

SDRduo Display

User Guide

A browser-based SDR receiver for the SDRplay RSPduo

Version 0.14

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1. Overview

SDRduo Display turns an SDRplay RSPduo into a full-featured, panadapter-style HF/VHF/UHF receiver you operate entirely from a normal web browser tab — no dedicated display hardware and no separate SDR application to configure. Your laptop does the signal processing (DSP) and streams spectrum, waterfall and audio to the browser over the local network.

A single program on your laptop drives everything:

```
RSPduo --USB--> SDRplay API --DSP (Python)--> local web server --> browser tab
```

Everything — tuning, mode, gain, spectrum span, memories — lives in that one browser page. Close the tab and the receiver keeps running in the background; reopen the page (or open it on another device on the same network) and you're back where you left off.

What it can do

- Full-spectrum panadapter: a scrolling spectrum trace and waterfall you click or scroll to tune.
- Modes: AM, FM (narrow/ham), WFM (broadcast FM), USB, LSB, CW.
- Selectable span (10 kHz–2 MHz) and tuning step (10 Hz–10 kHz).
- Manual gain reduction / LNA control, or hardware AGC.
- Squelch, S-meter, ADC overload warning.
- 8 memory preset buttons (frequency + mode).
- One-click VK amateur band buttons, 160 m through 70 cm.

What it doesn't do yet

- Tuner B / simultaneous dual-band receive (the RSPduo's second tuner isn't driven).
- Digital mode decoding (FT8 and similar), audio recording.
- Remembering your last frequency/mode between server restarts — it always starts on 20 m USB.
- Server-side memory storage — the 8 memory slots live in the browser, so they don't follow you to a different browser or computer.

2. Requirements

- **Hardware:** an SDRplay RSPduo, connected to the laptop by USB.
- **SDRplay API / driver:** installed and its background service (“SDRplay API Service”) running — this is SDRplay's own vendor software for the hardware, downloadable from sdrplay.com/software (get the “SDRplay API” package, v3.15 or newer).
- **Python:** 3.10 or newer.
- **Browser:** any modern browser (Chrome, Edge, Firefox). Audio uses the Web Audio API, standard in all of them.

Note: SDRduo Display does not install or bundle the SDRplay driver itself — install that separately, once, before first use.

3. Installing

Option A — the installer (recommended for a new computer)

If you have setup.exe (built from this project's Install\ folder):

1. Copy setup.exe to the target computer — it's the only file you need, the app is bundled inside it.

2. Run it. It will check for Python (offering to install it via winget if missing), copy the app to %LOCALAPPDATA%\SDRduoDisplay (no administrator rights needed), create a private Python virtual environment, install dependencies, and add Desktop and Start Menu shortcuts.
3. Install the SDRplay API driver separately if you haven't already (see Requirements above) — the installer deliberately does not do this for you, since it's SDRplay's own vendor software.

After that, launch it from the Desktop or Start Menu shortcut it created.

Option B — running from the project folder (development machine)

On the machine this project lives on:

1. Make sure the RSPduo is connected and the SDRplay API Service is running.
2. Double-click `start_sdrduo.bat`.

The first run creates a Python virtual environment and installs dependencies automatically; this takes a minute or two. It then starts the server and opens <http://127.0.0.1:8080> in your default browser. Later runs reuse the existing environment and start in a couple of seconds.

4. Starting a Session

1. Plug in the RSPduo and give it a few seconds to enumerate.
2. Launch SDRduo Display (shortcut, or `start_sdrduo.bat`).
3. A browser tab opens automatically at <http://127.0.0.1:8080>. If it doesn't, open that address yourself.
4. The connection dot next to the “SDRduo Display” title (top-left) turns green once the browser has linked up with the server. The receiver starts on 20 m USB by default.

Note: *The server keeps running (and the RSPduo stays claimed) even if you close the browser tab — reopen <http://127.0.0.1:8080> at any time to reconnect. To actually release the radio, use the Exit button (Section 14) rather than just closing the tab.*

Updates: a few seconds after the page opens, the browser asks GitHub whether a newer release exists (one small request; nothing is downloaded or installed). If one does, an amber UPDATE vX.Y AVAILABLE badge appears next to the title in the top bar; click it to open the download page. The check for updates tick box at the top right turns this off, and the choice is remembered in the browser.

5. Interface Tour

The screen is laid out top to bottom in the order you'll use it:

Area	What's there
Top bar	Title + connection status dot, current frequency (click to open the entry keypad), mode buttons, the S-meter block, and the Exit button (top-right).
Band / Step row	One-click VK amateur band buttons on the left; tuning-step selector on the right.
Span / Memory row	Spectrum span selector on the left; the 8 memory preset buttons and Save... on the right.
Spectrum + waterfall	The main display — click or scroll to tune (see Section 6).
Bottom control strip	Gain reduction, LNA state, AGC, Squelch, display Floor/Ceiling contrast, Volume, and the Audio on/off button.

6. Tuning

Click or scroll on the display

- Click anywhere on the spectrum or waterfall to jump the VFO to that frequency.

- Scroll the mouse wheel over either display to step the frequency up or down by the currently-selected Step size (see below) — the frequency snaps to the step grid first, so repeated scrolling always lands on round numbers.

Typing a frequency

Click the frequency readout at the top-left to open the on-screen keypad:

- Choose MHz or kHz with the unit toggle at the top of the keypad — it defaults to MHz. The live preview line under the digits (e.g. “= 14.200000 MHz”) always shows exactly what you're about to tune to, so there's no ambiguity about units before you commit.
- Tap digits and the decimal point; ⇐ (backspace) removes the last digit, C clears everything.
- Enter (or the on-screen Enter button) commits the frequency and closes the keypad; Cancel/Escape/clicking outside the keypad closes it without changing anything.
- A physical keyboard works too while the keypad is open: number keys, “.”, Backspace, Enter, Escape all do the same things as their on-screen equivalents.

Band buttons

The Band row jumps straight to a VK amateur band's default calling frequency and mode. These edges are a simplified approximation of the real ACMA/WIA band plan, close enough to land you in the right segment — not a substitute for checking the authoritative plan for anything near a band edge.

Band	Default
160 m	1.843 MHz LSB
80 m	3.600 MHz LSB
40 m	7.100 MHz LSB
30 m	10.116 MHz CW
20 m	14.200 MHz USB
17 m	18.130 MHz USB
15 m	21.200 MHz USB
12 m	24.950 MHz USB
10 m	28.400 MHz USB
6 m	50.150 MHz USB
2 m	146.500 MHz FM
70 cm	438.500 MHz FM

Step and Span

Step (10 Hz, 100 Hz, 500 Hz, 1 kHz, 5 kHz, 10 kHz) sets the scroll-wheel tuning increment. Span (10 kHz up to 2 MHz) sets how much spectrum the display shows at once — zoom in with a small span to work a crowded band, or zoom out with a wide span to scan for activity. Both choices are remembered in the browser and survive a page reload.

7. Modes

Mode	Use for
USB / LSB	SSB voice — USB above 10 MHz, LSB below, by amateur convention.
CW	Morse code.
AM	AM voice — airband, some broadcast/utility stations.
FM	Narrow (ham) FM — 2 m/70 cm repeaters and simplex.
WFM	Wide/broadcast FM — the 88–108 MHz commercial FM band. This is a genuinely different demodulator chain from ham FM, not the same filter widened; don't use FM for broadcast stations or WFM for repeaters, both will sound wrong.

Select a mode by clicking its button in the top bar. The active mode is highlighted.

8. Gain and AGC

Two ways to control RF gain, in the bottom control strip:

- **AGC (default: on):** the receiver adjusts gain reduction and LNA state automatically to keep signals at a sensible level.
- **Manual:** switch AGC off and set Gain reduction (20–59 dB) and LNA state (0–9) yourself with their sliders. Useful for a very strong local signal where you want gain pinned down rather than pumping.

Note: When AGC is on, crossing between HF, VHF and UHF (e.g. tuning from 40 m up to the 2 m band) automatically resets gain reduction/LNA to a safe starting point for AGC to re-adjust from. This prevents a gain setting that was sensible on a quiet HF band from badly overloading (or badly deafening) you on a strong local VHF/UHF signal. In manual mode, your chosen gain is left alone across band crossings — the receiver won't second-guess a deliberate manual setting.

The ADC OVERLOAD badge (next to the S-meter) lights up if the front end is being driven too hard — increase gain reduction (or let AGC handle it) if you see it regularly.

9. Squelch

Tick the Squelch checkbox to mute audio below a signal-strength threshold — particularly useful on FM, where an open (unsquelched) channel is constant noise between transmissions. Set the threshold with the SQL threshold slider (–120 to –20 dBFS); a SQUELCHED badge appears next to the S-meter whenever squelch is actively muting.

10. Spectrum and Waterfall Display

The Floor and Ceiling sliders in the bottom strip control display contrast only — they don't touch the RF gain. Narrowing the range between them (e.g. raising Floor closer to Ceiling) increases visual contrast so weak signals stand out more clearly against the noise floor, both in the spectrum trace's vertical scale and in the waterfall's colour mapping.

The frequency axis under the spectrum trace always shows the currently selected Span, with tick marks on round numbers regardless of how the span is set.

11. S-Meter

The S-meter reads out in S-units (S0–S9, then S9+dB above that) for a familiar feel, but there is no true calibration behind it — the underlying reading is the SDR's raw signal level (dBFS), which shifts with whatever gain reduction/LNA state is active, unlike a calibrated radio S-meter with a fixed dBm reference. Treat it as “S-units, approximately” — useful for comparing signals relative to each other in one session, not for an absolute, cross-session signal-report claim. Hover over the S-meter reading for the raw dBFS value.

12. Audio

Click Enable Audio (bottom-right of the control strip) to start hearing the receiver — browsers block audio from starting on their own until you interact with the page, so this button is always a manual first step each session. Click it again (now labelled Mute Audio) to silence it without disconnecting. Volume (0–200%) sets playback level; values above 100% add extra headroom for a naturally quiet signal.

13. Memory Presets

8 memory slots (M1–M8) store a frequency + mode combination for one-click recall.

- To save: click Save..., then click the slot you want to store the current frequency/mode into. The button reads “Click a slot...” while armed.

- To save directly without the Save... step: right-click any slot to overwrite it immediately with the current frequency/mode.
- To recall: click a filled slot (it's labelled with its stored frequency in MHz) to retune there instantly.

Note: Memories are stored in the browser (localStorage), not on the server — they persist across reloads of the same browser on the same computer, but won't follow you to a different browser or a different machine.

14. Stopping the Receiver

Use the Exit button, top-right of the screen, to shut down properly. It asks for confirmation, then:

- stops any playing audio immediately,
- tells the server to cleanly release the RSPduo through the SDRplay API,
- shows a full-screen “Server stopped” message once done — at that point it's safe to close the tab.

Why this matters: if the RSPduo isn't released cleanly — for example by force-closing the server's console window or ending the process in Task Manager instead of using Exit — the next launch can fail to find the device (“No RSPduo found”) for several seconds until the USB stack times out on its own. A clean Exit avoids that delay entirely; the next launch finds the device immediately.

Note: Simply closing the browser tab does NOT stop the server or release the radio — the server keeps running in the background so you (or anyone else on the network) can reconnect later. Use Exit when you're actually done for the session.

15. Troubleshooting

Symptom	Likely cause / fix
Connection dot stays grey/red	The server isn't running, or the browser can't reach it. Confirm the server window is open and the address is http://127.0.0.1:8080 (or the right IP if connecting from another device on the network).
“No RSPduo found” on launch	RSPduo not plugged in, SDRplay API Service not running, or the previous session wasn't shut down cleanly (see Section 14) — wait a few seconds and relaunch, or replug the RSPduo.
No audio	Click Enable Audio — browsers require a manual click before any page can play sound. Also check the Volume slider and that Squelch isn't muting on a weak/absent signal.
Frequency jumped much further than expected on a click	Check the Span selector — a wide span (e.g. 2 MHz) makes each pixel represent a much larger frequency range than a narrow one.
AM sounds distorted exactly on one frequency, clears a few kHz off	This was a known hardware DC-offset artifact, fixed architecturally in v0.11 — if you still see it, you're likely on an older version; update to the current build.
ADC OVERLOAD badge lit constantly	Front end is being driven too hard for the current gain setting — turn AGC on, or manually increase Gain reduction / lower LNA state.

16. Version

This guide describes SDRduo Display v0.20. See CHANGELOG.md in the project folder for the full, detailed version history.