FCC ID: PQS-DWM0001

Exhibit 9

User's Manual

Dualwave M
Wireless Modem

User Manual

© Wavenet Technology Pty Ltd
ACN 079 965 003

Publication No. DWMUSERD01 (First Draft 13 February 2002)

Published January 2002

This publication is copyright and no part may be reproduced or copied without the prior consent of:

Wavenet Technology Pty Ltd.
140 Burswood Rd
Burswood
Perth
WA 6100
Australia

Telephone: +61 8 9262 0200
Facsimile: +61 8 9355 5622
E-mail: wavenet@wavenet.com.au
Web Site: www.wavenet.com.au

This manual is intended to be used for the operation of Wavenet Technology equipment. Performance figures quoted are typical values and subject to normal manufacturing and service tolerances.

Wavenet Technology Pty Ltd reserves the right to alter, without notice, the equipment, software or specification to meet technological advancement.

Microsoft, Windows and the Windows logo are registered trademarks or trademarks of Microsoft Corporation in the United States and other countries. Palm M, Palm m500/m505/m125, and HotSync are trademarks of Palm Computing, Inc. Other product and company names herein may be the trademarks of their respective owners.

Whilst every precaution has been taken in the preparation of this document, neither Wavenet Technology Pty Ltd nor any of its representatives shall have any liability to any person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by the information contained in this book.

Published by Wavenet Technology Pty Ltd.

This product contains a transmitter approved under the FCC rules.

FCC ID: xxxxxxxxxx-xxxx-x

This device complies with Part 15 of the FCC rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received including interference that may cause undesired operation.

Contents

Introduction....5
Features....5
Compliance Statement....6
Information for Your Safety....6
System Requirements....8
Checking the Package Contents....8
Exploring Your Dualwave M....9
Online Indicator....11
On/Low Battery Indicator....11
Getting Started....12
Connecting Your Dualwave M to the PDA....12
Removing the Dualwave M....12
Charging the Dualwave M's Battery....13
Installing Modem Tools Software on Your PDA....14
Removing Software From Your PDA....17
Using Your Dualwave M....18
Modem Tools Application....19
Info Tab....19
Setup Tab....20
Network Tab....21
Wakeup Tab....22
About Modem Tools....23
Synchronising Data Between Your PDA and Computer....23
Updating Firmware on Your Dualwave M....25
Installing New Software on Your PDA....27
Troubleshooting....28
Technical Support....31
Care & Maintenance....32
Specifications....**Error! Bookmark not defined.**

Introduction

The Dualwave M is a wireless modem developed for Personal Digital Assistants (PDAs), such as the Palm™ m125/m500/m505. It enables access to worldwide DataTAC wireless networks in the USA, Canada, Malaysia, Singapore, Hong Kong, Taiwan and Australia.

The Dualwave M is available in 2 customer configurations.
A Public network version for the 806 – 821MHz band (25kHz channels) and a Private network version for the 821- 824MHz band (12.5kHz channels). These are not interchangeable.

This technology offers the following unique benefits to the PDA user.

- Dualwave M's unique PUSH technology "wakes up" the PDA and immediately alerts you of a new message.
- The data interface port and cable assembly provides two additional functions for the PDA user by:
  - Allowing installation and upgrades of software for the PDA via the serial connector.
  - Synchronising and updating data between PDA and PC via the USB connector.
- The battery charger connector allows:
  - The simultaneous charging of the PDA and Dualwave M batteries.

Using additional software, the Dualwave M effectively turns your PDA into a wireless window on the web and lets you use your existing e-mail accounts for mail.

This manual provides details on how to set up, charge and use the Dualwave M. There is a troubleshooting section to the rear of the manual and a section on the care and maintenance of your new Dualwave M. Specifications are displayed on the last page.

Features

The Dualwave M has the following features:

- Form hugging clip-on modem suitable for Palm™ m125/m500/m505 PDAs.
- Secure locking mechanism.
- May be used independently as a wireless modem for a PC/laptop by using additional software.
- Roaming capabilities as used in DataTAC system.
- Modem is always online using the DataTAC network.
- Auto wake up of PDAs from incoming messages.

- Extended battery life (5 days standby, 14 hours communication time).
- High sensitivity reception.
- Indicator lights shows the status of the network coverage and battery condition.

Compliance Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause interference harmful to radio communications.

There is no guarantee however, that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your supplier or an experienced radio/TV technician for assistance.

Warning: *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.*

Information for Your Safety

Please read these safety instructions and the operation instructions provided in this manual before operating the Dualwave M or the battery charger.

SAR (RF Absorption Levels into body)

Your Dualwave M contains a low power transmitter and receiver. When it is switched on, it receives and sends out radio frequency (RF) signals. In August 1996, the Federal Communications Commission (FCC) adopted RF exposure (SAR) guidelines with safety levels for handheld wireless devices. These guidelines are consistent with safety standards previously set by both USA and International Standards: ANSI C95.1 (1992), NCRP Report 89 (1986), ICNIP (1996).

The Dualwave M is designed for handheld operation and has been tested and certified to comply with the aforementioned FCC guidelines

and standards. The DUALWAVE M has been assessed at the worst case user conditions (zero separation distance). To maintain the optimum operational characteristics , no part of the human body should be in contact with the antenna during use.

Safe Use

Switch the Dualwave M off in areas where radio devices are forbidden, or when it may cause interference or danger. For example, fuel depots (fuel storage and distribution areas), chemical plants, locations in which hazardous or combustible gases may be present and where blasting operations are in progress.

Do not use the Dualwave M in an aircraft. Such use may affect aircraft instrumentation, communication and performance and may be illegal.

Be aware that the Dualwave M may interfere with the functionality of inadequately protected medical devices, including pacemakers. Additionally, the effect of the radio signals from the Dualwave M on other electronic systems, including those in your car (such as electronic fuel-injection systems, electronic anti-skid braking systems, and electronic cruise-control systems) is unknown and malfunction of these systems may result.

Do not use accessories or attachments (for example, a charging unit) that is not manufactured or supplied with the unit. Do not place the Dualwave M on an unstable surface. It may fall, causing injury and damage the equipment.

Discard the Dualwave M properly. The unit contains a lithium battery, neither the lithium battery or the Dualwave M should be disposed of in a fire. Dispose the Dualwave M containing the lithium battery in accordance with the laws and regulations in your area governing disposal of such cell types. Contact your supplier if you have any questions concerning disposal of the Dualwave M or the lithium battery.

Never push objects of any kind into the Dualwave M through openings as they may short out parts that could result in a fire or electrical shock. Never spill liquid of any kind on the Dualwave M. Do not use Dualwave M near water (for example near a bathtub or sink, in a wet basement, near a swimming pool etc.). The Dualwave M should be situated away from heat sources.

Unplug the battery charger from the power source before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth to clean the unit.

Unplug the battery charger from the power source and contact your supplier if:

- The power supply cord or plug is damaged.
- Liquid has been spilled or objects have fallen onto the Dualwave M or Battery Charger.
- The Dualwave M or Battery Charger has been exposed to rain or water.

- The Dualwave M or Battery Charger has been dropped or damaged in any way.
- The Dualwave M or Battery Charger does not operate normally by following the instructions contained in this manual.
- The Dualwave M or Battery Charger exhibits a distinct change in performance.

Failure to observe all these instructions will void the limited warranty.

System Requirements

To install the Dualwave M software (Modem Tools), onto your PDA, your computer system must meet the following minimum requirements:

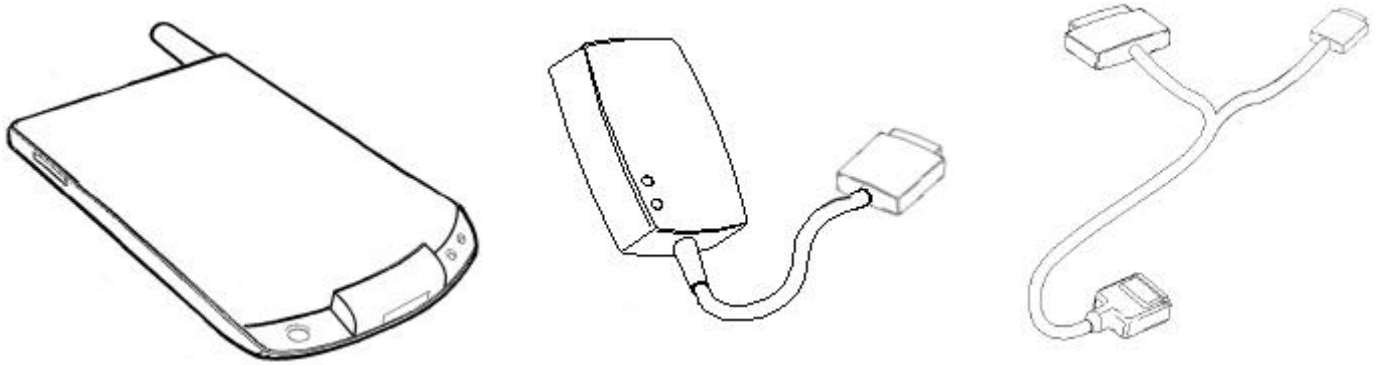
- Intel compatible 486 computer or higher
- Windows 95, or Windows NT 4.0, or later.
- 8MB RAM (memory) minimum, 16 MB recommended
- 1MB available hard disk space
- CD-ROM drive
- One available serial port (9-pin). A 25 to 9-pin adapter may be required if your system has a 25-pin serial port.
- The PDA desktop software must already be installed.
- One available USB port (used for the HotSync® process).

In addition, your PDA must have

- 500kB of available memory
- Palm OS version 3.5 or higher

Checking the Package Contents

The following items should be included in the box.



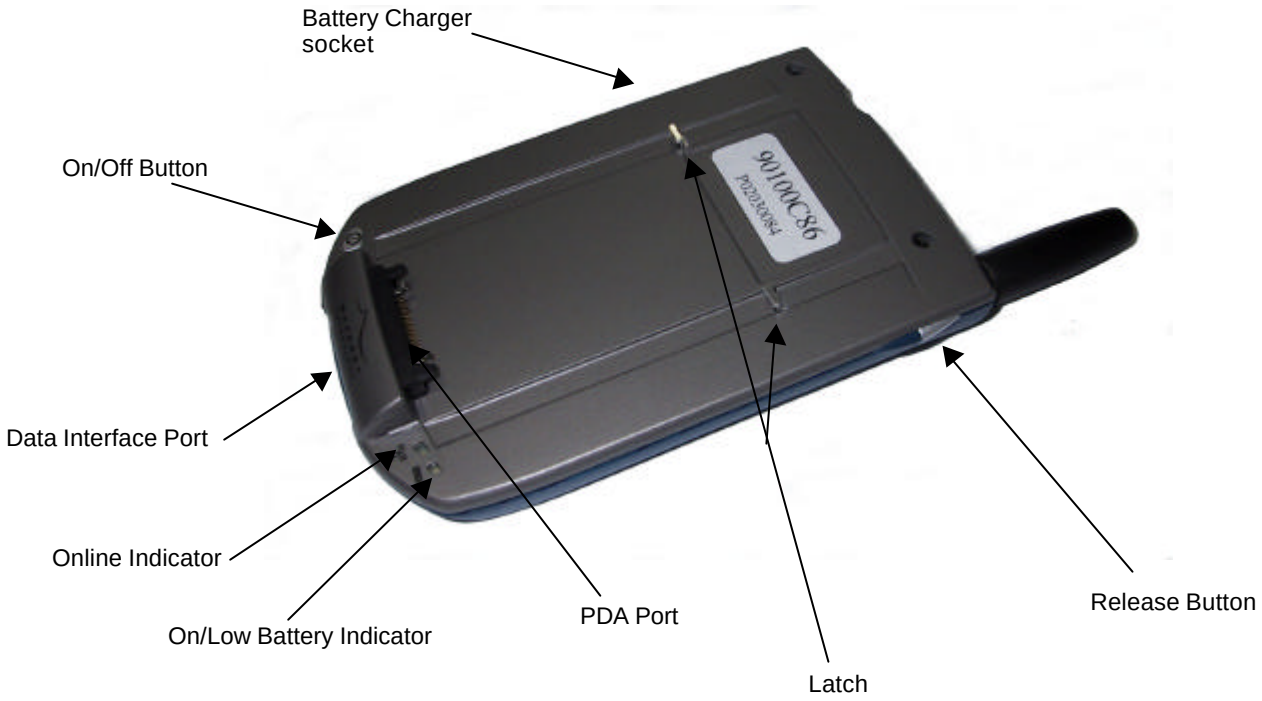
Dualwave M	Battery Charger	Data Comms cable
		The PC serial connector has 9 pins. Use a 25-pin to 9-pin adapter (not included), if your system has a 25-pin serial port.

You should also have the CD-ROM which includes the Modem Tools software, and

this User Manual.

Exploring Your Dualwave M

A picture of the Dualwave M is shown below.



The Dualwave M is made up of the following components:

Data Interface Port	Provides a USB connection to the PC for HotSync® operations and a serial connection to the PC for diagnostics and downloading software upgrades.
PDA Port	Provides a connection between the PDA and the modem.
Battery Charger socket	Provides a connection for the battery charger.

Release Button and Latch	Connects and releases the PDA from the Dualwave M.
On/Off Button	Switches the Dualwave M on or off.

The indicator descriptions are described on the following page.

Online Indicator

○	Off	The Dualwave M is not connected or is out of range.
-☼-	Slow flashing green (once per sec)	The Dualwave M is in range and has registered with the wireless network.
☼	Rapid flashing green (five times per sec)	Access denied. The network is denying registration.

On/Low Battery Indicator

○	Off	Power off
-☼-	Slow flashing green (once per sec)	Dualwave M is on and the battery is charged.
-☼-	Slow flashing red (once per sec)	Dualwave M is on but the battery needs charging.
☼	Rapid flashing red (five times per sec)	The battery is too low for normal operation. Charge the battery immediately.

Getting Started

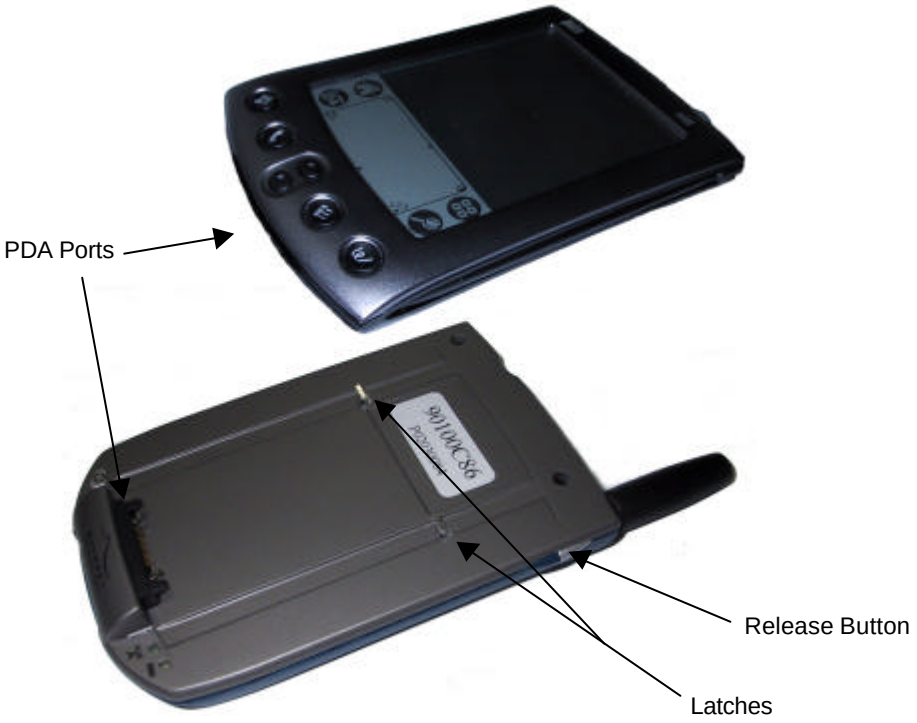
Before using your Dualwave M you must:

- Connect the Dualwave M to your PDA
- Fully charge the Dualwave M's battery
- Install the Modem Tools software on your computer and PDA

Connecting Your Dualwave M to the PDA

To connect the Dualwave M to your PDA, follow the steps below:

1. Slide the PDA into the Dualwave M so that the PDA ports are aligned.
2. Press the release button on the right hand side of the Dualwave M and press the back of the PDA into the Dualwave M until you hear a click. The button engages a latch that secures the PDA to the Dualwave M.



Removing the Dualwave M

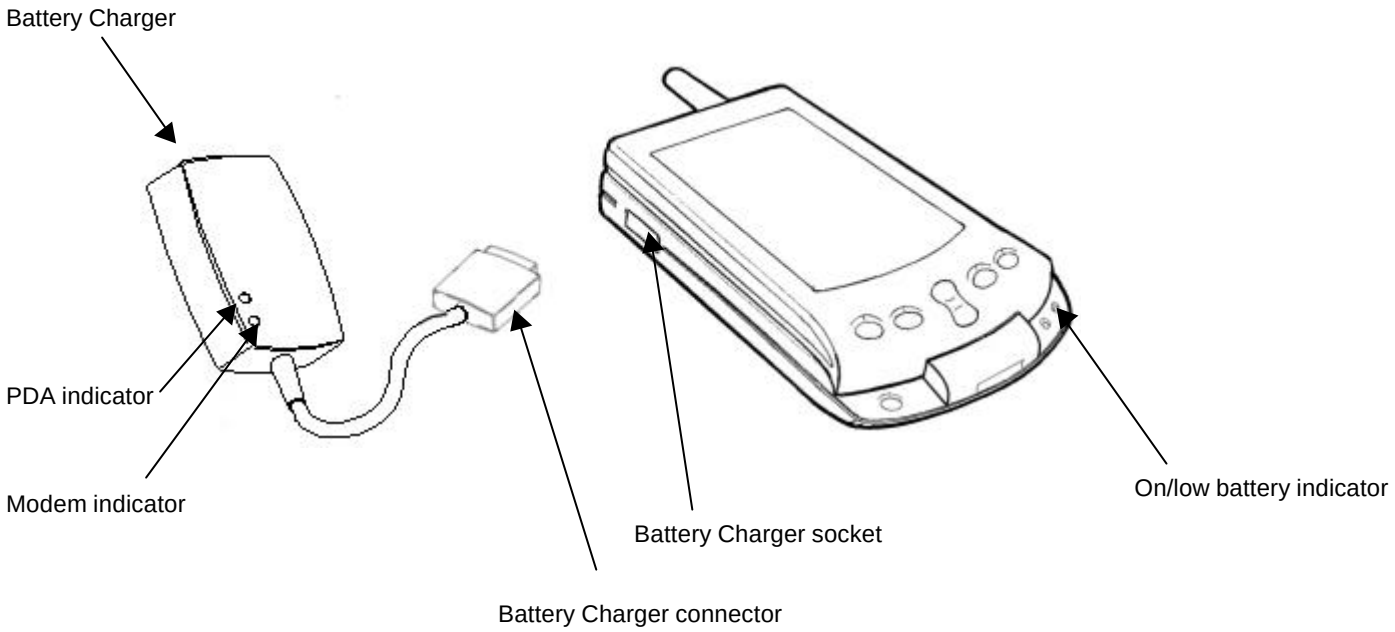
To remove the Dualwave M from your PDA, press the release button on the right hand side of the Dualwave M and gently pull the PDA up and away from the Dualwave M.

You must press the release button whilst disconnecting the Dualwave M or you may damage your PDA and the Dualwave M.

Charging the Dualwave M's Battery

Your Dualwave M's lithium battery is supplied discharged. For optimum performance, you should charge it fully before use. If during use, the Dualwave M's On/Low battery indicator displays flashing red, the battery needs immediate recharging.

The Battery Charger charges both the PDA and the modem. However, The Dualwave M's battery powers only the modem, not the PDA.



Follow the steps below to charge the PDA and Dualwave M's battery:

1. Connect your PDA to the Dualwave M first, if you intend to charge both your PDA and the Dualwave M together.
2. Attach the battery charger connector to the battery charger socket located on the left hand side of the unit.
3. Plug the battery charger into a power source for approximately four hours. The PDA and modem indicators on the battery charger display red while charging.

   Note: *Perform an overnight charge when charging the Dualwave M's battery for the first time.*
4. When the PDA and modem indicators on the battery charger change to green, both batteries are fully charged. If only one indicator changes to green, only one battery is fully charged.
5. Unplug the battery charger from the power source.
6. Detach the battery charger connector from the battery charger socket.

If the indicators on the battery charger are flashing red, indicating a fault, return the battery charger and Dualwave M to your vendor for servicing.

When the batteries are fully charged, the battery charger stops charging until the batteries' capacity falls below a certain value. The battery charger will then automatically start recharging the batteries again.

For optimum battery performance it is recommended that the battery charger is disconnected and reconnected from the power source to start the charge cycle from the beginning.

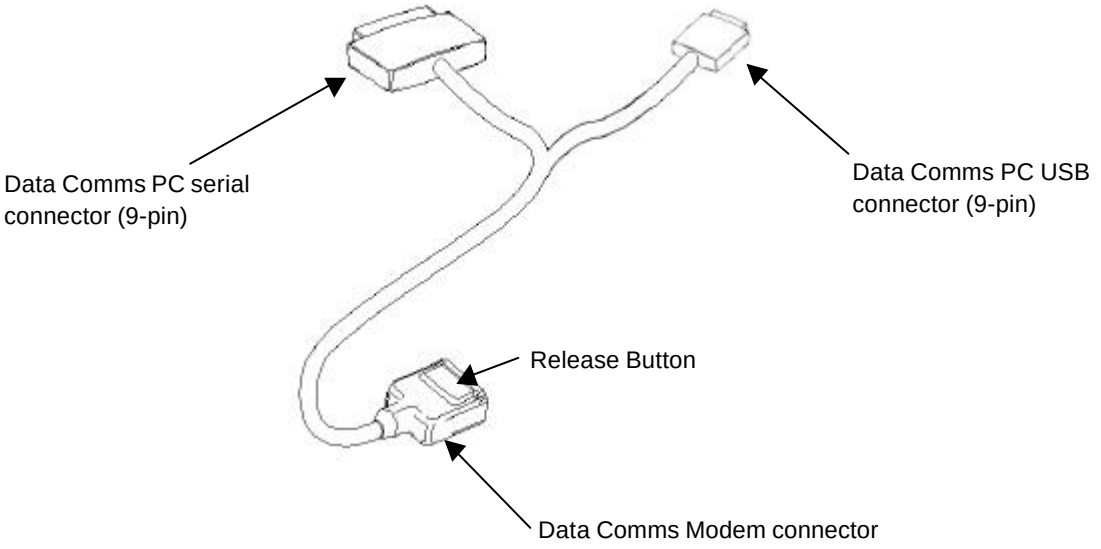
Warning: *For safety reasons, only use the battery charger supplied with the Dualwave M.*

Installing Modem Tools Software on Your PDA

To install the Modem Tools software onto your PDA, ensure that the PDA desktop software has been installed first and then use the following procedure:

1. Attach the Dualwave M to your PDA, as described previously.
2. Carefully push the Data Comms Modem connector squarely into the Dualwave M's Data Interface port. This is located at the front of the Dualwave M.

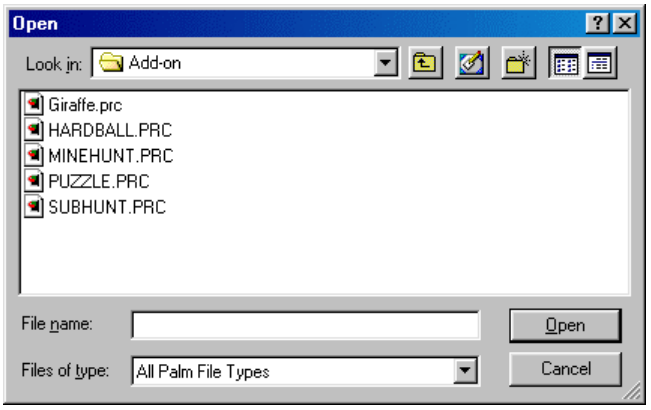
   Caution: *The Data Comms Modem Connector has a latch to secure the connector to the Dualwave M. Before removing the Data Comms Modem connector from the Dualwave M, press the release button on the underside of the connector to disengage the latch.*



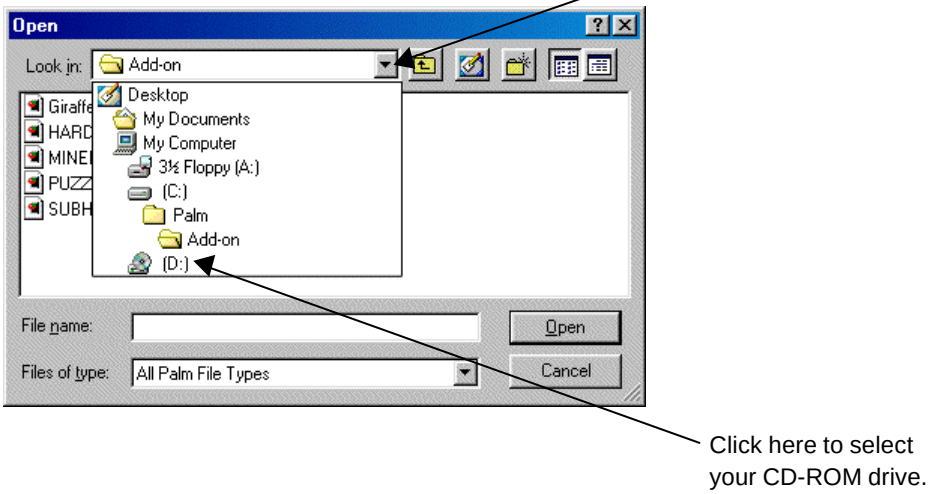
3. Connect the Data Comms PC serial connector to a COM (serial) port on your computer. Note that the Data Comms PC serial

connector is a 9-pin plug. If your computer has a 25-pin serial port you will need a 9-pin to 25-pin adapter.

4. Switch the PC on and insert the CD-ROM, which was supplied with your Dualwave M, into your CD-ROM drive.
5. Display the Palm Desktop screen by either:
   - Double-clicking the Palm desktop icon on your PC or,
   - Clicking Start from the PC's task bar and selecting: Programs ⇒ Palm Desktop ⇒ Palm Desktop.
6. Click Install to display the Install Tool screen.
7. Click Add... to display the following screen.



8. Click on the Look in field and select your CD-ROM drive (typically D drive), from the drop down list.

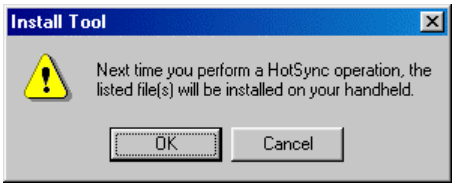


9. Select all of the files from the Modem Tools folder on the CD-ROM and click Open. The Install Tool screen is redisplayed with your selected files.

   Note: *To select all of the files from the Modem Tools folder, click the first file and then press the Ctrl key and the A key together.*

10. Click Done.

    The following message is displayed.



11. Click OK and press the HotSync® button on your PDA to transfer the application to your PDA.

    Note: *Refer to your PDA User Manual for more details on the HotSync® process.*

12. Wait for a message on your computer and PDA indicating that the process is complete.

Removing Software From Your PDA

To remove the software from your PDA, refer to the instructions in your PDA User manual. The typical procedure is shown below.

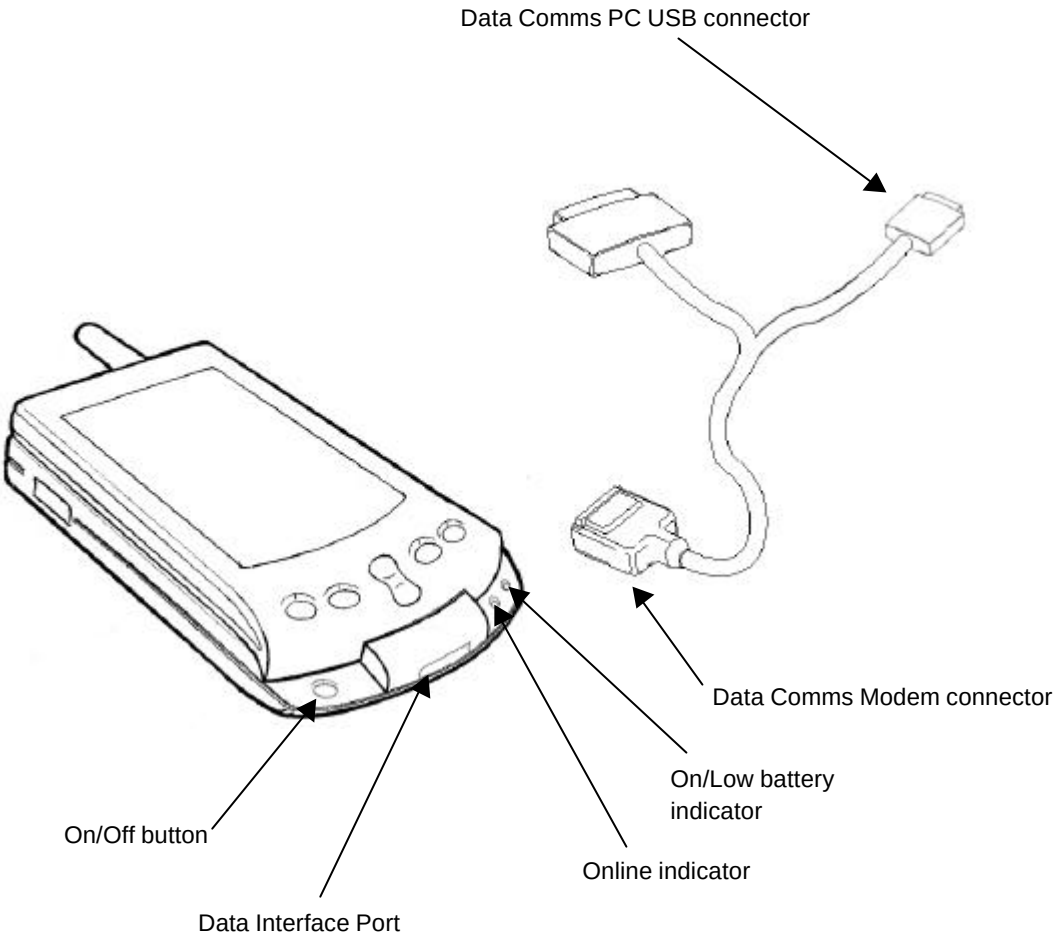
1. Tap the Applications icon on the main screen of your PDA.
2. Tap the Menu icon.
3. Tap App.
4. Tap Delete.
5. Tap the Dualwave M application.
6. Tap Delete.
7. Tap Yes.
8. Tap Done.

To remove the software from your PC:

1. From your PC's task bar, click

2. Select Settings, and then Control Panel from the pop-up menu.
3. Double-click the Add/Remove Programs icon.
4. From the Install/Uninstall tab, select the Dualwave M application.
5. Click

Using Your Dualwave M



Ensure your Dualwave M is fully charged, the Modem Tools software has been installed and the unit is attached to the PDA before use, as described earlier.

Press the On/Off button on the Dualwave M. The On/Low battery indicator should display slow flashing green (once per second). If it displays flashing red, the battery needs charging. See the previous section, Charging the Dualwave M's Battery on page 13, for further information.

The Online indicator will display slow flashing green (once per second) when the modem has registered with the wireless network.

Switch your PDA on. The PDA is now ready for use.

Note: *The network profile is set by default for the Dualwave M to be used in U.S.A. To use the Dualwave M in Canada, this setting must be changed. See page 20 for information on changing the network profile.*

Modem Tools Application

Modem Tools is a PDA application consisting of a single screen with four tabs. These four tabs are described in the following sub-sections.

To access Modem Tools, tap the Modem Tools icon from the main screen. By default the Info tab is displayed.

Info Tab

This tab displays the following information about the Dualwave M attached to the PDA:

	This indicates the status of the battery. Low battery levels can affect the connection.
Serial No.	Serial number of the modem.
LLI	Logical Link Identifier. This is the unique identity of the modem.
Channel	Radio channel currently being used by the modem.
Signal	The relative signal strength indicator (RSSI) measured in dBm.
Status	Indicates whether the modem is in or out of radio range.
Version	Shows the Version number of the firmware in the modem.

Setup Tab

This tab displays the following information:

Power Tap to switch Dualwave M on or off.

Vibrator By default the vibrator is on. This allows the Dualwave M to vibrate for three seconds after receipt of a radio message.

Network Profile You may select a network profile from those stored in the modem. Change the setting by tapping ▼ and select from the drop-down menu.

Power Save The Power Save option can greatly reduce the power consumption of your Dualwave M. The Dualwave M is designed to stay on so that it can notify you when it receives incoming messages and so you can quickly access your e-mail messages and information from the web. To conserve power, the Dualwave M can be set to one of several modes which have different power usage and latency options.
By default, the Power Save option is set to Express.
Tap ▼ and select one of the following options from the drop down menu.

Express	The power save option is disabled, shortest battery life
Min	Minimum power save. The modem wakes up and receives every 16 seconds
Average	Average power save. The modem wakes up and receives every 32 seconds
Max	Maximum power save, longest battery life

Network Tab

In order to make secure transactions via a gateway, a PDA requires a security certificate for the gateway.

This tab allows you to request a security certificate for a specified gateway and also displays a list of the host addresses of all gateways for which a certificate has been loaded on to the PDA.

To request a certificate, you must enter the host address of the gateway for which the certificate is required and then tap the Req Cert button.

If a certificate is successfully obtained and loaded on to the PDA, the host address of the gateway will be added to the list. There is no facility to remove a certificate once it has been obtained.

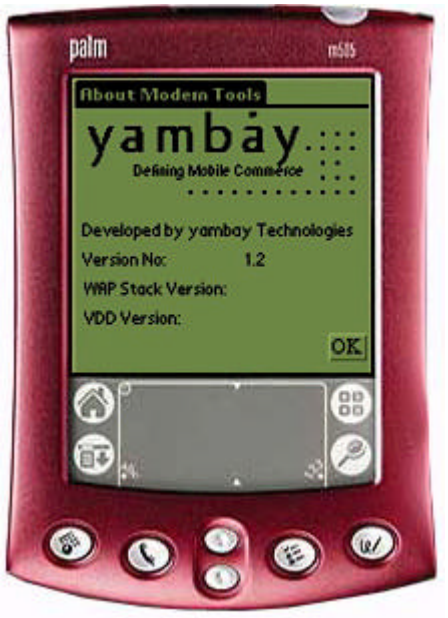
The request could fail for a number of reasons causing one of the following messages to be displayed.

Gateway Unavailable	The gateway is currently unavailable.
Out of range	The Dualwave M is not within radio range.
Timeout	The gateway has a timeout period. This message is displayed if no response is received from the gateway within 30 seconds.
Unknown Error	Indicates that some other failure occurred.

Wakeup Tab

This tab displays a list of applications on your PDA that are registered for wakeup.

About Modem Tools



This screen is displayed by tapping the icon, which appears in the top right hand corner of the Modem Tools screens.

The following information is displayed:

Version No.	The version number of Modem Tools.
WAP Stack Version	The WAP stack used to build Modem Tools.
VDD Version	The Virtual Device Driver (VDD) installed on the PDA.

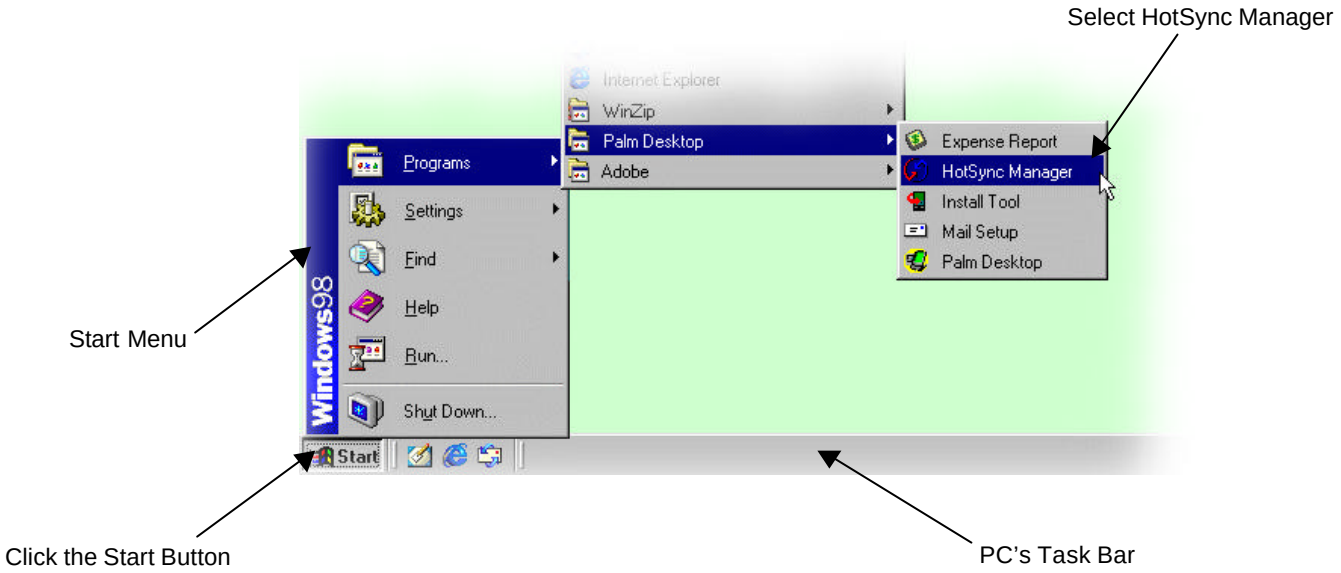
Tap the OK button to return to the Main screen.

Synchronising Data Between Your PDA and Computer

To synchronise data between the PDA and your computer, refer to the instructions in your PDA User Manual. Typically, follow the procedure below:

1. Attach the Data Comms Modem connector to the Dualwave M's Data Interface port located at the front of the Dualwave M.
2. Attach the Data Comms PC USB connector to a USB port on your computer.
3. Switch your PC on.

4. Start the HotSync® Manager if it is not already running, by either:
   - Double-clicking the HotSync® Manager icon from the PC's desktop, or
   - From the PC's task bar, click Start. From the start menu, select: Programs ⇒ Palm Desktop ⇒ HotSync Manager



5. Press the HotSync® button on your PDA to start the HotSync® process.
6. Wait for a message on your computer and PDA indicating that the process is complete.

Updating Firmware on Your Dualwave M

Firmware is the resident software installed on your Dualwave M.

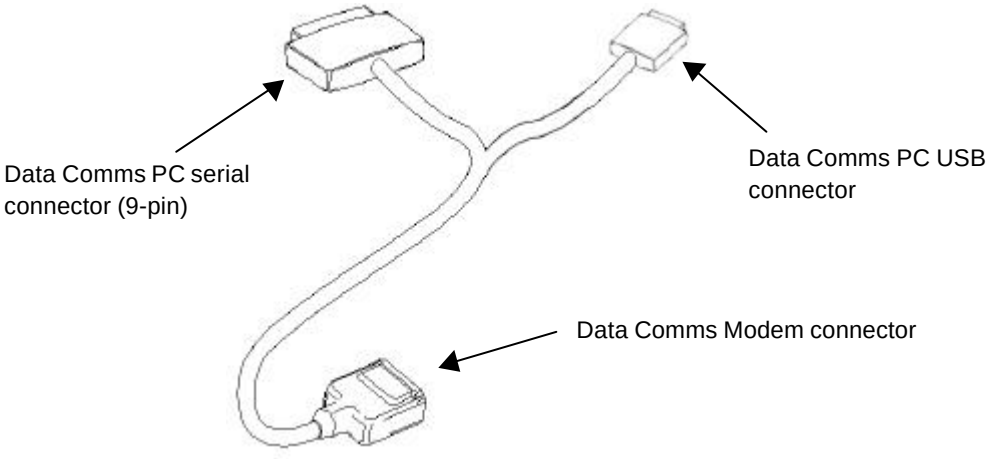
For optimum performance ensure that you are using the latest firmware version.

Follow the procedure below to check the version number of the firmware currently loaded on the Dualwave M.

1. Connect your PDA to the Dualwave M as described previously.
2. Switch your PDA on.
3. Tap the Modem Tools icon from the main screen. By default the Info tab is displayed.
4. From the Info tab, check the version number of the firmware.

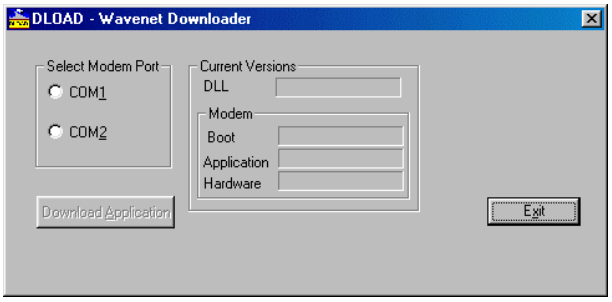
Using your web browser on your PC, navigate to the download site and check for the latest version of the Dualwave M firmware. If the version on the web is later than the firmware version on your Dualwave M, follow the procedure below.

1. From the web site, download the self-extracting file and save it to your hard drive.
2. Connect the Data Comms Modem connector to the Dualwave M's Data Interface port. This is located at the front of the Dualwave M.
3. Connect the Data Comms PC serial connector to a COM (serial) port on your computer. Note that the Data Comms PC serial connector is a 9-pin plug. If your computer has a 25-pin serial port you will need a 9-pin to 25-pin adapter.

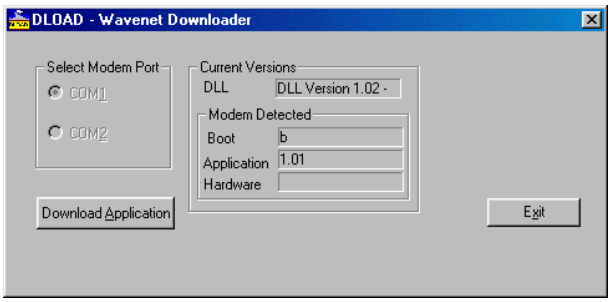


4. Press the Dualwave M's On/Off button to switch the Dualwave M on.

5. From the PC, double-click on the self-extracting file you have just downloaded to extract the contents.
6. Click the file: Loader.exe to display the following screen.



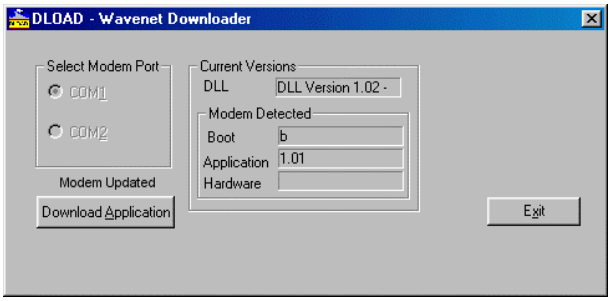
7. Select the appropriate modem port to which the Dualwave M is connected.
8. If the program recognises that the version of Firmware you are attempting to install is later than the version currently installed, the Download Application button will become enabled.



9. Click to update the firmware software.
10. A progress bar is displayed informing you of the progress of the update.
11. After the firmware has been updated, the Dualwave M is automatically switched off. A message is displayed prompting you to switch the Dualwave M on again.

12. Press the Dualwave M's On/Off button and click

13. A flashing message is then displayed above the Download Application button, indicating that the modem has been updated.



14. Click Exit to exit the program.

Check that the firmware version has been updated. Follow the procedure below to check the version number of the firmware.

1. Tap the Modem Tools icon from the main screen. By default the Info tab is displayed.
2. From the Info tab, check the version number of the firmware.

Installing New Software on Your PDA

Refer to the installation instructions that came with your software. There may be a Read Me file.

Typically, to install new software on your PDA from your PC, follow the same steps as installing the Modem Software on page 14. The exception is step 8; you must navigate to the required files, which may not necessarily be on your CD-ROM drive.

Troubleshooting

If you encounter a problem with your Dualwave M or battery charger, do not call technical support until you have reviewed the following list of frequently asked questions.

I'm getting no response from the Dualwave M.

Make sure that the Dualwave M is switched on and is fully charged. The On/Low Battery indicator should display slow flashing green (once per second).

Refer to page 13 for information on charging your Dualwave M.

If the unit is switched on and is fully charged, ensure that all the connections are secure.

The Dualwave M is fully charged and all connections are secure but I'm still getting no response.

Press the On/Off button to switch the unit off. Wait for about five seconds and press the On/Off button again to switch the unit back on. Please note that any messages currently being downloaded may be lost.

If the Dualwave M still doesn't respond, reset the unit by pressing the reset button located on the back of the Dualwave M. The reset button is recessed; simply insert the tip of your stylus or other thin blunt pointed object into the recession and press. Please note that any messages currently being downloaded may be lost.

I'm having difficulty sending and receiving messages. I'm not getting a very strong signal. I keep losing the signal.

Check the indicators. They should both display slow flashing green (once per second) when connected with the network.

Online indicator
This should display slow flashing green for a good network connection.

On/Low Battery Indicator
This should display slow flashing green to indicate that the battery is sufficiently charged.

The On/Low Battery Indicator is flashing green but the Online Indicator is showing nothing.

Check that you are in an area that provides coverage. Your network provider should have the details.

Check your network profile setting by tapping on your PDA's main screen to display the Modem Tools screen. Select the Setup tab to display the screen below:

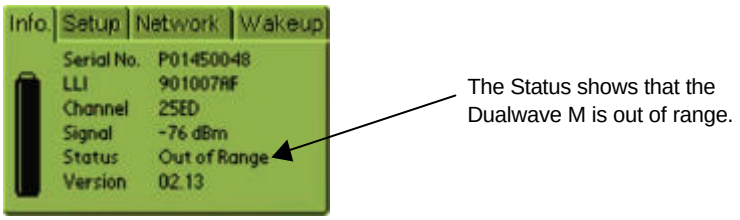
By default the Network Profile is set to Motient

Select Motient (default), if you are using your Dualwave M in U.S.A. or select Bel Mobility if you are in Canada.

Both indicators are flashing green every second but I'm still having difficulty connecting.

Check the connection status by tapping on your PDA's main screen to display the Modem Tools screen.

By default, the Info tab is displayed. Check the Status to see whether the Dualwave M is in or out of range.



What can I do to get back in range?

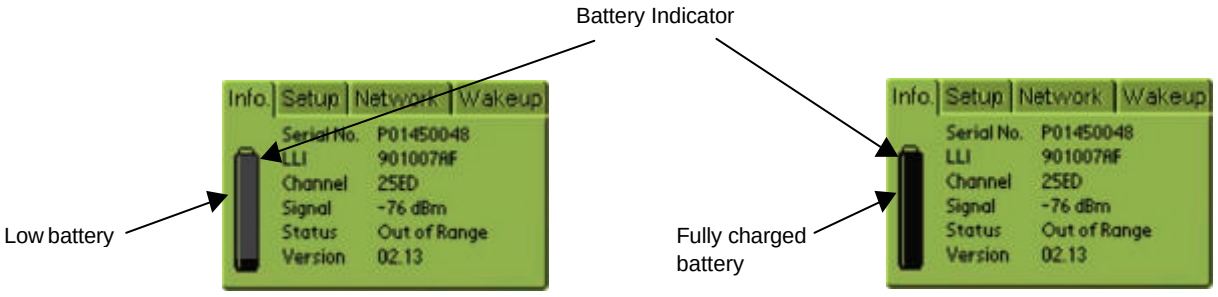
The wireless signal needs a clear path; avoid congested or metal buildings or tunnels. Tree leaves and windows may also affect the signal strength, as can environmental conditions, for example heavy rain.

Try moving away from buildings and hold the device away from your body.

The status shows that I'm in range, but I'm still having difficulty sending and receiving messages.

Check the battery level. Low battery levels can affect the connection.

Tap on your PDA's main screen to display the Modem Tools screen. Check the battery indicator and compare it with the examples below.



If the battery indicator shows that the battery capacity is low, charge the battery as described on page 13.

The Online LED is flashing quickly and I cannot access the network.

Your device has been denied access to the network. Contact your mobile network operator or supplier.

The On/Low Battery indicator is flashing red and green simultaneously.

Press the On/Off button to switch the unit off. Wait for about five seconds and press the On/Off button again to switch the unit back on. Please note that any messages currently being downloaded may be lost.

If the On/Low battery indicator is still flashing red and green simultaneously, the Dualwave M needs to be reprogrammed. See page 25 for the procedure on updating the firmware.

I tried to perform a HotSync® operation but it did not complete successfully.

Make sure HotSync® Manager is running. If the HotSync® Manager is running, exit and restart it.

Check the cable connections between the Dualwave M and the PC.

Make sure that all connectors are clean. If necessary, use a pencil eraser to clean them.

Make sure your Dualwave M resets before trying again. Turn off your modem, wait a minute and then try again.

I can't get the Dualwave M to charge.

Check that the Battery Charger LEDs are displaying red. The LEDs change to green when the PDA and Dualwave M are fully charged.

Confirm that the battery charger power cable is properly connected to the data comms PC connector.

Confirm that your battery charger is plugged into an AC outlet and that the AC outlet has power.

If you are charging both the PDA and the Dualwave M together, ensure that the PDA is connected to the Dualwave M first, before connecting the Charger.

Technical Support

If, after reviewing all the sources listed you cannot solve your problem, contact your supplier.

Care & Maintenance

Your Dualwave M is supplied maintenance free. However, periodically clean off the dirt and dust that may adhere to the exterior casing. Use the following procedures:

1. Disconnect the Battery Charger and cables from the Dualwave M.
2. Dampen a clean, soft cloth with water and wring the cloth well.
3. Use the well wrung cloth to gently remove dirt and dust.

Do not dampen the connectors or ports. Immediately remove any moisture that contacts these components by wiping them with a dry cloth.

Clean the connectors by using a pencil eraser.

Do not use a sodden cloth or apply a liquid to any portion of the Dualwave M.

Never use substances containing alcohol, thinners or benzene on the equipment. Use of these substances may deform, discolour or dissolve the casing.

The Dualwave M's lithium ion battery life will be shortened if used in extreme temperatures.

Do not use the Dualwave M at temperatures below –10°C or above 55ºC.

Do not leave the Dualwave M switched on in direct sunlight inside automobiles as the case temperature can easily exceed these limits.

Specifications

Physical Properties	
Weight	Approximately 150g
Size (L x W x H)	127mm x 80mm x 12mm
Communication Protocols	
Modem to radio network protocol	MDC, RD-LAP 3.1, 3.2, 3.3
Modem to terminal (e.g. handheld) protocol	NCL 1.2
Environmental Conditions	
Operating temperature	0°C to 45°C
Storage temperature	-20°C to 70°C
Relative humidity	5-95% Non condensing
Extreme temperature operation will degrade battery life.	
Transmitter	
Frequency range	806 – 821MHz (Public USA), 821 - 824MHz (Private USA)
	806 – 825MHz (Other than USA)
Channel spacing	25kHz (Public), 12.5 (Private)
Data rate	RDLAP 19.2kbps, RDLAP 9.6kbps
	MDC – 4.8kbps
RF output power	1.6W ± 10% (at 50 Ω antenna port)
Turn on time	< 5ms
Frequency error	± 1.5ppm
Spurious emission	< - 30dBm
Adjacent channel power	< -55dBc
Receiver	
Frequency range	851 – 866MHz (Public USA), 866 – 869MHz (Private USA)
	851 – 870MHz (Other than USA))
Channel spacing	25kHz (Public), 12.5kHz (Private)
Settling time	< 5ms
Sensitivity	< -112dB at 5% PER
Spurious emission (of modem in receive mode)	< -57dBm
Channel selectivity	> 50dB (5kHz dev 1kHz tone)
Spurious rejection	> 70dB
Image rejection	> 60dB
RSSI	-120dBm ~ -45dBm

Ports		
Communications Serial Port	RS-232 compatible serial port, operating speeds 9600 baud	
PDA Port	RS 232 compatible serial port 9600 baud	
LED Indicators		
Power on/off and battery status	Flashing green -	power on, battery charged
	Flashing red -	low battery
	Rapid flashing red	very low battery
Online	Flashing green -	online
Battery		
Lithium-ion battery (3.6V)	1300mA/hour 3.6V nominal	
Life	5 days standby, 14 hours communication time	
Size (L x W x H)	33mm x 47mm 8mm	
Temperature range	0°C to 45°C	
Protection circuit	Prevents overcharge and deep discharge	
Battery Charger		
External dual output 4.2 / 5 V DC battery charger		
Type	Constant current / constant voltage cycle +5V fixed voltage	
Weight	Approx. 500g	
Size (L x W x H)	100mm x 50mm x 40mm	
Operating temperature	0°C to 50°C	
Storage temperature	-20°C to 70°C	
Maximum charge current	600mA (modem), 400mA (PDA)	
Maximum charging voltage	4.2V (modem), 5V (PDA)	
Mains voltage range	100 ~ 250V AC (50 ~ 60Hz)	
Typical charge time	4 hours	
LED indicators	Two, modem and PDA	
	Green:	Fully charged
	Red:	Charging
	Flashing red:	Error