METAR Lightbox

User Setup & Configuration Manual

Version 2026.1 • March 2026

Arrow Flyer Services

> ⚠ **AVIATION DISCLAIMER**
> This device is for situational awareness only. It is NOT certified for operational aviation decision-making, flight planning, or navigation. Always consult official FAA weather briefings, NOTAMs, and certified aviation weather services before any flight.

Table of Contents

1. Introduction

The METAR Lightbox is a Wi-Fi connected aviation weather display that uses official FAA METAR data from AviationWeather.gov to present real-time flight conditions through intuitive LED color coding.

Once connected to your home Wi-Fi, the device operates entirely autonomously — continuously fetching updated METARs and displaying the current flight category for your selected airport. A built-in web portal at

A built-in configuration portal is accessible from any browser on your home network at `http://metar-lightbox.local/` — no app required.

2. LED Flight Category Display

The LED ring displays FAA-standard VFR flight categories using the following color scheme:

Color	Category	Criteria
GREEN	VFR	Ceiling > 3,000 ft AND Visibility > 5 SM
BLUE	MVFR	Ceiling 1,000–3,000 ft OR Visibility 3–5 SM
RED	IFR	Ceiling 500–999 ft OR Visibility 1–<3 SM
MAGENTA	LIFR	Ceiling < 500 ft OR Visibility < 1 SM
MAGENTA	HAZARD	Thunderstorm detected in raw METAR (overrides category)

> **Tip:** The device uses the most conservative (worst-case) of ceiling and visibility. If the API provides a category, it is only accepted if it is equal to or worse than the locally computed category.

3. First-Time Setup (Connecting to Home Wi-Fi)

Follow these steps the first time you power on your METAR Lightbox, or after a factory reset.

Step 1 – Power On

Connect the device to power. The LED ring will show a boot animation, then begin a soft blue “thinking” chase pattern while it waits for setup.

Within 30–60 seconds, the device broadcasts a temporary Wi-Fi network:

SSID: **`METAR-LIGHTBOX-SETUP`**

Step 2 – Connect Your Phone or Computer

Open your device’s Wi-Fi settings and connect to

`METAR-LIGHTBOX-SETUP`. A captive portal may open automatically.

Step 3 – Open the Setup Portal

If a browser tab does not open automatically, navigate to:

```
http://10.42.0.1
```

Step 4 – Configure Settings

Enter your home Wi-Fi network name (SSID) and password, and type your airport's ICAO code (e.g. KJFK).

Click "Save & Apply". The device will disconnect from the setup network and reboot. This takes approximately 30 seconds.

Step 5 – Verify Connection

Once the device joins your home network, the LED will display the flight category for your airport. The setup network (METAR-LIGHTBOX-SETUP) will disappear.

You can now access the configuration portal from any device on your home network at:

```
http://metar-lightbox.local/
```

> **Factory Reset:** Hold the GPIO button on the device for 3 seconds to re-enter setup mode at any time. This does not erase your saved settings.

4. Config Portal – Live Status & Report History

Once the device is on your home network, open any browser and go to `http://metar-lightbox.local/` to access the full configuration portal. No app or account is required.

4.1 Current Status Card

At the top of the portal page, the Current Status card shows a live decoded summary of the most recent METAR for your home airport:

- Flight category badge (VFR / MVFR / IFR / LIFR / HAZARD) with color coding
- Conditions trend arrow (↑ improving, ↓ degrading, → steady)
- Wind direction, speed, and gust (if present)
- Visibility and ceiling
- Temperature and dewpoint
- Altimeter setting
- Sky conditions (cloud layers)
- Raw METAR string
- Observation time and “Updated X minutes ago” timestamp

4.2 Secondary Airport Badges

Up to 3 additional airports can be configured for status display in the portal. Their current flight category appears as colored badges below the main status card. Secondary airports do not affect the LED display.

4.3 Report History

The portal maintains a rolling list of the last 10 raw METAR reports fetched for your home airport. This is displayed in a History card below the current status and updates automatically every 5 minutes.

4.4 System Health

The portal also displays device health indicators:

- Wi-Fi signal strength (RSSI)
- CPU temperature
- Device uptime

5. Configuration Options

All settings are saved to the device and persist through reboots. After clicking “Save & Apply”, the lightbox service restarts automatically (approximately 10 seconds).

5.1 Display & Airports

Home Airport (ICAO Code)

Enter the 4-letter ICAO identifier for the airport whose conditions will be displayed on the LED ring.

Example: `KJFK` • `KBOS` • `KMTN`

Secondary Airports (up to 3)

Add up to 3 additional ICAO codes to display their flight category status in the portal. These are shown as colored badges and are useful for monitoring nearby alternates at a glance. They do not affect the LED ring.

LED Brightness

Controls the global brightness of the LED ring. Range: 1–255 (default: 128 / 50%). Reduce brightness in dark rooms; increase for well-lit areas.

5.2 Refresh & Fallback

Refresh Interval

How often the device fetches a new METAR from AviationWeather.gov.

Value	Description
60 seconds	Near real-time
120 seconds (default)	Recommended
300 seconds	Low bandwidth
600 seconds	Minimal polling

Fallback Hours

If no current METAR is found, the device will search backwards this many hours to find the most recent available report. Useful for airports with infrequent reporting. Default: 2 hours.

5.3 Wind Gust Indication

Enable Gust Indicator

When enabled, any airport reporting gusts of 10 knots or more above the sustained wind speed will cause the LED ring to flash white. This provides an immediate at-a-glance indication of gusty conditions.

Gust Flash Interval

How often the gust flash repeats while gusty conditions are active. This is independent of the METAR refresh interval.

Selectable values: 10, 15, 30 (default), 60, 120, 300 seconds

Scale Flashes with Gust Strength

When enabled, the number of white flashes increases with gust severity. When disabled, a fixed 3 flashes are shown for any gust meeting the threshold.

Gust Excess (knots)	Flashes
10–14 kt	2 flashes
15–19 kt	3 flashes
20–24 kt	4 flashes
25–29 kt	5 flashes
≥ 30 kt	6 flashes (maximum)

5.4 Night Mode (Auto-Dim)

Night Mode automatically reduces LED brightness during nighttime hours to avoid disturbing a dark room. Day brightness and dim brightness are configured separately.

Fixed Time Mode

Set a specific start time and end time for dimming (24-hour format, e.g. 22:00 – 07:00). Ranges crossing midnight are handled correctly.

Sunrise/Sunset Mode (Auto)

When “Auto Sunrise/Sunset” is enabled, night mode uses the calculated local sunrise and sunset times based on your latitude and longitude. The LED dims from sunset to sunrise automatically every day without needing to update the schedule seasonally.

To use Auto mode, enter your approximate latitude and longitude in the Night Mode settings. Example: for Boston MA, enter

Latitude: `42.36` Longitude: `-71.05`

Dim Brightness

Controls the LED brightness during the night mode window. Range: 1–255. A value of 20–40 is typically comfortable for a dark bedroom.

6. Network Requirements

- 2.4 GHz Wi-Fi network (5 GHz is not supported on the Pi Zero 2 W)
- WPA/WPA2 Personal security
- Active internet connection to reach AviationWeather.gov
  mDNS / Bonjour supported on your network to use `http://metar-lightbox.local/` (standard on macOS/iOS/most routers). If not supported, find the device's IP address in your router's DHCP client list and use that instead.

7. Troubleshooting

Symptom	Resolution
LED stays blue/thinking after startup	Device is waiting for network or METAR fetch. Allow up to 60 seconds on first boot. Check Wi-Fi password if it persists.
LED dim red / error color	METAR fetch failed on cold start. Verify internet connectivity. Device will retry automatically.
METAR-LIGHTBOX-SETUP not visible	Device may already be connected to Wi-Fi. Try holding the button 3 seconds to re-enter setup mode.
metar-lightbox.local not resolving	mDNS may not be supported by your router. Use the device's IP address (check your router's DHCP client list).
Portal shows stale METAR time	The station may not be reporting. Increase the Fallback Hours setting in the portal to retrieve older reports.
Night mode not dimming	Verify Night Mode Enabled is checked, start/end times are set correctly, and the Dim Brightness value is lower than your normal brightness.
Gust flashes not showing	Confirm "Enable Gust Indicator" is checked. The current METAR must report a gust at least 10 kt above sustained wind.

8. Aviation Disclaimer

⚠ IMPORTANT – FOR SITUATIONAL AWARENESS ONLY

The METAR Lightbox is designed for general situational awareness only. It is NOT intended for, and must NOT be used as, a primary or sole source of weather information for flight planning, preflight briefings, in-flight decisions, or any operational aviation purpose.

METAR data is sourced from AviationWeather.gov and is subject to delays, outages, and station reporting gaps. The device's computed flight category may differ from official sources.

> Always obtain a complete weather briefing from an FAA-certified source (1800wxbrief.com, ForeFlight, Garmin Pilot, or an FAA Flight Service Briefer) and review all applicable NOTAMs before any flight.

This device has not been tested or certified by the FAA, EASA, or any aviation authority. It is sold as a decorative and informational consumer electronics product. The manufacturer and seller accept no liability for any aviation-related incident arising from reliance on this device.

Open source software licenses for components used in this product are available on the device at:

`/usr/local/share/metar-lightbox/LICENSES.txt`