

Q-MAC ELECTRONICS

HF TRANSCEIVERS &
ANTENNA SYSTEMS



PEACEKEEPERS & NGOS

HF HELP FILES



Q-MAC Electronics Pty Ltd

HF HELP FILES

Peacekeepers and NGOs

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1 HF Radio bridges the gap between Peacekeepers and NGOs

1.1 Communications Environment

Peacekeepers and NGOs are confronted with many similar communications problems when they find themselves in trouble spots where public order has broken down. Typically power supplies are disrupted and erratic. Telephone lines are unreliable. VHF and UHF trunked networks are unserviceable and vulnerable to sabotage as are cellular phone networks. Satellite telephones are attractive in that they do not require any in-country infrastructure; however they have high on-going call charges. In a location where there is only one satellite phone it will come in for very heavy usage. They are also not well suited to command networks where an easy broadcast facility is desirable. Furthermore it may be undesirable to have the traffic readily monitored by the security agencies associated with the service provider. The interests of the peacekeepers and NGOs may not coincide with those agencies. HF radio can provide a solution to all of the above constraints. It is light and portable, does not require fixed power supplies, needs no repeater stations or other permanent infrastructure and can provide communications security with frequency hopping.



1.2 Operational Requirement

Peacekeepers typically operate from a central command building or temporary structure with suitable satellite and wire antennas on the roof. One or more central HF base stations communicate with outlying stations either at command posts, vehicle stations or Manpacks. They have separate networks depending upon their function. Deployment may be in urban rural, forest or mountainous terrain. The detachments seldom have the luxury of line of sight communication, so the extended ground-wave coverage offered by HF and the Near Vertical Incidence Sky-wave coverage allows greater mission endurance than when depending upon VHF combat net radio. Those charged with providing communications for aid agencies in developing countries have to meet similar communications challenges. Medical teams may have to use mules or bicycles to reach remote villages in mountain regions. A light reliable HF set is a necessity where one has to call for support.

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1.3 Multi-Role Capability

It is desirable that the same equipment can be deployed in base, vehicular and manpack role. Many military sets have this multi-role capability, which is achieved by fitting the basic radio set into a manpack frame or a vehicle or base appliqué unit. Flexible power supply requirements are highly desirable. Battery power sources typically lie in the range 12 to 24 volt. Charging from portable solar panels or hand powered generators allows complete independence from mains power.



1.4 Logistic Support

In order to ease the burden of logistic support it is desirable to have a minimum number of different parts used in equipments and a high degree of commonality. It is also desirable that equipment can if possible use readily available local parts such as batteries in an emergency. The simpler the equipment is, the more likely it is to stay in service. This applies equally to peacekeepers and NGOs. There is an increasing tendency for communications equipment to use highly specialised, equipment specific batteries with smart chargers, which often turn out to be less than smart in the third world environment of brownouts and power surges.

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1.5 Minimal Training Requirement

Peacekeeping forces are often drafted at relatively short notice and equipment procurement may also occur with short timescales. This puts particular pressure on training regimes for personnel. Equipment, which is over-sophisticated can be a liability under these conditions.

Radio users are often not signals specialists and may not even be familiar with the menu driven style of user interface, which have proliferated on mobile phones and other consumer goods. Communications equipment for use in difficult conditions should have a minimum number of operator controls, which are intuitive in operation. It is most important that those involved in procurement consult the field users when specifying equipment. Both military and NGO agencies have horror stories of equipment, which is unusable due to over-complexity.



1.6 Electronic Threat Environment

There has never been a time in which it has been so easy for relatively unsophisticated elements in society to monitor communications. Whilst GSM mobile phones are quite difficult to monitor, normal HF, VHF and UHF radio networks are extremely vulnerable. Rebel or insurgent groups are well placed to monitor communications networks of Peacekeepers or Aid Agencies. With cheap off-the-shelf portable equipment operating from batteries and using concealed antennas either wire or TV style they can rapidly build up a profile of their victim networks usage. By staging an emergency situation, they can determine their target user's electronic order of battle enabling them to use this intelligence to the detriment of the Peacekeepers or NGOs. Under the pressure of an emergency the full suite of channels, call-signs locations and operating procedure become apparent. In particular Aid Agencies using HF radio in clear to arrange air drops of food and medicines lay themselves open to attack when the goods are dropped.

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1.7 Interception Danger

Wide range scanners are very cheaply available which will allow interception of HF, VHF and UHF radio traffic. These are advertised widely on the internet along with data on spectrum occupancy and identification techniques. Voice band inversion scramblers, which take the 3000Hz voice band and split it in two, whilst inverting the split audio spectrum achieve a small measure of security when used on VHF or UHF FM two-way radios. However when fitted to HF radios these devices are useless. Simply by switching the intercepting radio from USB to LSB, and altering the tuning slightly, the effect of the splitting and inversion is overcome and clear speech is once again audible. Even with effective voice scrambling or speech encryption, traffic is vulnerable to single frequency or spot jammers. HF radio when used in clear is particularly vulnerable to interception because of propagation over long distances via sky-wave. A rebel intercept station may monitor radio traffic safely at a distance of 700km and instruct others closer to the field of operation on the activities of the target users.



1.8 Jamming Danger

In addition to scanners, there is a proliferation of inexpensive amateur radio equipment which can very easily be modified (usually by snipping one wire or removing two diodes) to allow operation on receive and transmit across all the HF, VHF and UHF bands. The details of these modifications can be obtained on the internet simply by searching on the relevant model number. Using these radios, which again can be battery operated with concealed antennas, insurgents can jam as well as intercept traffic on NGO or Peacekeeper nets. This happened regularly to

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British peacekeepers in Bosnia using Clansman HF and VHF equipment, which was operated in many cases in clear.

Only by using frequency agility can the threat of both interception and jamming be overcome. At VHF and UHF spread spectrum communication is desirable whilst at HF frequency hopping is recommended. On a frequency hopping network, a central base station radiates occasional synchronisation bursts and changes frequency several times a second, with all stations maintaining perfect synchronism. The pattern followed is pseudo random with a repeat time of several million years rendering cracking of the hop sequence virtually impossible. This level of speech security puts interception and jamming beyond the range of any rebel or insurgent group.



1.9 Liason with NGOs

With ever greater frequency, Peacekeepers and Aid Agencies are being called upon to work in the same theatres. Somalia, Bosnia, Cote D'Ivoire and Iraq are examples. Typically civil war and disruption lead to large numbers of displaced persons who are separated from their traditional sources of food, support and protection. The Peacekeepers are charged with containing opposing military and paramilitary groups and protect civilians. The Aid Agencies need to bring emergency food water and accommodation to the displaced population. Communication between the Blue berets and the NGOs is essential in this situation. The two may be separated by distances which exceed the capability of VHF or UHF systems and for this reason HF is much used.



1.10 Interoperability

For many years, NGOs and UN Agencies (eg, ICRC) have used HF radios of Australian origin, which use a selective calling format called CCIR493. This allows users to call specific stations while other radios on the same channel remain muted. Unfortunately up until now military radios have not carried this selcall system which has made it difficult to coordinate operations between Peacekeepers and NGOs. With the introduction of the HF-90 from Q-MAC Electronics Pty Ltd both agencies can freely interoperate with one another using common channels and the standard selcall system. When total communication security is required the frequency hopping facility can be used. As the radio is available in commercial and military versions it is affordable to aid agencies and meets the most exacting environmental military standard.



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2 Other Information

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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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