V3 Bridge Guide — slices, bands and the wideband feed

V3 turns the bridge from a single receiver into a **Flex-style panadapter with multiple "slices"** on one captured window. One SDR, one LO — but several independent narrow receivers living inside the capture, each with its own VFO, mode, and output (WSJT-X over TCI, QMAP / WS-MAP, the receiver popout, …). The capture is wider; the slices roam inside it **digitally** (a per-slice DDC), so a second WSJT-X can chase signals without disturbing the first.

> **Defaults on a fresh install.** The **2nd slice is OFF** — it is opt-in, so an untouched bridge behaves like V2 with one receiver. Turn it on in Settings → Radio → **"Enable 2nd slice (roamer)"** (restart to apply). Park mode defaults to **Below band**, and the receiver demod to **USB**.
>
> *Changed 2026-11-02:* the 2nd slice used to default ON. It is now opt-in, because a second slice is of no use to the many stations running one WSJT-X, and on an externally tuned radio (a sound-card IQ feed, a transverter) it was the slice machinery — not the capture — that ignored the WSJT-X dial.

Slices, in order of importance

Slice 0 — the band-master (TCI 40001)

This is the boss. **Slice 0 is the ONLY slice that moves the SDR's LO / changes bands.** Drive it from your primary WSJT-X (the one on TCI **40001**, the CAT port shown in Settings, and the bridge's WSJT-X UDP listener). When you change bands here, the whole capture window follows. Everything else is subordinate to Slice 0. It is also the **primary TX slice** (TX is a single shared front-end resource — see *Transmit*).

> **The CAT port is per bridge**, not one number for the family — SDRplay 4538, RTL-SDR 4535, HackRF RX 4537, HackRF RX+TX 4536, Pluto RX 4534, AirSpy 4539, sound-card IQ 4540, IC-705 4533. That is deliberate: several bridges can run on one PC without fighting over a port. Settings always shows the one in use.

Slice 1 — the roamer (TCI 40002)

Digital-only. It tunes anywhere inside the captured window by shifting its DDC offset — it **never** moves the LO. Point a second WSJT-X at TCI **40002** and it decodes wherever you put it, with zero effect on Slice 0. It remembers its last frequency across restarts. On the RX-only bridges it is naturally RX-only; on the TX bridges (HackRF RX+TX, Pluto RX+TX) **slice 1 can also transmit** — first-come, first-served against Slice 0 (see *Transmit*). The IC-705 bridge has no second slice.

Rule of thumb: *Slice 0 picks the band; Slice 1 (and any further slices) live inside whatever window Slice 0 set.* If Slice 0 jumps to a band that doesn't contain Slice 1's frequency, Slice 1 is flagged out-of-range and muted.

Headline use case: **simultaneous FT8 + FT4** — Slice 0 on 14.074, Slice 1 on 14.080. Both fit one window, one LO, no second radio.

Slice 2 — the Receiver (the "Radio")

A third independent roamer — but instead of feeding WSJT-X, it's a **tunable multi-mode receiver played to your speakers**. Open it from **View → Receiver** (Ctrl+R). It has:

- its own **mode**: USB / LSB / CW / AM / NFM,
- a **tune** control, entered as an absolute frequency in MHz (e.g. 14.10000),
- **volume**, and an **Output** device picker — defaults to your system speakers, separate from the WSJT-X VAC feed, so you can listen while WSJT-X decodes.

Available in the SDRplay, HackRF RX+TX and Pluto RX+TX bridges.

> **Monitor audio (RX bridges):** separate from the Receiver popout, the RX bridges can also mirror the **slice RX audio itself** to a second speaker/headphone device in parallel with the WSJT-X feed, without disturbing it — opt-in via the device picker in Settings (disabled by default), with a 0–100% volume slider in the main window.

Like Slice 1 it's a digital-only roamer that never moves the LO. While it's open it shows as **slice 2 ("Receiver", roamer)** in the Slices window and as an **S2** marker on the panadapter. Use it to listen to SSB / a CW beacon / an FM repeater up the band while the digital slices decode at the bottom — one capture, one radio.

> The Slices window and the Receiver are both on the **View menu** (Ctrl+I / Ctrl+R), so you can show/hide them without restarting.

Band-snap: what actually moves

The key V3 idea: **band-snap moves the LO *park* (the capture-window center), not your operating dial.** Your WSJT-X dial stays authoritative — the slice's digital DDC follows it. So:

- Tune **within** the current window → instant, pure-digital, **zero disruption** to the other slices.
- Tune to a **new band** (outside the window) → the LO **re-parks** (a brief retune) to re-center the window optimally for the new band.

That hysteresis means routine QSY never disturbs the roamer — only a real band change does.

Frequency control — the Lock

Manual frequency control got simpler in 3.0.x: the old "manual override" concept is gone, replaced by a plain **Lock**.

- The **manual entry row is always visible** — type a frequency any time. Entry is in MHz and applies to **Slice 0's dial** (not the LO; the LO still parks per the park mode). A bare number is read as kHz within the current MHz.
- Frequency control is **last-writer-wins**: WSJT-X, CAT, TCI, and manual entry all steer the dial; whoever wrote last owns it. No lockout dance.
- **Lock** freezes the dial: while locked, WSJT-X/CAT/TCI tuning is ignored; manual entry still works (it's how you move a locked rig deliberately).

- The **band badge** on the Slice-0 display is also a **band picker** — click it to change band without touching WSJT-X.

Park modes — which to pick

Where the LO parks the window center on a band change. These are the labels as Settings shows them:

Mode	What it does	Use when
Below band — LO below activity	Parks the LO below the band's activity, so the whole window sits one-sided *above* the DC spike — and every IQ image stays out of band.	**The default.** The robust, band-agnostic choice for weak-signal and EME work on a ZIF SDR.
EME — LO below the EME segment	The same idea, framed on the EME segment: 50.200 / 144.125 / 432.125 / 902.125 / 1296.125, the 13 cm segments, 3400.125, 5760.125 and 10368.125 MHz.	EME — so QMAP / WS-MAP sees the whole segment regardless of dial.
Band center (DC-aware)	Per-band, DC-aware centering of the window on the band.	A wide allocation whose activity is off-center (2 m), where the spike falls in dead space.
Day/night block (wide SDR)	Parks at the wide-block centers (night ~11.5 MHz covering 160–15 m, day ~19 MHz covering 30–10 m).	Multi-band capture in one window (RX-888 / Pluto-class).
Off — park on dial	Legacy V2 behavior: window centered on your operating frequency.	Simple single-slice, narrow capture, or a radio you tune externally.

The window center is yours, per band. The EME / QMAP window center is no longer a fixed constant — it is a per-band setting you can move, which matters when the activity on your band is not where the sub-band arithmetic puts it (23 cm being the obvious case: the Q65 calling frequency and the QSO range do not sit where a centered 256 kHz window would put them).

Transverters

Transverter offset is per band, and the field is filled in from the SDR's IF rather than asked for twice. Set it once per band and the readout, the band badge and the wideband window are all in the band you are actually operating — not at the IF. The band table carries the microwave segments: **9 cm (3400 / 3456)**, **13 cm (2300 / 2304 / 2320, and the Japanese 2400 segment)**, **5760** and **10368** MHz.

> 13 cm needed its own Japanese row: the segment in use there is **2400**, not 2424.

The readout shows **what goes out** — the frequency on the air — not where the LO happens to be parked. On a transverter that is the difference between a dial you can read and one you have to do arithmetic on.

LO placement & the DC spike

Where to put the LO depends on your SDR's **receive architecture**, not just the dial band.

ZIF / quadrature SDRs (SDRplay, Pluto, HackRF; and the RTL in normal-tuner / VHF mode) — the **DC spike sits AT the LO** (window center):

- **Narrow HF band** (e.g. 20 m): park the LO just **below the band edge** so the whole band sits one-sided *above* the spike — e.g. LO ~13.97 so DC < 14.000 and the 14.000–14.226 window covers FT8/FT4 above it. *Below band* mode does this for you, and is the default.
- **Wide allocation** (e.g. 2 m, 144–146): **center** the LO (~145.000) and accept the DC notch mid-band — 2 m activity (144.1 / 144.174) is narrow and off-center, so the spike falls in dead space. That is what *Band center* is for.

Direct-sampling SDRs (RX-888; RTL HF Q-branch) — **no in-band DC spike** (DC is at true 0 Hz RF, far below HF), so **center freely**.

The real discriminator is the SDR's receive mode, not the dial frequency. A 28 MHz-IF transverter op reads ~28 MHz on the dial, but the RTL is back in normal-tuner (ZIF) mode there → the DC spike returns *and* it's an EME/QMAP use case → treat it like VHF (DC-aware park + 256 kHz feed), even though the dial says HF. The bridge keys this off the transverter/direct-sampling state, not the raw frequency.

> **VHF/UHF only:** the DC-aware park and the 256 kHz QMAP/Linrad feed both matter at VHF/UHF (where you run EME and a ZIF tuner). On plain HF (direct sampling, no transverter) there's no in-band spike and no QMAP feed — just go as wide as the SDR/CPU/ADC bits allow for the waterfall + slices.

Waterfall & the wideband feed

The panadapter tells you exactly what everything is looking at:

- A **yellow bar** (with end ticks) across the top, labelled **WIDE**, marks the **exact window being fed out** — the per-band anchor window, not simply "around the LO". It is labelled WIDE rather than QMAP because QMAP, WS-MAP and EME65 all read the same feed.
- **Zoom follows the park mode**: EME parks zoom to the segment edges; band parks zoom to the band bottom.
- **S0 / S1 / S2 markers** show each slice's position, and marker tags carry the frequency; **LO and band-edge markers** frame the window; a **band/mode badge** sits on the Slice-0 display, and the EME badge only appears on bands that have EME.
- The main frequency readout shows **Slice 0's dial**, never the parked LO.

The feed itself is smarter too:

- **The receiving program sees the true per-band window.** The IQ is digitally re-centered (NCO shift) and the header's center frequency set to the window center, so QMAP genuinely displays e.g. 14.000–14.256 MHz regardless of where park-mode placed the LO — and the DC spike lands **outside** the passband instead of polluting it. (The IC-705 bridge still uses the legacy LO-centered feed.)

Feeding two programs at once

Second program port sends the same wideband IQ to a second program on this PC, on its own port and **with its own bandwidth**. Two programs cannot listen on one UDP port, so:

- main port **50004** → QMAP or WS-MAP at 256 kHz,
- **Second program port 50005** → EME65 at **96 kHz**.

Set the second program's own port to match (in WS-MAP / EME65: Settings → I/O Devices → Port) and restart it. Zero means off, and the setting applies at once. Linrad bandwidth is also settable **per band**, so a band that only ever needs 96 kHz does not have to carry 256.

Quick setup (two slices)

1. **Turn on the 2nd slice**: Settings → Radio → "Enable 2nd slice (roamer)", then restart the bridge. Then **launch the bridge BEFORE WSJT-X** — TCI sessions don't survive a bridge restart, so restart WSJT-X after every bridge restart.
2. Slice 0 WSJT-X → **TCI 40001** (your main, band-master, TX-capable).
3. Slice 1 WSJT-X → **TCI 40002** (the roamer; TX-capable on the TX bridges). The 2nd-slice port is shown in Settings → Ports & Remote Control (always TCI port + 1).
4. Park mode defaults to **Below band**; switch to **EME** for EME, **Band center** for a wide allocation like 2 m.
5. **Change bands from Slice 0's WSJT-X** — the window follows, and Slice 1 keeps roaming inside it.
6. Want to *listen*? **View → Receiver** (Ctrl+R) opens the multi-mode receiver to your speakers (slice 2).

Transmit (TX)

TX is a **single shared front-end resource** — one TX chain, one LO — so two slices can never key at once.

- **Multi-slice TX is live** on the TX bridges (HackRF RX+TX, Pluto RX+TX): **both Slice 0 and Slice 1 can transmit**, arbitrated **first-come, first-served, never interrupted** — the first PTT to fire owns the TX chain; the other slice's PTT is suppressed until the owner releases, and an in-progress transmission is never cut off. There is no priority or pre-emption: whoever keys first holds it.
- When Slice 1 keys, the bridge retunes to its frequency for the transmission and returns to the park on PTT-off; its dial/PTT never bleed into the band-master readout. The Receiver (slice 2) is always RX-only.
- **Stuck-TX protection:** if a TCI client disconnects mid-transmission, the bridge drops PTT immediately.

Keep RX running during TX

By default the bridge sends **nothing** on the wire while you transmit, which is what you want if the SDR shares the antenna. Tick **"Keep RX running during TX"** and it keeps streaming right through the transmission.

Turn it on if your receive path is **out of circuit on TX** — an Elecraft K3's RX ANT loop, for instance, is disconnected on transmit, so the SDR has nothing to be hurt by. The gain is in the waterfall: without it, the stream stops for the whole transmit period and the receiving program paints a long black bar afterwards as it catches up. With it on, the receive patches sit next to each other.

Sun Noise Meter

View → Sun Noise — an analog-needle noise meter for antenna and system work. Point at cold sky, press **Zero**, point at the sun, and read the **Y-factor** off the gap. Selectable scale in dB per division, max- and min-hold, and optional dB readouts.

> **Untick AGC.** The window has an AGC checkbox because the receiver's AGC must be **off** for a valid Y-factor — with it on, Y collapses toward 0 dB and G/T is meaningless.

On the View menu by default across the whole fleet — no CLI flag needed.

Other niceties

- **Live-apply settings**: gain / front-end changes on HackRF and SDRplay take effect as you change them — no Apply click.
- Settings is laid out in **three columns** with Audio stacked under Ports & Remote Control, so it fits on a laptop screen.
- **Settings no longer overwrites a bridge's own defaults.** Opening and OK-ing Settings used to write the dialog's fallback values over app-specific defaults — on the sound-card IQ bridge that made the Linrad gain 10x hot. Each bridge now seeds its own values first.
- The main window's TCI line counts **clients across all slice servers**, and slice 1 has proper GUI wiring (RX gain, TX indicator, client count).
- **Window geometry persists** for the main window, Slices window, Receiver, and popouts — including on app shutdown, not just window close.
- Every installer bundles the **MSVC runtime** (fixes first-launch on clean Windows 10).
- The **Flex Bridge** is a newer sibling for FlexRadio over the SmartSDR API, with its own quick-start guide. It is not part of the installer list on the download page; ask if you have a Flex.
