101** module sold as “868/915 MHz”. Six wires: **VCC to 3V3** (never 5 V), **GND**, **SI to GPIO 23**, **SCLK to GPIO 18**, **SO to GPIO 19**, **CSn to GPIO 5**. GDO0 and GDO2 are not used. On the Elechouse 10-pin header: 1 VCC, 3 SI, 4 SCLK, 5 SO, 7 CSn, 9 GND.
- An **antenna**: the SMA whip that came with the module, or an 8.2 cm wire for 915.
- An Ecowitt or Ambient **WH31**, **WH51** or **WN34** sold for your band: 915 in the Americas, 868 in Europe.
- Any **OAT LoRa node** on 915.0 switched off or well away: it shares the channel.
- A computer with **Chrome** or **Edge** and a **data** USB cable. **Close any serial monitor** before flashing.
- Your **Wi-Fi** and where the readings go.

### FLASH IT (FIRST TIME ONLY)

- 1 Open [openagriculturetechnology.com/build/sketches/weather-station-listener/](https://openagriculturetechnology.com/build/sketches/weather-station-listener/) (reload it if it was already open), choose **Build 5**, press its button, **Install**, let it erase. The console's first line must say **1.4.0** and **CC1101 receiving (version 0x14)**; an older version means the install did not write.

### CONNECT TO THE NODE

- 2 **Power the node** with a USB cable (any USB charger or your computer).
- 3 **On your phone or laptop, join its Wi-Fi network**. It appears as **OAT-Setup-XXXXXX** (open, no password). A setup page opens by itself; if not, go to <http://192.168.4.1>.

|                    |                                                     |
|--------------------|-----------------------------------------------------|
| Setup page address | <b>http://192.168.4.1</b>                           |
| Username           | <b>admin</b>                                        |
| Password           | <b>oatsetup</b> (change it once the node is online) |

## FILL IN YOUR SETTINGS

Write yours here first, then type them into the setup page. One card per node.

Listener name

e.g. barn-wx

Farm ID

the same on every node you own

Location

Wi-Fi name (SSID)

2.4 GHz

Wi-Fi password

Delivery method

Webhook or MQTT (Home Assistant)

Webhook URL

https:// ... (or the Test Endpoint below)

MQTT host / port

if using MQTT

Band (MHz)

915.00 (Americas) · 868.35 (Europe) ·  
433.92

Station allow-list

optional: exact ids from Stations heard,  
comma-separated

Push interval (sec)

default 60

Sensor ids (from Stations heard)

e.g. fineoffset-wh51:00c639: write each  
here

## NO ENDPOINT YET? USE THE OAT TEST ENDPOINT

The listener appears under your Farm ID with each station and sensor beneath it.

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| Delivery method | <b>Webhook</b>                                                                                                                   |
| Webhook URL     | <b><a href="https://iot-test.openagriculturetechnology.com/ingest">https://iot-test.openagriculturetechnology.com/ingest</a></b> |
| Watch it live   | <b><a href="https://iot-test.openagriculturetechnology.com">https://iot-test.openagriculturetechnology.com</a></b>               |

It keeps roughly the last hour. Rain arrives as the station's running total; the endpoint does the daily subtraction.

## INTO HOME ASSISTANT (MQTT)

Choose MQTT, point it at the Mosquitto broker Home Assistant uses, and each reading lands on `oat/<name>/<station id>/<measurement>`. Declare each as an MQTT sensor in YAML (value\_json.value).

|                 |                                                                                  |
|-----------------|----------------------------------------------------------------------------------|
| MQTT host       | the Home Assistant machine                                                       |
| Port            | <b>1883</b> plain · <b>8883</b> with TLS ticked                                  |
| User / password | the broker's, if it has them                                                     |
| Then            | Settings → Devices & Services → MQTT: rename the device; the id stays underneath |

The guide at </home-assistant/weather-station/> has the dashboard cards and the frost, rain-hold and wind automations.

## SAVE & CHECK THE DATA IS FLOWING

- 4 Press Save.** The node joins your Wi-Fi while the setup page waits, then shows its **address on your own network**, like `http://192.168.1.37` and `http://oat-yourname.local`. Bookmark one; that's the node's home page from now on.

- 5 **Open Live Status** there and press **Send a test reading**. A green “OK” means a reading just reached your endpoint. That’s the whole job done.

**Updating later:** The setup page’s **Stations heard** lists every sensor under its own radio id, with its signal: a WH31 every 61 s, a WH51 every 70 s (10 s for a while after its reading changes), a WN34 about every 50 s. Give it two minutes.

### THE USB CONSOLE

Open the install page, choose **Console**.

|                 |                                                                                     |
|-----------------|-------------------------------------------------------------------------------------|
| <b>stations</b> | every sensor heard, with signal and age; chip version 0x14, state 0xd = receiving.  |
| <b>families</b> | frames per sensor family (0x37 WH31B, 0x51 WH51, 0x34 WN34): good, or failed_check. |
| <b>raw on</b>   | print every frame in hex with its signal and frequency offset; raw off to stop.     |
| <b>rss</b>      | the band's level for 100 ms; a quiet band reads about -100 dBm.                     |

### IF SOMETHING’S NOT WORKING

|                                                     |                                                                                                                                                                            |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nothing in families at all</b>                   | The boot line must say <b>CC1101 receiving (version 0x14)</b> . NOT RECEIVING: SPI wiring, 3V3, or a module that met 5 V.                                                  |
| <b>Frames arrive, all failed_check</b>              | Heard but not clean: a 433 MHz module on 915, no antenna, or a band that does not match the sensor.                                                                        |
| <b>Settings page says “This page isn’t working”</b> | Weak Wi-Fi. Pushes still get through; the page does not. Below about -80 dBm in <b>status</b> , move the board nearer the access point, or change settings on the console. |
| <b>I also own an Ecowitt gateway</b>                | Keep it; both only receive. The gateway names sensors by slot (soil 1), the listener by radio id: match them once by value.                                                |

Generated 2026-10-10 · This card and the firmware are open. The full sketch, the supported boards, and the web installer are at [openagriculturetechnology.com/build/sketches/weather-station-listener/](https://openagriculturetechnology.com/build/sketches/weather-station-listener/).