Q-MAC Electronics Pty Ltd
Western Australia

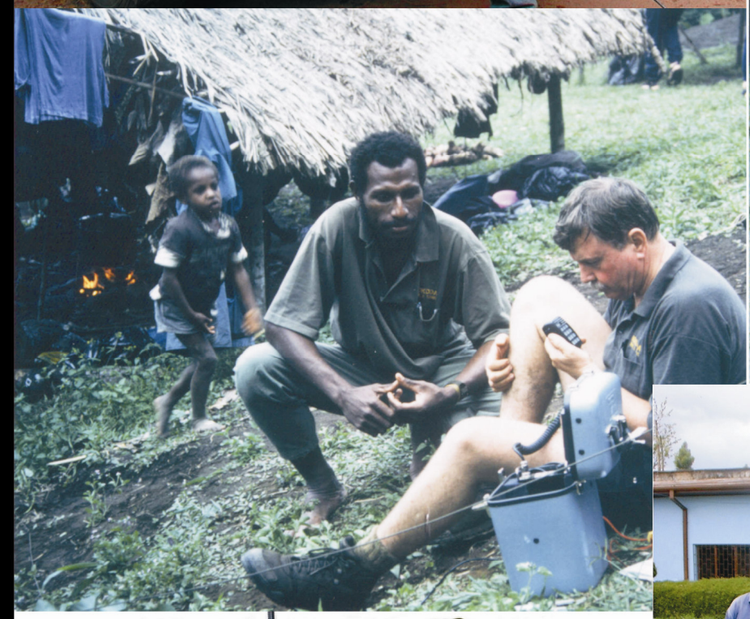
Represented by:

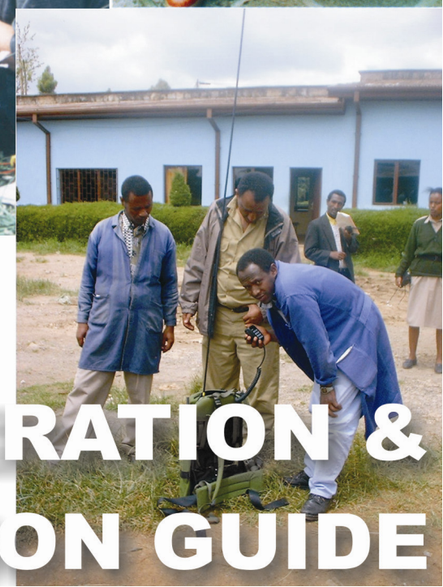
HF TRANSCEIVERS &
ANTENNA SYSTEMS

HF-90
HF SSB Transceiver

www.qmac.com

Q-MAC ELECTRONICS





HF-90 OPERATION & INSTALLATION GUIDE

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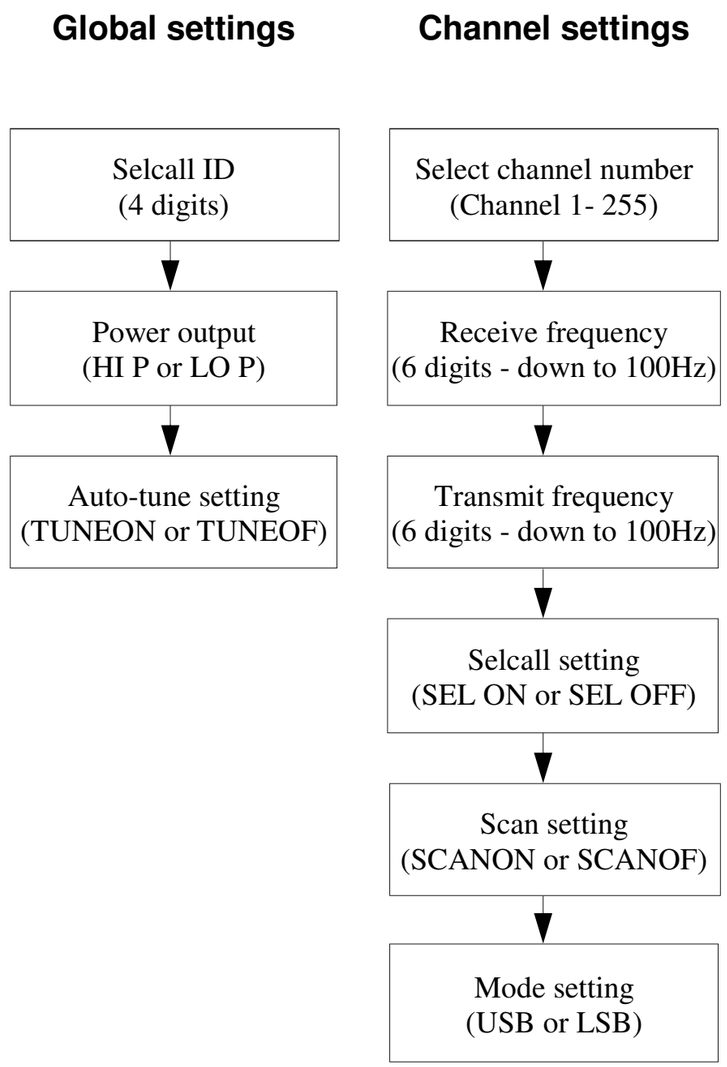
NOTES

TABLE OF CONTENTS

Field programming summary



At this point the display will show your channel Scan setting. For example:-

This display shows that Scan has been enabled on the given channel.

Press the ZERO (0) key to toggle between Scan settings and then press the STAR (*) key to save.

Warning: *Do not program more than 8 channels as scan channels (6 is ideal), otherwise you will experience problems receiving Selcalls, due to the time it will take to scan around all channels.*

Once you have pressed the STAR (*) key to save the Scan setting, the display will show your channel mode setting. For example:-

This display shows that USB mode (sideband) has been enabled on the given channel.

Press the ZERO (0) key to toggle between mode settings and then press the STAR (*) key to save and loopback to the start, or press the HASH (#) key to save and exit.

1. INTRODUCTION

About this Guide

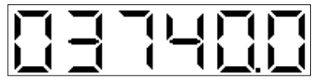
The main purpose of this guide is to provide you, the HF-90 user, with all the information you require to ensure optimum performance from your HF-90 radio.

The Guide explains in detail how to operate the HF-90 once it has been programmed by an authorised Q-MAC Representative. It also contains an Addendum concerning Field Programming, which is relevant only to international users (outside of Australia) who are licensed to program their own operating frequencies.

The Guide also covers basic principals of installation by way of check-lists. It does not give comprehensive instructions on how to install the HF-90. We recommend that the installation of your HF-90 be carried out by a qualified Q-MAC Representative.

Glossary of terms

ATU	Antenna Tuning Unit
BITE	Built In Test Equipment
CB	Citizen Band
DTMF	Dual Tone Multi Frequency (touch-pad)
HF	High Frequency
Hz	Hertz (measure of frequency)
ID	Identification
kHz	Kilohertz (measure of frequency)
LSB	Lower Sideband
MHz	Megahertz (measure of frequency)
PSU	Power Supply Unit
PTT	Press To Talk
RFDS	Royal Flying Doctor Service
Selcall	Selective Call
SSB	Single Sideband
Telcall	Selective Call with Telephone Call facility
USB	Upper Sideband



This display shows that frequency 3740 kHz has been entered.

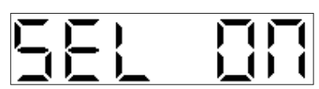
Once the receive frequency has been entered, and the STAR (*) key pressed, your display will now appear as follows:-

This display shows that you are ready to view/edit the transmit frequency.

The display above will disappear as soon as you release the STAR (*) key. At this point the display will appear with a transmit frequency which is the same as the receive frequency (in kHz), unless the channel has previously been programmed for split frequency use. The transmit frequency displayed can be accepted by pressing the STAR (*) key, or modified by entering the six digit frequency and pressing the STAR (*) key to save and proceed.

Transmit can be inhibited on any channel by pressing the ZERO (0) key twice followed by the STAR (*) key, thus selecting frequency “00000.0”.

Once the transmit frequency is selected and saved, the display will show your channel Selcall setting. For example:-



This display shows that Selcall has been enabled on the given channel.

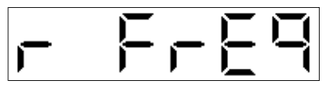
Press the ZERO (0) key to toggle between Selcall settings and then press the STAR (*) key to save.

Programming of channel settings

To enter channel settings press down the STAR (*) key on your DTMF keypad. Your display will appear as follows:-

This display shows that you have entered into channel settings.

First select the channel number you wish to program using the CHAN keys on the front panel of the HF-90 (you have a choice of Channel 1 - 255) and then press the STAR (*) key on the DTMF keypad to save and proceed. Your display will appear as follows:-



This display shows that you are ready to view/edit the receive frequency.

The display above will disappear as soon as you release the STAR (*) key. At this point the display will show your current receive frequency (in kHz). Note that if no receive frequency has been programmed into the selected channel, your display will appear as follows:-

This display shows that the channel selected has not been pre-programmed.

At this point, enter the new six digit frequency using the numeric keys on your DTMF keypad and then press the STAR (*) key to save. The frequency entered must comprise six digits (down to 100Hz). For example:-

2. UNDERSTANDING HF/SSB

What is HF/SSB?

HF (High Frequency) is the section of the radio spectrum between 1.6 and 30 MHz. SSB (Single Sideband) is a form of radio modulation. HF/SSB combines the characteristics of HF frequencies with SSB modulation to provide very efficient, flexible and inexpensive communications.

HF/SSB will enable short, medium and long range communications over flat, hilly or mountainous terrain - without the need for expensive re-transmission devices, such as the repeaters used in VHF (Very High Frequency) communications. Also, unlike satellite communications, there is no dependence on a service provider with all the associated ongoing costs.

In many remote areas around the globe, and in certain conditions, HF/SSB is the only form of communication possible.

How does HF/SSB work?

When HF/SSB radio waves are generated there are usually two components:-

- The ground-wave, which travels directly from the transmitting antenna to the receiving antenna following the contours of the earth, and ...

- The sky-wave, which travels upward and at an angle from the transmitting antenna, until it reaches the ionosphere (an ionised layer high above the earth's surface) and is refracted back down to earth, to the receiving antenna.

Generally speaking, ground-wave is used to communicate over shorter distances (in most cases less than 50km). However, because ground-wave follows the contours of the earth, it is affected by the type of terrain it passes over. For example, ground-wave is rapidly attenuated (reduced) when it passes over hilly or mountainous terrain.

Sky-wave is used to communicate over medium range and longer distances (up to 3,000km and beyond in good conditions). Because of the nature of sky-wave propagation, it is not affected by the type of terrain it passes over. This means that communications can be achieved over medium and long distances in mountainous areas, using HF/SSB sky-wave. However, sky-wave propagation is affected significantly by other factors as outlined in Section 2.3 of this Guide.

Ground-wave and sky-wave examples are illustrated on the following page.

Press the ZERO (0) key to toggle between power output settings and then press the STAR (*) key to save. At this point the display will show your current auto-tune setting. For example:-

This display shows that the auto-tune function is disabled (tune off).

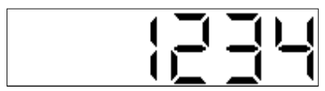
Press the ZERO (0) key to toggle between auto-tune settings and then press the STAR (*) key to save and loopback to the start, or press the HASH (#) key to save and exit.

Programming of global settings

To enter global settings press down the HASH (#) key on your DTMF keypad. Your display will appear as follows:-

This display shows that you have entered into global settings.

The display above will disappear as soon as you release the HASH (#) key. At this point the display will show the message "SEL Id" briefly, followed by your current four digit Selcall ID. For example:-

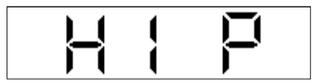


This display shows your current Selcall ID.

You may now enter your new four digit Selcall ID, using the numeric keys on your DTMF keypad, and then press the STAR (*) key to save. Your display will appear as follows:-

This display shows that your new Selcall ID has been entered.

The display above will disappear as soon as you release the STAR (*) key. At this point the display will show your current power output setting. For example:-



This display shows that your current power output is set to high power (hi power).

Radio propagation illustrated

The following illustrations show the characteristics of ground-wave and sky-wave propagation during the day time and night time. Each illustration clearly shows the level of the ionosphere.

In both illustrations Station A communicates with Stations B, C and D. Propagation from Station A to B is via ground-wave. You will notice how the time of day, and level of the ionosphere, does not affect ground-wave.

Propagation from Station A to C and D is via sky-wave. You will notice how the time of day, and level of the ionosphere, affects sky-wave.

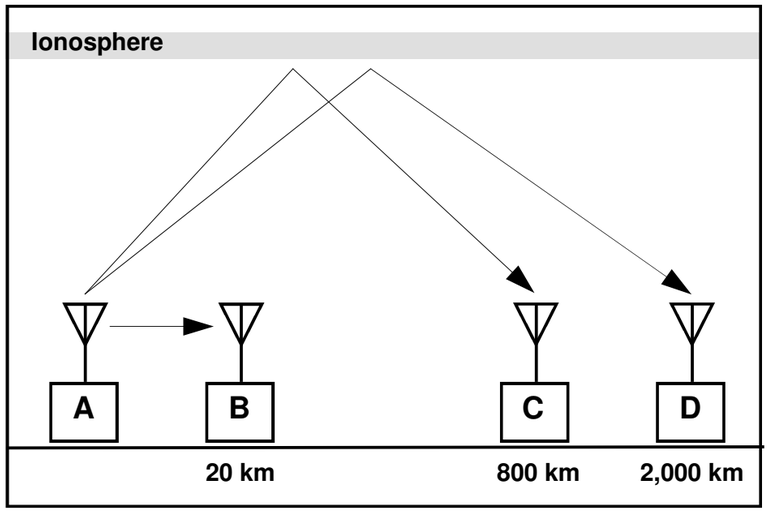
Under each diagram there are recommended working frequencies listed. Please note that these will vary according to time of year and other factors. They are intended only as a guide and are subject to change.

DAY TIME:

Sun is higher

Ionosphere is higher

Optimum working frequency is higher



Not to scale

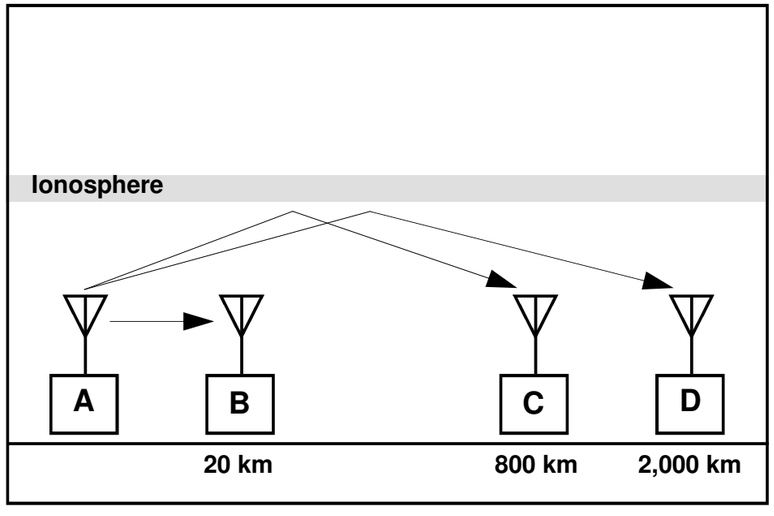
A to B - Recommended working frequency is 3 MHz
A to C - Recommended working frequency is 7 - 9 MHz
A to D - Recommended working frequency is 13 - 16 MHz

NIGHT TIME:

Sun is lower

Ionosphere is lower

Optimum working frequency is lower



Not to scale

A to B - Recommended working frequency is 3 MHz
A to C - Recommended working frequency is 5 to 7 MHz
A to D - Recommended working frequency is 9 to 12 MHz

Field programming function keys

Standard function keys for field programming are as follows:-

Enter global settings OR Save and exit.

***** Enter channel settings OR Save and proceed.

O Toggle between options.

Note that, by pressing down the PTT switch on your microphone, you can abort the programming function.

Exiting field programming mode

To exit the field programming mode, simply press the HASH (#) key on your DTMF keypad. Your display should appear as follows:-

This display shows that you have exited from the field programming mode.

Whenever exiting or aborting the field programming mode, your HF-90 will reset and then proceed through the power-on sequence (refer to Section 5.1 of this Guide).

Special Note: *You may only exit field programming mode after certain settings have been programmed. Details are as follows:-*

- *You can exit from global settings at any time, once the Selcall ID has been entered (refer to Addendum 1.2 in this Guide).*
- *You can exit from channel settings at any time, once the receive and transmit frequencies have been entered and saved (refer to Addendum 1.3 in this Guide).*

FIELD PROGRAMMING

Introduction

Field programming is available on all International Version HF-90s which have had this function enabled (via the PC Programming Package).

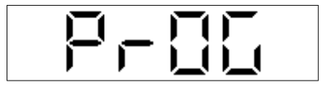
The Frequency Hopping Version also incorporates field programming, however the facilities available with this version are extended. If you are operating the Frequency Hopping Version, you should refer to the HF-90 Frequency Hopping User Guide.

Field programming is NOT available with Australian Version HF-90s.

In order to use the field programming function, you require a DTMF microphone/handset (or keypad, in the case of the avionics interface).

Entering field programming mode

To enter into field programming mode press and hold down both CLAR keys together for two seconds (from the front panel of the HF-90). At this point, your display will appear as follows:-



This display shows that you have entered into field programming mode.

Once in the field programming mode, you are ready to program global settings or channel settings (refer to following pages).

Factors which affect HF/SSB communications

There are a number of different factors which will affect the success of your communications via HF/SSB radio. These are outlined below:-

Your choice of frequency

Generally speaking the higher the frequency you select, the longer the distance covered. Frequency selection is perhaps the most important factor which will impact on the success of your HF/SSB communications.

Correct frequency selection is made easier with the use of a Beacon facility (refer to Section 6.3 of this Guide for details on the HF-90 Beacon).

Time of day

As a rule, the higher the sun is, the smaller the distance covered - for a particular frequency. This means that you can use a low frequency to communicate during times when the sun is low in the sky (early morning, late afternoon and evening), but you will need to use a higher frequency to cover the same distance during times when the sun is high in the sky (midday). You will need to observe the above rule carefully if your radio has a limited number of frequencies programmed into it, as you may only be able to communicate effectively at certain times of the day.

Season

The above rule (the higher the sun is, the smaller the distance covered - for a particular frequency) also applies to the season, or month of the year. Generally speaking, you will need to use a higher frequency to communicate effectively during Summer months, than you would need to in Winter.

Weather conditions

Certain weather conditions will also affect the success of your HF/SSB communications. You may find that in stormy conditions the background noise on your radio will increase, as a result of 'static' caused by lightning.

Man-made electrical interference

Interference of an electrical nature can be caused by overhanging power lines, high power generators, air-conditioners, thermostats, refrigerators and vehicle engines, when in close proximity to your antenna. The result of such interference may be a continuous or intermittent increase in the level of background noise.

System configuration and installation

The equipment you choose and the way in which it is set up will also affect the success of your HF/SSB communications. With respect to system configuration, your choice of antenna system and power supply is critical. What is good for one system is not necessarily good for another. The way in which your system is installed is also extremely important. Certain rules which must be observed for HF/SSB installations, such as correct antenna positioning and proper grounding, will affect the success of your communications, sometimes quite dramatically. Installation is covered in more detail in Section 8 of this Guide.

To ensure no mistakes are made with your system configuration and/or installation, you should speak to your Q-MAC Representative.

Special Note:

Please note that communications on <u>any</u> HF/SSB radio will sound different to that on a VHF (Very High Frequency) radio, UHF (Ultra High Frequency) radio or telephone. Because of the nature of HF/SSB propagation, a marginal level of background noise is always expected. This is normal.

ADDENDUM ...

Note that the following addendum only relates to the HF-90 International Version (where field programming has been enabled).

11. FURTHER READING

Other publications and documents produced by Q-MAC include:-

- HF-90 Technical Manual
- TA-90 Technical Manual
- HF-90 Frequency Hopping User Guide
- Quick Reference Guide
  HF-90 Programming Package
- Quick Reference Guide
  HF-90 Manpack
- Quick Reference Guide
  HF-90 Portable Package
- Quick Reference Guide
  HF-90 Vehicle Package
- Quick Reference Guide
  HF-90 Avionics Package
- Australian Frequency List

In addition to the above, Q-MAC can supply Data Sheets on the various HF-90 packages and accessories which are available. Please ask your Q-MAC Representative for further details.

3. SPEAKING ON AIR

How to make a voice call

Here follow a number of rules you should observe when making a voice call on your HF-90 radio (or any HF/SSB radio):-

- Select the appropriate channel (according to its frequency).
- Before voice calling the other station, listen to the channel to see if it is busy. If the channel is busy you should wait until communications have ceased. If the channel is free you can proceed with your call.
- Press and hold down the PTT switch on your microphone/handset and give a long voice call (5-10 seconds), indicating the station you are calling on.

Example: *"Perth base, Perth base, Perth base, this is Mobile 5ABC, Mobile 5ABC, Mobile 5ABC, calling on Channel 50 - Over".*

Please note this is also the recommended method of voice calling any Telstra Radphone Station or RFDS (Royal Flying Doctor Service) Station (relevant only to users within Australia).

- It is better if you can end all of your communications with the word "OVER". This indicates clearly to the other user that you have finished what you wish to say, so that they may speak. This is very important, particularly when you are speaking to someone who is on a telephone (via a telephone interconnect unit).

- Ensure that your mouth is always close to the microphone (or mouthpiece on a telephone handset) when speaking over HF/SSB radio.

- As a general rule, you should speak clearly and a little slower and louder than normal, when speaking over HF/SSB radio.

Instructions for making a Selcall (Selective Call) are outlined in Section 6.1 of this Guide.

10. ACCESSORIES

Q-MAC supplies a whole range of support accessories for the HF-90 transceiver. Whether you intend to use your HF-90 as a portable, vehicle-mount, base station, or multi-role transceiver, Q-MAC can provide suitable accessories for your requirement. Some of the accessories which we supply include:-

- Antennas and antenna tuning units - manpack, portable, vehicle and base station.

- Batteries - rechargeable and non-rechargeable.

- Battery chargers - mains power, vehicle battery and solar.

- Mains power supply units.

- Canvas backpacks (olive drab or blue) and weather-proof fibreglass carry cases (grey or red).

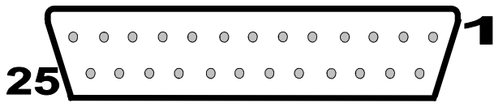
- External speakers c/w audio mute (squelch) facility, microphones and telephone handsets.

- CW/Telegraph keys and headphones.

- Vehicle Installation Kits.

For more information on the accessories which are supplied by Q-MAC, you should speak to your Q-MAC Representative.

DB-25 connector (rear panel of avionics interface) - *male*



The illustration above shows the pins on the DB-25 connector, which is found only on the rear panel of the avionics interface.

Pin No.	Function
1/2/3/14/15	Ground
11/12/13/24/25	+12-28V DC
5	Microphone active
9	Loud speaker audio
17	Microphone ground
22	PTT
7/19/20	Aux. supply to TA-90 Tuner

Radio alphabet

When it is necessary to spell out words over the radio, you should use the following words to denote individual letters. The Radio Alphabet, listed below, is used in all countries as an International Standard.

Letter	Word	Letter	Word
A	Alpha	**N**	November
B	Bravo	**O**	Oscar
C	Charlie	**P**	Papa
D	Delta	**Q**	Quebec
E	Echo	**R**	Romeo
F	Foxtrot	**S**	Sierra
G	Golf	**T**	Tango
H	Hotel	**U**	Uniform
I	India	**V**	Victor
J	Juliet	**W**	Whisky
K	Kilo	**X**	X-ray
L	Lima	**Y**	Yankee
M	Mike	**Z**	Zulu

4. OVERVIEW OF THE HF-90

HF-90 Versions and Models

HF-90 Versions

In order to satisfy the requirements of different users, Q-MAC Electronics have developed the following software versions for the HF-90 radio:-

- The HF-90A Version - referred to as the Australian Version.
- The HF-90E Version - referred to as the International (Export) Version, and ...
- The HF-90H Version - referred to as the Frequency Hopping Version (relevant to military, paramilitary and peace keeping forces).

Throughout this Guide you will notice references to all three versions. A separate Guide also covers specific aspects of the HF-90H Version (refer to Section 11 of this Guide).

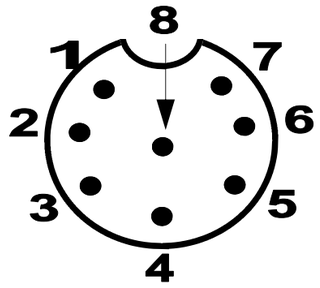
HF-90 Models

In addition, the HF-90 is available in two different formats. Namely:-

- The Standard Model, and ...
- The Advanced Model.

9. EXTERNAL CONNECTORS

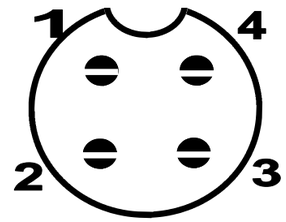
Microphone connector (front panel) - *male*



The illustration above shows the pin numbers on the front panel microphone connector.

Pin No.	Function
1	Microphone 1
2	Transmit data
3	Receive data
4	Loud speaker
5	Press to talk
6	Ground
7	Microphone 2
8	+5 Volt

Power connector (rear panel) - *male*



The illustration above shows the pin numbers on the rear panel power connector.

Pin No.	Function
1	Ground
2	Loud speaker
3	Aux. power
4	+12 to +28 Volt

Antenna

- The best antenna for a base station system, in terms of radiation efficiency, is one which has been cut to length and pre-tuned. These antennas usually accommodate a limited number of frequencies.

- If you wish to have maximum flexibility in terms of frequency selection, a broadband dipole is the best type of base station antenna.

- You should discuss your antenna requirements with your Q-MAC Representative.

- Ensure that the coaxial cable (which connects the antenna to the HF-90) is no longer than necessary.

- Base station antennas must be mounted away from overhanging power lines and telephone lines.

- Ensure that your base station antenna is mounted away from high power generators, air-conditioners, thermostats or refrigerators.

If you require basic functions, the Standard Model HF-90 is quite suitable. However, if you require advanced functions such as Field Programming (relevant to certain international users only) or Selcall related facilities, then you will need the Advanced Model HF-90. This is an additional option.

If you have a Standard Model HF-90, you can have this upgraded to an Advanced Model easily and cost effectively. The upgrade comprises of new operating software and a DTMF (Dual Tone Multi Frequency) microphone or handset. Simply enquire with your Q-MAC Representative.

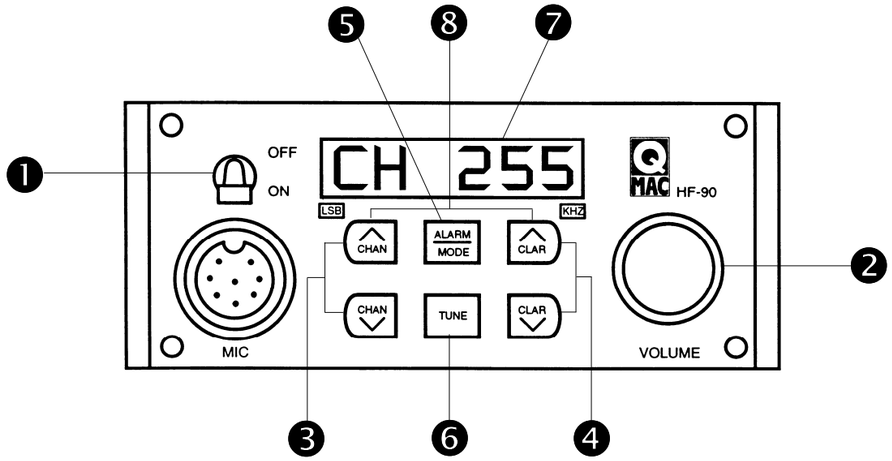
Section 6 of this Guide covers functions which are available only on the Advanced Model HF-90. All other Sections of this Guide are relevant to both Models.

Special Note: *Both the Australian Version and the International Version can be configured either as a Standard Model or Advanced Model. However, the Frequency Hopping Version MUST be configured as an Advanced Model.*

Operating the HF-90

Front panel controls

The following illustration shows the operating controls which are on the front panel of the HF-90 radio. The next Section of this Guide (Section 5) gives detailed instruction on how to use each of these controls.



❶	ON/OFF switch
❷	Volume control knob
❸	Channel up/down scroll keys
❹	Clarifier up/down scroll keys
❺	Alarm key & USB/LSB mode selection key
❻	Tune key
❼	LED display
❽	Erase function

- You should use the HF-90 in conjunction with the Q-MAC Power Supply Unit (PSU). If you plan to use any other type of PSU you must contact your Q-MAC Representative to ensure that the unit you have chosen is suitable.

- The HF-90 must be properly connected to a 12 - 24 Volt PSU. If the set does not receive adequate voltage it will not operate properly - there may be speech distortion on transmit and the LED display will begin to dim.

- The PSU used in conjunction with the HF-90 must be capable of providing 10 Amp continuous. PSUs which are manufactured for use with CB radios are generally not suitable.

- The power cable supplied by Q-MAC is designed to minimise voltage drop between the PSU and the HF-90. Installing a light core cable is not recommended.

- The HF-90 is protected against irregular power surges. However, if you are installing the radio in a location where there is a danger of lightning, you should take adequate measures to further protect the HF-90, as the set cannot withstand a direct lightning strike. Please enquire with your Q-MAC Representative about the different types of lightning protection available.

Grounding

- If the length of antenna coaxial cable is unusually long, it is good practice to ground the coaxial connector where it enters the radio. This can be done by using heavy copper braid connected to a local ground stake. This may also result in improved rejection of local noise.

Base station systems

When using the HF-90 in a base station configuration, you should observe the following check-list.

Positioning the HF-90

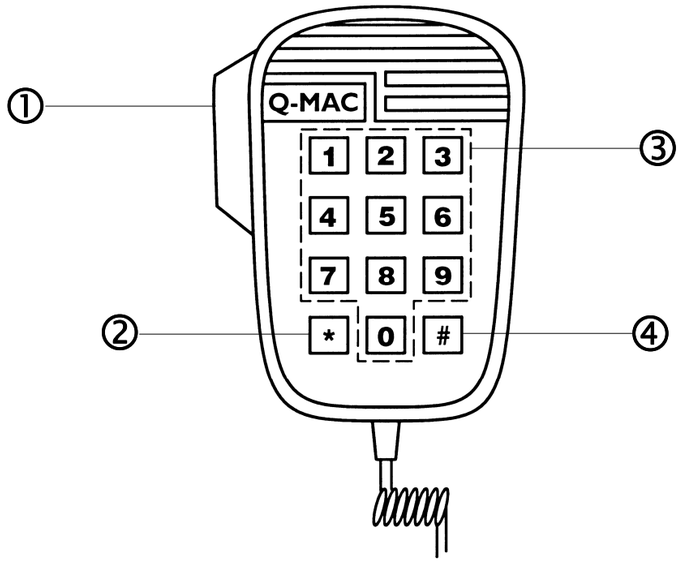
- Ensure that the HF-90 is mounted in a position which allows easy access for operation. In addition, the loudspeaker should be positioned close to where the operator will sit.
- The HF-90 must be mounted in a position which allows a free flow of air through the rear heatsink (cooling fins).
- When installing the HF-90 in a base station you should use the Q-MAC HF-90 Mounting Cradle. Assembly instructions are provided with each cradle.
- Do not expose the HF-90 to direct sunlight for extended periods.
- In a base station installation the HF-90 should not be placed directly on top of the Mains PSU. Some PSUs can generate an excessive amount of heat.

Power source

- Do not connect the HF-90 directly with AC mains supply. This will cause serious damage to the HF-90 and may result in personal injury.

DTMF microphone/handset controls

The following illustration shows the operating controls which are on the DTMF microphone/handset, supplied with the Advanced Model HF-90. Section 6 of this Guide gives detailed instruction on how to use each of these controls. The Addendum concerning Field Programming also covers operation of the DTMF microphone/handset.



①	Press to talk (PTT) switch
②	STAR key
③	Numeric keys
④	HASH key

Special Note:
HF-90 with avionics interface

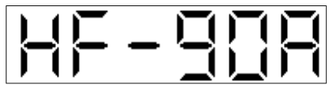
The HF-90, when ordered together with the avionics interface, is supplied with a modified front panel which incorporates all of the standard operating controls (opposite left) together with a DTMF keypad (top). Refer to Section 7.2 of this Guide.

5. STANDARD FUNCTIONS

❶ON/OFF switch

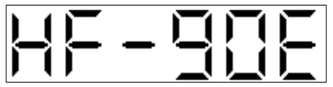
Switching the HF-90 on

To switch the HF-90 on, move the ON/OFF switch downward to the ON position. When the set is switched on an audible beep is heard and the front panel display appears as follows:-



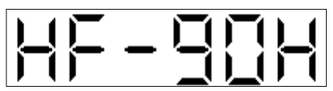
This display shows the version number of the radio - HF-90A, for the Australian Version.

OR ...



This display shows the version number of the radio - HF-90E, for the International Version.

OR ...



This display shows the version number of the radio - HF-90H, for the Frequency Hopping Version.

- When using the TA-90 autotune system ensure that; the whip antenna is undamaged, the white antenna insulator is clean and undamaged, the red wire feeding the top of the insulator is clear of metalwork by at least 50mm and that the ground connection to the TA-90 Tuner is adequate.

- When using a tapped whip antenna always ensure that the tap selected corresponds to the channel/ frequency in use on your HF-90 radio (usually the channel/frequency is engraved next to the tap). In addition, the excess portion of the wander lead should be wrapped tightly around the antenna.

Minimising engine interference

- Correct grounding will go a long way toward minimising engine interference.

- Q-MAC can also provide an interference suppression kit which further reduces the likelihood of engine interference.

Power source

- The HF-90 must be properly connected to a suitably charged 12 - 24 Volt battery. If the set does not receive adequate voltage it will not operate properly - there may be speech distortion on transmit and the LED display will begin to dim.

- The power cable supplied by Q-MAC is designed to minimise voltage drop between the vehicle battery and the HF-90. Installing a light core cable will result in severe transmitter distortion and could damage the radio.

- In a vehicle installation, Q-MAC recommends that you fit a cartridge fuse (20 Amp) in the active wire, close to the battery. This will protect the power cable from the risk of damage through short circuit.

Grounding

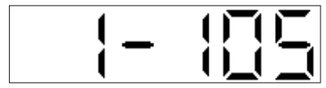
- In a vehicle system adequate grounding is provided by the metal body of the vehicle. The area of metal is sufficient to allow good ground coupling.

- Ensure that the ground on your antenna system (tapped whip antenna or automatic tuner) makes a good connection to the chassis of the vehicle. Failure to do this may substantially reduce the radiation efficiency of the antenna.

Antenna

Where a bull bar is fitted, a vehicle whip antenna should be mounted on the front of a vehicle (on a special bracket welded to the bull bar, on the passenger side of the vehicle).

The display on the previous page will be shown for half a second, immediately followed by another display showing relevant software information. For example:-



This display shows: Option Level 1 - Release 1, Version 05.

The display showing software information will also time-out after half a second. If you have an Advanced Model HF-90, the display will then show your Selcall ID (4 digits) for one second. At this point the HF-90 will revert to the default channel/frequency display (refer to Section 5.8 of this Guide). The channel/frequency shown will be the one which was last in use.

Switching the HF-90 off

To switch the HF-90 off, move the ON/OFF switch upward to the OFF position.

❷ Volume control knob

Adjusting volume

To increase the volume (of received signal) on the HF-90 rotate the VOLUME control knob in a clockwise direction. Or, to decrease the volume on the HF-90 rotate the VOLUME control knob in an anti-clockwise direction.

The VOLUME control knob on the HF-90 uses an Incremental Shaft Encoder. This means that there are no physical high/low limits when adjusting the volume - ie. the knob will keep rotating without coming to a stop. As you rotate the knob you will detect the high/low limits. Once a limit is reached, turning the knob in the same direction will no longer affect the volume. A small audible click occurs with each increase and decrease of volume.

Special Note: ***Advanced Model***

Please note that the VOLUME control knob can also be used as a Selcall Mute control on the HF-90 Advanced Model. Please refer to Section 6.5 of this Guide.

Vehicle systems

All HF-90s which are purchased as part of a Vehicle Package are supplied with a Quick Reference Guide, which explains how you can get the best results from your radio and antenna system.

Those users who are not supplied with a complete Vehicle Package or Quick Reference Guide should observe the following check-list.

Positioning the HF-90

- Ensure that the HF-90 is mounted in a position which allows easy access for operation. In addition, the loudspeaker should be positioned close to where the operator will sit.

- The HF-90 must be mounted in a position which allows a free flow of air through the rear heatsink (cooling fins).

- When mounting the HF-90 in a vehicle you should use the Q-MAC HF-90 Mounting Cradle. Assembly instructions are provided with each cradle.

- In a vehicle installation the HF-90 may be mounted under the dashboard of the vehicle, in the centre console, up against the centre console (with the front panel facing upward) or in an overhead shelf/console.

- The HF-90 should not be mounted on top of a vehicle dashboard where it is exposed to direct sunlight. In some places, the temperature within a car can reach temperatures in excess of 60°C. The top of the dashboard is usually the hottest part of a vehicle.

Antenna

- For portable use, an end-fed broadband antenna or TM-90 Tuner with Q-MAC Long Wire Antenna Kit are the most efficient options. These are simple to deploy and have omni-directional characteristics.

- If instant deployment and personal mobility are required, a manpack system incorporating the TM-90 Tuner and whip antenna will be the most appropriate option.

- You should discuss your antenna requirements with your Q-MAC Representative.

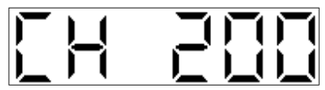
- Instructions on how to set up and operate manpack/ portable antennas are provided with all Manpack/ Portable Packages (on the Quick Reference Guide).

- If you are using a whip type antenna, avoid touching the antenna as this will detune it. There is also a risk of receiving an RF burn if touching the antenna when the radio is transmitting.

❸Channel up/down scroll keys

Selecting a channel

To select a channel higher than the one in use press the CHAN (up) key. By pressing and releasing the CHAN (up) key you will proceed to the next (higher) programmed channel. By pressing and holding down the CHAN (up) key you can scroll upward through a number of channels rapidly. When the desired channel number is reached you simply release the CHAN (up) key and the display will stop on the new channel number. For example:-



This display shows that the selected channel is Channel 200.

If you are operating an International Version HF-90, the channel display will time out after two seconds, after which time the operating frequency (receive frequency) will appear. For example:-

This display shows a channel frequency of 12650.0kHz (which is the same as 12.65MHz).

To select a channel lower than the one in use, press the CHAN (down) key in the same manner as mentioned above for the CHAN (up) key.

Once the appropriate channel has been selected, you are ready to commence communication. To transmit, simply press and hold down the PTT switch on your microphone/ handset (refer to Section 3.1 of this Guide).

Special Note: Using the TA-90 autotune system

Please note that, if you are using the HF-90 in conjunction with the TA-90 autotune system, you will hear a continuous high pitched tone for a few seconds, once you have presses the PTT switch for the first time on a new channel. This is the TA-90 Tuner entering its tune sequence (refer to Section 7.1 of this

Channel configuration

When scrolling up and down channels you may notice that your channel numbers do not follow a regular sequence such as 1, 2, 3, 4, 5. For example, they could appear as 1, 2, 13, 56, 245. This will depend on how your HF-90 has been programmed and for what use.

The maximum number of channels you can have programmed into the HF-90 is 255. Please note that when scrolling, the channel numbers will 'wrap around' from highest to lowest and vice versa. For example, the channels on your HF-90 could appear in a sequence such as this; 253, 254, 255, 1, 2, 3.

Special Note: Advanced Model

If you have an Advanced Model HF-90 you may notice, when scrolling between the lowest and highest channel number, that the display shows the word "SCAN". This is a separate channel designated for Selcall Scan (refer to Section 6.4 of this Guide).

Power source

- You should use the HF-90 in conjunction with a Q-MAC Battery. If you plan to use any other type of battery pack you must contact your Q-MAC Representative to ensure that the battery you have chosen is suitable.
- The HF-90 must be properly connected to a suitably charged 12 - 24 Volt battery. If the set does not receive adequate voltage it will not operate properly - there may be speech distortion on transmit and the LED display will begin to dim.
- Q-MAC recommends that you have a fuse in-line with the battery cable, so as to avoid damage to the cable and battery in the event of a short circuit.
- Q-MAC offers a variety of battery charger options, so that you can charge your battery from a solar source, mains power terminal or vehicle battery.

Grounding

- In all manpack and portable systems, an adequate ground (earth) is essential for satisfactory operation of the HF-90 radio.
- If a counterpoise is provided with your portable antenna system, ensure this is fully extended.
- If a ground stake is provided with your portable antenna system, ensure this is placed into the ground as far as possible.
- Grounding will also be improved where the surrounding soil is wet or damp.

8. INSTALLATION

Manpack and portable systems

When using the HF-90 in a manpack or portable system, we recommend that you use the Q-MAC Canvas Backpack or Weather-proof Fibreglass Carry Case. These are designed to house the HF-90 radio and its accessories, in a safe and convenient manner.

All HF-90s which are purchased as part of a Manpack or Portable Package are supplied with a Quick Reference Guide, which explains how you can get the best results from your radio, battery and antenna system.

Those users who are not supplied with a Manpack/Portable Package or Quick Reference Guide should observe the following check-list.

Using the HF-90 inside a backpack or carry case

- Ensure that the HF-90 is placed in a position which allows easy access for operation.
- The HF-90 must be placed in a position which allows a free flow of air through the rear heatsink (cooling fins).
- Do not leave the HF-90 exposed to direct sunlight for long periods of time.

❹ Clarifier up/down scroll keys

The clarifier function allows you to adjust the quality of audio (to obtain maximum intelligibility) by fine tuning the pitch of the received signal. A clarifier adjustment may be required when receiving a signal which is slightly off-frequency. Clarifier does not work while the set is in transmit mode and will not affect the transmit frequency.

Adjusting clarifier

The CLAR keys on the HF-90 will adjust the clarifier by increments of 5 units. The clarifier function enables a maximum adjustment of ±100 units.

To adjust the clarifier level on your HF-90 in an upward direction (thus increasing the receive frequency), press and release the CLAR (up) key. The first time you press the CLAR (up) key, the display will appear as follows:-

The zero in the above display indicates that the clarifier has not yet been adjusted - ie. it is at zero level.

Press and release the CLAR (up) key again. This time the display will appear as follows:-

This display shows that the clarifier has been adjusted by +5 units.

Each subsequent press of the CLAR (up) key will increase the receive frequency by another 5 units, until the upper limit of 100 units is reached.

To adjust the clarifier level on your HF-90 in a downward direction (thus decreasing the receive frequency), press and release the CLAR (down) key. The first time you press the CLAR (down) key the display will show the numeral zero (as illustrated on the previous page). Press and release the CLAR (down) key again. This time the display will appear as follows:-

This display shows that the clarifier has been adjusted by -5 units.

Each subsequent press of the CLAR (down) key will decrease the receive frequency by another 5 units, until the lower limit of -100 units is reached.

Once the clarifier has been adjusted for a particular channel the new setting will remain in place until another channel is selected or until the HF-90 is switched off. When returning back to the original channel the clarifier setting is not saved - ie. it will be set back at the zero level.

Avionics interface

The HF-90 may be supplied together with an avionics interface, for installation within a fixed wing aircraft or helicopter. The complete avionics unit, incorporating the HF-90 and avionics interface, is supplied within a General Aviation (GA) frame and comes together with the following:-

- An extended front panel incorporating all standard HF-90 controls plus a DTMF keypad.
- A separate rear panel incorporating a DB-25 connector, providing all interfacing to the avionics system (refer to Section 9 of this Guide).

There is one additional function offered by the HF-90 avionics unit, which is not available on the standard HF-90 Transceiver. This is outlined below. All other operations will be as per the HF-90 International Version.

Audio mute function

There is an audio mute circuit incorporated within the avionics interface, which can be enabled or disabled via the front panel DTMF keypad. When enabled, all background noise will be muted until such time as incoming audio (or an incoming Selcall) is received. When incoming audio is received, the mute is 'broken' so that communications are audible. If no audio is received (after approximately three seconds), the receive signal will once again be muted.

To enable or disable the audio mute, simply press down the TWO (2) and FIVE (5) keys simultaneously. These are located centre/top of the DTMF keypad.

7. COMPATIBLE PRODUCTS

TA-90 autotune system

When using the HF-90 in conjunction with the TA-90 autotune system (for vehicle use) there are certain operating characteristics which you should be aware of. In short, whenever the HF-90 transmits for the first time on a given channel (prior to a channel change), the TA-90 Tuner will enter its tune sequence. As the TA-90 tunes, you will hear a high pitched tone for a few seconds (only if your volume level has not been muted), after which voice communications can commence as normal.

Changing channel and transmitting

When you change channel and then press the PTT switch on your microphone/handset to transmit for the first time, you will hear the TA-90 enter its tune sequence (as outlined above).

Aside from pressing the PTT switch, your HF-90 also transmits when receiving a valid Selcall/Telcall or Beacon Request. It transmits by way of a Selcall/Telcall Confirmation or Beacon back to the originating radio (refer to Section 6 in this Guide). When this happens, and you have not transmitted previously on the given channel, the TA-90 enters its tune sequence prior to transmitting.

Receiving Selcall/Telcall or Beacon Request in scan mode

If you are scanning channels when you receive a valid Selcall/Telcall or Beacon Request, the HF-90 will stop scanning, lock on the relevant channel and the TA-90 will enter its tune sequence prior to transmitting the Selcall/ Telcall Confirmation or Beacon.

❺ a) Alarm key

This function is available only on the Australian Version

The ALARM key is for use in emergency situations so that you can alert the RFDS (Royal Flying Doctor Service) quickly and effectively.

To use the ALARM key you must be on an RFDS channel (a list of RFDS channels is printed on the "Australian Frequency List" supplied with your HF-90). Once you have selected an RFDS channel you can either test the alarm function or transmit an RFDS Emergency Alarm.

Testing the alarm function

To test the alarm function press and release the ALARM key. Your display will appear as follows:-

This display shows that the test alarm is being generated.

In conjunction with the above you will hear the sound of the two-tone test alarm being generated. In this instance the alarm is not being transmitted. The test alarm signal will continue sounding for sixty seconds or until another key is pressed (from the left or right key column).

Transmitting an RFDS Emergency Alarm

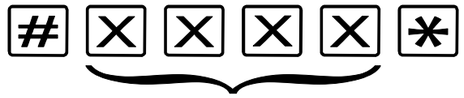
To transmit the RFDS Emergency Alarm press and hold the alarm key for two seconds. Your display will appear as illustrated on the following page:-

This display shows that the RFDS Emergency Alarm is being transmitted.

In conjunction with the above you will hear the sound of the two-tone RFDS Emergency Alarm being transmitted. The RFDS Emergency Alarm will continue to transmit for sixty seconds or until another key is pressed (from the left or right key column).

Important: *Please ensure that you use the RFDS Emergency Alarm only when you have a genuine emergency situation.*

Send Beacon Request (DTMF keypad)



4 digit Selcall ID

Initiate Selcall Scan

(DTMF keypad)

(front panel keypad)

Press down or to select Scan.

Programming the Selcall ID Number (front panel keypad / DTMF keypad)

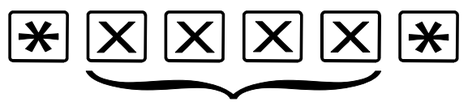
4 digit Selcall ID

The above instruction only applies to the Australian Version (or the International Version which has not been set up for Field Programming).

Advanced functions summary

Below is a summary of the steps (key presses) involved in working through the advanced functions. Please note that the letter "**X**" is used to denote any individual number.

Send Selcall (DTMF keypad)



4 digit Selcall ID

Resend last Selcall (DTMF keypad)

Send Telcall (DTMF keypad)

4 digit Selcall ID *Telephone No.*

Resend last Telcall (DTMF keypad)

Telcall Hang-up (DTMF keypad)

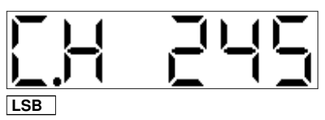
❺ b) USB/LSB mode selection key

This function is available only on the International Version

The HF-90 will operate in either USB (Upper Sideband) or LSB (Lower Sideband) mode.

LSB decimal indicator

If LSB channels are pre-programmed in the HF-90 or manually selected, a decimal indicator will appear on the bottom left of the display. The decimal indicator appears just above the LSB label (which is printed below the display window). For example, if Channel 245 is selected and it is set to LSB mode, the display appears as follows:-



This display shows that the channel in use (Channel 245) is set to LSB mode. Note the LSB label below the display window.

Changing the operating mode

To change the operating mode for a particular channel, first select the appropriate channel (refer to Section 5.3 of this Guide), then press and release the MODE key. The new mode will now be selected and the display will show this change. For example:-

This display shows that USB mode is selected.

OR ...

This display shows that LSB mode is selected.

Subsequent presses of the MODE key will simply allow you to move back and forth between USB and LSB modes.

Once the operating mode has been changed for a particular channel, this setting will remain in place until another channel is selected or until the HF-90 is switched off. When returning back to the original channel, the operating mode is not saved - ie. it will go back to its original programmed setting.

When mode selection has been disabled ...

Please note that if manual mode selection has been disabled on your set you will not be able to alter the pre-programmed mode settings. In this instance, when you press and release the MODE key, your display will show the word "CLOSED". It will appear as follows:-

This display shows that the mode selection function is "CLOSED" - ie. disabled.

When you see the above message on the display you will know that the operating mode cannot be manually adjusted.

Warning: *Some countries have restrictions regarding the operating mode (s) which can be used on an HF radio.*

Selcall Mute

The Selcall Mute function is used to mute the HF-90 receiver whilst you wait for an incoming Selcall/Telcall. The Selcall Mute cuts out all noise on the receiver including voice - ie. it is not selective. You can operate Selcall Mute when the set is tuned to a particular channel or when it is in Scan Mode.

Activating Selcall Mute

To activate Selcall Mute simply turn the VOLUME control knob in an anti-clockwise direction, until the noise level is diminished. The volume level on your set will remain at the new setting until an incoming Selcall/Telcall is received.

Receiving a Selcall

When you receive an incoming Selcall/Telcall (whilst Selcall Mute is activated), the HF-90 immediately detects the incoming Selcall and 'breaks' the mute. In other words, the volume level on the set is automatically reset to an audible level, so that you can begin communications when necessary.

The incoming Selcall/Telcall is then received normally, as outlined in Sections 6.1 and 6.2 of this Guide.

If you wish to reset the Selcall Mute once you have received a Selcall, simply repeat the procedure as outlined above.

Special Note:
Audio Mute

Please note that an audio mute (squelch) facility is also available via the Q-MAC External Mount Speaker. Alternatively, if you have an HF-90 with avionics interface, audio mute is enabled or disabled by simultaneously pressing and then releasing the 2 and 5 keys (centre top two keys) on the DTMF keypad.

Selcall Scan

The HF-90 Advanced Model incorporates a Selcall Scan function. Selcall Scan allows you to monitor up to eight programmed channels for incoming Selcalls/Telcalls.

Special Note: *The optimum number of channels which should be programmed for Selcall Scan is no more than six.*

Activating Selcall Scan

To activate Selcall Scan simply press the 0 key on your DTMF keypad. Alternatively, you may select Scan by using the CHAN scroll keys on the front panel of the HF-90. Scan lies between the highest and lowest channels programmed in your radio - think of it as being Channel 0. When scan is initiated your display will temporarily appear as follows:-

This display shows that Scan is selected.

Once Scan been selected and the key released, scanning will commence. You will see the channels being scanned in sequence and hear a clicking sound as each new channel temporarily locks into place.

Selcall Scan will continue until an incoming Selcall/Telcall is received, at which point the HF-90 will stop scanning and lock on the appropriate channel. The HF-90 will then respond in accordance with normal Selcall/Telcall procedure, as described in Sections 6.1 and 6.2 of this Guide.

Scanning may be cancelled manually by pressing the PTT switch on your microphone or one of the CHAN scroll keys.

❻ Tune key

The tune function allows you to transmit a continuous carrier signal at reduced power for manually tuning long wire antennas and un-tuned whips, when used in conjunction with an antenna tuning unit (ATU).

Activating the tune function

To activate the tune function press and release the TUNE key. Your HF-90 will transmit a continuous carrier signal at reduced power for several seconds. You will hear a continuous tone and the display will appear as follows:-

This display shows that the tune function is in process.

❼LED display

Default display

The default display on your HF-90 will appear as follows:-

- It will either show the channel number last in use **(Australian Version only)**, or ...
- It will show the frequency last in use **(International Version and Frequency Hopping Version).** This default display is always preceded by the channel last in use (which times out after approximately two seconds).

Your HF-90 radio will always revert to a default display in the following circumstances:-

- When it is first switched on.
- When you have cancelled a function, or ...
- When a function has automatically timed out.

Automatic display time-out

The HF-90 incorporates an automatic display time-out facility, which applies to the use of most advanced functions within the set (such as sending Selcalls, Telcalls or Beacon Requests).

The time-out facility will take effect once you have pressed a function key from the DTMF keypad on your microphone/ handset. Once the function is completed, or if another key is not pressed, the new display will automatically time-out after a period of five seconds. At this point the HF-90 will revert to the default display.

Several seconds after pressing the STAR key to send the Beacon Request, you will hear the Beacon as a series of three or four tones (depending on which station you are making contact with). The strength of these tones will indicate whether or not you are on a suitable channel to communicate with the other station. If the Beacon is very weak, you should repeat the above procedure on another channel. Once you have achieved a strong Beacon, you can then proceed with your Selcall or Telcall to that station.

Receiving a Beacon Request

If your HF-90 receives a Beacon Request, the response from your radio is automatic - ie. there is no need for you to respond manually. No Selcall Alarm will be received or recorded when receiving a Beacon Request. If your HF-90 is in scan mode when you receive a Beacon Request, the scan sequence will restart immediately, once the Beacon has been transmitted.

Special Note:
Using the TA-90 autotune system

Please note that, if you are using the HF-90 in conjunction with the TA-90 autotune system, you may hear a continuous high pitched tone for a few seconds, having received a valid Beacon Request, prior to the transmission of the Beacon. This is the TA-90 Tuner entering its tune sequence (refer to Section 7.1 of this Guide).

Beacon

The Beacon facility is used to check the signal strength between two HF-90s, or between an HF-90 and another HF transceiver fitted with the same Selcall format - such as the transceivers used in the Telstra Radphone Stations (relevant only to users within Australia). It is recommended that you make use of the Beacon facility prior to making a Selcall or Telcall so that you can ascertain which frequency (on which channel) will enable the most effective communications for a particular time of day, and for particular environmental conditions. In short, Beacon takes the 'guess work' out of HF/SSB communications.

Sending a Beacon Request

To send a Beacon Request use the DTMF keypad on your mic./handset (or front panel - if using HF-90 with avionics interface).

Sending a Beacon Request is very simple. It is almost the same procedure as sending a Selcall - the only difference being that, instead of pressing the STAR (*) key to initiate a normal Selcall, you press the HASH (#) key to initiate a Beacon Request. The rest of the procedure is the same as if you were sending a normal Selcall.

The procedure is as follows:-

Press the HASH (#) key, followed by the Selcall ID (of the station you wish to communicate with), then press the STAR key to send the Beacon Request. You will hear the same varying high pitched tone as you do with a Selcall and your display will appear as follows:-

This display shows that the Beacon Request is being sent - ie. in transmit mode.

❽Erase function

The HF-90 incorporates a direct entry Erase Function which allows the operator to quickly and easily erase the memory of the HF-90. This feature may be required if you wish to reprogram the HF-90 in the field (refer to Addendum at the back of this Guide), or if you wish to ensure that channel/ frequency information remains secure - in circumstances where the HF-90 falls into enemy hands **(relevant to military/ paramilitary operators only).**

To erase the memory of the HF-90, simply hold down the CHAN (up) and CLAR (up) keys together for six seconds. The display will appear as follows:-

This display shows that the Erase Function is in progress.

The display will show the word "ErASE" for twelve seconds whilst the memory is being erased. Finally the HF-90 will reset as though being turned on for the first time (refer to Section 5.1 of this Guide).

Special Note: *Please note that this function will erase all channels in memory except for one - the lowest channel. This is because the HF-90 requires a minimum of one channel programmed in memory at all times.*

① Press to talk (PTT) switch

To begin communications

To begin communications (ie. to transmit), simply press and hold down the PTT switch on your microphone/handset and then communicate in accordance with radio protocol (refer to Section 3 of this Guide).

Special Note: Using the TA-90 autotune system

Please note that, if you are using the HF-90 in conjunction with the TA-90 autotune system, you will hear a continuous high pitched tone for a few seconds, once you have presses the PTT switch for the first time on a new channel. This is the TA-90 Tuner entering its tune sequence (refer to Section 7.1 of this

Viewing the transmit frequency

To view the transmit frequency, simply press the PTT switch on your microphone or handset. The display will show the frequency in kHz. Because the channel resolution of the HF-90 is 100Hz, the frequency is displayed to one decimal place. For example:-

This display shows a transmit frequency of 12650.0kHz (which is the same as 12.65MHz).

Cancelling a function

To cancel any function, simply press and release the PTT switch on your microphone/handset. This will immediately cancel the function and the current display. The HF-90 will then revert back to the default display.

You can respond to the call immediately by pressing your microphone PTT switch and beginning communications with the telephone user. Pressing the PTT switch will immediately cancel the Selcall Alarm. Once the Selcall Alarm has been cancelled, your display will revert to the default channel display.

If the Selcall Alarm is not cancelled, the audible alarm will automatically time-out after sixty seconds. However, the display will continue to show that a call has been received by flashing the Selcall ID of the calling station, until the PTT switch is pressed. This provides a call recording facility for when the radio is unattended. However, if another call is received before the radio operator returns, the new call will be recorded and the previous call will be overwritten.

If you ever leave your radio unattended and then return to find that someone has sent you a Telcall, you will know immediately which station has called you by looking at the Selcall ID on your display. If the telephone user has left their telephone number for you to call them back, you can retrieve this number by pressing the STAR key followed by the HASH key. The telephone number will scroll across the left side of the display. After pressing these two keys to retrieve the telephone number, press the STAR key once more to return their call. These three key presses in sequence will initiate the Telcall Resend function.

Special Note: Using the TA-90 autotune system

Please note that, if you are using the HF-90 in conjunction with the TA-90 autotune system, you may hear a continuous high pitched tone for a few seconds, having received a valid Telcall, prior to the transmission of the Telcall Confirmation. This is the TA-90 Tuner entering its tune sequence (refer to Section 7.1 of

Warning: *If the hang-up command is not executed your call will still be in progress until the auto time-out is activated.*

After pressing the HASH key twice, your display will appear as follows:-

This display shows that Telcall hang-up has been executed.

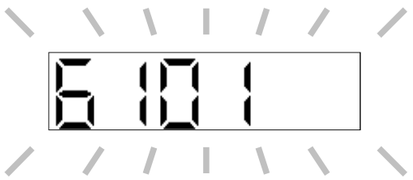
The HANGUP display will time-out after three seconds and the default channel display will reappear.

Telcall Resend

Please note that you can resend the last recorded Telcall quickly and easily, by pressing the following keys in sequence:- STAR, HASH, STAR.

Receiving a Telcall

When receiving a Telcall (from a telephone user) you will hear the Selcall Alarm. In addition your display will flash the Selcall ID of the station that is calling you - ie. the Selcall ID of the Telstra Radphone Station (relevant only to users within Australia) or other Telephone Interconnect Station. For example:-



This flashing display shows that you have received a call from Station No. 6101.

6. ADVANCED FUNCTIONS

Selcall

Selcall (short for Selective Call) allows you to make and receive calls to/from another radio easily and directly, by a simple method of digital signalling. Selcall allows you to send a coded alarm signal to alert a specific radio user that they are being called. If the Selcall is received successfully by the other radio user, their set will automatically transmit a positive confirmation alarm back to your set.

For you to be able to use Selcall, the radio which you wish to communicate with must also have the Selcall function. The HF-90 uses a Selcall format which is compatible with all major Australian brands and Telstra Radphone Services (relevant only to users within Australia).

Please refer to the end of Section 6.1 for instructions on how to program the Selcall ID number.

Sending a Selcall

To send a Selcall use the DTMF keypad on your mic./ handset (or front panel - if using HF-90 with avionics interface).

Prior to sending a Selcall, ensure you are on the correct Selcall channel. We recommend using the Beacon facility to select the appropriate Selcall channel (refer to Section 6.3 of this Guide).

First press the STAR (*) key. Pressing this key initiates the Selcall procedure. Your display will appear as follows:-

This display shows that Selcall has been initiated.

Next, press the numeric keys to select the appropriate Selcall ID (four digits) of the station you wish to contact. As you press each individual numeric key, the corresponding number will appear on the display until all numbers have been selected. At this point all numbers will appear on the display together. For example:-

This display shows that Selcall ID 1234 has been selected.

If in the process of selecting the Selcall ID you press an incorrect number, you can clear the display by pressing and releasing the PTT switch on the microphone.

Once the Selcall ID has been correctly selected, press the STAR key again to send the Selcall. You will hear a varying high pitched tone as the Selcall is being transmitted, and your display will appear as follows:-

This display shows that Selcall is being sent - ie. in transmit mode.

Several seconds after pressing the STAR key to send the Selcall, you should hear a series of high pitched beeps. This is your positive confirmation (known as the Selcall Confirmation) being transmitted from the called station to let you know that your Selcall has been received successfully. If you do not hear the Selcall Confirmation you should repeat the procedure outlined above, on the same channel or a new channel. If your Selcall is not successful this may be due to inappropriate frequency selection or excessive interference (refer to Section 2.3 of this Guide). In the event of strong interference, it may be necessary to repeat Selcall up to three times.

At this point your display will appear as follows:-

This display shows that the Selcall is being sent - ie. in transmit mode.

Several seconds after pressing the STAR key to send the Telcall, you should hear a series of high pitched beeps. This is the Telcall Confirmation being transmitted from the Telephone Interconnect Station to let you know that your Telcall has been received successfully. If you do not hear the Telcall Confirmation you should repeat the procedure outlined above, on the same channel or a new channel. If your Selcall is not successful this may be due to inappropriate frequency selection or excessive interference (refer to Section 2.3 of this Guide).

If your Telcall is successful (ie. you hear the Telcall Confirmation) you will hear the telephone ring at the other end. This will take several seconds as the Telephone Interconnect Unit has to complete its dialling. After the person at the other end picks up the telephone, you will generally have to wait for a start tone before proceeding with your call.

Important: *Please note that communications will be in simplex mode (HF radio mode) therefore you should inform the telephone user that you are calling from an HF radio and that all speech should be ended with the word "OVER".*

If the telephone at the other end is not picked up try again later.

Telcall Hang-up

If your Telcall is successful and you have managed to get through to the telephone user, you should complete the call (ie. hang up) by pressing the HASH key twice.

This display shows that Selcall ID 5678 has been selected.

Once the Selcall ID has been correctly selected, press the HASH (#) key. This tells the HF-90 that you wish to send a Telcall as opposed to just a Selcall. Your display will now appear as follows:-

This display shows that Telcall has been initiated.

Next, press the numeric keys to select the telephone number. As you press each individual numeric key, the corresponding number will appear on the display until all numbers have been selected. Please note that the display can only show a maximum of six digits/characters, therefore as you enter the telephone number the digits will scroll across the left side of the screen. For example:-

This display shows that a telephone number has been selected - with 224555 as the last six digits.

If, in the process of selecting the telephone number, you press an incorrect number, you can clear the display by pressing and releasing the PTT switch on the microphone.

Once the telephone number has been correctly selected, press the STAR key again to send the Telcall. You will hear a varying high pitched tone as the Selcall (the first part of your command) is being transmitted.

Your display will revert to the default channel display as soon as a Selcall confirmation is received, or if the call is unsuccessful.

Selcall Resend

Please note that you can resend the last recorded Selcall quickly and easily, by pressing the STAR key twice.

Receiving a Selcall

When receiving a Selcall you will hear a series of continuous loud beeps (which cannot be adjusted with the VOLUME control knob) - this is the Selcall Alarm. In addition your display will flash the Selcall ID of the station that is calling you. For example:-

This flashing display shows that you have received a call from Station No. 4321.

You can respond to the call immediately by pressing your microphone PTT switch and commencing communications with the calling station. Pressing the PTT switch immediately cancels the Selcall Alarm. Once the Selcall Alarm has been cancelled, the display will revert to the default channel display.

When a Selcall is being received you should not adjust the user controls, as this may result in the incoming call being lost.

If the Selcall Alarm is not cancelled the audible alarm will time-out after sixty seconds. However, the display will continue to show that a call has been received by flashing the Selcall ID of the calling station, until the PTT switch is pressed. This provides a call recording facility for when the radio is unattended. However, if another call is received before the radio operator returns, the new call will be recorded and the previous call will be overwritten.

If you leave your radio unattended and then return to find that someone has sent you a Selcall, you will know immediately who has called you by looking at the flashing Selcall ID on your display. To return their call simply press the STAR key twice. This will initiate the Selcall Resend function.

Special Note:
Using the TA-90 autotune system

Please note that, if you are using the HF-90 in conjunction with the TA-90 autotune system, you may hear a continuous high pitched tone for a few seconds, having received a valid Selcall, prior to the transmission of the Selcall Confirmation. This is the TA-90 Tuner entering its tune sequence (refer to Section 7.1 of this Guide).

Programming the Selcall ID Number

To program the 4 digit Selcall ID number first hold down the two CLAR keys simultaneously (for two seconds). Then release the CLAR keys to display the current Selcall ID (this will be a 4 digit number). To enter a new ID, select the 4 digits from the numeric keys on the microphone and then press the STAR (*) key to save.

To display the current (new) ID, press the two CLAR keys simultaneously then release, or switch the set off and then on again (refer to Section 5.1 of this Guide).

Special Note:

The above instruction only applies to the Australian Version (or the International Version which has not been set up for Field Programming).

Telcall

Telcall (ie. Selcall incorporating a telephone call facility) allows you to make and receive direct calls to/from a normal DTMF (touch-pad) telephone, without the need for a telephone operator. The HF-90 uses a Telcall format which is compatible with all major Australian brands and Telstra's Radphone Services (relevant only to users within Australia).

Telcall must be used in conjunction with an approved Telephone Interconnect Unit or Service.

Sending a Telcall

To send a Telcall use the DTMF keypad on your mic./handset (or front panel - if using HF-90 with avionics interface).

Prior to sending a Telcall, ensure you are on the correct Selcall/Telcall channel. We recommend using the Beacon facility to select the appropriate Selcall/Telcall channel (refer to Section 6.3 in this Guide).

First press the STAR (*) key. Pressing the STAR key will initiate Selcall - the first step required in sending a Telcall. Your display will appear as follows:-

This display shows that Selcall has been initiated.

Next, press the numeric keys to select the appropriate Selcall ID (four digits). This will be the Selcall ID of the Telstra Radphone Station (relevant only to users within Australia) or other Telephone Interconnect Station. As you press each individual numeric key, the corresponding number will appear on the display until all numbers have been selected. As this point all numbers will appear on the display together. An example is illustrated on the following page:-