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Product Review

WiMo PicoAPRS Version 4
APRS VHF Transceiver

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WiMo's PicoAPRS, version 4, is the smallest, lightest handheld transceiver I've ever encountered. It is slightly larger than a box of wooden matches (see Table 1).

Its name can be misleading, as you may be tempted to regard the PicoAPRS as just another Automatic Packet Reporting System (APRS) tracking device. While it can certainly serve that purpose, the PicoAPRS is a 2-meter FM voice transceiver as well.

Developed by Taner Schenker, DB1NTO, the PicoAPRS packs an abundance of features into its tiny enclosure. For APRS applications, it includes a sensitive GPS receiver, a KISS terminal node controller (TNC), Wi-Fi and Bluetooth wireless control, and APRS IGate and digipeater functionality. For voice operating, you have 21 memory slots, receive-channel scanning, the usual side-mounted push-to-talk (**PTT**) button, and a minuscule, but surprisingly loud, speaker.

The PicoAPRS spans 144 to 148 MHz and offers either 0.5 or 1 W output. Everything is powered by an internal 850 mAh lithium-ion battery. Depending on how often (and how long) you are transmitting, the battery provides up to about 10 hours of operating time.

The transceiver sports a colorful 240 × 240-pixel display. While some of us must occasionally resort to eyeglasses to read the screen, I found it to be sharp and quite bright — so much so that my glasses usually remained in my pocket while I was using the PicoAPRS.

It is important to point out that the display is not a touchscreen. Instead, you must use the five-position joystick control below the screen to navigate the menus and make selections. Navigating in this fashion isn't intuitive, and it took a while for me to become accustomed to it.

Curiously, the PicoAPRS lacks two critical components that require additional purchases: an antenna and a USB-C cable. The radio is often depicted in advertisements with a flexible "rubber duck" antenna, but you won't find an antenna when you open the box. For this review, I purchased an antenna from Amazon for about $10. Any antenna will do if it has a male SMA connector. I also had an SMA-to-SO-239 pigtail adapter that I used to attach the PicoAPRS to my mobile and home antennas.

You'll need a USB-C cable to charge the battery and communicate with the built-in TNC (unless you use the wireless function). These cables are commonly available for just a few dollars.

FM Voice
A 3-second push on the **PTT** button powers up the PicoAPRS. To operate in voice mode, you must select **FM VOICE** via the menu system. You can program a frequency and operate simplex straightaway in this fashion. However, repeater operating requires you to first program the PicoAPRS memories to designate the transmit frequency, receive frequency, CTCSS tone frequency, etc. This can be done through the PicoAPRS display, but it is easier to accomplish via a wireless connection. For wireless access, you must configure the radio's built-in web server for the network you will be using, such as one in your home. Select your network, enter the network password, and PicoAPRS

> **Bottom Line**
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> The WiMo PicoAPRS APRS VHF transceiver is a remarkable feat of technology, with functionalities that have been squeezed into an ultra-compact and ultra-lightweight radio.

will connect automatically and display its assigned IP address, such as 192.168.0.25 (see Figure 1). Alternatively, the PicoAPRS will provide a QR code that you can scan with your smartphone, which is even easier.

Once the web server is active, you can go to any computer on your network, open a web browser, and enter the IP address. From this screen you can program each memory slot. When you click **SAVE**, everything will be stored in the Pico-APRS memories.

With the memories programmed accordingly, it is easy to select the frequency combo for the repeater you desire. You can even scan through the memory channels. In voice mode, volume and squelch levels are shown on the screen and are adjustable via the joystick control.

Despite producing only 1 W maximum output, I was able to reliably reach any local repeater (see Figure 2) using just the flexible antenna. I received excellent reports with several comments on my clean transmit audio. Unfortunately, the PicoAPRS lacks ports for external earphones or microphones, which might be an issue when using the radio in situations where there is significant ambient noise.

APRS

If you are unfamiliar with APRS, it is a digital mode that is commonly used for tracking moving objects, text messaging, and other types of data exchange (such as information from automated home weather stations). Object positions and information are typically displayed on software-generated maps.

In tracking applications, position data from GPS satellites is encoded into bursts of data that are transmitted on a regular basis, such as once every 60 seconds (transmit timing can be selected through the PicoAPRS menus). These are simplex transmissions usually occurring on 144.390 MHz.

If an APRS station, such as a digipeater, receives your transmission, it will relay the information to other stations in the area that may also pass it on to the internet.

Table 1
WiMo PicoAPRS Version 4 APRS VHF Transceiver, serial number 132582542771764

Manufacturer's Specifications	Measured in the ARRL Lab
Frequency coverage: 144 – 148 MHz.	As specified.
Modes: FM voice, APRS.	As specified.
Power requirements: 3.7 V – 850 mAh lithium-ion battery.	As specified.
Transmitter	**Transmitter Dynamic Testing**
Power output: 1 W.	1 W at 3.7 V dc (full charge).
Spurious signal and harmonic suppression: Not specified.	> −60 dB. Meets FCC requirements.

Size (height, width, depth): 2.6 × 1.4 × 0.9 inch. Reviewed antenna, 6 inches.
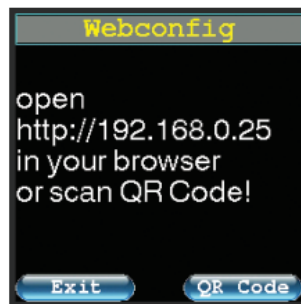Weight: 2 ounces.

Figure 1 — The PicoAPRS offers a built-in web server that can connect to any Wi-Fi network.

Figure 2 — The PicoAPRS in FM voice mode.

For those already knowledgeable about APRS, I should mention that the relay path is fixed in the PicoAPRS at WIDE1-1, WIDE2-2, except when you select the International Space Station packet digipeater frequency of 145.8250 MHz. At that frequency, the path defaults to ARISS, WIDE2-1.

During this review, I found that the PicoAPRS could acquire signals from enough GPS satellites to determine my position within a minute or so after turning it on. The satellite antenna system icon flashes on and off in the display and then becomes steady once the receiver has a "fix."

The screen can display a surprising amount of APRS information, showing position messages, status messages, text messages, and more (see Figure 3). Through the menus you can see information for the last stations heard, including distance and compass direction. The PicoAPRS will also display your GPS coordinates and even your speed.

If you hope to have your APRS transmissions relayed throughout the network, I'd strongly recommend using a suitable antenna. If you rely on only a flexible antenna, you will likely discover that reports of your position will reach the network only occasionally. I had the best results with the PicoAPRS attached to my mobile antenna.

Another cool feature of the PicoAPRS is its ability to connect to a computer, smartphone, or tablet via a wireless Bluetooth link. If you have APRS software running on your device, you can access the PicoAPRS TNC and use it to send and receive APRS data. To test this function, I used the APRS.fi app on my Apple iPad. Once I had established the Bluetooth connection to the PicoAPRS, local APRS activity began appearing on the tablet in all its colorful glory (see Figure 4). With the PicoAPRS connected to my outside antenna at home, I had total access to the local network through my nearest APRS digipeater.

The PicoAPRS can operate while being powered through the USB-C cable. That being the case, you could use the radio as the core of a permanent home APRS station.

Figure 3 — Receiving weather station data via the local APRS network.

I should also mention that the PicoAPRS wireless connection capability allows you to update its firmware via the internet. This is easily done through the menu system. When the developer adds new features, you can update your radio within minutes.

WiMo offers a detailed user manual that explains all the functions of the PicoAPRS. You can download it as a PDF file at **www.wimo.com/en/picoaprs**.

The SOS Function

The PicoAPRS includes a clever emergency function. With luck, you'll never need to use it, but should you find yourself in a life-threatening situation, you need only press and hold the center button for about 5 seconds. This activates the SOS function, which will switch the PicoAPRS to APRS mode (if it isn't in that mode already). Transmit power will be set to maximum, and the PicoAPRS will send an APRS emergency message with your position. It will repeat this emergency message every 60 seconds.

A Remarkable Radio

While the PicoAPRS is a tiny transceiver, its hefty cost may raise some eyebrows. We tend to associate small size with small cost, but that isn't the case here. However, in my opinion, the value proposition justifies the price. In the PicoAPRS you get not only a full-featured APRS transceiver (that can also function as a digipeater, by the way), but you also have a capable 2-meter FM voice radio. The fact that all of this functionality has been squeezed into an ultra-compact, ultra-lightweight radio is a remarkable feat of technology.

Manufacturer: WiMo Antennen und Elektronik GmbH, Am Gäxwald 14, 76863 Herxheim, Germany, **www.wimo.com**. Price: $399.99.
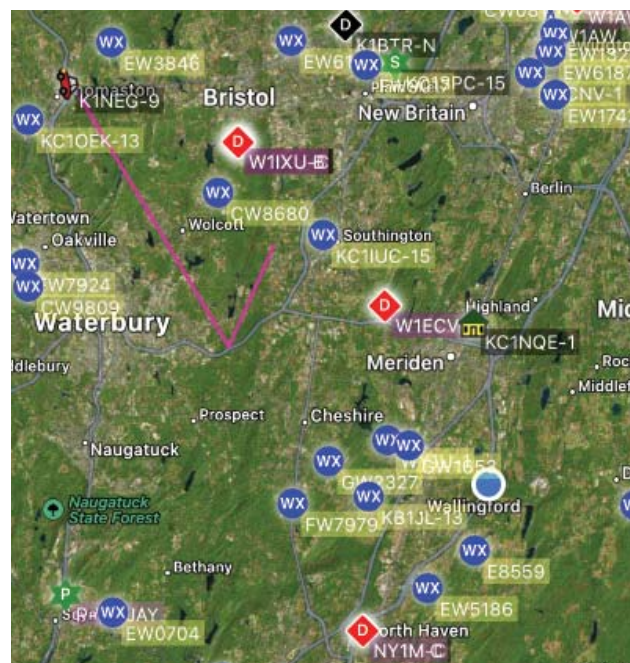

Figure 4 — Using the APRS.fi app on my tablet, I could connect to the PicoAPRS's internal KISS TNC via Bluetooth and monitor local APRS activity.