



Q-MAC ELECTRONICS

PRODUCT CATALOG

Effective Date: April 2003
Version 5.1

Q-MAC Electronics Pty Ltd
142 Hasler Road, Osborne Park WA 6017
PO Box 1334, OPBC WA 6916
AUSTRALIA
Tel: +61 (0)8 9242 2900
Fax: +61 (0)8 9242 3900
E-mail: sales@qmac.com

<http://www.qmac.com/>

IMPORTANT NOTES ABOUT THIS CATALOG	2
CONFIGURING Q-MAC PACKAGES	3
MILITARY PRODUCTS	4
COMMERCIAL PRODUCTS	32
SALES TERMS AND CONDITIONS	70
LETTERS OF CREDIT	71
INTERNATIONAL FREIGHT INFORMATION	72
Q-MAC WARRANTY POLICY	74
PRODUCT INDEX	75
DATA SECTION	78

CONTENTS

1	IMPORTANT NOTES ABOUT THIS CATALOG.....	2
2	CONFIGURING Q-MAC PACKAGES.....	3
3	MILITARY PRODUCTS.....	4
3.1	HF-90M PACKAGES _____	5
3.2	HF-90M TRANSCEIVER & OPTIONS _____	16
3.3	ANTENNA SYSTEMS _____	18
3.4	POWER SUPPLIES, CHARGERS & ACCESSORIES _____	23
3.5	CARRY PACKS & CASES _____	26
3.6	OTHER PARTS & ACCESSORIES _____	27
3.7	DEALER SUPPORT PRODUCTS _____	30
4	COMMERCIAL PRODUCTS.....	32
4.1	HF-90 PACKAGES _____	33
4.2	HF-90 TRANSCEIVER & OPTIONS _____	48
4.3	ANTENNA SYSTEMS _____	53
4.4	POWER SUPPLIES, CHARGERS & ACCESSORIES _____	59
4.5	CARRY PACKS & CASES _____	61
4.6	OTHER PARTS & ACCESSORIES _____	62
4.7	DEALER SUPPORT PRODUCTS _____	68
5	SALES TERMS AND CONDITIONS.....	70
6	LETTERS OF CREDIT.....	71
6.1	Documentary Letter Of Credit Format _____	71
7	INTERNATIONAL FREIGHT INFORMATION.....	72
7.1	International Freight Abbreviations _____	72
7.2	International Freight Definitions _____	72
8	Q-MAC WARRANTY POLICY.....	74
9	PRODUCT INDEX.....	75
10	DATA SECTION.....	78
10.1	HF-90 Golden Rules _____	78
10.2	Batteries _____	78
10.3	Antenna Basics _____	78
10.4	Practical Antenna Performance _____	79

1 IMPORTANT NOTES ABOUT THIS CATALOG

Product Descriptions:-

- All product descriptions 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 will be used to consolidate goods.

Modes of Delivery:-

- Q-MAC utilises INCOTERMS 2000 (as per Section 7) to describe modes of delivery. Where terminology on purchase orders differs from INCOTERMS 2000, Q-MAC reserves the right utilize the nearest matching mode of transport listed in Section 7, INTERNATIONAL FREIGHT INFORMATION.

Confidentiality:-

- The information contained within this catalog is for the sole use of quoting Q-MAC products and services to bona-fide customers. This catalog cannot be copied, reproduced or distributed in any form to any 3rd party without the express written permission of Q-MAC management.

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 MILITARY PRODUCTS



3.1 HF-90M PACKAGES

Unless indicated otherwise all packages are based on the Standard Model HF-90M

To upgrade to an Advanced Model HF-90M with any of these packages, add the Advanced Option (Part No. QM9056).

To upgrade to a Frequency Hopping Model HF-90M with any Advanced Model, add the Frequency Hopping Option (Part No. QM9061).

3.1.1 MX9011 HF-90M Military Grade Monoblock Manpack

A MILITARY GRADE MONOBLOCK MANPACK FOR COMMUNICATING ON FOOT

The HF-90M Military transceiver is a state of the art communications device specifically designed for tactical military applications. The HF-90M will withstand immersion, shock and vibration to military standards.

The HF-90M transceiver is an extremely compact and light weight unit, featuring only essential controls to ensure ease of operation. The HF-90M is available with a secure, jam-resistant ECCM Frequency Hopping option.

Applications:

The HF-90M Military Grade Monoblock Manpack is ideal for military and paramilitary applications. The Frequency Hopping option provides secure, jam-resistant HF communications.



(11.00kg)

Includes:-

- HF-90M transceiver
- Mil-Std Telephone Handset
- TA-99 auto tuner complete with coaxial & earth cables
- Collapsible whip antenna (6-section)
- Long wire antenna kit
- Tape whip antenna
- Rechargeable battery (7 Ah) complete with enclosure, charging and accessory power socket and battery condition monitor
- Ruggedised full frame backpack with canvas accessory pockets

3.1.2 MX9011b HF-90M Military Grade Monoblock Manpack (minus battery)



(9.00kg)

Includes:-

- All items mentioned above, except for the battery. Includes battery enclosure suited to 7Ah batteries.

3.1.3 MX9011C HF-90M Military Grade Manpack with 3.5AH battery



(10.00kg)

Includes:-

- All items mentioned above, replacing the standard 7.5AH battery and battery enclosure with a 3.5AH NiCad battery and matching enclosure.

3.1.3.1 Available Advanced Options



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include:-

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF microphone
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

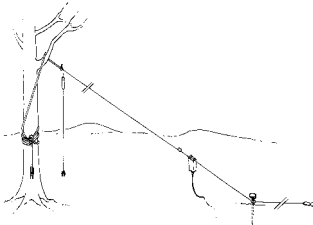
Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90M with Advanced Option #6 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

3.1.3.2 Suggested Optional Items (not included with package):



QM7005 Portable broadband antenna, standard version

End-fed broadband antenna, 2-30MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage.

(1.25kg)



QM8024M DC Step-Up Battery Charging Device

Suits Q-MAC SLA Rechargeable Batteries - Steps up vehicle voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with mating connector to suit military grade packages.

(0.30kg)



QM8022M AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and mating connector to suit military grade packages. Supplied with specified AC mains plug to suit local AC socket.

(1.00kg)



QM8026M AC Mains Charger for NiCad

Compact desk-top unit to suit Q-MAC Rechargeable NiCad Batteries – 115/230 Volt AC input, complete with cable and mating connector to suit military grade packages. Supplied with specified AC mains plug to suit local AC socket.

(1.00kg)



QM8021M Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and mating connector to suit military grade packages. Comprises five panels, which fold into a compact canvas pouch. Available in black and olive drab.

(1.30kg)



QM8028M Hand Crank Generator (complete with mounts)

Suits Q-MAC SLA Rechargeable Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets Mil Std 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame), tree-mount with strap and mating connector to suit military grade packages.

(2.70kg)



QM8051M Battery Condition Monitor

Battery condition monitor to suit military grade radio connector. Monitors battery charge level via a series of LED indicators.

(0.10kg)

3.1.4 MX9013 HF-90M Ruggedised Manpack

SECURE VOICE IN A HYBRID MILITARY / COMMERCIAL GRADE PACKAGE FOR COMMUNICATING ON FOOT

The HF-90M military grade transceiver is a state of the art communications device specifically designed for tactical military applications. The HF-90M transceiver will withstand immersion, shock and vibration to military standards.

The HF-90M transceiver is an extremely compact and light weight unit, featuring only essential controls to ensure ease of operation. The MX9013 includes a secure, jam-resistant ECCM Frequency Hopping feature.

Applications:

The MX9013 Manpack is ideal for military and paramilitary applications. The Frequency Hopping feature provides secure, jam-resistant HF communications.



(8.50kg)

Includes:-

- HF-90M transceiver
- Mil-Std Telephone Handset with DTMF
- Advanced Software
- TA-99 auto tuner complete with coaxial & earth cables
- Collapsible whip antenna (6-section)
- Long wire antenna kit
- Tape whip antenna
- Rechargeable battery (7 Ah) complete with power cable and battery condition monitor
- Full frame backpack
- DC Step-up battery charging device
- AC mains charger
- Frequency Hopping (Part No. QM9061)

3.1.5 MX9013b HF-90M Military Grade Manpack (minus battery)

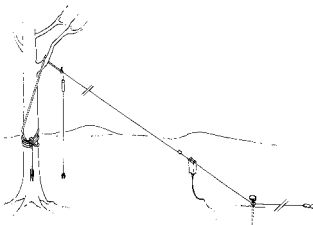


(5.95kg)

Includes:-

- All items mentioned above, except for the battery

3.1.5.1 Suggested Optional Items (not included with package):



QM7005 Portable broadband antenna, standard version

End-fed broadband antenna, 2-30MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage.

(1.25kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)



QM8028 Hand Crank Generator (complete with mounts)

Suits Q-MAC SLA Rechargeable Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets Mil Std 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame) and tree-mount with strap.

(2.70kg)

3.1.6 MX9014 HF-90M Ruggedised Manpack

AFFORDABLE MILITARY GRADE PACKAGE FOR COMMUNICATING WHILE ON FOOT

The HF-90M military grade transceiver is a state of the art communications device specifically designed for tactical military applications. The HF-90M will withstand immersion, shock and vibration to military standard.

The HF-90M transceiver is an extremely compact and light weight unit, featuring only essential controls to ensure ease of operation. The HF-90M is available with a secure, jam-resistant ECCM Frequency Hopping option.

Applications:

The MX9014 Ruggedised Manpack is ideal for military and paramilitary applications where affordability is important. The Frequency Hopping option provides secure, jam-resistant HF communications.



(7.90kg)

Includes:-

- HF-90M transceiver complete with Mil-Std Telephone Handset
- TA-99 auto tuner complete with coaxial & earth cables
- Collapsible whip antenna (6-section)
- Long wire antenna kit
- Rechargeable battery (7 Ah) complete with power cable and battery condition monitor
- Full frame backpack

3.1.7 MX9014b HF-90M Ruggedised Manpack (minus battery)

Includes:-

- All items mentioned above, except for the battery



(5.35kg)

3.1.7.1 Available Advanced Options



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include:-

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF handset
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

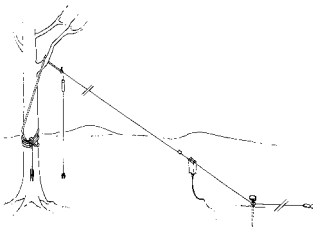
Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90M with Advanced Option #6 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

3.1.7.2 Suggested Optional Items (not included with package):



QM7005 Portable broadband antenna, standard version

End-fed broadband antenna, 2-30MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage.

(+1.25kg)



QM7309 Tape Whip Antenna

Flexible tape whip antenna (1m) suited to use in jungle/forestry areas, 4-12.9 MHz operation complete with gooseneck.

(+0.20kg)



QM8024 DC Step-Up Battery Charging Device

Suits Q-MAC SLA Rechargeable Batteries - Steps up battery voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with appropriate connector.

(0.30kg)



QM8022 AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug.

(0.70kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)



QM8028 Hand Crank Generator (complete with mounts)

Suits Q-MAC SLA Rechargeable Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets MIL STD 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame) and tree-mount with strap.

(2.70kg)

3.1.8 MX9027 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.

Applications:

The Q-MAC ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed) is ideal for border patrol, environmental, search and rescue, aid and relief, and mining vehicles.

Includes:-

- HF-90M transceiver complete with microphone and DC power cable
- Transceiver installation kit complete with mounting cradle & external mount speaker with audio mute facility
- ML-90 Auto-tune Antenna system with cables and connectors
- ML-90 installation kit including roof-rack mounting hardware

Not suitable for use with HF-90 Frequency Hopping Option/Upgrades – insufficient bandwidth. Specify 12V or 24V version at time of order.

(110.00kg)

3.1.8.1 Available Advanced Options



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include: -

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF handset
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)

3.1.9 MX9015 Vehicle Package

A MILITARY GRADE PACKAGE FOR VEHICLE INSTALLATIONS

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

Includes:-

- HF-90M transceiver
- Military grade telephone handset (QM4016)
- Power cable with military connector
- Vehicle installation kit with mounting cradle
- TA-90M automatic tuning whip antenna system covering 2-20MHz

Specify 12V or 24V version at time of order.

Applications:

The Q-MAC HF-90 Vehicle Package with whip antenna is ideal for border patrol, and search and rescue vehicles.

(10.00kg)

3.1.9.1 Available Advanced Options



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include: -

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF handset
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90M with Advanced Option #6 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

3.1.10 MX9024 HF-90M High Powered 500 Watt Base Station Package (complete)

A FIXED HF-90M TRANSCEIVER WITH THE 500W OUTPUT POWER

The Q-MAC HF-90M 500W Base Station Package is designed for critically important fixed base station use. It includes an HF-90M transceiver coupled with solid state, 500 Watt amplifier and power supply, all contained in a small 19" equipment rack with casters.

Applications:

The Q-MAC HF-90M 500W Base Station Package is ideal for national or regional headquarters, embassies, military and border patrol applications. With the HF-90 Frequency Hopping Option, secure HF networks can be implemented.



Includes:-

- HF-90M transceiver with advanced software
- 19" 10RU Equipment Rack & Hardware
- External panel mounted speaker with audio mute facility
- AC mains power converter unit 90A/ 12V DC.
- 500 watt amplifier with fan kit
- Military telephone handset
- 3 wire centre-fed broadband dipole antenna.
- 50m RG213 coax cable

(65.00kg)

3.1.10.1 Suggested Optional Items (not included with package):



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M.

Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include: -

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF handset
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90M with Advanced Option #6 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

3.1.11 MX9019 Integrated HF-90 Base Station

AN INTEGRATED HF-90M TRANSCEIVER BASE STATION

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

Applications:

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



Includes:-

- HF-90M transceiver
- Military telephone handset
- External panel mounted speaker with audio mute facility
- AC mains power supply unit complete with battery backup facility.
- Rechargeable battery (7 Ah)
- Fixed broadband dipole antenna – multi wire

(42.00kg)

3.1.11.1 Suggested Optional Items (not included with package):



QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) to DTMF Mil-Std telephone handset (QM4014) - suited to HF-90M packages.

Advanced features include: -

All features with Standard Model, PLUS ...

- Front-end Programming via the associated DTMF handset
- Selcall (Based CCIR 493-4)
- Telcall
- Beacon
- Selcall/Telcall Scan and Mute

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90M with Advanced Option #6 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

3.1.12 QM9082M Email and Chat Data Package

A DATA PACKAGE FOR LINKING TO OTHER DATA STATIONS

The combination of a Pactor Protocol modem with Wavemail software and the HF90M package provides long range email and electronic chat capability over HF radio spectrum. The Wavemail software provides multi-user and multi-site routing.

Compatible with:

Base Station
Vehicle Manpack
High Powered Base Station



Includes:-

- Swiss PTC Modem
- Wavemail software
- HF-90m interface unit and cables
- Fan

(4.00kg)

3.2 HF-90M TRANSCEIVER & OPTIONS

3.2.1 QM9101 HF-90M Transceiver – Military Grade



Standard features include:-

- 2 - 30 MHz frequency coverage
- 50 Watt PEP power output
- 12V - 24V operating voltage
- 255 programmable channels
- USB/LSB toggle switch
- Tune function
- Clarifier
- Rx signal strength indicator
- Erase facility
- 6 digit LED display

HF-90 Operation & Installation Guide included.

Standard accessories include: -

- Mil-Std telephone handset microphone (QM4016)
- DC power cable - suited to portables/manpacks.

(1.55kg)

3.2.2 QM9056 Advanced Option #6

Software and hardware option to convert a Standard Model HF-90M to an Advanced Model HF-90M. Replaces standard Mil-Std telephone handset (QM4016) with DTMF Mil-Std telephone handset (QM4014) - suited to all MX90xx HF-90M packages.

Advanced features include:-

- 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

+(0.20kg)

3.2.3 HF-90M Package / Options Matrix

USE THIS TABLE TO CLARIFY WHICH ADVANCED OPTIONS CAN BE ADDED TO WHICH HF-90M PACKAGES.

<u>Package Part Number and Description</u>	<u>Advanced Option #</u>
MX9011 HF-90M Monoblock Manpack	6
MX9013 Ruggedised Manpack with Frequency Hopping	(included)
MX9014 Ruggedised Manpack	6
MX9015 HF-90M Military Grade Vehicle Package	6
MX9018 HF-90M Military Grade Base Station	6
MX9019 HF-90M Integrated Base Station Package	6
MX9024 HF-90M High Powered Base Station Package	6
MX9027 HF-90M NVIS Roof Rack Antenna (fixed transceiver)	6

3.2.4 QM9061 HF-90M Frequency Hopping Option (Factory Fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence



+(0.05kg)

Requires HF-90M with Advanced Software and Handset Options. HF-90 Frequency Hopping User Guide included.

Frequency Hopping option is subject to Australian Defence Export Controls. An End-User Declaration is required for supply of this option.

3.2.5 QM9062 HF-90M Frequency Hopping Option (Field Upgrade)

Enables complete protection against intercept and jamming, to a military standard. Includes firmware and extraction tool required to upgrade an HF-90M.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence



+(0.15kg)

Requires HF-90 with Advanced Software and Handset Options. HF-90 Frequency Hopping User Guide included.

Frequency Hopping option is subject to Australian Defence Export Controls. An End-User Declaration is required for supply of this option.

3.3 ANTENNA SYSTEMS

3.3.1 Portable/Manpack Antenna Systems

3.3.1.1 QM2101 TA-99 Military Grade Automatic Tuner

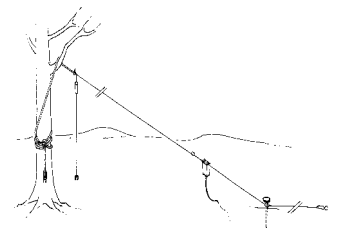
Incorporates LED tuning indicators. Suits collapsible whip, tape & long wire antennas. Supplied with coaxial and earth leads.



+(0.90kg)

3.3.1.2 QM7005 Portable Broadband Antenna (standard version)

End-fed broadband antenna, 2-30 MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage. As supplied with the HF-90M Manpack Package.



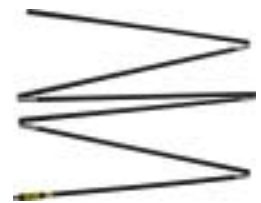
+(1.25kg)

3.3.1.3 QM7301 Collapsible Whip Antenna (6-section)

High efficiency collapsible six section whip antenna (3m). As supplied with the HF-90 Manpack.

Frequency coverage: when used with TM-90, Manual Tuner: 3.6-10MHz
when used with TA-99, Automatic Tuner: 2-26MHz
when used with TA-99 and Frequency Hopping: 4-26MHz

Collapsed length: 500mm



+(0.30kg)

3.3.1.4 QM7302 Collapsible Whip Antenna (2-section)

Collapsible two section whip antenna (1m), complete with flexible goose neck.

Frequency coverage: when used with TM-90, Manual Tuner: 4-12.9 MHz
when used with TA-99, Automatic Tuner: 3.5-26MHz
when used with TA-99 and Frequency Hopping: 3.5-26MHz

Collapsed length: 495mm



+(0.20kg)

3.3.1.5 QM7309 Tape Whip Antenna

Flexible tape whip antenna (1m) complete with flexible goose neck.
Suited to use in jungle/forestry areas.

Frequency coverage: when used with TM-90, Manual Tuner: 4-12.9 MHz
 when used with TA-99, Automatic Tuner: 3.5-26MHz
 when used with TA-99 and Frequency Hopping: 3.5-26MHz



+(0.20kg)

3.3.1.6 QM7821 Antenna Angle Adaptor

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



+(0.10kg)

3.3.1.7 QM7310 Long Wire Antenna Kit

Suitable for use with TM-90 Manual Tuner and TA-99 Automatic Tuner as a rapid-use antenna system.

Frequency coverage: when used with TM-90, Manual Tuner: 2.5-10 MHz
 when used with TA-99, Automatic Tuner: 2-20MHz
 when used with TA-99 and Frequency Hopping: 2-20MHz

Includes:-

- Long wire antenna (7m)
- Counterpoise (5m)
- Long wire antenna adaptor (fits TM-90 and TA-99 tuners)
- Throw rope.

As supplied with the HF-90M Manpack.

+(0.45kg)

Spares for Long Wire Antenna Kit

3.3.1.8 QM7311 Long Wire Antenna Only

Made from easy-to-use plastic coated wire. Incorporates plastic insulator at one end and 'banana' plug at other end (to fit into adaptor). Overall length is 7m. Antenna may be stretched out its full length to cover low freq range or folded in half to cover high freq range.

+(0.15kg)

3.3.1.9 QM7312 Counterpoise

Supplied with 'banana' plug at one end (to fit into connector mounted in carry case). Overall length is 5m.

+(0.10kg)

3.3.1.10 QM7313 Long Wire Antenna Adaptor

Screws into antenna socket on TM-90 Manual Tuner to allow use with long wire antenna. Will also accommodate a regular piece of wire cut to length, which is bare ended.

+(0.05kg)

3.3.2 Vehicle Antenna Systems

3.3.2.1 QM7113 ML-90 Auto-tuning Antenna System (Rack and Tuner)

Roof Rack fully-automatic antenna tuner, complete with rack mounting bracket, cables and ML-90 Tuner. Allows efficient operation between 3.5-15MHz.

*Not compatible with HF-90 Frequency Hopping Option/Upgrades in Frequency.
Only compatible with Q-MAC transceivers.*



+(105.00kg)

3.3.2.2 QM7112M TA-90M Auto-tune Antenna System

Compact fully-automatic antenna tuner in robust metal housing, complete with heavy-duty mounting bracket, pair 45 mm & 50 mm C-clamps, cables and continuously loaded fibreglass whip antenna (1/2" BSW base) with fittings. Allows efficient operation between 2-20 MHz. As supplied with the HF-90M Vehicle Package (MX9015).

*Compatible with HF-90M Frequency Hopping Option/Upgrades
in Frequency Range approx. 4 to 20 MHz.*



+(5.50kg)

Spares & Accessories to suit TA-90M Auto-tune Antenna System

3.3.2.3 QM5053 High Voltage Antenna Feed Cable

Translucent high voltage cable complete with lugs and convoluted split tubing. As supplied with the TA-90 Mounting Kit.

+(0.05kg)

3.3.2.4 QM6071 TA-90 Mounting Kit

Kit includes all items as supplied with TA-90 Auto-tune Antenna System minus the TA-90 Tuner and Continuously Loaded Whip Antenna.

+(2.45kg)

3.3.2.5 QM7121M TA-90M Tuner – Military Grade (12 Volt Version)

Supplied complete with mounting bracket assembly. As supplied with the TA-90M Auto-tune Antenna System.

+(2.40kg)

*Compatible with HF-90M Frequency Hopping Option/Upgrades
in Frequency Range approx. 4 to 20 MHz.*

3.3.2.6 QM7601 TA-90 Upgrade 12 Volt to 24 Volt Version

TA-90M Upgrade 12 Volt to 24 Volt Version.

+(0.00kg)

3.3.2.7 QM7131 Continuously Loaded Whip Antenna

Rugged fibreglass construction with 1/2" BSW base. As supplied with the TA-90M Auto-tune Antenna System.

+(0.65kg)

3.3.2.8 QM7136 Antenna Base Assembly

High voltage insulator base (150 mm). As supplied with the TA-90M Mounting Kit.

+(0.65kg)

3.3.2.9 QM7137 Pair 60mm C-Clamps

To fix TA-90M Mounting Bracket to larger bull-bars.

+(0.30kg)

3.3.2.10 QM7801 Heavy Duty Antenna Base and Spring

Suits manual-tap whip antennas - stainless steel construction.

+(1.50kg)

3.3.2.11 QM7810 Antenna Spring

Spring only, as supplied with the TA-90M Mounting Kit.

+(1.35kg)

3.3.3 Base Station Antenna Systems

3.3.3.1 QM7001 Fixed Broadband Dipole Antenna – Single Wire

Single wire centre-fed broadband dipole, 2-30 MHz, 120 Watt PEP rating, stainless steel construction complete with 30 metres RG-58 coaxial cable with connectors. Simple installation.

Not supplied with installation accessories.



(3.00kg)

3.3.3.2 QM7002 Fixed Broadband Dipole Antenna – Multi Wire

3-wire centre-fed broadband dipole, 2-30 MHz, 100 Watt rating, stainless steel construction with fibreglass spreaders complete with 30 metres RG-58 coaxial cable with connectors. Includes parts and instructions to mount in horizontal or inverted V configurations. Improved efficiency. As supplied with the HF-90M Base Station Package.

Not supplied with installation accessories.



(9.00kg)

3.3.3.3 QM7022 Mast Kit for Broadband Dipole Antenna

Mast kit to suit portable use of single wire broadband dipole antenna. Comes with canvas bag.

(13.00kg)

Not supplied with installation accessories.

3.3.3.4 QM7021 Halyard Kit

Includes:-

- 2 x 30m lengths of UV-stable rope (6mm)
- 2 x stainless steel pulleys
- 2 x stainless steel D shackles

Ideal for installing the QM7001 and QM7002 Fixed Broadband Dipole Antennas.

(0.60kg)

3.4 POWER SUPPLIES, CHARGERS & ACCESSORIES

3.4.1 QM8101 Military Grade Battery (7 Ah)

Suits HF-90M Monoblock. Sealed Lead Acid Battery (SLA) in military grade casing with military connector.



(Includes 7Ah SLA Battery)

(3.50kg)

3.4.2 QM8101b Military Grade Battery Enclosure Only (Suit 7 Ah SLA Battery)

Military grade battery enclosure with military connector, for a 7 Ah SLA battery to suit HF-90M Monoblock.



(Enclosure only – no battery included)

(1.00kg)

3.4.3 QM8011 Rechargeable Battery (7 Ah)

12V, 7 Ah, sealed lead acid (SLA) gel battery (non-hazardous for freight purposes). As used with QM8101b battery enclosure (above) and most Manpack/Portable Packages.



(2.55kg)

3.4.4 QM8102 Military Grade NiCad Battery (3.5 Ah)

Suits HF-90M Monoblock. Nickel Cadmium (NiCad) in military grade casing with military connector.



(Includes Custom NiCad Battery Pack)

(2.50kg)

3.4.5 QM8102b Military Grade Battery Enclosure Only (Suit 3.5 Ah NiCad Battery)



(Enclosure Only - No Battery Pack)

Military grade battery enclosure with military connector, for a 3.5 Ah NiCad battery to suit HF-90M Monoblock.

(1.00kg)

3.4.6 QM8021M Fold-up Solar Panel Charger



Suits Q-MAC Rechargeable SLA Batteries - 10.8 Watt rated power, complete with extension cable and mating connector to suit military grade packages. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)

3.4.7 QM8022M AC Mains Charger (2A)



Compact desk-top unit to suit Q-MAC Rechargeable SLA Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug.

(1.00kg)

3.4.8 QM8026M AC Mains Charger for NiCad



AC mains charger for NiCad battery, (fast charger) 120/240V AC input, complete with cable, military connector and specified AC mains plug.

(1.00kg)

3.4.9 QM8024M DC Step-Up Battery Charging Device

Suits Q-MAC Rechargeable SLA Batteries - Steps up battery voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with mating connector for HF-90M Manpack.



(0.30kg)

3.4.10 QM8028M Hand Crank Generator (complete with mounts)

Suits Q-MAC Rechargeable SLA Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets Mil Std 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame) and tree-mount with strap.



(2.70kg)

3.4.11 QM8051M Battery Condition Monitor

Battery condition monitor to suit military grade radio connector. Monitors battery charge level via a series of LED indicators.



(0.10kg)

3.5 CARRY PACKS & CASES

3.5.1 QM6003 Canvas Backpack on Frame – military grade

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

Standard colours are Olive Drab or Blue.

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



(2.80kg)

3.5.2 QM6006 All Welded Backpack Frame – military grade

Ruggedised all steel backpack frame and canvas webbing for Monoblock Manpack

Standard colour is Black frame with Olive Drab canvas pockets.

Dimensions 490H x 400W x 250D mm (including frame and waist support).



(9.00kg)

3.6 OTHER PARTS & ACCESSORIES

3.6.1 Installation Accessories

3.6.1.1 QM6063 Mounting Cradle for HF-90M on TA-90M

Suited to vehicle and base station applications.

(1.00kg)

3.6.1.2 Microphones/Handsets

Telephone Handsets

3.6.1.3 QM4014 Military Handset DTMF MIL-STD



Industry standard, military grade telephone handset with Mil-spec Connector and DTMF keys for use with Advanced Software features such as Selcall, Beacon Call, Frequency Hopping and Front Panel Programming.

For use with Mil-Spec Model HF-90M

(0.45kg)

3.6.1.4 QM4016 Military Handset No DTMF MIL-STD



Industry standard, military grade telephone handset with Mil-spec Connector.
For use with Mil-Spec Model HF-90M

(0.45kg)

3.6.1.5 Audio Accessories

Headphones

3.6.1.6 QM4042M Headphones (military-grade)

Ruggedised headsets incorporating military connector. Suits CW option & telegraph key.

(0.45kg)

3.6.1.7 QM4051M CW Option & Telegraph Key

External CW option housed in a compact die-cast metal box with telegraph key mounted on top. Incorporates a connection for headphones. Supplied with 1.5m lead.

(1.00kg)

3.6.1.8 QM4023M External Mount Speaker (complete with audio mute)

Incorporates audio mute facility for fixed channel operation.

(2.00kg)

3.6.1.9 Cables

DC Power Cables

3.6.1.10 QM5001M HF-90 → Misc Power Source (4.5m)

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-90M Vehicle Package and HF-90M Base Station Package.

(2.00kg)

3.6.1.11 QM5002M HF-90 → Portable Battery (0.6m)

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

(0.10kg)

Coaxial Cables (RG-58)

3.6.1.12 QM5021 HF-90 → Vehicle Antenna (4.5m)

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

(0.25kg)

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

BNC connector fitted at one end, PL259 plug fitted to the other end. As supplied with base station antennas (Section 3.3).

(1.50kg)

3.6.1.14 QM5064 TA-99 to HF-90M

Coaxial cable, 110mm, to connect TA-99 to HF-90M Suited to Manpack Package

(0.01kg)

3.6.1.15 QM5068 TA-90M to HF-90M

Coaxial cable, 320mm, to connect TA-90M to HF-90M. Suited to integrated Vehicle Package.

(0.01kg)

3.6.1.16 QM5051M Programming Cable complete with Adaptor

HF-90M → computer serial port (2m). Supplied with DB25 connector and also with adaptor for DB9 connector.

(0.3kg)

For use with HF-90 programming package (Part No. QM1002M).

3.6.2 Miscellaneous Items

3.6.2.1 QM3001 PL259 to BNC Adaptor



(0.05kg)

3.6.2.2 QM4061M Data Interface Unit

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

(1.00kg)

3.6.2.3 QM9501M Fan Option (modular)

Fits to rear of HF-90M. Suited to continuous-duty base station applications.

(0.07kg)

3.7 DEALER SUPPORT PRODUCTS

3.7.1 Programming Software

3.7.1.1 QM1002M HF-90 Programming Package



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

Standard Model HF-90M:-

- Channel/frequency programming
- USB/LSB mode toggle enable/disable
- Power output setting
- Auto-tune enable/disable

Advanced Model HF-90M:-

- Field programming enable
- Selcall ID number
- Selcall and Scanning on specific channels/frequencies

Includes programming cable (Part No. QM5051M).

Includes Quick Reference Guide - HF-90 Programming Package.

Package is provided on 3½" floppy disk as standard.

(1.00kg)

3.7.2 Product Documentation

3.7.2.1 QM1021 HF-90 Technical Manual



Authorised Dealers receive one HF-90 Technical Manual at no charge, with their first purchase of the HF-90 Transceiver. Extra copies must be purchased.

(0.35kg)

3.7.3 Replacement Modules

3.7.3.1 96003 HF-90M RXMP Module



Receiver & Microprocessor Module.

(0.15kg)

3.7.3.2 96005 HF-90M Front Panel Module



HF-90M Front Panel, including front panel PCB.

(0.20kg)

3.7.3.3 96004 HF-90M PASW Module



Power Amplifier & Switch Mode Power Supply Module complete with heatsink assembly.

(0.20kg)

4 COMMERCIAL PRODUCTS



4.1 HF-90 PACKAGES

Unless indicated otherwise all packages are based on the Standard Model HF-90

To upgrade to an Advanced Model HF-90 with any of these packages, add the Advanced Option (Part No. QM9051/2/3/4/7/8).

To upgrade to a Frequency Hopping Model HF-90 with any Advanced Model, add the Frequency Hopping Option (Part No. QM9061).

4.1.1 QM9013 HF-90 Manpack

COMMUNICATE WHILE ON FOOT

The Q-MAC HF-90 Manpack is a portable, instant-deployment HF SSB Radio Communication System, incorporating the Q-MAC HF-90 Transceiver. This package is designed for applications where the operator requires medium to long range communications whilst on foot. It is ideal where mobility is of paramount importance, given that it is compact, lightweight and comfortable to carry for long periods. It may be used whilst carried on the operator's back, or when placed on the ground.

Applications:

The Q-MAC HF-90 Manpack is ideal for a variety of applications including international aid projects, military/paramilitary applications, search and rescue, mineral exploration, forestry management, conservation and wildlife projects.



(Pictured with Advanced Option and Backpack Upgrade)

Includes:-

- HF-90 transceiver complete with speaker microphone
- TM-90 Manual Tuner complete 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 battery (7 Ah) complete with power cable and battery condition monitor
- Canvas backpack complete with support stakes

(7.50kg)

4.1.2 QM9013b HF-90 Manpack (minus battery)

Includes:-

- All items mentioned above, except for the battery.



(4.95kg)

4.1.2.1 Available Advanced Options



QM9052 Advanced Option #2

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF speaker microphone (QM4003).

Advanced Software Features include:

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

(+0.10kg)



QM9054 Advanced Option #4

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) - suited to all packages. Includes Advanced Software Features (as per Option #2)

(+0.20kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

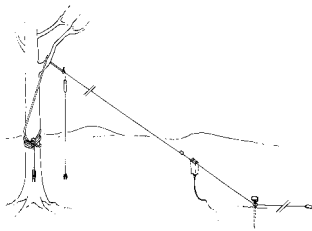
Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90 with Advanced Option #2, or Advanced Option #4, or Advanced Option #7 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

4.1.2.2 Suggested Optional Items (not included with package):



QM7005 Portable broadband antenna, standard version

End-fed broadband antenna, 2-30MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage.

(1.25kg)



QM7309 Tape Whip Antenna

Flexible tape whip antenna (1m) suited to use in jungle/forestry areas, 4-12.9 MHz operation complete with gooseneck.

(0.20kg)



QM8024 DC Step-Up Battery Charging Device

Suits Q-MAC SLA Rechargeable Batteries - Steps up vehicle voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with mating connector.

(0.30kg)



QM8022 AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug to suit local AC socket.

(0.70kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and mating connectors. Comprises five panels, which fold into a compact canvas pouch. Available in black and olive drab.

(1.30kg)



QM8028 Hand Crank Generator (complete with mounts)

Suits Q-MAC SLA Rechargeable Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets Mil Std 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame) and tree-mount with strap.

(2.70kg)



QM8011 Rechargeable Battery (7 Ah)

12V, 7 Ah, sealed lead acid gel battery (non-hazardous for freight purposes). As supplied with most HF-90 Manpack/Portable Packages.

(2.55kg)

QM9071 Backpack Upgrade

Replaces standard backpack with military grade framed backpack

(1.30kg)

4.1.3 QM9012 HF-90 Portable Package

AN HF RADIO SYSTEM IN A COMPACT PORTABLE PACKAGE

The Q-MAC HF-90 Portable Package is designed for applications where the operator requires reliable long distance communications in a compact portable 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 Portable Package is ideal for a variety of applications including international aid projects, mineral exploration, search and rescue, conservations and wildlife, forestry management and remote area 4WD use.



(8.10kg)

Includes:-

- HF-90 transceiver complete with microphone.
- Portable broadband antenna (std version) complete with deployment accessories.
- Rechargeable battery (7 Ah) complete with power cable and battery condition monitor.
- Hard carry case complete with built-in speaker with audio mute facility.

4.1.4 QM9012b HF-90 Portable Package (minus battery)



(5.55kg)

Includes:-

- All items mentioned above, except for the battery.

4.1.4.1 Available Advanced Options



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.



(+0.10kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.



(+0.20kg)

4.1.4.2 Suggested Optional Items (not included with package):



QM8024 DC Step-Up Battery Charging Device

Suits Q-MAC SLA Rechargeable Batteries - Steps up battery voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with appropriate connector.

(0.30kg)



QM8022 AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug.

(0.70kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)

4.1.5 QM9023 HF-90 MiniPack

AN HF RADIO SYSTEM IN A SMALL PORTABLE PACKAGE

The Q-MAC HF-90 MiniPack is the world's smallest high-power (50W) portable HF SSB radio communications system. The entire package, comprising transceiver, 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 any motorcycle, on a boat, or even by pack animal.

Applications:

The Q-MAC HF-90 Portable Package is ideal for a variety of applications including international aid projects, mineral exploration, search and rescue, conservations and wildlife, forestry management and remote area 4WD use. Its small size also makes it useful for covert operations.



Includes:-

- HF-90 transceiver complete with speaker microphone.
- MiniPack broadband antenna.
- MiniPack rechargeable battery (4 Ah) complete with power cable.
- Pelican® 1200 case.

(3.65kg)

4.1.5.1 Available Advanced Options



QM9052 Advanced Option #2

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF speaker microphone (QM4003) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9057 Advanced Option #7

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

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Option #2, or Advanced Option #7 (above).

HF-90 Frequency Hopping User Guide included.

(+0.05kg)

4.1.5.2 Suggested Optional Items (not included with package):



QM8025 MiniPack AC Mains Charger

Compact charger to suit HF-90 MiniPack - 100-250 Volt AC input, 12 Volt DC nominal, 900mA limited current. Supplied with specified AC mains plug (2-pin).

(0.25kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)



QM7020 MiniPack broadband antenna

Includes end-fed broadband antenna, 2-30MHz, 100Watt rating, with miniature counterpoise and earth stake.

(0.20kg)

4.1.6 QM9025 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.

Applications:

The Q-MAC ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed) is ideal for border patrol, environmental, search and rescue, aid and relief, and mining vehicles.

Includes:-

- HF-90 transceiver complete with microphone and DC power cable
- Transceiver installation kit complete with mounting cradle & external mount speaker with audio mute facility
- ML-90 Auto-tune Antenna system with cables and connectors
- ML-90 installation kit including roof-rack mounting hardware

Not suitable for use with HF-90 Frequency Hopping Option/Upgrades – insufficient bandwidth. Specify 12V or 24V version at time of order.

(110.00kg)

4.1.6.1 Available Advanced Options



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Option #2, or Advanced Option #7 (above).

HF-90 Frequency Hopping User Guide included.

(+0.05kg)

4.1.7 QM9026 ML-90 NVIS Roof Rack Antenna Vehicle Package (removable)



IMPROVED PERFORMANCE PORTABLE TRANSCEIVER FROM A VEHICLE INSTALLATION

The Q-MAC ML-90 Roof Rack Antenna Vehicle Package (removable 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 removable portable transceiver package provides the additional benefit of use away from the vehicle via an end-fed broadband antenna included in a self-contained package with battery.

Applications:

The Q-MAC ML-90 NVIS Roof Rack Antenna Vehicle Package (removable) is ideal for border patrol, environmental, search and rescue, aid and relief, and mining vehicles.

Includes:-

- ML-90 Auto-tune Antenna system.
- HF-90 Portable Package
- DC Step-up Battery Charger
- ML-90 cables and connectors
- ML-90 installation kit including roof-rack mounting hardware

Not suitable for use with HF-90 Frequency Hopping Option/Upgrades – insufficient bandwidth. Specify 12V or 24V version at time of order.

(107.00kg)

4.1.7.1 Available Advanced Options



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Option #2, or Advanced Option #7 (above).

HF-90 Frequency Hopping User Guide included.

(+0.05kg)

4.1.7.2 Suggested Optional Items (not included with package):



QM8024 DC Step-Up Battery Charging Device

Suits Q-MAC SLA Rechargeable Batteries - Steps up battery voltage to 14.5 Volt for charging via vehicle cigarette lighter socket, complete with appropriate connector.

(0.30kg)



QM8022 AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug.

(0.70kg)



QM8021 Fold-up Solar Panel Charger

Suits Q-MAC Rechargeable SLA Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)



QM8011 Rechargeable Battery (7 Ah)

12V, 7 Ah, sealed lead acid gel battery (non-hazardous for freight purposes). As supplied with most HF-90 Manpack/Portable Packages.

(2.55kg)

4.1.8 QM9015 HF-90 Vehicle Package (whip antenna)

CONVENTIONAL HF VEHICLE INSTALLATION

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

Applications:

The Q-MAC HF-90 Vehicle Package with whip antenna is ideal for border patrol, environmental, search and rescue, aid and relief, and mining vehicles.

Includes:-

- HF-90 transceiver complete with microphone and DC power cable
- Vehicle installation kit complete with mounting cradle & external mount speaker with audio mute facility
- TA-90 auto-tune antenna system
- TA-90 mounting hardware

Compatible with HF-90 Frequency Hopping Option/Upgrades in Frequency Range approx. 4 to 20 MHz. Specify 12V or 24V version at time of order.



(9.55kg)

4.1.8.1 Available Advanced Options



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Option #2, or Advanced Option #7 (above).

HF-90 Frequency Hopping User Guide included.

(+0.05kg)

4.1.9 QM9024 HF-90 High Powered 500 Watt Base Station Package (complete)

A FIXED HF-90 TRANSCEIVER WITH THE 500W OUTPUT POWER

The Q-MAC HF-90 500W Base Station Package is designed for critically important fixed base station use. It includes an HF-90 transceiver coupled with solid state, 500 Watt amplifier and power supply, all contained in a small 19" equipment rack with casters.

Applications:

The Q-MAC HF-90 500W Base Station Package is ideal for national or regional headquarters, embassies, military and border patrol applications. With the HF-90 Frequency Hopping Option, secure HF networks can be implemented.

Includes:-

- HF-90 transceiver with advanced software
- 19" 10RU Equipment Rack & Hardware
- External panel mounted speaker with audio mute facility
- AC mains power converter unit 90A/ 12V DC
- 500 watt amplifier with fan kit
- Desktop pedestal DTMF microphone
- 3 wire centre-fed broadband dipole antenna (QM7002)
- 50m RG213 coax cable



(65.00kg)

4.1.9.1 Suggested Optional Items (not included with package):



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

HF-90 Frequency Hopping User Guide included.

(+0.05kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)

4.1.10 QM9020 Integrated HF-90 Base Station

AN INTEGRATED HF-90 TRANSCEIVER BASE STATION

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

Applications:

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



Includes:-

- HF-90 transceiver
- F1st microphone
- Panel mounted speaker with audio mute facility
- AC mains power supply unit complete with battery backup facility.
- Rechargeable battery (7 Ah)
- Fixed broadband dipole antenna – multi wire (QM7002)

(42.00kg)

4.1.10.1 Suggested Optional Items (not included with package):



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9058 Advanced Option #8

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 (QM4006) with commercial grade connector.

(+0.20kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90 with Advanced Option #6 (below).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)

4.1.11 QM9018 HF-90 Base Station Kit Package (complete)

A FIXED HF-90 TRANSCEIVER BASE STATION IN KIT FORM

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

Applications:

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



Includes:-

- HF-90 transceiver complete with microphone and DC power cable
- Mounting cradle
- External panel mounted speaker with audio mute facility
- AC mains power supply unit complete with battery backup facility.
- Rechargeable battery (7 Ah)
- Fixed broadband dipole antenna – multi wire (QM7002)

(37.00kg)

4.1.12 QM9018b HF-90 Base Station Package (minus battery)



Includes:-

- All items mentioned above, except for the battery.

(35.00kg)

4.1.12.1 Suggested Optional Items (not included with package):



QM9051 Advanced Option #1

Software and hardware upgrade to convert Standard HF-90 to an Advanced HF-90. Includes replacing standard speaker microphone with DTMF microphone (QM4002) (does not include speaker) and allowing front end programming for reprogramming channel information in the field, without the use of a computer.

(+0.10kg)



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

*Requires HF-90 with Advanced Option #1 (above).
HF-90 Frequency Hopping User Guide included.*

(+0.05kg)



QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial grade connector (QM4015) - suited to commercial HF-90 packages where rugged and/or very low temperature operation is required.

(+0.20kg)

QM7021 Halyard Kit

Includes:-

- 2 x 30m lengths of UV-stable rope (6mm)
- 2 x stainless steel pulleys
- 2 x stainless steel D shackles

Ideal for installing the QM7001 and QM7002 Fixed Broadband Dipole Antennas.

(0.60kg)

4.1.13 QM9082 Email and Chat Data Package

A DATA PACKAGE FOR LINKING TO OTHER DATA STATIONS

The combination of a Pactor Protocol modem with Wavemail software and the HF90 package provides long range email and electronic chat capability over HF radio spectrum. The Wavemail software provides multi-user and multi-site routing.

Compatible with:
Base Station
Vehicle Manpack
High Powered Base Station



Includes:-

- Swiss PTC Modem
- Wavemail software
- HF-90 interface unit and cables
- Fan

(4.00kg)

4.1.14 QM9022 HF-90 DISASTER RESPONSE Package

A MULTIPLE APPLICATION SOLUTION

The Q-MAC HF-90 Disaster Response Package 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 / charger systems, carry packs / cases, and mounting accessories. The operator can set up either of the following system: Manpack, Portable, Vehicle, and Base Station.

Applications:

The Q-MAC HF-90 Disaster Response Package is ideal for humanitarian, emergency service and peace keeping organisations.



Includes:-

- HF-90 transceiver complete with advanced option (incl. DTMF microphone)
- TM-90 Manual Tuner complete 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 complete with mounting kit
- Vehicle whip antenna (split configuration)
- 2 x Rechargeable battery (7 Ah)
- Battery condition monitor
- 2 x DC power cable (manpack/portable use)
- 2 x DC power cable (vehicle/base 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 complete with support stakes
- Vehicle installation kit
- DTMF speaker microphone (spare)
- Q-MAC aluminium road case complete with combination lock

(47.00kg)

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

4.1.14.1 Suggested Optional Items (not included with package):



QM9061 HF-90 Frequency Hopping Option (factory fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

HF-90 Frequency Hopping User Guide included.

(+0.05kg)



QM9001 HF-90 Transceiver

Spare transceiver to make up additional packages.

Features include:-

- 2 - 30 MHz frequency coverage
- 50 Watt PEP power output
- 12V - 24V operating voltage
- 255 programmable channels
- USB/LSB toggle switch
- Tune function
- Clarifier
- Rx signal strength indicator
- Erase facility
- 6 digit LED display
- Speaker microphone
- DC power cable (Part No. QM5001)

HF-90 Operation & Installation Guide included.

(+2.05kg)



QM9052 Advanced Option #2

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) - suited to QM9023, QM9013 packages.

Advanced features include:-

- 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

(+0.10kg)

4.2 HF-90 TRANSCEIVER & OPTIONS

4.2.1 QM9001 HF-90 Transceiver – Standard Model

Suited to vehicle/base station applications.

Standard features include:-

- 2 - 30 MHz frequency coverage
- 50 Watt PEP power output
- 12V - 24V operating voltage
- 255 programmable channels
- USB/LSB toggle switch
- Tune function
- Clarifier
- Rx signal strength indicator
- Erase facility
- 6 digit LED display
- Speaker microphone
- DC power cable (Part No. QM5001)

HF-90 Operation & Installation Guide included.



(2.05kg)

4.2.2 QM9001b HF-90 Transceiver – Standard Model

Suited to portable and manpack applications.

Standard features include:-

- 2 - 30 MHz frequency coverage
- 50 Watt PEP power output
- 12V - 24V operating voltage
- 255 programmable channels
- USB/LSB toggle switch
- Tune function
- Clarifier
- Rx signal strength indicator
- Erase facility
- 6 digit LED display
- Speaker microphone
- DC power cable (Part No. QM5002)

HF-90 Operation & Installation Guide included.



(1.55kg)

4.2.3 QM9051 Advanced Option #1

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF (QM4002) microphone (does not include speaker*) - suited to QM9012, QM9015, QM9018, QM9020, QM9025, QM9026 and QM9024 packages.

Advanced features include:-

- 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

Advanced Option #1 requires external mount speaker (Part No. QM4021).



+(0.10kg)

4.2.4 QM9052 Advanced Option #2

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) - suited to QM9023, QM9013 packages.

Advanced features include:-

- 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



+(0.10kg)

4.2.5 QM9053 Advanced Option #3

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. Suited to all QM90xx packages.

Advanced features include:-

- 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

Note that the Frequency Hopping Option (Part No. QM9061/2/3) far exceeds the Scrambler with respect to voice security and voice quality.



+(0.10kg)

4.2.6 QM9054 Advanced Option #4

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) – suited to all QM90xx packages.

Advanced features include:-

- 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



+(0.20kg)

4.2.7 QM9057 Advanced Option #7

Software and hardware option to convert a Standard Model HF-90 to an Advanced Model HF-90. Replaces standard microphone with a DTMF Mil-Std telephone handset with commercial connector (QM4015) - suited to commercial QM90xx HF-90 packages.

Advanced features include:-

- 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



+(0.20kg)

4.2.8 QM9058 Advanced Option #8

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) - suited to commercial QM90xx HF-90 packages.

Advanced features include:-

- 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



+(0.20kg)

4.2.9 HF-90 Package / Options Matrix

USE THIS TABLE TO CLARIFY WHICH ADVANCED OPTIONS CAN BE ADDED TO WHICH HF-90 PACKAGES.

<u>Package Part Number and Description</u>	<u>Advanced Option #</u>
QM9012 Portable Package	1, 2, 3, 4, 7
QM9013 Manpack Package	2, 3, 4, 7
QM9015 Vehicle Package (Whip Antenna)	1, 2, 3, 4, 7
QM9018 Base Station Package	1, 2, 3, 4, 7, 8
QM9020 Integrated Base Station	1, 2, 3, 4, 7, 8
QM9022 Disaster Response Package	(dependent on configuration)
QM9023 Minipack	2, 3, 7
QM9024 High Powered 500 Watt Base Station Package	1, 2, 3, 4, 7, 8
QM9025 ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed)	1, 2, 3, 4, 7
QM9026 ML-90 NVIS Roof Rack Antenna Vehicle Package (removable)	1, 2, 3, 4, 7

Notes:

1. Although Advanced Options 2, 4 and 7 may be used in all packages noted above, these are not normally used with those packages that include external speakers.
2. Although Advanced Option 3, scrambler may be used with any of the packages, the frequency hopping options listed below provide significantly better performance and protection against interception and jamming.

4.2.10 QM9061 HF-90 Frequency Hopping Option (Factory Fitted)

Enables complete protection against intercept and jamming, to a military standard.

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

+(0.05kg)

Requires HF-90 with Advanced Software and Handset Options. HF-90 Frequency Hopping User Guide included.

Frequency Hopping option is subject to Australian Defence Export Controls. An End-User Declaration is required for supply of this option.

4.2.11 QM9062 HF-90 Frequency Hopping Option (Suits Late Model HF-90)

Enables complete protection against intercept and jamming, to a military standard. Includes firmware and extraction tool required to upgrade an HF-90 with Serial Number ≥ 3500 .

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Software and Handset Options. HF-90 Frequency Hopping User Guide included.

+(0.15kg)

Frequency Hopping option is subject to Australian Defence Export Controls. An End-User Declaration is required for supply of this option.

4.2.12 QM9063 HF-90 Frequency Hopping Option (Suits Early Model HF-90)

Enables complete protection against intercept and jamming, to a military standard. Includes hardware and firmware required to upgrade an HF-90 with a Serial No. < 3500 .

Features include:-

- 5 hops per second
- 256 kHz bandwidth (1 kHz spacing)
- Synchronization time of 25 seconds (average)
- Pseudo-random hopping sequence

Requires HF-90 with Advanced Software and Handset Options. HF-90 Frequency Hopping User Guide included.

+(0.35kg)

Frequency Hopping option is subject to Australian Defence Export Controls. An End-User Declaration is required for supply of this option.

4.3 ANTENNA SYSTEMS

4.3.1 Portable/Manpack Antenna Systems

4.3.1.1 QM2001 TM-90 Manual Tuner

Single-control tuner, incorporating LED tuning indicators. Suits collapsible whip, tape and long wire antennas. Supplied with coaxial and earth leads. As supplied with the HF-90 Manpack Package.



+(0.90kg)

4.3.1.2 QM2101 TA-99 Military Grade Automatic Tuner

Incorporates LED tuning indicators. Suits collapsible whip, tape & long wire antennas. Supplied with coaxial and earth leads.



+(0.90kg)

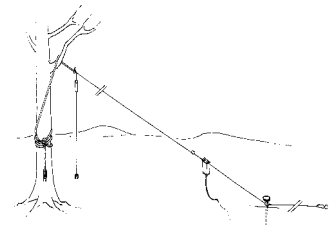
4.3.1.3 QM2102 TM-90 to TA-99 Product Upgrade for new product orders only.

Replaces TM-90 Manual Tuner to a TA-99 Auto Tuner in QM9013 Manpack.

+(0.0kg)

4.3.1.4 QM7005 Portable Broadband Antenna (standard version).

End-fed broadband antenna, 2-30 MHz, 100 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. Antenna is supplied on a shuttle for easy deployment and storage. As supplied with the HF-90 Portable Package.



+(1.25kg)

4.3.1.5 QM7020 Minipack Broadband Antenna - Spares Kit



Includes:-

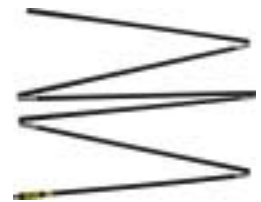
- End-fed broadband antenna, 2-30 MHz, 100 Watt rating, made from light-gauge insulated wire, supplied on slim-line reel.
- Miniature counterpoise complete with earth clip.
- Earth stake.

As supplied with the HF-90 MiniPack.

Note that this 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. It is designed as a spares kit only.

+(0.20kg)

4.3.1.6 QM7301 Collapsible Whip Antenna (6-section)



High efficiency collapsible six section whip antenna (3m).
As supplied with the HF-90 Manpack.

Frequency coverage: when used with TM-90, Manual Tuner: 3.6-10MHz
 when used with TA-99, Automatic Tuner: 2-26MHz
 when used with TA-99 and Frequency Hopping: 4-26MHz

Collapsed length: 500mm

+(0.30kg)

4.3.1.7 QM7302 Collapsible Whip Antenna (2-section)



Collapsible two section whip antenna (1m), complete with flexible goose neck.

Frequency coverage: when used with TM-90, Manual Tuner: 4-12.9 MHz
 when used with TA-99, Automatic Tuner: 3.5-26MHz
 when used with TA-99 and Frequency Hopping: 3.5-26MHz

Collapsed length: 495mm

+(0.20kg)

4.3.1.8 QM7309 Tape Whip Antenna



Flexible tape whip antenna (1m) complete with flexible goose neck.
Suited to use in jungle/forestry areas.

Frequency coverage: when used with TM-90, Manual Tuner: 4-12.9 MHz
 when used with TA-99, Automatic Tuner: 3.5-26MHz
 when used with TA-99 and Frequency Hopping: 3.5-26MHz

+(0.20kg)

4.3.1.9 QM7351 Antenna Extender Coil Section

Extends 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 whip antenna (6 section).

Length: 500mm

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

Not suitable for use with HF-90 Frequency Hopping Option/Upgrades – insufficient bandwidth.



+(0.20kg)

4.3.1.10 QM7821 Antenna Angle Adaptor

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



+(0.10kg)

4.3.1.11 QM7310 Long Wire Antenna Kit

Suitable for use with TM-90 Manual Tuner and TA-99 Automatic Tuner as a rapid-use antenna system.

Frequency coverage: when used with TM-90, Manual Tuner: 2.5-10 MHz
when used with TA-99, Automatic Tuner: 2-20MHz
when used with TA-99 and Frequency Hopping: 2-20MHz

Includes:-

- Long wire antenna (7m)
- Counterpoise (5m)
- Long wire antenna adaptor (fits TM-90 and TA-99 tuners)
- Throw rope.

As supplied with the HF-90 Manpack and HF-90 Rapid-Use Portable Package.

+(0.45kg)

Spares for Long Wire Antenna Kit

4.3.1.12 QM7311 Long Wire Antenna Only

Made from easy-to-use plastic coated wire. Incorporates plastic insulator at one end and 'banana' plug at other end (to fit into adaptor). Overall length is 7m. Antenna may be stretched out its full length to cover low freq range or folded in half to cover high freq range.

+(0.15kg)

4.3.1.13 QM7312 Counterpoise

Supplied with 'banana' plug at one end (to fit into connector mounted in carry case). Overall length is 5m.

+(0.10kg)

4.3.1.14 QM7313 Long Wire Antenna Adaptor

Screws into antenna socket on TM-90 Manual Tuner to allow use with long wire antenna. Will also accommodate a regular piece of wire cut to length, which is bare ended.

+(0.05kg)

4.3.2 Vehicle Antenna Systems

4.3.2.1 QM7113 ML-90 Auto-tuning Antenna System (Rack and Tuner)

Roof Rack fully-automatic antenna tuner, complete with rack mounting bracket, cables and ML-90 Tuner. Allows efficient operation between 3.5-15MHz.



+(105.00kg)

Not compatible with HF-90 Frequency Hopping Option/Upgrades in Frequency. Specify 12V or 24V version at time of order.

4.3.2.2 QM7112 TA-90 Auto-tune Antenna System

Compact fully-automatic antenna tuner in robust metal housing, complete with heavy-duty mounting bracket, pair 45 mm & 50 mm C-clamps, cables and continuously loaded fibreglass whip antenna (1/2" BSW base) with fittings. Allows efficient operation between 2-20 MHz. As supplied with the HF-90 Vehicle Package.

+(5.50kg)

Compatible with HF-90 Frequency Hopping Option/Upgrades in Frequency Range approx. 4 to 20 MHz. Specify 12V or 24V version at time of order.

Spares & Accessories to suit TA-90 Auto-tune Antenna System

4.3.2.3 QM5053 High Voltage Antenna Feed Cable

Translucent high voltage cable complete with lugs and convoluted split tubing. As supplied with the TA-90 Mounting Kit.

+(0.05kg)

4.3.2.4 QM5043 TA-90 Power Cable

Supplied complete with lugs and plastic connectors for fitting to HF-90 Transceiver power cable (Part No. QM5001). As supplied with the TA-90 Mounting Kit.

+(0.25kg)

4.3.2.5 QM6071 TA-90 Mounting Kit

Kit includes all items as supplied with TA-90 Auto-tune Antenna System minus the TA-90 Tuner and Continuously Loaded Whip Antenna (above).

+(2.45kg)

4.3.2.6 QM7121 TA-90 Tuner – (12 Volt Version)

Supplied complete with mounting bracket assembly. As supplied with the TA-90 Auto-tune Antenna System.

+(2.40kg)

Partially compatible with HF-90 Frequency Hopping Option/Upgrades – from approx. 4 to 20 MHz.

4.3.2.7 QM7121a TA-90 Tuner (24 Volt Version)

Supplied complete with mounting bracket assembly. As supplied with the TA-90 Auto-tune Antenna System.

+(2.40kg)

Partially compatible with HF-90 Frequency Hopping Option/Upgrades – from approx. 4 to 20 MHz.

4.3.2.8 QM7601 TA-90 Upgrade 12 Volt to 24 Volt Version

TA-90 Upgrade 12 Volt to 24 Volt Version.

+(0.00kg)

4.3.2.9 QM7131 Continuously Loaded Whip Antenna

Rugged fibreglass construction with 1/2" BSW base. As supplied with the TA-90 Auto-tune Antenna System.

+(0.65kg)

4.3.2.10 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.

+(0.80kg)

4.3.2.11 QM7136 Antenna Base Assembly

High voltage insulator base (150 mm). As supplied with the TA-90 Mounting Kit.

+(0.65kg)

4.3.2.12 QM7137 Pair 60mm C-Clamps

To fix TA-90 Mounting Bracket to larger bull-bars.

+(0.30kg)

4.3.2.13 QM7801 Heavy Duty Antenna Base and Spring

Suits manual-tap whip antennas - stainless steel construction.

+(1.50kg)

4.3.2.14 QM7810 Antenna Spring

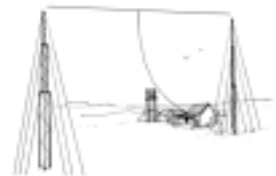
Spring only, as supplied with the TA-90 Mounting Kit.

+(1.35kg)

4.3.3 Base Station Antenna Systems

4.3.3.1 QM7001 Fixed Broadband Dipole Antenna – Single Wire

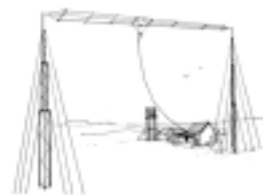
Single wire centre-fed broadband dipole, 2-30 MHz, 120 Watt PEP rating, stainless steel construction complete with 30 metres RG-58 coaxial cable with connectors. Simple installation.



(3.00kg)

Not supplied with installation accessories.

4.3.3.2 QM7002 Fixed Broadband Dipole Antenna – Multi Wire



3-wire centre-fed broadband dipole, 2-30 MHz, 100 Watt rating, stainless steel construction with fibreglass spreaders complete with 30 metres RG-58 coaxial cable with connectors. Includes parts and instructions to mount in horizontal or inverted V configurations. Improved efficiency. As supplied with the HF-90 Base Station Package.

(9.00kg)

Not supplied with installation accessories.

4.3.3.3 QM7022 Mast Kit for Broadband Dipole Antenna

Mast kit to suit portable use of single wire broadband dipole antenna. Comes with canvas bag.

(13.00kg)

Not supplied with installation accessories.

4.3.3.4 QM7021 Halyard Kit

Includes:-

- 2 x 30m lengths of UV-stable rope (6mm)
- 2 x stainless steel pulleys
- 2 x stainless steel D shackles

Ideal for installing the QM7001 and QM7002 Fixed Broadband Dipole Antennas.

(0.60kg)

4.4 POWER SUPPLIES, CHARGERS & ACCESSORIES

4.4.1 QM8004 MiniPack Rechargeable Battery (4 Ah)

12V, 4 Ah (2 x 2 Ah batteries in parallel), sealed lead acid gel battery (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.

(1.20kg)

4.4.2 QM8011 Rechargeable Battery (7 Ah)

12V, 7 Ah, sealed lead acid gel battery (non-hazardous for freight purposes). As supplied with most HF-90 Manpack/Portable Packages.

(2.55kg)

4.4.3 QM8021 Fold-up Solar Panel Charger

Suits Q-MAC SLA Rechargeable Batteries - 10.8 Watt rated power, complete with extension cable and appropriate connectors. Comprises five panels, which fold into a compact canvas pouch. Standard colour is black.

(1.30kg)

4.4.4 QM8022 AC Mains Charger (2A)

Compact desk-top unit to suit Q-MAC SLA Rechargeable Batteries – 115/230 Volt AC input, 12 Volt DC nominal, 2 Amp limited current, complete with charging status LED indicators and appropriate connector. Supplied with specified AC mains plug.

(0.70kg)

4.4.5 QM8024 DC Step-Up Battery Charging Device

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

(0.30kg)

4.4.6 QM8025 MiniPack AC Mains Charger (900mA)

Compact charger to suit HF-90 MiniPack - 100-250 Volt AC input, 12 Volt DC nominal, 900mA limited current. Supplied with specified AC mains plug (2-pin).



(0.25kg)

4.4.7 QM8028 Hand Crank Generator (complete with mounts)

Suits Q-MAC SLA Rechargeable Batteries – Output voltage between 13.8 – 16.2V, output current between 1.15 – 1.35A (assumes 60RPM and 12 Ohm resistive load). Lightweight, yet built from high impact material (meets Mil Std 810). Supplied together with monopod (includes carry pack suited to Q-MAC Canvas Backpack on Frame) and tree-mount with strap.



(2.70kg)

4.4.8 QM8031 AC Mains Power Supply Unit

115/230 Volt AC, 15 Amp desk-top 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 (Part No. QM5001)

(1.50kg)

4.4.9 QM8032 Battery Changerover Switch

Monitors the 13.8V DC output from a PSU. Automatically switches to battery in the event of 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.

(0.75kg)

4.4.10 QM8041 AC Mains Multi-Adaptor

Accommodates Australian, European, UK and US style plugs (2-ways). As supplied with the HF-90 Disaster Response Package.

(0.20kg)

4.5 CARRY PACKS & CASES

4.5.1 QM6001 Canvas Backpack – standard

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

(1.50kg)

*Standard colours are Olive Drab or Blue.
Dimensions 545H x 275W x 160D mm.*

4.5.2 QM6003 Canvas Backpack on Frame

Custom designed modular backpack supplied on 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.

(2.80kg)

*Standard colours are Olive Drab or Blue.
Dimensions 510H x 400W x 300D mm (including frame and waist support).*

4.5.3 QM6014 Hard Carry Case

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 Rapid-Use Portable Package and HF-90 Portable Package.

(2.70kg)

*Standard colour is Grey.
Dimensions:- 320H x 275W x 205D mm.*

4.5.4 QM6015 Pelican[®] 1200 Case

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

(0.80kg)

*Standard colours are Black or Yellow.
Dimensions:- 194H x 235W x 111D mm.*

4.5.5 QM6020 Aluminium Road Case

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

(20.00kg)

Dimensions:- 280H x 680W x 780D mm.

4.6 OTHER PARTS & ACCESSORIES

4.6.1 Installation Accessories

4.6.1.1 QM6052 HF-90 Vehicle Installation Kit

Includes:-

- Mounting cradle
- External mount speaker with audio mute facility
- Coaxial cable (RG-58) complete with connectors (4.5m)
- HRC fuse (20 Amp) and holder
- Battery lugs – heavy duty, cable ties, mic clip, grommets and self-amalgamating tape

As supplied with the HF-90 Vehicle Package..

(1.30kg)

DC power cable (Part No. QM5001) is not included with the HF-90 Vehicle Installation Kit. It is supplied together with the HF-90 Transceiver (Part No. QM9001) or on its own.

4.6.1.2 QM6061 Mounting Cradle

Suited to vehicle and base station applications. As supplied with the HF-90 Vehicle Installation Kit and HF-90 Base Station Package.

(0.35kg)

4.6.1.3 Microphones/Handsets

Fist Microphones

4.6.1.4 QM4001 Speaker microphone



For use with Standard Model HF-90.

(0.20kg)

4.6.1.5 QM4002 DTMF microphone



For use with Advanced Model HF-90. Requires external speaker.

(0.25kg)

4.6.1.6 QM4003 DTMF microphone complete with built-in speaker

For use with Advanced Model HF-90.



(0.25kg)

4.6.1.7 QM4004 DTMF scrambler microphone complete with built-in speaker

Incorporates variable split-band frequency inversion voice scrambler. For use with Advanced Model HF-90. Not recommended for Frequency Hopping models



(0.25kg)

Pedestal Microphones

4.6.1.8 QM4006 DTMF Commercial Pedestal Microphone

DTMF commercial pedestal microphone. For use with Standard Model HF-90.



(1.00kg)

Telephone Handsets

4.6.1.9 QM4011 Telephone handset (commercial-grade)

Handset complete with PTT. For use with Standard Model HF-90.



(0.30kg)

4.6.1.10 QM4013 DTMF Telephone handset (commercial-grade)



Handset complete with DTMF keypad and PTT. For use with Advanced Model HF-90.

(0.40kg)

MIL-STD Telephone handsets

4.6.1.11 QM4012 Military Handset No DTMF



Industry standard, military grade telephone handset with Commercial Connector.
For use with Standard Model HF-90

(0.45kg)

4.6.1.12 QM4015 Military Handset DTMF



Industry standard, military grade telephone handset with Commercial Connector and DTMF keys for use with Advanced Software features such as Selcall, Beacon Call, Frequency Hopping and Front Panel Programming.
For use with Advanced Model HF-90

(0.45kg)

4.6.1.13 Audio Accessories

Headphones

4.6.1.14 QM4041 Headphones (commercial-grade)

Headsets incorporating 6.25 mm jack plug. Suits CW option & telegraph key.

(0.20kg)

4.6.1.15 QM4042 Headphones (military-grade)

Ruggedised headsets incorporating 6.25 mm jack plug. Suits CW option & telegraph key.

(0.45kg)

4.6.1.16 QM4021 External Mount Speaker (complete with audio mute)



Incorporates audio mute facility for fixed channel operation.

(0.45kg)

4.6.1.17 QM4051 CW Option & Telegraph Key



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.

(0.45kg)

4.6.1.18 Cables

DC Power Cables

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



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 Base Station Package.

(0.65kg)

4.6.1.20 QM5002 HF-90 → Portable Battery (0.6m)



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

(0.10kg)

Refer to page 56 for TA-90 power cable.

4.6.1.21 QM5003 HF-90 → Vehicle Battery (3.0m)

4-pole power connector at one end complete with connector for external speaker on flying lead, crocodile clips at the other end. As supplied with the HF-90 Emergency Package.

(0.50kg)

Refer to page 56 for TA-90 power cable.

Coaxial Cables (RG-58)

4.6.1.22 QM5021 HF-90 → Vehicle Antenna (4.5m)

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

(0.25kg)

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

BNC connector fitted at one end, PL259 plug fitted to the other end. As supplied with base station antennas (Section 3.3).

(1.50kg)

4.6.1.24 QM5041 HF-90 → TM-90 (150mm)

BNC connector fitted at both ends. As supplied with Manpack.

(0.15kg)

4.6.1.25 QM5051 Programming Cable complete with Adaptor

HF-90 → computer serial port (2m). Supplied with DB25 connector and also with adaptor for DB9 connector.

(0.20kg)

For use with HF-90 programming package (Part No. QM1002).

4.6.2 Miscellaneous Items

4.6.2.1 QM8051 Battery Condition Monitor

Monitors battery charge level via a series of LED indicators. As supplied with the HF-90 Manpack and HF-90 Portable Packages.



(0.10kg)

4.6.2.2 QM3001 PL259 to BNC Adaptor



(0.05kg)

4.6.2.3 QM4061 Data Interface Unit

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



(1.00kg)

4.6.2.4 QM9501 Fan Option (modular)

Fits to rear of HF-90. Suited to continuous-duty base station applications.



(0.07kg)

4.7 DEALER SUPPORT PRODUCTS

4.7.1 Programming Software

4.7.1.1 QM1002 HF-90 Programming Package



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

Standard Model HF-90:-

- Channel/frequency programming
- USB/LSB mode toggle enable/disable
- Power output setting
- Auto-tune enable/disable

Advanced Model HF-90:-

- Field programming enable
- Selcall ID number
- Selcall and Scanning on specific channels/frequencies

Includes programming cable (Part No. QM5051).

Includes Quick Reference Guide - HF-90 Programming Package.

Package is provided on 3½" floppy disk as standard.

(0.05kg)

4.7.2 Product Documentation

4.7.2.1 QM1021 HF-90 Technical Manual



Authorised Dealers receive one HF-90 Technical Manual at no charge, with their first purchase of the HF-90 Transceiver. Extra copies must be purchased.

(0.35kg)

4.7.3 Replacement Modules

4.7.3.1 96000 HF-90 Front Panel Module



Front panel module includes front panel PCB.

(0.15kg)

4.7.3.2 96002 HF-90 PASW Module



Power Amplifier & Switch Mode Power Supply Module complete with heatsink assembly.

(0.40kg)

4.7.3.3 96003 HF-90 RXMP Module



Receiver & Microprocessor Module.

(0.15kg)

5 SALES TERMS AND CONDITIONS

1. Definitions

In the Sales Terms & Conditions herein:

- 'Q-MAC' means Q-MAC Electronics Pty Ltd (ACN 054 566 684) of 142 Hasler Road Osborne Park, Western Australia 6017.
- 'Customer' means the party which has ordered the goods and to whom the goods will be or have been supplied.
- 'Goods' means the products manufactured and/or supplied by Q-MAC as itemised on the Invoice.
- '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.
- 'Purchase Price' means the total price identified on the invoice, being for the Goods.
- '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, inclusive of all applicable freight, insurance and documentation charges, must be paid prior to despatch of goods, unless the Customer is granted adequate credit facility by Q-MAC.
- 2.2 The Purchase Price must be paid for in full, by way of:
 - 2.2.1 Telegraphic Transfer - direct to Q-MAC's account; or
 - 2.2.2 Confirmed Irrevocable Letter of Credit - in which case the Q-MAC LC handling fee of US\$150.00 is incurred and must be reflected in the total amount payable on the Letter of Credit. Q-MAC Letter of Credit Terms and Conditions apply (See Section 6).
- 2.3 For specific large orders, Q-MAC reserves the right to request a percentage of the Purchase Price as down-payment, prior to proceeding with the Customer's order. In such cases, the balance of the Purchase Price must be paid prior to despatch of Goods, unless the Customer is granted adequate credit facility by Q-MAC.
- 2.4 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.
- 2.5 Late Payment Penalty- 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 1st day following the due date.

3. Delivery

- 3.1 Freight charges, for delivery of Goods outside Australia, will be charged to the Customer and added to their Invoice.
- 3.2 Where the Customer does not agree to Q-MAC's standard delivery arrangement, the Customer must clearly specify in writing their preferred delivery arrangement. 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.
- 3.3 Q-MAC will always endeavor to meet the delivery 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 delivery.
- 3.4 Q-MAC utilizes INCOTERMS 2000 (as per Section 7) to describe modes of delivery. Where terminology on purchase orders differs from INCOTERMS 2000, Q-MAC reserves the right utilize the nearest matching mode of transport listed in INCOTERMS 2000, Section 7.

4. Liability and Indemnity

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 Goods.

5. Obligation to Supply

This Agreement does not impose any obligation on Q-MAC to supply Goods to the Customer.

6. Variation

Q-MAC may vary these Sales Terms & Conditions at any time, by written notification to the Customer.

7. Applicable Law

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

6 LETTERS OF CREDIT

6.1 DOCUMENTARY LETTER OF CREDIT FORMAT

Format acceptable to Q-MAC Electronics Pty Ltd INCOTERMS 2000

<i>Form of Documentary Credit:</i>	Irrevocable
<i>Date And Place Of Expiry:</i>	(30 days after shipment) Australia
<i>Beneficiary:</i>	Q-MAC Electronics Pty Ltd 142 Hasler Road OSBORNE PARK WA 6017 AUSTRALIA
<i>Bank</i>	National Australia Bank International Trade and Finance Operations Perth
<i>Swift Code</i>	NATAAU3306P
<i>Amount:</i>	USD (as applicable)
<i>Available with/ Available by:</i>	National Australia Bank Limited
<i>Drafts at:</i>	Sight
<i>Partial shipments:</i>	Allowed
<i>Transshipment:</i>	Allowed
<i>Loading On Board/ Dispatch/ Taking In Charge At/ From:</i>	Perth Airport / Fremantle Wharf
<i>For Transportation To:</i>	(destination) Airport / Wharf
<i>Description of Goods Or Services:</i>	(as applicable)
<i>Documents Required:</i>	Commercial Invoice Packing List Air Waybill / Bill of Lading
<i>Charges:</i>	All charges outside Australia are for the applicants account
<i>Confirmation Instructions:</i>	Confirm

Note: Letters of Credit must be issued by a recognised and reputable International Bank acceptable to Q-MAC Electronics Pty Ltd.

7 INTERNATIONAL FREIGHT INFORMATION

7.1 INTERNATIONAL FREIGHT ABBREVIATIONS

INCOTERMS 2000

Departure:

EXW EX WORKS (... named place)

Main Carriage Unpaid:

FOB FREE ON BOARD (... named port of shipment)

Main Carriage Paid:

CIF COST, INSURANCE AND FREIGHT (... named port of destination)

CIP CARRIAGE AND INSURANCE PAID TO (...named place of destination)

Arrival:

DDU DELIVERED DUTY UNPAID (... named place of destination)

DDP DELIVERED DUTY PAID (... named place of destination)

Methods most commonly used in freight of Q-MAC consignments:

EXW; CIP; DDU

7.2 INTERNATIONAL FREIGHT DEFINITIONS

EXW - EX WORKS (... named place)

"Ex works" 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.

FOB - FREE ON BOARD (... named port of shipment)

"Free on Board" 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.

CIF - COST INSURANCE AND FREIGHT (... named port of destination)

"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.

CIP - CARRIAGE AND INSURANCE PAID TO (... named place of destination)

"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

DDU - DELIVERED DUTY UNPAID (... named place of destination)

"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.

DDP - DELIVERED DUTY PAID (... named place of destination)

"Delivered duty paid" means that the seller delivers the goods to the buyer, cleared for import, and not unloaded from any arriving means of transport at the named place of destination. The seller has to bear all the costs and risks involved in bringing the goods thereto including, where applicable', any "duty" (which term includes the responsibility for and the risk 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. Whilst the EXW term represents the minimum obligation for the seller, DDP represents the maximum obligation. This term should not be used if the seller is unable directly or indirectly to obtain the import license. However, if the parties wish to exclude from the seller's obligations some of the costs payable upon import of the goods (such as value-added tax: VAT), this should be made clear by adding explicit wording to this effect in the contract of sale. If the parties wish the buyer to bear all risks and costs of the import, the DDU term should be used. 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.

8 Q-MAC WARRANTY POLICY

Q-MAC Electronics Pty Ltd ('the Company') warrants all products designed/manufactured by the Company to be free of faults arising from defects in workmanship and/or materials.

In the event that the product is proven faulty within the prescribed period, the Company will remedy such fault at no charge to the end user, provided the product is returned to the Company or to one of its Authorised Dealers in accordance with published procedures. The standard prescribed period is 3 (three) years from the date of shipment (to the end user). 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.

This Warranty shall not apply where:

- the product has been subject to abuse or accidental damage;
- the product has been installed, adjusted or repaired by anyone other than an Authorised Dealer;
- the product has been installed, operated, adjusted or repaired, other than in accordance with instructions issued by the Company;
- the serial label attached to the product has been defaced or removed.

In addition, this Warranty shall not apply to:

- the distance or terrain over which transceiver products will operate, or ...
- the quality of transmission or reception as a result of unfavourable environmental conditions.

This Warranty shall only apply to:

- products designed, manufactured and supplied by the Company. This presently includes the HF-90 Transceiver, HF-90M Transceiver, TA-99 Tuner, ML-90 Tuner, ML-90 Antenna, TA-90 Tuner, and DTMF keypads which the Company has designed and manufactured.

In all other cases, the Company will make every endeavour to ensure that the end user receives full benefit of any warranty given by the manufacturer. Note that batteries are considered a consumable item and are not covered by this warranty.

WARRANTY OF REPAIRS OR REPLACEMENTS

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.

WARRANTY CONDITIONS

Items requiring warranty repair or replacement will be subject to approval by the company. Goods must be suitably packaged for airfreight and be marked "freight pre-paid". The company reserves the right to 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.

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.

9 PRODUCT INDEX

Q-MAC PART NO.	DESCRIPTION	WEIGHT	PAGE
96000	Front Panel Module	0.15	68
96002	PASW Module	0.40	69
96003	RXMP Module	0.15	69
96004	PASW Module (HF-90M)	0.45	31
96005	Font Panel Module (HF-90M)	0.20	31
MX9011	HF-90M Monoblock Manpack 7Ah	11.00	5
MX9011b	HF-90M Monoblock Manpack (minus battery)	9.00	5
MX9011c	HF-90M Monoblock Manpack 3.5Ah	10.00	5
MX9013	HF-90M Military Grade Manpack (Complete)	8.50	8
MX9013b	HF-90M Military Grade Manpack (minus battery)	5.95	8
MX9014	HF-90M Military Grade Manpack (Standard)	7.90	9
MX9014b	HF-90M Military Grade Manpack (minus battery)	5.35	9
MX9015	HF-90M Military Grade Vehicle Package	10.00	12
MX9019	HF-90M Integrated Base Station Package	42.00	14
MX9024	HF-90M High Powered Base Station	65.00	13
MX9027	HF-90M NVIS Roof Rack Antenna (Fixed TXCVR)	110.00	11
QM1002	HF-90 Programming Package and Cable	0.05	68
QM1002M	HF-90M Programming Package and Cable	1.00	30
QM1021	HF-90 Technical Manual	0.35	68
QM2001	TM-90 Manual Tuner	0.90	53
QM2101	TA-99 Automatic Tuner	0.90	53
QM2102	TM-90 to TA-99 (Upgrade for Manpack Packages)	0.00	53
QM3001	BNC/ PL259 Adaptor	0.05	67
QM4001	Speaker microphone	0.20	62
QM4002	DTMF microphone	0.25	62
QM4003	DTMF microphone with built in speaker	0.25	63
QM4004	DTMF scrambler microphone c/w built in speaker	0.25	63
QM4006	DTMF Commercial Pedestal Microphone	1.00	63
QM4011	Telephone handset (commercial grade)	0.30	63
QM4012	Military handset (no DTMF) Commercial Connector	0.45	64
QM4013	DTMF Telephone Handset (commercial grade)	0.40	64
QM4014	Military Handset DTMF Mil-Std	0.45	27
QM4015	Military Handset DTMF Commercial Connector	0.45	64
QM4016	Military Handset no DTMF Mil-Std	0.45	27
QM4021	External Mount Speaker (with mounting bracket)	0.45	65
QM4023M	Military External Speaker	2.00	28
QM4041	Headphone (commercial grade)	0.20	64
QM4042	Headphones military grade, commercial connector	0.45	64
QM4042M	Headphones military grade, military connector	0.45	27
QM4051	CW Option & Telegraph Key	0.45	65
QM4051M	CW Option and Telegraph Key (military grade)	1.00	28
QM4061	HF-90 Data Interface Unit	1.00	67
QM4061M	HF-90 Data Interface Unit with military connectors	1.00	29
QM5001	DC Power cable (4.5m)- HF-90 to misc power source	0.65	65
QM5001M	Power supply lead – HF-90M	2.00	28
QM5002	DC Power cable (0.6m) - HF-90 to portable battery	0.10	65
QM5002M	DC Power cable (0.6m) - HF-90 to portable battery	0.10	28
QM5003	DC Power cable (3.0m) - HF-90 to vehicle battery	0.50	66
QM5021	HF-90 vehicle antenna coax cable (4.5m)	0.25	66
QM5022	HF-90 base station antenna coax cable (30m)	1.50	66
QM5041	HF-90 to TM-90 coax cable	0.15	66
QM5043	TA-90 Power Cable	0.25	56
QM5051	Programming cable c/w Adaptor	0.20	66

Q-MAC PART NO.	DESCRIPTION	WEIGHT	PAGE	
QM5051M	Programming cable c/w Adaptor (military grade)	0.30		29
QM5053	TA-90 High Voltage Antenna Feed Cable	0.05	56	20
QM5064	TA-90 to HF-90M Coaxial Cable	0.01		28
QM5068	TA-90M to HF-90M Coaxial Cable	0.01		28
QM6001	Canvas Backpack – standard	1.50	61	
QM6003	Canvas Backpack on frame – military grade	2.80	61	26
QM6006	Military Grade, all welded backpack frame	9.00		26
QM6014	Fibreglass Hard Carry Case	2.70	61	
QM6015	Pelican 1200 Case	0.80	61	
QM6020	Aluminium Road Case	20.00	61	
QM6052	Vehicle Installation Kit	1.30	62	
QM6061	Mounting Cradle	0.35	62	
QM6063	Mounting Cradle for HF-90M on TA-90M	1.00		27
QM6071	TA-90 Mounting Kit	2.45	56	20
QM7001	Fixed Broadband Dipole Antenna – Single wire	3.00	57	21
QM7002	Fixed Broadband Dipole Antenna – Multi Wire	9.00	58	21
QM7005	End Fed Portable Broadband Antenna – single wire	1.25	53	18
QM7020	Minipack Broadband Antenna (Spares Kit)	0.20	54	
QM7021	Halyard Kit	0.60	58	22
QM7022	Fixed Broadband Dipole Antenna – Mast Kit	13.00	58	22
QM7112	TA-90 Auto-tune Antenna System	5.50	56	
QM7112M	TA-90M Auto-tune Antenna System	5.50		20
QM7113	ML-90 Auto-tune Antenna System (Rack and Tuner)	105.00	56	20
QM7121	TA-90 Tuner	2.40	56	
QM7121a	TA-90 Tuner (24V Version)	2.40	56	
QM7121M	TA-90 Tuner (12V Version)	2.40	20	
QM7131	Continuously Loaded Whip Antenna	0.65	57	21
QM7133	Continuously Loaded Whip Antenna (split configuration)	0.80	57	
QM7136	Antenna Base Assembly	0.65	57	21
QM7137	Pair 60mm C-Clamps	0.30	57	21
QM7301	Collapsible Whip Antenna (6 section)	0.30	54	18
QM7302	Collapsible Whip Antenna (2 section)	0.20	54	18
QM7309	Tape Whip Antenna	0.20	54	19
QM7310	Long Wire Antenna Kit	0.45	55	19
QM7311	Long Wire Antenna Only	0.15	55	19
QM7312	Counterpoise	0.10	55	19
QM7313	Long Wire Antenna Adaptor	0.05	55	19
QM7351	Antenna Extender Coil Section	0.20	55	
QM7601	TA-90 Upgrade from 12V to 24V Version	0.00	56	20
QM7801	Heavy Duty Antenna Base & Spring	1.50	57	21
QM7810	TA-90 Antenna Spring	1.35	57	21
QM7821	Antenna Angle Adaptor	0.10	55	19
QM8004	Minipack Rechargeable Battery (4Ah)	1.20	59	
QM8011	Rechargeable Battery (7Ah)	2.55	59	23
QM8021	Fold-up Solar Panel Charger	1.30	59	
QM8021M	Fold-up Solar Panel Charger with Military Connector	1.30		24
QM8022	AC Mains Charger (2A)	0.70	59	
QM8022M	AC Mains Charger 2A Fast Charger with Military Connector	1.00		24
QM8024	Step-Up Battery Charging Device	0.30	59	
QM8024M	Step-Up Battery Charging Device, Military Connector	0.30		25
QM8025	Minipack AC Mains Charger (900mA)	0.25	60	
QM8026M	AC Mains Fast Charger with Military Connector for 3.5AH NiCad Battery	1.00		24
QM8028	Hand Crank Generator (with mounts)	2.70	60	
QM8028M	Hand Crank Generator (with mounts), Military Connector	2.70		25
QM8031	AC Mains Power Supply Unit	1.50	60	

Q-MAC PART NO.	DESCRIPTION	WEIGHT	PAGE	
QM8032	Battery Changeover Switch	0.75	60	
QM8041	AC Mains Multi-Adaptor	0.20	60	
QM8051	Battery Condition Monitor	0.10	67	
QM8051M	Battery Condition Monitor, Military Connector	0.10		25
QM8101	Military Grade 7Ah SLA Battery	3.50		23
QM8101b	Military Grade 7Ah SLA Battery Enclosure Only	1.00		23
QM8102	Military Grade 3.5Ah NiCad Battery	2.50		23
QM8102b	Military Grade 3.5Hh NiCad Battery Enclosure Only	1.00		24
QM9001	Transceiver – Standard Model (DC Cable for Vehicle/Base)	2.05	48	
QM9001b	Transceiver – Standard Model (DC Cable for Portable/Manpack)	1.55	48	
QM9012	Portable Package - Hard Carry Case (complete)	8.10	36	
QM9012b	Portable Package - Hard Carry Case (minus battery)	5.55	36	
QM9013	Manpack (Complete)	7.50	33	
QM9013b	Manpack (minus battery)	4.95	33	
QM9015	Vehicle Package (Whip Antenna)	9.55	41	
QM9018	Base Station Package (complete)	37.00	44	
QM9018b	Base Station Package (minus battery)	35.00	45	
QM9020	HF-90 Integrated Base Package	42.00		
QM9022	Disaster Response Package	47.00	46	
QM9023	HF-90 Minipack	3.65	37	
QM9024	High Powered 500 watt Base Station Package	65.00	42	
QM9025	ML-90 NVIS Roof Rack Antenna Vehicle Package (fixed)	110.00	39	
QM9026	ML-90 NVIS Roof Rack Antenna Vehicle Package (removable)	107.00	40	
QM9051	Advanced Option #1	+0.10	49	
QM9052	Advanced Option #2	+0.10	49	
QM9053	Advanced Option #3	+0.10	49	
QM9054	Advanced Option #4	+0.20	50	
QM9056	Advanced Option #6	+0.20		16
QM9057	Advanced Option #7	+0.20	50	
QM9058	Advanced Option #8	+0.20	50	
QM9061	Frequency Hopping Option (factory fitted)	0.05	51	17
QM9062	Frequency Hopping Option (suits late model HF-90)	0.15	52	17
QM9063	Frequency Hopping Option (suits early model HF-90)	0.35	52	
QM9071	Backpack Upgrade to military grade backpack	1.30	35	
QM9082	Base Station Data Package	4.00	46	
QM9082M	Base Station Data Package – Military Data Interface Unit	4.00		15
QM9101	Transceiver – Military Grade 810F	1.55		16
QM9501	Fan Option (modular)	0.07	67	
QM9501M	Fan Option (modular)	0.07		29

10 DATA SECTION

10.1 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 correct 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.

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.

10.2 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.

Lead Acid 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.

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

Always use an approved charger when charging your batteries.

10.3 ANTENNA BASICS

Q-MAC Electronics supplies three different classes of wire antennas.

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).

Endfed 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 users 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.

10.4 PRACTICAL 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	Ground wave	Sky wave
	MANPACK ANTENNA TUNERS		
QM7301	6-section collapsible whip antenna	5-10km max	150km- 600km
QM7301 QM7351	6-section collapsible whip antenna used in conjunction with Extender coil.	5-10km max	Not suited to sky wave
QM7302	2-section collapsible whip antenna	2-5km max	150km – 400km
QM7310	Long wire antenna kit	5-30km max	150km – 1000km
	ANTENNA NOT REQUIRING TUNER		
QM7005	Portable Broadband Antenna	5-30km max	150km – 1000km

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 (Ground Wave) 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

N.B. The overriding factor for effective communications via ground wave 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

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