FT-847 Crossband-Repeater

Version 1.3.2

By Rolf Heine, DL6ZB

For the Yaesu FT-847. FT-847 Crossband-Repeater is a small Windows program that runs one Yaesu FT-847 as an FM cross-band repeater between 2 m and 70 cm. It is freeware.

The FT-847 does the repeating itself: in satellite mode, its cross-band repeat function (menu 41, X-RPT) retransmits a signal received on one band on the other band. The program controls the radio through its CAT port and decides on which band the radio listens.

While the repeater runs, the program reads the squelch status of the radio via CAT. As long as the squelch is closed, it swaps the satellite transmit and receive frequencies after an adjustable time, so the radio listens alternately on 2 m and on 70 cm. It always writes the transmit frequency first and then the receive frequency. When a signal arrives, the current direction is held, and the radio's repeat function switches the transmitter on and retransmits the signal on the other band. The direction therefore follows the band on which a signal arrives.

At the first swap the radio listens on UHF and transmits on VHF.

Everything fits in one window. Every field, button and indicator has a tooltip. The user interface is available in seven languages: Deutsch, English, 日本語, Italiano, Français, Español and Português (Brasil).

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1. Requirements

- A Yaesu FT-847.
- A serial CAT connection between the PC and the CAT port of the FT-847 (a COM port on the PC).
- Windows x64.
- The **.NET 10 Desktop Runtime for Windows x64** (Windows Desktop Runtime, version 10.0.0 or any later 10.0.x). The plain .NET Runtime is not enough. Download: dotnet.microsoft.com/en-us/download/dotnet/10.0
- No other program may use the CAT port of the FT-847 at the same time.

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2. Installation

1. Install the .NET 10 Desktop Runtime (x64) if it is not installed yet.
2. Unzip the download ZIP into a folder of your choice. There is no installer.
3. Start `Ft847Kreuzband.exe`.

The folder contains the program files, the legal notice in several languages (`LEGAL*.txt`) and this manual in English and German. The .NET runtime itself is not included.

Only one copy of the program can run at a time, so two programs never claim the same CAT port. If the window does not appear, check whether another copy is already running (Task Manager).

SHA-256 of `Ft847Kreuzband.exe`:

```
7cf366d441e53e19ac69028fcdba1c028fd1ad39bf1b1babc1389fc5208e2e14
```

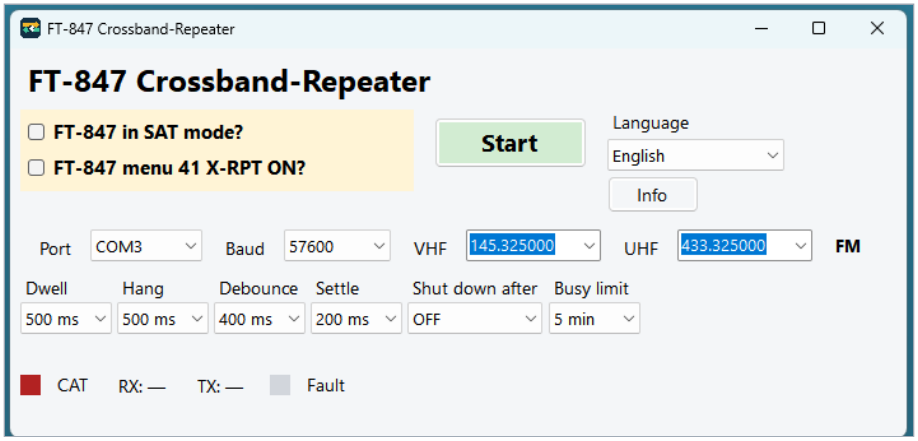
3. Radio Setup

Do this once before the first start:

1. Make sure no second CAT program is running, and disconnect the FC-20 control cable.
2. In menu 37, set the CAT baud rate of the FT-847 to 4800, 9600 or 57600 baud. The same rate is selected in the program.
3. Close the squelch.
4. Set both frequencies to FM.
5. Set the output power on the front panel. The program does not change the power. For repeater operation, the FT-847 manual recommends at most 25 W.

Satellite mode is switched on by the program (tick “FT-847 in SAT mode?”). **Menu 41 X-RPT must be set to ON by hand on the radio** after satellite mode is on. CAT cannot set menu 41.

4. The Window and Its Settings



The main window with the English user interface

At the top is the yellow field with the two checkboxes, next to it the Start button, then Language and Info. Below is a row with Port, Baud, VHF, UHF and FM, then the row with the timing settings, and at the bottom the indicators.

Checkboxes

Element	Function
FT-847 in SAT mode?	Ticking it switches the FT-847 into satellite mode: the program opens the port, switches CAT on, switches SAT on, switches CAT off and releases the port again. If that fails, the tick clears.
FT-847 menu 41 X-RPT ON?	Tick this box once you have set menu 41 X-RPT to ON on the radio by hand. After satellite mode has been switched on, a reminder appears below the box.

Both ticks are needed for Start. They are not saved and must be set again at every program start.

Connection and frequencies

Setting	Meaning
Port	Serial CAT port. The list is refreshed each time it is opened. COM7 is preselected when it is present or was saved. Opening the list does not open the port.
Baud	4800, 9600 or 57600 baud, as set in menu 37 of the radio. Default 57600. The line runs at 8N2 without handshake.
VHF	2 m frequency from 144 MHz up to, but not including, 146 MHz, in 10 Hz steps. Default 145.325000.
UHF	70 cm frequency from 430 MHz up to, but not including, 440 MHz, in 10 Hz steps. Default 433.325000.
FM	Mode, display only. Both frequencies must be set to FM on the radio.

The frequency fields are lists in which you can also type a frequency. A valid new entry is added to the saved list. Both frequencies must be on different bands; the program rejects a pair on the same band or two identical frequencies.

The default frequencies 145.325000 MHz and 433.325000 MHz are starting values only, not authorised repeater channels. Band plan, licence and local coordination are the responsibility of the operator.

Timing

Setting	Meaning
Dwell	Minimum time in the current direction. After a frequency pair has been written, the program writes no new pair until this time has passed. The other frequency is not heard during this time. Presets: 3 s, 1 s and 500 ms.
Hang	Waiting time after the last received signal or the last transmission. A swap waits until this time has passed. At Start, the start moment counts as the last signal, so the first swap waits as well. 0 ms means no extra waiting time.
Debounce	The squelch must stay closed, and the radio must not be transmitting, for at least this long before a swap is allowed. If the squelch opens, the time starts again.
Settle	After writing a new frequency pair, the program waits this long and sends nothing. It then reads the squelch status. If a signal is present, this direction is held.
Shut down after	OFF, 15 min, 30 min or 60 min. Default OFF, which means continuous operation without a time limit. When the time has expired, the program switches the transmitter off and ends repeater operation; satellite mode stays on. This is not a transmit time-out in the radio.
Busy limit	1 min, 3 min or 5 min. Default 1 min. If a signal is received or the radio transmits without a break for longer than this time, the program switches the transmitter off and ends repeater operation; satellite mode stays on and the Fault indicator lights. If the squelch closes before that, the time starts again. The busy limit is always active, also with Shut down after set to OFF.

All times are selected from presets. A saved time that does not match a preset is moved to the nearest preset at program start (with equal distance, to the shorter one).

Buttons

Element	Function
Start / Stop	Start needs both ticks; otherwise the program asks “SAT mode and X-RPT ticked?”. Start opens the port, switches CAT on and writes the first frequency pair. While the repeater runs, the same button shows Stop.
Language	Interface language. The choice takes effect immediately for labels, tooltips and Info, and it is always saved.
Info	Short guide, copyright and legal notice.

Port, baud rate, frequencies, times and language are saved automatically. The window does not stay on top of other windows.

5. Operation

1. Close the squelch.
2. Tick “FT-847 in SAT mode?”. The program switches satellite mode on and releases the COM port again.
3. Set menu 41 X-RPT to ON on the radio by hand and tick “FT-847 menu 41 X-RPT ON?”.
4. Make sure both frequencies are set to FM.
5. Select or enter the VHF and UHF frequencies and the timing values.
6. Click **Start**. The repeater runs; the button now shows **Stop**.
7. Click **Stop** to end everything: the program switches the transmitter off, switches satellite mode off, switches CAT off, releases the COM port and clears both ticks.

With satellite mode off, X-RPT is switched off on the radio as well. Before the next run, tick “FT-847 in SAT mode?” again and set menu 41 X-RPT to ON again on the radio.

Closing the window does the same as Stop.

6. Indicators

Indicator	Meaning
CAT	Green when CAT communication is working, red when there is no CAT connection.
RX / TX	The current direction, for example “RX: UHF TX: VHF”. While a signal is received and the repeater transmits, RX is highlighted in blue and TX in red, each with white text. Without a signal the text stays plain.
Fault	Red when the connection was lost or the repeater was shut down by the program, for example by the busy limit or by Shut down after. Stop does not light this indicator.

The current state is shown by the indicators, not in a text line.

7. Safety and Emergency Notes

- **A crash of the program, a crash of Windows or a lost USB connection does not switch the transmitter off.** If the transmitter stays on: press the SAT key on the radio, set menu 41 to OFF, or disconnect the radio from power.

- On communication problems (no answer, timeout, incomplete or outdated data, lost interface), on a busy signal that does not end, and when Shut down after expires, the program tries the same shutdown: it switches the transmitter off; satellite mode stays on.
- Repeater operation means long transmit periods (a high duty cycle). Continuous operation at high power can overheat and damage the power amplifier of the FT-847. Reduce the output power (for example 25 W maximum), provide cooling and supervise operation. Use Busy limit and Shut down after.
- The program does not set the output power. Set it on the front panel.
- Use only one CAT program at a time, and disconnect the FC-20 control cable.
- Use only frequencies that the band plan, your licence and local coordination allow. The default frequencies are not authorised repeater channels.
- Observe the rules on the protection of persons in electromagnetic fields. Continuous transmission increases exposure; reassess the safety distances.

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8. Legal Notes

Scope: Federal Republic of Germany. German law applies exclusively. The German text is the legally binding version.

FT-847 Crossband-Repeater 1.3.2 is provided free of charge as freeware for private use and amateur radio. It is a voluntary effort without any intention of making a profit. Copyright © 2026 Rolf Heine, DL6ZB. Distribution is allowed only for non-commercial purposes, only unchanged, and with this copyright notice.

Yaesu is a trademark of Yaesu Musen Co., Ltd. The program is an independent work and is not connected with Yaesu. The rights of Yaesu and other rights holders remain unaffected. All names and trademarks mentioned are the property of their respective owners.

Only licensed radio amateurs holding a valid amateur radio licence may operate the cross-band repeater (X-RPT), within the limits of their licence. In Germany, the Amateur Radio Act (Amateurfunkgesetz, AFuG) and the Amateur Radio Ordinance (Amateurfunkverordnung, AFuV) apply. The operator is responsible for operating within the applicable rules.

The software is provided without warranty. Any liability for damage resulting from its use is excluded. Use is at your own risk.

Equipment protection: Repeater operation means long transmit periods (a high duty cycle). Continuous operation at high power can overheat and damage the FT-847 power amplifier. Reduce transmit power (for example 25 W maximum), provide cooling, and supervise operation; use the busy limit and shut down after.

EMF exposure: The operator must comply with the rules that protect people from electromagnetic fields. In Germany that is the Ordinance on the Verification Procedure to Limit Electromagnetic Fields (BEMFV), including notification of fixed amateur radio installations to the Federal Network Agency (Bundesnetzagentur, BNetzA). Continuous transmission increases exposure; reassess the safety distances.

Responsible:

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