# APRS++ Product Manual

Version: 2026-08-01

APRS++ is a compact interface that connects an Android phone to a handheld radio for portable APRS operation. It provides USB audio and PTT control.

## Box Contents

- APRS++ USB-C interface
- Supplied heat shrink tubing
- 2 audio cables
- 2 PCB-mount audio connectors
- 1 USB-C male-to-male cable

## Required Cable

Connect the Android phone to the APRS++ interface with a **USB-C male-to-male cable**.

The cable must support data; a charge-only cable will not work. Do **not** use a physical USB OTG adapter. It can be mechanically unreliable in the field and may cause USB audio or CM108 PTT problems.

## Phone Requirements

- Android 8.0 or later
- USB host/OTG support

Some phones require **USB OTG mode** to be enabled manually in Android settings before they detect the interface. This is different from using a physical OTG adapter. The setting varies by manufacturer and may reset automatically; consult the phone manual, manufacturer support, YouTube, or other online resources for phone-specific instructions.

## App Installation

The APRS++ Android app is available on the Google Play Store (click here).

## Compatible Radios

- BaoFeng UV-5R
- BaoFeng UV-5R Mini
- Other radios using the standard **Kenwood 2-pin (K1)** accessory connector, with 3.5 mm speaker and 2.5 mm microphone/PTT plugs

Confirm the radio's connector and pinout before use; similar-looking connectors may be wired differently.

## Mechanical Protection

Before field use, protect the interface with the supplied heat shrink tubing. This helps prevent shorts, cable strain, and contact damage.

For additional strain relief, pass a small zip tie through or between the two PCB holes and secure the cable. Do not overtighten it or bend the PCB.

## Radio Setup

1. Connect the APRS++ interface to the Android phone with the supplied USB-C cable.
2. Connect the radio audio cable to your handheld radio.
3. Turn the handheld radio squelch **fully OFF**.
4. Tune the radio to the desired APRS frequency.
5. Start APRS++ and confirm that the CM108/USB audio interface is detected.
6. While receiving APRS tones, adjust the radio volume until the APRS++ audio indicator peaks at about **50 to 60%**.

Keep squelch off so the decoder receives the full audio stream, including weak packets that may not open the squelch.

## Before Transmitting

- Transmit only on frequencies and modes permitted by your amateur radio licence and local regulations.
- Confirm your callsign/SSID, APRS path, and frequency before enabling tracking.
- Before field use, run **Diagnostics > Test CM108** and **Diagnostics > Field Ready**.
- **Test CM108 briefly toggles PTT.** Stop tracking first, then test on a clear frequency or into a dummy load.
- Do not rely on APRS++ as your only means of emergency communication.

## Operating Notes

- If the audio indicator is too low, increase the handheld radio volume.
- If the audio indicator is constantly near the top or clipping, reduce the radio volume.
- Use a short USB-C cable and provide strain relief.
- Avoid leaving the bare PCB exposed during portable operation.
- Test both receive and transmit before going into the field.

## Debugging

Work through these checks in order:

1. **Check OS detection.** Connect the APRS++ interface to a Windows, macOS, or Linux computer first, without the radio. Confirm that the operating system detects the interface as a USB audio device; it may also show a CM108-compatible HID device. If it is not detected, try another known-good data cable and USB port.
2. **Test with Dire Wolf.** Connect the radio, select the APRS++ USB audio device in Dire Wolf, and check whether it can decode APRS audio. Where supported and configured, Dire Wolf can also test CM108 GPIO PTT. This helps separate hardware and radio problems from app problems.
3. **Check Android detection.** Reconnect the interface to the phone, approve any USB permission prompt, and confirm that APRS++ detects the CM108/USB audio interface.
4. **Check receive audio.** Turn squelch fully off. If packets are not decoded, adjust the radio volume and watch the audio indicator; aim for peaks around **50 to 60%**.
5. **Check transmit audio.** If PTT works but another receiver hears weak or clipped tones, adjust the APRS++ output volume and the radio/interface audio level.

## Field RF Tips

- If APRS++ shows transmit or USB/audio problems when RF power is high, reduce RF power and retest.
- Add a tiger tail or counterpoise to the handheld radio.
- Pass audio and USB cables through a ferrite toroid or clip-on ferrite choke.
- Keep the phone, interface, cables, radio, and antenna separated as much as practical.
- Use short cables and do not coil excess cable near the antenna or radio.
- If problems continue, lower the transmit power, improve the antenna, or move the radio farther from the phone and interface.

## Resources

- APRS Interface for BaoFeng and Other Radios — technical information about APRS interfaces, audio testing, CM108 PTT, and Dire Wolf.
- aprs.fi — view live APRS activity and search for a callsign.

## Support

For builds, field-radio hardware, firmware, or help, visit Bunzee Labs. When requesting help, include the **Diagnostics > Field Ready** output, phone model, Android version, radio model, and cable type.

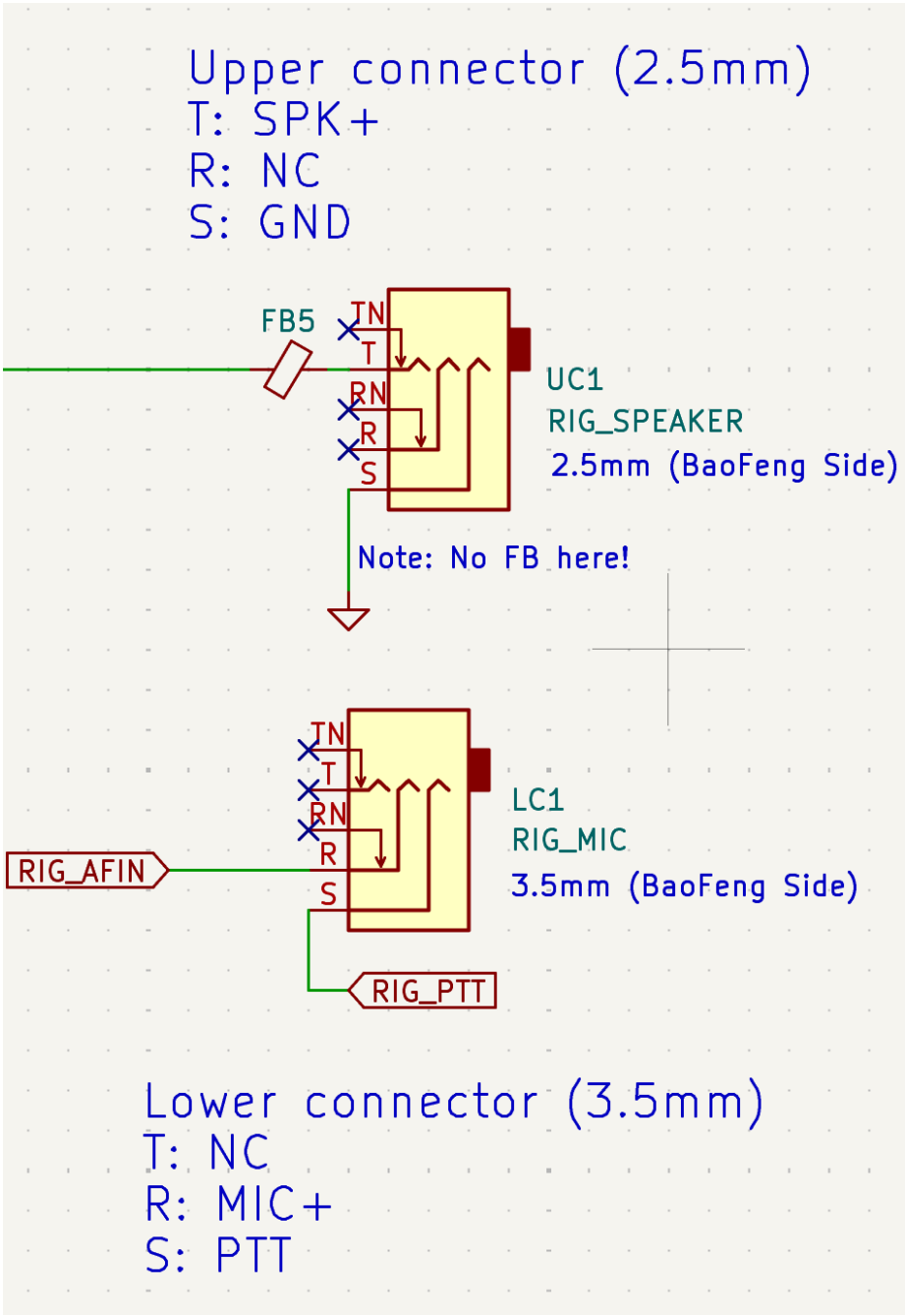



Figure 1: Pinout