CC FT8 / FT4 Plugin

User Manual · Plugin ID: MOD033 · CC-Line Series · HamSphere 4.0

CC FT8 is a weak-signal digital mode plugin implementing both **FT8** (15-second slots) and **FT4** (7.5-second slots), with a full WSJT-X-compatible decoder (LDPC + CRC, frequency/time oversampling) and a GFSK transmitter.

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1. Screen Layout

The plugin window is divided into the following regions:

- **Header strip (top).** Your callsign, current band, dial frequency, UTC clock, a green ● LIVE indicator, and an orange FT8/FT4 mode badge on the far right.
- **Waterfall (left).** A scrolling spectral display covering 200–3000 Hz with a ruler marked at 500 Hz intervals. The orange vertical line marks your selected RX/TX audio frequency; a faint green line marks the last decoded signal's offset.
- **Status bar.** SYNC indicator, last decode offset (DF), and bandwidth readout.
- **Mode row.** FT8 / FT4 selector buttons plus a slot-period progress bar.
- **Left buttons.** CQ ONLY / All msgs, TX ON / TX OFF, and Clear RX.
- **Band Activity (right).** The scrollable decode list — columns UTC, dB, Hz, Message. The indicator dot blinks green between decodes and turns orange while decoding.
- **TX Control (lower right).** TX arming, HALT, AUTO/MANUAL, slot indicator, and the six-message TX sequence.
- **Stat strip (bottom).** Mode, SNR, DF, Decoded count, and the large transmit-state indicator.

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2. Getting Started

Selecting a band. The plugin locks your dial to the correct (band, mode) frequency automatically. If you select an unsupported band, the stat strip shows **SELECT HF BAND**, transmit is disabled, and receive is skipped. Switch to a supported HF band.

Choosing a mode. Click **FT8** or **FT4** in the mode row. FT8 uses 15-second slots; FT4 uses 7.5-second slots.

Receiving. Once a supported band is selected, decoding runs automatically every slot. Rows are color-coded:

- **Green** — CQ calls
- **Red** — CQ DX calls

- **Orange** — messages containing your callsign
- **Grey** — all other traffic

Use **CQ ONLY** to filter to CQ calls, and **Clear RX** to wipe the list (this also disarms TX and resets the sequence).

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3. Tuning and Scrolling

Click anywhere in the waterfall to set your audio frequency (200–3000 Hz). Use the mouse wheel over the waterfall to nudge by 1 Hz, or hold **Shift** for 10 Hz steps. Scroll over the Band Activity panel to page back through decode history (Shift for faster scrolling).

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4. Operating Frequencies (Automatic — Cannot Be Changed)

The FT8 and FT4 operating frequency for each band is **set automatically by the plugin and cannot be altered manually**. When you change band or mode, the plugin hard-locks your dial to the correct frequency for that (band, mode) combination, reloading the table from the server on startup. The dial is never retuned during a transmission, and bands not in the table are blocked.

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5. Your Unique Callsign Tone Frequency

When you transmit FT8/FT4 digital messages, your signal is placed at a **tone (audio) frequency that is unique to your callsign**. The plugin derives this offset from a hash of your callsign, so you don't clash with other operators on the system at the same time. When replying to a specific station, the plugin instead follows that station's offset so you stay together in the passband.

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6. Making a QSO

Calling CQ:

1. Set the sequencer to **AUTO**.
2. Click **row 1** (the CQ row) to select it.
3. Press **TX OFF / TX ON** to arm the transmitter — this puts your transceiver into **ARM** mode.

4. Your CQ transmits in the next available slot, depending on whether you're set to the EVEN or ODD time slot.

When a station replies, click their decoded row in the Band Activity list — the plugin builds the reply sequence and steps through it automatically.

Replying to a station. Click a decoded row in the Band Activity list. The plugin will set your TX audio frequency to that station's offset, extract their callsign, build the six-message reply, convert the measured report into a sendable token, calculate the correct (opposite) transmit slot, and auto-arm TX.

The six-message sequence:

Row	Content
1	CQ + your call + grid
2	Their call + your call + grid
3	Their call + your call + report
4	Their call + your call + R-report
5	Their call + your call + RR73
6	13-char free-text message (see Section 7)

Click a row to select which message transmits next; the active row is highlighted green.

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7. Personal (Free-Text) Message — Row 6

Row 6 is a **13-character free-text field**, not a callsign field. It will **not** transmit callsigns or standard QSO content — it sends a plain free-text message of **up to 13 characters** (automatically uppercased and restricted to the valid FT8 character set).

Double-click row 6 to open the **Personal messages** dialog, where you can:

- Type a message (max 13 chars) and click **ADD** or press Enter
- Click an existing entry to load it into row 6
- Click the ✕ on the right of an entry to delete it

When a personal message occupies row 6, it is transmitted as FT8/FT4 free text rather than a standard message.

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8. Transmit Controls

- **TX ON / TX OFF** — arms or disarms the transmitter.
- **HALT** — immediately stops any active transmission and drops PTT.
- **AUTO / MANUAL** — in AUTO the sequence advances after each transmission and disarms after the final 73; in MANUAL the selected message repeats each cycle.

A safety guard prevents transmission starting more than 350 ms into a slot, and the plugin never starts a second transmission within the same slot.

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9. Understanding Time Slots (EVEN / ODD)

FT8 and FT4 are **slot-synchronized** modes — every station transmits in fixed, clock-aligned windows rather than whenever they like. This is what lets many stations share one frequency without talking over each other.

- In **FT8**, each slot is **15 seconds**, aligned to UTC: transmissions start at :00, :15, :30, or :45 past the minute.
- In **FT4**, each slot is **7.5 seconds** — eight slots per minute.

Slots alternate between two parities:

- **EVEN** — slots starting at :00 and :30 (in FT8).
- **ODD** — slots starting at :15 and :45 (in FT8).

In a normal QSO the two stations occupy **opposite** parities — one always in EVEN, the other always in ODD — so they take turns automatically. When you call CQ you pick a parity and keep it. When you reply to another station, the plugin automatically chooses the opposite parity and re-syncs it live each time your partner is decoded, so you stay interleaved and never transmit simultaneously.

Accurate UTC time is essential. Your computer clock aligns these slots. If it drifts more than a second or two, your transmissions fall outside the slot window and other stations won't decode you.

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10. Reading the Status Indicators

Indicator	Meaning
SYNC	Lights green when a signal is decoded in the current slot.
DF	Audio offset of the most recent decode, in Hz.
SNR	Signal report of the last decode (green if positive, yellow if negative).

Indicator	Meaning
Decoded	Running count of decoded messages this session.
RX	Receiving.
ARM	TX armed, waiting for its slot.
TX	Transmitting now.
SELECT HF BAND	Current band not supported.

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11. Notes and Behaviors

The plugin shows your own transmitted signal on the waterfall during TX and provides a local sidetone monitor. Your own transmissions are echoed back by the server but are filtered out of the activity list, decode count, and parity learning, so you never accidentally try to work yourself. The audio sample rate is auto-detected from the incoming stream during the first couple of seconds of receive.
