

Efficient Multiband HF Mobile

Theory and Practice

Craig J Coley, WB5KUO

The 8-Foot Whip

Analysis at HF Frequencies

- About 25 pF Capacitance
- About 22uH Inductance
- Radiation Resistance (R_r)
 - 0.34 Ohms at 3.6 MHz
 - 1.31 Ohms at 7.1 MHz
 - 5.17 Ohms at 14.1 MHz
 - 11.58 Ohms at 21.1 MHz



The 8-Foot Whip

Analysis at HF Frequencies

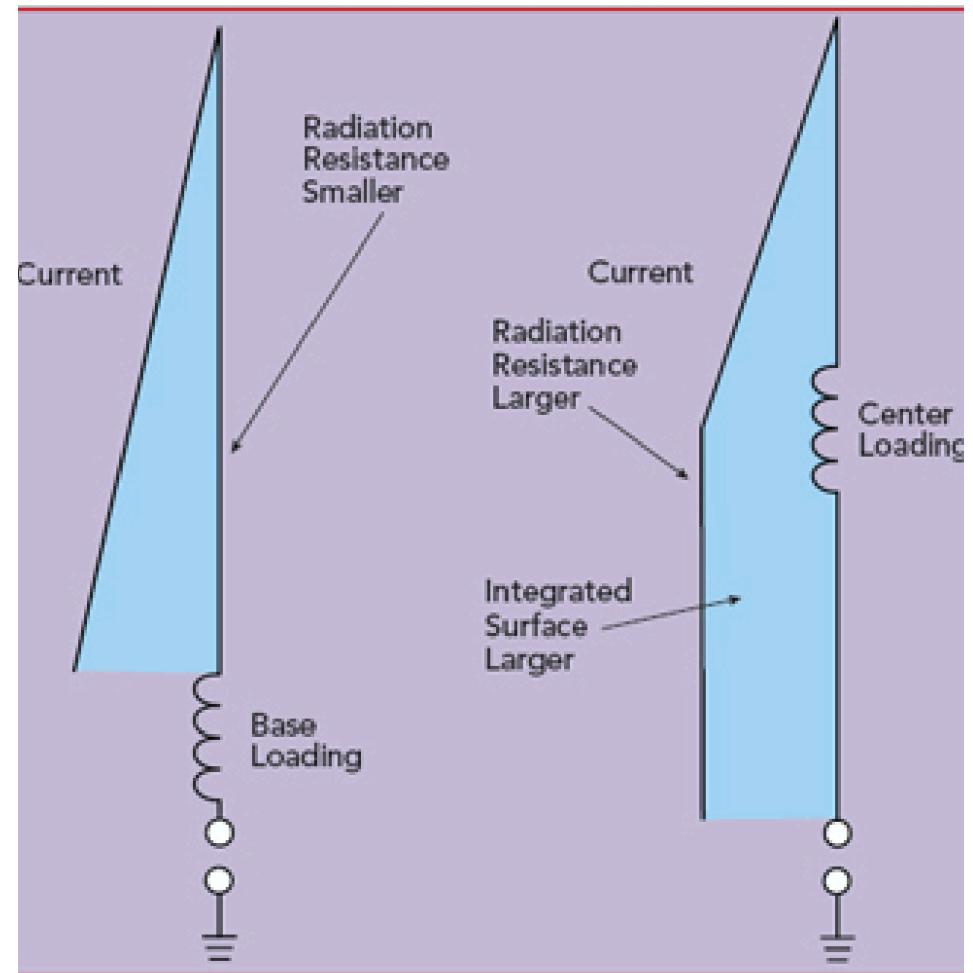
- Feedpoint Impedance equals
Antenna Impedance + Loss
Resistance
- Antenna Impedance equals
Radiation Resistance + Reactance
 - 0.34-j1768 Ohms at 3.6 MHz
 - 1.31-j896 Ohms at 7.1 MHz
 - 5.17-j451 Ohms at 14.1 MHz
 - 11.58-j302 Ohms at 21.1 MHz



The 8-Foot Whip

Base versus Center Loading

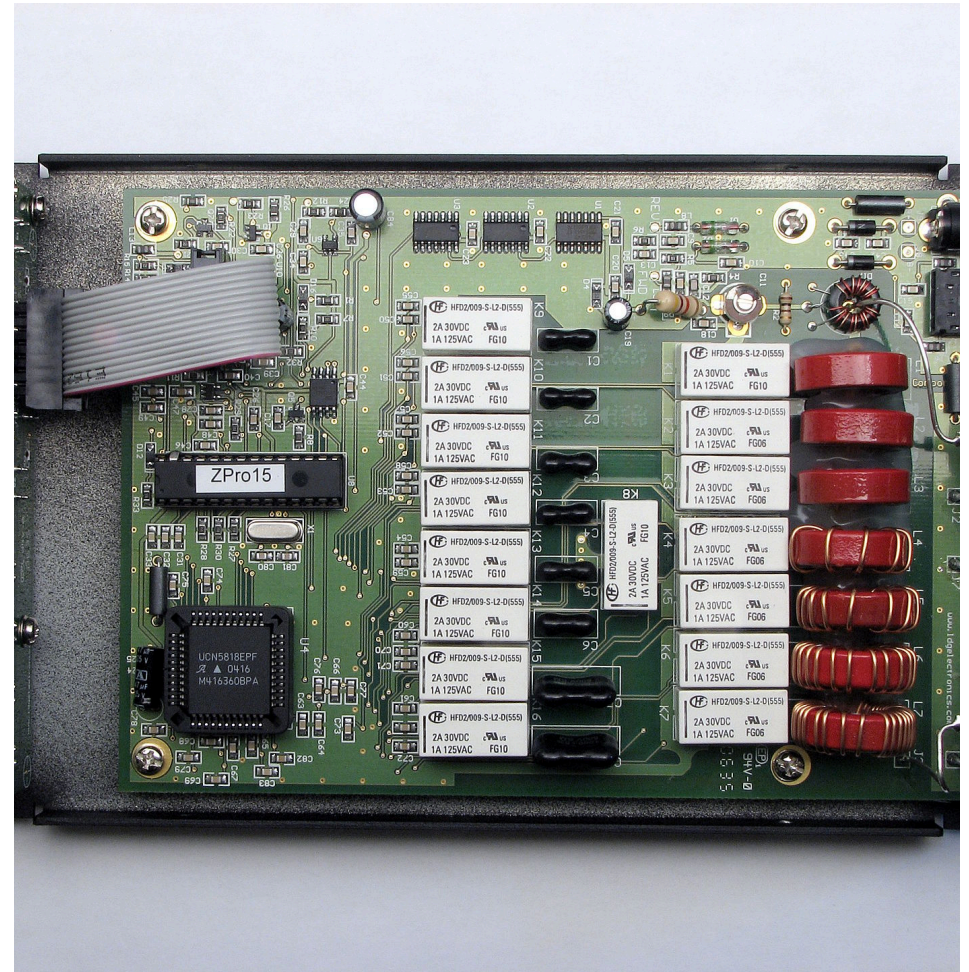
- Base loading is more convenient but has no effect on Radiation Resistance
- Center Loading increases Radiation Resistance and improves Radiation Efficiency
 - About the Double Radiation Resistance
 - More if Higher than center (Hustler)



The 8-Foot Whip+ATU

Multiband Coverage

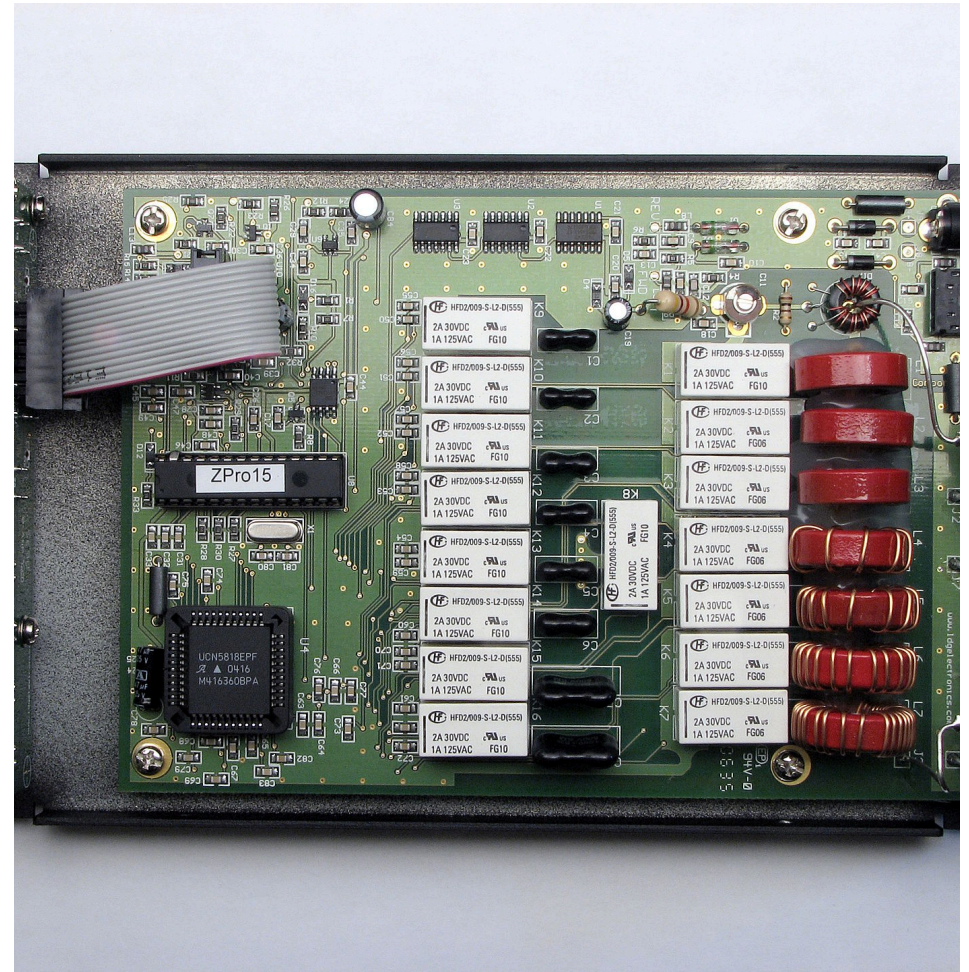
- Automatically compensates for resistive and reactive mismatch
- Due to high RF current, a GOOD GROUND to vehicle is required
- Won't tune lower bands with 8 foot whip
- Icom AH-4 requires 23 feet to tune 3.5 MHz



Center Loaded Whip+ATU

Optimized Multiband Performance

- Electrical length of whip long enough to meet ATU needs
- Center loaded whip raises radiation resistance for higher efficiency
- 30m center loaded whip has an electrical length of 25 feet and is optimal for many tuners.



Practical Installation

RAV4 Installation of WB5KUO

- Hustler MO-1 + RM-40S
- 40m chosen over 30m to improve efficiency on 75m SSB



Practical Installation

RAV4 Installation of WB5KUO

- ICOM 7100 Transceiver
- ICOM AH-4 ATE
mounted adjacent to
antenna mount.
- Connected with #12
stranded copper wire
- NO COAX TO WHIP



Practical Installation

RAV4 Installation of WB5KUO

- ICOM 7100 Transceiver
- Small Control Head fits easily on RAV4 shelf



Questions??

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