

# ANTENNAS

## The DDDR – Directional Discontinuity Ring Radiator

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Photo A. The DDDR (Directional Discontinuity Ring Radiator) is a vertically polarized antenna. (All photos and artwork by the author)

Photo B. A commercial 2-meter vertically polarized DDDR antenna.

Yes, it kind of looks like a halo, but the DDDR is a vertically polarized antenna (Photo A). For decades this antenna has been known as the Directional Discontinuity Ring Radiator, but in recent years it has often been called a Directly Driven Ring Radiator.

In Photo B we have a 2-meter DDDR that is only 7 inches across, and this antenna does provide a low-profile vertically polarized signal. What looks like a threaded antenna mount on the top is used to hold a radome cover. Photo C is what is marketed as a 440-MHz DDDR, but it is really more of an inverted-F antenna, since the ring barely makes it 180 degrees around. Again you can see the threaded antenna mount on top, which is used to hold its radome cover. This time the antenna uses a standard NMO (new Motorola) mount, and the washer out on the end forms a capacitor back to the body of the car for fine tuning the SWR.

Figure 1 shows how to make a slot antenna. Normally, we think of a dipole as a 1/2-wave of conductor surrounded by insulator. However, now we have a 1/2 wave of insulator surrounded by conductor. The two antennas are opposite in construction and opposite in polarization. A horizontal slot antenna is a vertically polarized antenna. The metal slot antenna shown in Photo D is horizontally polarized, and the PC-board slot array in Photo E is vertically polarized as shown—opposite in where you put the conductors/insulators and opposite in the polarization that has come out.

There are many ways to excite a slot antenna. Those of you who have been through FCC Part 15 compliance testing with your computer products probably have found out the hard way that slots in a computer case, such as the one shown in Photo F, can be very, very efficiently driven by traces on a PC board.

The original DDDR antenna was developed as an HF antenna by Northrop Corporation in the 1960s, and there have been a few modest attempts to market smaller ones as ham antennas. You can also think of the DDDR as an inverted-F antenna bent into a circle.

There has been a big push to revisit DDDRs because of their low profile and small size for a vertically polarized antenna



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Photo B. A commercial 2-meter vertically polarized DDDR antenna.