Mini-FT8 User Manual

Revision	Release Date	Notes
V1.3.2	2026/1/29	• Add SD card support • Add a startup screen
V1.3.1	2026/1/28	• Fix hashtable overflow
V1.3	2026/1/24	• Add support for nonstandard callsign • Hook up SkipTX1 to autoseq

1. Screen Layout

(Startup Screen)

The Cardputer ADV has a tiny 1.14" 240×135 TFT screen. It has obvious drawbacks, but for our POTA/SOTA use cases we don't stare at the screen much. The small display also helps reduce power consumption. The built-in 1700 mAh battery lasts for hours (10+ hours in my testing).

- Top 18 px: Waterfall (shows band activity / conditions) (200-3000Hz)
- Next 3 px: 15s countdown bar (a tiny 5x3 blue dot shows Cursor)
- Main area 114 px (19×6): 6 lines of text — this is the primary operating area

There are two simple ways to improve readability if needed:

- Use a 3× plastic magnifier (same size as Cardputer)
- Use a smartphone camera and zoom in

2. UI System

Mini-FT8 has a simple UI that can be adapted to a keyboard, touch screen, buttons, or remote control. When you click a line button (1–6 in our case), each item behaves as one of five types:

1. Select: choose from predefined options (e.g., CQ Type)

2. Action: trigger an action (e.g., Send FreeText)
3. Edit: edit the value in place (e.g., Callsign)
4. Long Edit: open a full-screen editor (e.g., Comment)
5. Information: read-only display (e.g., Battery)

You can switch between pages by clicking:

- **R(x):** Shows decoded messages (default page).
- **S(tatus):** Think of this as a frequently used "quick menu."
- **T(x):** Actively manage the transmission (TX) queue.
- **M(enu):** Settings (3 pages).
- **Q(so):** Shows QSOs from YYYYMMDD.adi.
- **B(and):** Change band frequencies (just in case).
- **C(onnect to PC):** Connect to a PC to read/delete files.

Exception: If you're in C page, you must click C again (or type "exit" on the PC) to leave C page.

(There are some zombie pages, e.g. H, L will be removed later)

2.1 Rx: Shows decoded messages (default page)
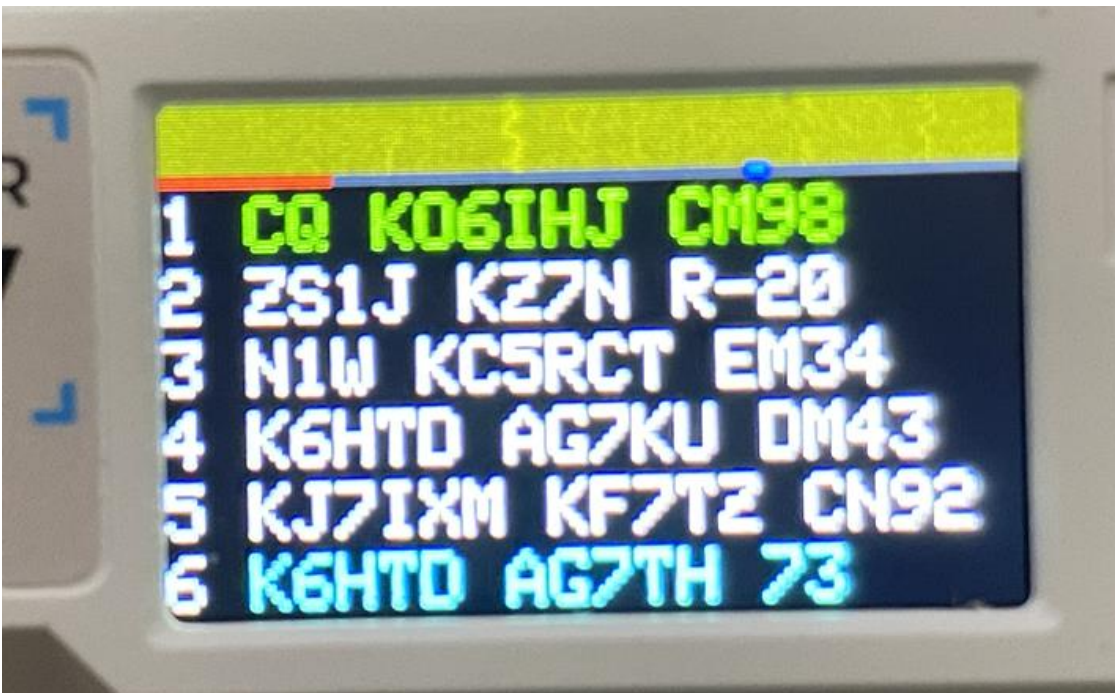
Mini-FT8 can decode 20+ messages under optimal conditions. Messages are sorted in this order: **reply-to-me**, **CQ**, then **others**.

Only **12 messages** are shown on the **Rx** page. If **line 6** is **cyan**, a **second page** is available—press **Down (.)** to view it (otherwise, don't bother). You can find the **full decode list** in **RxTxLog.txt**.

You can click on one or more **CQ** messages to start QSOs. If the click happens within **4 seconds** of the slot boundary, **Tx starts immediately**; otherwise, it will be **scheduled for the next appropriate slot**.

You can also click **other** messages—this is mainly intended for **stations that called CQ previously**, or a **rare callsign**. (If you missed the chance to click that callsign, you can even use **FreeText** if you *really* need it)

Reply-to-me messages are handled automatically by **auto sequencing**.

If you're calling CQ or replying to a CQ, Mini-FT8 will automatically switch to the Tx page while transmitting. This is a feature, not a bug.

2.2 Status: Think of this as a frequently used "quick menu."
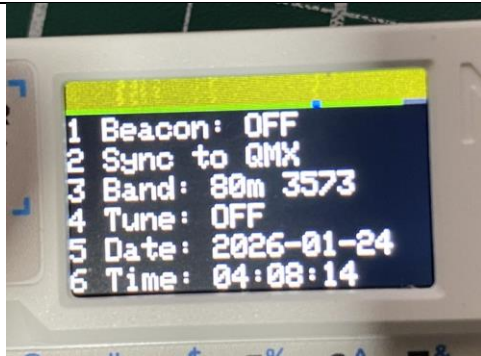
|	
	1. Select: [OFF|EVEN|ODD] 2. Action: Connect/Sync to QMX 3. Select: Select band from active band (N3) 4. Select: Turn tune ON/OFF 5. Edit: Set date 6. Edit: Set time **Tip: setting time (RTC sync trick)** Example: if it's 04:08:05 now, give yourself ~10 seconds. Enter 040814. When your watch reaches 04:08:13, press OK. The RTC will land close to the correct second, and auto-sync will use decoded FT8 messages to adjust RTC.

2.3 Tx: Actively manage the transmission (TX) queue

	• Line 1: Next message that is scheduled for transmission. Press 1 to cycle through queued messages (known bug: only cycles the first two; needs to be fixed). • Lines 2–6: Queued messages. Press 2–6 to delete the corresponding entry. • You can press Esc to cancel an active transmission. The message remains in the queue until it is deleted or expires. • The queue supports up to 9 messages.

2.4 Menu: Settings (3 pages)

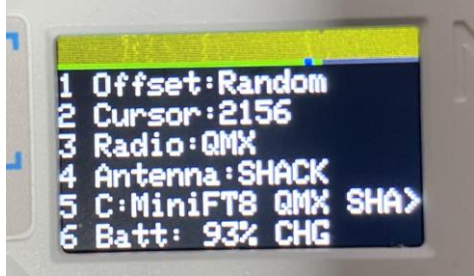Page 1 (M)
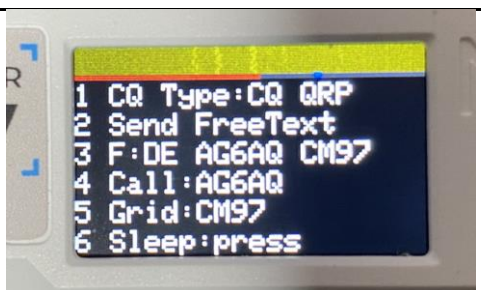
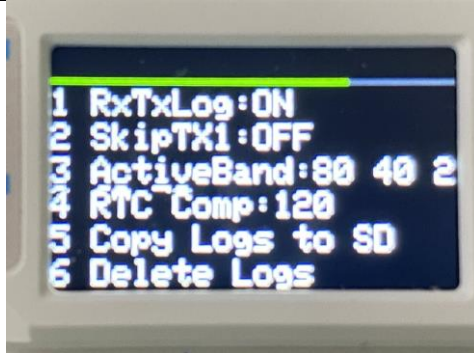|	
	1. Select: [CQ | SOTA | POTA | QRP | FD | FreeText] 2. Action: Send FreeText in the next slot 3. Long Edit: Open FreeText editor (full edit) 4. Edit: Up to 11 characters callsign 5. Edit: 4-charater Grid 6. Action: Put Cardputer into sleep **FreeText – intended uses:** • Plain free text, e.g. "TNX 73"

|	
	• Typed like a standard CQ, e.g. CQ EU W6XYZ CM97 If it matches a standard FT8 message format, it will be encoded/sent as a standard message (not FreeText). • Self-spot for sotamat, e.g. "SM W6ABC/PKW7"

Page 2 (M. or N)

	1. Select: [Random | Cursor | Rx]
	   • Random: choose a Tx offset within 500–2500 Hz.
	   • Cursor: Use the current cursor frequency for Tx offset.
	   • Rx: Use the currently selected Rx message frequency (the one you clicked) as a Tx offset.
	2. Edit: Tx offset (only used when Select = Cursor)
	   • a tiny blue dot shows the cursor on countdown bar, if you're not using it and want to hide the dot, enter a value <200 or >3000)
	3. Select: QMX (only radio supported right now)
	4. Edit: just a short note for yourself
	5. Long Edit: Comment saved into the .adi file
	   • In the ADIF comment field, /Radio will be replaced by item 3 (Radio selection), and /Ant will be replaced by item 4 (Antenna).
	6. Information

Page 3 (M.. or O)

	1. Select: [ON | OFF] Enable/disable RxTxLog.txt logging 2. Select: [ON | OFF] When replying to a CQ, skip the grid exchange and reply with signal report instead 3. Long Edit: Band selection (choose from 12 bands, in B pages) 4. Edit: Hardware RTC compensation (calibrates clock drift) • more details see: RTC Deep Sleep Compensation 5. Copy *.adi and RxTxLog.txt to SD card (if present) 6. Delete *.adi and RxTxLog.txt on device (!!!)

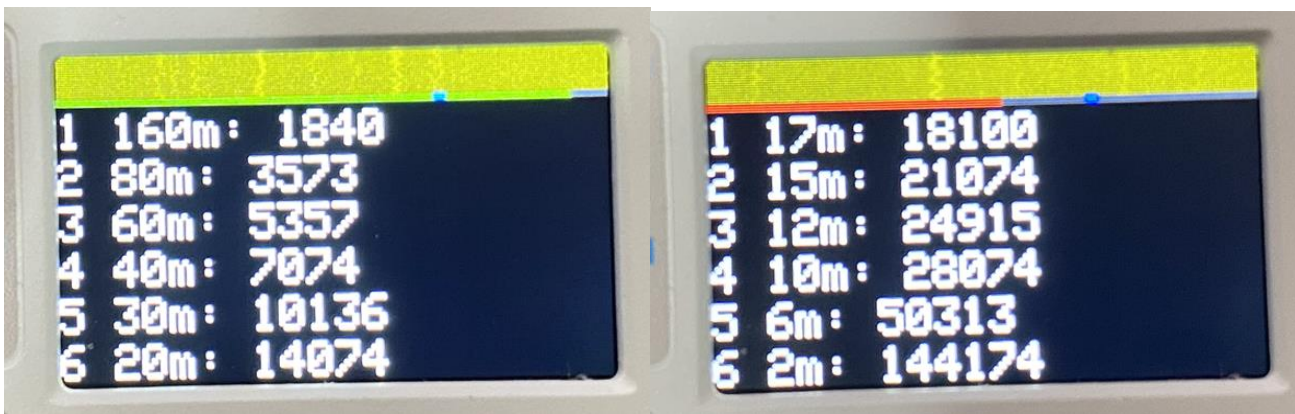## 2.5 Qso: Shows QSOs from YYYYMMDD.adi

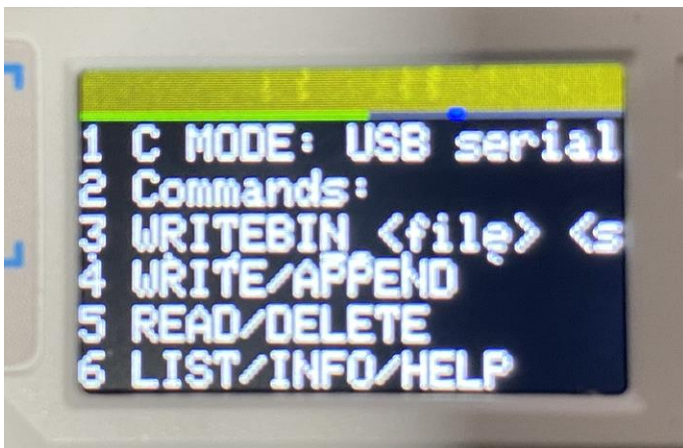Informative, use 1-6, Up/Down and Esc to navigate different .adi files
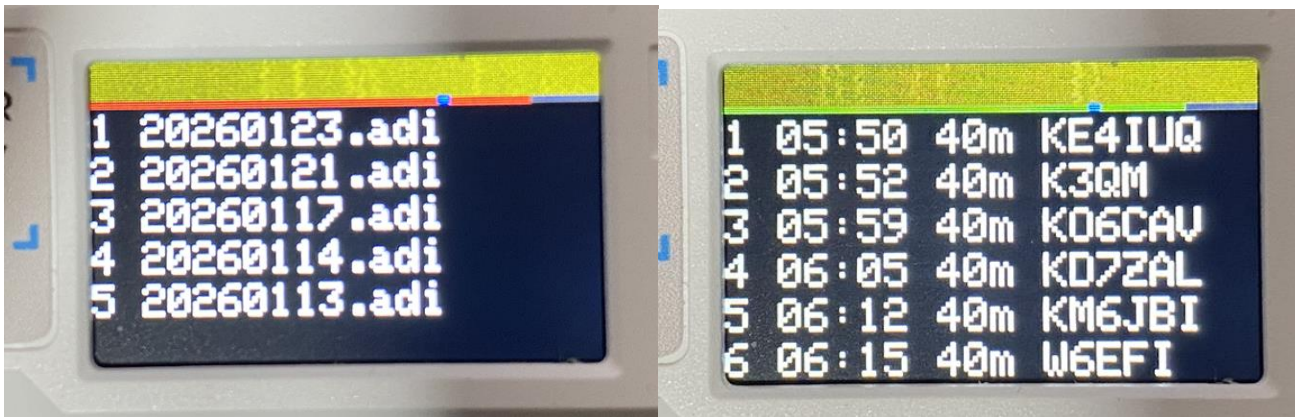
2.6 Band: Change band frequencies (just in case)

Edit band frequencies (Most people don't need to edit these pages)

2.7 Connect to PC: Read/Delete files

Information (Help Info for PC Terminal)

3. Basic Operations

Startup Screen:

- Mini-FT8 V1.3.2
- S – Status (Operate)

- R - Rx page
- T - Tx page
- M – Menu (Setting)
- Other: Q/C/B/N/O/D

1. Power on **Mini-FT8** and double-check the **Menu** settings are correct.
2. Press S → go to the **Status** page.
3. Press **5/6** → Set **Time/Date (UTC)**.
4. Press **3** → select band *(Active band is configured in **Menu page 3**)*.
5. Press **2** → **Connect to QMX**.
   - Then **power on the QMX**
6. Press **2** → **Sync to QMX**.
   - If you don't see **"Sync to QMX"**, it means **there is no connection**.
7. Press **4** → tune the antenna (if needed).
8. Press **1** → enable **Beacon** (Even or Odd slot) if you're doing **POTA/SOTA** activation.
9. Go to the **Rx/Tx** page and have fun.

4. File System and Logging

Mini-FT8 uses on-chip flash (4 MB SPIFFS) to store settings and logs.

4.1 Settings: /spiffs/ StationData.ini

Saves device settings. You can download/upload it, but it's generally best to leave it alone.

4.2 RX/TX Log: /spiffs/RxTxLog.txt

This log serves three purposes (enable/disable in Menu → Page 2):

- Debug AutoSeq behavior
- Save received messages for propagation evaluation
- Help confirm QSOs that failed at signoff (a minimal QSO only requires callsign exchange)

Maintenance tip: RxTxLog.txt can grow large over time. It's a good idea to download it periodically and delete the copy on the Cardputer.

4.3 ADIF Log: /spiffs/YYYYMMDD.adi

Appended when a QSO is completed (RR73 sent/received).

The QSO viewer (Q) reads this file and shows entries like: hh:mm band call.

4.4 Download Logs

4.4.1 Use SD Card

- Insert a FAT/FAT32 formatted SD card.

- Go to Menu page 3 (O), press 5 — all log files will be copied to the SD card.
- After confirming the files are saved on the SD card, you can optionally delete the log files on the device.

4.4.2 Use pc_terminal.py

This is the easiest way, the script was written by ChatGPT

- On M5 Carputer, click C to enter communication
- On PC: *python .\pc_terminal.py COM11* for multiple commands
- On PC: *python .\pc_terminal.py COM11 read 20260113.adi* for single command

(files will be written into current directory)

 Make sure pyserial is installed (pip install pyserial).

Ubuntu/Linux: use the device node, e.g. python3 pc_terminal.py /dev/ttyACM0 (or /dev/ttyUSB0)

On Ubuntu, ensure your user can access the port: sudo usermod -a -G dialout $USER(then log out/in), or temporarily sudo chmod a+rw /dev/ttyACM0

4.4.3 Use a Serial Port Terminal

 The protocol is plain UART, so almost any serial terminal will work.

 Examples:

- PuTTY
    - Terminal → Implicit CR in every LF: enable
    - Terminal → Local echo: Force on
- Arduino IDE Serial Monitor
    - Works fine as a simple UART terminal as well.

5. FAQ

5.1 How to Upload Firmware (FW) to Cardputer

ChatGPT is the best resource to get this done.

5.1.1 Method 1: Flash from source (ESP-IDF)

- Install ESP-IDF (matching the project version).
- Connect Cardputer to PC with a USB-C data cable.
- In the project folder:
    - idf.py build
    - idf.py -p <PORT> flash
- Windows port looks like COM11
- Linux port looks like /dev/ttyACM0 (make sure you have permission)

Benefit of this method: you can get the latest firmware without waiting for an official release. Updates are pushed to GitHub after they pass basic sanity checks.

5.1.2 Method 2: Flash released binaries (no build)

Download the release package (bins + scripts).

- Install esptool: pip install esptool
- Run the provided flash script:
    - Windows: flash.ps1 (edit COMx first)
    - Ubuntu/Linux: flash.sh (edit /dev/ttyACMx first)

Tip: use a short, good-quality USB-C cable. Some "charge-only" cables won't work for flashing.

5.2 How to Charge the Cardputer

5.2.1 Charge via USB-C using a normal 5V USB supply.

Leave the Cardputer power switch ON, then put it into sleep when you're not using it.

5.2.2 Charge via PORTA

You can also charge the Cardputer via PORTA.

A simple DIY method is to homebrew a charge cable: cut a USB cable you don't mind sacrificing, then connect VBUS (5V) and GND to the 4-pin Grove connector.

- USB VBUS (5V) → Grove VCC
- USB GND → Grove GND

Before plugging in, make sure the micro switch next to PORTA is set to the 5VIN position.

5.3 How to Operate on Frequencies Other Than the "Standard" Ones

If you want to operate on a different dial frequency (for example, 7040 kHz), you can change it on the B(and) pages.

If you want to make 7040 kHz a selectable preset option, you'll need to hack it. A simple approach is to reuse an unused band entry:

- Pick an unused band (for example, 160 m) and change its frequency to 7040 kHz on the B(and) page.
- Then enable that "band" by adding 160 to the Active Band list (Menu → Page 3).

5.4 How to install Mini-FT8 under M5Launcher

If you have M5Launcher installed, do 3) 4), otherwise follow 1) 2) 3) 4)

1. esptool.py --chip esp32s3 erase_flash
2. install M5Launcher from https://bmorcelli.github.io/Launcher/webflasher.html
3. Copy MiniFT8_M5Launcher.bin to SD card

4. Reboot

Generate MiniFT8_M5Launcher.bin with:

esptool.py --chip esp32s3 merge_bin --output MiniFT8_M5Launcher.bin --flash_mode dio --flash_size 8MB --flash_freq 80m 0x0 bootloader.bin 0x8000 partition-table.bin 0x10000 mini_ft8.bin

6. ToDo List and Known Bugs

6.1 Add GPS

6.2 Add FD

6.3 Tx cycles only the first 2 queued messages