



Product Review and Short Takes from QST Magazine

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Product Reviews:

mini Radio Solutions miniVNA Network and Antenna Analyzer

Two More Antenna System Measurement Devices

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Antenna system measurement devices are one of the most popular categories of auxiliary amateur station equipment. This should not be a surprise, since antenna systems are one of the major areas of amateur construction, experimentation and repair. Having a device that can characterize an antenna in one step is a great help in all of these pursuits. Amateurs have a wide range of choices, many of which have been reviewed or described in *QST* or *QEX* in recent years.¹⁻⁸

This time we have two different types of units. One is a computer controlled device that can perform both antenna and network analyzer tasks, as well as serve as an accurate signal source. The other can be used as a handheld meter, but also can provide computer displayed data and serve as a signal source. You may want to look over the earlier reviews and articles as part of your assessment of these units to decide which type best fits your requirements. We describe each below — in alphabetical order.

¹J. Hallas, W1ZR, "A Look at Some High-End Antenna Analyzers," Product Review, *QST*, May 2005, pp 65-69. *QST* Product reviews are available on the Web at www.arrl.org/members-only/prodrev/.

²J. Hallas, W1ZR, "Antenna Analyzers with a Different View," Product Review, *QST*, Nov 2006, pp 70-74.

³M. Wilson, K1RO, "Array Solutions PowerMaster Wattmeter," Product Review, *QST*, Jan 2006, pp 70-72.

⁴J. Garcia, NJ 1Q, "Alpha Power 4510 Wattmeter," Product Review, *QST*, Jul 2006, pp 62-64.

⁵J. Hallas, W1ZR, "Three More Antenna System Measurement Devices," Product Review, *QST*, Aug 2007, pp 67-73.

⁶B. Clunn, W5BIG, "An Antenna Impedance Meter for the High Frequency Bands," *QST*, Nov 2006, pp 28-32.

⁷L. Phipps, N8LP, "The LP-100 Wattmeter," *QEX*, Jan/Feb 2006, pp 3-13.

⁸J. Hallas, W1ZR, "WaveNode WN-1 Station Monitoring System," Product Review, *QST*, Oct 2004, pp 71-74.

mini Radio Solutions miniVNA NETWORK AND ANTENNA ANALYZER

This capable device can fit into a shirt pocket. It can measure the usual antenna parameters across frequencies ranging from 0.1 to 180 MHz in whatever size slice you want. It can also do much more, as we will discuss. To do anything, however, it needs to be connected to a computer, so we're talking about a shirt pocket and a backpack, or perhaps another pocket, for the PC. Bluetooth operation is also possible for remote measurement.



What's it Do?

The unit has three connectors — a data connector to hook to a PC USB port, a DUT (device under test) BNC connector and a DET (detector) BNC connector. There is no power connector because the unit derives power from the computer's USB port, although you will have to rig a dc source if you use it with a Bluetooth device. Specifications are provided in Table 1.

Antenna Analyzer Mode

In antenna analyzer mode, the left tab on top of the PC display screen, the DET port is

left unused and the antenna system is connected to the DUT port. Figure 1 shows the resulting output, and it looks a bit overwhelming until you decide to select only the parameters of interest. Once you deselect the parameters you don't want to look at, it becomes very manageable. For example, for antenna tuning you may wish to just view SWR. In addition to the plotted data, a click to move either "marker" to any frequency will provide you with the tabular data for the two marker frequencies shown below the plot.

The frequency sweep range can be set manually, or you can select either the HF BANDS or VHF BANDS

box and it will give a choice of a frequency range that includes each amateur band, with considerable overlap. The outputs are pretty straightforward, once you decide what they mean (they aren't described in the docu-

Bottom Line

A very useful device for both antenna and lab measurements — if you can figure out for yourself how to use it and what all the buttons mean. A promised effort by the manufacturer and distributor should resolve this fairly quickly.

Table 1
miniVNA Antenna Impedance Meter

Manufacturer's Specifications

Frequency range: 0.1 to 180 MHz.
Frequency accuracy: Not specified.
Impedance range: Not specified.
Impedance accuracy: Not specified
Drift: 30 ppm.
Output power: 1.0 mW max, load not specified.
Power requirements: USB connection.
Size (height, width, depth): 1 × 2.25 × 5 inches.
Price: \$399.

Measured in the ARRL Lab

As specified.
54.4 ppm.
Tested from 5-1000 Ω.
See Table 3.
N/A
0.6 mW into 50 Ω.

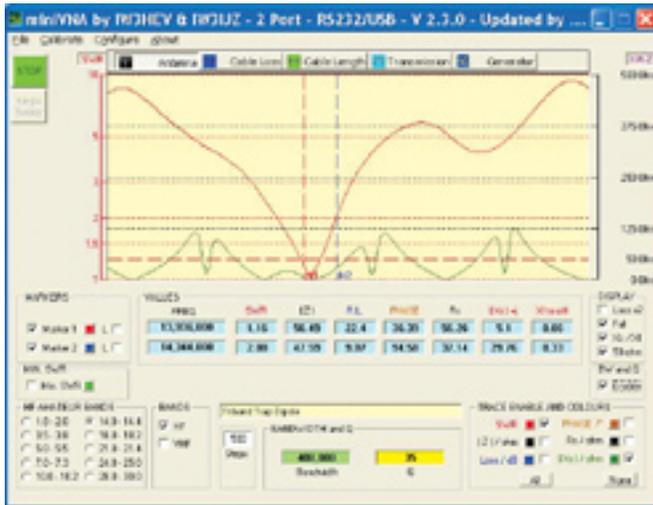


Figure 1 — The miniVNA output in antenna analyzer mode. The multiple displays can be reduced if unneeded to show only desired data.

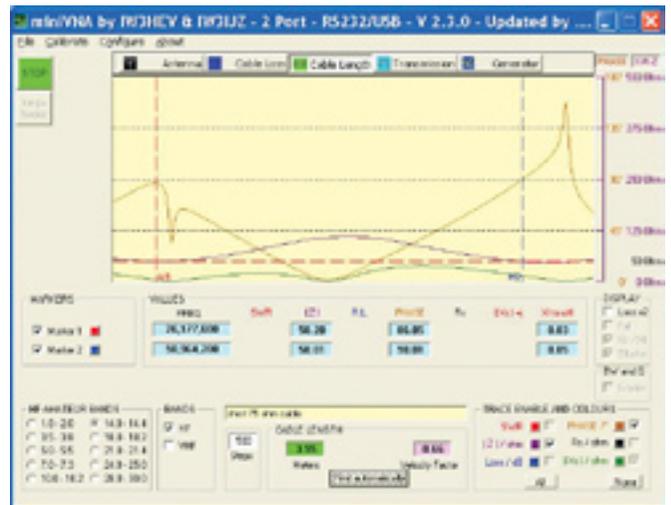


Figure 2 — The miniVNA display while in automatic cable length measuring mode.

mentation, see below). As with most, but not all, such units, the plotted phase is provided on a 0 to 180° basis without an indication of sign. There is a choice of an additional display parameter, XL/XC, that appears to change depending on whether it thinks the reactance is capacitive or inductive. The associated L or C value is provided.

Vector Network Analyzer Modes

By selecting any of the next three tabs, you are in vector network analyzer (VNA) mode. In this case, rather than examining the impedance of a two-terminal device, the internal generator signal from the DET port is passed through the device under test with its output connected to the DUT port. In this mode, cables may be tested for insertion loss or their length estimated. Filters and other selective devices may be measured over a wide frequency range.

Figure 2 shows a cable loss measurement, while Figure 3 is the throughput of an old R. L. Drake low pass filter that I found in a corner of the basement. I put one marker on the top of its passband and the other just into the lower edge of TV channel 2. As noted, after many years of sitting on a shelf, the filter still passes 10 meters and attenuates signals in the TV band. While the display only indicates a 30 dB range, the actual dynamic range is specified at 50 to 55 dB, borne out in the tabular data. Offsets can be entered to shift the position of the 30 dB of graphical display range, or you can check the LOSS X2 box and expand the scale

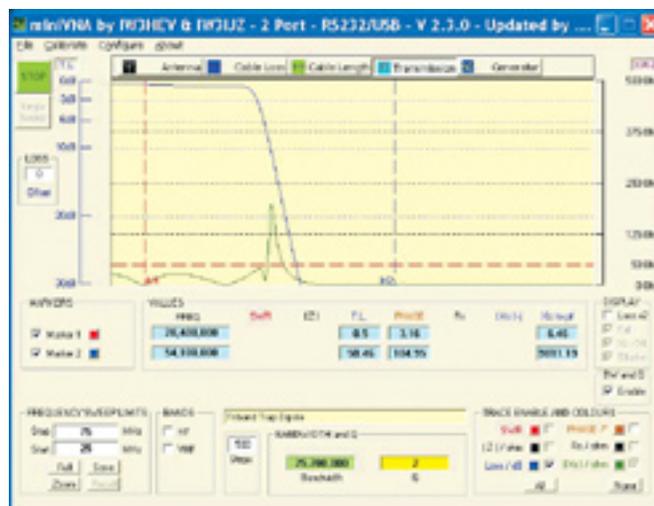


Figure 3 — Using the network analyzer mode of the miniVNA to measure the characteristics of a low pass filter.

to 60 dB. While this is not quite up to the capabilities of the more serious VNAs on the market, it may be just what an amateur needs at a fraction of the usual cost.

Documentation

This may be the weakest link of this otherwise innovative product, and hopefully one that will be corrected fairly soon. Packed with the device is a single 8½ × 11 inch sheet with German on one side and English on the other. It is called a *Quick Installation Reference Manual*, and while it was certainly quick, I didn't find it very helpful for installation, or much else. The included CD and installation program ran fine, after I found the .exe file, but there was a requirement to find a manufacturer's driver file for the internal USB device. I did find that on the Internet, but the files referenced in the *Quick Start* were nowhere

to be found. It did finally set up using the autodetect function, although it first detected other ports connected to my PC and keyed up my transceiver! Its operational instructions just said "press RUN to start measuring." Some may like a bit more guidance on what and how to measure!

I went to the mRS Web site and was pleased to find an eight page *Reference Manual*. This was better, but still didn't quite help me find the files they wanted me to modify to set the COM port. This manual includes a hardware description, with indication of where to connect dc if you use a different kind of device, such

as the Bluetooth transceiver. Each mode is described in about half a page with a screen shot, but they seem to assume that the screen, and operation, are self explanatory.

I found a glimmer of hope on the Web page of their US distributor, W4RT. Here was a link to different seven page document called the *Software Manual*. This started with a description of the CALIBRATE function, not mentioned elsewhere and then provided a thoughtful description of how to use the device in some representative applications. A thoroughly revised set of documentation, along with expanded software is promised around the time you read this.

Manufacturer: mini Radio Solutions, www.miniradiosolutions.com; US distributor: W4RT Electronics, 3077-K Leeman Ferry Rd, Huntsville, AL 35801; www.w4rt.com.