USER MANUAL

G7JJF APRS Client

Amateur Radio APRS client for Android

Version 1.9.8

11 November 2026

Platform	Android 8.0 or later (API 26+), phone or tablet
Car	Android Auto (Car App API level 2+, full map needs level 7+)
Interfaces	APRS-IS, TCP KISS, Bluetooth SPP, BLE (Nordic UART, Mobilinkd, Radtel, HM-10), AGW/Direwolf, USB serial, Audio DSP (Bell 202)
Destination (tocall)	APZGJJ
Licence	Freeware for amateur radio use

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Freeware — no advertising, no account required

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CHAPTER 1

Introduction

An APRS station in your pocket — internet, RF and car in one app.

G7JJF APRS Client is a full-featured Automatic Packet Reporting System (APRS) station for Android phones and tablets. It is written for licensed radio amateurs who want a single app that can sit on the internet APRS network (APRS-IS), talk to real radios through a range of TNCs, and still be comfortable to use on a phone screen or in the car through Android Auto.

Everything the app hears — whether it arrives from an APRS-IS server, a Bluetooth TNC in your pocket, Direwolf on a Raspberry Pi in the shack, or the phone's own microphone — is merged into one packet stream. The map, the station log, the message threads and the alerts all work from that single stream, so it does not matter how a station was heard: you see it in the same place and can reply to it in the same way.

What the app can do

- **APRS-IS client** with server-side range, prefix, buddy and custom filters, automatic passcode calculation, keepalives and automatic reconnection.
- **Six RF interfaces** that can all run at once: TCP KISS (Direwolf, hardware TNCs on the LAN), Bluetooth Classic SPP in KISS or text mode, Bluetooth Low Energy (Nordic UART, Mobilinkd BLE KISS or HM-10 serial), AGWPE/Direwolf AGW port, USB serial (KV4P HT, CP2102-based TNCs) and a built-in Bell 202 audio soft-TNC that uses the phone's microphone and speaker.
- **Live map** with four base layers (CARTO, OpenStreetMap, satellite, topographic), emoji or official APRS symbols, clustering, trails, age fading, distance rings, measuring, waypoints, KML overlays, address search and offline tile download.
- **Full APRS decoding** — uncompressed and compressed positions, Mic-E, DAO extra precision, weather (positionless and with position), objects and items (including kills), telemetry with PARM/UNIT/EQNS definitions and comment telemetry, status, messages, bulletins and NWS alerts.
- **Messaging** in conversation threads with message numbers, acks, rejects, APRS 1.1 reply-acks, automatic retries, duplicate suppression, templates, a route override (force APRS-IS or force RF) and inline reply from the notification.
- **Beaconing** at a fixed interval or with SmartBeaconing (speed-dependent rate plus corner pegging), from GPS or a fixed QTH, with optional altitude and battery level.
- **RX iGate** (RF to APRS-IS) and **TX iGate** (APRS-IS to RF, messages for local stations and optionally positions of watch-listed stations) using correct q-constructs and third-party format, a **fill-in digipeater**, and **Beacon Check** to see which digipeaters and iGates carried each of your RF beacons.
- **AX.25 connected-mode packet terminal** for BBSs and nodes (BPQ, FBB and similar), implementing T1/T3/N2 timers, polls and finals, REJ recovery and window control as described in the AX.25 specification, connecting via digipeaters, with macros, session logs and a monitor that decodes NET/ROM.
- **Objects manager**, **APRS services** helper (ANSRVR, WHO-IS, EMAIL-2, SMSGTE, WXBOT, APRS OTA, APSPOT, APRS2SOTA, MPAD, QRX, Telegram and WhatsApp gateways, WLNK-1 and more), **email forwarding** of incoming messages, **DX cluster**, **ISS pass prediction** with pass reminders, **solar propagation**, **sunrise/sunset**, **grid square** and **passcode** tools, and a **barometer** using the phone's pressure sensor.

- **Logging** — track log with GPX export, QSO log with ADIF export, raw stream recording, packet rate graph, TX history, station export to CSV or KML.
- **Alerts** — watch list, circular geo-fences, proximity to your position, weather thresholds, bulletin keywords and message notifications, optionally spoken aloud.
- **Android Auto** with a home grid, station/weather/repeater/object lists, messages with reply, and a live drawn map on head units that support it.
- **Home-screen widget** and **Quick Settings tiles** for connect and beacon.
- **Station profiles**, settings export/import and full **backup and restore**.

About this manual

This manual describes version 1.9.8 (build 54). Every chapter is written from the behaviour of the app itself: where the manual gives a number — a timer, a limit, a default — it is the value the app actually uses. Button and menu names are given as they appear on screen. Many on-screen labels carry a small emoji icon; the manual leaves the icon out and gives only the words (for example the menu item shown as a satellite dish and the words *AX.25 Packet Terminal* is written simply as **AX.25 Packet Terminal**).

Paths through the menus are written with arrows, for example **Menu → Radio Tools → ISS Passes**. *Menu* always means the main menu opened with the ☰ button at the top left (or the **Tools** tab).

> **Important.** Transmitting on amateur frequencies — including beaconing, sending messages, acking, running a TX iGate or using the packet terminal — requires an amateur radio licence. In the UK that means a Full or Intermediate licence issued by Ofcom. Sending to APRS-IS with a valid passcode is treated in the same way, because iGates may gate your traffic to RF. Make sure you are licensed before enabling any transmit function.

CHAPTER 2

Requirements and Installation

Device requirements

Item	Requirement
Android version	Android 8.0 (API 26) or later. The app targets Android 16 (API 36).
Screen	Phone or tablet, portrait or landscape.
Internet	Needed for APRS-IS, map tiles, address search, ISS data, propagation, DX cluster and email.
GPS	Optional. Needed for GPS beaconing, the track log and SmartBeaconing.
Bluetooth	Classic Bluetooth for SPP TNCs; Bluetooth LE for BLE TNCs.
USB host (OTG)	Needed for USB serial TNCs such as the KV4P HT.
Microphone / audio	Needed for the Audio DSP TNC.
Android Auto	Car App API level 2 or later for the car screens; level 7 or later for the drawn map.

Installing

Install the app from the **Google Play Store**. While it is in testing, apply for the beta test at **www.g7jjf.com/aprs/**; you will receive an invitation at your Google account's e-mail address with a link that lets you install it from Play. Updates then arrive through Play like any other app, and your settings and data are kept.

> **Note.** If you had a copy installed earlier from an APK file, Play may refuse to update it because the two are signed differently. Make a backup first (**Menu → Backup → Backup All Data**), uninstall the old copy, install from Play, then restore the backup.

Permissions

The app asks for the permissions it needs when it first starts, or when you first use a feature that needs them. You can refuse any of them; the related feature simply will not work until you grant it in Android Settings → Apps → G7JJF APRS Client → Permissions.

Permission	Used for
Location (precise)	GPS beaconing, SmartBeaconing, track log, map GPS button, filter centre from GPS.
Notifications (Android 13+)	Message, bulletin, weather, geo-fence and watch list alerts, and the ongoing service notification. Without it, alerts are silently skipped.
Nearby devices / Bluetooth	Scanning for and connecting to Bluetooth and BLE TNCs.
Microphone	Receiving with the Audio DSP TNC.
USB device access	Asked by Android each time a USB serial TNC is connected.
Ignore battery optimisation	Keeps the APRS service alive with the screen off. The app asks on every launch until it is granted — strongly recommended.

Permission	Used for
Foreground service, wake lock, boot completed, exact alarms	Running in the background, the 9-minute connection watchdog and reconnecting after a reboot.

> **Tip.** For reliable background operation also exclude the app from any manufacturer battery saver (Samsung *Sleeping apps*, Xiaomi *Autostart*, Huawei *App launch* and similar). See the chapter on background operation.

What you need to transmit

- An amateur radio licence and your callsign.
- For APRS-IS: nothing else — the app calculates the standard APRS-IS passcode from your callsign automatically. You can still type a passcode if you prefer.
- For RF: a radio and a TNC of some kind (hardware KISS TNC, Direwolf, a Bluetooth/BLE TNC such as a Mobilinkd, a radio with a built-in TNC that speaks KISS over Bluetooth, a KV4P HT, or an audio interface cable for the Audio DSP TNC).

CHAPTER 3

Quick Start

From installation to your first beacon in a few minutes.

This chapter gets you from a fresh install to seeing stations on the map and sending your first beacon. Each step is explained in more detail later in the manual.

The setup wizard

On first start the app opens a short **setup wizard**: your callsign and what the phone is used for (which sets the SSID: -9 car, -7 handheld, none for home, -10 internet only), your home position as a locator or latitude and longitude (or the current GPS fix), how you reach APRS (internet only, a Bluetooth LE radio, a Bluetooth TNC, a USB TNC, Direwolf on a PC or the phone's audio), and beaconing (off, every 30 minutes, or SmartBeaconing). **Finish** saves it all, connects to APRS-IS if you chose to, and opens the window for connecting your radio. **Skip** leaves everything as it is. Run it again at any time from **Menu → Tools → Setup Wizard**; the steps below do the same by hand.

1. Enter your callsign

1. Tap the **Settings** tab at the bottom of the screen.
2. In **STATION**, type your callsign in **Callsign** — letters and digits only, up to six characters, without an SSID.
3. Choose an **SSID** if you want one (for example 9 for a car, 7 or 11 for a handheld or phone; 0 means no SSID). See the SSID appendix for the usual conventions.
4. Leave **Passcode** blank: the app works it out from the callsign. (A typed passcode is used as-is.)

2. Set your home position

1. Scroll to **FILTER**. Enter your home latitude and longitude in decimal degrees (north and east positive, south and west negative), or tap **Get QTH from GPS** to fill them from the current fix.
2. Pick a range with the quick buttons — **Local 50**, **County 100**, **Region 200** or **Wide 500** km — or type a value. This is the radius the APRS-IS server will send you traffic for.

> **Note.** The position in FILTER is your *QTH*. It is the centre of the APRS-IS range filter, the reference point for distances and bearings, the home marker on the map, and the position used for beacons when GPS is not in use.

3. Save and connect

1. Scroll to the bottom and tap **SAVE SETTINGS**.
2. Tap the status text at the top of the screen (it reads *Disconnected*). It changes to *Connecting to euro.aprs2.net...* and then to a green connected message. The coloured dot next to it turns green once packets are flowing.
3. Tap the **Map** tab. Stations appear within a few seconds.

4. Send a beacon

1. In Settings → **BEACONING**, enter a **comment** (up to 43 characters including any battery and altitude extras) and choose a symbol.
2. Choose **Fixed** and set an **interval** in seconds (for a fixed station 1800 s, i.e. 30 minutes, is considerate), or choose **Smart** for SmartBeaconing when mobile. 0 means no automatic beacons.
3. Choose the **position source**: **GPS** or **QTH**.
4. Save, then press **TX** on the map toolbar to send a beacon straight away. Your home marker moves to the beaconed position.

5. Add a radio (optional)

Open **Menu → APRS Connections** and pick the interface that matches your hardware — for example **Bluetooth TNC** for a paired Mobilinkd or a radio with a Bluetooth KISS TNC, or **KISS TNC TCP/IP** for Direwolf. Once connected, packets heard on RF appear alongside the internet traffic, tagged with their source. Your beacons now go out on RF as well, using the RF path set in Settings.

6. Send a message

Tap **Messages → My Messages → New Message**, type a callsign and tap **Open**, then type your text and tap the send arrow. The bubble shows an hourglass while waiting, two ticks when the other station acknowledges, or a cross if no acknowledgement arrives after the retries.

CHAPTER 4

The Main Screen

The main screen has three parts: the **status bar** across the top, the current **screen** in the middle, and the **tab bar** along the bottom. Further screens and tools are opened from the main **menu**.

Tablets and landscape

Turn on **Landscape / tablet layout** in Settings → Display (it is off to start with). Then, on a wide screen — a tablet, or a phone turned on its side (720 dp wide or more) — the map stays on the left and the screen you choose (packets, messages, station log, bulletins, settings) appears beside it on the right, so you can watch the map while reading. Choosing **Map** keeps the last side screen. Turn the phone upright again for the usual one-screen layout. With the setting off, one screen fills the display whichever way round the phone is.

Status bar

Control	What it does
☰ **Menu**	Opens the main menu. Shows a red dot (☰ ●) when there are unread messages or bulletins.
☽ **Night mode**	Toggles night mode: forces the dark theme, selects the CARTO map layer and dims the screen to 15% brightness. Tap again to restore brightness and the previous theme.
☀ / ◑ **Theme**	Switches between the dark and light themes (☀ is shown while dark, ◑ while light). Using it also turns off the automatic sunrise/sunset theme schedule.
● **Quality dot**	Grey: APRS-IS not connected. Red: connected but no packets arriving. Amber: under 3 packets per minute. Green: 3 or more packets per minute.
Status text	Shows the connection state. **Tap it to connect or disconnect APRS-IS.**

The status text changes with the connections:

Text	Meaning
Disconnected (grey)	Nothing connected.
Connecting to *host*… (amber)	Opening the APRS-IS connection.
Reconnecting in *N* s…	Waiting before an automatic reconnect after an error.
IS Connected, IS + KISS+BT… (green)	APRS-IS logged in, plus any RF interfaces listed.
IS · *N* pkts · *X*/min	Logged in; packet count and current rate, updated as packets arrive.
RF: KISS+BT+BLE+AGW+USB+Audio (cyan)	RF interfaces only, no APRS-IS.
Error: *message* (red)	The last connection attempt failed; the app will retry.

Tab bar

Tab	Opens
Map	The live map (chapter 7).
Stations	The station log — every station heard, with search, filters and sorting (chapter 8).
Messages	Message traffic and your conversations (chapter 9). Shows *Msgs (N)* when unread.
Tools	The main menu (the same as ☰).
Settings	All settings (chapter 5).

The **Back** button closes an open conversation first, then steps back through the last ten tabs you visited. Pressing Back on the map with nothing left in the history asks whether to exit the app.

The main menu

The menu is a scrolling list grouped into sections. Items with a count show how many new entries there are since you last looked.

Section	Items
(top)	Map · Station Log (+N new) · Packets · Messages (N unread) · Bulletins · Settings · Debug
APRS Connections	APRS-IS · Bluetooth TNC · BLE TNC · AGW Interface · KISS TNC TCP/IP · USB Serial · Audio DSP TNC · Radio Control · TNC Bridge · AX.25 Packet Terminal · Text Terminal
Tools	Emergency beacon · Watchlist · WX Stations · Offline Tiles · Objects Manager · Station Profiles · TX History · Stream Logs · Packet Capture · Group Broadcast · Crash Logs · Setup Wizard · Install on Watch
Logging & Tracking	Track Log · QSO Log · Packet Rate · Beacon Check · Event Board
Messaging	Email Gateway · Message Templates
Radio Tools	Propagation · ISS Passes · Sunrise/Sunset · Barometer · UK Repeaters · RepeaterBook · Geo-Fence Alerts · DX Cluster · APRS Services · Map Overlay · Grid Square · Passcode Calc · SSID Reference
Export	Station Export · Theme Schedule
Backup	Backup All Data · Share Backup Data · Restore Backup
(bottom)	About / Help · User Manual · Donate · Reset to Defaults · Exit

Connection rows

The first six rows of *APRS Connections* have a status button on the right: ● **ON** in green when that interface is connected, ○ **OFF** in grey when it is not.

- Tapping ○ **OFF** connects APRS-IS directly, or opens the connection dialog for a TNC.
- Tapping ● **ON** disconnects APRS-IS, BLE, AGW or KISS straight away. For Bluetooth and USB it reopens the connection dialog, where you can change the mode, open the terminal or disconnect.
- Tapping the row name disconnects a connected interface (with a short confirmation message), or opens its dialog if it is not connected.

Debug screen

Menu → Debug has two tabs. **App Log** is the application's own log, newest first and coloured by level (errors red, warnings orange, debug cyan). **Comms** is a live monitor of every line sent and received — transmissions to APRS-IS in red, to RF in orange, RF receptions in cyan, APRS-IS receptions in grey, iGate events in the accent colour and GPS events in green. It keeps the last 1000 lines. Each tab has **Clear** and **Save**; Save writes a text file and opens the Android share sheet so you can e-mail it or save it to Drive.

> **Tip.** When reporting a problem, reproduce it, then use **Save** on the App Log tab and send the file to the author along with a description.

Exiting

Menu → Exit (or Back on the map) asks *Stop the APRS service and exit completely?* Choosing **Exit** saves the station log, disconnects every interface, stops the background service and closes the app. Simply switching to another app or turning the screen off does *not* stop the service — beaconing, iGating and message reception carry on in the background.

CHAPTER 5

Settings Reference

Every setting, what it does and its default.

All settings are on the **Settings** tab. A row of tabs under the Export / Import / Share buttons splits them into five pages; the app remembers the one you last used.

Tab	Sections
Station	STATION, SERVER, FILTER, AUTOMATION
Beacon	BEACONING, AUTO-BEACON ON MESSAGE, ADVANCED, PHONE BAROMETER
Display	DISPLAY, MAP TILE CACHE
Alerts	AUTO-REPLY, SPOKEN ALERTS, PROXIMITY ALERT, ISS PASS REMINDER, BULLETIN ALERTS, MESSAGE AUDIO ALERT
RF	RF INTERFACES, RX iGATE, TX iGATE, DIGIPEATER, BEACON CHECK, AX.25 PACKET

The sections are described below. Changes take effect when you tap **SAVE SETTINGS** at the bottom of any page — it saves the changes on every tab at once; leaving the Settings screen without saving discards them. Settings are stored with Android DataStore, and a copy of the key fields is kept separately so they survive a corrupted store.

> **New in 1.8.2.** Saving settings no longer resets fields that are not shown on the Settings page (such as the TNC addresses, extra filter clauses and Android Auto options), and the extra filter clauses field is now saved correctly.

STATION

Field	Description
Callsign	Your callsign without SSID. Upper case, up to 6 characters. Default *MYCALL* — the app will not do anything useful until this is changed.
SSID	0–15. 0 means no SSID; any other value is added as -N. Used for APRS-IS login, beacons and messages. (The packet terminal always uses the plain callsign.)
Passcode	Your APRS-IS passcode. Leave blank (or enter -1) and the app calculates the correct passcode from the callsign automatically. Enter a number only if you need to override it.
HamQTH lookup login	The HamQTH.com user name used for callsign lookups in Station Detail. **Change** enters a new user name and password; **Remove** deletes them from the phone. Takes effect at once. The login is kept separately from the other settings and is never included in settings exports, shared settings files or station profiles.

> **Note.** Because a blank passcode is auto-calculated, the app always logs in as a verified, transmit-capable station. The Passcode Calc tool still shows the traditional note that -1 means receive-only; in this app -1 means *calculate it for me*.

AUTOMATION

Allow automation apps (default off) lets Tasker, MacroDroid, Automate and similar apps send beacons, messages and status reports through this app, and tells them when a message arrives or a station comes near. Leave it off unless you use one: while it is on, any app on the phone could transmit under your callsign. The commands and events are listed in chapter 22.

SERVER

Server and **Port** select the APRS-IS server. The default is `euro.aprs2.net` port `14580`, the user-defined-filter port of the Tier 2 network. Preset chips fill both fields:

Preset	Server	Notes
euro	euro.aprs2.net:14580	Europe rotate (default)
rotate	rotate.aprs2.net:14580	Worldwide rotate
noam	noam.aprs2.net:14580	North America
soam	soam.aprs2.net:14580	South America
asia	asia.aprs2.net:14580	Asia
aunz	aunz.aprs2.net:14580	Australia and New Zealand
uk	uk.aprs2.net:14580	UK servers
euro:10152	euro.aprs2.net:10152	Full feed — every packet worldwide. Very high data use; filters are ignored on this port.

FILTER

These settings build the server-side filter sent when logging in to APRS-IS. The server then sends only matching traffic, which keeps data use and battery drain down.

Field	Description
Filter preset	Quick choices: **All local 100** (range 100 km), **Messages only** (turns on the messages-only filter below), **Weather only** (`t/w`), **Mobiles only**, **Friend tracking** (`b/CALL`), **Wide area 500**, **No filter 999**.
Auto-clear	Off, 1, 2, 4 or 8 hours. Stations not heard for that long are removed from the map automatically. The packet list and station log are not affected.
Range (km)	Radius of the range filter `r/lat/lon/range`. Quick buttons: Local 50, County 100, Region 200, Wide 500. Default 200.
Centre latitude / longitude	Your QTH in decimal degrees. **Get QTH from GPS** fills them from the current GPS fix.

See the filter syntax appendix for the clauses you can add yourself.

DISPLAY

Field	Choices
Distance units	km or miles. Used for all distances, speeds (km/h or mph) and altitudes (m or ft).
Temperature	°C or °F.

Field	Choices
Symbols	**Emoji** (the app's own colourful set) or **Official** (the standard APRS symbol sprites).
Theme	Light (default on a new install), Dark or **Red** — red on black for use at night, so the screen doesn't spoil your night vision (portable, SOTA, astronomy). In Red the map uses dark tiles turned red as well.
Landscape / tablet layout	Off (default): one screen fills the display in any orientation. On: on a wide screen the map sits beside the other screens.
Keep screen on	Off (default). On: the phone's screen doesn't go off while the app is open — for a phone on a dashboard mount. Uses more battery; leaving the app lets the screen sleep as usual.

BEACONING

Field	Description
Record APRS stream	Writes every raw line to a daily log file (see Stream Logs).
WX alert: wind (mph)	Notify when a weather station reports wind at or above this speed. 0 = off.
WX alert: temp low (°F)	Notify when a weather station reports a temperature at or below this. Blank = off.
Messages-only filter	Instead of every packet within range, receive only messages addressed to you (`g/CALL`) and message traffic within range of your last beaconed position (`t/m/CALL/km`). Prefix, buddy and extra clauses still apply.
Extra filter clauses	Any further APRS-IS filter clauses, appended to the login filter exactly as typed, e.g. `b/G4XYZ* p/GB7`.
Beacon on connect	Sends one position beacon as soon as the APRS-IS login is accepted.
Auto-connect	Connect to APRS-IS when the app starts, and reconnect after a reboot if you were connected.
Interval (seconds)	Time between automatic beacons in Fixed mode. **0 turns automatic beaconing off.** Typical values: 600 (10 min) mobile, 1800 (30 min) fixed.
Smart / Fixed	**Fixed** beacons every *interval*. **Smart** uses SmartBeaconing (chapter 10).
Comment	Text sent after the position. Battery and altitude extras, if enabled, are added to it and the whole comment is limited to 43 characters.
Status text	Sent as a status packet (`>text`) on APRS-IS when you save settings and each time APRS-IS logs in.
Position source	**GPS** — beacon the current GPS fix (falls back to the QTH if there is no recent fix). **QTH** — always beacon the fixed position from FILTER.
Filter position source	**QTH** — the APRS-IS range filter is centred on your QTH. **GPS** — centred on your GPS position.
RF path	Digipeater path for RF transmissions: `WIDE1-1,WIDE2-1` (default, recommended), `WIDE2-2`, `WIDE1-1`, `WIDE1-1,NOGATE` (digipeat but ask iGates not to gate), `NOGATE`.
Symbol	Twelve common beacon symbols (car, house, person, phone, bike, van, truck and so on). The car symbol is automatically sent as a house when you are stationary.
GPS follow	**Auto** — the map follows your GPS position. **Manual** — the map stays where you put it.

RX iGATE

Field	Description
Enable RX iGate	Forward packets heard on any RF interface to APRS-IS (chapter 11).
iGate callsign	Callsign placed after qAR in gated packets. Blank = your own callsign-SSID.
iGate message	Identifies your iGate on APRS-IS every 30 minutes while the RX iGate is on. With a separate iGate callsign it is sent as a position at your QTH with the iGate symbol; with your own callsign it is sent as a status packet (skipped if you have set a status text).

RF INTERFACES

Reconnect to the last Bluetooth radio automatically (off by default): when the app starts, and every 45 seconds after that, it connects the Bluetooth or BLE radio/TNC you last used if it isn't connected — so the radio comes back by itself after being switched off or going out of range. Disconnecting it yourself stops the retries until you next connect it.

One **packet only** switch for each RF interface (KISS TNC, Bluetooth TNC, BLE TNC, AGW, USB serial TNC, Audio DSP TNC). All are off by default, so every interface is used for APRS.

Turn it on for an interface used on a packet radio (non-APRS) frequency. It is then used only for AX.25 connections — the packet terminal and its Monitor (chapter 13). Nothing heard on it reaches the map, station list, messages, alerts or the iGate, and no APRS is sent on it: no beacons, messages, acks, objects, weather reports, iGate or digipeater traffic. If no other interface is connected, the app behaves as if there were no RF at all and uses APRS-IS.

Example: a TCP KISS TNC on 144.800 MHz for APRS, and AGW (Direwolf or soundmodem) on a packet frequency set to packet only, for BBS and node connections.

TX iGATE

Field	Description
Enable TX iGate	Forward suitable APRS-IS traffic to RF (chapter 11). Default off.
Heard window (min)	A station must have been heard on RF within this many minutes to be served. Default 30.
Gate messages	Gate messages addressed to locally heard stations. Default on.
Gate positions	Gate position packets of watch-listed stations. Default off.

DIGIPEATER, BEACON CHECK and ISS PASS REMINDER

Field	Description
Digipeat WIDE1-1 and my callsign	Fill-in digipeater on KISS-mode interfaces (chapter 11). Default off.
Check my RF beacons reach APRS-IS	Send beacons by RF only and report how each reached APRS-IS (chapter 11). Default off.
ISS pass reminder	Off, 20°, 30°, 45° or 60° — notify 10 minutes before passes at least this high (chapter 15). Default off.

AUTO-REPLY, SPOKEN ALERTS, PROXIMITY ALERT and PHONE BAROMETER

Field	Description
Auto-reply	Off, Always or In Android Auto — answer messages automatically with the text below, once an hour per station (chapter 9). Default off.
Auto-reply text	Up to 63 characters; it is sent after `AA:` . Default *Driving at the moment - will reply later. 73*.
Speak alerts	Read out new messages, watch-list, geo-fence and proximity alerts with the phone's text-to-speech voice (chapter 17). Default off.
Proximity alert	Off, 1, 2, 5, 10 or 25 (km or miles, as set under Units) — notify when a station comes this close to your GPS position (chapter 17). Default off.
Watch-list stations only	Limit proximity alerts to stations on the watch list. Default off.
Barometer report	Off, 10, 30 or 60 min — send the phone's air pressure as an APRS weather report (chapter 15). Shown only on phones with a pressure sensor. Default off.
Height (m)	Height of the phone above sea level, used to correct the pressure to sea level. Blank uses the GPS altitude.

BULLETIN ALERTS

A comma-separated list of keywords. Any bulletin whose text or subject contains one of them raises a high-priority *APRS ALERT* notification. Default:
`SEVERE,TORNADO,FLOOD,HURRICANE,TSUNAMI,EARTHQUAKE,FIRE,EMERGENCY`.

QUIET HOURS

Between the chosen times (from 21:00, 22:00, 23:00 or 00:00 until 06:00, 07:00, 08:00 or 09:00; default off, 23:00–07:00), alerts arrive without a sound: no notification sound, spoken alert or tone. Notifications still appear. **Emergency alerts always sound. Also pause automatic beacons** stops automatic beacons during those hours too — Beacon Now still works.

MESSAGE AUDIO ALERT and AUTO-BEACON ON MESSAGE

Message audio alert plays a short beep when a message addressed to you arrives, in addition to the notification. **Auto-beacon on message** sends a QTH position beacon one second after acknowledging a message addressed to you — useful for letting the sender see where you are.

MAP TILE CACHE

Shows how much of the 200 MB map tile cache is in use, with a button to clear it.

AX.25 PACKET

Parameters for the connected-mode packet terminal (chapter 13). They do not affect APRS.

Field	Choices	Default	Meaning
T1	5 / 10 / 15 / 30 s	10 s	Wait for an acknowledgement before polling or retransmitting, for a direct link. Through digipeaters it is stretched automatically to T1 × (1 + 2 × digipeaters).

Field	Choices	Default	Meaning
Retries (N2)	5 / 10 / 15 / 20	10	T1 expiries in a row before the link is declared failed.
Window	1 / 3 / 4 / 7	4	Maximum unacknowledged I-frames outstanding (modulo 8).
I-frame length	128 / 256 / 512 / 1024	128	Maximum bytes of text per I-frame.
Response time	0 / 0.2 / 0.4 / 1 s	0.4 s	Delay before acknowledging received I-frames, so a half-duplex TNC can finish receiving a burst.

ADVANCED

Field	Description
Battery in beacon	Adds `Bat:NN%` to the beacon comment.
Altitude in beacon	Adds `/A=NNNNNN` (feet, from GPS) to the beacon comment.
Compressed position beacons	Sends your position in the APRS compressed format: a shorter packet (less airtime on a busy RF channel), the position to about 30 cm instead of about 18 m, and your course and speed while moving at 2 knots or more. All current APRS software and aprs.fi read it. Not used while position privacy applies, because the compressed format cannot blur a position. Default off.
Symbol from SSID	If your symbol is still the default car, choose the symbol conventionally associated with your SSID instead (see the SSID appendix).
Auto-reconnect	Reconnect APRS-IS automatically when the phone changes network (Wi-Fi to mobile data and back). Default on.

POSITION PRIVACY

Near home you may not want your exact address on aprs.fi. With **Position privacy** on, beacons sent within the chosen distance of your QTH carry a deliberately rough position, using the standard APRS *position ambiguity*: the last digits of the latitude and longitude are left blank, and other stations and aprs.fi show you in the middle of a box of the chosen size. Altitude is left out while it applies. Away from home your position is exact; emergency beacons are always exact.

Field	Choices	Default
Applies within	Off · 1 km · 2 km · 5 km of the QTH · Always	Off
How rough	≈ 200 m · ≈ 2 km · ≈ 20 km	≈ 2 km

BATTERY SAVER

When the battery is below the chosen level (Off · 15% · 20% · 30%; default Off) and the phone isn't charging, automatic beacons — fixed interval and SmartBeaconing — go a third as often. Beacon Now, messages and everything else work as normal.

Export, Import and Share

Three chips at the bottom of the page work on the settings only (not messages or logs):

- **Export** writes a readable JSON file `aprs_settings_yyyy-MM-dd_HHmm.json` to the Downloads folder.
- **Import** reads such a file back and fills in the Settings page — tap **SAVE SETTINGS** to apply it.
- **Share** sends the JSON through the Android share sheet.

For everything else (messages, logs, profiles, geo-fences) use **Menu → Backup**, described in chapter 19.

CHAPTER 6

Connections

APRS-IS and the six RF interfaces — what they are and how to set them up.

The app can use APRS-IS and up to six RF interfaces at the same time. Every interface feeds the same packet stream, and each received packet is tagged with where it came from (IS, KISS, BT, BLE, AGW, USB or AUDIO). All interfaces are opened from **Menu → APRS Connections**.

How transmissions are routed

Traffic	Where it goes
Position beacons	Every connected interface at once: APRS-IS (if logged in) and every connected RF interface, including USB and Audio. RF copies use the RF path from Settings.
Messages and acks	The RF interface the other station was heard on **directly** in the last 30 minutes (KISS, Bluetooth, BLE, AGW, USB or Audio), if it is still connected — even if the station has since also been seen via APRS-IS. Otherwise wherever it was last heard; APRS-IS if that interface is not connected or the station is unknown. Long-press Send to override (chapter 9).
Retries	The same interface as the original send, falling back to APRS-IS if it has disconnected.
Objects	APRS-IS plus every connected RF interface.
Bulletins	APRS-IS plus every connected RF interface.
TX iGate	Every connected RF interface.
Packet terminal	One RF port, chosen in the order Bluetooth, BLE, TCP KISS, AGW, USB.

APRS-IS

APRS-IS is the internet backbone of APRS. Connect by tapping the status text, the APRS-IS row in the menu, the APRS Quick Settings tile, or Connect IS in Android Auto. All of these use your saved settings.

> **New in 1.8.2.** Connecting from the Quick Settings tile, from Android Auto, or automatically after a reboot now uses your full saved settings. Previously these paths could log in with built-in defaults, and a normal connect could temporarily switch off iGating, the RF path and the extra filter clauses.

What happens when you connect

1. The server name is looked up; IPv4 addresses are tried first, then IPv6, each with a 5-second timeout.
2. The app sends its login line: `user CALL-SSID pass NNNNN vers G7JJF-AprsClient 1.9.8 filter r/lat/lon/km …` followed by any prefix, buddy, messages-only and extra clauses.
3. When the server replies with its `# logresp` line the state becomes *logged in*. If **Beacon on connect** is set, a beacon is sent now.
4. A `#keepalive` line is sent every 240 seconds so that routers and the server keep the connection open.

Reconnection

- If the server closes the connection, or nothing is received for 30 seconds, the app reconnects at once.
- After a connection error it waits 10 seconds and tries again, indefinitely, until you disconnect.
- A watchdog alarm every 9 minutes pings the server and forces a reconnect if the connection has silently died — this catches mobile networks that drop idle connections without telling the phone.
- A background job every 15 minutes restarts the service if Android has killed it.
- With **Auto-reconnect** on, a change of network (for example leaving Wi-Fi) triggers a clean reconnect.
- Tapping disconnect stops all of this until you connect again.

KISS TNC over TCP/IP

Connects to any TNC that offers KISS over a TCP socket — most commonly **Direwolf**, but also hardware TNCs with a network port, soundmodem and similar. Open **Menu → APRS Connections → KISS TNC TCP/IP**.

Field	Description
TNC Host	Host name or IP address. Default `localhost` (Direwolf running on the phone, e.g. in Termux). For Direwolf on a Raspberry Pi use its LAN address, e.g. `192.168.1.50`.
Port	TCP port. Direwolf's default KISS port is `8001`.

Tap **Connect**. The host and port are remembered. The app sends standard KISS data frames on port 0 (FEND/FESC escaping as per the KISS specification) and accepts frames from the TNC. APRS UI frames go into the packet stream; other AX.25 frames are passed to the packet terminal.

```
# direwolf.conf — make sure the KISS TCP port is enabled
KISSPORT 8001
AGWPORT 8000
```

> **Note.** The TCP KISS connection does not reconnect by itself if the TNC goes away; connect again from the menu. Received packets are handled by the background service, so reception and iGating carry on with the screen off or the app closed.

Bluetooth TNC (Classic / SPP)

For TNCs that use the Bluetooth Serial Port Profile: Mobilinkd TNC2/TNC3, many radios with built-in Bluetooth KISS TNCs (for example Kenwood TH-D74/D75, BTECH UV-Pro and similar), and Arduino/ESP32 home-brew TNCs.

1. Pair the TNC first in Android **Settings → Bluetooth**. If no paired devices are found the app offers **Open BT Settings**.
2. Open **Menu → APRS Connections → Bluetooth TNC**.
3. Choose the **Protocol**: **KISS** for binary KISS framing (almost all modern TNCs) or **Text** for TNCs that output monitored packets as text lines in TNC2 format (`CALL>DEST,PATH:info`).
4. Tap the device in the list. The app connects and remembers the device and mode.

While connected, the dialog shows **Disconnect** at the top of the list. In Text mode, lines that contain both `>` and `:` are treated as packets; everything is also shown in the Text Terminal. Bluetooth TNC packets are processed by the background service, so they keep arriving with the

screen off or when you are using Android Auto.

For connected-mode packet (the AX.25 terminal) the app inserts small gaps between frames on Bluetooth so that half-duplex radio TNCs have time to switch between receive and transmit.

BLE TNC (Bluetooth Low Energy)

For radios and TNCs that carry KISS over Bluetooth Low Energy. Three BLE serial profiles are supported, and the app uses whichever the device offers:

- **Nordic UART Service** — VGC VR-N76, Radioddity GA-5WB, ESP32 and LoRa APRS trackers and most BLE TNCs.
- **Mobilinkd BLE KISS** — Mobilinkd TNC3 and TNC4, kv4p-ht, and the BTECH UV-PRO (which may advertise itself as *UV-P*).
- **Radtel BLE KISS** — Radtel RT-950 Pro and radios using the same FFE0 service.
- **HM-10 style serial modules** — home-built TNCs with a cheap BLE serial adapter.

BLE devices do not need to be paired first. A radio accepts only one BLE connection at a time, so disconnect the maker's own app before connecting.

1. Open **Menu → APRS Connections → BLE TNC**. Scanning starts immediately and the title shows how many devices were found.
2. Each device is listed with its name, address and signal strength (RSSI). Only devices advertising one of the supported services are shown.
3. Tap a device to connect. The status line shows which profile was found. The app subscribes to the receive characteristic and sends KISS frames in 20-byte chunks, each confirmed by the TNC when it supports that.

The list stays open while the app connects and its status line shows progress. A failed attempt is retried twice; if the link still cannot be set up within 20 seconds the reason is shown:

- *Could not connect* or *The radio closed the connection* — the radio is usually busy with another connection: its own app, another phone, or this phone over Bluetooth Classic. Disconnect that first. A radio's KISS TNC also has to be switched on in its menu.
- *The radio hung up straight after connecting (status 19)* — the radio accepted the link and then dropped it. The usual cause is that the radio is paired in Android's Bluetooth settings (for example for Bluetooth Classic use): BLE KISS radios such as the UV-PRO are meant to be connected directly from the app, so choose Forget/Unpair there and connect again. Its own app must be closed too.
- *The radio wants to be paired first* — accept the pairing request, or pair the radio in Android's Bluetooth settings, then connect again.
- *No BLE KISS service found* — the device offers none of the supported services. Such a TNC may need to be used in Bluetooth Classic mode instead.

Radio Control (UV-PRO, GA-5WB, VR-N76, VR-N7500)

Radios with Benshi firmware — BTECH UV-PRO, Radioddity GA-5WB, Vero VR-N76 and VR-N7500 — can be controlled from the app over Bluetooth LE. Connect the radio as a BLE TNC once, then open **Menu → APRS Connections → Radio Control**; the app remembers the radio, so later it works even when the BLE TNC is not connected. The app reads the radio's memory channels and lists each with its name, receive frequency, offset, CTCSS/DCS tone, bandwidth and power; **A** and **B** mark the channels selected now. Tap a channel and confirm to select it on VFO A — for example to move to the APRS channel, or to 145.825 MHz for an ISS pass.

Only the selected channel is changed: the app reads the radio's settings, changes the channel number and writes them back unchanged otherwise, then reads them again to check. Channel contents are only read, never written. The protocol follows the open benlink project. If a radio does not answer, close the window and open it again; a radio connected over Bluetooth Classic only, or another make, shows a message that it has no control service.

AGW Interface

Connects to the AGWPE API offered by Direwolf, AGWPE, UZ7HO soundmodem and similar. Open **Menu → APRS Connections → AGW Interface** and enter the **Host** (default `localhost`), **Port** (default `8000`) and **Radio Port** (0 = the first radio). On connect the app asks the engine for port information and turns on raw monitoring; it sends APRS packets as unproto frames with your digipeater path. The dialog lists the AGW frame types used for reference.

USB Serial TNC

For TNCs connected with a USB OTG cable: the **KV4P HT** (ESP32 handheld), CP2102, CH340 and FTDI based KISS TNCs, and Direwolf on another computer via a USB-serial link.

Field	Description
Protocol	**KISS** (default) or **Text**.
Baud rate	1200, 2400, 4800, **9600** (default), 19200, 38400, 57600 or 115200. Data format is fixed at 8N1.

Plug the device in, open **Menu → APRS Connections → USB Serial**, and tap **Connect**. Android asks for permission to use the USB device; allow it. When a recognised device is attached the dialog shows *Found: device name (manufacturer)*. A KV4P HT (CP2102, VID 0x10C4 / PID 0xEA60) is preferred if several devices are attached, and is reset through DTR/RTS when the port opens.

USB packets are received in the background service and can be gated by the RX iGate. Beacons are sent on USB, and so are messages and acks to stations heard on USB.

> **New in 1.8.2.** The USB KISS receiver now decodes escaped bytes correctly and handles back-to-back frames that share a single FEND delimiter.

Audio DSP TNC

Two speeds: **1200 baud** Bell 202 (mark 1200 Hz, space 2200 Hz) for VHF APRS on 144.800 / 144.390 MHz, and **300 baud** with 1600/1800 Hz tones for HF APRS (for example 10.1476 MHz LSB, as Direwolf's MODEM 300). Choose with the chips in the Audio TNC window; the choice is remembered. On HF, tune so the signal sits on the two lines in the waterfall — within about 30 Hz; further off, decoding falls away.

A complete 1200-baud Bell 202 AFSK modem in software, using the phone's microphone input and audio output. It lets you receive — and transmit, with a suitable interface — without any TNC hardware.

Item	Value
Modulation	Bell 202 AFSK, mark 1200 Hz, space 2200 Hz, 1200 baud, NRZI, HDLC framing
Sample rate	22 050 Hz, 16-bit mono. The phone's unprocessed audio input is used where it has one (otherwise its voice-recognition input), avoiding the automatic gain and noise suppression meant for speech.

Item	Value
Demodulator	Tone correlators over one bit for each tone, separate automatic level control for mark and space (so radio de-emphasis or pre-emphasis doesn't matter), and a digital PLL that keeps the bit clock locked to the incoming signal. CRC-CCITT checked; frames 18–400 bytes.
TX preamble	45 flags (300 ms) before the frame, so a VOX has time to open; 5 after, plus 0.25 s silence. Frames sent together go in one transmission.
TX level	Fixed 90% of full scale; adjust with the phone's **media** volume
PTT	Not keyed by the app — use the radio's VOX or a VOX-keyed interface

The dialog contains a live **waterfall** (0–3400 Hz, mark and space marked) so you can see the two tones and set levels. It adjusts itself to the input level: the background noise shows dark blue and signals up to 50 dB stronger run through green and yellow to red. The dialog also shows the last eight received packets, and a transmit box pre-filled with a test position packet.

- **Start RX / Stop RX** — start or stop listening (microphone permission needed).
- **Transmit** — modulate and play the packet in the transmit box.
- **Loopback** — encode, modulate and decode the packet entirely in software to prove the modem works without any radio.
- **Keep Running** closes the dialog and keeps receiving in the background; **Stop & Close** stops it.

Wiring: radio speaker or data output to the phone's microphone input (through an attenuator and isolation as needed) and the phone's headphone output to the radio's microphone input, with VOX on the radio. Commercial APRS audio cables with a TRRS plug are available for most handhelds.

> **New in 1.8.2.** Received audio packets now keep every byte of the information field, so Mic-E and compressed positions decoded by the Audio TNC are correct.

> **Important.** Transmitting through the audio TNC keys your radio through VOX. Check the deviation on a second receiver and keep the media volume at the level that gives clean decoding — overdriven audio is the commonest cause of packets not being heard.

TNC Bridge — the phone as a network TNC

Menu → APRS Connections → TNC Bridge lets a program on a PC use the radio the phone is connected to: Xastir, YAAC, APRSIS32, PinPoint, Outpost, a BBS or node program — anything that can use a KISS TNC over TCP/IP. Choose the radio interface (any connected one: Bluetooth, BLE, USB, TCP KISS, AGW or the audio modem) and a port (default 8001), and tap **Start bridge**. The window shows the phone's network address; in the PC program choose a KISS TCP/IP TNC at that address and port.

- Every frame the radio receives is passed to the program, and the program's frames are transmitted.
- Up to four programs can be connected at once. KISS settings commands (TXDELAY, persistence…) are ignored: the radio or TNC keeps its own.
- The app carries on as usual alongside — map, messages, iGate and terminal all keep working.
- The bridge runs until you stop it or the app is closed. The phone and PC must be on the same network (Wi-Fi, or the PC on the phone's hotspot or USB tethering).

> **Important.** While the bridge runs, any device on the network can transmit through your radio. Use it only on your own network, and stop it when you have finished.

Text Terminal

Menu → APRS Connections → Text Terminal opens a plain serial terminal on the Bluetooth TNC (or the USB TNC if Bluetooth is not connected). Use it to talk to a TNC's command interpreter, to check that data is arriving, or with Text-mode TNCs. Received text is green, what you send is in the accent colour, status lines are amber. Each line you send ends with a carriage return. The terminal keeps the last 500 lines; **Clear** empties it.

CHAPTER 7

The Map

The map shows every station with a position, coloured symbols, your own home marker, and a range of overlays. It is drawn on a fast canvas, so it stays smooth with hundreds of stations.

Gestures

Gesture	Action
Drag	Pan the map.
Pinch	Zoom smoothly between level 2 (whole world) and level 18 (street level).
Tap a station	Open **Station Detail** (the nearest station within about 40 px).
Tap your home marker	Open your own station details.
Tap a cluster	Zoom in two levels centred on the cluster.
Tap a waypoint	Offer to remove it.
Tap a KML point	Show its name and description.
Long-press (0.6 s)	Open the **Drop Waypoint** dialog for that spot.

Toolbar

A scrolling toolbar runs along the bottom of the map. From left to right:

Button	Action
+ / −	Zoom in or out one level.
⌂ **Home**	Centre on your QTH at zoom 10 and redraw the filter circle.
⊞ **Fit**	Centre the map on all stations and choose a zoom level that fits them.
GPS (location pin)	Centre on your last GPS fix.
Search (magnifier)	Find a station by callsign (see below).
TX	Send a position beacon now.
GPS indicator	*No Fix*, *Stale* (more than 120 s old) or ±*N m*. Green ≤ 20 m, amber ≤ 50 m, orange beyond. Tap for latitude, longitude, accuracy, altitude, speed and fix age.
Measure	Tap two points to draw a dashed line with distance and bearing. Tap Measure again to clear.
Near Me	List the 15 nearest stations to your QTH with distance and comment; tap one for details.
Address (postbox)	Search for a place, address or postcode (OpenStreetMap Nominatim, up to 5 results).
Labels	Show or hide callsign labels (on by default).
Trails	Show or hide station trails. Trails keep being collected while hidden.
Digi	Draw approximate 50 km coverage circles around digipeaters (callsigns containing MB7 or GB7, or starting DIGI).
RPT	The nearest UK repeaters, from the ETCC list (see Radio Tools → UK Repeaters, chapter 15).

Button	Action
Rings	Choose distance rings of 10, 25, 50, 100 and/or 200 km around your QTH (Show), or remove them (Clear).
WPT	Delete all waypoints.
Map / OSM / Sat / Topo	Choose the base layer (remembered between sessions).
Cluster	Turn clustering of nearby stations on or off.
Radar	Show the latest weather radar (rain and snow) over the map, refreshed every 10 minutes, from RainViewer. Radar images go down to about county scale; closer in they are enlarged.
Station count	*N stn* and activity bars ○○○○○ to ●●●●● (packets per minute: 0, <1, <5, <15, <30, 30+), plus RX-iG / TX-iG counts.
⚡ **N mph**	Current speed, shown when SmartBeaconing is on.
All / Pos / Msg / WX / Obj	Show only stations of that type on the map. The same filter applies to the Packets list.

Base layers

Layer	Source	Best for
Map	CARTO Voyager	Clean general-purpose map; default
OSM	OpenStreetMap standard	Detail, road names, footpaths
Sat	Esri World Imagery	Aerial photography
Topo	OpenTopoMap	Contours and terrain — portable and hill-top operating

Use **Menu → Tools → Offline Tiles** to pre-load an area before going somewhere without coverage. Downloaded tiles are used by the map automatically, and when the phone is offline they stand in for whichever layer is selected (chapter 18).

What is drawn

- **Stations** with their APRS symbol (emoji or official sprite set). Overlay characters are drawn on top of the symbol. Weather stations always show the weather symbol.
- **Age fading**: full colour if heard in the last 10 minutes, 75% under an hour, 45% under three hours, 25% after that.
- **Labels** under each symbol. Objects and items are labelled with the object name, not the sender.
- **Clusters** below zoom 12 when stations are within 30 px of each other — a circle with the count.
- **Trails** — the last 30 positions of each moving station as fading cyan dots.
- **Your home marker** with your beacon symbol and callsign in yellow (blue in the light theme), and your own beacon trail in magenta (last 50 beacons).
- **Filter circle** — dashed yellow circle showing the APRS-IS range filter.
- **Track Log** (green, with a chequered flag at the start) and **station track history** (yellow) when you choose to show them.
- **Waypoints** (orange), **KML** points and lines, **distance rings** (cyan dashed), **scale bar**.
- At most 300 stations are drawn at once; the rest are still in the station log.

Finding a station

Tap the magnifier and enter a callsign (with or without SSID). **Find** looks for an exact match, then any SSID of the same callsign, then the station log, and centres the map at zoom 14. If the station is unknown — perhaps outside your filter range — **Search APRS-IS** opens it on aprs.fi in the browser.

Drop Waypoint dialog

Long-press anywhere on the map. The dialog shows the coordinates and Maidenhead locator of the point.

- **Drop Waypoint** — add a named waypoint (default name *WPT*). Waypoints are saved.
- **APRS Object** — create an APRS object at this point (chapter 12).
- **More… → Copy Coordinates** — copy the latitude and longitude to the clipboard.
- **More… → Set Filter Centre Here** — move your QTH / filter centre to this point.

Map overlays (KML, KMZ and GeoJSON)

Menu → Radio Tools → Map Overlay draws a file on the map — an event route and checkpoints, a search area, club sites — exported from Google Earth, Google My Maps, geojson.io, a mapping app or an event organiser. It reads `.kml`, zipped `.kmz` and GeoJSON (`.geojson` / `.json`) files.

- Named points become map points with their descriptions.
- Lines are drawn in the file's own colours (KML line colour, or the GeoJSON *stroke* property); polygons are drawn as their outlines, and multi-part shapes are drawn in full.
- The map zooms to fit the overlay when it is loaded.
- The overlay stays on the map, also after the app is restarted, until you choose **Map Overlay** again, which removes it.

Map replay

Menu → Tools → Map Replay plays the last hour, 6 hours or 24 hours back on the map: every station where it was at each moment, with its trail so far, faded by how old its position was then. Drag the slider to any time, ▶ / ⏸ to play and pause, **1m/s** to change speed (1, 5 or 20 minutes a second), ✕ to return to the live map. It uses the positions the app has kept — up to 500 per station since it started. Live packets go on arriving while you watch and appear when you close it.

Night mode

The ☽ button in the status bar is designed for night driving and dark-adapted operating: it switches to the dark theme and a dark version of the CARTO map and drops screen brightness to 15%. Tap ☽ again (or the theme button) to return to normal. **Menu → Export → Theme Schedule** can switch between the light and dark themes automatically at sunrise and sunset at your QTH (checked every five minutes).

CHAPTER 8

Stations, Packets and Station Detail

Packet explained

Long-press a packet on the Packets screen, or tap **Explain this packet** under RAW in Station Detail, to see the packet taken apart: who sent it; the software it came from (read from the destination, such as APDR = APRSdroid); each step of the path — WIDE1-1 fill-in hop, WIDE2-1 with hops left, * where it has been repeated, qAR and the iGate that gated it; the kind of packet from its first character; and every value decoded — position and any ambiguity, locator, symbol, speed and heading, altitude, PHG, weather, telemetry, message text and ID, status and comment. **Copy** puts the raw packet on the clipboard.

Station Detail

Station Detail opens when you tap a station on the map, a row in the station log, a packet or a conversation header. It shows the most recent information for that station, arranged in sections. Long-press any value to copy it.

Section	Contents
Header	Callsign (or object name) in large type, packet type, the sending station for objects, and the interface it was heard on (APRS-IS, KISS TNC, Bluetooth TNC, BLE TNC, AGW, USB Serial TNC, Audio DSP TNC).
POSITION	Grid square, latitude and longitude, distance and bearing from your QTH.
MOTION	Course, speed and altitude (in your chosen units).
COMMENT	The station's comment text.
WEATHER	Temperature in both units, wind direction, speed and gust, humidity, pressure, rain.
MESSAGE	Addressee and text, for message packets.
PHG	Power, antenna height and gain, if the station sends PHG.
PATH / RAW	The digipeater path and the complete raw packet. **Show path on map** draws the route the packet took (see below).

Below the sections are action buttons. Only those that apply are shown:

- **Telemetry History** — chart of the station's analogue telemetry channels, named and scaled from its PARM, UNIT and EQNS definitions where it sends them.
- **Track History (N positions)** — draw the station's movement on the map.
- **Weather History** — charts of temperature, wind, pressure and so on (up to 30 days).
- **QRZ.com** and **APRS.fi** — open the station on those sites.
- **Look up CALL (HamQTH)** — name, QTH, country, grid, zones and QSL details shown in the window itself. HamQTH.com is free but needs an account: the first lookup asks for your HamQTH user name and password, which are kept on the phone only. Change or remove them in **Settings → Station**.
- **Log QSO** — open the QSO log with the callsign filled in.
- **Watch / Watching** — add to or remove from the watch list.
- **Position history** — the last five positions with time and distance.
- **Message CALL** — open the conversation with this station.

- **Map** — back to the map, centred on the station (when it has a position).
- **Share** and **Copy All** — the station's details as text.
- **Find** — an arrow that points at the station, using the phone's compass, with the distance, whether you are getting closer, and how long ago its position was heard. It follows both your position and the station's as they change — useful for meeting up, events and fox hunts. On a phone without a compass the arrow is drawn with north up.
- **ISS** and **Sun** — ISS passes and sunrise/sunset for the station's location.

Show path on map draws a dashed orange line from the station through each digipeater that repeated the packet to the iGate that put it on APRS-IS — or to your own station if you heard it on RF — with an arrow on each hop. Generic path entries such as WIDE2 say nothing about who repeated the packet and are skipped, as are digipeaters whose position the app has not heard. The line clears itself after three minutes.

Stations tab (station log)

The **Stations** tab lists every station heard — one card per callsign — and is the best way to see what is around you. The header shows the number of stations matching the current filters, and a statistics line gives the session length, how many have positions or weather, and the most active station.

Control	Function
Search	Filter by callsign or comment text.
All / **Pos** / **WX** / **Mobile**	All stations; those with a position; weather stations; or moving stations (position and more than one packet).
All / **IS** / **RF**	Where the station was heard.
Recent / **First** / **Call** / **Count** / **Distance**	Sort order (Call: by callsign). The choice is kept.
Clear	Empty the station log.

Each card shows the type icon, callsign, source, last heard time, packet count, badges for position, weather and telemetry, distance, bearing and grid, and the last comment. Tap a card for **Packet History**, **Station Detail**, **Centre Map** or **Weather History**. Packet History lists the station's recent packets newest first, colour-coded by type; tap one to see its raw text.

The station log is saved and reloaded when the app starts; stations not heard for seven days are dropped.

Packets screen

Menu → Packets is a live list of decoded packets (up to 300 shown). Each card shows the time, a type code (POS, MSG, WX, OBJ, ITM, TLM, STA, QRY), a source pill (IS, KISS, BT, BLE, AGW, USB, AUDIO), the callsign, distance, symbol, and decoded position, motion, weather, message or comment lines.

- **All** / **IS only** / **RF only** and the type chips filter the list; the search box filters by callsign or comment. RF covers every radio interface, including USB and the Audio TNC.
- **Auto** (on by default) keeps the list at the newest packet. Turn it off to read: the list then holds its place while new packets arrive above.
- Tap a packet for Station Detail; long-press it for **Packet explained** (below).

- **Raw** switches to a raw-text view, one line per packet, coloured by type; your own transmissions start with >> and are red. In raw view **Save** writes the list to a text file and shares it.
- **Clear** empties the packet list.

WX Stations

Menu → Tools → WX Stations lists every weather station heard, nearest first, with temperature, wind and humidity. Tap one to see its weather history charts.

Station Export

Menu → Export → Station Export saves the station log as a **CSV spreadsheet** (callsign, first and last heard, packet count, source, position, grid, distance, comment) or a **KML map file** of the stations with positions, and opens the share sheet.

CHAPTER 9

Messaging

Conversations, acknowledgements, bulletins and e-mail forwarding.

APRS messaging is two-way text of up to 67 characters, with acknowledgement. The app keeps your conversations as threads, retries messages that are not acknowledged, acknowledges messages sent to you, and alerts you when one arrives.

Messages tab

The tab has two views:

- **Traffic** — every message the app has overheard, including those between other stations. Messages you sent are blue on the right, messages to you are green, others are grey and labelled *FROM → TO*. Use **Filter…** to search. **Flat** lists messages in time order; **Grouped** gathers them into conversations (*A ↔ B*), most recently active first. Long-press to delete.
- **My Messages** — your conversations, one per station, newest first, with a preview of the last message and an unread count. The search box finds conversations by callsign or message text. Tap to open; long-press to delete the whole conversation.

Starting a conversation

Tap **New Message**, type the callsign (with SSID if the station uses one — APRS messages go to an exact callsign-SSID) and tap **Open**. You can also start from **Message CALL** in Station Detail.

The conversation screen

The header shows the station's callsign, distance and direction, and the interface it will be messaged on (*via APRS-IS*, *via Bluetooth TNC* and so on). **ℹ** opens Station Detail; the share button exports the whole thread as text. □ / □ mutes the station: its messages still arrive, are acknowledged and kept, but without a notification, spoken alert, tone or Android Auto read-out — for a chatty service or net. Muted conversations show □ in My Messages.

Your messages are on the right, theirs on the left. Consecutive messages within 30 seconds are joined into one bubble. The status of each of your messages is shown at the start of the bubble:

Mark	Meaning
□	In the **outbox** — nothing was connected; it goes by itself as soon as APRS-IS or a radio connects.
hourglass	Sent, waiting for an acknowledgement (retries in progress).
✓✓	Acknowledged by the other station.
✗	Failed — no acknowledgement after all retries, or rejected by the other station.

Received messages show the time and *ACK sent*. Long-press a bubble to copy or delete it; for your own messages it also offers **ℹ Delivery details** — for each message (or each part), the interface it went out on, how many tries it took, when it was acknowledged and which way the acknowledgement came back. **Tap a failed message (✗)** — or choose **↻ Send again** — to send it again without retyping; a long message's failed parts go again in order.

Composing

- The button lets you speak the message: the words are added to the text box so you can check them before sending (needs the phone's speech recognition, usually Google).
- One APRS message holds **67 characters**. You can type more (up to 300): the counter then shows how many messages it will take (*120 · 2 messages*), and the text is split between words and sent **in order** — each part only once the one before has been acknowledged (or has given up), so they can't arrive jumbled. If a part fails, the rest are kept as failed messages to send again. The same applies to long replies from the watch, the car and notification replies. The characters `{`, `|` and `~` cannot be typed: APRS does not allow them in message text.
- Above the text box the app shows the packet that will be sent, for example `G7JJF>APZGJJ,…::G4XYZ :Hello{nn`. The path (…) and message number (nn) are filled in when it is sent — APRS-IS, or the RF interface the station was last heard on.
- The **templates** button offers saved phrases: templates saved for this station (**+ Save new template**, long-press to delete) and the global ones (nine built in — QRV, QRT, QSY, PSE QSL, TNX 73 and so on). `{CALL}`, `{GRID}`, `{TIME}` and `{DEST}` are replaced by your callsign, locator, the time (HHmm) and the station you are messaging. **Edit global templates** — or **Menu → Messaging → Message Templates** — adds and removes global ones.
- The **position** button inserts your QTH as `Posn: dd.dddddN,ddd.dddddW`.
- Tap the **send arrow** to send. **Long-press** it for a route override: **Force APRS-IS** or **Force RF** (every connected RF interface).

Delivery, acknowledgement and retries

Each message is sent with a message number, `:ADDRESSEE:text{N`. If no acknowledgement arrives the message is sent again after 30 s, then after a further 60, 90, 120 and 150 s — six transmissions in all, over 7½ minutes — and then marked failed. An acknowledgement or a reply-ack at any point stops the retries and marks the message ✓✓. A reject (`rej`) marks it failed at once.

Outbox. A message sent with nothing connected is not lost: it waits in the outbox () and goes out — with the usual retries — as soon as APRS-IS or an APRS radio interface connects, checked every 10 seconds. Handy when portable with patchy coverage. A conversation with a message waiting shows before its preview in the list. While anything is waiting, a **Outbox** row at the top of My Messages shows how many; tap it to see them all, oldest first (the order they will go), and tap one to open its conversation or delete it — or **Delete all**.

Reply-acks. With a station that uses APRS 1.1 reply-acks, the app uses them too: each of your messages also carries the number of that station's last message, so if your separate acknowledgement was lost, the reply confirms it. Other stations get plain message numbers, as before.

Message numbers carry on from the last one you sent, even after the app restarts, so a new message never shares a number with an old one.

Forced sends (route override) go out once, without retries. They are still marked ✓✓ when an acknowledgement arrives, and failed if none arrives within the same 7½ minutes or if no suitable interface was connected.

> **New in 1.8.2.** Forced (APRS-IS / RF) messages can now be acknowledged; previously they stayed in the waiting state for ever.

Receiving

- A message counts as yours if it is addressed to your callsign-SSID or to your plain callsign.
- Messages with a number are acknowledged automatically on the interface the sender was heard on.
- **Reply-acks** (APRS 1.1, `{MM}AA`) are understood: a reply carrying the number of your message acknowledges it.
- **Duplicates** — the same message number from the same station, usually a retry because your ack was lost — are acknowledged again but not shown, notified or forwarded twice.
- You get a high-priority notification with a **Reply** action so you can answer from the notification shade. Tapping the notification opens the conversation.
- Optional extras: a short beep (**Message audio alert**), an automatic beacon (**Auto-beacon on message**) and forwarding by e-mail (**Email Gateway**).

Auto-reply

Settings → Alerts → Auto-reply answers messages for you — for example *Driving at the moment - will reply later. 73*. Choose **Always**, or **In Android Auto** to answer only while the phone is connected to the car. Each station gets at most one auto-reply an hour. The reply starts `AA:`, the usual sign of an automatic answer, and a message that itself starts `AA:` is never answered, so two stations with auto-reply on cannot keep answering each other. Service robots (JOKE, MPAD, EMAIL-2, APRS2SOTA and the like) are never answered either: only callsigns of the amateur form (a prefix, a digit and up to four letters) get a reply. Incoming messages are still acknowledged, notified and stored as usual.

Bulletins

Bulletins are messages addressed to `BLN0`–`BLN9` (general bulletins), `BLNA`–`BLNZ` (announcements), named groups such as `BLNWX`, or `NWS…` (US National Weather Service alerts). **Menu → Bulletins** lists those received over APRS-IS or RF, newest first — NWS in red, announcements in cyan. Bulletins from the last 48 hours are kept between sessions.

Every new bulletin raises a normal notification; repeats of a bulletin you already have do not. If its text contains one of your **Bulletin alert** keywords it raises a high-priority *APRS ALERT* instead.

Sending a bulletin

Tap **Send** on the Bulletins screen. Choose the **Bulletin ID** (chips for BLN0, BLN1, BLN2, BLNWX, BLNEMG, or type your own, up to five characters after BLN) and the text (up to 67 characters). The bulletin is sent on APRS-IS and on every connected RF interface with your RF path. Bulletins are not acknowledged; repeat important ones a few times over the following hour.

Group Broadcast

Menu → Tools → Group Broadcast sends the same message individually to a list of callsigns (separated by commas or spaces). Each copy is an ordinary message with its own number, acknowledgement and retries.

Email Gateway

Menu → Messaging → Email Gateway forwards every APRS message addressed to you to an e-mail address, so you can follow your APRS traffic from your desk. This is your own SMTP forwarding — not to be confused with the EMAIL-2 APRS service, which sends e-mail *from* APRS (see APRS Services).

Field	Description
Enable	Turn forwarding on or off.
SMTP Host / Port	Your mail provider's outgoing server. Port **587** uses STARTTLS; port **465** uses SSL (turn on *Use SSL*). Examples: smtp.gmail.com 587, smtp.office365.com 587, smtp.mail.yahoo.com 465.
Require authentication	On for normal mail providers; off only for a relay that accepts mail without a login.
Username / Password	Your mail login. For Gmail and Yahoo create an **App Password** — your normal password will be refused.
From address	Sender address; blank uses the username.
Destination email	Where forwarded messages are sent.
Subject prefix	Added to the subject, default *APRS*.
Include sender position	Adds the sender's last known position and a map link.

Test checks the settings by sending a test e-mail; **Send Test** sends a sample forwarded message. Forwarded mail has the subject `[APRS] APRS msg from CALL` and contains the time, sender, your callsign, the text and optionally the position.

> **New in 1.8.2.** STARTTLS on port 587 is now supported, so Gmail and Office 365 work. The app will not send a password over an unencrypted connection: if a server on a non-SSL port does not offer STARTTLS, the send fails with an explanation.

> **Important.** The SMTP password is stored on the phone and is included in full backups. Use an app-specific password, and keep backup files private.

CHAPTER 10

Beaconing

Fixed and SmartBeaconing position reports — exactly what is sent, and when.

A beacon is a position report: your callsign, position, symbol and comment. Other stations see it on their maps and APRS-IS sites such as aprs.fi. The app can beacon automatically, at a fixed interval or with SmartBeaconing, and on demand with the **TX** button.

The beacon packet

```
CALL-SSID>APZGJJ,TCPIP*:=5309.27N/00100.73W-Comment Bat:85% /A=000150
CALL-SSID>APZGJJ,WIDE1-1,WIDE2-1:=5309.27N/00100.73W-Comment          (RF copy)
```

- `APZGJJ` is the app's destination (tocall), which identifies the software on aprs.fi and similar.
- `=` marks a position report from a **messaging-capable** station, so others know they can message you.
- Latitude and longitude are uncompressed, rounded to a hundredth of a minute (about 18 m).
- The symbol table and code come from Settings. When you are stationary (under about 3 mph) the car symbol is sent as a house.
- The comment, plus `Bat:NN%` and `/A=NNNNNN` (feet) if enabled, is limited to 43 characters.
- On APRS-IS the path is `TCPIP*`; on RF it is your RF path.

> **New in 1.8.2.** Beacons now use `=` (messaging capable) instead of `!`, and positions are rounded correctly — a value such as 59.996 minutes is now sent as the next whole degree rather than as 60.00 minutes.

Where beacons go

Every beacon is sent on every connected interface: APRS-IS if logged in, and each connected RF interface (KISS, Bluetooth, BLE, AGW, USB, Audio). Automatic beaconing only runs while at least one interface is connected.

Position source

- **QTH** — the fixed position from Settings → FILTER is beaconed every *interval* seconds. SmartBeaconing does not apply.
- **GPS** — the current GPS fix is beaconed. If the fix is stale (older than twice the interval, minimum 60 s) or there is none, the QTH is beaconed instead once the interval has elapsed. A QTH of 0, 0 is never beaconed.

Fixed interval

Set **Fixed** and an **Interval** in seconds. 0 disables automatic beacons. Please be considerate of the shared channel: 10 minutes (600 s) is plenty for a slow-moving station, 30 minutes (1800 s) for a fixed one.

SmartBeaconing

SmartBeaconing beacons more often when you are travelling fast and when you turn, and rarely when you are stopped or moving slowly, giving a good track for the minimum of channel use. Choose **Smart** in Settings and **GPS** as the position source.

Parameter	Value
Slow rate	Every 300 s (5 min) at 5 mph or less, including when stationary
Fast rate	Every 30 s at 60 mph or more
Between 5 and 60 mph	Interval falls linearly from 300 s to 30 s
Corner pegging	Extra beacon when the heading changes by 30° or more, moving at 3 mph or more, at least 10 s after the last beacon
Check rate	Every 10 s

At 30 mph, for example, the interval is 300 − (25 ÷ 55 × 270) ≈ 177 s. The map toolbar shows your current speed while SmartBeaconing is active.

> **New in 1.8.2.** SmartBeaconing was reworked: it no longer beacons every 10 seconds, it now sends turn beacons, and its rate is independent of the fixed interval setting.

Manual beacons

Press **TX** on the map toolbar to beacon immediately; the toast tells you whether GPS or QTH was used. The **APRS Beacon** Quick Settings tile and **Beacon Now** in Android Auto do the same from outside the app. **Beacon on connect** sends one beacon each time APRS-IS logs in.

After each beacon the home marker moves to the beaconed position, a magenta dot is added to your beacon trail, the widget is updated, and — for GPS beacons — a point is added to the track log if it is recording.

CHAPTER 11

iGate, Digipeater and Beacon Check

Linking RF and the internet, repeating local packets, and checking how your beacons get out.

An iGate links RF and APRS-IS. An **RX iGate** passes what it hears on the air to the internet, which is how packets from RF-only stations reach aprs.fi. A **TX iGate** passes internet traffic back to the air for local stations — mainly messages.

> **Important.** Running an iGate makes your station part of the APRS network infrastructure. Use a valid passcode, check that your RF path and TNC are configured correctly, and do not run a TX iGate where a well-sited one already serves the area.

RX iGate (RF → APRS-IS)

Turn on **Settings → RX iGATE → Enable RX iGate** and connect both APRS-IS and an RF interface. Every packet received on KISS, Bluetooth, BLE, AGW, USB or the Audio TNC is sent to APRS-IS with the `qAR` construct:

```
G4ABC-9>APDR16,WIDE1*,WIDE2-1,qAR,G7JJF-10:=5301.23N/00112.34W>...
```

Packets are **not** gated if their header contains `TCPIP`, `TCPXX`, `NOGATE` or `RFONLY`, or if they are third-party packets (information field beginning `}`). Your own packets heard back from a digipeater are not gated (they already went to APRS-IS directly), and the same packet heard again within 30 seconds — typically via another digipeater — is gated only once.

> **New in 1.8.2.** Packets received over TCP KISS and AGW now keep the `*` that marks the last digipeater used, so gated paths show correctly on aprs.fi.

TX iGate (APRS-IS → RF)

Turn on **Settings → TX iGATE → Enable TX iGate** with at least one RF interface connected. Only traffic received from APRS-IS is considered, and only when:

- **Messages** (if *Gate messages* is on): the message is addressed to a station that has been heard directly **on RF** within the *heard window* (default 30 minutes), is not addressed to you, and its sender has not itself been heard on RF in that time (if it has, the message is already on the air locally).
- **Positions** (if *Gate positions* is on): the sender is on your watch list and has been heard on RF within the heard window.
- The packet is not from you or your iGate callsign, and has no `TCPXX`, `NOGATE` or `RFONLY` in its header.
- No more than three packets per source station have been gated in the last 60 seconds.

Gated packets use the standard third-party format, so receiving stations can tell that they came from the internet:

```
G7JJF-10>APZGJJ,WIDE1-1:}M0XYZ>APRS,TCPIP,G7JJF-10*::G4ABC-9  :See you at 8{12
```

iGate identification and statistics

While the RX iGate is on and APRS-IS is logged in, the app identifies the iGate on APRS-IS every 30 minutes with the **iGate message** from Settings. If you use a separate **iGate callsign**, this is a position at your QTH with the standard iGate symbol (`I&`) and the message as its comment; if the iGate uses your own callsign, it is a status packet instead (skipped if you have set your own status text). It is sent on APRS-IS only.

The map's station badge shows **RX-iG:N** and **TX-iG:N** — how many packets have been gated in each direction this session. Every gated packet is also shown in Debug → Comms, marked `[iGATE→IS]` or `[iGATE→RF]`.

Fill-in digipeater

With **Settings → Digipeater** on, the app repeats RF packets whose next hop is **WIDE1-1** or your own callsign — the first hop of the usual `WIDE1-1,WIDE2-1` path — filling gaps in local coverage from a car or a hilltop. A packet is repeated on the interface it was heard on, once: a second copy heard within 30 seconds (direct or via another digipeater) is not repeated again. Your own packets, internet (TCPIP) and third-party traffic are never repeated.

The path is rewritten in the standard traceable way, so others can see who repeated it:

```
M0ABC-9>APRS,WIDE1-1,WIDE2-1:…   →   M0ABC-9>APRS,G7JJF*,WIDE1*,WIDE2-1:…
```

Digipeating needs a TNC in KISS mode (Bluetooth KISS, BLE, TCP KISS, AGW, USB KISS) or the audio modem; a TNC in text mode cannot send another station's packet. Each repeated packet appears in Debug → Comms as `[DIGI]` and in TX History as *Digi*.

> **Important.** Only run a digipeater where your licence allows it. In the UK, unattended operation may need a separate permit.

Beacon check — did my beacon get out?

With **Settings → Beacon check** on, and both an RF interface and APRS-IS connected, position beacons are sent **by RF only**, and the app watches APRS-IS for the copy an iGate passes on. It reports which digipeaters repeated the beacon and which iGate gated it, for example:

```
Beacon reached APRS-IS via MB7UGR → iGate M0SDM (4 s)
```

If no copy arrives within 2 minutes the report says so. The beacon is not sent to APRS-IS directly because the servers would then drop every iGated copy as a duplicate. Your own position still appears on your map, and the server filter is extended with your callsign so the copies reach you wherever you are. With no RF interface connected, beacons go to APRS-IS as usual.

Each result is shown briefly at the bottom of the screen and listed in **Menu → Logging & Tracking → Beacon Check**, newest first, with a summary of how many beacons got through and the iGates that heard you most. *Via a digipeater* means the beacon was repeated, but only by digipeaters that do not add their callsign to the path.

Results are kept for about a week of beaconing (the last 1,000) and survive a restart. Three buttons at the top of the window use them:

- **Map** (coverage map) — a dot on the map at each place you sent a checked beacon: **green** if it reached APRS-IS, **red** if it did not. Drive around with Beacon Check on and the map shows where your station gets into the network and where the gaps are. **Hide dots** removes them.

- **Clear** — deletes all results, for example before mapping a new antenna.

Who heard me — above the list, the digipeaters that repeated you and the iGates that gated you in the last 7 days, most used first, with a count. Where the app knows the station's position it adds the farthest distance it heard you from: for a digipeater, beacons where it was the first hop; for an iGate, beacons it heard directly with no digipeater in between.

CHAPTER 12

Objects

APRS **objects** are positions that are not stations — an event, a net control point, a hazard, a parking area. They appear on everyone's map under their own name with their own symbol, and carry the callsign of the station that created them.

Creating an object

Either long-press the map and choose **APRS Object**, or open **Menu → Tools → Objects Manager → + Add** and pick the position from **My GPS position**, **My QTH** or **Enter coordinates manually**.

Field	Description
Object Name	Up to 9 characters, e.g. `RALLY`, `NET-CTL`, `CAR-PARK`.
Comment	Up to 43 characters, e.g. `Talk-in 145.500 from 0900`.
Symbol	About 50 symbols grouped as vehicles, emergency, road, infrastructure, weather and people.
Overlay	Optional single letter or digit shown on the symbol.

Send transmits the object on APRS-IS and every connected RF interface with a UTC time stamp and draws it on your map. Objects you create are saved and **re-sent automatically every 10 minutes** so that they stay on other maps.

Managing objects

The Objects Manager lists your objects with symbol, position, grid and comment. Tap one for:

- **Edit comment & symbol** — change them and re-send.
- **Move to new location** — create the object again at the new position, then kill the old one.
- **Re-send now** — transmit immediately.
- **Kill (remove from APRS)** — send the object as *killed*, which removes it from other stations' maps, and delete it from your list. Long-press a row for the same.

> **New in 1.8.2.** Re-sent, edited and killed objects now always carry the correct symbol, overlay and comment, and killed objects disappear from the map when the kill is received.

Objects and items received from other stations are shown on the map under the object name, with the sending station given in Station Detail. A killed object or item is removed from the map.

CHAPTER 13

AX.25 Packet Terminal

Connected-mode packet to BBSs and nodes.

The AX.25 Packet Terminal makes **connected-mode** packet radio connections to BBSs, nodes and other stations — the traditional keyboard-to-keyboard packet that predates APRS. It works over every RF interface, including the phone's own audio modem.

Opening the terminal

Connect an RF interface, then choose **Menu → APRS Connections → AX.25 Packet Terminal**. Your **plain callsign** (without SSID) is used as the source callsign so that it matches BBS user records.

One connection per interface

Each RF interface — Bluetooth, BLE, TCP KISS, AGW, USB and the audio modem — has its own page in the terminal, with its own connection, terminal text and Monitor, so you can be connected to a BBS through one radio and a node through another at the same time. An interface on a packet radio frequency can be set to **packet only** (Settings → RF → RF Interfaces, chapter 5) so that no APRS goes in or out of it. The buttons under the title choose the page:

Button	Meaning
● **BLE GB7NAS**	Connected to GB7NAS on that interface (shown in green).
◐ **BLE GB7NAS**	Connecting or disconnecting.
○ **BLE**	Interface connected, no link.
BLE (dimmed)	Interface not connected — nothing can be started there.
… (3)	Three lots of text have arrived on a page you are not looking at.

Connections stay up when you close the terminal window. Closing it tells you which links are still open; reopen the terminal to carry on, and anything received meanwhile is waiting on the page. A link ends when you press **Disconnect**, when the other station or the radio drops it, or when the app is shut down. The terminal opens on the page you used last, if it is still connected.

Layout

- **Title bar** — **Clear** (clears the current tab), **Raw** (hex dump of received frames, for diagnosis), **Save** (saves the tab you are looking at — Terminal or Monitor — to a file and offers it to share, e-mail or save to your storage) and ✕ to close the window (links stay up). All act on the interface page shown.
- **Interface buttons** — see above.
- **Terminal** / **Monitor** tabs.
- **Connect row** — the remote callsign (e.g. `GB7CPL-3`) and a button that reads **Connect**, **Cancel** while connecting, and **Disconnect** while connected. To connect through digipeaters, add them as on a TNC: `GB7NAS via MB7UGR` or `GB7NAS v MB7UGR,GB7DIN-8` (up to 8). The last entry is remembered for each interface.
- **Input box** — each line you enter is sent with a carriage return. Tap **Send** with the box empty to send just a return — for *Press return to continue* prompts and paged listings.

- **▾ (macros)** — a menu of saved commands; tap one to send it. **Edit macros…** opens a list to edit, one command per line (for example `ll 10`, `r 19350`, `B`). Macros are kept when the app closes and are included in a full backup.

Monitor tab

The Monitor tab shows every frame received or sent on that page's interface, connected-mode and APRS alike — time, addresses and path (`*` marks a digipeater that has repeated it), the frame type with N(S), N(R) and poll/final, and the information field:

```
19:42:07 GB7CPL-3>G7JJF [I(N(S)=2,N(R)=5,P)] pid=0xF0 "Msg# 1234 ..."
19:42:08 G7JJF>GB7CPL-3 [RR(N(R)=3,F)]
```

Frame types are I, RR, RNR, REJ, SABM, UA, DISC, DM, FRMR and UI. **P**, **F** or **P/F** shows the poll/final bit. Received frames are green and your own frames are in the accent colour; a saved Monitor file marks each line RX or TX instead.

Frames are collected all the time, whether or not the terminal is open, and the last 1,000 are kept for each interface until the app is closed — so the Monitor is also the place to look at what an interface has been hearing. The list follows new frames unless you have scrolled up. **Clear** and **Save** in the title bar act on the Monitor while it is showing.

A text-mode TNC (Bluetooth or USB without KISS) delivers decoded text rather than AX.25 frames, so its Monitor stays empty.

Connecting through the audio modem

Start the audio modem (**Menu → APRS Connections → Audio DSP TNC**) and choose the **Audio** page. The modem is half duplex: anything it decodes while transmitting, or within half a second after, is taken to be its own signal and ignored. Frames waiting to go out together — a window of I-frames, say — are sent in one transmission, so the radio keys up once. The radio is keyed by VOX, which takes a moment to open and to drop out, so on a busy or slow link raise **T1** a little (15–20 s) in Settings → RF → AX.25 Packet, and a smaller window (2–4) helps.

NET/ROM frames (PID 0xCF) are decoded too. A NODES broadcast is shown with the sender's alias and one line per route (alias:callsign, best neighbour and quality); network packets show origin, destination, time-to-live and the transport opcode — CONN REQ (with user and originating node), CONN ACK, CONN REFUSED, DISC REQ, DISC ACK, INFO (with sequence numbers and text) and INFO ACK, plus any CHOKE, NAK or MORE flags.

```
08:58:12 GB7NAS-7>NODES [UI] NET/ROM NODES from NASNOD
    NASBBS:GB7NAS-1 via GB7NAS-7 q=255
08:58:20 GB7NAS-7>GB7DIN-8 [I(N(S)=3,N(R)=5)] NET/ROM GB7NAS-4→GB7DIN-8 ttl=7 INFO cct=0345 S=
1 R=2 "..."
```

Your own frames appear as they are handed to the TNC. If a TNC holds a frame for more than two seconds (typically because it is waiting for a clear channel), the terminal reports *TNC took N s to accept the last frame*. While a frame is held, further acknowledgements are not queued up behind it: only one RR waits, and it carries the current N(R) when it goes.

How the link works

The terminal implements AX.25 version 2.0 connected mode (modulo 8) as used by BPQ32, LinBPQ, FBB, JNOS and most nodes:

Mechanism	Behaviour
Address format	The SABM goes out in the original (v1) format, which every node accepts. As soon as the node's own frames show AX.25 v2 command/response bits, the terminal uses them too: I-frames, polls and DISC as commands; acknowledgements, F=1 answers and UA as responses. v2 nodes such as BPQ only accept a poll answer that is marked as a response.
Connect	SABM with P=1, repeated every T1 up to N2 times. UA completes the link; DM means refused. A remote asking for SABME (modulo 128) is answered with DM so it falls back to SABM.
Sending	Text is split into I-frames of up to the configured length and up to *window* frames are sent before waiting for acknowledgement.
Receiving	In-sequence I-frames are shown and acknowledged with RR after the response delay (immediately if the frame had P set). An out-of-sequence frame causes one REJ; an old duplicate is acknowledged again.
T1 (ack timer)	If an acknowledgement is overdue, the oldest frame is resent with P=1 (or an RR poll is sent). Progress resets the retry count; N2 failures in a row drop the link with *Link failure*.
T3 (idle timer)	**300 s** — the value recommended in the AX.25 specification. After five minutes of silence the link is checked with an RR poll.
Busy	RNR from the other end pauses sending until it is ready again.
Disconnect	DISC, waiting for UA; after two unanswered T1 periods the link is closed anyway. A SABM received while connected resets the link.

T1, N2, window, frame length and response delay are set in **Settings → AX.25 PACKET**. The defaults (10 s, 10 retries, window 4, 128 bytes, 0.4 s) follow common TNC practice for 1200-baud links. T1 is the value for a direct link: when connecting via digipeaters it is stretched automatically to T1 × (1 + 2 × digipeaters) — 30 s via one, 50 s via two — because each one adds another trip over the air. On a poor or busy link a smaller window (1–2) helps.

Fixed values: T3 (idle-link poll) 5 minutes; disconnect gives up after two unanswered DISCs; on Bluetooth the app waits 0.6 s after the last received frame before transmitting and 150 ms between frames, so half-duplex radio TNCs can switch over. TX delay, persistence and slot time are set in the TNC or radio itself.

Status lines in the terminal tell you what is happening: *Connecting to X…*, *Retrying SABM (n/N)…*, *Connected to X*, *Connection refused (DM)*, *X ended the link*, *Link reset by X*, *Link failure — no response from X after N retries*, *Disconnected*.

> **New in 1.8.2.** The terminal was audited against the AX.25 specification: poll/final handling, T1/T3 timers, retry counting, REJ recovery and RNR were all corrected; T3 now defaults to 300 s; the header ✕ closes the terminal correctly; and the Monitor labels P and F bits.

> **Note.** Only outgoing connections are supported; an incoming connection request is refused with DM.

CHAPTER 14

APRS Services

Many useful APRS services are robots that you message: you send a short command and get the answer back as a message. **Menu → Radio Tools → APRS Services** gathers the common ones on one screen, with forms that build the commands for you and a command reference for each. Choose a service from the chip strip at the top. Answers arrive in **Messages** as a conversation with the service.

> **Note.** Commands go over APRS-IS when you are logged in, otherwise by RF to be passed on by an iGate — so they work from places with no phone signal. Each command is limited to 67 characters.

Service	What it does	Example
ANSRVR	Group announcements. Check in to the weekly **APRS Thursday** net, join, leave and list groups.	`CQ HOTG 73 from G7JJF`
CQSRVR	Send a CQ to a group (one per 30 minutes).	`CQ GROUP message`
WHO-IS	Look up a callsign (name and location from QRZ.com).	`G4ABC` or `F G4ABC`
EMAIL-2	Send a short e-mail; set up aliases.	`me@example.com Running late`
EMAIL	Simple e-mail gateway.	`address message`
SMSGTE	SMS text messages — USA and Canada numbers only.	`+15551234567 message`
WXBOT	US National Weather Service forecasts and METARs.	`IO93md today`
WXYO	International weather forecast by grid or callsign.	`IO93 tomorrow`
WXNOW	Current conditions at the nearest weather stations.	`n 3`
JOKE	Jokes, quotes and fortunes from APRSD.	
APRS OTA	On-the-air activity: host, chase and QSL activations.	`HOST description`
APSPOT	Self-spot POTA, SOTA and WWFF activations.	`! POTA G-0123 7.144 SSB`
APRS2SOTA	Spot a SOTA activation on SOTAwatch. Callsign must be registered at sotaspots.co.uk.	`G/CE-001 144.320 SSB`
FIND	Find a station's location.	`G4ABC`
REPEAT	Nearest repeaters to you.	`nearest`
UKRPT	Nearest UK repeaters from the ETCC list, by band, mode, locator or another station's position; one repeater's details. Distances in km or miles (remembered for your callsign). Buttons for 2 m FM, 70 cm FM, DMR, D-STAR, Fusion, MORE and miles/km.	`2M FM`, `70CM DMR IO93LC`, `INFO GB3NF`, `KM`
UKNODES	Nearest UK iGates, digipeaters, LoRa and packet nodes heard on APRS-IS in the last day; one node's details. Buttons for All, iGates, Digis, LoRa, LoRa iGates, Packet, 2 m APRS, MORE and miles/km.	`ALL`, `LORA IGATE`, `PACKET IO93LC`, `GB7CAM`
WLNK-1	Winlink e-mail via APRSLink.	`SP to$subject text`
NWS	Subscribe to NWS alerts by US ZIP code.	

Service	What it does	Example
MPAD	Worldwide weather by place, grid or your position, plus METAR/TAF, CWOP, satellite passes, repeaters, sun and moon times, DAPNET pager messages and more.	`Lincoln; gb tomorrow`
ISS	Next ISS pass for your last beaconed position — works over RF.	`pass?`
QRX	Mailbox: stores messages sent to you while you were off air and alerts you when you return. Register once with REG.	`I`, `R`, `RLY ALL`
APRS2TG	Message a Telegram user (they must have started the gateway's bot).	`msg @user text`
WTSAPP	Message a WhatsApp number.	`@+447700900123 text`
IRC	Chat channels over APRS.	`/join #lounge`
QUIZME	Amateur radio practice questions.	`Q`
ECHOMY	Replies with how many hops your message took and the distance — a path test.	`TEST`

Robots come and go: if one stops answering, the service may be off air. ISS and QUIZME in particular could not be confirmed as running when this manual was written.

APRS2SOTA — spotting from a summit

SOTA (Summits On The Air) activators post *spots* — summit, frequency and mode — on SOTAwatch so chasers can find them. The **APRS2SOTA** service sends the spot as an APRS message, so it works from a summit with no phone signal: over **RF** through any iGate that hears you, or over APRS-IS when you are logged in. Register your callsign once at sotaspots.co.uk; spots from unregistered callsigns are ignored.

1. Open **Menu → Radio Tools → APRS Services → APRS2SOTA**.
2. Enter the summit reference (e.g. `G/CE-001`), frequency (e.g. `144.320` or `7.032`) and mode (SSB, CW, FM, AM, DATA or DV). Add an operator callsign if it is not your own, and a short comment if you like. Everything except the comment is remembered for next time.
3. Tap **Spot me**. **QRT** tells chasers you have gone off air; **QSY** posts a new frequency.

The gateway acknowledges each spot, and the ack appears under APRS2SOTA in Messages. Keep beaconing on the way up — your positions show on aprs.fi and SOTA mapping sites.

CHAPTER 15

Radio and Operating Tools

The **Radio Tools** section of the menu contains utilities for general operating.

Propagation

Current solar and geomagnetic data from NOAA's Space Weather Prediction Center (falling back to hamqsl.com): Solar Flux Index, sunspot number, A and K indices and X-ray class, colour-coded green, amber or red, with a simple HF outlook (20/40 m, 10/6 m, aurora). The window waits for fresh data each time it opens; tap **Refresh** to fetch again.

ISS Passes

Predicts International Space Station passes for the next **5 days**, for passes higher than **10°**. From Station Detail it uses that station's position; from the menu it uses your GPS fix, or the filter centre if there is no fix. Orbital elements (TLE) are fetched from CelesTrak, with wheretheiss.at, AMSAT and ARISS as fall-backs, and kept for six hours; **Refresh TLE** forces a new download. If no source can be reached, the last TLE is used — a few days old still gives usable times.

Each pass shows the date, maximum elevation (green when 40° or more — the best passes), rise, peak and set times with compass directions and duration. A yellow dot marks a pass you can see with the naked eye: the sky is dark where you are and the ISS is in sunlight. Times are accurate to a few seconds.

The last line gives the Doppler shift in kHz at rise (AOS) and set (LOS) — the largest shifts of the pass; it passes through zero at the peak — for the APRS digipeater on 145.825 MHz and the cross-band repeater downlink on 437.800 MHz. Listen above the nominal frequency as the ISS rises and below it as it sets.

Pass reminder — in **Settings → ISS Pass Reminder** choose a minimum height (20°, 30°, 45° or 60°) and the app notifies you 10 minutes before each pass that rises that high, with its rise, peak and set times and directions. It uses your GPS position (or the filter centre) and works in the background while the app's service is running.

Satellite mode

The button under the pass list sets **satellite mode** for the current or next pass higher than 10°. Tune the radio on your RF interface to **145.825 MHz**. From the moment the ISS rises until it sets, the app sends your position on RF once a minute with the path **ARISS**, and then switches itself off. Tap the button again to stop sooner. It needs an RF interface used for APRS; it sends nothing to APRS-IS.

Stations heard through the ISS digipeater are listed under the button, and a notification tells you when your own beacon was repeated by the ISS. They are recognised by the ISS callsign marked as used in the path (`RS0ISS*`, `NA1SS*` or `ARISS*`).

> **Tip.** Use a short comment, and keep satellite mode to passes you are actually listening to — everyone in the footprint shares one channel for a few minutes, and a beacon a minute is the accepted maximum.

Barometer

On phones with a pressure sensor, **Menu → Radio Tools → Barometer** shows the air pressure, the change over the last three hours (steady, rising, falling, or quickly when 6 hPa or more) and a chart of the last 48 hours. A reading is taken every 10 minutes while the app's service runs. With a height set in **Settings → Phone Barometer** (or a GPS altitude) the figures are corrected to sea level, as weather maps show them; otherwise they are the pressure at the phone.

Set **Barometer report** to send the pressure as an APRS weather report every 10, 30 or 60 minutes, on APRS-IS and any connected RF interface. It is a positionless report, so your position and symbol are unchanged, and it carries pressure only — other fields are sent as "no data". Readings are best from a phone left still indoors; in a moving car, air vents and changes of height make them less reliable.

Sunrise/Sunset

Sunrise, solar noon, sunset and day length for today and tomorrow at your QTH (or a station's position), including polar day and night.

UK Repeaters

The UK repeaters nearest to you — from your GPS fix, or your QTH when there isn't one — from the ETCC's list on ukrepeater.net, nearest first (the same as the RPT button on the map toolbar). Each line shows the callsign, output frequency, modes and CTCSS tone, then the town, distance, direction and channel.

- **Band** and **mode** buttons narrow the list (2 m, 70 cm, 6 m, 23 cm, 10 m; FM, DMR, D-STAR, Fusion). Your choice is kept.
- Tap a repeater for its details: output and input frequencies with the shift, CTCSS, modes, channel, locator and distance. **Map** centres the map on it.
- The list is downloaded the first time and kept on the phone, so it works without signal. It is refreshed when more than a week old.
- **Update** downloads the list now; **Close** shuts the window.

Repeater data: ETCC / ukrepeater.net. Repeaters whose keepers asked for site privacy have only an approximate position.

RepeaterBook

For repeaters outside the UK: opens RepeaterBook's listings within 50 km of your position (or QTH) in the browser. RepeaterBook doesn't let apps download its data, so they aren't listed in the app.

Geo-Fence Alerts

Described in chapter 17.

DX Cluster

Connects to the DX cluster at `dxfun.com:8000` with your callsign and shows the latest spots (DX call, frequency, band, spotter), updating live. HF frequencies are in kHz as clusters post them (14025.0), VHF and above in MHz (144.174); the band is shown beside each. The header shows *Connecting…*, *Connected*, *Disconnected* or the error if the connection fails. Band chips filter the list (160 m to 2 m). Closing the window leaves the cluster connected, so spots keep arriving; reopen it to see them, and use **Disconnect** to close the connection.

Grid Square

Shows your QTH's six-character Maidenhead locator, and converts any grid square (e.g. `IO92kk`) to latitude and longitude with distance and bearing from you. **Show on Map** centres the map on it.

Passcode Calc

Calculates the APRS-IS passcode for any callsign as you type (the SSID is ignored). **Copy** puts it on the clipboard. You do not normally need this, because the app calculates your own passcode automatically.

SSID Reference

A table of the conventional meanings of SSIDs -1 to -15 (reproduced in the appendix).

CHAPTER 16

Logging

Packet Capture

Menu → Tools → Packet Capture records every packet received on any interface to a file, with its time (UTC) and the interface — for checking coverage, reporting a problem or keeping a record of an event. **Start recording** / **Stop recording**; each capture is a new file. Captures can be shared (**Share**) or deleted.

Replay plays a capture back into the map, station log and packet list — at real time, 10×, 60× or all at once. **Replay a file…** plays any text file of packets in the usual CALL>DEST,PATH:data form, such as a Stream Log or a raw export from aprs.fi. Replayed packets are only shown: they are never sent on, gated, digipeated, acknowledged or answered.

Event Board

Menu → Logging & Tracking → Event Board is for public service and club events — a marathon, a cycle ride, a rally, a search. Tap **Edit** to name the event, list the stations taking part (a call without SSID matches any of its SSIDs) and set the checkpoint radius (default 200 m).

Checkpoints are the named points of the current **Map Overlay** — load the route's KML or GeoJSON file first. A station has passed a checkpoint when one of its positions came within the radius; the board works this out from each station's recent positions and keeps a log with the times, which survives a restart.

The board shows	
Dot	Green: heard in the last 10 minutes · amber: 10–30 minutes · red: longer · grey: not heard.
First line	Callsign, how long ago it was heard, and its speed.
Second line	Checkpoints passed, the last one with its time, and the nearest checkpoint now.

Tap a station for Station Detail. ✉ **All** sends one message to every station (each to the SSID last heard). ⇪ **CSV** shares the checkpoint log as a spreadsheet file. **Clear log** empties it. The board refreshes every 10 seconds while it is open.

Track Log

Menu → Logging & Tracking → Track Log records your own GPS track. Tap **Record** to start; the app starts its own GPS listener and logs your position as you move (and with each GPS beacon). The header shows the number of points and the distance covered. Up to 10 000 points are kept.

- **Show on Map** draws the track in green with a chequered flag at the start.
- **Export GPX** writes `g7jjf_track.gpx` (GPX 1.1 with time, elevation, speed in m/s and course) and shares it — open it in Google Earth, Strava, OsmAnd and similar.
- **Clear Track** deletes all points.

QSO Log

A simple logbook. **+ Log QSO** (also available from Station Detail, the watch list and Repeater Detail) records callsign, name, QTH, grid, frequency (default 144.800), mode (default APRS), RST (default 59) and notes, with the UTC date and time. If you log the same callsign twice within an hour the app asks before adding a duplicate.

The search box filters the log by callsign, name, QTH, grid or notes as you type. Tap an entry to view it, **Edit** it or **Log Again**; long-press to delete. **ADIF Export** writes `g7jjf_qso_log.adi` (ADIF 3.1.0) for import into logging programs and LoTW/QRZ uploads; mode APRS is exported as the ADIF mode PKT, and the BAND field is worked out from the frequency.

> **New in 1.8.2.** QSOs confirmed through the duplicate prompt are now saved with the same defaults as other entries, and the ADIF BAND is taken from the frequency instead of always being 2 m.

Packet Rate

A graph of packets per minute over time, with current and peak rates. Useful for checking a filter or seeing how busy the channel is. It needs at least two minutes of data.

TX History

Menu → Tools → TX History lists everything the app has transmitted this session — beacons, smart beacons, messages, acks, objects and bulletins — with the time, the interface and the raw packet. Long-press to copy. Use it to confirm what actually went out.

Stream Logs

With **Record APRS stream** on (Settings → BEACONING), every line in the Comms monitor — received packets, your transmissions and iGate activity — is appended to a daily file `aprs_yyyy-MM-dd.txt`. The last seven days are kept. **Menu → Tools → Stream Logs** lists the files; tap one to share it. **Delete All** removes them.

CHAPTER 17

Watch List, Geo-fences and Alerts

Emergency beacon

Menu → Tools → Emergency beacon sends your position as an APRS **EMERGENCY** — the Mic-E "Emergency" status that radios, aprs.fi and other clients show as a distress call. Tick **This is a real emergency** to enable **SEND EMERGENCY**. It goes out on APRS-IS and every radio interface used for APRS, now and every 2 minutes, with your GPS position (or the QTH), speed, course and the word EMERGENCY. A TNC in text mode cannot send Mic-E, so it gets a normal position with EMERGENCY in the comment.

An ongoing notification shows while it runs; **Stop emergency** there, or the menu item (now *EMERGENCY ON — tap to stop*), ends it and sends one ordinary beacon so your last report is no longer an emergency.

> **Important.** Use it only when life or property is at risk. It does not call the emergency services — phone 999, 112 or 911 if you can. Anyone who hears it may do so on your behalf.

Emergency alerts

When the app hears another station's emergency — a Mic-E Emergency, or EMERGENCY in a position or status — it sounds an alarm, shows a high-priority notification with the station's distance and direction from you, and speaks it. Tap the notification for Station Detail and **Find**. Each station alerts at most once every 30 minutes.

Watch list

Menu → Tools → Watchlist keeps an eye on particular stations — family, friends, a club vehicle. **+ Add** takes a callsign (with or without SSID; without SSID matches every SSID) and an optional label. You get a notification when a watched station appears — the first time it is heard, or when it is heard again after 30 minutes or more of silence — and the list shows when it was last heard, its comment, and its distance and grid. Tap an entry for Station Detail, Centre Map, Log QSO or Remove. Watched stations are also the ones a TX iGate will gate positions for.

Geo-fences

Menu → Radio Tools → Geo-Fence Alerts defines circular areas and notifies you when a station enters or leaves one — useful for event tracking ("runner 23 has reached the checkpoint"), seeing when a family member is nearly home, or knowing when the club bus arrives.

Field	Description
Name	e.g. *Home area* or *Finish line*.
Callsign	Blank for all stations, or a callsign or prefix (`G4ABC` matches G4ABC, G4ABC-9 …).
Centre latitude / longitude	Defaults to your QTH.
Radius (km)	Default 5 km.
Alert on enter / exit	Which crossings raise a notification (enter on, exit off by default).

Every position heard — from APRS-IS or RF — is checked against each fence, and a notification *Geo-fence: name — CALL entered/left name* is raised when a station crosses the boundary.

> **New in 1.8.2.** Geo-fence alerts now work. Previously the station's new position was recorded before the check, so no crossing could ever be detected, and only RF packets were checked.

Proximity alert

Settings → Proximity Alert notifies you when a station comes within a set distance (1 to 25 km or miles) of **your own GPS position**, wherever you are — useful when driving to meet someone or looking for local stations on the move. Turn on **Watch-list stations only** to hear only about the stations you are watching. Each station alerts once, and again only after it has gone more than half as far again outside the distance. The notification gives its distance and direction from you. Your own callsign (any SSID) and objects are ignored, and nothing is checked without a GPS fix from the last 10 minutes.

Spoken alerts

Turn on **Settings → Spoken Alerts** and new messages ("Message from G 4 A B C. ..."), watch-list stations, geo-fence crossings and proximity alerts are also read out by the phone's text-to-speech voice. Callsigns are spelt out letter by letter. When a reply arrives in several parts, the sender is announced once and the parts are read on as one message. Speech is played as navigation guidance, so it lowers music and comes through the car speakers with Android Auto.

Weather alerts

Set a wind speed and/or a low temperature in Settings → BEACONING. Any weather station heard — on APRS-IS or RF — that reaches a threshold raises a *Weather Alert* notification, repeated for the same station at most once an hour. Alerts work with the app's screen closed.

Bulletin alerts

Described in chapter 9 — bulletins containing your keywords raise high-priority alerts.

Notifications

Channel	Importance	Used for
APRS-IS Connection	Low (silent)	The permanent service notification showing the connection state.
APRS Messages	High, vibrate	Messages to you (with Reply).
APRS Tracking Alerts	High, vibrate	Watch list, geo-fence, proximity and ISS pass alerts (not cleared by opening Messages).
APRS Alerts	Default	New bulletins.
APRS Emergency Alerts	High	Bulletins matching your alert keywords.
APRS Weather Alerts	High, vibrate	Weather thresholds.

You can change the sound, vibration and importance of each channel in Android Settings → Apps → G7JJF APRS Client → Notifications. Opening the Messages tab clears message notifications.

CHAPTER 18

Offline Map Tiles

Menu → Tools → Offline Tiles downloads OpenStreetMap tiles for an area so that the map works without mobile data — for portable operation, in the car, or abroad.

Setting	Choices
Area around	**My QTH**, or **Where the map is now** — move the map to the region first (a holiday, an event, a SOTA summit), then open Offline Tiles. The choice is remembered.
Coverage radius	10, **20** (default), 30, 50, 75, 100 or 150 km around that point.
Detail level	Up to zoom 10, 11, **12** (default) or 13. Tiles from zoom 8 up are downloaded.

Downloaded tiles are used by the map automatically. When the phone has no connection, a downloaded OpenStreetMap tile is shown in place of any tile from the selected layer (CARTO, Sat or Topo) that is not cached, so the map keeps working whichever layer you use. The Android Auto map uses the same cache.

The dialog estimates the number of tiles and megabytes before you start (about 15 kB a tile) and shows the cache in use out of 200 MB. **Download** starts (and **Stop** stops) the download, with a progress bar; **Clear Cache** empties the tile cache.

> **Tip.** Download on Wi-Fi. A 20 km radius to zoom 12 is a few hundred tiles; 75 km to zoom 13 is several thousand and may exceed the cache. To cover a wider area, use a lower detail level.

> **Note.** Please respect the OpenStreetMap tile usage policy: download only the area you need, and not repeatedly.

CHAPTER 19

Profiles, Backup and Reset

Station Profiles

Profiles store complete sets of settings so you can switch quickly between, say, *Home* (fixed QTH, iGate on, KISS to Direwolf), *Car* (SSID 9, SmartBeaconing, Bluetooth TNC) and *Portable* (SSID 7, topographic map). **Menu → Tools → Station Profiles**:

- Type a name and tap **+ Save** to save the current settings as a profile (an existing name is replaced).
- Tap a profile to apply it. The profile's settings replace yours (settings a profile does not store, such as the symbol style and buddy filters, are left as they are), beaconing restarts as the profile requires and, if APRS-IS is connected, reconnects with the new callsign and filter.
- Tap × to delete a profile.

Profiles include station, server, filter, beaconing, iGate, alert and display settings and the TNC addresses and AX.25 parameters. TNC connections are not opened automatically, and the e-mail gateway settings are not part of profiles.

Backup and restore

The **Backup** section of the menu saves everything in one zip file:

- **Backup All Data** writes `aprs_backup_yyyy-MM-dd_HHmm.zip` to the phone's **Downloads** folder.
- **Share Backup Data** makes the same zip and opens the share sheet (Drive, e-mail and so on).
- **Restore Backup** reads a backup zip, replaces the current settings and data, and restarts the app.

A backup contains your settings (as readable JSON and as the DataStore file), the packet cache, station log, messages, weather history, watch list, QSO log, track log, bulletins, geo-fences and station profiles, and the app's preference files (including the e-mail gateway settings).

> **New in 1.8.2.** Backups now really include messages, bulletins, geo-fences and station profiles — previously these were left out because of file-name mismatches.

> **Important.** A backup contains your e-mail gateway login, and restoring it restores the gateway settings too. Keep backup files private.

Donate

The app is free, with no ads. **Menu → Donate** (also linked from About / Help) shows a photo of Tilly, dressed for Wear it Pink, and a **Donate on JustGiving** button that opens the fundraising page of Tracy Welch (the author's wife) for Breast Cancer Now (registered charity 1160558 England and Wales, SC045584 Scotland, 1200 Isle of Man) in your browser. Donations go to the charity; none go to the developer. The app never asks you to donate — the menu entry is the only place it appears.

Reset to Defaults

Menu → Reset to Defaults — after two confirmations — deletes all settings, profiles, cached packets, messages, weather history, the station log, track and QSO logs, bulletins, watch list, the e-mail gateway settings, geo-fences, waypoints, saved objects, message templates, stream logs and the tile cache, and restarts the app. Crash logs are kept. Make a backup first if you might want anything back.

Crash logs

If the app ever crashes, a report is saved (the newest five are kept). On the next start the app offers to share it. **Menu → Tools → Crash Logs** lists saved reports with **Share** and **Delete** buttons. Sending a crash report to the author is the fastest way to get a problem fixed.

CHAPTER 20

Android Auto

APRS on the car's display.

The app works on the car's display through **Android Auto**. Everything runs on the phone — the car screens are a view onto the same service, so APRS-IS, Bluetooth, BLE and USB TNCs, beaconing and messaging all carry on while you drive.

> **Important.** Only interact with the car screens when it is safe and legal to do so. Android Auto limits text entry and list lengths while the car is moving.

Setting up

1. Configure and test the app on the phone first (callsign, filter, beaconing, TNC).
2. Install the app from the Play Store (see chapter 2): Android Auto then shows it without any extra settings.
3. Connect to the car. The app appears in the Android Auto launcher as *G7JJF APRS*.

While the phone is projecting, the phone screen shows a *Driving Mode — use the car display* overlay; **← Back to Map** dismisses it if a passenger wants to use the phone app.

Home screen

The main car screen is a grid of tiles. The title shows *APRS-IS · N stations*, *RF TNC · N stations* or *Not connected*, and refreshes every two seconds.

Tile	Function
Map	The drawn station map (needs a head unit with Car App API level 7 or later).
Stations	The 20 nearest stations to where you are now (the QTH when there is no GPS fix), with distance, direction and comment; updated as you drive. **A–Z** lists them by callsign, **Nearest** goes back to nearest first; the choice is kept (also on Weather, Repeaters and Objects).
Weather	The 20 nearest weather stations with temperature and wind.
Repeaters	Repeater objects heard on APRS.
Messages	Conversations, with the number of new messages — new since Messages was last opened in the car or on the phone. Open one to read the last 10 messages and **Reply**; new replies appear while it is open. A reply sent in several parts shows as one message; tap a message to read all of it. A dictated reply longer than one APRS message (67 characters) is sent as several, split between words.
Objects	Objects heard nearby, by their own names. **Send Message** on an object writes to its owner.
My Position	Car or phone GPS position, locator, speed, course and altitude; **Show Me on Map**.
Beacon Now	Shows what will be sent and sends a beacon.
Connect IS / Disconnect	Connect or disconnect APRS-IS using your saved settings.
Connect RF / Disconnect RF	Pick and connect a BLE TNC (live scan), a paired Bluetooth TNC (KISS or Text) or the USB TNC; or disconnect them.

Tile	Function
About	Version, callsign, connection, server and session counts.

Tapping a station in any list opens its details — comment, position, weather — with **Navigate**, **Send Message** and **Map**. Distances in the car lists are measured from where you are (car or phone GPS), or from your QTH when there is no fix.

Messages in the car

- **New messages** show briefly on the car screen ("Message from JOKE: …") while the car app is open, and are counted on the Messages tile; open the conversation to read it in full and reply. With **Spoken alerts** on (Settings), the phone reads them out through the car speakers.
- **Whole replies, once.** Services such as JOKE and MPAD answer in several messages a few seconds apart. The app waits until the sender has been quiet for 10 seconds, then announces the whole answer as one — on the car screen, in the phone notification and in the app's own spoken alerts.
- **Quick replies.** Reply (and Send Message) opens a list of one-tap answers — OK, QSL 73, On my way, Running late, Driving will reply later — which work while moving, when many cars lock the keyboard. **Type a message…** opens the keyboard when the car allows it.
- Spoken or typed replies longer than one APRS message (67 characters) are sent as several, split between words.

Navigate

Navigate on a station's details sends its position to the navigation app you use in Android Auto — Google Maps, Waze, TomTom GO or another — which starts a route to it. Android Auto chooses the app: the one you used most recently in the car.

Alerts on the car screen

Android Auto shows notifications only from messaging, calling and navigation apps, so a station coming within your **Proximity alert** distance, or anyone sending an **emergency**, is notified on the phone, not the car screen. Emergencies are always spoken; with **Spoken alerts** on, nearby stations are spoken too, through the car speakers.

> **Note.** Messages don't appear in Android Auto's own messaging (the list your texts appear in). An app registered for that opens Android Auto's messages screen instead of its own map, so this app isn't. Android Auto also hides car apps that weren't installed from Google Play: for a build installed another way, use `adb install -i com.android.vending`, or turn on Unknown sources in Android Auto's developer settings.

The car map

On head units with Car App API level 7 or later the map is drawn directly on the car display with the same symbols, clustering and age fading as the phone map.

- On-screen buttons: **+** and **−** zoom (levels 4–18), **⊙** re-centres on your position and resumes following, **TX** sends a beacon, and the top button shows the map layer — **Map**, **OSM**, **Sat** or **Topo**, the same four as the phone map — and steps to the next each time you tap it. Drag (or use the Pan action) to move the map.

- Tap a station (generous 80-pixel target) for its details; tap a cluster to zoom in. Clusters are used below zoom 12 when more than eight stations are visible; labels appear from zoom 10.
- Your own position uses your beacon symbol while moving (the SSID symbol if **Symbol from SSID** is on, and a car if your beacon symbol is the house) and a house when parked, with a heading arrow and a trail of the last 120 points. Moving is taken from the GPS speed or, where the car's GPS gives none, from how far you travel between fixes; it changes back to a house a minute after you stop, so traffic lights don't make it flicker.
- A status strip shows the connection (IS, RF or both), the GPS source (car GPS, phone GPS or none), the number of stations shown at the current zoom, and your beacons — when the last went and when the next is due (*TX 2m ago · next 1m*; *auto off* when automatic beaconing is off). **TX** confirms on the car screen.
- Buttons and text are sized to the car screen's pixel density.
- The car's own GPS is used where the head unit provides it and the phone's otherwise — whichever has the newer fix.
- Satellite imagery (**Sat**) is easier to see in bright sunlight. The layer is remembered. On **Map** the map turns dark when the car is in night mode, or the phone app is in night mode (☽) or the red theme; at those times **OSM** and **Topo**, which have no dark version, are shown at half brightness.
- Tiles are OpenStreetMap in the light theme and CARTO Voyager otherwise by day, and CARTO's dark map when the car is in night mode, so the screen isn't bright in the dark. They are cached on the phone (shared with the phone map, up to 200 MB).

CHAPTER 21

Widget and Quick Settings Tiles

Home-screen widget

Add the widget from your launcher's widget picker. It shows at a glance:

- your callsign and connection state (*IS Connected*, *IS + RF…*, *RF: …* or *Disconnected*);
- your last beaconed position (or QTH) and locator;
- the time of your last beacon;
- the number of stations heard and unread messages;
- the last station heard, with distance, bearing and time.

The widget updates at most every 30 seconds, and immediately after a connection change or a beacon. Tap it to open the app.

Quick Settings tiles

Pull down the notification shade, tap the pencil (edit) icon and drag the tiles into place.

Tile	Action
APRS	Connect or disconnect APRS-IS. Shows *Connected* or *Tap to connect*.
APRS Beacon	Send a position beacon now (last GPS fix, otherwise the QTH). Shows *Sending…* then *Sent!*.

CHAPTER 22

Wear OS Watch and Automation

Your station on your wrist, and in your own automations.

The app has a companion for Wear OS watches. It shows what the phone app has, and sends through it: the phone does the radio and APRS-IS work, the watch is a remote for it.

Installing

With the phone app installed from Google Play, open the Play Store on the watch and install **G7JJF APRS** (or choose the watch in the phone's Play Store listing). The watch must be paired with the phone through the watch maker's app (Galaxy Wearable, Pixel Watch, Wear OS). Nothing needs setting up: the watch finds the phone app by itself.

The phone app also offers it: when a Wear OS watch is connected that does not have the watch app, the app asks once (a few seconds after it starts) whether to install it, and **Open on watch** opens the watch app's Play Store page on the watch — tap **Install** there. Android does not let one app install another on a watch, so that last tap is yours. Each watch is asked once; **Menu → Tools → Install on Watch** offers it again, or tells you the watch app is already installed.

Screens

Screen	What it shows
Home	Your callsign, the connection status line from the phone's notification and when it was last updated; **Beacon now**, **Messages**, **Nearby**, **Status**, **Emergency** and **About**.
Beacon now	Sends a position beacon from the phone at once — GPS if it has a fix, otherwise the QTH — exactly like the Beacon Quick Settings tile.
Messages	Conversations, newest first, with the latest message. **New message** asks for a callsign.
Conversation	The last ten messages (✓ acknowledged, ✗ failed, … waiting; a multi-part reply shows as one), quick replies (OK, Thanks, QSL, 73, Yes, No, On my way, Call me) and a text box — the watch keyboard offers typing and voice.
Nearby	The ten nearest stations with a position heard in the last hour: arrow, distance, direction and how long ago (marks a weather station). Tap one for its details — what it is, speed, heading and altitude when moving, its comment, whether it was heard on radio or via the internet — and its latest weather (temperature, wind, gust, humidity, pressure, rain) in your units. **Message** starts a conversation with it; **Find** opens the compass below.
Find	A large arrow that keeps pointing at the station as you turn — using the watch's compass, corrected for magnetic variation — with the distance and bearing. While it is open the phone sends positions every 5 seconds and the screen stays on; leaving it stops both.
Status	Send a status report from the phone: **QRV**, **QRT**, **Mobile**, **Portable**, **On summit**, **Back home**, or your own (typed or spoken).
Emergency	Starts the phone's emergency beacon (chapter 17) — **hold the red button for two seconds**, so it can't be set off by accident; the watch buzzes when it starts. While it runs, home shows **EMERGENCY ON — stop**, which opens **Stop emergency**.

Screen	What it shows
About	The watch app's version and build, the phone app's version (when connected) and your station — useful when reporting a problem.

Swipe right, or tap the title (shown with ‹), to go back a screen; swipe right on the home screen to close the app. Incoming messages also appear as phone notifications on the watch, with the watch's own **Reply** button, whether or not the watch app is installed.

> **Note.** The phone app's background service must be running (the app connected to APRS-IS or an RF interface) for the watch to send anything. The phone sends the watch updates only while the watch app (or tile) is on screen — a fresh snapshot as it opens, then changes every 30 seconds (every 5 on the Find compass) or at once for a message. With the watch app closed, only a new message to you is sent, for the tile and complication, so it costs next to no battery in the background.

Watch tile

The watch app also has a tile — swipe from the watch face to reach it. To add it, long-press the watch face (or swipe to the end of your tiles and tap **+**) and choose **G7JJF APRS**.

Part	What it does
Callsign and status	Your station and the phone's connection status line.
Beacon now	Sends a beacon from the phone at once and shows "Beacon sent" — one tap, one beacon.
✉ line	The latest incoming message, with the number of new ones since you last looked at messages on the watch. Tap to open Messages.
↗ line	The nearest station: arrow, callsign, distance and direction. Tap to open Nearby.
updated …	How old the information is.

While the tile is on screen it asks the phone for fresh information and redraws when it arrives, usually within a second or two. When you swipe away, the phone stops sending — like the app, the tile costs no battery in the background. "Open the phone app" means the watch has had nothing from the phone yet.

Watch-face complication

Watch faces with complication slots can show **G7JJF APRS**: long-press the watch face, choose **Customise** (or **Edit**), pick a slot and choose G7JJF APRS. A short slot shows ✉ and the number of new messages; a long slot adds the nearest station and its distance. Tap it to open the watch app — at Messages when there are new ones.

The complication never polls. The phone sends the watch one update when a new message arrives — even with the watch app closed, so the count is right — and otherwise only while the app or tile is shown.

Automation (Tasker and similar apps)

With **Settings → Station → Automation → Allow automation apps** on, other apps can control the app with broadcast intents, and receive its events. In Tasker, use *Send Intent* (Target: Broadcast Receiver) for commands and the *Intent Received* event for events; extras become %variables.

Command (action)	Extras	Does
com.g7jjf.aprsclient.action.BEACON	—	Send a position beacon now.
com.g7jjf.aprsclient.action.SEND_MESSAGE	to, text	Send an APRS message (to: up to 9 characters; text: up to 67, { | ~ removed).
com.g7jjf.aprsclient.action.SEND_STATUS	text	Send a status report to APRS-IS.
com.g7jjf.aprsclient.action.CONNECT	—	Connect to APRS-IS.
com.g7jjf.aprsclient.action.DISCONNECT	—	Disconnect from APRS-IS.

Event (action)	Extras	When
com.g7jjf.aprsclient.event.MESSAGE_RECEIVED	from, text	A message addressed to you arrives.
com.g7jjf.aprsclient.event.STATION_NEARBY	call, text	A proximity alert fires (Settings → Proximity Alert); text is for example *2.3 km NE of you*.

Commands work while the app's background service is running; Android does not let another app's broadcast start it. Ignored commands are noted in the app's log with the reason.

> **Tip.** Examples: beacon when you arrive home or leave (a Tasker location profile); message a friend *Home safe* when the phone joins your home Wi-Fi; flash the phone's light or play a sound of your choice when an APRS message arrives.

CHAPTER 23

Background Operation and Battery

APRS is most useful when it keeps running: beaconing from the car, iGating, and catching messages. The app runs as an Android **foreground service** for this, shown by a permanent low-priority notification with the connection state.

What keeps running

- The APRS-IS connection, keepalives and automatic reconnection.
- Beaconing and SmartBeaconing (GPS keeps running with the screen off).
- Reception on every RF interface (TCP KISS, Bluetooth, BLE, AGW, USB and the Audio TNC), iGating, message acks and retries.
- All alerts — messages (including replying from the notification), bulletins, weather, watch list and geo-fences.
- Saving data — station log, messages, weather, logs — every 10 minutes and when the service stops.

All of this runs in the service, so it carries on when the app's screen is closed or swiped away from the recent-apps list.

Watchdogs and restarts

Mechanism	Behaviour
Connection watchdog	Every 9 minutes, even in Doze: pings APRS-IS and reconnects if the connection has died.
Background job	Every 15 minutes when a network is available: restarts the service if Android killed it while you were connected.
Swipe-away	If you were connected, the service restarts itself a second later.
Reboot / update	If **Auto-connect** is on and you were connected, the service starts and connects to APRS-IS after the phone boots or the app is updated.
Exit / Disconnect	Choosing Exit or disconnecting turns all of the above off until you connect again.

> **New in 1.8.2.** After a reboot the app now actually reconnects to APRS-IS; before, it only started the service.

GPS and microphone in the background

Android only lets an app use GPS or the microphone in the background if its background service says it needs them. The app's service does so whenever you have granted the location or microphone permission, so SmartBeaconing, proximity alerts and the audio TNC keep working with the screen off. Android allows this to be set up only while the app is on screen: after a reboot, GPS and the microphone are picked up the first time you open the app, and until then GPS positions may not arrive while the screen is off.

Battery optimisation

Android and some manufacturers aggressively stop background apps. For dependable operation:

1. Allow the app to ignore battery optimisation when asked (or Settings → Apps → G7JJF APRS Client → Battery → **Unrestricted**).
2. On Samsung, remove it from *Sleeping apps* and *Deep sleeping apps*. On Xiaomi, enable *Autostart* and set *No restrictions*. On Huawei/Honor, set *App launch* to manual with all three switches on. On OnePlus/Oppo/Realme, allow background activity. The website dontkillmyapp.com has step-by-step guides for each make.
3. Leave the app in the recent-apps list rather than swiping it away.

Battery use depends mostly on GPS and the screen. With the screen off, APRS-IS alone uses very little; continuous GPS for SmartBeaconing uses noticeably more, so plug in when mobile.

CHAPTER 24

Troubleshooting

Most problems can be diagnosed with **Menu → Debug**: the Comms tab shows exactly what is sent and received, and the App Log shows errors.

Symptom	What to check
No stations on the map after connecting	Check the callsign is set (not MYCALL) and the QTH is not 0, 0 — the range filter is centred there. Increase the range. Look in Debug → Comms for the server's `# logresp` line.
Status stays *Connecting…* or shows an error	Check internet access and the server name and port (14580). Try another preset such as rotate. Some Wi-Fi networks block port 14580 — try mobile data.
My beacons do not appear on aprs.fi	Check the passcode (leave blank for automatic) — if the server reports the login as *unverified* the app shows a warning and the server drops everything you send. Check that the interval is not 0. Search aprs.fi for your exact callsign-SSID. Look for >> lines in Debug → Comms.
Position is wrong or at 0, 0	With position source GPS, wait for a fix (map toolbar shows ±N m). With QTH, check the FILTER latitude and longitude — west and south are negative.
Messages stay on the hourglass and then fail	The other station may be off-air, or replies may not reach you. Check the callsign-SSID is exact. Try **Force APRS-IS** (long-press Send). On RF, check your path and that a digipeater or iGate hears you.
Bluetooth TNC will not connect	Pair it in Android Settings first. Make sure no other app is connected to it. Choose KISS or Text to match the TNC. Turn the TNC off and on.
BLE TNC not listed	Grant *Nearby devices* permission, enable Location services (required for BLE scans on some versions), and make sure the TNC is in BLE mode and not connected to another phone.
USB TNC not found	Use a proper OTG adapter, allow the USB permission prompt, and choose the right baud rate (KV4P: 9600 unless your firmware says otherwise).
Audio TNC decodes nothing	Check microphone permission and that the waterfall shows the two tones. Adjust the radio volume — too loud is as bad as too quiet. Try **Loopback** to prove the modem.
Audio TNC transmits but nobody hears	Enable VOX on the radio, set the phone's media volume to a level that keys the radio cleanly, and check deviation on another receiver.
The node keeps repeating a frame; the terminal says *TNC took N s to accept*	The TNC is not transmitting our acknowledgements promptly — usually it believes the channel is busy. Make sure the radio's squelch is closed on a quiet channel, and check the TNC's KISS persistence, slot time and TX delay settings.
Packet terminal says *Link failure*	The node did not answer. Check the callsign-SSID, that the node is reachable direct, and increase T1 and reduce the window in Settings → AX.25 PACKET for weak or busy links.
Notifications do not appear	Allow notifications for the app (Android 13+), and check the channel settings in Android Settings → Apps → Notifications.
The app stops in the background	Follow the battery optimisation steps in the previous chapter.
Map is blank or grey	Tiles need internet unless downloaded with Offline Tiles. Try another layer. Clear the tile cache in Settings → MAP TILE CACHE.

Symptom	What to check
E-mail gateway fails	Use an App Password for Gmail/Yahoo/Outlook. Port 587 without SSL (STARTTLS) or 465 with *Use SSL*. The error message says whether authentication, connection or TLS failed.
Android Auto does not show the app	Check it was installed from the Play Store. A copy installed any other way is shown only if *Unknown sources* is turned on in Android Auto's developer settings (tap the version number in Android Auto settings repeatedly, then ⋮ → Developer settings).

Known limitations

- Station profiles do not include the e-mail gateway settings (by design, as they hold a password).
- Repeater listings open in the browser, because RepeaterBook no longer lets apps download its data.
- The messages-only filter's range part (`t/m/CALL/km`) is centred on your last position known to the APRS-IS server, so it needs you to have beaconed at least once.

CHAPTER 25

Technical Reference

Architecture

The app is written in Kotlin. A foreground service (`AprsIsService`) owns the APRS-IS connection, the packet stream, the station map, messaging, beaconing, iGating and alerting. The phone interface, the widget, the Quick Settings tiles and the Android Auto screens are views onto it. Received packets from every source are parsed by one APRS decoder and merged.

Supported APRS formats

Format	Notes
Uncompressed position	`! = / @`, with and without timestamp (DHM zulu/local, HMS); position ambiguity; course/speed, PHG, RNG, DFS, altitude `/A=`.
Compressed position	Base-91 lat/lon, course/speed, range or altitude from the cs bytes.
Mic-E	Current and old Mic-E, all message codes, speed and course, altitude, manufacturer suffix, overlays.
DAO	`!DAO!` extra precision (human-readable and base-91).
Weather	Positionless _, and weather after a position with the _ symbol: wind, gust, temperature, rain 1 h / 24 h / since midnight, humidity, pressure, luminosity, snow.
Objects and items	`;` and `)`, live and killed, compressed or uncompressed.
Telemetry	`T#` packets, comment telemetry `|ss11|`, PARM/UNIT/EQNS/BITS messages.
Messages	Messages, acks, rejects, reply-acks, bulletins, announcements, NWS.
Status, capabilities, queries	`>` status (with Maidenhead), `<` capabilities, `?` queries.
Third-party	`}` packets are unwrapped.
NMEA	`$GPRMC` and `$GPGGA` raw GPS.
Maidenhead beacon	`[IO93ab]`.

The decoder was validated against the reference test vectors of the Perl Ham::APRS::FAP library and differentially against the aprslib Python library on thousands of real and generated packets, and fuzz-tested with millions of malformed inputs without a crash.

Protocols and interfaces

Item	Detail
APRS-IS	TCP, login `vers G7JJF-AprsClient` + app version, keepalive 240 s, read timeout 30 s, retry 10 s.
Tocall	`APZGJJ`
KISS	FEND 0xC0, FESC 0xDB, TFEND 0xDC, TFESC 0xDD; data frames on port 0.
Bluetooth SPP	UUID 00001101-0000-1000-8000-00805F9B34FB, paired devices.

Item	Detail
BLE	Nordic UART 6E400001-B5A3-F393-E0A9-E50E24DCCA9E (write …0002, notify …0003); Mobilinkd BLE KISS 00000001-ba2a-46c9-ae49-01b0961f68bb (write …0002, notify …0003); Radtel 0000FFE0 (notify FFE1, write FF31 or FFE2); HM-10 serial 0000FFE0 (FFE1 both ways).
AGWPE	Frames G, k (raw monitor), K (raw), V (unproto).
USB serial	usb-serial-for-android; CP2102, CH34x, FTDI, CDC-ACM; 8N1.
AX.25	v2.0 modulo 8 connected mode; UI frames control 0x03, PID 0xF0.

Storage and retention

Data	Kept
Station log	Saved every 10 minutes; stations heard in the last 7 days are reloaded.
Packet cache	The last 100 packets are saved for the next start; up to 500 in memory.
Messages	Your own and those to you, 500 on disk.
Weather history	30 days.
Bulletins	200; those from the last 48 hours are reloaded.
Track log	10 000 points.
Stream logs	7 daily files.
Crash logs	5 newest.
Map tiles	50 MB.
App log	Trimmed to the last 400 lines when it exceeds 200 kB.

Build information

Item	Value
Package	com.g7jjf.aprsclient
Version	1.9.8 (versionCode 54)
SDK	minSdk 26, compileSdk and targetSdk 36
Toolchain	Kotlin 1.9.22, Gradle 8.7, JVM 17
Libraries	androidx.car.app 1.7.0 · play-services-location 21.2.0 · android-mail 1.6.7 · usb-serial-for-android 3.7.2 · datastore-preferences 1.0.0 · gson 2.10.1 · kotlinx-coroutines 1.7.3

CHAPTER 26

Appendices

A. SSID conventions

These are conventions, not rules, but following them helps others understand your station. The symbol is the one chosen by **Symbol from SSID**.

SSID	Usual use	Symbol from SSID
(none)	Primary station, usually home	car (house when stopped)
-1	Digipeater, home station or other	car
-2	Digipeater or other	truck
-3	Digipeater	fire engine
-4	HF to VHF gateway	bicycle
-5	Smartphone, other networks (D-STAR, IRLP…)	phone
-6	Special activity, satellite ops, camping	campground
-7	Handheld (walkie-talkie)	person
-8	Boat, sailboat, RV or second mobile	sailboat
-9	Primary mobile (car)	car
-10	Internet, iGate, Echolink	gateway
-11	Balloon, aircraft, spacecraft	balloon
-12	APRStt, DTMF, one-way tracker	person
-13	Weather station	weather
-14	Trucking	truck
-15	Generic, other	car

The same list is in the app under Menu → Radio Tools → SSID Reference.

B. APRS-IS filter syntax

You can add any of these to **Extra filter clauses**, separated by spaces. The server sends a packet if it matches *any* clause; clauses starting with `-` remove matches.

Clause	Meaning	Example
r/lat/lon/km	Range around a point (the app adds this from FILTER)	`r/53.15/-0.99/100`
m/km	Range around your own last position	`m/50`
f/call/km	Range around another station	`f/G4ABC-9/20`
p/prefix	Callsign prefix	`p/GB7 p/MB7`
b/call	Buddy list — exact calls, * wildcard	`b/G4ABC* b/M0XYZ-9`
o/name	Object name	`o/RALLY`
t/types	Packet types: p position, o object, i item, m message, q query, s status, t telemetry, u user-defined, n NWS, w weather	`t/w`

Clause	Meaning	Example
s/symbols	Primary-table symbols	`s/->`
d/digi	Packets via a digipeater	`d/MB7UN`
e/igate	Packets gated by an iGate	`e/G7JJF-10`
g/call	Messages to a callsign or group	`g/BLN*`
a/N/W/S/E	Area (box)	`a/54/-2/52/1`
-clause	Exclude	`-t/w`

C. Glossary

Term	Meaning
APRS	Automatic Packet Reporting System — real-time tactical data on amateur radio, created by Bob Bruninga WB4APR.
APRS-IS	The internet network of servers that links iGates and clients worldwide.
AX.25	The amateur link-layer protocol used by APRS (UI frames) and connected-mode packet.
Digipeater	A station that repeats packets to extend range. WIDE1-1 and WIDE2-1 are generic aliases.
iGate	A station that gates packets between RF and APRS-IS.
KISS	Keep It Simple, Stupid — the simple framing protocol between a computer and a TNC.
Mic-E	A compact position format that encodes latitude in the destination field.
Object / Item	A named position not tied to a station.
Passcode	A number derived from your callsign that lets APRS-IS accept your packets.
Path	The list of digipeater aliases a packet asks to be repeated by.
q-construct	Path elements (qAR, qAC, qAO…) added by APRS-IS to record how a packet entered.
QTH	Your home or fixed location.
SmartBeaconing	Beaconing that adapts to speed and turns (algorithm by Tony Arnerich KD7TA and Steve Bragg KA9MVA).
SSID	The -0 to -15 suffix that distinguishes several stations with one callsign.
TNC	Terminal Node Controller — the modem between computer and radio.
Tocall	The destination field identifying the sending software (APZGJJ for this app).

D. Changes in version 1.9.8

- Fixed: new lines at the top of the Comms Monitor could show twice.
- Fixed: the packet rate at the top of the screen showed 500/min after the app had been asleep. It is now the rate over the last 5 minutes.
- Fixed: the Android Auto map's station count now matches the car home screen and the phone. It was counting the Station Log, which keeps stations from the last 7 days. The count in the map's status bar now reads "N shown": the stations on screen at the current zoom.
- Fixed: GPS beacons now use the same symbol as your position on the car map. A house symbol beacons as a car while moving (it showed as a car in Android Auto but a house on aprs.fi), and a

car parked for a minute beacons as a house. The TX button follows the same rule.

- Fixed: the Bluetooth radio wasn't reconnected automatically when a BLE radio had also been used: the old BLE radio was always tried first. The last radio you choose is now the one remembered and reconnected.
- Fixed: your position could stop moving on the Android Auto map when the car's GPS stopped sending fixes. The map now uses whichever of the car's and the phone's GPS is newer.
- Fixed: Android Auto screens could still show different station counts; they now all use the same list.
- The Android Auto map now turns dark when the phone app is in night mode (☽) or the red theme, as well as when the car is in night mode.
- Fixed: APRS-IS could stay disconnected after losing signal, with nothing in the log. A server name lookup that hangs now gives up after 15 seconds and retries, and a dropped connection is logged.
- New: a map layer button at the top of the Android Auto map's buttons. It steps through the phone map's four layers — Map, OSM, Sat (satellite, easier to see in bright sunlight) and Topo — and the choice is remembered.
- Saved debug logs and Comms Monitor logs now start with the app version, Android version and phone model.
- OSM and Topo maps are now dimmed at night — on the phone in night mode (☽), and on the Android Auto map when it is in night mode — as they have no dark version.

E. Changes in version 1.9.7

- Fixed: My Messages could go blank — no conversations and no New Message button — until the app was restarted. It happened when Android rebuilt the app's screen in the background (for example on a light/dark switch) while a conversation had been open.

F. Changes in version 1.9.6

- Fixed: SmartBeaconing sent nothing when the app was started by Android Auto alone (phone app not opened): beaconing was only started when the phone app opened, and Android could give the background service no GPS. The service now starts beaconing itself from your saved settings, opening Android Auto turns the service's GPS on, and beacons also use the car's own GPS when it is fresher than the phone's.

G. Changes in version 1.9.5

- New: a **Map** button on a station's details centres the map on that station.
- Fixed: on a busy feed your own messages could disappear from My Messages until the app was restarted. Other stations' messages heard on the feed no longer push yours out: up to 500 of yours are kept, as in the saved copy, and the latest 200 of everyone else's.
- Fixed: Android Auto could crash when opening a message (or another screen) from the map, if Android Auto passed the map display to a map screen that had already closed.
- New: Radio Tools → UK Repeaters lists the nearest UK repeaters from the ETCC's list (ukrepeater.net), with frequencies, CTCSS, modes and distance, filters for band and mode, and Map. The list is kept on the phone and refreshed weekly. Radio Tools → RepeaterBook opens RepeaterBook in the browser for repeaters abroad.
- New: UKRPT on the APRS Services screen — ask the UKRPT service for the nearest UK repeaters by band, mode or locator, over APRS-IS or RF. Its replies show one repeater per line in a single

bubble (other services' multi-part replies still read as one paragraph).

- New: UKNODES on the APRS Services screen — the nearest UK iGates, digipeaters, LoRa and packet nodes heard on the air, and a node's details. One node per line in a single bubble, as for UKRPT.
- New: UKRPT Miles and km buttons — the service remembers your choice for your callsign.
- Fixed: beacons sent while driving could go out as a house. Speed now also comes from the distance travelled (some GPS reports 0), and the house is only used after a minute without moving — the same rule as your symbol on the car map.

H. Changes in version 1.9.4

- Android Auto: a new message now shows briefly on the car screen while the car app is open, and with Spoken alerts on the phone reads it out through the car speakers. The car notifications in 1.9.3 never appeared (Android Auto only shows notifications from messaging, calling and navigation apps) and are removed.
- A repeat acknowledgement for a message already acknowledged is no longer logged as an error.
- Fixed: a beacon could go out — on RF too — with the callsign MYCALL when Android Auto started the app before its saved settings had loaded. Nothing is now ever sent without a real callsign, and the service loads the settings itself as soon as it starts.
- Fixed: automatic beaconing (including SmartBeaconing) could stay off after the app was started from Android Auto, because beaconing started with the built-in defaults when the settings were slow to load.
- Android Auto map: your symbol no longer flips between car and house while driving. Movement is now measured over at least 5 seconds, and a car GPS that always reports 0 speed no longer counts as parked.
- New: Settings → Display → **Keep screen on**, for a phone on a dashboard mount.
- New: Settings → RF → **Reconnect to the last Bluetooth radio automatically**.
- New: Android Auto station lists can be sorted by callsign (A–Z), and the station log keeps the sort you chose.

I. Changes in version 1.9.3

- Android Auto: new messages, nearby stations and emergencies sent to the car screen as notifications, replacing the pop-ups added in 1.9.1, which never appeared (Android Auto only shows those in navigation apps).
- Android Auto map: while you're moving your position now shows as a car when your beacon symbol is a house (as it is when beaconing a fixed QTH), instead of a house driving down the road.
- New: Menu → User Manual, and a User Manual button on the About screen, open this manual online.

J. Changes in version 1.9.2

- Busy areas: with a wide range filter (hundreds of packets a minute) the map could stop drawing. It now gets only the stations that changed, at most once a second, and redraws once for each update.

K. Changes in version 1.9.1

- Station history saved between sessions now keeps the time each packet was heard. It was re-stamped with the time the app started, so Map Replay showed old stations as just heard.
- Updated for Android 15 and later: the screen runs edge to edge on every Android version, the release build is optimised (smaller download), and an unused library is removed.
- The APRS-IS login now reports the app's real version (it always said 1.1).
- Map Replay could crash when chosen while packets were arriving. Fixed; the same fault could also upset the watch's station details and the saved station log.
- Light theme: pick lists in pop-up windows (the Outbox, Map Replay and others) could show white text on white. Fixed; pop-ups in the red night theme also use the theme's colours.
- New: a Outbox row at the top of My Messages while messages are waiting to send — lists them all, with open conversation and delete; conversations with a waiting message show in the list.
- New: Settings → Compressed position beacons — shorter position packets, more precise, with course and speed while moving. Off by default.
- Compressed positions with no course or speed from other stations, which the app could ignore, are now shown.
- New: Menu → Donate — a photo of Tilly and a link to the JustGiving page of Tracy Welch, the author's wife, for Breast Cancer Now. Donations go to the charity, none to the developer, and the app never prompts.
- New: watch tile — Beacon now, the latest message with a count of new ones, the nearest station and the phone's status, one swipe from the watch face. Tap a line to open that screen of the watch app.
- Android Auto: your position showed as a house while driving on cars whose own GPS reports no speed. Moving is now also worked out from the distance between fixes, so it shows your beacon symbol (car), and the heading arrow appears too.
- Android Auto: after switching to another app (navigation, music) and back, the map stopped following you until it was closed and reopened. It now carries on at once.
- Android Auto: a message sent from the car could be lost when the car app had started without the phone app ("Message sent" was shown regardless); it is now sent through the app's service, or you are told it was not. Dictated messages lose { | ~ and are split into 67-character parts.
- Android Auto: the map hid all your own stations (other SSIDs, home) and the objects you send; only your own position is now left to its own marker.
- Android Auto: the Objects list showed the owner's callsign and opened the owner's details; it now shows the object.
- Android Auto: the Messages count only ever went up; it now counts new messages since you last looked, in the car or on the phone.
- Android Auto: Station → Show on Map → back left the first map frozen; tapping a station did nothing, and the status bar said Offline, when the car app had started without the phone app; the scale bar could be out by up to two times after pinch-zooming. All fixed.
- Android Auto: station lists sort by distance from where you are (they used the QTH) and give the nearest compass point (they could be 45° out); Messages, conversations and My Position update while open; TX on the map confirms on the car screen; speed shows even when the car's GPS gives none; RF-only connections show as RF.
- Android Auto: opening the map repeatedly no longer leaves background threads running.
- Android Auto: four unused screens and entry points removed from the code (nothing you use changes).

- Android Auto map: bigger buttons and status bar text, sized to the car screen's pixel density so they are readable on sharp, high-resolution screens too.
- New: Android Auto — a new message pops up on the car screen, with Open for the conversation.
- New: multi-part replies (JOKE, MPAD…) are announced once, whole, when the last part has arrived — in the phone notification and in spoken alerts.
- New: Android Auto quick replies — one-tap answers that work while driving.
- New: Android Auto **Navigate** — sends a station's position to your navigation app (Google Maps, Waze, TomTom GO…).
- New: Android Auto map turns dark when the car is in night mode.
- New: proximity and emergency alerts pop up on the car screen, with Navigate and Details.
- New: the Android Auto map's status bar shows when the last beacon went and when the next is due.
- New: watch **Emergency** — hold for two seconds to start the phone's emergency beacon; stop it from the watch too.
- New: watch **Find** — a compass arrow pointing at a station from Nearby, with the distance.
- New: watch **Status** — one-tap status reports (QRV, QRT, On summit…) or your own.
- New: watch-face complication — new messages and the nearest station.
- New: **Position privacy** — near home, beacons carry a deliberately rough position (APRS position ambiguity) instead of your address (Settings → Beacon).
- New: **Quiet hours** — alerts arrive silently overnight; emergencies still sound; automatic beacons can pause too (Settings → Alerts).
- New: **Packet explained** — any packet taken apart field by field (long-press on the Packets screen, or Explain in Station Detail).
- New: **Battery saver** — automatic beacons a third as often when the battery is low (Settings → Beacon).
- New: **Red** theme — red on black, for keeping night vision (Settings → Display).
- New: **Map Replay** — play back the last hour, 6 hours or day on the map (Menu → Tools).
- Settings: the Symbol from SSID help line listed the wrong symbols for several SSIDs; corrected.
- Messages: type more than 67 characters and it is sent as several messages, in order — each part after the one before is acknowledged. Long replies from the watch, the car and notifications now go the same way (they were sent all at once, so parts could arrive out of order).
- Messages: an **outbox** — a message sent with nothing connected waits (□) and goes when APRS-IS or a radio connects, instead of failing.
- Messages: tap a failed message to **send it again**.
- Messages: **mute** a station or service (□) — its messages arrive silently.
- Messages: **delivery details** — interface, tries and acknowledgement for each message you send.
- Messages: APRS 1.1 **reply-acks** are now sent to stations that use them, not only understood.
- Messages: message numbers continued from 1 after every restart, so an acknowledgement could mark an older stored message with the same number; numbering now carries on from the last message sent.

L. Changes in version 1.9.0

- Radio Control: always said "No answer from the radio", even when the radio had connected — a successful connection was mistaken for a timeout, so the channel list was never read. Setting up the link also no longer waits on the radio agreeing a larger packet size, and if the radio really does not answer, the message says which step it stopped at.
- Radio Control: when the radio does not answer a command, the screen now says why — for example that it refused the command because it needs pairing — and the Debug screen shows every command and reply.
- Radio Control: works with newer UV-PRO firmware, which sends a 22-byte settings block instead of the documented 20 bytes. The app used to reject the reply and stop.
- Watch app: multi-part replies — a joke from JOKE, an answer from MPAD and the like — are joined into one message, as on the phone and the car screen, instead of showing as separate pieces.
- Watch app: tap a station on Nearby to see what it is, how it is moving, its comment and its latest weather report, with a button to message it.
- Debug log: no more "setMapTheme is not defined" and similar MapJS errors at start-up. They were harmless — settings sent to the map before it had loaded, and applied again once it had — and are now skipped quietly.

M. Changes in version 1.8.9

- New: emergency beacon — a Mic-E EMERGENCY every 2 minutes on APRS-IS and radio until stopped, with a deliberate start and a stop button in the notification.
- New: emergency alerts — an alarm, notification and spoken warning when another station sends an emergency, with its distance and direction.
- New: speak a message — □ in the message box.
- New: 300 baud HF APRS in the audio modem (1600/1800 Hz), beside 1200 baud VHF.
- New: tablet and landscape layout — the map beside the packets, messages or station log. Off to start with; turn it on in Settings → Display → Landscape / tablet layout.
- New: Packet Capture — record received packets to a file, share it, and replay captures, stream logs or aprs.fi exports into the map.
- New: weather radar layer on the map (RainViewer).
- Offline Tiles: download around where the map is now, not only the QTH; radius up to 150 km; tile cache raised from 50 MB to 200 MB.
- A new install starts in the light theme (it was dark). Existing setups keep their theme.
- Map: with night mode on, the CARTO dark map showed an "API key required" watermark. It now uses the app's key, as the day map already did.
- Watch app: battery use cut. The phone used to send the watch an urgent update every 30 seconds whenever anything changed (on a busy feed, almost always), waking the watch's Bluetooth all day even with the watch app closed. It now sends updates only while the watch app is on screen. Update the phone and watch apps together.
- Radio Control said "Connect the radio as a BLE TNC first" even with the radio connected as a BLE TNC. It now uses the radio that is connected, and the BLE TNC screen remembers the radio for next time (only the car screen did before).
- Map: callsign labels, the disc behind each symbol and cluster bubbles now take their colours from the map underneath rather than the app theme — a white outline on a light map, a dark one on the night or satellite map. In the dark theme on a light map, callsigns no longer have a

dark smudge around them.

N. Changes in version 1.8.7

- Dark theme: windows such as the setup wizard showed light text on a white background when the app was dark but the phone itself was in light mode. Windows now always use the app's own theme.
- Watch app: swiping right on Messages, a conversation or Nearby closed the whole app instead of going back. It now goes back one screen (the title, marked ‹, also goes back when tapped); on the home screen a swipe still closes the app.
- New: the phone app notices a connected Wear OS watch without the watch app and offers to open its Play Store page on the watch (once per watch; Menu → Tools → Install on Watch to ask again).
- Watch app: new About screen with the watch and phone app versions.

O. Changes in version 1.8.6

- New: Wear OS watch app — status, Beacon now, conversations with quick replies or typed/spoken replies, and the nearest stations with distance and direction (chapter 22).
- New: automation — Tasker, MacroDroid and similar apps can send beacons, messages and status reports, and are told when a message arrives or a station comes near (Settings → Station → Automation, off by default; chapter 22).
- New: Find in Station Detail — a compass arrow pointing at the station, with distance and whether you are getting closer.
- New: ISS satellite mode — a beacon a minute via ARISS during one pass, then off; stations heard through the ISS are listed, and you are told when your own beacon went through it.
- New: map overlays read GeoJSON as well as KML and KMZ, draw polygons and every part of multi-part shapes, and stay on the map after a restart. The menu item is now called Map Overlay.
- Messages: the packet to be sent is shown above the text box; { | and ~, which APRS does not allow in message text, can no longer be typed (a { broke the message number).
- New: setup wizard on first start — callsign, position, radio and beaconing in five steps (Menu → Tools → Setup Wizard to run it again).
- New: TNC Bridge — a PC program (Xastir, YAAC, a BBS…) can use the phone's radio as a KISS TNC over the network.
- New: Radio Control for UV-PRO, GA-5WB, VR-N76 and VR-N7500 — list the radio's channels and select one, over Bluetooth LE.
- New: Event Board — the stations taking part in an event, when each was heard, speed, and the checkpoints passed (from the Map Overlay), with a group message and a CSV log.

P. Changes in version 1.8.5

- Manual: the app is installed and updated from the Google Play Store.
- Fixed: a crash every 9 minutes on Android 12 and later after Android had stopped the background service — the connection watchdog tried to restart it from the background, which Android does not allow. It now checks a running service directly and otherwise waits for the app to be opened.
- New: Settings → RF → RF Interfaces — set any RF interface to packet only, e.g. AGW on a packet radio frequency for the terminal while a KISS TNC handles APRS. A packet-only interface takes no

part in APRS: nothing heard on it is decoded as APRS and no beacons, messages, objects, iGate or digipeater traffic are sent on it.

- Settings → Station shows the HamQTH lookup login, with Change and Remove buttons.
- New: auto-reply to messages — always, or only while Android Auto is connected; once an hour per station, never to service robots.
- New: Beacon Check coverage map — green and red dots where your RF beacons did and did not reach APRS-IS.
- New: Beacon Check "who heard me" — the digipeaters and iGates that carried you over the last week, with counts and distances. Results are now kept across restarts.
- Packet terminal: one connection per RF interface, each with its own page, text and Monitor; connections stay up when the terminal window is closed.
- Packet terminal Monitor: frames received and sent are collected all the time for each interface (last 1,000).
- Audio modem: new demodulator with bit-clock recovery and per-tone level control. The old one sampled each bit at a fixed, unsynchronised time: it missed some frames even on a clean signal and nearly all of them when the two sound cards' clocks differed slightly. Bench tests: 60 of 60 frames decoded with clock offsets of ±1%, emphasis and heavy noise, where the old one decoded between none and 52.
- GPS and the audio TNC's microphone keep working when the app is in the background or the screen is off (the background service now declares location and microphone use when those permissions are granted).
- Audio modem: connected-mode control frames (SABM, UA, RR, DISC, DM — 17 bytes) were discarded as too short, so connecting through the audio modem could never succeed. Tested end to end against a simulated BBS with noise, clock error and de-emphasis.
- Objects: the coordinates entered for a new object work in every language (a decimal comma, or the phone's own digits, made them fail silently).
- Audio modem: unprocessed (or voice-recognition) audio input instead of the speech-processed microphone; capture thread at audio priority; TX preamble 300 ms (was 133 ms) for VOX; UI frames with the poll bit are decoded.
- Audio TNC waterfall: scales itself to the input level (it saturated to red at normal levels) and no longer allocates a new screen-sized buffer for every redraw.
- Packet terminal: connected mode over the audio modem. Audio transmissions are queued rather than dropped when the modem is busy, and the modem ignores its own signal while transmitting.
- Android Auto: the parts of a multi-part reply (JOKE, MPAD …) are joined into one message, as on the phone; tap a message to read all of it.

Q. Changes in version 1.8.4

- New: APRS2SOTA in APRS Services — spot SOTA activations on SOTAwatch over RF or APRS-IS, with QRT and QSY buttons.
- New: more APRS Services — MPAD (worldwide weather, METAR, satellites, repeaters and more), ISS, QRX mailbox, APRS2TG (Telegram), WTSAPP (WhatsApp), IRC, QUIZME and ECHOMY path test.
- APRS Services: commands go by RF (through an iGate) when APRS-IS is not connected.
- New: spoken alerts — messages, watch list, geo-fence and proximity alerts read out by the phone.

- New: proximity alert when a station (or only watch-listed stations) comes within a set distance of your GPS position.
- New: Station Detail → Show path on map draws the route a packet took through the digipeaters to the iGate or to you.
- New: Station Detail → callsign lookup from HamQTH.com, shown in the window.
- New: Barometer — the phone's pressure sensor, with a 3-hour trend, a 48-hour chart and optional APRS weather reports.
- Settings are split into five tabs — Station, Beacon, Display, Alerts and RF.
- Packet terminal: the Save button saves whichever tab is showing — Terminal or Monitor.
- Packet terminal: Send with an empty input box sends a bare return.
- AX.25: new default window 4 and frame length 128 bytes (were 7 and 256).
- Messages: the parts of a multi-part reply (from JOKE, MPAD and other services) are joined on one line in the bubble, and spoken alerts say "Message from" once for the whole reply.
- Fixed: opening Messages crashed the app on Android 13 and earlier once a message had been sent.
- Fixed: a message to a station not heard on RF was dropped when APRS-IS was not connected; it now goes out on the connected RF interfaces.

R. Changes in version 1.8.3

- Messages, acks, Force RF, bulletins, objects and the TX iGate now use every RF interface, including USB and the Audio TNC; objects and bulletins now go out on RF as well as APRS-IS.
- Messages go to a station on the RF interface it was heard on directly in the last 30 minutes, even if it has since also been seen via APRS-IS; the TX iGate uses the same direct-RF test and no longer gates messages whose sender is already local.
- RX iGate: packets heard twice within 30 s are gated once, and your own packets heard back from a digipeater are not gated.
- E-mail gateway validates the server's certificate and host name (SSL and STARTTLS).
- GPX export uses '.' decimals in every language and speed in m/s; CSV export uses '.' decimals; KML export escapes special characters; ADIF exports APRS as mode PKT; object time stamps and altitude are always written with ASCII digits.
- Applying a station profile keeps settings the profile does not store.
- Reset to Defaults also clears geo-fences, waypoints, objects, templates and stream logs.
- Watch list and geo-fence alerts have their own notification channel; geo-fence alerts open the app.
- The AGW radio port is remembered; the Rings button no longer stays lit with nothing drawn; the SmartBeaconing speed badge follows the distance unit; the Bulletins screen updates live.
- Android Auto: Beacon Now works with RF-only connections and without the phone app open; the navigation map shows stations even if the phone app hasn't been opened.
- Thread-safety fixes for the station log and bulletin listeners and the weather alert cool-down map.
- Packet terminal: the Monitor shows our frames when the TNC actually accepts them; a TNC holding frames is reported; acknowledgements no longer pile up behind a held frame, and a deferred RR can no longer be dropped part-way through being sent.
- BLE TNC: transmitted frames could be corrupted — chunks were written without waiting for the Bluetooth stack, so some were lost or repeated, and two frames sent at once could interleave.

Writes are now serialised and flow-controlled.

- Packet terminal: with v2 nodes (BPQ, Linux) the terminal now sends proper command/response bits. Previously our answers to a node's polls were in v1 format, which a v2 node ignores — it kept polling and then disconnected (seen with GB7NAS).
- Packet terminal: if the TNC drops (for example the radio's Bluetooth link goes) during a connection, the terminal now ends the link and says so, instead of retrying into a dead port.
- Packet terminal: the quick-command button row (BYE, HELP, LIST…) has been removed.
- BLE TNC: frames are written with acknowledged writes when the TNC supports them, so every 20-byte piece is confirmed by the TNC before the next is sent (fixes beacons arriving with missing or scrambled pieces).
- Packet terminal Monitor: NET/ROM frames are decoded — NODES broadcasts as a route list, and network packets with their opcode (connect, disconnect, info, ack) and circuit details.
- BLE TNC: as well as the Nordic UART Service, the app now finds TNCs using the Mobilinkd BLE KISS service (TNC3/TNC4, kv4p-ht) and HM-10 style serial modules.
- BLE TNC: connecting is more reliable — failed attempts (Android's status 133) are retried, the link counts as connected only once the radio has accepted notifications, and the reason for a failure (radio busy, pairing needed, no KISS service, no answer) is shown instead of the dialog just closing.
- ISS Passes: predictions now work. The orbit was computed with the mean motion in the wrong units (placing the ISS inside the Earth) and the TLE epoch was 12 hours out, so no pass was ever found. Pass times now agree with SGP4 to within about 5 seconds. Also fixed: the TLE fetch could pick up another satellite from the AMSAT list, naked-eye visibility now also checks that the ISS is sunlit, the position comes from GPS when available, and Doppler is shown at AOS/LOS (it is zero at the peak).
- DX Cluster: each spot fits on one line — HF frequencies in kHz, VHF and above in MHz, with the band beside.
- BLE TNC: Radtel RT-950 Pro style radios are supported, and a radio that hangs up straight after connecting (status 19) now gets advice to unpair it in Android's Bluetooth settings.
- New: fill-in digipeater (WIDE1-1 and your callsign) for KISS-mode TNCs and the audio modem.
- New: Beacon Check — RF beacons are watched for on APRS-IS and each one is reported with the digipeaters that repeated it and the iGate that gated it.
- New: packet terminal connects via digipeaters (`CALL via DIGI1,DIGI2`) and has a macros menu; T1 is stretched automatically for each digipeater.
- New: ISS pass reminder notification 10 minutes before passes above a chosen height.
- Audio modem: transmitted text now uses the same character set as received text (bytes above 127 were sent as '?').

S. Changes in version 1.8.2

APRS

- Decoder audited against APRS101 and the 1.1/1.2 addenda and validated against FAP and aprslib test cases: fixes to Mic-E, compressed positions, DAO, timestamps, comment telemetry, weather, objects and items (including killed objects, which are now removed from the map).
- Beacons are sent with `=` (messaging capable) and correctly rounded coordinates.
- SmartBeaconing reworked: correct speed curve, turn beacons, no 10-second beacon flood.
- Message handling: APRS 1.1 reply-acks, duplicate suppression, forced sends can be acknowledged.

- TX iGate uses the correct third-party format; RX iGate filtering of TCPIP/NOGATE/RFONLY and third-party packets; TCP KISS and AGW keep the digipeated *.
- Objects: correct symbol, overlay and comment on re-send, edit and kill.
- Position message (location button) uses N/S/E/W correctly.

Connected-mode packet

- AX.25 implementation audited against the specification: poll/final, T1/T3, N2 retry counting, REJ and RNR handling; T3 defaults to the recommended 300 s.
- Terminal window: header × closes correctly; Monitor shows P and F bits.

Connections and data

- APRS-IS connections from the Quick Settings tile, Android Auto and after a reboot now use your full saved settings; a normal connect no longer resets iGate and filter options.
- Automatic reconnection after a reboot now connects.
- USB KISS reception decodes escaped bytes; Audio TNC keeps Mic-E characters.
- Saving settings no longer resets hidden fields; extra filter clauses are saved.
- Geo-fence alerts now fire, for APRS-IS and RF stations.
- Backups include messages, bulletins, geo-fences and profiles.
- E-mail gateway supports STARTTLS (Gmail, Office 365) and will not send a password unencrypted.
- Beacon on connect is implemented. Crash Logs added to the Tools menu.
- Symbol from SSID and the SSID Reference now follow the standard SSID conventions.
- QSO log: duplicate-prompt entries are saved; ADIF band from frequency; search works. Watch list menu fixed for stations without a position. Station Detail names the USB interface.

Further fixes

- Offline tiles are now actually used by the map, and stand in for any layer when the phone is offline. The download counts tiles that really arrived and no longer exceeds the cache's file limit.
- Map: Fit re-centres as well as zooming; hiding trails no longer deletes them; removing a waypoint is permanent; waypoint and KML names containing quotes or apostrophes work; the layer chips show the layer actually in use; night mode uses a dark map and survives the theme change.
- KMZ files can be loaded.
- Packets: the Auto button follows the newest packet or holds your place; RF filters include USB and Audio; the menu's Packets (+N) badge works.
- Messages: Traffic Flat/Grouped and My Messages search work; templates fill in {CALL}, {GRID}, {TIME} and {DEST}; global templates can be edited (Menu → Messaging → Message Templates); station templates can be deleted.
- RX and TX iGate counters count gated packets; the iGate message identifies the iGate on APRS-IS; the status text is also sent at login; an unverified APRS-IS login is reported.
- The messages-only filter now produces a valid APRS-IS filter.
- TCP KISS, AGW and Audio TNC reception, weather alerts and notification replies now work with the app screen closed. Weather alerts and bulletins also come from RF; repeated bulletins no longer re-notify; a station checked but not over a threshold no longer starts the one-hour alert cool-down.
- Watch list alerts when a station appears rather than on every packet.

- DX cluster status is shown correctly and spots update when the window is reopened; disconnecting closes the connection.
- Propagation shows data on the first opening.
- Bulletins Clear and TX History Clear refresh the screen; the Text Terminal's Connect button opens the connection dialog; positions show S and W hemispheres everywhere; the Audio TNC test packet uses a valid APRS position.
- Station profiles and the settings export include the AX.25 parameters; restoring a backup restores the e-mail gateway settings.
- In-app About/Help text brought up to date.

CHAPTER 27

Support and Credits

G7JJF APRS Client is written and maintained by **Jon Welch G7JJF**.

Website	www.g7jjf.com/aprs/ — the app's page, news and testing
This manual	Online at www.g7jjf.com/aprs/manual/, and as a PDF at www.g7jjf.com/aprs/G7JJF-APRS-Client-Manual.pdf — or Menu → User Manual, or **User Manual** on the About screen
Beta test	Apply at www.g7jjf.com/aprs/
E-mail	jon@g7jjf.com
APRS	Send a message to G7JJF
Privacy policy	www.g7jjf.com/aprs-privacy.htm

When reporting a problem please include the app version (Menu → About / Help), your phone model and Android version, the interface you were using, and a saved debug log or crash log.

Licence

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Credits

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- Address search by OpenStreetMap Nominatim.
- ISS orbital data courtesy of CelesTrak (Dr T.S. Kelso), AMSAT and ARISS.
- Space weather data from NOAA SWPC and hamqsl.com.
- APRS-IS by the APRS Tier 2 network (aprs2.net) and its volunteer server operators.
- SmartBeaconing algorithm by Tony Arnerich KD7TA and Steve Bragg KA9MVA.
- USB serial support by usb-serial-for-android (mik3y).
- Test vectors from Ham::APRS::FAP (Heikki Hannikainen OH7LZB) and aprslib (Rossen Georgiev).

73 de G7JJF · IO93MD