

Helical

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A short helical used with a 80 - 100 cm tv-sat offset dish for HRPT reception

By Harrie van Deursen.

For HRPT reception we need a right-hand circularly polarized antenna.

One way to achieve that is to use a left-hand circularly polarized helical feed looking to the center of a parabolic dish.

Because a standard helical has an impedance of 140 ohm, we need some kind of impedance transformer to match the helical to the 50 ohm input of the preamp.

I have chosen the 1/4 wave adaptor shown in figure 1.

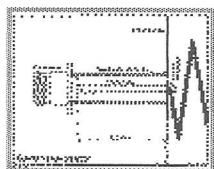


Figure 1.

The inner conductor is made of 6 mm² copper earth wire and the outer conductor of copper tube 13x15 mm diameter.

Because there is no data available for a helix used with an offset dish, I decided to make length and diameter of the helix variable.

I used a T-shaped plastic rod (9 mm diam.) that slides trough a 10 mm cable feed-trough mounted in the reflector plate.

By shifting or turning that rod you can adjust the length and/or the diameter of the helix to a certain extend.

You should adapt the LNA mount of the offset dish so that you can mount the helix, but because of not knowing the focal point of the helix you must make that variable to.

After a lot of experimenting I found the following optimal values:

Helical 8 turns of 2.5 mm² copper wire (about 145 cm length and 1.75 diam.)

Length of helical is 95 mm, distance between turns is about 12 mm.

Outer diameter of helical is 59.5 mm.

Optimal distance from lower rim of the dish to middle of reflector plate was (in my case) 47.5 cm.

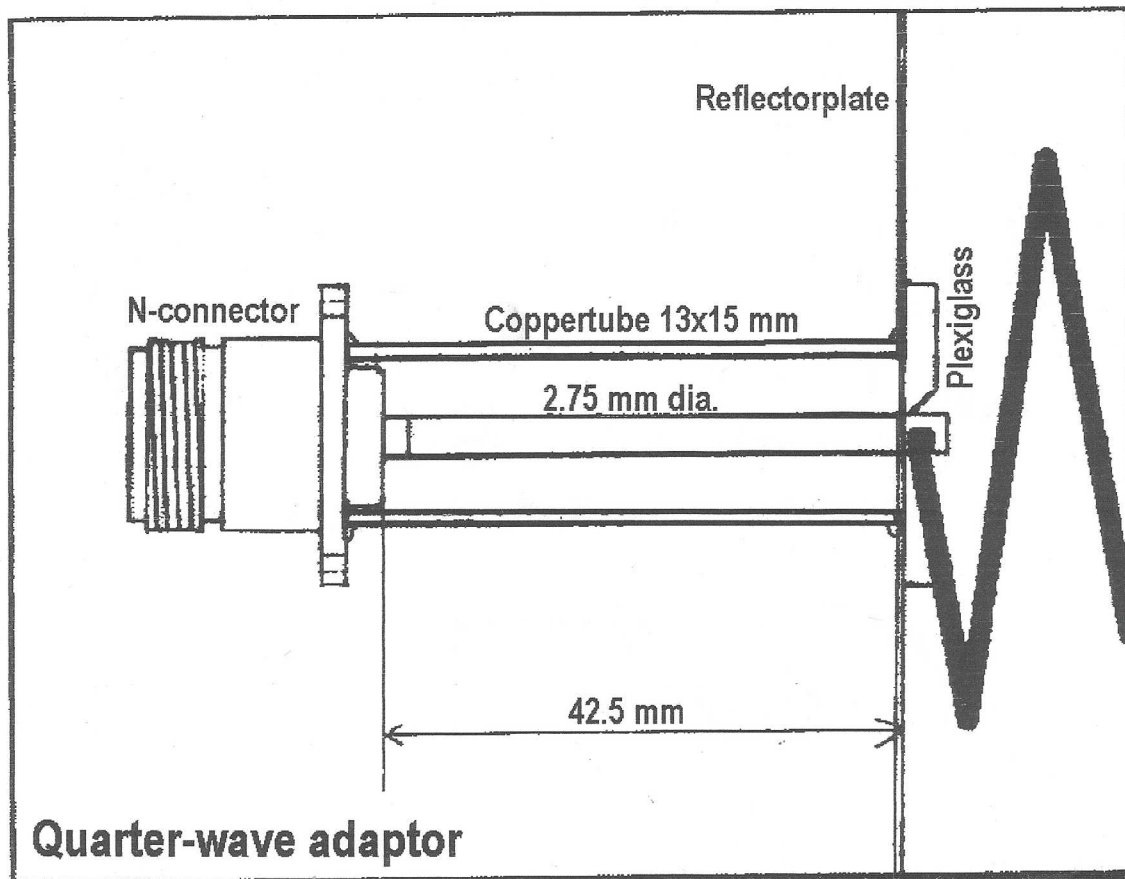
Size of the reflector plate is not critical. I used a 15x19 cm brass plate, 0.5 mm thick, the lower 4 cm bended so the helical is looking to the center of the dish.

The reflector is reinforced by soldering some brass strips to the back.

The helix is centered to the reflector by means of a piece of Plexiglas.

To the end of mounting the helix as close as possible to the reflector the hole in the Plexiglas piece is countersunk and a groove is made from where the first winding of the helix starts.

For details see figure 2.



Spurious signals, 10 mm, 15 mm, 20 mm

2 m

15

3.2 m

1000000

1

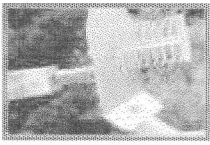


Figure 2.

The preamp is mounted directly to the N-connector by means of a N-coupler.

To look at the final assembly see figure 3.

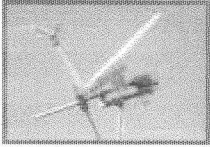


Figure 3.

Here a picture of the complete setup.

As you can see in figure 4, the dish is not used in the TV-sat position (LNA mount at lower rim) but turned 90 degrees (LNA mount at left or right side).

See also the [Rotorcontrol](#) page for info about the AZ/EL rotor controller.



Figure 4.

Using a good preamp, with a 80 cm dish, reception is practically error free at about 6 to 7 degrees.

With a 100 cm dish that is 3 to 4 degrees.

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