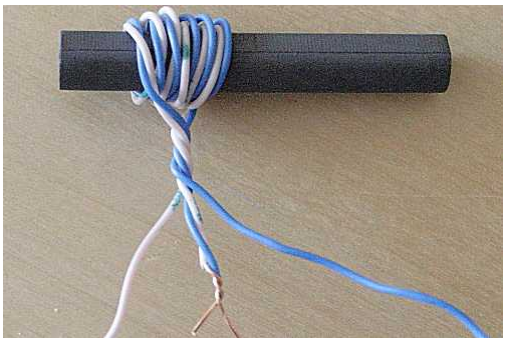
Ferrite- and sense antenna.

pa0nhc ARDFrx80-7 20171215

The here used small ferrite rod (Conrad 535575) nicely fits inside a small 8.5cm x 17cm x 3cm Hammond 1599 ABS box. I this version, a 50x20x20mm piece of square ALU pipe functions as **sense antenna,** screwed on top of the box. I prefer a 17cm long whip sense antenna. Its BNC bus is at the right side of the ferrite rod. REM : The ferrite rod should NOT make contact with the BNC bus.

Winding the ferrite antenna.



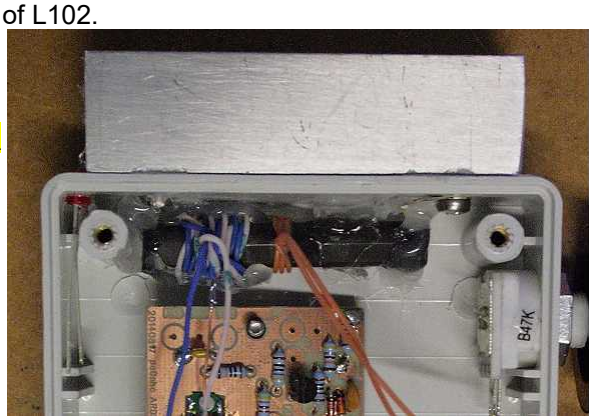
1. Strip one pair twisted wires from a piece of CAT5 computer network cable.
2. Wind 7 twisted turns closely spaced around the ferrite rod (L102 now has 2x7 turns) at abt. 1/3rd of the length of the rod.
3. Twist the ends once, to keep the coil firmly in shape.
4. Make the center tap by interconnecting two different colored wires. This center tap connection should be as near as possible to the coil (shorter than on the photo).

Adjusting the self inductance of L102.

5. Connect a 150pF 1% capacitor to the outer coil connections of L102.

REM : >> the self inductance of the coil is influenced (will become smaller) when it is near any conducting surface << **Therefore adjust the coil when in its definitive location :**

6. Lay the ferrite antenna inside the box in the corner where it later on will be fixed.
7. With a dipmeter near and parallel to coil L102, find the resonance dip of L102.
8. Shift L102 over the ferrite rod, until it resonates at 4.45MHz. The coil selfinductance is now adjusted to **8.0uH nominal** (with 10pF stray capacitance taken in account).



From now on, the position of the coil on the rod should not be changed.

9. Glue coil L102 to the ferrite rod using *thermal* glue.

After 5 min. cooling down, check the resonance frequency with the antenna again in the box.

REM: The tuning of the antenna is later on *only* done with trimmer C105.

10. Remove the 150pF test-C.
11. At the center of the rod, wind sense coupling coil **L101** (3 close wound turns).
12. Glue sense coil L101 also to the ferrite rod using thermal glue.
13. Twist the ends of coil L101, and the ends of L102. Keep wires of L101 and L102 separated.

REM: The length of the connecting wires of sense coil L101 should be long enough to easily be interchangeable.

14. Now fix the antenna inside the box, using thermal glue around the ends of the rod.

IMPORTANT: While cooling down, keep the rod *exactly* in parallel with the long corner of the box. The long side of the sense antenna tube then indicates both minima in the antennas directivity pattern. This makes accurate bearings possible.

Sense adjustment.

The sense antenna could be a piece of aluminum pipe screwed onto the top of the box. But a whip antenna (abt.17cm long) works a bit better.

The distance from the transmitter, the size of the sense antenna, and the number of turns in L101 influence the needed gain of the sense amplifier.

As the drain of FET101 is a *current* source, more turns in L101 means more sense signal coupled into L102. Three turns for L101 worked well at the 50x8mm ferrite rod.

- With an activated sense antenna, the **maximum** in the directivity pattern should point in walking direction.
- On the top of the box should be an arrow, indicating that maximum direction of the antenna pattern.
- Interchanging wires FA1 and FA2 will interchange the positions of the minimum and maximum in the antenna pattern.
- With activated sense antenna, a deep null should be noticed on one side of the directivity pattern.
- At a few hundreds meters distance from a vertical polarized transmitter antenna, adjust trim pot R105 for that deep null.