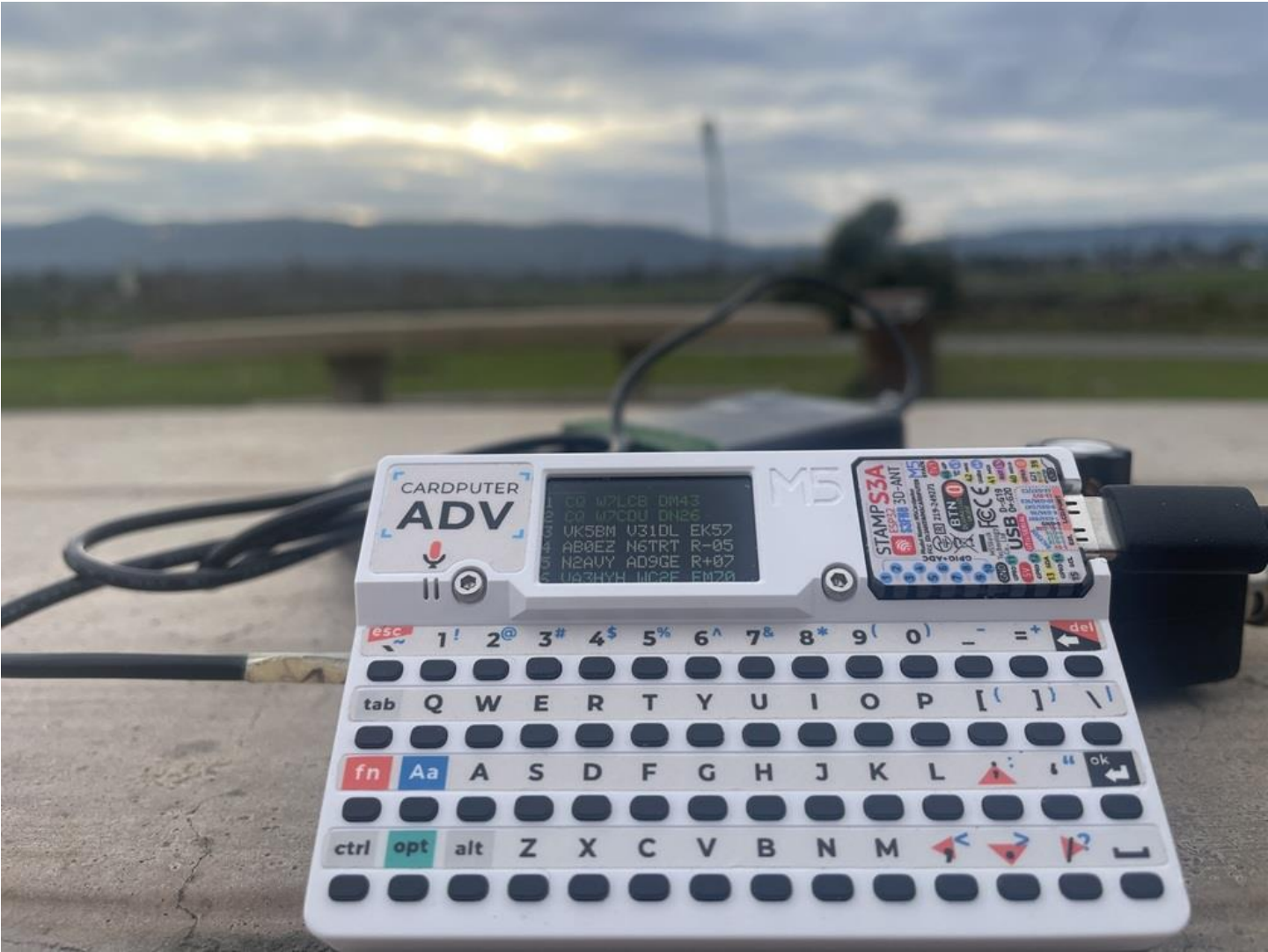


# Mini-FT8 User Manual

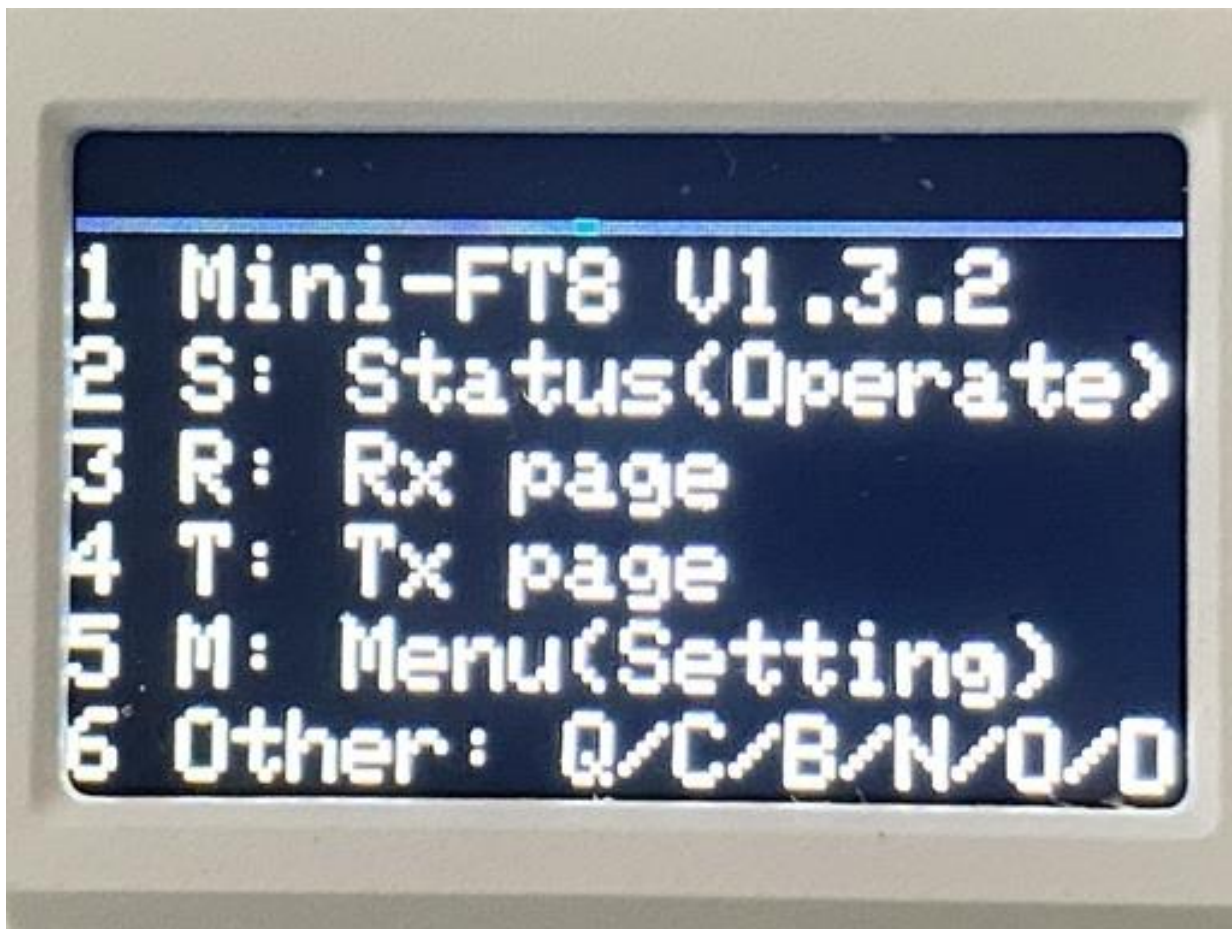


Revision	Release Date	Notes
V1.3.2	2026/1/29	<ul style="list-style-type: none"><li>• Add SD card support</li><li>• Add a startup screen</li></ul>
V1.3.1	2026/1/28	<ul style="list-style-type: none"><li>• Fix hashtable overflow</li></ul>
V1.3	2026/1/24	<ul style="list-style-type: none"><li>• Add support for nonstandard callsign</li><li>• Hook up SkipTX1 to autoseq</li></ul>

1. Screen Layout.....	1
2. UI System.....	2
2.1 Rx: Shows decoded messages (default page) .....	3
2.2 Status: Think of this as a frequently used “quick menu.” .....	4
2.3 Tx: Actively manage the transmission (TX) queue .....	4
2.4 Menu: Settings (3 pages).....	4

2.5 Qso: Shows QSOs from YYYYMMDD.adi .....	5
2.6 Band: Change band frequencies (just in case) .....	6
2.7 Connect to PC: Read/Delete files .....	6
3. Basic Operations .....	6
4. File System and Logging .....	7
4.1 Settings: /spiffs/ StationData.ini.....	7
4.2 RX/TX Log: /spiffs/RxTxLog.txt .....	7
4.3 ADIF Log: /spiffs/YYYYMMDD.adi.....	7
4.4 Download Logs .....	7
4.4.1 Use SD Card .....	7
4.4.2 Use pc_terminal.py .....	8
4.4.3 Use a Serial Port Terminal.....	8
5. FAQ .....	8
5.1 How to Upload Firmware (FW) to Cardputer .....	8
5.1.1 Method 1: Flash from source (ESP-IDF) .....	8
5.1.2 Method 2: Flash released binaries (no build) .....	9
5.2 How to Charge the Cardputer.....	9
5.2.1 Charge via USB-C using a normal 5V USB supply. ....	9
5.2.2 Charge via PORTA .....	9
5.3 How to Operate on Frequencies Other Than the “Standard” Ones .....	9
5.4 How to install Mini-FT8 under M5Launcher.....	9
6. ToDo List and Known Bugs.....	10
6.1 Add GPS.....	10
6.2 Add FD .....	10
6.3 Tx cycles only the first 2 queued messages .....	10

## 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)

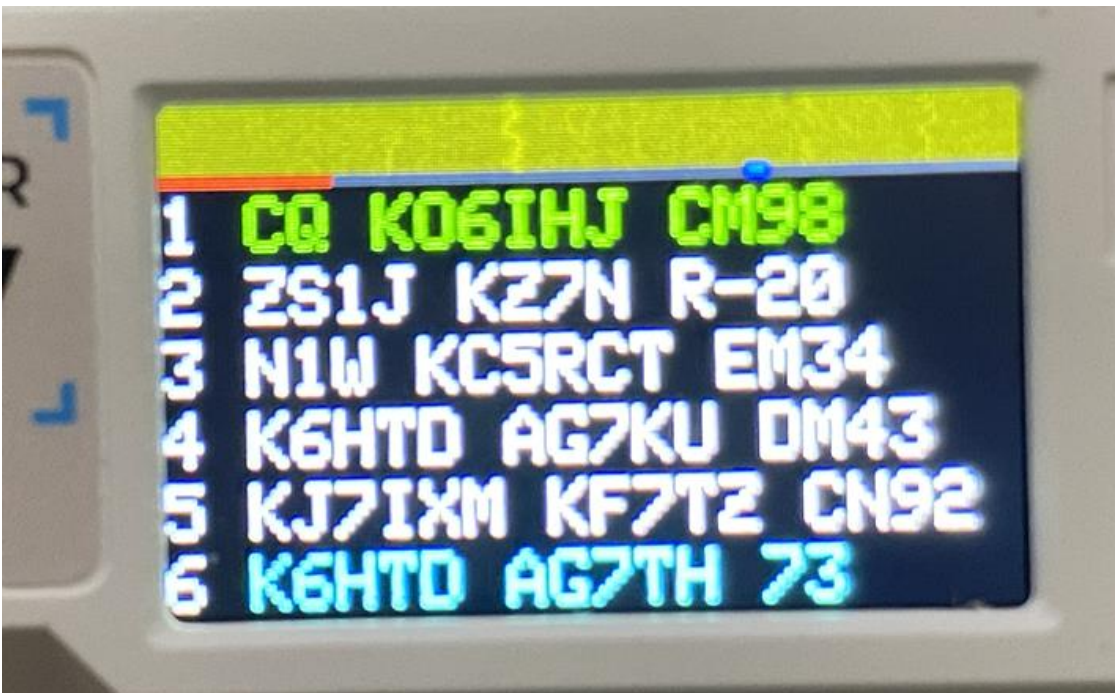
You can switch between pages by clicking:

- **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.ad1.
- **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**.

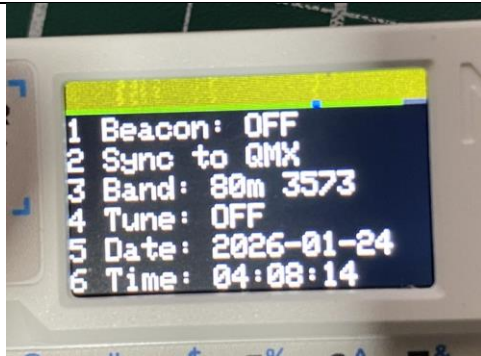


You can also click **other** messages—this is mainly intended for **stations that called CQ previously**, or a **rare callsign**. (If you missed the chance to click that callsign, you can even use **FreeText** if you *really* need it)

**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.

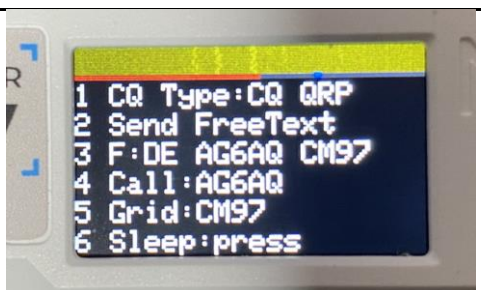
## 2.3 Tx: Actively manage the transmission (TX) queue



- 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)



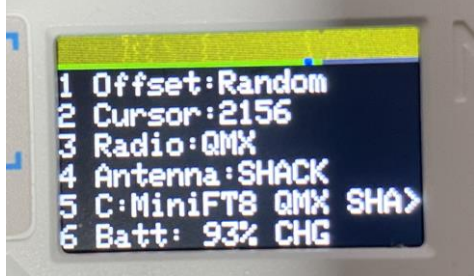
1. Select: [CQ | SOTA | POTA | QRP | FD | FreeText]
2. Action: Send FreeText in the next slot
3. Long Edit: Open FreeText editor (full edit)
4. Edit: Up to 11 characters callsign
5. Edit: 4-character Grid
6. Action: Put Cardputer into sleep

### FreeText – intended uses:

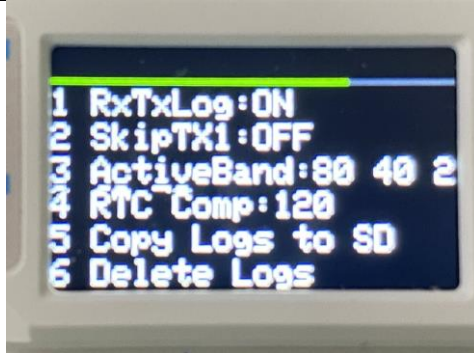
- Plain free text, e.g. “TNX 73”

	<ul style="list-style-type: none"> <li>• 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).</li> <li>• Self-spot for sotamat, e.g. “SM W6ABC/PKW7”</li> </ul>
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Page 2 (M. or N)

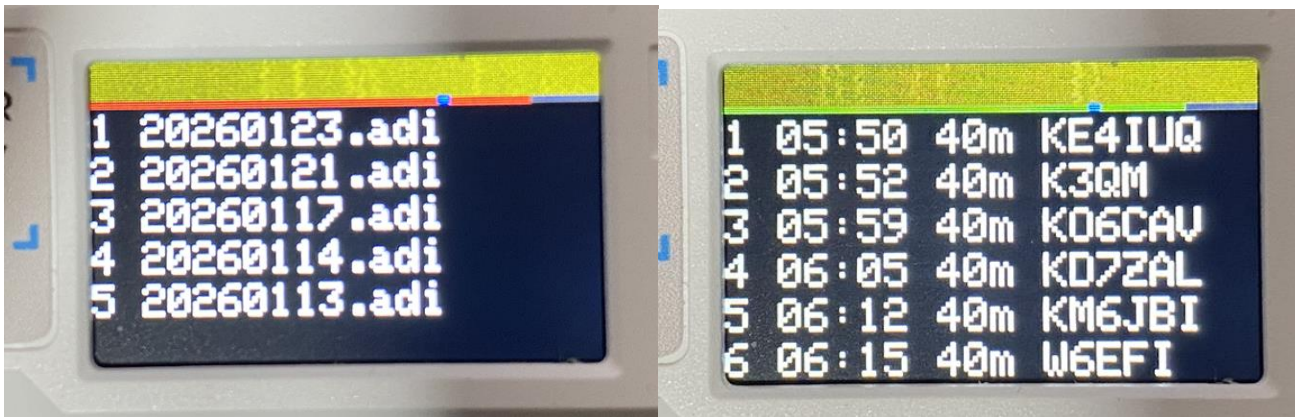
	<ol style="list-style-type: none"> <li>1. Select: [Random   Cursor   Rx] <ul style="list-style-type: none"> <li>• Random: choose a Tx offset within 500–2500 Hz.</li> <li>• Cursor: Use the current cursor frequency for Tx offset.</li> <li>• Rx: Use the currently selected Rx message frequency (the one you clicked) as a Tx offset.</li> </ul> </li> <li>2. Edit: Tx offset (only used when Select = Cursor) <ul style="list-style-type: none"> <li>• 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 &lt;200 or &gt;3000)</li> </ul> </li> <li>3. Select: QMX (only radio supported right now)</li> <li>4. Edit: just a short note for yourself</li> <li>5. Long Edit: Comment saved into the .adi file <ul style="list-style-type: none"> <li>• In the ADIF comment field, /Radio will be replaced by item 3 (Radio selection), and /Ant will be replaced by item 4 (Antenna).</li> </ul> </li> <li>6. Information</li> </ol>
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Page 3 (M.. or O)

	<ol style="list-style-type: none"> <li>1. Select: [ON   OFF] Enable/disable RxTxLog.txt logging</li> <li>2. Select: [ON   OFF] When replying to a CQ, skip the grid exchange and reply with signal report instead</li> <li>3. Long Edit: Band selection (choose from 12 bands, in B pages)</li> <li>4. Edit: Hardware RTC compensation (calibrates clock drift) <ul style="list-style-type: none"> <li>• more details see: <a href="#">RTC Deep Sleep Compensation</a></li> </ul> </li> <li>5. Copy *.adi and RxTxLog.txt to SD card (if present)</li> <li>6. Delete *.adi and RxTxLog.txt on device (!!!)</li> </ol>
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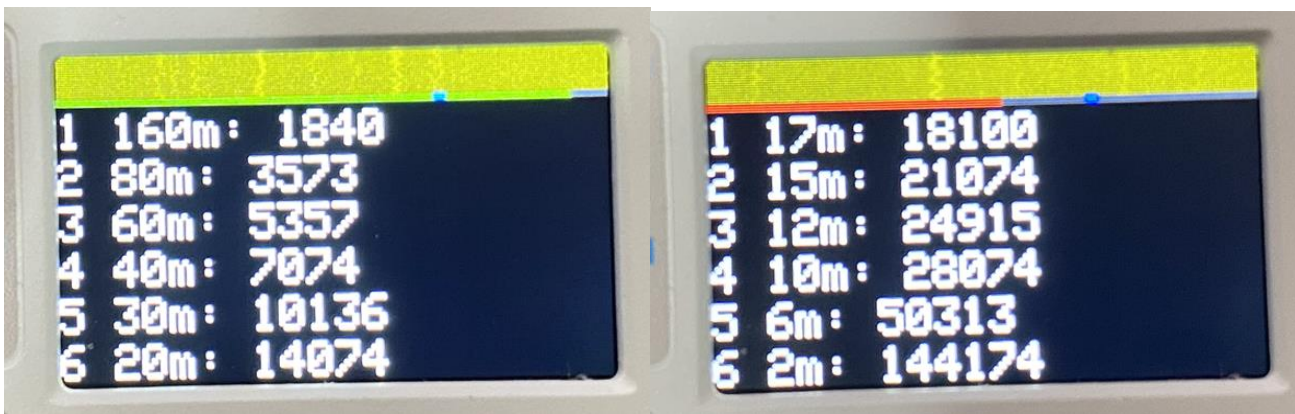
## 2.5 Qso: Shows QSOs from YYYYMMDD.adi

Informative, use 1-6, Up/Down and Esc to navigate different .adi files



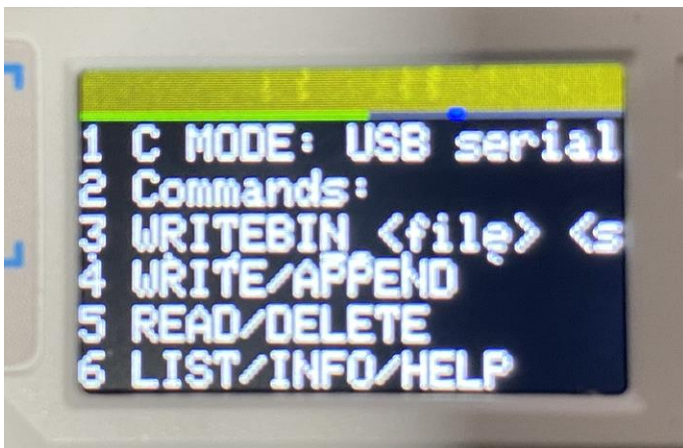
## 2.6 Band: Change band frequencies (just in case)

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.adf

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
```

You can put multiple Mini\_FT8 revisions on the SD card and use the same card to store log files.

## 6. ToDo List and Known Bugs

### 6.1 Add GPS

### 6.2 Add FD

### 6.3 Tx cycles only the first 2 queued messages