

Aerial-51

ALT-512 QRP transceiver



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In the past few years we've seen a slight resurgence of field-portable QRP radios, compact transceivers with a total output power of just 5-15 watts.

A slight resurgence of field-portable QRP radios? This may seem a little ironic: after all, aren't we in the doldrums of an insufferably long solar slump? But QRP enthusiasts are rarely daunted. Programmes like Summits On The Air (SOTA) and Parks on the Air (POTA) have prompted many an amateur to venture out from the home shack, gear in tow. Some operators find that their home environment is

either too noisy or too restrictive to play radio, so having a portable and packable radio at the ready solves this problem.

While CW is still a preferred mode for many QRPers, new digital modes like FT8 and FT4 allow radio operators to tick off multiple all-time new ones, in spite of poor propagation, with just a modest antenna, basic computer and low power.

Germany-based retailer and manufacturer, Aerial-51, has recently introduced a transceiver for the European market: the ALT-512 SDR transceiver, designed and built in Europe.

Build

The ALT-512 is quite portable, weighing in at only 580g with especially modest dimensions of 14.7 x 10.7 x 7cm.

The chassis is made of extruded aluminium (6063), smooth to the touch, and sports soft rolled-off corners. The side panels have a protective polycarbonate seal around the edges to help prevent the bottom or sides of the radio from being scratched.

The multi-colour buttons have a prominent profile and a highly tactile feel. With that said, unlike most modern transceivers, there's no confirmation 'click' response when fully pressing them. I haven't found that pressing a button ever results in a lack of performance function. All of the external connections are on the right and left of the radio chassis. It includes everything one would expect, (Photo X). I did find the button and control layout a little cluttered. Obviously, in the designers' defence, the choice was made to give the user more direct controls on the front panel rather than relying on embedded menu functions for adjustments. With small field portable radios



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this is always a compromise, but in the end I would choose to have more options for direct control, rather than having to dig through menu items to make common adjustments.

The encoder is a simple aluminium knob and lacks a dimple or any ability to adjust the brake but I found the tuning mechanism to be quite pleasant and well-adjusted. The AF knob feels 'tight' when turning – if your hand accidentally hits it during operation, it will not move.

Instead of having a built-in bail, the ALT-512 has two extendable legs on the back of the unit that fold up to the chassis. Once the legs are extended, you have a nice operating angle position.

It also comes with a quality hand microphone, fused DC power cord with pigtailed (note: I added Anderson Powerpole connectors to mine), hex wrenches and a USB cable for both CAT and audio control.

The colour backlit display measures 2.4in; while this is modest in size, it does effectively display a lot of information simultaneously. It cannot be customised nor can the contrast or brightness be modified, at least with the current firmware. I'm particularly pleased that the display designer chose to include a persistent voltage meter and clock, both of which I reference during field operations.

Features

The ALT-512 is a 12-band transceiver covering the 160, 80, 60, 40, 30, 20, 17, 15, 12, 10, 6 and 4m bands. It has expanded receiver capabilities including 100 to 1800kHz, and 27 to 28MHz; note that in the US, the 4m band is receive-only.

There is also a transverter option that allows for an accurate frequency display on 2m and 70cm with a 28MHz IF and a drive level of 150mW. I did not test this option.

The display contains a lot of information. Almost one third of the display is dedicated to 48kHz spectrum/waterfall. The user can choose either spectrum or waterfall

display, and almost all of the parameters are adjustable via menu selections. Initially, I questioned how useful such a spectrum display would be, but I've discovered it's incredibly useful.

Operation manual reading is requisite, but I'll save you time: a number of the labelled button functions are accessible either by a short push, a long push, or either of those actions during transmit or receive. For example, before I read the preliminary manual, I found the AGC/POW/IF button confusing. A short push toggles the Virtual Intermediate Frequency (the suggestion is that it always it always be kept on). A long push activates the Auto Gain Control time-constant adjustment. It was the POW (Power) adjustment that I couldn't seem to access; but upon reading the manual, I quickly learned this is adjusted *only while the PTT is engaged* (ie, when you're transmitting).

Audio

In the field I typically rely on earphones or a boom headset to provide a little sound isolation, especially if I'm operating in a space with noise from passersby, rushing water, or traffic. But occasionally, I want to share the audio experience – particularly if I'm working with another amateur to log contacts or if I'm conducting a demonstration.

In general, built-in audio on field-portable radios is severely compromised. Since field-portable radios have compact dimensions, there simply isn't a lot of room to fit an internal speaker. I'm very pleased with the internal speaker on the ALT-512, it's one of the best speakers I've tested in a field-portable QRP radio and it amplifies enough that it's quite useful both in the shack and especially in the field. Being a small speaker (internally mounted on the right side of the radio) it lacks any sense of a bass response, but works quite effectively for voice and CW.

Likewise, audio via headphones/earphones is pleasant and has enough



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amplification to push larger over-the-ear headsets. Via headphones, there is a low-level, ever-present audio hiss that is generated somewhere in the audio chain, but fortunately it has no negative effect since it's *well* below the HF noise floor. I imagine this could be mitigated by a future firmware update.

On the Air

SSB: Using SSB I've received excellent audio reports with the supplied hand-held microphone. Although small in size, the radio is not short on phone features and you can adjust the transmitted audio. The default SSB audio filter is 2.8kHz. The manufacturer includes a special note in the operator's manual stating that *due to the sharp skirts of the DSP filters, if the bandwidth is too narrow, the audio will sound "clipped"*. When I first started testing the ALT-512, I accidentally had the second Tx filter on a narrow setting and can confirm this.

Interestingly, the ALT-512 also has an adjustable 'echo' effect that adds reverberation to the transmitted audio. The manufacturer notes that the echo feature could enhance 'audio punch' when working DX. Admittedly, when you're running QRP SSB and trying to work DX, anything to make your intelligible audio stand out could be a useful tool.

Speaking of DX, I found the spectrum display quite useful as it made it easier for me to spot where DX was pulling contacts during large pileups. I was able to grab a DX station (Belize) in the field by using the spectrum display to strategically position my 10W signal where the DX was listening. This helped me log Belize (V31) with relative ease.

CW: I've enjoyed operating the ALT-512

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in CW mode. CW operators who prefer full break-in QSK may be somewhat disappointed to find that the ALT-512 does not support this. In other words, audio recovery is not quick enough to hear received audio between sent characters unless operating at very slow speeds.

However, I adjusted the VOX delay to 100ms that allows for 'fast semi break-in', as the manufacturer terms it. At this speed, there is no discernable clicking of any sort other than expected mild audio pops. The recovery is quick enough that, between words (not characters), you can hear the Rx audio. Frankly, I actually prefer a longer delay because most of my CW sending is around 18 WPM and I'd rather not be distracted by the received audio, except for between sentences or during deliberate pauses in the conversation.

The ALT-512 includes a full complement of CW features. The sidetone pitch and volume are adjustable as well as the CW weight ratio and can be configured for a straight key or paddles.

It also includes a simple CW decoder on both receive and transmit. I found that, while operable, the decoder is not incredibly accurate. There is a 'level' adjustment that may help decoder accuracy, but I didn't spend an extended period of time testing this.

Digital Modes

One feature I love about the ALT-512 is its internal sound card. Like a number of tabletop SDR transceivers, it will run digital modes without needing an external sound card. This is a wonderful feature for portable operations.

Setting up for full rig control is simple on a Windows PC. Simply use the supplied USB cable to connect the radio to your computer – Windows will automatically download and install the cable driver. The free Omni-Rig application links the radio with your digital mode software. The ALT-512 uses the Kenwood TS-2000 CAT command set.

I was able to completely control the radio using the WSJT-X application. Initial setup time was perhaps 15 minutes, but I did spend an additional half hour convincing my PC to send audio out and key the transmitter. I would not anticipate others struggling with the same problem as I believe this was simply a nuance and audio-out conflict with my PC.

In short: the ALT-512 is a *superb* QRP rig for running FT8. Field operation couldn't be easier: add a laptop or Windows tablet to your field pack, and you're good to go! Although the ALT-512 chassis became warm during extended FT8 sessions, it never overheated, decreased power, or shut down.

Summary

Every radio has its pros and cons. When I begin a review of a radio, I take notes from the very beginning so that I don't forget some of my initial impressions. Here is the list I formed over the time I've spent evaluating the ALT-512.

Pros:

- Excellent 2.4" TFT backlit colour display
- Spectrum/waterfall display is wide enough to be useful and refresh rate is rapid enough to be responsive
- Buttons are tactile
- Band-specific bandpass filters to reject

out-of-band strong stations (see "con" regarding general coverage)

- Built-in sound card interface for digital modes
- Excellent duty cycle for FT8 and other digital modes
- Dedicated voltage and time segments on display
- PTT out for external amplifiers

Cons:

- Front panel labels a little cluttered and require a learning curve
- No general coverage reception (see "pro" regarding band-pass filters)
- Front panel labels can be difficult to read in low light
- No internal battery option
- No internal ATU option
- User manual still an initial version at time of press

Conclusion

The ALT-512 is a comprehensive, compact QRP radio that should satisfy any operator who enjoys playing radio in the field or in the shack. Although the ALT-512 doesn't have internal batteries, nor an internal ATU like some field radios, it's also *much* less expensive. Field operators will be pleased to note that on receive, and with the internal speaker volume turned up high, the ALT-512 only needed 0.45A according to my measurements. If you combine it with a resonant field antenna and small LiFePo battery, you'll be able to 'play radio' for hours on end.

While the front panel is a little dense with buttons, it also offers the operator quick access to the most frequently used features and adjustments without having to dig through embedded menus during a QSO.

The ALT-512 also offers a functional, responsive spectrum display that few other portable radios currently on the market offer and sports almost every connection you could expect in a radio of this price class.

In addition – though perhaps this is subjective – it feels like a quality piece of kit to me, one that can take the rigors of travel and field operation. It's also obvious that it was designed by and for active amateur radio operators. I've also been quite pleased with the customer support from Aerial-51: if you have questions, concerns, or praise, they should all get immediate attention.

The ALT-512 was designed by LZ2TU, RA9YTJ and LZ1JY. It is manufactured in Europe and marketed under the brand name Aerial-51 (<https://www.aerial-51.com/alt-512/>) by Appello-Funk GmbH (<https://www.appello-funk.de/>). It is available from a number of sources priced around 799 Euro.