

Q-MAC ELECTRONICS



HF TRANSCEIVERS &
ANTENNA SYSTEMS

ANTENNA TUNER

HF HELP FILES



Q-MAC Electronics Pty Ltd

HF HELP FILES

MOBILE ANTENNA TUNERS

- 1 VARIABLE INDUCTORS AND VARIABLE CAPACITORS IN MOBILE HF ANTENNAS..... 3**
- 1.1 VARIABLE INDUCTOR TUNERS IN MOBILE HF ANTENNAS..... 3
- 1.2 VARIABLE CAPACITOR TUNERS IN MOBILE HF ANTENNAS..... 3
- 1.2.1 *Why this matters*..... 3
- 1.3 CONCLUSION..... 3
- 2 OTHER INFORMATION..... 4**
- 2.1 AUTHOR..... 4
- 2.2 ABOUT Q-MAC ELECTRONICS 4
- 2.3 CONTACT DETAILS 4

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Page 2 of 4
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1 Variable Inductors and Variable Capacitors in Mobile HF Antennas

1.1 Variable Inductor Tuners in Mobile HF Antennas

The Codan 9350 is a variable inductance tuner, the inductance being used in order to cancel the capacitance of the short whip.

The Q-MAC TA-90 is also a variable inductance tuner, as it also has a short whip. The tuning is achieved in small steps by relays. The inductor uses iron powder toroidal cores, which achieve a higher Q (greater efficiency) for smaller size.

The Barrett mobile tuner is similar to the Q-MAC, but uses air cored solenoidal coils, giving lower efficiency and larger size than with iron powder toroidal cores. However, there is a small saving in cost.

1.2 Variable Capacitor Tuners in Mobile HF Antennas.

The Q-MAC Magnetic Loop, ML-90, is inductive, and a variable capacitor tuner is employed to cancel the inductor. The apparent electrical length of the antenna is many times longer than a whip, as it forms one turn of a coil, and it is well known that a coil “appears” electrically to be much longer than its actual length.

1.2.1 Why this matters.

- Inductively tuned antennas are inherently more lossy than capacitively tuned antennas.
- Variable capacitors are low loss due to ceramic insulation & high conductivity tuning vanes.
- You can make variable capacitors of much higher Q than variable inductors.

It is not possible to use a variable capacitor tuner with a whip antenna, because the short length of the whip is inherently capacitive, and therefore an inductor is needed to “balance” it.

1.3 Conclusion

If you must use a whip-based antenna system, you should avoid tuners with air cored solenoidal coils.

A Magnetic Loop antenna, tuned with a variable capacitor, achieves a higher Q (greater efficiency), and radiates more than 10 times as much power as a short whip antenna.



2 Other Information

2.1 Author

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Rod Macduff is Managing Director of Q-MAC Electronics which is a specialist supplier of HF Communications to the Humanitarian, Aid & Relief and Military organisations. Rod Macduff worked with Racal BCC for 10 years on the Jaguar V tactical hopping radio and travelled extensively consulting with armies on their secure communication issues. The Q-MAC HF-90 hopping radio is in service in 75 nations and has been adopted by Humanitarian, Aid & Relief, Army, Police and Intelligence organisations.

2.2 About Q-MAC Electronics

Q-MAC Electronics is specialist designer and manufacturer of HF Transceivers. The flagship product the HF-90 is the world's smallest high performance HF SSB Transceiver. The HF-90 and Q-MAC Electronics have been awarded many accolades and is currently used by thousands of users in over 80 countries worldwide. The HF-90 is one of the most versatile HF transceivers available and is suited to military, paramilitary and humanitarian aid and relief applications.

Q-MAC offers the HF-90 in a variety of configurations suited to manpack, vehicle and base station applications. A full complement of accessories is also offered for use with the HF-90; including antennas, field battery charging accessories, carry packs/cases and more. All Q-MAC products are backed by the company's strong commitment to after sales service, support and certified ISO9001 quality standards.

2.3 Contact Details

For Further Information Contact;

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Page 4 of 4
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