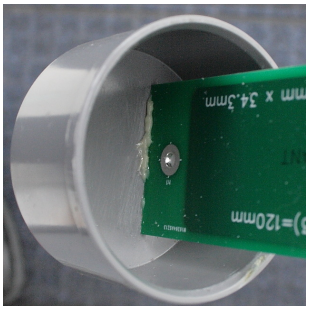
Pa0nhc improved version of Pa0rdt **"Miniwhip"** active wideband receiving antenna.
PCB 20180121-19 20180213

Installation 1 / 2.

The antenna PCB must be installed **vertically,** in a non-screening, fully closed, rain resist housing. For instance in a 50cm long, 50mm dia. gray PVC or white PPC pipe. Closed with plastic top and bottom end caps. Seal caps drip-water-tight with tape or Vaseline.

Screw hole "GND" of the antenna PCB must be connected to a dedicated noise free ground, or to a noise free grounded metal antenna mast

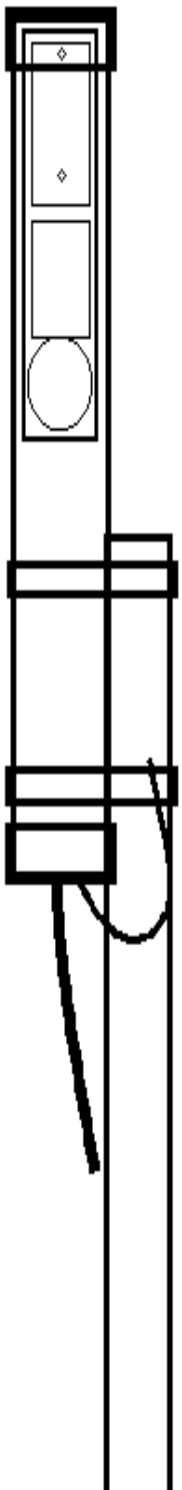


The antenna surface "ANT" must be FULLY ABOVE the top of a metal antenna mast.

The PCB can be glued into a **PVC** end top-cap **(see photo) ==>>**
This makes maintenance easiest. The top of the PCB is designed for it.

Holes h1 and h4 can be used to connect a longer whip.

Highly recommended : Leave 13V power supply always switched ON. Then the little internally generated warmth can prevent condensation.



For good sensitivity and best noise free reception:

Install the antenna unit :
- far away from noise sources
- as high as possible
- as free as possible from metal structures
- noise free grounded
- with the antenna surface FULLY above the top of an antenna mast.

Grounding:

Before going on, be sure you are protected by
an automatic ground-current-leak-switch in the mains supply line.
The complete Miniwhip_antenna + splitter + power_supply must
only be grounded to ONE POINT : the grounded antenna mast.
Screw hole "GND" on the antenna PCB must be connected to the *noise free* grounded antenna mast or dedicated ground.
*The mast may **not** be "grounded" to the polluted mains safety "ground".*
>> Then disconnect all safety ground wires at :
- the receiver and
- the DC power supply
- all other connected equipment

Further :
- Use THIN coax (2.8 mm RG174) as this can be wound more times through ferrite cores.
- Install hi-Ui (>=5000) ferrite material on the beginning and the end of every cable.
- Wind these cables several times through the ferrite hole for far more effectiveness.

3 times through a ferrite core hole = 9 times more effective than 1 time straight through the ferrite core hole!

TIP : use able and cheap ferrite rings:
Conrad NR 534480 (Ui=5.000, remove the insulating shells).
Conrad NR 500683 (Ui=5000, Epcos B64290-L618-X35)
Epcos has more suited ferrite rings (ui=5000-10.000) in various dimensions.

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Installation 2 / 2.

More signal ?

First : to give the best Signal-to-Noise-Ratio, experiences read from other E-field active antenna users suggest a Miniwhip installation :
- as FREE as possible from other metal objects
- up to 6m above surroundings
- when installed at low height on a roof, the use of a “Ground-surface” made of chicken-mesh, connected to the “GND” hole on the PCB.

How to test the needlessness of more signal :

- Tune the receiver to a frequency without any man-made signal of abt. 7 MHz.
- Switch the receivers antenna input between the Miniwhip and a 50 Ohms dummy load.

If the noise level received by the Miniwhip is ***3dB or higher*** than the receivers own back ground noise (when connected to the dummy load), a higher received signal level is senseless.

Longer whip ?

With the circumference of the little antenna surface on the PCB of only 0.2m, its RF source capacitance is abt. 0.2 x 10 pF = 2 pF. This source capacitance forms, together with the 0.5 Mohm input circuit impedance of the FET stage, a high pass filter which attenuates frequencies below 150 kHz by 6 dB / octave (-24 dB @ 10 kHz).

A longer whip increases the antenna's electrical source capacitance: for instance to 20 pF @ 1m antenna surface circumference. **Adding a whip of 1 m length could enhance the antenna source capacitance, and lower the critical HPF, thereby enhancing the input signal strength especially at very low frequencies (< 30 kHz).**

A test with an 80cm long 5x20mm ALU strip antenna extension, showed at frequencies higher than abt 300 kHz a possible signal strength rise of abt. 12 dB.

BUT : with a longer whip, all signals will become stronger in the whole frequency range of the Miniwhip : all wanted signals, *and* all received noises. **On frequencies above 300 kHz, the Signal to Noise ratio probably will *not* be improved by a longer whip.** But only resulting in *a connected receiver having 12 dB less head room* for the very strongest signals. (Like : local AM, FM and TV broadcast, HF and VHF radio amateurs, taxi communications).

In certain cases a longer whip could therefore cause Inter Modulation Distortion *in the connected receiver*, causing “reception” of non existing signals and annoying back ground noises. Which then only can be overcome by inserting a 12dB attenuator. Senseless.
A longer whip only makes sense for those who are interested in signals well below 100 kHz.

In general : Free and high installation is the best solution.

S meter readings.

Signals from a vertical polarized Minwhip antenna can show definitive less S-meter deviations than signals from horizontal full size dipole antennas. *Do not worry as long as the intelligibility of the received signal is good.* **The Signal To Noise Ratio is the most important issue.** Keep it all in mind when giving signal strength reports.
