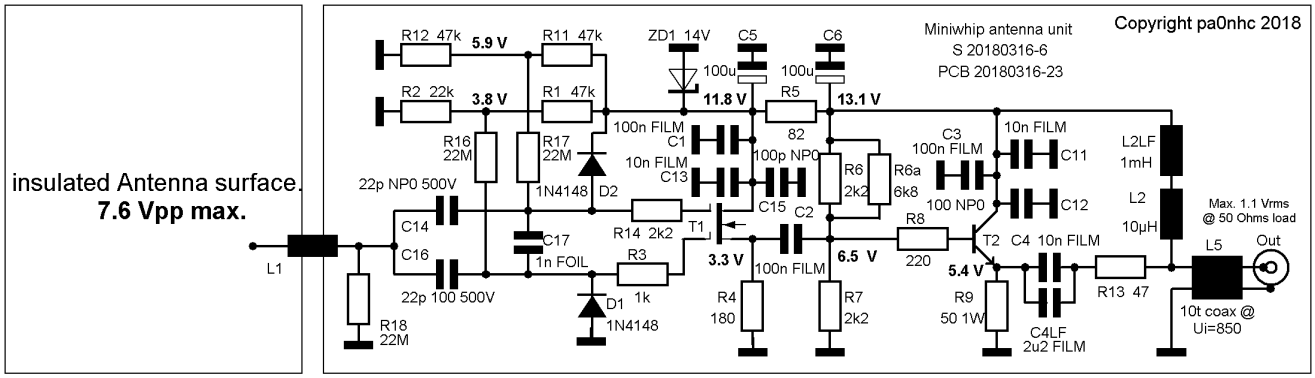
Properties of
PA0NHC improved version of PA0RDT "Miniwhip" active wideband receiving antenna. 20180628 S 20180415 PCB 20180316-23

Antenna unit. Full schema publication : 20240215



Here the full schematic diagram of the by PA0NHC improved miniwhip antenna unit. The left part shows my ***unique*** development. During maximal level signal level drive from the antenna surface, it ensures a ***constant*** *optimal voltage difference* between gate1 and gate2. When the bias voltage ***difference*** between gate1 and gate2 of the FET is constant (does not vary), the steepnes of the FET is also constant. Resulting in NO distortion and optimal high signal level properties.

This type of source follower is uique, it does NOT exist enywhere else (according to pa3fwm).

Properties :

- Fully **class A** circuitry, **clean reception without IMD.**
- All used parts are commonly available, only two SMD components.
- The cleanest reception possible if well installed.
- Output IP3 (7 + 8 MHz) +35 dBm, IP2 (1MHz) +45 dBm (! !) measured by pa3fwm (TU Twente).
- In this **new version** much higher input-resistance at the antenna circuit.
- Larger values coupling C's.
- Frequency range 5 kHz to 145 MHz..
- Power : 10 Vdc – 14Vdc 130mA max..
- *max output 0.8 Vrms @ 50 Ohms load (!)*.
- Really wideband with R/C coupling to the receiver, ***no transformer***

This Miniwhip compared with my 2.5m square magnetic loop antenna :

(Loop efficiency abt. -2dB at 80m and -0.5dB at 40m).

The Minwhip was installed vertically, at 2m distance from, and at nearly the same hight as the loop .

Observing with an AIRSPY HF+ SDR receiver unit, connected to a denoised PC, and using SDRsharp software :

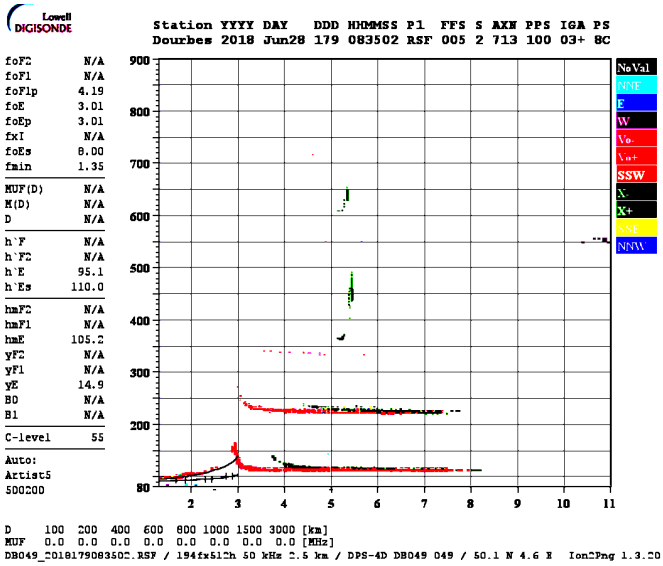
Weatherfax transmitter DDH3 (10kW) at 3855 kHz during summer morning hours. The distance is abt 375 km. The results below were avaraged from more than 10 observations.

Compared with the loop, the Miniwhip gave :

– Signal strength : **-15dB** +- 1.5dB.

– Signal to Noise ratio : **+3.5 dB** +-2.5dB.

In my **VERY NOISY location**, my MINIWHIP gave abt. *15dB less signal,* but *abt. 3.5dB better signal to noise reception*. Less signal strength is not always a problem. In a wideband receiver input, it can help to prevent overload from very strong MegaWatt broadcast stations. *As long as S/N is good, do not bother about less signal*. When giving signal reports, just add 15dB (2½ IARU S-points or 5 Japanes S-points) to the signal strength indicated by the receivers S-meter. On 14MHz and above, activate the pre



amplifier in the receiver.

Listening with my Kenwood TS570D transciever to HAM stations during 20180628 morning hours on 3692kHz. *Propagation for NVIS was very bad (MUF=0), due to a blocking E-layer. T*he signal-to-noise ratio was nearly the same on both antennas. Listening on the Miniwhip between 7MHz and 30MHz, i could hear many DX HAM stations.

The useable signal distances for the vertically polarized Miniwhip :

The following properties are valid for **all vertical polarised antennas** (like the Miniwhip) :

Good reception of :

- Short distance *ground wave communication on VLF / LF / LW / MW / SW / VHF*
- *DX reception of Short Wave signals at distances over 300km*

- *Less suitable* for NVIS reception of signals from distances UNDER 300km between 3MHz and 8MHz.

REM:

You need a clean external (linear, ***NON-switchable***) power supply : (10V to) 14V – 130mA .
See : **http://www.pa0nhc.nl/PS/12V-130mA/indexE.htm**

AC characteristics DC characteristics (supply voltage 14.0 Vdc).:

	200 kHz	**Splitter**	Vdc
Input @ R18	0 dB	in	14.03
R4	-3.2 dB	out	13.01
R9	-3.8 dB	I-in	127.8 mA
R13/L2/Rx	-10,1 dB (including 6dB loss due to 50 Ohms output impedance).	**Ant**	
		T2c	12.74
		R4	3.02
		R9	5.21

Listen DX at :

The broad band webSDR at the university Twente (50kHz to 30MHz)
[http://websdr.ewi.utwente.nl:8901/] T**hey use a "Miniwhip".**

Highly recommended to read :

Theory **[http://www.pa3fwm.nl/technotes/tn07.html]** about the practice **[http://www.pa3fwm.nl/technotes/tn09d.html]** of the Miniwhip antenna (written by **pa3FWM**).
