

DPD Productions ADS-B Vertical Antenna

One of the basic principles under which I operate as a radio monitor is “the higher the radio frequency, the better the antenna needed for good reception.” While I might be able to get away with a simple wire antenna for my HF amateur station, that won’t be the case with my VHF/UHF amateur and scanner stations.

So, when I recently set up my Mode-S/ADS-B radio system in the mountains of western North Carolina, I knew I would need a good, top-end omnidirectional antenna to receive the 1090 MHz data transmissions from aircraft. My goal was simple: the better and higher the antenna, the more range and, consequently, the more aircraft I would be able to plot.

What I settled on was the DPD Productions ADS-B vertical antenna. This omnidirectional antenna is tuned for Mode-S/ADS-B reception, using receivers such as the SBS-1/2 or RadarBox, and is specifically tuned to the frequency of 1090 MHz, which is the center of the Mode-S/ADS-B band.

Antenna Construction and Installation

The actual brass antenna elements and feed point for this antenna are sealed inside a UV resistant plastic radome which allows the antenna to be very resistant to weather and other environmental damage. The antenna is strong enough to withstand an ice storm and will also do well in a coastal environment: You won’t have to worry about corrosion on the elements with this design. The design also helps control friction-induced static from wind and dust.

Instead of the usual UHF connector included with most antennas, the ADS-B antenna includes a 50 Ohm female N connector on the end of a small cable pigtail. N connectors are more water resistant and handle high frequencies better.

As you purchase this antenna, one additional decision you will need to make is your choice of coax. Due to the high frequency at which these systems operate and the potential losses that can occur through cable, I highly recommend that you choose at least an RG8 size coax cable with N connectors. Using anything smaller or adding adapters will introduce losses at this frequency most monitors will find unacceptable. Spending the extra funds

will definitely increase the performance of this antenna.

The instructions that came with the antenna were well written, and installation was a snap. A metal ground plane is not needed with this design and no assembly was necessary, nor were extra mounting parts needed. You just use the mounting clamps that come with the antenna to attach the antenna to any standard 1-1/4 inch mounting mast (mast not included).

I found the construction of this antenna superb. It is extremely well made and should last a long time on the pole with little or no maintenance.

Bottom Line

My ADS-B receiver came with a small magnetic mount antenna provided. Reception on that antenna up here in the mountains wasn’t great. When I connected my receiver to the DPD antenna, the difference was noticeable right away.

Not only did I receive more aircraft – both Mode-S and ADS-B – but my polar plot diagram started increasing in size right away. In other words, my range was extended dramatically with this antenna!

I also noticed that the amount of ADS-B equipped aircraft increased within the same range as I had before. That seems to indicate that I had been missing some ADS-B aircraft that were right under my nose.

The bandwidth of this antenna is fairly narrow. It may be that some intermod issues may have caused me to miss some ADS-B traffic when I used the 1090 MHz mag mount. The narrow bandwidth of this antenna may have eliminated intermod problems created by adjacent strong signals.

I also find that the movement of aircraft on my screen now seems more “fluid” since the signals being received are much stronger. This allows for fewer drop outs and a smoother track on screen.

If you have a Mode-S receiver and you don’t have a DPD ADS-B antenna, you really don’t know what you are missing.

This antenna is available from DPD Productions. You can get more information on ordering it and their other antenna products at www.dpdproductions.com/.

– Review by Larry Van Horn, N5FPW



**Table One: DPD ADS-B Vertical
Manufacturer Specifications**

Gain	9 dBi
SWR	1.5:1 or less on center frequency
Pattern	Omnidirectional
Wavelength	Multiple 1/2
Tuned Freq	1090 MHz (Mode-S / ADS-B band)
Connector	N Female
Cable	RG8X
Cable Length	12-inches
Height	57-inches
Width	1 1/4-inch
Weight	1-lb 11-oz
Wind Area	0.50 square feet

REVIEW 2

❖ MFJ-260C 300 Watt Wideband Dummy Load

So, why would anyone want to hook a big resistor to a ham rig when there’s an antenna available?

Dummy loads – for those of our readers unfamiliar with them – represent ideal antennas ... with one exception. On the plus side, they are pure resistances: no “reactances” (deleterious inductance and capacitance effects) which can result in wasted power.

If your rig is supposed to be attached to a 50 ohm load (the antenna), then that’s what a 50 ohm dummy load provides. And it has an enormously-wide bandwidth with no adjustments being necessary.

So what is that one exception? Why don’t we use them as antennas? Because all of the power that they acquire is used up as heat!

The dummy load is exclusively a transmitter tuning apparatus. It allows a transmitter’s power output circuitry to be maximized under ideal conditions as if it were feeding its signal to a perfect antenna. This way we can concentrate on optimizing the antenna to radiate as much of the RF power it is receiving from the transmitter as it can.

The MFJ-260C is such a wideband dummy load. It is a non-reactive, high-wattage resistor on a heat sink, contained in a husky metal case. Air slots allow convective cooling. Rubber bumper feet reduce the likelihood of it slipping on or scratching a desktop surface.

This 300 watt model is designed to operate from DC to 650 MHz, and is fitted with a UHF-style N connector. A derating curve is silk-screened to one end to show safe “on” periods vs. power levels, so as not to destructively overheat the resistor.

The MFJ-260C will allow 300 watts to be loaded into it for about half a minute, but a more typical 100 watt transmitter can operate at full power for up to one and one-half minutes before the heating becomes excessive. After a brief cool-down period, you can go again.



Many VHF/UHF rigs operate at significantly lower levels, like 25 watts or even less. Hand-holds are often only five watts. As you might expect, at these low power levels, continuous transmissions are acceptable for five to 10 minutes at a clip.

So, does it do its job?

We confirmed that the MFJ-260C 50-ohm resistance, heat derating recommendations, and SWR (under 1.5:1) are accurate. The unit is well constructed and painted, and is housed in an all-metal (aluminum), cosmetically-professional enclosure.

If you transmit, you're eventually going to question whether your rig is putting out the power it's supposed to. A quality dummy load like the MFJ-260C will absorb that transmitter's energy like a perfectly-matched antenna, while you check the output with a wattmeter or simply read the transmitter's meters.

In a pinch, feel the cabinet of the dummy load for heat and compare the time interval with the chart on the back of the unit! And, did I mention that the price is right? MFJ-260C dummy load, \$39.95 from MFJ Enterprises (P.O. Box 494, Mississippi State, MS 39762; www.mfjenterprises.com; 1-800-647-1800); also available from selected MT advertisers.

— Review by Bob Grove, W8JHD.

REVIEW 3

❖ Midnight Science Ultrasonic Dish

In April 2009, we reviewed the RX-1 ultrasonic receiver for listening to the sounds of nature, such as bat calls. It's a fine receiver for listening to these chirps in the 40 kHz range, down-converted into the human hearing range. That receiver has been replaced by the Ultra RX-2 with automatic gain control.

Now, an optional parabolic dish reflector is available as well for both models. We ordered the dish and followed the directions to attach it to our original RX1 as shown in the attached photo.



Some assembly required

The dish kit modification does require some tools and shop experience. Holes have to be drilled in the receiver case to accommodate the bracket which holds the dish; a hand grip must also be mounted on the bottom of the receiver case; and a two-conductor cable needs to be soldered to the receiver (after removing the original microphone) and to the new mike in the parabolic dish unit.

The parabolic dish is sturdily held against the receiver mounting plate by three metal struts. The microphone is aimed back at the dish from the focal point of the reflected sound. The entire assembly is comfortably balanced, lightweight, and held by a pistol grip.

Let's listen

After assembly, it was time to test the unit. Switching on the receiver, the directivity and gain of the new combination was immediately apparent.

Grasping the hand grip and aiming the dish at various targets, I was able to select the ultrasonic components of keys rattling, my collies' dog collars, water running from a faucet (yes, that's ultrasonically noisy!), and even footfalls on our gravel driveway — a crunching piezoelectric effect.

Walking through the house with the dish-amplified detector was an ear-opening experience. Computers emanate a strange whine, while electrical wiring and switches often radiate clicks.

A longer walk through the neighborhood revealed quite an array of ultrasounds — insects' and hummingbirds' wings beating, stream water trickling, my wife's digital camera autofunctions, and a solar-powered, solid-state fence charger that sounded like an alien invasion in a science fiction movie! And right now I'm waiting for nightfall to eavesdrop on bats!

Practical applications

Electrically-infuriating power lines often develop leakage paths in insulator cracks and loose connections. The resulting "hisses" and "zaps" are rich in acoustic harmonics which can be audibly bulls-eyed by aiming the ultrasonic dish.

Locating high-pressure gas leaks is another useful application of the dish. Again, the out-gassing is rich in acoustic harmonics.

The bottom line

While the Midnight Science RX1 and RX2 ultrasonic receivers are sufficiently sensitive to detect a wide array of ultrasound sources, the addition of a parabolic reflector adds directivity as well as additional gain, making the system very satisfactory for both hobby and practical applications.

The original swath of directivity for the mike alone is a wide 50 degrees, but the addition of the parabolic dish narrows this to a razor-sharp 3 degrees! Not only that, it adds some 20 dB of gain as well.

For more information and ordering information for these ultrasonic instruments, visit the Midnight Science website, home of the Xtal Set Society, at www.midnightscience.com/ultra-kits.html (The Xtal Set Society, PO BOX 3636, Lawrence, KS 66046 Ph: 405-517-7347)

— Review by Bob Grove, W8JHD

REVIEW 4

❖ MFJ Lapel-Style Speaker/Microphone

For most of us, using a hand-held two-way radio means drawing it off a belt and holding it to our faces to send and receive. So how about

our favorite TV and movie action thrillers where the good guys all talk up their sleeves or press a button and talk through their collars? They may not even have a cord dangling from an ear bud.

Lapel-style speakers and speaker/microphones provide excellent comfort, immediate response and reliable quality near the ear, all without removing the handy-talkie from your belt. Such is the 294 series from MFJ Enterprises.

The 294 series must be ordered to fit particular models of radios, since not all use the same mike/earphone jack configuration. The MFJ294Y is a single, 1/8-inch (3.5 mm) plug style. It has four contacts for earphone (speaker), mike, transmit/receive, and common ground. Compare this with common mono and stereo plugs with two or three contacts respectively.

The speaker/mike plug on the 294Y is made to mate with the ICOM IC-Q7A and the Yaesu FT50R and VX1 transceivers. A small button on the side of the casing is pressed to engage the transmit function. A rigid spring clip can swivel 360 degrees for the most convenient access on a shirt lapel or collar. The speaker/mike is connected to the radio by a 3-1/2 foot coil cord.



So how about scanners?

Those of us who choose to use the unit for our belt-worn scanners don't need the microphone or transmit/receive provision; an efficient speaker near our ear is all we want. And the 294 provides this with lightweight, compact convenience; however, it will be necessary for some scanner models to accessorize the plug with an adapter.

The tip of the plug is for speaker activation, the most common configuration for external monaural earphone and speaker jacks. I found that the 294Y worked right out of the package with my Uniden scanner and with my ATEN spectrum analyzer as well.

The plug requires a 1/8-inch (3.5 mm) monaural jack. The speaker's 8 ohm impedance will match any low-impedance audio output jack. The electret condenser microphone is rated for a 20-20,000 Hz frequency response.

The speaker audio quality is voice tapered, and its crisp output provides clarity with minimum distortion even at high outputs in noisy locations.

Whether you're looking for a high performance, low cost lapel speaker for a scanner, or a convenient speaker/mike for your HT, or just want to impress the crowd, the MFJ294 speaker/mike is for you!

MFJ294 \$16.95 from MFJ Enterprises, Starkville, MS (P.O. Box 494, Mississippi State, MS 39762; www.mfjenterprises.com; 1-800-647-1800); also available from selected MT advertisers.

— Review by Bob Grove, W8JHD.