



MAC TACTICAL
RADIOS

AUSTRALIAN CATALOGUE COMMERCIAL PRODUCTS



- HF-90 Transceivers
- Manpack Packages
- Vehicle Packages
- Portable Packages
- Base Station Packages
- Disaster Response Package
- Data Products
- NVIS Antenna Systems
- Antenna Tuning Units
- Whip, Broadband & Long Wire Antenna Systems
- Power Supplies & Chargers
- Programming Software
- Testing Devices
- Service and Spare Parts

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CONFIDENTIAL



Q-MAC ELECTRONICS

**CONFIDENTIAL
AUSTRALIAN DEALER CATALOGUE**

**COMMERCIAL HF PRODUCTS
CATALOGUE**

Effective Date: July 2006
Version 7.0A

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1 IMPORTANT NOTES

List Prices

- The prices listed in the Australian Dealer Price List (given as "List Prices") are recommended End User Prices.
- All prices given in the Australian Dealer Price List are in Australian Dollars and do not include Australian GST.
- All packages listed in this Catalogue include road freight Australia wide. Requests for air freight will be at an additional charge. Transceivers and accessories purchased separately to packages will incur freight charges.
- Q-MAC reserves the right to alter prices without notice.

Product Descriptions

- All product descriptions and specifications provided herein are subject to change without notice.

Product Images

- All product images are included as a guide only and may not represent actual product described.

Listed Weights

- Weights listed herein are approximate and include packaging. They are intended as a guide only so that Customers may estimate freight costs.
- When calculating the overall weight of a consignment, Customers should also allow for boxes/cartons that may be used to consolidate goods.

Modes of Delivery

- Q-MAC utilises Incoterms 2000 (as per section 5) to describe modes of delivery. Where terminology on purchase orders differs from Incoterms 2000, Q-MAC reserves the right to utilise the nearest matching mode of transport listed in section 5, Freight Information.

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Q-MAC Bank Details for Telegraphic Transfers

Account Name:	Q-MAC ELECTRONICS PTY LTD
Account Number:	306 089 1902685
Bank:	BANKWEST
Branch:	PERTH
Address:	LEVEL 30 BANKWEST TOWER, 108 ST GEORGE'S TERRACE, PERTH, WA 6000 AUSTRALIA
Swift Code For Rapid Transfers:	BKWAAU6P

2 CONFIGURING Q-MAC PACKAGES

Q-MAC encourages the use of this checklist to ensure end users consider all aspects of their application. This is especially relevant for field deployment where missing items will cause significant inconvenience.



3 PRODUCTS

3.1 HF-90 SSB HF TRANSCEIVER



HF-90

2-30 MHz

50 Watts PEP

Secure, Simple to Use and Versatile

The HF-90 is a rugged all-purpose HF SSB transceiver, designed for portable, mobile and fixed base station applications. It is an extremely compact and light weight unit, featuring only essential controls to ensure ease of operation.

The HF-90 has been designed with the field user in mind. Not only is it simple to operate, but it is also priced competitively to suit commercial, humanitarian and government requirements. Furthermore, it is value-engineered to ensure low cost of ownership over the long term.

The transceiver has a quality, high specification design. It provides full frequency coverage from 2-30 MHz and has capacity for up to 255 programmed channels. The unit can operate at a selected power level of up to 50 watts, whilst achieving low battery consumption. It is also extremely reliable due to the advanced SMD manufacturing process used and overall design efficiency.

The specifications of the HF-90 will enable reliable communications up to distances of 3000km depending on antenna. In addition, the transceiver incorporates superior signal handling capability which ensures excellent reception even in the most crowded radio environments.

In short, this revolutionary transceiver incorporates the very latest in RF design technology, making the HF-90 the most compact, versatile, high performance HF SSB transceiver available on the international market today.

Features.

- Simple Intuitive Operation
- Small Size
- Light Weight - Less than 1 kg
- 50 Watt PEP
- 255 Channels
- Selective Calling
- USB/LSB Operation
- 4 Minute MTTR
- 6000 Hour MTBF
- Low Cost



3.2 MANPACK PACKAGES

3.2.1 QM9913 HF-90 Australian Manpack Package - Manual Tuner

COMMUNICATE WHILE ON FOOT

The Q-MAC HF-90 Australian Manpack Package is a portable, instant-deployment HF SSB radio communication system, incorporating the Q-MAC HF-90 transceiver and DTMF speaker microphone. This package is designed for applications where the operator requires medium to long range communications whilst on foot. The HF-90 Australian Manpack is compact, lightweight and comfortable to carry for long periods so is ideal where mobility is of paramount importance. The unit can be operated whilst carried on the user's back or when placed on the ground.

Q-MAC's HF-90 Australian Manpack Package is ideal for a variety of applications including aid and disaster relief projects; search and rescue operations; mineral exploration; forestry management; conservation and wildlife projects; as well as police and paramilitary applications.

Includes:

- HF-90 Transceiver
- Advanced Option 2 (software & DTMF speaker microphone)
- TM-90 Manual Tuner (with coaxial & earth cables)
- Collapsible Whip Antenna (6-section), frequency range of 3.6-10MHz when used with TM-90
- Long Wire Antenna Kit, frequency range of 2.5-10MHz when used with TM-90
- Rechargeable SLA Battery (7 Ah), Power Cable and Battery Condition Monitor
- Canvas Backpack (with support stakes)
- Quick Reference Guide and Operator Manual



Pictured with Advanced Option & Upgrade to Framed Backpack

QM9913 MANPACK ORDERING INFORMATION

Stock Code	Description	Weight
QM9913	Standard Australian Manpack - Olive drab canvas; Including battery	7.60 kg
QM9913b	Standard Australian Manpack - Olive drab canvas; Not including battery	5.05 kg

Recommended Options/Upgrades

QM9071	Backpack Upgrade to Framed Backpack - Olive drab canvas	1.30 kg
QM7005	End-fed Broadband Antenna	1.25 kg
QM7309	Tape Whip Antenna	0.20 kg
QM2102	Automatic Antenna Tuner Upgrade	0.00 kg
QM8024	DC Charger - For vehicle charging	0.30 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081)	0.70 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Manpack applications.

Miscellaneous Options/Accessories

QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset	0.20 kg
QM9053	Advanced Option 3 - Software and voice scrambling DTMF fist speaker microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8021	Solar Panel Charger - Fold up	1.30 kg
QM8035	Hand Crank Generator	2.70 kg
QM8011	Rechargeable 7Ah SLA Spare Battery	2.55 kg

3.2.2 QM9909 HF-90 Australian Manpack Package - Auto Tuner

COMMUNICATE WHILE ON FOOT

The Q-MAC HF-90 Australian Manpack Package is a portable, instant-deployment HF SSB radio communication system, incorporating the Q-MAC HF-90 transceiver and DTMF speaker microphone. This package is designed for applications where the operator requires medium to long range communications whilst on foot. The HF-90 Australian Manpack is compact, lightweight and comfortable to carry for long periods so is ideal where mobility is of paramount importance. The unit can be operated whilst carried on the user's back or when placed on the ground.

Q-MAC's HF-90 Australian Manpack Package is ideal for a variety of applications including aid and disaster relief projects; search and rescue operations; mineral exploration; forestry management; conservation and wildlife projects; as well as police and paramilitary applications.



Pictured with Advanced Option & Canvas Backpack with Frame

Includes:

- HF-90 Transceiver
- Advanced Option 2 (software & DTMF speaker microphone)
- TA-99 Automatic Antenna Tuner (with coaxial & earth cables)
- Collapsible Whip Antenna (6-section), frequency range of 2-26MHz when used with TA-99
- Long Wire Antenna Kit, frequency range of 2-20MHz when used with TA-99
- Rechargeable SLA Battery (7 Ah), Power Cable and Battery Condition Monitor
- Canvas Backpack with Frame and Accessory Pocket
- Quick Reference Guide and Operator Manual

QM9913 MANPACK ORDERING INFORMATION

Stock Code	Description	Weight
QM9909	HF-90 Australian Manpack with TA-99 ATU - Olive drab canvas; Including battery	7.60 kg
QM9909b	HF-90 Australian Manpack with TA-99 ATU - Olive drab canvas; Not including battery	5.10 kg

Recommended Options/Upgrades

QM7005	End-fed Broadband Antenna	1.25 kg
QM7309	Tape Whip Antenna	0.20 kg
QM8024	DC Charger - For vehicle charging	0.30 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081)	0.70 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Manpack applications.

Miscellaneous Options/Accessories

QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset	0.20 kg
QM9053	Advanced Option 3 - Software and voice scrambling DTMF fist speaker microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8021	Solar Panel Charger - Fold up	1.30 kg
QM8035	Hand Crank Generator	2.70 kg
QM8011	Rechargeable 7Ah SLA Spare Battery	2.55 kg

3.3 MOBILE (VEHICLE) PACKAGES

3.3.1 QM9025/26 ML-90 NVIS Roof Rack Antenna Vehicle Package (Fixed Transceiver)

IMPROVED PERFORMANCE FROM A VEHICLE INSTALLATION

The Q-MAC ML-90 Roof Rack Antenna Vehicle Package (fixed transceiver) is ideal for NVIS propagation or applications requiring constant coverage for distances of 0-1000km. The ML-90 Package provides significantly more gain than conventional whip antenna systems. The ML-90 is optimised for use in frequencies between 3.6-14MHz.

The Q-MAC ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed) is ideal for humanitarian aid and relief agencies; border patrol; police; environmental conservation groups; search and rescue; and mining vehicles. The ML-90 outperforms whip systems in mountains and valleys where NVIS propagation is essential and very effective at overcoming the 'Skip Zone' common with whip antenna systems.

Includes:

- HF-90 Transceiver with non-DTMF microphone and DC power cable and transceiver installation kit complete with mounting cradle & external mount speaker with audio mute facility for QM9025 [OR]
- QM9912 Portable Package with End Fed Broadband Antenna and Vehicle DC Battery Charger (QM9026 Package)
- ML-90 Auto-tune Antenna system with cables and connectors
- ML-90 installation kit including roof-rack mounting hardware

Specify standard 12V system or 24V modification (QM7602) at time of order.

ML-90 NVIS ROOF RACK/TRANSCEIVER PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9025	ML-90 Fixed Transceiver Package - Standard size 1.8m(L) x 1.25m(W)	105.00 kg
QM9025b	ML-90 Fixed Transceiver Package - Compact size 1.5m(L) x 1.25m(W)	95.00 kg
QM9026	ML-90 Portable Transceiver Package - Standard size 1.8m(L) x 1.25m(W)	107.00 kg
QM9026b	ML-90 Portable Transceiver Package - Compact size 1.5m(L) x 1.25m(W)	95.00 kg

NOTE: The QM9025 and QM9026 packages include one mounting kit in the price. Please order a suitable roof rack mounting option from the table below.

QM9026/b includes QM9912 Portable Transceiver Package with End-Fed Broadband Antenna and Vehicle DC Battery Charger. Useful for combined mobile and portable operations.

ML-90 NVIS Roof Rack Mounting Options Ordering Information

QM3100	Roof Rack Mounting Hardware - Gutter mount	0.00 kg
QM3101	Roof Rack Mounting Hardware - Existing mounting track	0.00 kg
QM3102	Roof Rack Mounting Hardware - Concealed gutter door jam	0.00 kg
QM3103	Roof Rack Mounting Hardware - Track installation and mounting feet	0.00 kg

Recommended Options/Upgrades

QM9051	Advanced Option 1 - Software and DTMF fist microphone	0.10 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081) (Suitable only for QM9026/QM9026b)	0.70 kg
QM4027	Upgrade to Standard Speaker to DSP Noise Reduction External Loudspeaker	0.00 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Vehicle applications.

Miscellaneous Options/Accessories

QM7602	ML-90/ML-91 Modification from 12 Volt version to 24 Volt version	0.00 kg
QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset	0.20 kg
QM9053	Advanced Option 3 - Software and voice scrambling DTMF fist speaker microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8021	Solar Panel Charger - Fold up (Suitable only for QM9026/QM9026b)	1.30 kg
QM8035	Hand Crank Generator (Suitable only for QM9026/QM9026b)	2.70 kg
QM8011	Rechargeable 7Ah SLA Spare Battery (Suitable only for QM9026/QM9026b)	2.55 kg

The Q-MAC Electronics Pty Ltd ML-90 Vehicle Roof Rack Magnetic Loop Antenna System is protected in design by Australian Patent No 2001100423.



3.3.2 QM9915 HF-90 Australian Vehicle Package (Whip Antenna)

CONVENTIONAL HF VEHICLE INSTALLATION

The Q-MAC HF-90 Australian Vehicle Package is a HF SSB radio communication system designed for long-range mobile applications. The small footprint of the HF-90 transceiver makes it ideal for dashboard mounting, simplifying installation by eliminating the requirement to mount a separate control head or run control cabling to a remote control head.

Q-MAC's HF-90 Vehicle Package with whip antenna is ideal for humanitarian agencies; border patrol; police; environmental conservation groups; search and rescue operations; and mining vehicles.

Includes:

- HF-90 Transceiver (with DTMF microphone and DC power cable)
- Vehicle installation Kit, Mounting Cradle & External Mount Speaker (with audio mute facility)
- TA-90 Auto-Tune Antenna System
- TA-90 Mounting Hardware

Specify standard 12V package or 24V modification (QM7601) at time of order.



QM9915 VEHICLE PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9915	HF-90 Australian Vehicle Package	10.05 kg

Recommended Options/Upgrades

QM4027	Upgrades to Standard Speaker to DSP Noise Reduction External Loudspeaker	0.00 kg
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These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Vehicle applications.

Miscellaneous Options/Accessories/Spares

QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset	0.20 kg
QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM7601	TA-90 Modification from 12 Volt version to 24 Volt	0.00 kg

3.4 PORTABLE PACKAGES

3.4.1 QM9923 HF-90 Australian MiniPack

A HF RADIO SYSTEM IN A SMALL PORTABLE PACKAGE

The Q-MAC HF-90 Australian MiniPack is the world's smallest high-power (50W) portable HF SSB radio communications system. The entire package, comprising transceiver, DTMF speaker microphone, broadband antenna system and battery system, is contained within a rugged Pelican® Case. When closed, the package is fully waterproof (submersible) and is easily carried by hand, on the back of a motorcycle, on a boat, or even by pack animal.

Q-MAC's HF-90 Australian MiniPack is ideal for a variety of applications including aid and disaster relief projects; mineral exploration; search and rescue; conservation and wildlife; forestry management; and remote area 4WD use. Its small size also makes it useful for covert operations.

Includes:

- HF-90 Transceiver
- DTMF Speaker Microphone
- MiniPack Broadband Antenna
- MiniPack Rechargeable SLA Battery (4 Ah) with Power Cable
- Pelican® 1200 Case



QM9923 MINIPACK PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9923	HF-90 Australian MiniPack Package - Pelican hard case; Including battery	3.75 kg

Recommended Options/Upgrades

QM8024	DC Charger - For vehicle charging	0.30 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081)	0.70 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Portable applications.

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8021	Solar Panel Charger - Fold up	1.30 kg
QM8035	Hand Crank Generator	2.70 kg
QM8004	MiniPack Rechargeable Battery	1.20 kg

3.4.2 QM9912 HF-90 Australian Portable Package

A HF RADIO SYSTEM IN A COMPACT PORTABLE PACKAGE

Description:

The Q-MAC HF-90 Australian Portable Package is designed for applications where the operator requires reliable long distance communications in a compact portable base format. It is simple to use and fully self contained, incorporating its own rechargeable battery system and a simple roll-out antenna for rapid deployment.

Applications:

The Q-MAC HF-90 Australian Portable Package is ideal for a variety of applications including aid and disaster relief projects; mineral exploration; search and rescue operations; conservation and wildlife applications; forestry management; and remote area 4WD use.

Includes:

- HF-90 Transceiver (with DTMF microphone)
- Portable Broadband Antenna (STD version) and Deployment Accessories
- Rechargeable Battery (7 Ah), Power Cable and Battery Condition Monitor
- Hard Carry Case with Built-In Speaker and Audio Mute Facility



QM9912 PORTABLE PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9912	HF-90 Australian Portable Package - Grey hard case; Including battery	8.20 kg
QM9912b	HF-90 Australian Portable Package - Grey hard case; Not including battery	5.65 kg

Recommended Options/Upgrades

QM8024	DC Charger - For vehicle charging	0.30 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081)	0.70 kg
QM4027	Upgrades to Standard Speaker to DSP Noise Reduction External Loudspeaker	0.00 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Portable applications.

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8021	Solar Panel Charger - Fold up	1.30 kg
QM8035	Hand Crank Generator	2.70 kg
QM8011	Rechargeable 7Ah SLA Spare Battery	2.55 kg

3.4.3 QM9021 HF-90 Humanitarian Relief Package

A HF RADIO SYSTEM FOR ALL CONDITIONS

The Q-MAC HF-90 Humanitarian Relief Package is designed for applications where the operator requires reliable long distance communications in a compact portable base station format. It is simple to use and fully self contained, incorporating its own rechargeable battery system, a simple roll-out antenna for rapid deployment or a tuned whip antenna system. Space is included for two 7 Ah batteries as well a Solar Panel and AC/DC chargers.

Applications:

The Q-MAC HF-90 Humanitarian Relief Package is ideal for a variety of applications including aid and disaster relief projects; search and rescue; conservation and wildlife operations; forestry management; and remote area use where flexibility in antenna types is required.

Includes:

- HF-90 Transceiver (with microphone)
- Portable Broadband Antenna (STD version) and Deployment Accessories
- TM-90 Manual Tuner with Long Wire Antenna, 8-section 3m Whip and 1m Whip with Gooseneck
- 2 x Rechargeable Batteries (7 Ah), Power Cable and Battery Condition Monitor
- Hard Carry Case with Built-In Speaker and Audio Mute Facility

Carry case has space available for optional solar panel and AC chargers.



Pictured with Advanced Option DTMF Microphone

QM9021 PORTABLE PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9021	Humanitarian Relief Package - Blue hard case; Including 2 x 7 Ah SLA batteries	14.00 kg
QM9021b	Humanitarian Relief Package - Blue hard case; Not including batteries	9.00 kg

Recommended Options/Upgrades

QM9051	Advanced Option 1 - Software and DTMF fist microphone	0.10 kg
QM8024	DC Charger - For vehicle charging	0.30 kg
QM8022	AC Mains Charger - Specify Australian plug type at time of order (QM5081)	0.70 kg
QM8021	Solar Panel Charger - Fold up	1.30 kg
QM4027	Upgrade to Standard Speaker to DSP Noise Reduction External Loudspeaker	0.00 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Portable applications.

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM8035	Hand Crank Generator	2.70 kg
QM8011	Rechargeable 7Ah SLA Spare Battery	2.55 kg

3.5 BASE STATION PACKAGES

3.5.1 QM9920 HF-90 Australian Integrated Base Station Package

AN INTEGRATED HF-90 TRANSCEIVER BASE STATION

The Q-MAC HF-90 Australian Integrated Base Station Package is ideal for fixed base and rapid deployment of a field base station. The main components, including transceiver, standby battery and power supply, are all contained in an integrated housing.

The Q-MAC HF-90 Base Station Package is ideal for regional offices, temporary base stations and logistics applications in remote areas where power disruption is expected.

Includes:

- HF-90 Transceiver
- DTMF Fist Microphone
- Panel Mounted Speaker (with audio mute facility)
- AC Mains Power Supply Unit (with battery backup facility)
- Rechargeable Battery (7 Ah)
- Fixed Broadband Dipole Antenna - multi wire (QM7002)
- Halyard Kit
- Lightning Surge Arrestor Kit



QM9920 BASE STATION PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9920	Australian Integrated Base Station	42.10 kg
NOTE:	Please also order an IEC mains cable to suit Australian usage (QM5085). Refer to section 3.13.10.2 for details. One cable is included in the package price.	0.05 kg

Recommended Options/Upgrades

QM4026	Upgrades to Standard Speaker to DSP Noise Reduction Loudspeaker	0.00 kg
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These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most Base Station applications.

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM9058	Advanced Option 8 - Software and DTMF desktop pedestal microphone	0.20 kg
QM8011	Rechargeable 7Ah SLA Spare Battery - Internal Back Up Battery Replacement	2.55 kg
QM9082	Email and Chat Data Package	4.00 kg

3.5.2 QM9918 HF-90 Australian Base Station Kit Package

A FIXED HF-90 TRANSCEIVER BASE STATION IN KIT FORM

The Q-MAC HF-90 Australian Base Station Kit Package is ideal for cost effective deployment of a field base station. The main components, including transceiver, standby battery and DTMF microphone, are all separate, providing flexible mounting arrangements.

The Q-MAC HF-90 Australian Base Station Package is ideal for regional offices, temporary base stations and tactical applications.

Includes:

- HF-90 Transceiver (with DTMF microphone and DC power cable)
- Mounting Cradle
- External Mounted Speaker (with audio mute facility)
- AC Mains Power Supply Unit (with battery backup facility)
- Rechargeable Battery (7 Ah)
- Fixed broadband Dipole Antenna - multi wire (QM7002)
- Halyard Kit
- Lightning Surge Arrestor Kit



QM9918 BASE STATION KIT PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9918	Australian Base Station Kit - With 7 AH SLA battery	37.10 kg
QM9918b	Australian Base Station Kit - Without battery	35.10 kg
NOTE:	Please also order an IEC mains cable to suit Australian usage (QM5085). Refer to section 3.13.10.2 for details. One cable is included in the package price.	0.05 kg

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM9058	Advanced Option 8 - Software and DTMF desktop pedestal microphone	0.20 kg
QM8011	Rechargeable 7Ah SLA Spare Battery - Internal Back Up Battery Replacement	2.55 kg
QM9082	Email and Chat Data Package	4.00 kg

3.6 DATA PRODUCTS

3.6.1 QM9082 Email and Chat Data Package

HF MODEM FOR SIMPLE EMAIL, CHAT AND DATA TRANSFER

Description:

The combination of a Pactor 2 Level 3 Protocol modem with simple to use software and the HF-90 package provides long range email, file transfer and electronic chat capability over HF radio spectrum. The software provides password protected multi-user accounts with multi-site routing/forwarding.

Compatibility:

QM9082 HF Modem is compatible with all HF-90 packages.

Includes:

- HF Data Modem
- Email and Chat Client Software
- HF-90 Interface Unit and Interconnecting Cables
- HF-90 Fan Kit



QM9082 EMAIL AND CHAT DATA PACKAGE ORDERING INFORMATION

Stock Code	Description	Weight
QM9082	Email and Chat Data Package	4.00 kg

3.7 DISASTER RESPONSE PACKAGE

3.7.1 QM9022 HF-90 Disaster Response Package

A MULTIPLE APPLICATION SOLUTION

The Q-MAC HF-90 Disaster Response Package (DRP) is a transportable “all in one” package incorporating the Q-MAC HF-90 transceiver. Along with the HF-90, the package contains a variety of antennas; power supplies; charger systems; carry packs and cases; and mounting accessories. Using the DRP, the operator has the choice of setting up either a Manpack, Portable, Vehicle or Base Station system.



Applications:

The Q-MAC HF-90 Disaster Response Package is ideal for humanitarian, emergency services and peace keeping organisations which need to cater for unpredictable conditions.

Includes:

- HF-90 Transceiver with Advanced Option 1 (software & DTMF microphone)
- TM-90 Manual Tuner (with coaxial & earth cables)
- Long Wire Antenna Kit
- Collapsible Whip Antenna (6-section)
- Extender Coil Section
- Collapsible Whip Antenna (2-section)
- Portable Broadband Antenna
- TA-90 Tuner (with mounting kit)
- Vehicle Whip Antenna (split configuration)
- 2 x SLA Rechargeable Battery (7 Ah)
- 1 x Battery Condition Monitor
- 2 x DC Power Cable (Manpack/Portable use)
- 2 x DC Power Cable (Vehicle/Base Station use)
- AC Mains Power Supply Unit
- DC Step-Up Battery Charging Device
- AC Mains Charger (2A)
- Fold-Up Solar Panel Charger
- AC Multi Adaptor (Australian, European, UK & US plugs)
- Hard Carry Case
- Canvas Backpack (with support stakes)
- Vehicle Installation Kit
- DTMF Speaker Microphone (spare)
- Q-MAC Aluminium Road Case (with combination lock)

Additional transceivers and/or accessories can be added as required.

ORDERING INFORMATION

Stock Code	Description	Weight
QM9022	Disaster Response Package - Includes one HF-90 transceiver	47.00 kg

Recommended Options/Upgrades

QM9901	Additional HF-90 Australian Transceiver - Room for up to 3 transceivers per DRP	2.05 kg
QM9052	Advanced Option 2 - Software and DTMF fist speaker microphone	0.10 kg

These options are the most commonly ordered options and recommended by Q-MAC to provide a comprehensive solution for most applications.

Miscellaneous Options/Accessories

QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg

3.8 HF-90 TRANSCEIVER STANDALONE & OPTIONS

3.8.1 QM9901 HF-90 Australian Transceiver

SPARE TRANSCEIVER TO MAKE UP ADDITIONAL PACKAGES

Includes:

- 2-30 MHz Frequency Coverage
- 50 Watt PEP Power Output
- 12V - 24V Operating Voltage
- 255 Programmable Channels
- USB/LSB Function
- Tune Function
- Clarifier
- Rx Signal Strength Indicator
- Erase Facility
- 6 Digit LED Display
- Speaker Microphone
- HF-90 Operation & Installation Guide



ORDERING INFORMATION

Stock Code	Description	Weight
QM9901	Australian HF-90 - Includes QM5001 DC power cable to suit vehicle or kit base station applications	2.05 kg
QM9901b	Australian HF-90 - Includes QM5002 DC power cable to suit portable and manpack applications	1.55 kg
Software/Handset Options		
QM9051	Advanced Option 1 - Software and DTMF fist microphone	0.10 kg
QM9052	Advanced Option 2 - Software and DTMF fist speaker microphone	0.10 kg
QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone	0.10 kg
QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset	0.20 kg
QM9057	Advanced Option 7 - Software and military DTMF telephone handset	0.20 kg
QM9058	Advanced Option 8 - Software and DTMF desktop pedestal microphone	0.20 kg
Miscellaneous Options/Accessories		
QM9090	Custom Option - HF-90 power reduction to 20 Watts	0.01 kg
QM9091	Custom Option - HF-90 3kHz filter option for data transmission	0.01 kg

3.9 ADVANCED OPTIONS - UPGRADES

Upgrade options only.

To purchase handsets as stand alone items for spare parts, please refer to the separate section on Handsets, (see 3.13 Other Parts & Accessories).

3.9.1 QM9051 Advanced Option 1

UPGRADE TO DTMF MICROPHONE

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF microphone (QM4002).

The microphone does not include a speaker.

Compatibility:

Advanced Option 1 is suitable for QM9912, QM9915, QM9918, QM9920, QM9025 and QM9026 packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9051	Advanced Option 1 - Software and DTMF fist microphone upgrade	0.10 kg

3.9.2 QM9052 Advanced Option 2

UPGRADE TO DTMF SPEAKER MICROPHONE

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF speaker microphone (QM4003).

Compatibility:

Advanced Option 2 is suited to QM9923 and QM9913 packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9052	Advanced Option 2 - Software and DTMF microphone upgrade	0.10 kg

3.9.3 QM9053 Advanced Option 3

UPGRADE TO BUILT IN VOICE SCRAMBLER

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard speaker microphone with a variable split-band frequency inversion voice scrambler built into the microphone. 16 codes selectable.

Compatibility:

Advanced Option 3 is suited to all QM90xx and QM99xx packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9053	Advanced Option 3 - Software and voice scrambler DTMF microphone upgrade	0.10 kg

3.9.4 QM9054 Advanced Option 4

UPGRADE TO DTMF TELEPHONE HANDSET

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard speaker microphone with a DTMF telephone handset (QM4013).

Compatibility:

Advanced Option 4 is suited to all QM90xx packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9054	Advanced Option 4 - Software and commercial DTMF telephone handset upgrade	0.20 kg

3.9.5 QM9057 Advanced Option 7

UPGRADE TO DTMF MIL-STD TELEPHONE HANDSET

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF military standard telephone handset with a commercial connector (QM4015).

Compatibility:

Advanced Option 7 is suited to all commercial QM90xx HF-90 packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9057	Advanced Option 7 - Software and military DTMF telephone handset upgrade	0.20 kg

3.9.6 QM9058 Advanced Option 8

UPGRADE TO DTMF DESKTOP MICROPHONE

Description:

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Desktop gooseneck microphone with commercial connector (QM4006).

Compatibility:

Advanced Option 8 is suited to QM9918 and QM9920 HF-90 packages.

Includes:

- Front-end Programming
- Selcall (based on CCIR 493-4)
- Telcall (based on CCIR 493-4)
- Beacon (based on CCIR 493-4)
- Selcall/Telcall Scan and Mute



ORDERING INFORMATION

Stock Code	Description	Weight
QM9058	Advanced Option 8 - Software and DTMF desktop pedestal microphone upgrade	0.20 kg

3.9.7 HF-90 Package Options Matrix

USE THIS TABLE TO CLARIFY WHICH ADVANCED OPTIONS CAN BE ADDED TO Q-MAC'S HF-90 PACKAGES



Package Part Number and Description	Advanced Option #
QM9912 Australian Portable Package	1, 3, 4, 7
QM9909 Australian Manpack Package with TA-99 ATU	2, 3, 4, 7
QM9913 Australian Manpack Package	2, 3, 4, 7
QM9915 Australian Vehicle Package (Whip Antenna)	1, 3, 4, 7
QM9918 Australian Base Station Package	1, 3, 4, 7, 8
QM9920 Australian Integrated Base Station	1, 3, 4, 7, 8
QM9022 Disaster Response Package	(dependent on configuration)
QM9923 Australian MiniPack	2, 3, 7
QM9025 ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed)	1, 3, 4, 7
QM9026 ML-90 NVIS Roof Rack Antenna Vehicle Package (removable)	1, 3, 4, 7

Although Advanced Options 2, 4 and 7 may be used in all packages noted above, under typical operating conditions they are not normally used with packages that include external speakers.

3.10 ANTENNA SYSTEMS

3.10.1 NVIS Roof Rack Antenna Systems

3.10.1.1 QM7113 ML-90 Auto-Tuning Antenna System (Rack and Tuner) for HF-90 50W System

INNOVATIVE VEHICLE HF COMMUNICATION SOLUTION

Description:

The Q-MAC ML-90 Roof Rack Antenna Package is ideal for NVIS propagation or applications requiring constant coverage for distances of 0-1000km. The ML-90 Package provides significantly more gain than conventional whip antenna systems. The ML-90 is optimised for use in frequencies between 3.6-14MHz.

The Q-MAC ML-90 NVIS Roof Rack Antenna Package is ideal for humanitarian aid and relief agencies; border patrol; police; environmental conservation groups; search and rescue operations; and mining vehicles. The ML-90 outperforms whip systems in mountains and valleys where NVIS propagation is essential. The ML-90 is also very effective at overcoming the 'Skip Zone' common with whip antenna systems.

Includes:

Roof Rack fully-automatic antenna tuner, complete with rack mounting bracket, cables and ML-90 Tuner. Allows efficient operation between 3.6-14MHz.

Compatibility:

- Suitable for use with the Q-MAC HF-90 transceiver *(not included)*

Specify standard 12V system or 24V modification (QM7602) at time of order.



ORDERING INFORMATION

Stock Code	Description	Weight
QM7113	ML-90 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) (This part number requires a rack mounting kit - see below for details)	105.00 kg
QM7113b	ML-90 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) (This part number requires a rack mounting kit - see below for details)	90.00 kg
NOTE:	The QM7113 and QM7113b both include a mounting kit. Please order a suitable Roof Rack Mounting Option from the table below.	0.00 kg

ML-90 NVIS Roof Rack Mounting Options Ordering Information

QM3100	Roof Rack Mounting Hardware - Gutter mount	0.00 kg
QM3101	Roof Rack Mounting Hardware - Existing mounting track	0.00 kg
QM3102	Roof Rack Mounting Hardware - Concealed gutter door jam	0.00 kg
QM3103	Roof Rack Mounting Hardware - Track installation and mounting feet	0.00 kg

ML-90 NVIS Roof Rack Spare Parts

QM7602	ML-90/ML-91 Modification from 12 Volt version to 24 Volt version	0.00 kg
QM5078	ML-90 DC Feed Adaptor Cable - Cable to connect old version HF-90s (without DC feed on antenna socket) to current model ML-90	0.30 kg
95312	ML-90/ML-91 Replacement Antenna Element	5.00 kg
QM5059	ML-90/ML-91 Replacement Cable - ATU to ground connection point	1.00 kg
QM5062	ML-90/ML-91 Replacement High Voltage Cable - ATU to antenna	1.00 kg
QM5076	ML-90/ML-91 Replacement Cable - ATU to RF/DC feed box	1.00 kg
95319	ML-90/ML-91 Wind Deflector Replacement Part	10.00 kg
QM7122	ML-90 Automatic Antenna Tuner Unit Only - As supplied with QM7113	4.50 kg
QM7123	ML-90 Antenna Feed Box Only - As supplied with QM7113	1.50 kg
QM2160	Upgrade ML-90 125W Capable ATU	1.00 kg

3.10.1.2 QM7114 ML-91 Auto-Tuning Antenna System (Rack and Tuner) for OEM 125W System

INNOVATIVE VEHICLE HF COMMUNICATION SOLUTION

Description:

The Q-MAC ML-91 Roof Rack Antenna Package is ideal for NVIS propagation or applications requiring constant coverage for distances of 0-1000km. The ML-91 Package provides significantly more gain than conventional whip antenna systems. The ML-91 is optimised for use in frequencies between 3.6-13MHz.

The Q-MAC ML-91 NVIS Roof Rack Antenna Package is ideal for humanitarian aid and relief agencies; border patrol; police; environmental conservation groups; search and rescue operations; and mining vehicles. The ML-91 outperforms whip systems in mountains and valleys where NVIS propagation is essential. The ML-91 is also very effective at overcoming the 'Skip Zone' common with whip antenna systems.

Includes:

Roof Rack fully-automatic antenna tuner, complete with rack mounting bracket, cables and ML-91 Tuner. Allows efficient operation between 3.6-13MHz.

Compatibility:

Suitable for use with Q-MAC, Codan™, Barrett Communications™ and Icom™ transceivers (*transceiver is not included*). Maximum power rating of 125W.



ORDERING INFORMATION

Stock Code	Description	Weight
QM7114-Q	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) - Suitable for use with Q-MAC transceiver (transceiver not included)	105.00 kg
QM7114-B	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) - Suitable for use with Barrett transceiver (transceiver not included)	105.00 kg
QM7114-C	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) - Suitable for use with Codan transceiver (transceiver not included)	105.00 kg
QM7114-I	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) - Suitable for use with Icom transceiver (transceiver not included)	105.00 kg
QM7114b-Q	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) - Suitable for use with Q-MAC transceiver (transceiver not included)	95.00 kg
QM7114b-B	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) - Suitable for use with Barrett transceiver (transceiver not included)	95.00 kg
QM7114b-C	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) - Suitable for use with Codan transceiver (transceiver not included)	95.00 kg
QM7114b-I	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) - Suitable for use with Icom transceiver (transceiver not included)	95.00 kg
NOTE:	All QM7114 and QM7114b variations include a mounting kit. Please order a suitable Roof Rack Mounting Option from the table below.	0.00 kg

Other transceiver compatibility options available on application.

ML-91 NVIS Roof Rack Mounting Options Ordering Information

QM3100	Roof Rack Mounting Hardware - Gutter mount	0.00 kg
QM3101	Roof Rack Mounting Hardware - Existing mounting track	0.00 kg
QM3102	Roof Rack Mounting Hardware - Concealed gutter door jam	0.00 kg
QM3103	Roof Rack Mounting Hardware - Track installation and mounting feet	0.00 kg

ML-91 NVIS Roof Rack Spare Parts

QM5078-Q	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU - Suitable for use with Q-MAC transceiver	0.50 kg
QM5078-B	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU - Suitable for use with Barrett transceiver	0.50 kg
QM5078-C	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU - Suitable for use with Codan transceiver	0.50 kg
QM5078-I	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU - Suitable for use with Icom transceiver	0.50 kg
95312	ML-90/ML-91 Replacement Antenna Element	5.00 kg
QM5059	ML-90/ML-91 Replacement Cable - ATU to ground connection point	1.00 kg
QM5062	ML-90/ML-91 Replacement High Voltage Cable - ATU to antenna	1.00 kg
QM5076	ML-90/ML-91 Replacement Cable - ATU to RF/DC feed box	1.00 kg
QM7125	ML-91 Automatic Antenna Tuner Unit Only - As supplied with all QM7114 systems	4.50 kg
95319	ML-90/ML-91 Wind Deflector Replacement Part	10.00 kg

3.10.2 Vehicle Whip Antenna Systems

3.10.2.1 QM7112 TA-90 Auto-Tune Antenna System

Description:

Compact, fully-automatic antenna tuner in robust metal housing. Designed specifically for use with the Q-MAC HF-90 Transceiver, allowing it to deliver maximum power to a range of short whip or wire antennas. Allows efficient operation between 2-20 MHz. As supplied with the HF-90 Vehicle Package.

Includes:

- Die-Cast Metal Housing
- Heavy-Duty Mounting Bracket
- Pair of 45mm C-clamps
- Pair of 50mm C-clamps
- Cables
- Continuously Loaded Fibreglass Whip Antenna (½" BSW base)

Specify standard 12V system or 24V modification (QM7601) at time of order.



QM7112 TA-90 AUTO TUNE ANTENNA SYSTEM ORDERING INFORMATION

Stock Code	Description	Weight
QM7112	TA-90 Tuner system - Complete with antenna and mounting brackets	5.50 kg
Spares and Accessories Ordering Information		
QM7121	TA-90 Tuner (12V Version) - Supplied complete with mounting bracket assembly; As supplied with the TA-90 auto-tune antenna system	2.40 kg
QM7121a	TA-90 Tuner (24V Version) - Supplied complete with mounting bracket assembly; As supplied with the TA-90 auto-tune antenna system	2.40 kg
QM5021	HF-90 to TA-90 Coaxial Cable	0.25 kg
QM5053	High Voltage Antenna Feed Cable - Translucent high voltage cable (500mm), lugs and convoluted split tubing; As supplied with the TA-90 Mounting Kit	0.05 kg
QM5043	TA-90 Power Cable - Supplied complete with lugs and plastic connectors for fitting to HF-90 Transceiver power cable (QM5001); As supplied with the TA-90 Mounting Kit	0.25 kg
QM6071	TA-90 Mounting Kit - Includes all items as supplied with TA-90 Auto-tune Antenna System minus the TA-90 Tuner and Continuously Loaded Whip Antenna (above)	2.45 kg
QM7601	TA-90 Modification from 12 Volt version to 24 Volt version - Used with QM9915	0.00 kg
QM7131	Continuously Loaded Whip Antenna - Rugged fibreglass construction with 1/2" BSW base; As supplied with the TA-90 Auto-tune Antenna System	0.65 kg
QM7133	Continuously Loaded Whip Antenna (Split Configuration) - Rugged fibreglass construction with 1/2" BSW base; Comprises two separate parts that screw together for easy storage; Designed for use with the TA-90 Tuner; As supplied with the HF-90 Disaster Response Package	0.80 kg
QM7136	Antenna Base Assembly - High voltage insulator base (150 mm); As supplied with the TA-90 Mounting Kit	0.65 kg
QM7137	C-Clamps 60mm - To fix TA-90 Mounting Plate to larger diameter bull-bar	0.30 kg
QM7801	Heavy Duty Antenna Base and Spring - Suits manual-tap whip antennas; Stainless steel construction	1.50 kg
QM7810	Antenna Spring - Spring only, As supplied in the TA-90 Mounting Kit	1.35 kg

3.10.3 Portable/Manpack Antenna Systems

3.10.3.1 QM2001 TM-90 Manual Tuner

Description:
Single-control tuner, incorporating LED tuning indicators. Supplied with coaxial and earth leads. As supplied with the HF-90 Manpack Package.



Compatibility:
The TM-90 suits collapsible whip, tape and long wire antennas.

ORDERING INFORMATION

Stock Code	Description	Weight
QM2001	TM-90 Manual Tuner	0.90 kg

3.10.3.2 QM2101 TA-99 Automatic Tuner

Description:
Automatic antenna tuning unit, incorporating LED tuning indicator. Supplied with spare coaxial cable.



Compatibility:
The TA-99 suits collapsible whip, tape and long wire antennas. Suitable for the HF-90 Manpack Package. Not suitable for the Portable Package.

ORDERING INFORMATION

Stock Code	Description	Weight
QM2101	TA-99 Automatic Tuner	0.90 kg

3.10.3.3 QM2102 TM-90 to TA-99 Product Upgrade (New Product Orders Only)

Description:
Replaces the TM-90 Manual Tuner with a TA-99 Auto Tuner in QM9913 Manpack.



The QM2102 upgrade option is available for new product orders only.

ORDERING INFORMATION

Stock Code	Description	Weight
QM2102	TM-90 to TA-99 Product Upgrade - New product orders only	0.00 kg

3.10.3.4 QM7005 Portable Broadband Antenna (Standard Version)

Description:
End-fed broadband antenna, 2-30 MHz, 50 Watt rating, made from insulated wire (for easy handling), incorporating counterpoise and earth-clip, complete with 5m RG-58 coaxial cable with connectors, throw cords and earth stake. The antenna is supplied on a shuttle for easy deployment and storage.



Compatibility:
As supplied standard with the HF-90 Portable Package. Available as an option for the Manpack Package.

ORDERING INFORMATION

Stock Code	Description	Weight
QM7005	Portable Broadband Antenna - Standard version	1.25 kg

3.10.3.5 QM7020 MiniPack Broadband Antenna - Spares Kit

Description:

The QM7020 MiniPack Broadband Antenna Spares Kit is not a complete independent antenna system. It requires the matching transformer box and coaxial connection, supplied as part of the mounting bracket within the HF-90 MiniPack.

Includes:

- End-fed Broadband Antenna, 2-30 MHz, 100 Watt rating, made from light-gauge insulated wire, supplied on slim-line reel
- Miniature Counterpoise with Earth Clip
- Earth Stake



ORDERING INFORMATION

Stock Code	Description	Weight
QM7020	MiniPack Broadband Antenna - Spares kit	0.20 kg

3.10.3.6 QM7301 Collapsible Whip Antenna (6-Section)

Description:

High efficiency collapsible six section whip antenna (3m). As supplied with the HF-90 Manpack. The collapsed length of the antenna is 500mm.

Frequency Coverage:

With TM-90 Manual Tuner: 3.6-10MHz
 With TA-99 Automatic Tuner: 2-26MHz



ORDERING INFORMATION

Stock Code	Description	Weight
QM7301	Collapsible Whip Antenna (6-section)	0.30g

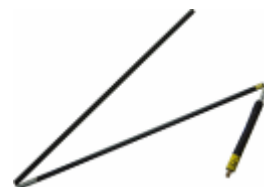
3.10.3.7 QM7302 Collapsible Whip Antenna (2-Section)

Description:

Collapsible two section whip antenna (1m), complete with flexible goose neck. The collapsed length of the antenna is 495mm.

Frequency Coverage:

With TM-90 Manual Tuner: 4-12.9 MHz
 With TA-99 Automatic Tuner: 3.5-26MHz



ORDERING INFORMATION

Stock Code	Description	Weight
QM7302	Collapsible Whip Antenna (2-section)	0.20 kg

3.10.3.8 QM7303 Collapsible Whip Antenna (8-Section)

Description:

High efficiency collapsible eight-section whip antenna (3m). The collapsed length is 390mm.



ORDERING INFORMATION

Stock Code	Description	Weight
QM7303	Collapsible Whip Antenna (8-section)	0.30 kg

3.10.3.9 QM7304 Collapsible Whip Antenna (4-section)

Description:

Collapsible 4-section whip antenna (1m), complete with flexible goose neck. The collapsed length is 335mm.



ORDERING INFORMATION

Stock Code	Description	Weight
QM7304	Collapsible Whip Antenna (4-section)	0.20 kg

3.10.3.10 QM7309 Tape Whip Antenna

Description:

Flexible tape whip antenna (1m) complete with flexible goose neck. Suitable for use in jungle and forestry areas.

Frequency Coverage:

With TM-90 Manual Tuner: 4-12.9 MHz
 With TA-99 Automatic Tuner: 3.5-26MHz



ORDERING INFORMATION

Stock Code	Description	Weight
QM7309	Tape Whip Antenna (1m)	0.20 kg

3.10.3.11 QM7351 Antenna Extender Coil Section

Description:

Extends the operation of Collapsible Whip Antenna (6-section) down to 2.7 MHz. This allows operation between 2.7 and 3.6 MHz (i.e. to the lower frequency limit of the collapsible 6-section whip antenna). Section length is 500mm.



Compatibility:

Not suitable for use with QM7302, QM7304 or QM7309 whip antennas.

ORDERING INFORMATION

Stock Code	Description	Weight
QM7351	Antenna Extender Coil Section	0.20 kg

3.10.3.12 QM7821 Antenna Angle Adaptor

Description:

Allows adjustment of antenna angle to facilitate NVIS propagation. Suited for use with the Collapsible Whip Antenna (6-section).

Compatibility:

Suitable for use with the TM-90 Manual Tuner and TA-99 Automatic Tuner.



ORDERING INFORMATION

Stock Code	Description	Weight
QM7821	Antenna Angle Adaptor	0.10 kg

3.10.3.13 QM7310 Long Wire Antenna Kit

Description:

Suitable for use with the TM-90 Manual Tuner and TA-99 Automatic Tuner as a rapid-use antenna system. As supplied with the HF-90 Manpack.



Frequency Coverage:

With TM-90 Manual Tuner: 2.5-10 MHz; With TA-99 Automatic Tuner: 2-20 MHz

Includes:

- Long Wire Antenna (7m)
- Counterpoise (5m)
- Long Wire Antenna Adaptor (fits TM-90 and TA-99 tuners)
- Throw Rope

ORDERING INFORMATION

Stock Code	Description	Weight
QM7310	Long Wire Antenna Kit	0.45 kg

3.10.4 Base Station Antenna Systems

3.10.4.1 QM7001 Fixed Broadband Dipole Antenna - Single Wire

Description:

Single wire centre-fed broadband dipole, 2-30 MHz, 130 Watt Data, 250 Watt Voice, PEP rating, stainless steel construction, complete with 30 metres RG-58 coaxial cable with connectors. Simple installation.



Includes:

Includes Halyard Kit. *Not supplied with installation accessories such as poles/masts.*

ORDERING INFORMATION

Stock Code	Description	Weight
QM7001	Fixed Broadband Dipole Antenna - Single wire	3.00 kg

3.10.4.2 QM7022 Mast Kit for Broadband Dipole Antenna

Description:

Mast kit to suit portable use of single wire broadband dipole antenna.

Includes:

Comes with canvas bag. *Not supplied with installation accessories such as poles/masts.*

ORDERING INFORMATION

Stock Code	Description	Weight
QM7022	Mast Kit for Broadband Dipole Antenna	13.00 kg

3.10.4.3 QM7002 Fixed Broadband Dipole Antenna - Multi Wire

Description:

3-wire centre-fed broadband dipole, 2-30 MHz, 130 Watt Data, 250 Watt Voice rating, stainless steel construction with fibreglass spreaders complete with 30 metres RG-58 coaxial cable with connectors. As supplied with the HF-90 Base Station Package.



Includes:

Includes parts and instructions to mount in horizontal or inverted V configurations. Includes Halyard Kit. *Not supplied with installation accessories such as poles/masts.*

ORDERING INFORMATION

Stock Code	Description	Weight
QM7002	Fixed Broadband Dipole Antenna - Multi wire	12.00 kg

3.10.4.4 QM7003 Fixed Broadband Dipole Antenna - Multi Wire High Power

Description:

3-wire centre-fed broadband dipole, 2-30 MHz, 500 Watt Data, 1000 Watt Voice rating, stainless steel construction with fibreglass spreaders complete with 30 metres RG-58 coaxial cable with connectors. As supplied with the HF-90 High Power Base Station Package.

Includes:

Includes parts and instructions to mount in horizontal or inverted V configurations. Includes Halyard Kit. *Not supplied with installation accessories such as poles/masts.*



ORDERING INFORMATION

Stock Code	Description	Weight
QM7003	Fixed Broadband Dipole Antenna - Multi wire high power	18.00 kg

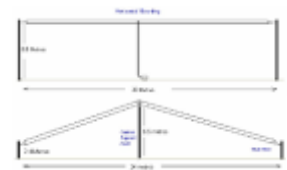
3.10.4.5 QM7004 Fixed Terminated Folded Dipole Broadband Antenna

Description:

Folded Dipole Broadband Antenna 5-18 MHz, 100 Watt Data, 150 Watt Voice rating, stainless steel construction with UV resistant spreaders complete with 30 metres RG-58 coaxial cable with connectors.

Includes:

Includes parts and instructions to mount in horizontal or inverted V configurations. Includes Halyard Kit. *Not supplied with installation accessories such as poles/masts.*



ORDERING INFORMATION

Stock Code	Description	Weight
QM7004	Fixed Terminated Folded Dipole Broadband Antenna	6.00 kg

3.10.4.6 QM7024 Lightning Surge Arrestor Kit

Description:

Ideal for protecting fixed Base Station installations. As supplied in the HF-90 Base Station packages.

Includes:

- 1 x Surge Arrestor
- 1 x Earthing Rod, Cable Clamp and Earthing Strap
- 1 x 5m Coaxial Cable

ORDERING INFORMATION

Stock Code	Description	Weight
QM7024	Lightning Surge Arrestor Kit	10.00 kg

3.10.4.7 QM7023 Lightning Surge Arrestor Kit - High Power Base

Description:

Ideal for protecting fixed Base Station installations. As supplied in the high power Base Station packages.

Includes:

- 1 x Surge Arrestor
- 1 x Earthing Rod, Cable Clamp and Earthing Strap
- 1 x 5m Coaxial Cable

ORDERING INFORMATION

Stock Code	Description	Weight
QM7023	Lightning Surge Arrestor Kit - High power base	10.00 kg

3.10.4.8 QM7021 Halyard Kit

Description:

Ideal for installing the QM7001, QM7002 and QM7003 Fixed Dipole Broadband Antennas. Included in QM7001, QM7002 and QM7003.

Includes:

- 2 x 30m UV-Stable Rope (6mm)
- 2 x Stainless Steel Pulleys
- 2 x Stainless Steel D Shackles

ORDERING INFORMATION

Stock Code	Description	Weight
QM7021	Halyard Kit	0.60 kg
Other antenna types are available on application.		

3.11 POWER SUPPLIES, CHARGERS & ACCESSORIES

3.11.1 QM8011 Rechargeable SLA Battery (7 Ah)

Description:

12V (nominal), 7 Ah, SLA gel battery. Classified as non-hazardous for freight purposes. As supplied with most HF-90 Manpack and Portable packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8011	Rechargeable SLA Battery (7 Ah)	2.55 kg

3.11.2 QM8022 AC Mains Charger (2.2A)

Description:

Compact desktop unit to suit Q-MAC SLA Rechargeable Batteries - 115/230 Volt AC input, 12 Volt DC nominal, 2.2 Amp limited current, complete with charging status LED indicators and appropriate connector. Suits all HF-90 Manpack, MiniPack and Portable packages. Specify plug type.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8022	AC Mains Charger (2.2A)	0.70 kg
NOTE:	Please also order a Figure 8 mains cable to suit Australian usage (QM5081). Refer to section 3.13.10.1 for details. One cable is included in the price of the QM8022.	0.05 kg

3.11.3 QM8024 DC Step-Up Battery Charger

Description:

Suits Q-MAC SLA Rechargeable Batteries - Steps up battery voltage to 14.5 Volt for charging via a vehicle cigarette lighter socket. Complete with mating connector for HF-90 Manpack, Portable and MiniPack packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8024	DC Step-Up Battery Charger	0.30 kg

3.11.4 QM8004 MiniPack Rechargeable Battery (4 Ah)

Description:

12V, 4 Ah (2 x 2 Ah batteries in parallel), sealed lead acid gel battery. Classified as non-hazardous for freight purposes. Supplied in custom packaging for ready connection to HF-90 Transceiver complete with DC power cable and connector for charging devices. As supplied with the HF-90 MiniPack.

Note: Price includes battery only (not items as pictured).



ORDERING INFORMATION

Stock Code	Description	Weight
QM8004	MiniPack Rechargeable Battery (4 Ah)	1.20 kg

3.11.5 QM8021 Fold-Up Solar Panel Charger

Description:

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. The unit comprises five panels, which fold into a compact canvas pouch.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8021	Fold-Up Solar Panel Charger	1.30 kg

3.11.6 QM8035 Hand Crank Generator (With Mounts)

Description:

Suits Q-MAC SLA Rechargeable Batteries - Output voltage between 13.8-16.2V, output current between 1.15-1.35A (assumes 60 RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material to meet military standard 810.

Includes:

- Hand Crank Generator
- Canvas Bag
- Tripod
- Tree Mount (with strap)



ORDERING INFORMATION

Stock Code	Description	Weight
QM8035	Hand Crank Generator - With mounts	2.70 kg

3.11.7 QM8031 AC Mains Power Supply Unit

Description:

115/230 Volt AC, 15 Amp desktop unit, complete with over voltage/current protection and short circuit protection. Supplied with specified AC mains plug. As supplied with the HF-90 Base Station Package. Requires 4.5m DC Power Cable (QM5001). Specify plug type below.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8031	AC Mains Power Supply Unit	1.50 kg
NOTE:	Please also order an IEC mains cable to suit Australian usage (QM5084). Refer to section 3.13.10.2 for details. One cable is included in the price of the QM8031.	0.05 kg

3.11.8 QM8032 Battery Changeover Switch

Description:

Monitors the 13.8V DC output from a PSU. Automatically switches to battery in the event of a mains power failure and back again when power is restored. Incorporates battery charging facility. Supplied with appropriate cables and battery lugs. As supplied with the HF-90 Base Station Package.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8032	Battery Changeover Switch	0.75 kg

3.12 CARRY PACKS & CASES

3.12.1 QM6001 Canvas Backpack - Standard

Description:

Custom designed backpack made from water resistant canvas, with fully padded and reinforced compartments to house the HF-90 and its accessories. Incorporates two stainless steel support stakes. As supplied with the HF-90 Manpack and HF-90 Portable packages.

Dimensions:

545H x 275W x 160D mm



ORDERING INFORMATION

Stock Code	Description	Weight
QM6001	Standard Backpack - Olive drab canvas	1.50 kg

3.12.2 QM6003 Canvas Backpack - Frame

Description:

Custom designed modular backpack supplied on a rugged frame. Made from water resistant canvas, with fully padded and reinforced compartments to house the HF-90 and its accessories. Modular format allows flexibility with respect to the configuration.

Dimensions:

510H x 400W x 300D mm (including frame and waist support)



ORDERING INFORMATION

Stock Code	Description	Weight
QM6003	Frame Backpack - Olive drab canvas	2.80 kg

3.12.3 QM6014 Hard Carry Case

Description:

Custom designed weatherproof hard carry case with reinforced interiors. Extremely rugged and floatable. Incorporates speaker with audio mute facility mounted internally (under the lid) and earth lead (to TM-90 Tuner). As supplied with the HF-90 Portable Package.

Standard colour is grey. Other colours are available on request with a minimum order quantity of 50.

Dimensions:

320H x 275W x 205D mm



ORDERING INFORMATION

Stock Code	Description	Weight
QM6014	Hard Carry Case	2.70 kg

3.12.4 QM6015 Rugged MiniPack Case

Description:
Extremely rugged and fully-waterproof (submersible) case. As supplied with the HF-90 MiniPack.



Dimensions:
Inside: 240H x 185W x 110D mm
Outside: 273H x 247W x 127D mm

ORDERING INFORMATION

Stock Code	Description	Weight
QM6015	MiniPack Case - Black	0.80 kg
QM6015Y	MiniPack Case - Yellow	0.80 kg

3.12.5 QM6017 Rugged DataPack Case

Description:
Extremely rugged and fully-waterproof (submersible) case. As supplied with the Email/Chat Data Package.



Dimensions:
Inside: 240H x 185W x 155D mm
Outside: 273H x 247W x 177D mm

ORDERING INFORMATION

Stock Code	Description	Weight
QM6017	Data Pack Case - Black	0.80 kg
QM6017Y	Data Pack Case - Yellow	0.80 kg

3.12.6 QM6020 Aluminium Road Case

Description:
Custom designed weatherproof aluminium road case complete with compartments to house the HF-90 transceiver along with its many accessories. Supplied with a combination lock. As supplied with the HF-90 Disaster Response Package.



Dimensions:
280H x 680W x 780D mm

ORDERING INFORMATION

Stock Code	Description	Weight
QM6020	Aluminium Road Case	20.00 kg

3.13 OTHER PARTS & ACCESSORIES

3.13.1 Installation Accessories

3.13.1.1 QM6052 HF-90 Vehicle Installation Kit

Includes:

- Mounting Cradle
- External Mount Speaker with Audio Mute Facility
- Coaxial Cable (RG-58) with Connectors (4.5m)
- HRC Fuse (20 Amp) and Holder
- Battery Lugs (heavy duty), Cable Ties, Microphone Clip, Grommets and Self-Amalgamating Tape

As supplied with the HF-90 Vehicle Package.

Note:

DC power cable (QM5001) is not included with the HF-90 Vehicle Installation Kit. It is supplied together with the HF-90 Transceiver (QM9901) or on its own.



ORDERING INFORMATION

Stock Code	Description	Weight
QM6052	HF-90 Vehicle Installation Kit	1.30 kg

3.13.1.2 QM6061 Mounting Cradle

Description:

Mounting cradle suitable for vehicle and base station applications. As supplied with the HF-90 Vehicle Installation Kit and the HF-90 Base Station Package.



ORDERING INFORMATION

Stock Code	Description	Weight
QM6061	Mounting Cradle	0.35 kg

3.13.2 Audio Accessories

3.13.2.1 QM4041 Headphones (Commercial Grade)

Description:

Commercial grade headsets incorporating 6.25 mm jack plug. Suits CW option and telegraph key.

ORDERING INFORMATION

Stock Code	Description	Weight
QM4041	Headphones - Commercial grade	0.20 kg

3.13.2.2 QM4042 Headphones (Industrial Grade)

Description:

Ruggedised, industrial grade headsets incorporating 6.25 mm jack plug. Suits CW option and telegraph key.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4042	Headphones - Industrial grade	0.45 kg

3.13.2.3 QM4021 External Mount Speaker (with Audio Mute)

Description:
Speaker incorporating audio mute facility for fixed channel operation.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4021	External Mount Speaker - With audio mute	0.45 kg

3.13.2.4 QM4024 External Mount Speaker (with DSP Noise Reduction)

Description:
Noise eliminating speaker incorporating Digital Signal Processing (DSP) technology to remove unwanted background noise from speech. Fully adaptive noise cancelling. Plug and go - No adjustments necessary.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4024	External Mount Speaker - With DSP noise reduction	0.45 kg

3.13.2.5 QM4051 CW Options & Telegraph Key

Description:
External CW option housed in a compact die-cast metal box with telegraph key mounted on top. Incorporates a 6.25 mm mono jack for connection of suitable headphones. Supplied with 1.5m lead.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4051	CW Options & Telegraph Key	0.45 kg

3.13.3 Fist Microphones

3.13.3.1 QM4001 Speaker Microphone

Description:
For use with Standard Model HF-90. Suited to Manpack and MiniPack packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4001	QM4001 Speaker Microphone	0.20 kg

3.13.3.2 QM4002 DTMF Microphone

Description:
For use with Advanced Model HF-90. Requires external speaker. Suited to Vehicle, Portable and Base Station packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4002	DTMF Microphone	0.25 kg

3.13.3.3 QM4003 DTMF Microphone with Built-in Speaker

Description:

For use with Advanced Model HF-90. Suited to Manpack and MiniPack packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4003	DTMF Microphone with Built-in Speaker	0.25 kg

3.13.3.4 QM4004 DTMF Scrambler Microphone

Description:

Microphone incorporating variable split-band frequency inversion voice scrambler and built in speaker. 16 codes selectable. For use with Advanced Model HF-90 radios.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4004	DTMF Scrambler Microphone	0.25 kg

3.13.4 Pedestal Microphones

3.13.4.1 QM4006 DTMF Pedestal Microphone (Commercial)

Description:

Commercial grade, DTMF pedestal microphone for use with Advanced Model HF-90. Suited to Base Station packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4006	DTMF Pedestal Microphone - Commercial	1.00 kg

3.13.5 Telephone Handsets

3.13.5.1 QM4011 Telephone Handset (Commercial Grade)

Description:

Commercial grade, non-DTMF telephone handset complete with PTT. For use with Standard Model HF-90 transceivers.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4011	Telephone Handset - Commercial grade	0.30 kg

3.13.5.2 QM4013 DTMF Telephone Handset (Commercial Grade)

Description:

Commercial grade telephone handset complete with DTMF keypad and PTT. For use with advanced software features such as Selcall, Beacon Call and Front Panel Programming.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4013	DTMF Telephone Handset - Commercial grade	0.40 kg

3.13.5.3 QM4012 Non-DTMF Handset (Military Grade)

Description:

Industry standard, military grade, non-DTMF telephone handset with commercial connector. For use with the Standard Model HF-90.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4012	Non-DTMF Handset - Military grade	0.45 kg

3.13.5.4 QM4015 DTMF Handset (Military Grade)

Description:

Industry standard, military grade telephone handset with commercial connector and DTMF keys for use with advanced software features such as Selcall, Beacon Call and Front Panel Programming. For use with the Advanced Model HF-90.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4015	DTMF Handset - Military grade	0.45 kg

3.13.6 DC Power Cables

3.13.6.1 QM5001 HF-90 → Misc Power Source Cable (4.5m)

Description:

4-pole power connector at one end complete with connector for external speaker on flying lead, bare ended at the other end. As supplied with the HF-90 Vehicle Package and HF-90 Kit Base Station Package.



ORDERING INFORMATION

Stock Code	Description	Weight
QM5001	HF-90 → Miscellaneous Power Source Cable (4.5m)	0.65 kg

3.13.6.2 QM5002 HF-90 → Portable Battery Cable (0.6m)

Description:

4-pole power connector at one end complete with connector for external speaker on flying lead, spade connectors at the other end and with connector for charging devices on flying lead. Incorporates in-line fuse. As supplied with the HF-90 Manpack Package and HF-90 Portable Package.



ORDERING INFORMATION

Stock Code	Description	Weight
QM5002	HF-90 → Portable Battery Cable (0.6m)	0.10 kg

3.13.6.3 QM5003 HF-90 → Miscellaneous Power Source

Description:

4-pole power connector at one end complete with connector for external speaker on flying lead, crocodile clips at the other end. Not fused.

ORDERING INFORMATION

Stock Code	Description	Weight
QM5003	HF-90 → Vehicle Battery Cable (3.0m)	0.50 kg

3.13.7 Coaxial Cables (RG-58)

3.13.7.1 QM5021 HF-90 → Vehicle Antenna Cable (4.5m)

Description:

BNC connector fitted at one end, nothing fitted at the other end. PL259 plug supplied loose. As supplied with Vehicle Installation Kit.

ORDERING INFORMATION

Stock Code	Description	Weight
QM5021	HF-90 → Vehicle Antenna Cable (4.5m)	0.25 kg

3.13.7.2 QM5022 HF-90 → Base Station Antenna Cable (30m)

Description:

BNC connector fitted at one end, PL259 plug fitted to the other end. As supplied with base station antennas.

ORDERING INFORMATION

Stock Code	Description	Weight
QM5022	HF-90 → Base Station Antenna Cable (30m)	1.50 kg

3.13.7.3 QM5041 HF-90 → TM-90 Cable (250mm)

Description:

BNC connector fitted at both ends. As supplied with the HF-90 Manpack.

ORDERING INFORMATION

Stock Code	Description	Weight
QM5041	HF-90 → TM-90 Cable (250mm)	0.15 kg

3.13.7.4 QM5064 HF-90 → TA-99 Cable (120mm)

Description:

BNC connector fitted at both ends. As supplied with the HF-90 Manpack.

ORDERING INFORMATION

Stock Code	Description	Weight
QM5064	HF-90 → TA-99 Cable (120mm)	0.1 kg

3.13.8 Other Cables

3.13.8.1 QM5051 Programming Cable (with Adaptor)

Description:

Programming Cable to connect the HF-90 with a computer serial port. Supplied with DB25 connector and adaptor for DB9 connector. For use with the HF-90M Programming Package (QM1001).

ORDERING INFORMATION

Stock Code	Description	Weight
QM5051	Programming Cable - With adaptor	0.20 kg

3.13.9 Miscellaneous Items

3.13.9.1 QM8051 SLA Battery Condition Monitor

Description:

Monitors battery charge level of Sealed Lead Acid (SLA) batteries via a series of LED indicators. As supplied with the HF-90 Manpack and HF-90 Portable packages.



ORDERING INFORMATION

Stock Code	Description	Weight
QM8051	SLA Battery Condition Monitor	0.10 kg

3.13.9.2 QM3001 PL259 → BNC Adaptor

Description:

Converts PL259 Plug to BNC Plug.



ORDERING INFORMATION

Stock Code	Description	Weight
QM3001	PL259 → BNC Adaptor	0.05 kg

3.13.9.3 QM4061 Data Interface Unit

Description:

Provides an interface between a HF-90 transceiver and a RF modem. Includes a control port for PTT control and auxiliary microphone/speaker connector.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4061	Data Interface Unit	1.00 kg

3.13.9.4 QM9501 Fan Option (Modular)

Description:

Fan fitting to the rear of the HF-90. Suited to continuous duty base station applications, such as data transmission with the QM9082. As supplied in the QM9082 Email and Chat Data Package (see 3.6.1).



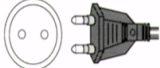
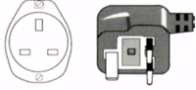




ORDERING INFORMATION

Stock Code	Description	Weight
QM9501	Fan Option - Modular	0.10 kg

3.13.10 Mains Cables

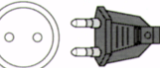
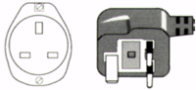
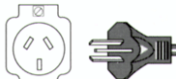



3.13.10.1 Figure 8 Sockets & Cables

Mains outlets vary across the globe. Summarised below are the most common mains plugs and the Q-MAC part number for ordering. Where required, please order a Figure 8 mains cable to suit Australian usage (QM5081).

Mains End					
Equipment End	Type A: Continental Europe	Type B: United Kingdom	Type C: Australia, New Zealand, Argentina	Type D: North America	Type E: India, South Africa
	Order Code: QM5087 (0.05 kg)	Order Code: QM5082 (0.05 kg)	Order Code: QM5081 (0.05 kg)	Order Code: QM5083 (0.05 kg)	Order Code: QM5118 (0.05 kg)
Figure 8 socket					

3.13.10.2 IEC Sockets & Cables

Mains outlets vary across the globe. Summarised below are the most common mains plugs and the Q-MAC part number for ordering. Where required, please order an IEC mains cable to suit Australian usage (QM5084).

Mains End					
Equipment End	Type A: Continental Europe	Type B: United Kingdom	Type C: Australia, New Zealand, Argentina	Type D: North America	Type E: India, South Africa
	Order Code: QM5085 (0.05 kg)	Order Code: QM5086 (0.05 kg)	Order Code: QM5084 (0.05 kg)	Order Code: QM5119 (0.05 kg)	Order Code: QM5120 (0.05 kg)
IEC socket					

3.14 DEALER SUPPORT PRODUCTS

3.14.1 Programming Software

3.14.1.1 QM1001 HF-90 Programming Package

Description:

IBM compatible software package (Windows 98 Operating System) allows programming of the following functions:

Standard Model HF-90:

- Channel/Frequency Programming
- Power Output Setting
- Auto-Tune Enable/Disable
- Selcall ID Number
- Selcall and Scanning on Specific Channels/Frequencies



Includes:

- Programming Cable
- Quick Reference Guide: HF-90 Programming Package

Note:

The package is provided on CD as standard. The HF-90 Programming Package is for use by licensed radio dealers only.

ORDERING INFORMATION

Stock Code	Description	Weight
QM1001	HF-90 Programming Package - Australian version	0.05 kg

3.14.2 Product Documentation

3.14.2.1 QM1021 HF-90/M Technical Manual

Description:

Detailed manual outlining product specifications, software, maintenance, fault finding and testing.

Note:

Authorised Q-MAC Dealers receive one HF-90/M Technical Manual at no charge with their first purchase of a HF-90 or HF-90M Transceiver. Extra copies must be purchased if required.



ORDERING INFORMATION

Stock Code	Description	Weight
QM1021	HF-90/M Technical Manual	0.35 kg

3.14.3 Replacement Modules

3.14.3.1 96000 HF-90 Front Panel Module

Description:

HF-90 front panel module, including front panel PCB.



ORDERING INFORMATION

Stock Code	Description	Weight
96000	HF-90 Front Panel Module	0.15 kg

3.14.3.2 96002 HF-90 PASW Module

Description:

Power amplifier and switch mode power supply module, complete with heatsink assembly.



ORDERING INFORMATION

Stock Code	Description	Weight
96002	HF-90 PASW Module	0.40 kg

3.14.3.3 96003 HF-90 RXMP Module

Description:

Receiver and microprocessor module.



ORDERING INFORMATION

Stock Code	Description	Weight
96003	HF-90 RXMP Module	0.15 kg

3.14.4 Test Devices

3.14.4.1 QM4085 HF Test Indicator Unit

Description:

Tests HF-90/M radios and provides indications of RF Output Power Present, DC Power on Coax Present and Tune Interrupt Signal Present. Incorporates a dummy load and signal source. Suitable for testing commercial HF-90 or military HF-90M transceivers.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4085	HF Test Indicator Unit	1.00 kg

3.14.4.2 QM4082 Antenna Current Meter

Description:

Meter for measuring antenna current in a whip antenna system. For use where the antenna coaxial cable carries DC voltage to drive an automatic antenna tuner. This device provides an effective method of determining the performance of antenna systems incorporating antenna tuners that require DC on the coaxial cable e.g. TA-99, TM-90.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4082	Antenna Current Meter	2.00 kg

3.14.4.3 QM4084 DC Blocking Filter

Description:

In line BNC to BNC DC Blocking Filter used when testing HF-90 with DC enabled on coax.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4084	DC Blocking Filter	0.30 kg

3.14.4.4 QM4072 Asymmetric T Piece

Description:
Asymmetric T Piece with a RF monitor point. Used for bench testing the HF-90 in line with antenna. Allows monitoring of output wave form on oscilloscope.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4072	Asymmetric T Piece	0.30 kg

3.14.4.5 QM4075 50 Ohm RF Dummy Load

Description:
50 Ohm Dummy Load with QM3001 BNC-PL259 UHF adaptor.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4075	50 Ohm RF Dummy Load	1.00 kg

3.14.4.6 QM4071 Breakout Test Box

Description:
Breakout unit with Audio In, Audio Out and External PTT. Useful for bench testing HF-90s.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4071	Breakout Test Box	0.30 kg

3.14.4.7 QM4081 Voice Enunciator Box

Description:
Device to automatically key and modulate a HF-90 transceiver.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4081	Voice Enunciator Box	1.00 kg

3.14.4.8 QM4083 Field Service Tool/Pocket Knife

Description:
Convenient pocket tool suitable for the field assembly and disassembly of HF-90s.



ORDERING INFORMATION

Stock Code	Description	Weight
QM4083	Field Service Tool	0.30 kg

3.14.5 HF-90 Overhaul Service

3.14.5.1 QM9099 HF-90 Overhaul Service

Includes:

- New front panel keys
- New rotary encoder
- New power switch
- New microphone socket
- New knob and handles
- Thorough clean
- Microprocessor firmware update (to the latest version compatible with the hardware version installed)
- Electronic design change updates (to the latest version compatible with the hardware version installed)
- Re-test
- Repair damaged/suspect components
- Re-alignment
- Labour charges
- Extend warranty for 12 months



Note:

The extended warranty will only apply if the unit has not suffered water damage. The HF-90 Overhaul Service *does not apply* to radios that have suffered severe irreparable damage and require complete module replacement.

ORDERING INFORMATION

Stock Code	Description	Weight
QM9099	HF-90 Overhaul Service	2.00 kg

3.14.6 Spares Kits

3.14.6.1 QM1044 Spares Kit (Component Level TA-90)

Description:

Recommended spares for the maintenance of up to 50 TA-90 ATUs for a service period of 2 to 3 years. Also includes HF-90 Vehicle Power Cable, Coax, HV and Ground Cables. Q-MAC recommends that 5 complete TA-90 units are kept as spares in addition to these component spares (*not included*).



ORDERING INFORMATION

Stock Code	Description	Weight
QM1044	Spares Kit - Component level TA-90	15.00 kg

3.14.6.2 QM1045 Spares Kit (Component Level TA-99)

Description:

Recommended spares for the maintenance of up to 50 TA-99 ATUs for a service period of 2 to 3 years. Q-MAC recommends that 5 complete TA-99 units are kept as spares in addition to these component spares (*not included*).



ORDERING INFORMATION

Stock Code	Description	Weight
QM1045	Spares Kit - Component level TA-99	5.00 kg

3.14.6.3 QM1046 Spares Kit (Component Level HF-90)

Description:

Recommended spares for the maintenance of up to 50 HF-90 transceivers for a service period of 2 to 3 years. Q-MAC recommends that 5 complete HF-90 units are kept as spares in addition to these component spares *(not included)*.



ORDERING INFORMATION

Stock Code	Description	Weight
QM1046	Spares Kit - Component level HF-90	10.00 kg

3.14.6.4 QM1048 Spares Kit (Component Level ML-90 ATU)

Description:

Recommended spares for the maintenance of up to 50 ML-90 Automatic Antenna Tuners for a service period of 2 to 3 years. Q-MAC recommends that 5 complete ML-90 ATUs are kept as spares in addition to these component spares *(not included)*. This spares package does not include roof rack or antenna element spares.



ORDERING INFORMATION

Stock Code	Description	Weight
QM1048	Spares Kit - Component level ML-90 ATU	15.00 kg

4 SALES TERMS AND CONDITIONS

1 Definitions

- 1.1 'Q-MAC' means Q-MAC Electronics Pty Ltd (ACN 054 566 684) of 142 Hasler Road Osborne Park, 6017, Western Australia.
- 1.2 'Customer' means the party which has ordered the goods and to whom the goods will be or have been supplied.
- 1.3 'Goods' means the products or services manufactured and/or supplied by Q-MAC as itemised on the Invoice.
- 1.4 'Invoice' means the document upon which Q-MAC records the details and pricing relating to an order placed by a Customer for the supply of Goods.
- 1.5 'Purchase Price' means the total price identified on the invoice, being for the Goods, and is inclusive of all applicable freight, insurance and documentation charges.
- 1.6 'Agreement' means the agreement between the Customer and Q-MAC for the supply of Goods in accordance with the Sales Terms & Conditions herein.

2 Payment & Ownership of Goods

- 2.1 The Purchase Price must be paid prior to despatch of goods, unless the Customer is granted adequate credit facility by Q-MAC.
- 2.2 For specific large orders, Q-MAC requires a percentage of the Purchase Price as down-payment, prior to proceeding with the Customer's order and subsequent progress payments. In such cases, the balance of the Purchase Price must be paid prior to despatch of Goods, unless an adequate credit facility is granted by Q-MAC.
- 2.3 Ownership title of the Goods remains with Q-MAC until the Customer has paid for the Goods and all applicable freight, insurance and documentation charges in full.
- 2.4 Invoices not paid within the prescribed time frame are subject to a late payment penalty fee of 2% of the outstanding balance per month. Fees are applicable from the first day following the due date.
- 2.5 A Customer may request a credit facility with Q-MAC and will be required to complete a credit application. Q-MAC makes no representation that a credit facility will be granted. Q-MAC may terminate any credit facility by advice in writing at any time at its sole discretion. Credit facilities will be suspended should the Customer fail to pay an account within the terms specified. Suspension shall remain in force at least until the outstanding amount is paid in full.
- 2.6 In the event of the Customer's death, insolvency, bankruptcy, winding up, suspension of payments, dissolution or modification of partnership, non-payment or non-acceptance of any shipment(s) or draft(s), overdue account, etc, Q-MAC may cancel or suspend the order.
- 2.7 Q-MAC always reserves all rights to recover from the Customer any loss occasioned thereby, in addition to any lien to which Q-MAC may by statutes or otherwise be entitled. Q-MAC shall also be entitled to a general lien on all property or goods belonging to the Customer in Q-MAC's possession (although such goods or some of them have been paid for) for the unpaid price of any other goods or services sold and delivered to the Customer under any order or request.
- 2.8 Unless otherwise agreed risk shall pass to the Customer upon advice of readiness. Notwithstanding that risk may have passed to the Customer, property and title in any goods shall remain with Q-MAC until receipt by Q-MAC of the price of the goods as invoiced by Q-MAC. Until such time as property and title in the goods passes to the Customer, the Customer shall hold the goods as bailee for Q-MAC.
- 2.9 If the Customer sells the goods to a third party prior to paying Q-MAC the purchase price thereof, Q-MAC shall be entitled to be paid so much of the price paid by the third party as is necessary to satisfy the moneys owing by the Customer. The Customer shall not otherwise in any way part with possession or dispose of the goods until Q-MAC has received payment for those goods.
- 2.10 If the agreement is terminated by Q-MAC, then Q-MAC is entitled to the immediate return of the goods and is authorised to enter any premises to repossess goods stored there. Upon the repossession of the goods, Q-MAC shall be entitled to resell the goods for the best price it can obtain and to be paid by the Customer any and all shortfall between that sale price and the debt owing to Q-MAC, together with the damages suffered by Q-MAC as a result of the default by the Customer. Such damages include, but are not limited to, the legal costs and other expenses incurred in obtaining possession of the goods. The Customer shall have no claim against Q-MAC for any damages or other moneys whatsoever if Q-MAC repossesses or attempts to repossess the goods.
- 2.11 If the contract between the parties or any credit facility is terminated by Q-MAC and invoices remain unpaid, Q-MAC shall be entitled to the immediate return of the goods and is authorised to enter upon the premises of the Customer or any other premises at which the goods are stored to repossess the goods.

3 Delivery

- 3.1 Freight and associated charges will be charged to the Customer. The standard delivery method is airfreight.
- 3.2 Q-MAC utilises INCOTERMS 2000 to describe modes of delivery.
- 3.3 Where the Customer does not agree to Q-MAC's standard delivery arrangement, the Customer must clearly specify in writing their preferred delivery arrangement, utilising INCOTERMS 2000. Q-MAC reserves the right to refuse any such specified delivery arrangement. Alternatively, the Customer may arrange for collection and delivery of Goods at their cost.
- 3.4 Q-MAC will always endeavour to meet the dispatch date as specified by the Customer and agreed by Q-MAC, however Q-MAC will not be held liable for any loss incurred by the Customer as a result of any delay in dispatch.
- 3.5 Where a dispatch is delayed by the Customer, Q-MAC will invoice the Customer for a suitable progress payment.
- 3.6 The Customer must inspect the product immediately upon delivery and must within 24 hours of delivery give written notice to Q-MAC, with full particulars, of any claim that the Product is not in accordance with the confirmed order.
- 3.7 If the Customer does not give that notice, then the Product is deemed to have been accepted by the Customer and the Customer must pay for the Product in accordance with the terms and conditions of this agreement.

4 Cancellation & Termination

- 4.1 If a cancellation is accepted by Q-MAC, cancellation fees will be charged, depending on the work already done to complete the order, at the time when the cancellation is accepted.
- 4.2 Cancellations will not be accepted by Q-MAC for custom items ordered specifically for the Customer, and the full contract value will be charged.
- 4.3 Q-MAC's agreement to continue to deliver or sell shall always be conditional upon it being satisfied of the Customer's ability to pay and comply with these terms and conditions. If Q-MAC suspends and/or terminates deliveries it shall not be liable in any way for any claim, damage, expense, or cost arising there from and all moneys then outstanding by the Customer shall immediately become due and payable.

5 Warranty

- 5.1 Q-MAC warrants all products designed/manufactured by Q-MAC to be free of faults arising from defects in workmanship and/or materials.
- 5.2 In the event that the product is proven faulty within 3 (three) years from the date of shipment ex works, Q-MAC will remedy such fault at no charge to the end user, provided the product is returned to Q-MAC or to one of its Authorised Dealers in accordance with published procedures.
- 5.3 Where an extended warranty has been pre-paid at the time of initial equipment purchase, the prescribed period will be the standard prescribed period plus the period of the extended warranty.
- 5.4 Subject to the terms of this Warranty, no liability (express or implied) is accepted for any consequential loss or damage resulting from a fault in the product. All guarantees (express or implied) concerning quality or fitness for purpose are hereby expressly excluded.
- 5.5 This warranty shall only apply to products designed, manufactured and supplied by Q-MAC.
- 5.6 In all other cases, Q-MAC will make every endeavour to ensure that the end user receives full benefit of any warranty given by third party manufacturers.
- 5.7 This warranty shall not apply to:
 - a. where the product has been subject to abuse or accidental damage.
 - b. where the product has been installed, adjusted or repaired by anyone other than an Authorised Dealer.
 - c. where the product has been installed, operated, adjusted or repaired, other than in accordance with instructions issued by Q-MAC.
 - d. where the serial label attached to the product has been defaced or removed.
 - e. to the distance or terrain over which transceiver products will operate.
 - f. to the quality of transmission or reception as a result of unfavourable environmental conditions.
- 5.8 The company warrants that all batteries supplied by the company will be free from defects in design, workmanship and materials for a period of 6 (six) months from the date of shipment. The liability of the warranty is limited to the resupply or repair providing the fault is reported within 48 (forty eight) hours of the fault occurring. A battery will degrade in performance over time. The company does not warrant the life, performance, charge rate or discharge rate of the battery.
- 5.9 Repairs conducted on warranty items are warranted for 6 (six) months or the balance of the original warranty, whichever is the longer. Repairs conducted on non-warranty items are warranted for 6 (six) months on the fault repaired only.
- 5.10 Items requiring warranty repair or replacement will be subject to approval by Q-MAC. Goods must be suitably packaged for airfreight and be marked "freight pre-paid". Q-MAC will reject any packages sent for warranty repair where the freight has not been pre-paid or goods have been inadequately packaged resulting in freight damage.
- 5.11 Where an item has been returned for repair and found not to be coverable under warranty, Q-MAC will notify the Customer of a repair estimate. Where the Customer elects not to proceed with a repair, a service fee will apply. Q-MAC will also invoice the Customer for the freight of non-warranty items.

6 Export Controls

- 6.1 Where items are subject to export controls of the Australian government, the Customer will be required to complete an end-user declaration. Failure to complete the export application in a timely manner may result in delays to the order dispatch.
- 6.2 Items subject to these controls may not be re-exported.
- 6.3 Where an export application has been refused, suspended, or cancelled due to an Australian government ruling or United Nations sanction, Q-MAC will not be liable for any loss or consequential damages.

7 Copyright

- 7.1 All intellectual property, including but not limited to designs, source code, compiled code, and documentation remain the property of Q-MAC at all times.
- 7.2 Duplication, reverse engineering, or attempts to reverse engineer intellectual property is strictly forbidden.

8 Liability and Indemnity

- 8.1 Q-MAC will not be liable to the Customer, or any other party, for any loss or consequential damages in connection with the provision or use of the Goods.
- 8.2 Force Majeure: Every effort will be made to carry out any contract based on this quotation, however the due performance of it is subject to variation or cancellation owing to an "Act of God", Terrorist acts, war, strikes, lock-outs, fire, flood, drought or any other cause beyond the seller's control, or owing to inability to procure items except at increased prices as a result of any of the foregoing causes.

9 Variation

- 9.1 Q-MAC may vary these Sales Terms & Conditions at any time.

10 Applicable Law

- 10.1 This Agreement should be interpreted in accordance with the laws of Western Australia.

Last revised 13 June 2005

5 FREIGHT INFORMATION

Included below are the INCOTERMS 2000 definitions for the most commonly used types of freight used by Q-MAC.

5.1 EX WORKS (EXW)

"Ex works" (EXW) means that the seller delivers when he places the goods at the disposal of the buyer at the seller's premises or another named place (i.e. works, factory, warehouse, etc.) not cleared for export and not loaded on any collecting vehicle. This term thus represents the minimum obligation for the seller, and the buyer has to bear all costs and risks involved in taking the goods from the seller's premises. However, if the parties wish the seller to be responsible for the loading of the goods on departure and to bear the risks and all the costs of such loading, this should be made clear by adding explicit wording to this effect in the contract of sale. This term should not be used when the buyer cannot carry out the export formalities directly or indirectly. In such circumstances, the FCA term should be used, provided the seller agrees that he will load at his cost and risk.

5.2 FREE ON BOARD (FOB)

"Free on Board" (FOB) means that the seller delivers when the goods pass the ship's rail at the named port of shipment. This means that the buyer has to bear all costs and risks of loss of or damage to the goods from that point. The FOB term requires the seller to clear the goods for export. This term can be used only for sea or inland waterway transport. If the parties do not intend to deliver the goods across the ship's rail, the FCA term should be used.

5.3 COST INSURANCE AND FREIGHT (CIF)

"Cost, Insurance and Freight" means that the seller delivers when the goods pass the ship's rail in the port of shipment. The seller must pay the costs and freight necessary to bring the goods to the named port of destination BUT the risk of loss of or damage to the goods, as well as any additional costs due to events occurring after the time of delivery, are transferred from the seller to the buyer. However, in CIF the seller also has to procure marine insurance against the buyer's risk of loss of or damage to the goods during the carriage. Consequently, the seller contracts for insurance and pays the insurance premium. The buyer should note that under the CIF term the seller is required to obtain insurance only on minimum cover'. Should the buyer wish to have the protection of greater cover, he would either need to agree as much expressly with the seller or to make his own extra insurance arrangements. The CIF term requires the seller to clear the goods for export. This term can be used only for sea and inland waterway transport. If the parties do not intend to deliver the goods across the ship's rail, the CIP term should be used.

5.4 CARRIAGE AND INSURANCE PAID (CIP)

"Carriage and Insurance paid to..." means that the seller delivers the goods to the carrier nominated by him, but the seller must in addition pay the cost of carriage necessary to bring the goods to the named destination. This means that the buyer bears all risks and any additional cost occurring after the goods have been so delivered. However, in CIP the seller also has to procure insurance against the buyer's risk of loss of or damage to the goods during the carriage. Consequently, the seller contracts for insurance and pays the insurance premium. The buyer should note that under the CIP term the seller is required to obtain insurance only on minimum cover'. Should the buyer wish to have the protection of greater cover, he would either need to agree as much expressly with the seller or to make his own extra insurance arrangements. "Carrier" means any person who, in a contract of carriage, undertakes to perform or to procure the performance of transport, by rail, road, air, sea, inland waterway or by a combination of such modes. If subsequent carriers are used for the carriage to the agreed destination, the risk passes when the goods have been delivered to the first carrier. The CIP term requires the seller to clear the goods for export. This term may be used irrespective of the mode of transport, including multimodal transport.

5.5 DELIVERED DUTY UNPAID (DDU)

"Delivered duty unpaid" means that the seller delivers the goods to the buyer, not cleared for import, and not unloaded from any arriving means of transport at the named place of destination. The seller has to bear the costs and risks involved in bringing the goods thereto, other than, where applicable, any "duty" (which term includes the responsibility for and the risks of the carrying out of customs formalities, and the payment of formalities, customs duties, taxes and other charges) for import in the country of destination. Such "duty" has to be borne by the buyer as well as any costs and risks caused by his failure to clear the goods for import in time. However, if the parties wish the seller to carry out customs formalities and bear the costs and risks resulting there from as well as some of the costs payable upon import of the goods, this should be made clear by adding explicit wording to this effect in the contract of sale. This term may be used irrespective of the mode of transport but when delivery is to take place in the port of destination on board the vessel or on the quay (wharf), the DES or DEQ terms should be used.

6 DATA SECTION

6.1 HF-90 GOLDEN RULES

- Use of an adequate power supply and cabling is critical to the correct functioning of the HF-90 family of transceivers. Unless adequate current is supplied to the transceiver, poor performance will result.
- Do not attempt to operate the HF-90 directly from a battery charger while the battery is disconnected. Although no damage will occur to the HF-90, it will not operate correctly.
- Using the HF-90 while float charging the battery may reduce the performance of the receiver due to noise generated by the battery charger.
- Always ensure that the power cable connecting the transceiver to the power source is at least the same diameter as that originally supplied with the equipment. If the distance between the transceiver and power supply is increased, then the diameter of the power cable will probably need to be increased also. The greater the distance between the transceiver and the power supply, the heavier gauge of cable required.
- The HF-90 can operate on voltages down to around 10VDC. Receiver performance will remain fairly constant, however the transmit output power will be reduced at voltages lower than 13.8VDC.
- Due to its small size and its high power rating the HF-90 dissipates a significant amount of heat and consequently gets quite hot after extended periods of transmitting. This is normal and not a cause for concern. The radio has been designed to operate with a heatsink temperature (rear of the radio) in excess of 80°C.

6.2 BATTERIES

- Correct use and maintenance of rechargeable batteries is essential to providing trouble-free performance of your portable radio system. Q-MAC supplies different batteries for different applications. The charging requirements vary depending on the type of battery being used.
- Sealed Lead Acid (SLA) batteries require a constant voltage charge and may be recharged at any time in their discharge cycle. e.g. recharge after use. They should not be left in a discharged state for extended periods, (nominal cell voltage = 2V).
- Nickel Cadmium (NiCad) batteries require a constant current charge and should preferably be recharged at the end of their discharge cycle. i.e. recharge after being completely discharged. NiCad batteries are susceptible to "memory effect". This occurs when batteries are recharged before they are fully discharged, decreasing the ability of the cells to accept a charge, therefore reducing the capacity of the batteries, (nominal cell voltage = 1.2V).
- Nickel Metal Hydride (NiMH) is more expensive than NiCad, and can be up to 30-40% more capacity than a NiCad battery of the same size and is less susceptible to memory effect. Like NiCad batteries, NiMH batteries prefer a constant current charge, (nominal cell voltage = 1.2V).
- Lithium Ion (Li-Ion) batteries have higher energy density per unit of volume & weight than other battery types (three times as much as NiCad). Li-Ion batteries do not suffer from memory effect. Charging a Li-Ion battery requires a two-stage process - constant current followed by constant voltage - making Li-Ion battery chargers more complex, (nominal cell voltage = 3.6V).
- Lithium Ion batteries are subject to extra freight charges due to dangerous goods classification by IATA.
- Battery chargers are **NOT** universally interchangeable. **ALWAYS** use an approved charger when charging your batteries.
- **SAVE MONEY** by ordering portable packages with the 'b' suffix and purchasing equivalent batteries locally to reduce freight costs! Q-MAC cannot guarantee radio performance on battery life in these instances or that Q-MAC charges will work with other batteries.

6.3 THE EFFECT OF POWER OUTPUT ON RANGE

There is much misunderstanding on the topic of power output and range achieved by HF communication systems. Two different propagation modes exist for HF communication. These are Skywave and Groundwave.

6.3.1 Groundwave

Field strength on groundwave varies with range and soil type. At close range over dry ground, a 12dB increase in power is required to double the range. At longer range, a 20dB increase in power is required to double the range. Limit range on groundwave can be as little as 10km over sand or as much as 100km over seawater. A change of output power from 50 Watt to 130 Watt is only 4dB and consequently has only a very small effect on achievable range - typically 2%. There is often more than 4dB difference between the efficiencies of different manufacturer's vehicle antenna tuners so that a 50 Watt radio can outperform a 130 Watt radio if the antenna tuner is more efficient.

6.3.2 Skywave

Many users of HF links use Skywave in the 100-500km range. This is considered as NVIS, Near Vertically Incident Skywave, where the signal bounces directly back from the ionosphere. A horizontally polarized antenna is used which has high angle radiation. The received signal is essentially constant over a radius of 500km. The signal to noise ratio is good if the correct frequency is chosen and a 4dB difference in signal level is not detectable. The correct frequency is one a little beneath the CRITICAL frequency, which can be found by studying ionosondes available at www.ips.oz.au. The critical frequency rises to about 9MHz at noon during a sunspot maximum and is as low as 5MHz at noon during a sunspot minimum. Vertical whip antennas on vehicles are not well suited for this mode of operation and are often bent back to increase the horizontal radiation.

For longer distance, communication of 1000km and beyond power becomes a more significant issue. However, 4dB change will not help significantly. At least 10dB increase in power is necessary to make a worthwhile difference. This would mean increasing from 50 Watt to 500 Watt. In fixed station use, the utilization of a beam antenna should be considered for higher frequency long distance working.

6.3.3 Noise

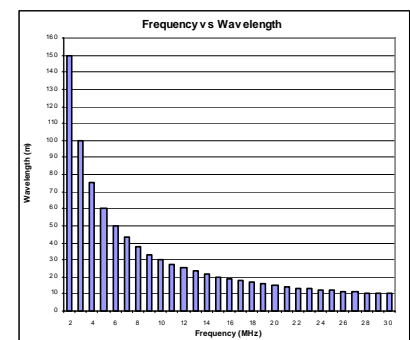
Most HF systems are limited by external noise level if operation is on frequencies below 10MHz. Atmospheric noise due to thunderstorm activity varies by up to 50dB between summer and winter. It is highest in summer and lowest in winter. Man-made power line and other noise can also vary by 50dB, being very severe in urban environments where overhead power lines and computers are present. Relative to a 50dB variation, 4dB change is vanishingly small and so in circumstances where a 50 Watt signal will not get through, a 130 Watt signal will not get through either.

6.4 ANTENNA BASICS

Why Do I Need Such A Long Antenna?

The relationship between frequency and wavelength is inversely proportional. That is, the lower the frequency, the longer the antenna. (refer to graph). Generally, antennas that are less than $\frac{1}{4}$ wavelength in length will not perform as effectively - shorter antennas are a compromise between what is practical and what is still effective.

In addition to the various whip antennas, Q-MAC Electronics supplies four different classes of wire antennas. Details of these wire antennas are as follows...



Broadband Dipole

These antennas are balanced antennas and consequently do not depend on a ground connection to form part of the antenna system. They contain elements which terminate the incident wave rendering them essentially broadband. They do not require an antenna tuning unit and work well over short to medium (0-1000km) ranges with moderate elevation (5-10m) and at longer range (>1000km) with higher elevation (20m).

End-fed Broadband

These antennas are unbalanced monopole antennas and a ground connection is a vital part of the antenna system. They contain elements which terminate the incident wave rendering them essentially broadband. They do not require an antenna tuning unit and work well over short to medium (0-1000km) ranges with moderate elevation (5-10m) and at longer range (>1000km) with higher elevation (20m).

Long Wire Antenna

This antenna is frequency conscious and requires both an antenna tuning unit and a good ground connection in order to maximize the radiated power. The length of the wire is typically less than a quarter wavelength and a variable inductor within the antenna tuner is used to add effective length to the wire. If ground conductivity is poor, a wire "counterpoise" can be used as an alternative to a ground connection.

Whip Antenna

This is a special case of the Long Wire Antenna where the wire is replaced by a short rod. For a Manpack Package, the user's body, or the ground on which the Manpack rests, forms the ground system. As a result of the poorer ground and shorter antenna length, the performance of whip antennas is significantly less than wire antennas.

6.5 PRACTICAL HF ANTENNA PERFORMANCE

The following distances should be indicative with respect to Q-MAC Manpack antenna systems. In each instance, it is assumed that the Manpack is communicating with a base station utilising a QM7002 Broadband Dipole Antenna or similar wire antenna.

Product Code	Description	Groundwave	Skywave
Manpack Antenna Tuners			
QM7301	6-section collapsible whip antenna	5-10km max	150-600km
QM7301 & QM7351	6-section collapsible whip antenna used in conjunction with Extender coil	5-10km max	Not suited to skywave
QM7302	2-section collapsible whip antenna	2-5km max	150-400km
QM7310	Long wire antenna kit	5-30km max	150-1000km

Antenna Not Requiring Tuner

QM7005	Portable Broadband Antenna	5-30km max	150-1000km
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The above distances are of course subject to correct deployment of the antenna systems in question, frequencies in use, time of day, propagation conditions etc. **They are only indicative.** Refer to the tables below.

Effective Short Range Communication (Groundwave) is Dependent On:

Frequency used:	- Lower frequency provides greater distance
Conductivity of terrain:	- Less conductivity provides less distance (e.g. <5km over very dry land) - High conductivity provides greater distance (e.g. 100km+ over sea)
Noise floor of frequency used:	- Increased noise reduces usability

The overriding factor for effective communications via groundwave is the conductivity of the terrain.

Effective Long Range Communication (Skywave) is Dependent On:

Frequency used:	- Shorter distance covered using lower frequency - Longer distance covered using higher frequency
Time of day:	- A given frequency covers greater distance at night
Season:	- A given frequency covers greater distance during winter months
Time in sunspot cycle:	- A given frequency covers less distance during high sunspot activity
Noise floor of frequency used:	- Increased noise reduces usability

The overriding factor for effective communications via skywave is the appropriate selection of frequency.

6.6 Q-MAC Automatic Antenna Tuners

Installation:

Most Q-MAC automatic antenna tuners rely on being powered by the DC voltage on the RF coaxial cable from the transceiver. This provides a more efficient method of installation by reducing the interconnecting cables in the radio system.

Testing:

If a technician is required to test the operation of the antenna system containing a Q-MAC automatic antenna tuner, then it is recommended that an Antenna Current meter (QM4082) is used instead of a VSWR meter. Attempting to use a VSWR meter will block the DC voltage from the HF-90 transceiver therefore preventing the tuner from functioning.

6.7 USEFUL HF PROPAGATION WEBSITES

Australian Government:

IPS Radio and Space Services: www.ips.oz.au

Solar Terrestrial Dispatch:

Near Real Time Maximum Usable Frequency (MUF) Map: www.spacew.com/www/realtime

Near Real Time Critical Frequency Map: www.spacew.com/www/fof2

7 PRODUCT INDEX

Part No.	Product Description	Weight (kg)	Page
95312	ML-90 Replacement Antenna Element	5.00	19
95319	ML-90 Replacement Wind Deflector	10.00	19
96000	Front Panel Module	0.15	38
96002	PASW Module	0.40	39
96003	RXMP Module	0.15	39
QM1001	HF-90 Programming Package (Aust) & Cable	0.05	38
QM1021	HF-90 Technical Manual	0.35	38
QM1044	Spares Kit -Component Level TA-90	15.00	41
QM1045	Spares Kit -Component Level TA-99	5.00	41
QM1046	Spares Kit -Component Level HF-90	10.00	42
QM1048	Spares Kit -Component Level ML-90 ATU Unit	15.00	42
QM2001	TM-90 Tuner	0.90	22
QM2101	TA-99 ML-STD Auto Tuner	0.90	22
QM2102	TM-90 To TA-99 (Upgrade for Manpack Packages)	0.00	22
QM2160	Upgrade ML-90 125W Capable ATU	1.00	19
QM3001	BNC/PL259 Adaptor	0.05	36
QM3100	Roof Rack Mounting Hardware- Gutter Mount	0.00	7
QM3101	Roof Rack Mounting Hardware -Existing Mount Track	0.00	7
QM3102	Roof Rack Mounting Hardware- Concealed Gutter Door Jam	0.00	7
QM3103	Roof Rack Mounting hardware-Track Installation and Mounting Feet	0.00	7
QM4001	Speaker microphone	0.20	32
QM4002	DTMF microphone (std)	0.25	32
QM4003	DTMF microphone c/w built-in speaker	0.25	33
QM4004	DTMF scrambler microphone c/w built-in speaker	0.25	33
QM4006	DTMF Commercial Pedestal Microphone	1.00	33
QM4011	Telephone handset - Commercial grade	0.30	33
QM4012	Military Handset No DTMF	0.45	34
QM4013	Telephone handset - Commercial grade (inc DTMF keypad)	0.40	34
QM4015	Military Handset DTMF	0.45	34
QM4021	External Mount Speaker (c/w audio mute)	0.45	32
QM4024	External Mount Speaker - DSP Noise Reduction	0.45	32
QM4026	Upgrade from Standard Speaker to DSP Noise Reduction Speaker	0.00	12
QM4027	Upgrade from Standard Speaker to DSP Noise Reduction Speaker	0.00	7
QM4041	Headphones - Commercial grade	0.20	31
QM4042	Headphones - Industrial grade	0.45	31
QM4051	CW Option & Telegraph Key	0.45	32
QM4061	HF-90 Data Interface Unit	1.00	36
QM4071	Break Out Unit	0.30	40
QM4072	Asymmetric T Piece	0.30	40
QM4075	RF Dummy Load	1.00	40
QM4081	Voice Enunciator Box	1.00	40
QM4082	Antenna Current Meter	2.00	39
QM4083	Field Service Tool	0.30	40
QM4084	DC Blocking Filter	0.30	39
QM4085	HF-90/M Field Test Unit	1.00	39
QM5001	DC Power Cable (4.5m)	0.65	34
QM5002	DC Power Cable (0.6m)	0.10	34
QM5003	DC Power Cable (3.0m) - General Purpose	0.50	35
QM5021	Coaxial Cable (4.5m)	0.25	35
QM5022	Coaxial Cable (30m)	1.50	35
QM5041	Coaxial Cable (HF-90 to TM-90)	0.15	35
QM5043	TA-90 Power Cable	0.25	21
QM5051	Programming Cable c/w Adaptor	0.20	36
QM5053	TA-90 High Voltage Antenna Feed Cable	0.05	21
QM5059	Cable from ML-90 ATU to Ground	1.00	19
QM5062	High Voltage Cable from ML-90 to Antenna	1.00	19
QM5064	TA-99 to HF-90(M) Coaxial Cable	0.10	35
QM5076	Cable from ML-90 ATU to Feed Box	1.00	19
QM5078	ML-90 DC Feed Adaptor Cable	0.30	19
QM5078-Q	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU Suitable for use with Q-MAC transceiver	0.50	20
QM5078-B	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU Suitable for use with Barrett transceiver	0.50	20
QM5078-C	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU Suitable for use with Codan transceiver	0.50	20
QM5078-I	ML-91 Control Cable - Cable to connect transceiver to ML-91 ATU Suitable for use with Icom transceiver	0.50	20

Part No.	Product Description	Weight (kg)	Page
QM5081	AC Mains Cable 2 PIN IEC Type C (Australia, NZ, Argent)	0.10	37
QM5082	AC Mains Cable 2 PIN IEC Type B (UK)	0.10	37
QM5083	AC Mains Cable 2 PIN IEC Type D (North America)	0.10	37
QM5084	AC Mains Cable 3 PIN IEC Type C (Australia, NZ, Argent)	0.10	37
QM5085	AC Mains Cable 3 PIN IEC Type A (Continental Europe)	0.10	37
QM5086	AC Mains Cable 3 PIN IEC Type B (UK)	0.10	37
QM5087	AC Mains Cable 2 PIN IEC Type A (Continental Europe)	0.10	37
QM5118	AC Mains Cable 2 PIN IEC Type E (India and RSA)	0.10	37
QM5119	AC Mains Cable 3 PIN IEC Type D (North America)	0.10	37
QM5120	AC Mains Cable 3 PIN IEC Type E (India and RSA)	0.10	37
QM6001	Canvas Backpack - Standard; Olive drab canvas	1.50	29
QM6003	Canvas Backpack - Military Grade c/w Frame; Olive drab canvas	2.80	29
QM6014	Fibreglass Carry Case	2.70	29
QM6015	Pelican 1200 Case - Black	0.80	30
QM6015Y	Pelican 1200 Case - Yellow	0.80	30
QM6017	Pelican 1250 Case - Black	0.80	30
QM6017Y	Pelican 1250 Case - Yellow	0.80	30
QM6020	Aluminium Road Case	20.00	30
QM6052	HF-90 Vehicle Installation Kit (Advanced)	1.30	31
QM6061	Mounting Cradle	0.35	31
QM6071	TA-90 Mounting Kit	2.45	21
QM7001	Fixed Broadband Dipole Antenna - Single Wire	3.00	25
QM7002	Fixed Broadband Dipole Antenna - Multi Wire	12.00	25
QM7003	Fixed Broadband Dipole Antenna - Multi Wire - 1000W Voice 500W Data	18.00	26
QM7004	Terminated Folded Dipole Antenna	6.00	26
QM7005	Portable Broadband Antenna (Standard)	1.25	22
QM7020	MiniPack Broadband Antenna (spares kit)	0.20	23
QM7021	Halyard Kit	0.60	27
QM7022	Fixed Broadband Dipole Antenna - Mast Kit	13.00	25
QM7023	Surge Arrestor for High Powered Base Station	10.00	26
QM7024	Surge Arrestor for Integrated Base Station	10.00	26
QM7112	TA-90 Auto-tune Antenna System	5.50	21
QM7113	ML-90 Auto-tuning Antenna System (Rack and Tuner)	105.00	19
QM7113b	ML-90 Auto-tuning Antenna System - Compact Size 1.5m(L) x 1.25m (W)	90.00	19
QM7114	ML-91 (125 W Capable) Auto-tuning Antenna System (Rack and Tuner)	105.00	20
QM7114-Q	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) Suitable for use with Q-MAC transceiver	105.00	20
QM7114-B	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) Suitable for use with Barrett transceiver	105.00	20
QM7114-C	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) Suitable for use with Codan transceiver	105.00	20
QM7114-I	ML-91 Auto-tuning Antenna System Standard Size 1.8m(L) x 1.25m(W) Suitable for use with Icom transceiver	105.00	20
QM7114b-Q	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) Suitable for use with Q-MAC transceiver	95.00	20
QM7114b-B	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) Suitable for use with Barrett transceiver	95.00	20
QM7114b-C	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) Suitable for use with Codan transceiver	95.00	20
QM7114b-I	ML-91 Auto-tuning Antenna System Compact Size 1.5m(L) x 1.25m(W) Suitable for use with Icom transceiver	95.00	20
QM7121	TA-90 Tuner	2.40	21
QM7121a	TA-90 Tuner (24 Volt Version)	2.40	21
QM7122	ML-90 Antenna Tuning Unit Only	4.50	19
QM7123	ML-90 Antenna Feed Box	1.50	19
QM7125	ML-91 Antenna Tuning Unit Only	4.50	20
QM7131	Continuously Loaded Whip Antenna	0.65	21
QM7133	Continuously Loaded Whip Antenna (split configuration)	0.80	21
QM7136	Antenna Base Assembly	0.65	21
QM7137	Pair 60mm C-Clamps	0.30	21
QM7301	Collapsible Whip Antenna (6-section)	0.30	23
QM7302	Collapsible Whip Antenna (2-section)	0.20	23
QM7303	Collapsible Whip Antenna (8-section)	0.30	23
QM7304	Collapsible Whip Antenna (4-section)	0.20	24
QM7309	Tape Whip Antenna	0.20	24
QM7310	Long Wire Antenna Kit	0.45	25
QM7351	Antenna Extender Coil Section	0.20	24
QM7601	TA-90 Upgrade from 12 V to 24 Volt Version	0.00	21
QM7602	ML-90/ML-91 Modification from 12 Volt version to 24 Volt version	0.00	7
QM7801	Heavy Duty Antenna Base & Spring	1.50	21
QM7810	TA-90 Antenna Spring	1.35	21
QM7821	Antenna Angle Adaptor	0.10	24

Part No.	Product Description	Weight (kg)	Page
QM8004	MiniPack Rechargeable Battery (4 Ah)	1.20	28
QM8011	Rechargeable Battery (7Ah)	2.55	27
QM8021	Fold-up Solar Panel Charger (SLA Only)	1.30	28
QM8022	AC Mains Charger (2A) for SLA Batteries	0.70	27
QM8024	Step-Up Battery Charging Device - SLA Batteries	0.30	27
QM8031	AC Mains Power Supply Unit	1.50	28
QM8032	Battery Changeover Switch	0.75	29
QM8035	Hand Crank Generator (c/w tree strap and tripod) - Suits HF-90	2.70	28
QM8051	Battery Condition Monitor - SLA Batteries	0.10	36
QM9021	HF-90 Humanitarian Relief Package (including batteries)	14.00	11
QM9021b	HF-90 Humanitarian Relief Package (minus batteries)	9.00	11
QM9022	HF-90 Disaster Response Package	47.00	14
QM9025	ML-90 NVIS Roof Rack Antenna Vehicle Package - Standard Size (fixed transceiver)	105.00	7
QM9025b	ML-90 NVIS Roof Rack Antenna Vehicle Package - Compact Size (fixed transceiver)	95.00	7
QM9026	ML-90 NVIS Roof Rack Antenna Vehicle Package - Standard Size (removable transceiver)	107.00	7
QM9026b	ML-90 NVIS Roof Rack Antenna Vehicle Package - Compact Size (removable transceiver)	97.00	7
QM9051	Advanced Option 1 - c/w DTMF Microphone. (no speaker)	0.10	16
QM9052	Advanced Option 2 - c/w DTMF Speaker Microphone	0.10	16
QM9053	Advanced Option 3 - c/w DTMF Scrambler Microphone	0.10	17
QM9054	Advanced Option 4 - c/w DTMF Telephone Handset	0.20	17
QM9057	Advanced Option 7 - Upgrade to DTMF Mil-Std Telephone Handset	0.20	17
QM9058	Advanced Option 8 - Upgrade to DTMF Desktop Microphone on Gooseneck	0.20	18
QM9071	Backpack Upgrade to Framed Backpack - Olive drab canvas	1.30	5
QM9082	Email/Chat Data Package	4.00	13
QM9090	Option - HF-90 Power Reduction	0.01	15
QM9091	Option - HF-90 3Khz Filter	0.01	15
QM9099	HF-90 Overhaul Service	2.00	41
QM9501	Fan Option (modular)	0.10	36
QM9901	HF-90 Australian Transceiver - Standard model including vehicle/base DC power cable	2.05	15
QM9901b	HF-90 Australian Transceiver - Standard model including Portable/Manpack DC power cable	1.55	15
QM9909	HF-90 Australian Manpack with TA-99 ATU - Olive drab canvas	7.60	6
QM9909b	HF-90 Australian Manpack with TA-99 ATU - Olive drab canvas; Minus battery	5.10	6
QM9912	HF-90 Australian Portable Package (incl. Batt.) c/w fibreglass carry case	8.20	10
QM9912b	HF-90 Australian Portable Package (minus battery) c/w fibreglass carry case	5.65	10
QM9913	HF-90 Australian Manpack - Olive drab canvas (complete)	7.60	5
QM9913b	HF-90 Australian Manpack - Olive drab canvas (minus battery)	5.05	5
QM9915	HF-90 Australian Vehicle Package (whip antenna)	10.05	8
QM9918	HF-90 Australian Base Station Package (complete)	37.10	13
QM9918b	HF-90 Australian Base Station Package (minus battery)	35.10	13
QM9920	HF-90 Australian Integrated Base Station Package	42.10	12
QM9923	HF-90 Australian MiniPack	3.75	9