

**TM8260** Dual Radio Systems

# Installation and Programming Guide



MMA-00041-01  
Issue 01  
March 2006

## Contact Information

### Tait Radio Communications Corporate Head Office

Tait Electronics Ltd  
P.O. Box 1645  
Christchurch  
New Zealand

For the address and telephone number of regional offices, refer to the TaitWorld website:

Website: <http://www.taitworld.com>

### Technical Support

For assistance with specific technical issues, contact Technical Support:

E-mail: [support@taitworld.com](mailto:support@taitworld.com)

Website: <http://support.taitworld.com>

## Copyright and Trademarks

All information contained in this manual is the property of Tait Electronics Limited. All rights reserved.

This manual may not, in whole or in part, be copied, photocopied, reproduced, translated, stored, or reduced to any electronic medium or machine-readable form, without prior written permission from Tait Electronics Limited.

The word TAIT and the TAIT logo are trademarks of Tait Electronics Limited.

All trade names referenced are the service mark, trademark or registered trademark of the respective manufacturers.

## Disclaimer

There are no warranties extended or granted by this manual. Tait Electronics Limited accepts no responsibility for damage arising from use of the information contained in the manual or of the equipment and software it describes. It is the responsibility of the user to ensure that use of such information, equipment and software complies with the laws, rules and regulations of the applicable jurisdictions.

## Enquiries and Comments

If you have any enquiries regarding this manual, or any comments, suggestions and notifications of errors, please contact Technical Support.

## Updates of Manual and Equipment

In the interests of improving the performance, reliability or servicing of the equipment, Tait Electronics Limited reserves the right to update the equipment or this manual or both without prior notice.

## Intellectual Property Rights

This product may be protected by one or more patents of Tait Electronics Limited together with their international equivalents, pending patent applications and registered trade marks: NZ338097, NZ508054, NZ508340, NZ508806, NZ508807, NZ509242, NZ509640, NZ509959, NZ510496, NZ511155, NZ511421, NZ516280/519742, NZ519118, NZ519344, NZ520650/537902, NZ521450, NZ524509, NZ524537, NZ524630, NZ530819, NZ534475, NZ534692, NZ535471, NZ536945, NZ537434, NZ534369, NZ522236, NZ524378, AU2003281447, AU2002235062, AU2004216984, CA2439018, EU03784706.8, EU02701829.0, EU04714053.8, GB23865476, GB2386010, GB0516094.0, GB0516092.4, US09/847322, US60/613748, US60/539617, US10/520827, US10/468740, US5,745,840, US10/520827.

## To Our European Customers



Tait Electronics Limited is an environmentally responsible company which supports waste minimization and material recovery. The European Union's Waste Electrical and Electronic Equipment

Directive requires that this product be disposed of separately from the general waste stream when its service life is over. Please be environmentally responsible and dispose through the original supplier, your local municipal waste "separate collection" service, or contact Tait Electronics Limited.

# Contents

---

<b>Preface</b> .....	<b>5</b>
Scope of Manual .....	5
Associated Documentation .....	5
Document Conventions .....	5
<b>Safety Warnings</b> .....	<b>7</b>
RF Exposure Hazard .....	7
Safe Radio Mounting .....	7
Interference with Vehicular Electronics .....	8
Preparation when Drilling Holes .....	8
Vehicles Powered by Liquefied Petroleum Gas .....	8
Radio Installation in Gas or Fuel tankers .....	8
Non-standard Radio Installations .....	9
Negative Earth Supply .....	9
<b>1 Preparing the Installation</b> .....	<b>11</b>
1.1 Regulations .....	11
1.2 Installation Tools .....	11
1.3 Unpacking and Checking the Equipment for Completeness .....	11
1.4 Installation Considerations .....	12
1.5 Installation Overview .....	13
<b>2 Installing a Dual-Radio System</b> .....	<b>15</b>
2.1 Installing a Basic Dual-Radio System .....	15
2.2 Advanced Dual-Radio Installation .....	27
2.3 Checking the Installation .....	28
<b>3 Programming the Radio System</b> .....	<b>31</b>
3.1 Programming a Dual-Radio System .....	31
3.2 Recommended Dual-Radio Settings .....	32
3.3 Upgrading Radio Firmware .....	34
3.4 Calibrating the Radio System .....	34
3.5 Troubleshooting .....	35
<b>4 Checklist: Dual-Radio System</b> .....	<b>37</b>
<b>5 Glossary</b> .....	<b>39</b>
<b>Tait General Software Licence Agreement</b> .....	<b>41</b>



# Preface

---

## Scope of Manual

This manual describes the installation and programming of TM8260 dual mobile radio systems. A dual radio system is where one control head is connected to two radio bodies.

The installation of accessories (such as the cross-band repeater cable) and mounting options is described in the installation instructions provided with the equipment, and the relevant section in the service manual.

## Associated Documentation

TM8260 User's Guide (MMA-00040-xx)

TM8200 Programming Application Online Help

TM8100/TM8200 Service Manual (MMA-00005-xx)

Technical notes are published from time to time to describe applications for Tait products, to provide technical details not included in manuals, and to offer solutions for any problems that arise.

All available TM8200 product documentation is provided on the CD supplied with the service kit<sup>1</sup>. Updates may also be published on the Tait support website.

## Document Conventions

Within this manual, four types of alerts are given to the reader: Warning, Caution, Important and Note. The following paragraphs illustrate each type of alert and its associated symbol.



**Warning!!** This alert is used when there is a potential risk of death or serious injury.



**Caution** This alert is used when there is the risk of minor or moderate injury to people.



**Important** This alert is used to warn about the risk of equipment damage or malfunction.



**Note** This alert is used to highlight information that is required to ensure procedures are performed correctly.

---

1. Technical notes are only available in PDF format from the Tait support website. Consult your nearest Tait Dealer or Customer Service Organization for more information.

Within this manual, the following symbols are used to highlight differences between the 40 W/50 W and the 25 W radios:



This symbol highlights information that is relevant to 40 W/50 W radios.



This symbol highlights information that is relevant to 25 W radios.

# Safety Warnings

---

This section contains important information on the safe installation of the radio. You must read this information before starting the installation.

You must also read and observe the safety information on radio operation provided in the user's guide.

## RF Exposure Hazard

To comply with FCC RF exposure limits:



For 40W/50W radio bodies:

- VHF radios must be installed using an antenna mounted centrally on the vehicle roof, with a gain of 2.15 dBi or 5.15 dBi.
- UHF radios must be installed using an antenna mounted either centrally on the roof with a gain of 2.15 dBi or 5.65 dBi, or centrally mounted on the trunk with a gain of 5.65 dBi.



For 25W radios:

- The radio must be installed using an externally mounted antenna with a gain of either 2.15 dBi or 5.15 dBi.

In all cases, an antenna must not be mounted at a location such that any person or persons can come closer than 35 inches (0.9m) to the antenna.

## Safe Radio Mounting



**Warning!!** Mount the radio securely so that it will not break loose in the event of a collision. An unsecured radio is dangerous to the vehicle occupants.

- Mount the radios and the microphone where they will not interfere with:
  - the deployment of passenger airbags
  - the vehicle operator controls
  - the vehicle operator's view.
- Do not mount the radio bodies vertically, with the remote interface facing down. This will violate compliance with the standards UL/CSA/EN 60950, Safety of Information Technology Equipment.

## Interference with Vehicular Electronics



**Warning!!** Some vehicular electronic devices may be prone to malfunction due to the lack of protection from RF energy when your radio is transmitting.

Examples of vehicular electronic devices that may be affected by RF energy are:

- electronic fuel injection systems
- electronic anti-skid braking systems
- electronic cruise control systems
- indicators.

If the vehicle contains such equipment, consult the vehicle manufacturer or dealer to determine whether these electronic circuits will perform normally when the radio is transmitting.

## Preparation when Drilling Holes



**Warning!!** When drilling holes in the vehicle, check that drilling at the selected points will not damage existing wiring, petrol tanks, fuel lines, brake pipes, or battery cables.

## Vehicles Powered by Liquefied Petroleum Gas



**Warning!!** Radio installation in vehicles powered by LPG (liquefied petroleum gas) with the LPG container in a sealed-off space within the interior of the vehicle must conform to the National Fire Protection Association Standard NFPA 58. This standard states that the radio equipment installation must meet the following requirements:

- The space containing the radio equipment shall be isolated by a seal from the space containing the LPG container and its fitting.
- Outside filling connections shall be used for the LPG container and its fittings.
- The LPG container space shall be vented to the outside of the vehicle.

## Radio Installation in Gas or Fuel tankers

Special conditions must be observed when installing a radio on gas and fuel tankers. Consult your radio provider or Tait-accredited service center for more details.



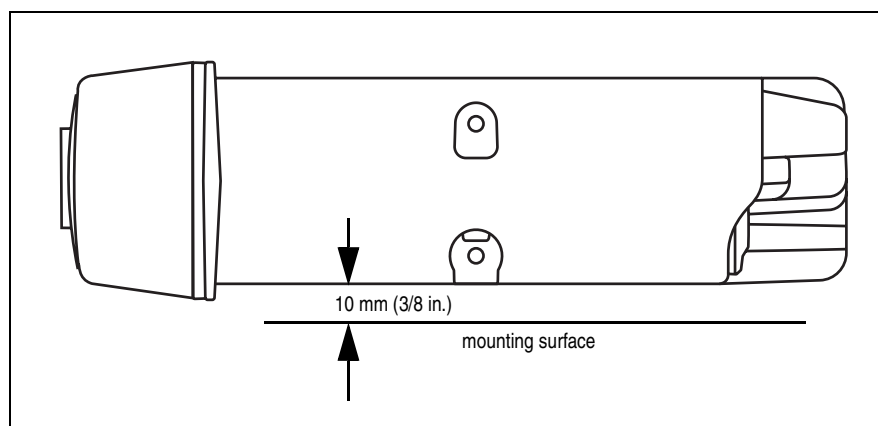
## Non-standard Radio Installations

The installation U-bracket has been designed so that there is enough airflow around the radio body to provide cooling.

If a non-standard installation method is used, care must be taken that sufficient heat can be dissipated from the heatsink fins and the ridged bottom surface of the radio.

For this to be achieved, there must be a gap of more than 10 mm (3/8 inch) between the bottom surface of the radio chassis and the mounting surface. This is illustrated in [Figure A](#).

**Figure A** Gap between radio chassis and mounting surface



## Negative Earth Supply

The radios are designed to operate only in a negative earth system.



# 1 Preparing the Installation

---

This section contains the following information:

- Regulations
- Installation Tools
- Unpacking and Checking the Equipment for Completeness
- Installation Considerations
- Installation Overview.

## 1.1 Regulations

### **MPT 1362 Code of Practice**

TM8260 mobile radio systems should be installed in accordance with the MPT 1362 Code of Practice.

### **Vehicle Manufacturer's Installation Instructions**

Follow your vehicle manufacturer's instructions for installing mobile radios. For more information, refer to the vehicle manufacturer's website or contact the vehicle manufacturer's dealer.

## 1.2 Installation Tools

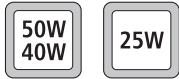
The following tools are required to install the radio system:

- drill and drill bits
- 5mm (3/16 inch) flat-bladed screwdriver
- Torx T-10 screwdriver
- Torx T-20 screwdriver
- Pozidriv screwdriver
- 8 mm (5/16 inch) socket
- wire cutters/strippers
- RF connector crimp tool
- fuse crimp tool
- in-line RF power meter capable of measuring forward and reflected power at the operating frequency of each radio.

## 1.3 Unpacking and Checking the Equipment for Completeness

To install a dual-radio system (two radio bodies connected to one control head), you require the following equipment:

- 2 x TM8260 radio bodies (for example, TMAB22-B100B and TMAB22-H600B).
- 2 x body remote interfaces (TMAC31-0T).



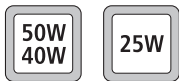
- 2 x installation kits suitable for the radio bodies, for example, the TMAA03-17 installation kit (40 W/50 W radios), or TMAA03-01 installation kit (25 W radios).



**Note** Installation kits are also available without the U-bracket included and with other antenna connector options. Other cradle mounting arrangements are also available. Consult your nearest Tait Dealer or Customer Service Organization for more information.



**Warning!!** Danger of fire. The radio's protection mechanisms rely on the correct fuses on both the negative and positive power supply leads being present. Failure to fit the correct fuses may result in fire or damage to the radio. The correct fuse types are:



- 40 W/50 W radios: 20 A fuses (Tait IPN 365-00010-81)
  - 25 W radios: 10 A fuses (Tait IPN 365-00010-80).
- TM8200 graphical-display control head (TMAC40-1T).
  - control head remote kit (TMAA03-03).
  - any supported TM8000 microphone, for example, rugged (TMAA02-01) or keypad (TMAA02-08).
  - control head remote cable (TMAA04-01).
  - radio connecting cable (TMAA04-03).
  - 2 x antennas and antenna coaxial cable.

The following equipment is optional, and enables additional features that do not come as standard with TM8260 radio systems. This equipment may need to be ordered separately.

- 2 x remote speakers (TMAA10-03).
- cross-band linking, GPS, and external interface cable (TMAA04-06)
- components to connect the radio system to an external alert device.
- components to connect the radio system to an ignition signal.
- GPS antenna/receiver (TMAA05-01) with plate mount (TMAA05-03) or magnetic mount (TMAA05-04).

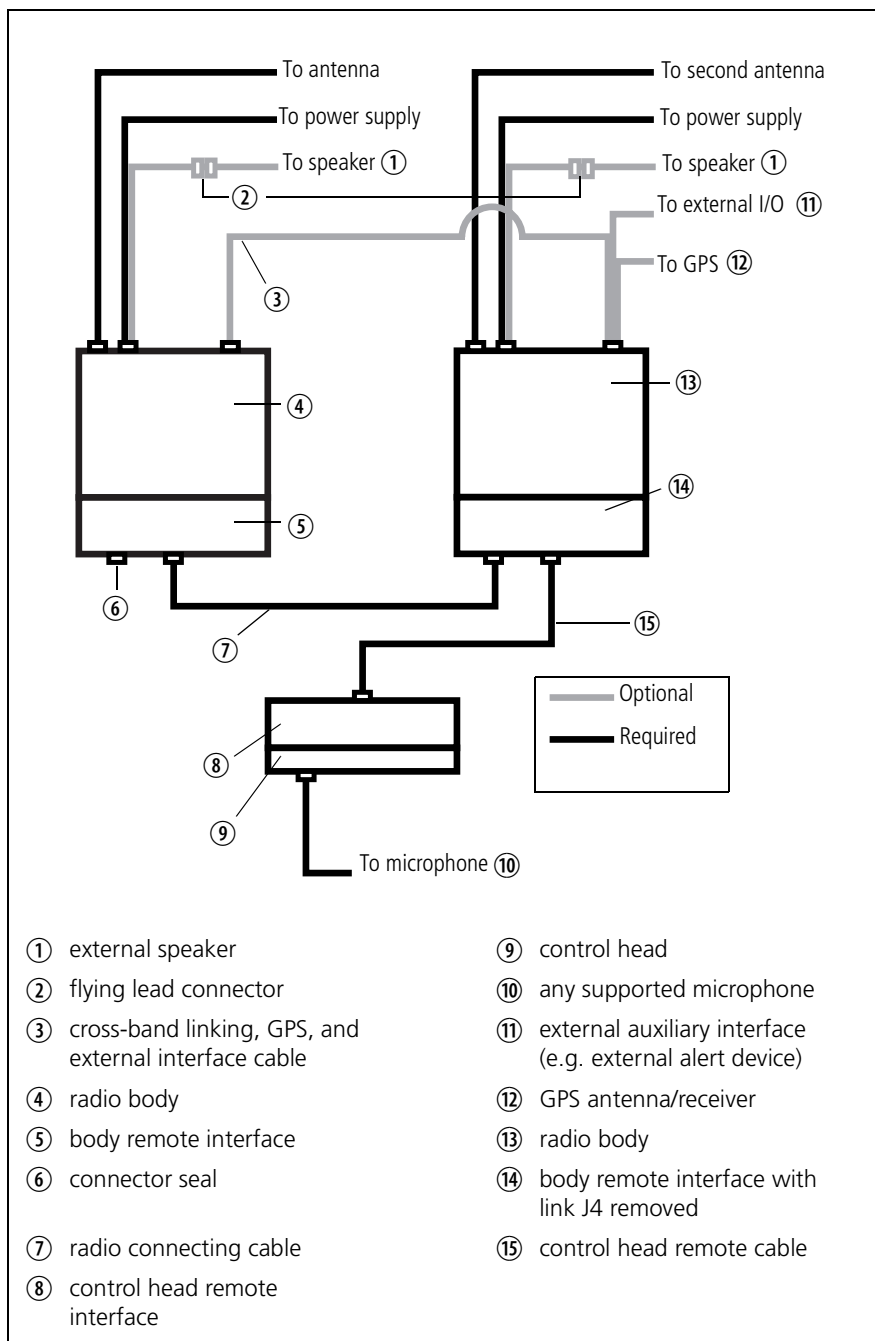
## 1.4 Installation Considerations

Inspect the vehicle and determine the safest and most convenient position for mounting the radio bodies and control head, and routing the various cables. The radio bodies must be no further than 1.5m (4.9ft.) apart. The control head must be no further than 6m (19.6ft.) from a radio body.

## 1.5 Installation Overview

Figure 1.1 summarizes how the components in a TM8260 dual-radio system are installed. For more detailed instructions, see “Installing a Dual-Radio System” on page 15.

Figure 1.1 TM8260 installation overview





## 2 Installing a Dual-Radio System

---

This section contains the following information:

- Installing a Basic Dual-Radio System
- Advanced Dual-Radio Installation
- Checking the Installation.

### 2.1 Installing a Basic Dual-Radio System

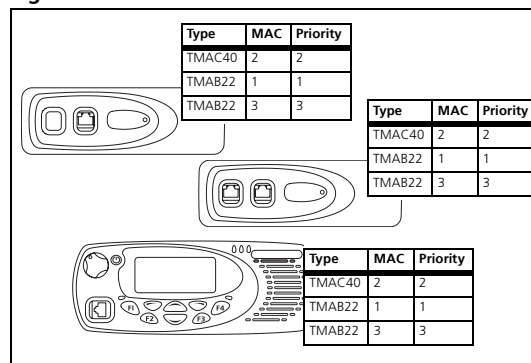
To install a basic dual-radio system:

1. Download MAC addresses to all devices in the system. See [“Downloading MAC Addresses” on page 16](#).
2. Remove link J4 from the radio body interface that will be connected to the control head. See [“Removing Link J4” on page 17](#).
3. Assemble the body interfaces. See [“Assembling the Body Interfaces” on page 19](#).
4. Assemble the control-head interface. See [“Assembling the Control Head Interface” on page 20](#).
5. Mount the control head and radio bodies. See [“Mounting the Control Head and Radio Bodies” on page 21](#).
6. Install the antennas. See [“Installing the Antennas” on page 21](#).
7. Connect the control head and radio bodies. See [“Installing the Control Head Remote and Radio Connecting Cables” on page 23](#).
8. Connect the radios to a power source. See [“Connecting the Power Cables to a Power Source” on page 25](#).
9. Program the radio system. See [“Programming a Dual-Radio System” on page 31](#).

## 2.1.1 Downloading MAC Addresses

Every device in a dual-radio system must have a system configuration table (SCT) downloaded, with unique MAC (media access control) addresses (Figure 2.1). This enables you to read, program, calibrate, and upgrade all devices in the radio system via the control head microphone port. Complete the following steps after unpacking the radio system, but **before** installing the remote interfaces and assembling and mounting the system.

Figure 2.1 Devices with SCTs downloaded



1. From the Programming Application, click Tools > Multiple Device Configuration.
2. Make sure a table similar to Figure 2.2 is displayed in the dialog.



**Note** The radio body with the lowest MAC address determines the foreground radio each time the system is turned on.

Either:

- click File > **Open**, and open the device configuration file for the system, or
- click Edit > **Add Device** and define the table.

Figure 2.2 Example of a system configuration table

Type	Name	MAC	Priority
Head (TMAC40)	Head	2	2
Body (TMAB22)	VHF Radio	1	1
Body (TMAB22)	UHF Radio	3	3



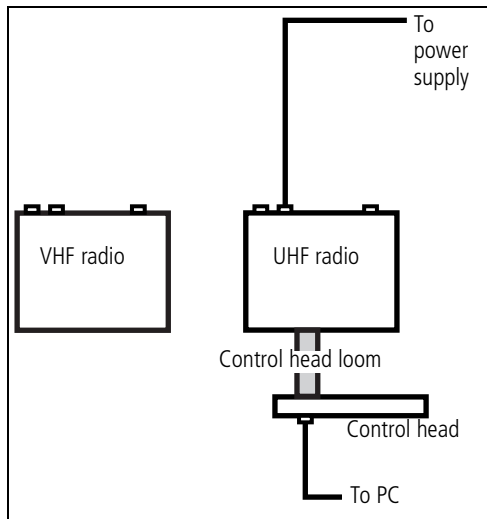
**Important** The system configuration table must be downloaded to devices in the order stated within these steps. If not, then the control head may receive the same address as a radio body and you will no longer be able to communicate with all or part of the system.



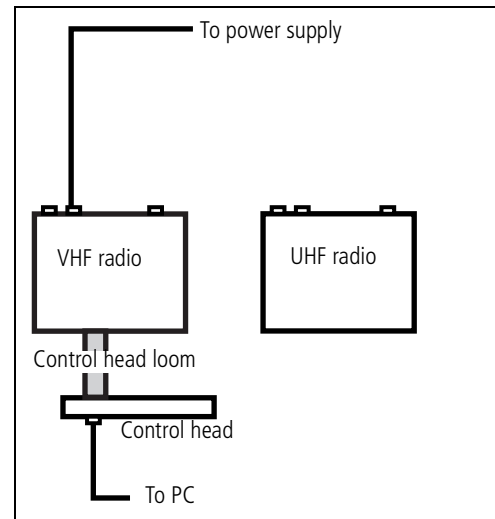
**Important** The entire table must be downloaded to each device, not just information about the device that the table is intended for. See Figure 2.1.



**Figure 2.3 UHF radio body connected directly to the control head**



**Figure 2.4 VHF radio body connected directly to the control head**



3. Connect the control head directly to the radio body that you want to assign with the highest numerical MAC address value (in the example table in [Figure 2.2](#), this is the UHF radio), and apply power. See [Figure 2.3](#).



**Important**

Connect **one** radio body at a time. Do not attempt to download MAC addresses if both radio bodies are connected together and have power applied.

4. Connect the control head microphone port to your PC.
5. Click Radio > **Download MAC Address**, and download the table to device TMAB22 with the higher address.
6. Connect the control head directly to the radio body that will have the lowest numerical MAC address value (in the example table in [Figure 2.2](#), this is the VHF radio), and apply power. See [Figure 2.4](#).
7. Click Radio > **Download MAC Address** again, and download the same table to device TMAB22 with the lower address.
8. Click Radio > **Download MAC Address** a third time, and download the same table to the control head (device TMAC40).
9. Check that all red indicators in the table are now green.

## 2.1.2 Removing Link J4

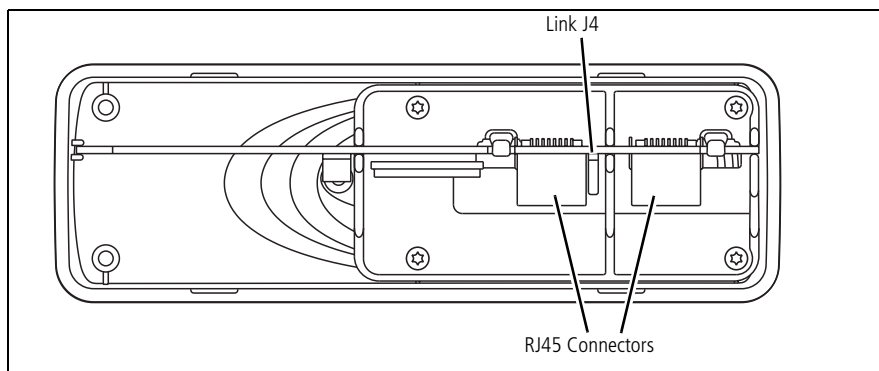
Every body remote interface (TMAC31-0T) is manufactured, by default, with a 120Ω termination resistor across the RS485 signal lines. The control head remote (TMAA03-03) also has this termination.

This termination is required at the ends of an RS485 network. In the case of a TM8260 dual-radio system, the radio body interface with the two connections (to the control head and to the other radio body) is a node on the network and must not have this termination.

To remove this termination, use your fingernail (or similar) to remove the jumper (shorting link) J4. Link J4 is located between the two RJ45 connectors (see [Figure 2.5](#)), and can be removed without removing the PCB.

This must only be removed on the body remote interface connected to the control head (see [“Installation Overview” on page 13](#)), and can only be removed when the interface is separate from the radio body. If the interface has already been installed, see [“Removing the Body Interface”](#) below.

**Figure 2.5 Location of Link J4**

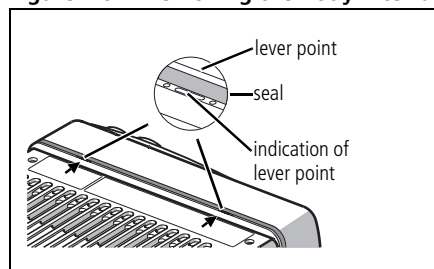


**Removing the Body Interface**

1. On the underside of the radio, insert a 5mm (3/16in.) flat-bladed screwdriver between the body interface and the seal, in the positions shown ([Figure 2.6](#)).

Insertion points and are lever points and are indicated on the radio chassis by a dot-dash-dot pattern (•—•).

**Figure 2.6 Removing the Body Interface**



**Caution** Take care that the seal is not damaged. Damage to this seal reduces environmental protection.

2. Use the screwdriver to lift the remote interface off the chassis clip, then repeat in the other position.  
You should now be able to inspect, and if necessary remove, shorting link J4. It is not necessary to remove the body interface loom or the earthing tag to remove the link.

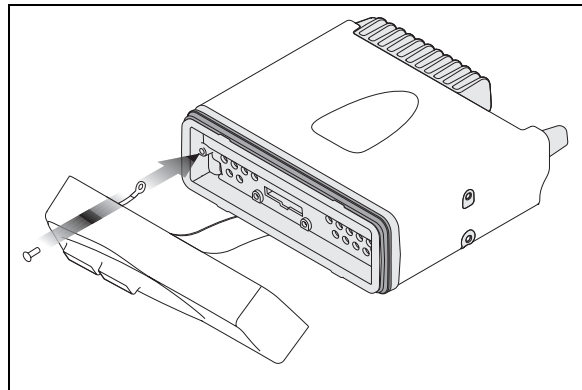
### 2.1.3 Assembling the Body Interfaces

The following steps show how to connect a body remote interface to a radio body. Complete these steps for both radio bodies.

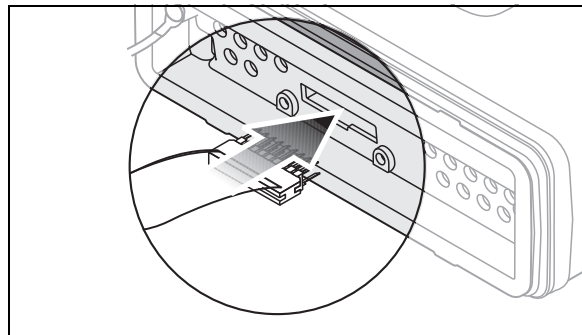


**Important** One remote interface must have link J4 removed. See [“Removing Link J4” on page 17](#) for more information. After you install the interface with link J4 removed, make sure you can identify that radio body when connecting the cables afterwards.

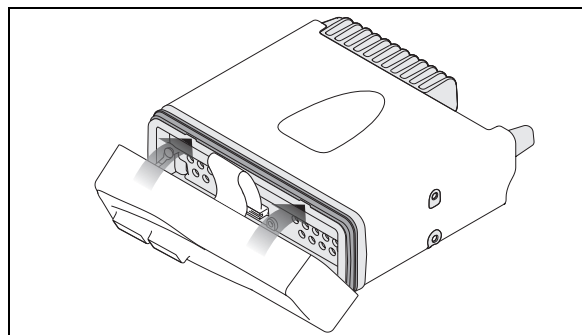
1. Screw the earthing tag onto the left screw boss on the radio chassis, using the Torx T-10 screw provided.



2. Plug the body-interface loom onto the control-head connector.



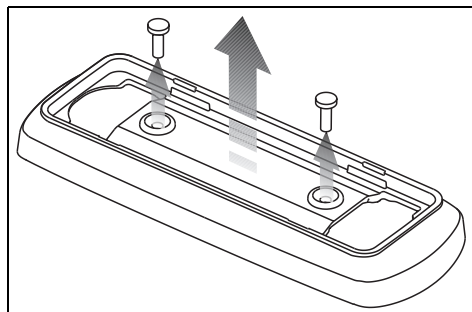
3. Insert the bottom edge of the control head onto the two clips in the front of the radio chassis, then snap into place.



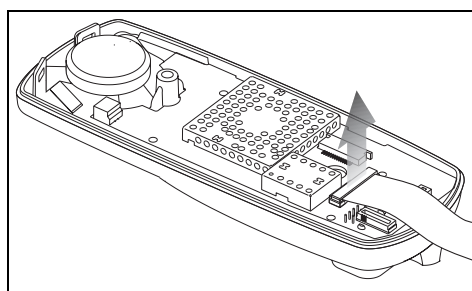
## 2.1.4 Assembling the Control Head Interface

The following steps show how to connect the control head remote interface to the control head.

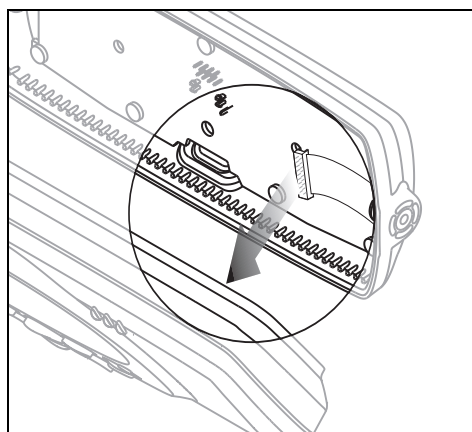
1. Undo the two Torx T-20 screws and remove the adaptor flange.



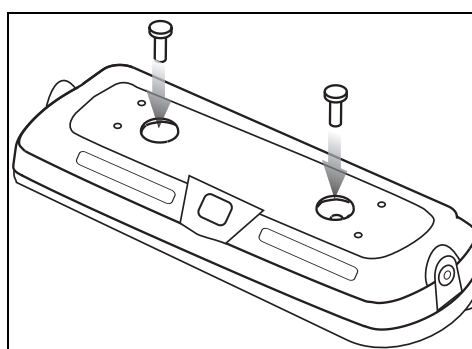
2. Unplug the control-head loom and discard.



3. Plug the control-head interface loom into the connector on the control head.



4. Use the two Torx T-20 screws from the first step to fit the control-head remote interface to the control head. Be careful not to damage the space-frame seal.



## 2.1.5 Mounting the Control Head and Radio Bodies

Use the bracket and screws provided to mount the control head. The control head must be no further than 6m (19.6ft.) from a radio body.

Mount the two radio bodies no further than 1.5 metres (4.9ft.) apart using the preferred mounting method (such as U-brackets, slide-in cradles, or security brackets).

For more information, refer to the instructions included with the cradle or bracket installation kit.

## 2.1.6 Installing the Antennas

A separate antenna for each radio is recommended, rather than a single antenna configuration (such as a multi-band antenna with a duplexer or splitter). See [“Installation Overview” on page 13](#). Use ground-independent antennas if no suitable ground plane is available.

It is important that the antennas are separated as far as possible from each other to reduce interference. MPT 1362 recommends a separation of at least  $\frac{1}{4}$  wavelength for transmit frequencies below 600 MHz and one wavelength for transmit frequencies above 600MHz. See [Table 2.1](#) below, and [“Regulations” on page 11](#).

If dual-transmit will be used for extended periods of time, the antennas must be separated even further (such as on opposite widths of the vehicle).

**Table 2.1 Approximate frequency to wavelength conversion**

Band Name	Frequency (MHz)	Wavelength (cm)	1/4 Wavelength (cm)
A4 (lower range)	66	454	114
A4 (upper range)	88	341	85
B1 (lower range)	136	220	55
B1 (upper range)	174	172	43
H6 (lower range)	450	67	17
H6 (upper range)	530	57	14

Install the antennas according to the antenna manufacturer's instructions. Good quality 50Ω coaxial cable must be used, such as RG58 or UR76.



### Important

Route the cables in a manner that minimizes:

- coupling into the electronic control systems of the vehicle
- coupling of electric vehicle systems, such as alternators, into the radio

Avoid sharp bends in the cables. These distort the cable and alter its electrical characteristics.



### Warning!! RF exposure hazard

To comply with FCC RF exposure limits:

1. Mount the antennas at a location such that no person or persons can come closer than 35 inches (0.9m) to the antenna.



2. For 40W/50W radios:

- VHF radios must be installed using an antenna mounted centrally on the vehicle roof, with a gain of 2.15dBi or 5.15 dBi.
- UHF radios must be installed using an antenna mounted either centrally on the roof with a gain of 2.15 dBi or 5.65 dBi, or centrally mounted on the trunk with a gain of 5.65 dBi.

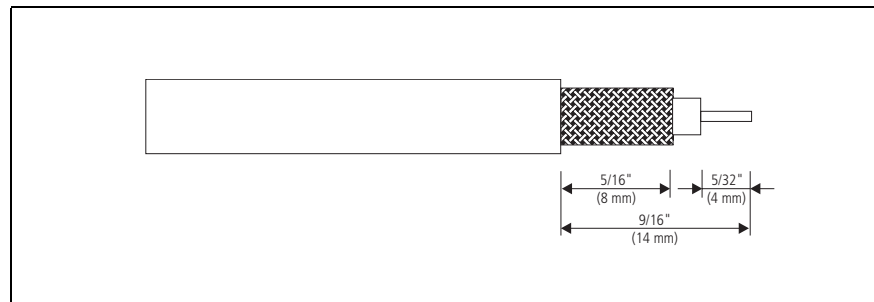


3. For 25W radios, the radio must be installed using an externally mounted antenna with a gain of either 2.15 dBi or 5.15 dBi.

### Terminating the Antenna Cable

1. Run one antenna cable (not supplied) from an antenna to the mounting location of the matching radio body. Cut the cable to length, allowing approximately 20 cm (8in.) excess at the radio end.
2. Terminate the free end of the antenna cable with the mini-UHF plug or BNC plug (supplied) as shown in [Figure 2.7](#).
3. Repeat steps 1 and 2 for the other antenna and matching radio body.

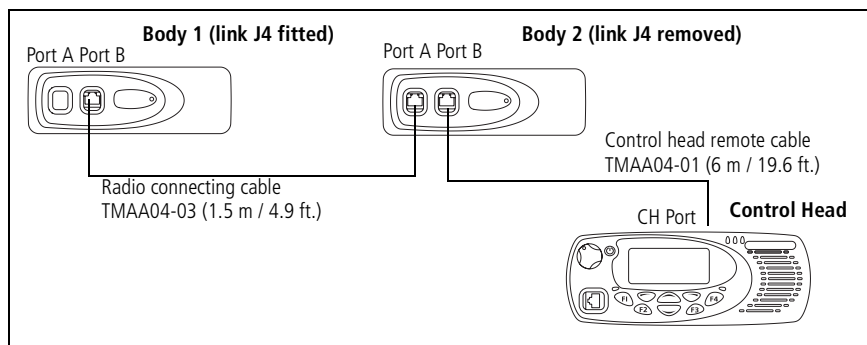
Figure 2.7 Terminating the antenna cable



## 2.1.7 Installing the Control Head Remote and Radio Connecting Cables

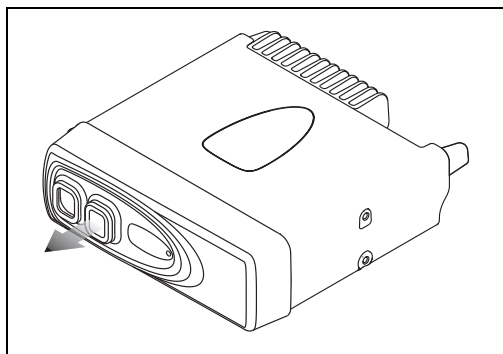
Figure 2.8 contains an overview of the connections between the radio bodies and the control head. For detailed steps, see page 23. For information on the pins and signals of all ports, see “Pins and Signals” on page 24.

Figure 2.8 Overview of connections between radio bodies and control head

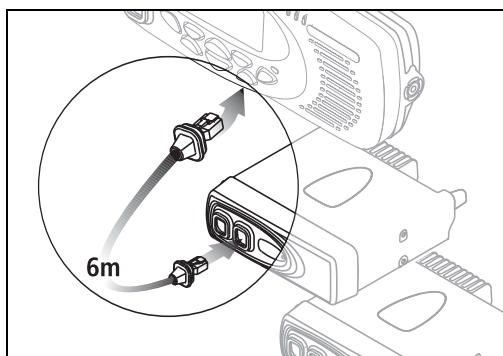


### Detailed Steps

1. Remove all connector seals.



2. Attach one end of the control head remote cable to port B of the radio body with link J4 removed.



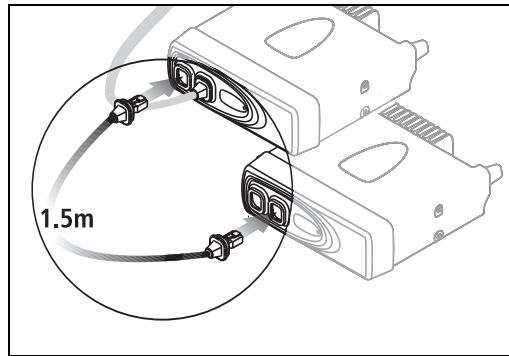
3. Attach the other end of the cable to the rear port of the control head.



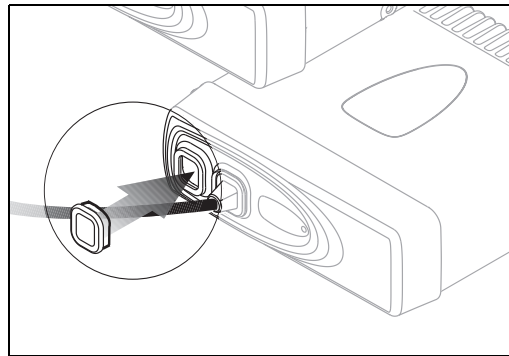
### Important

If a radio body does not have link J4 removed, or you cannot identify the correct radio body to use, you will need to disassemble one or both interfaces. See “Removing the Body Interface” on page 18 for more information.

- Attach one end of the radio connecting cable to port A of the body connected to the control head, and the other end to port B of the second body with link J4 fitted.




- Insert a connector seal in the port with no cable (port A of the body with link J4 fitted).



### Pins and Signals

The pinouts in [Table 2.2](#) are for the two RJ45 ports on the radio body interface, and single RJ45 port on the control head interface.

**Table 2.2 Remote Interface Ports—Pins and Signals**

	Pin	Name	Description
 <p>front view</p>	1	RX_AUDIO	Analogue receive audio – after volume control.
	2	13V8	Default setting is a switched +13V8 line.
	3	RS485+	RS485 data.
	4	AGND/PTT	Default setting is analogue ground.
	5	MIC AUDIO	Analogue electret mic input.
	6	RS485	RS485 data.
	7	DGND	Digital ground.
	8	ON/OFF	Radio on/off control.

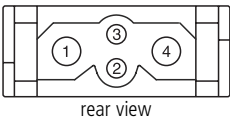
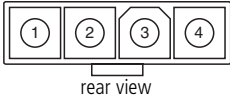


## 2.1.8 Connecting the Power Cables to a Power Source

To provide power to TM8260 radio systems, you must connect each radio body separately to a power source or sources. TM8260 radio systems do not currently support a single lead-to-battery connection.

It is important to ensure that both radio bodies have a solid and secure power supply. Unexpected behaviour can arise if the power supply to one body operates at a lower voltage than the other, or is momentarily interrupted, as might occur with a poorly formed or intermittent wiring termination.

**Table 2.3** Radio body power connector—pins and signals

Pinout	Pin	Signal name	Description	Signal type
<p><b>40W/50W radio</b></p>  <p>rear view</p> <p><b>25W radio</b></p>  <p>rear view</p>	1	AGND	Earth return for radio body power source	Ground
	2	SPK-	External speaker output. Balanced load configuration	Analog
	3	SPK+	External speaker output. Balanced load configuration	Analog
	4	13V8 BATT	DC power input for radio body and control head	Power



### **Important**

Each radio is designed to operate from a nominal 12V negative ground supply. Each radio may draw up to 15A of current. Each radio will tolerate a supply voltage range of 10.8V to 16.0V at the radio.

### **Selecting the Power Source**

In passenger vehicles, the radio system is always connected directly to the battery.

In trucks, where direct connection to the battery is often not possible, each radio can be connected to a suitable terminal inside the fuse box that is connected directly to the battery.

### **24V-to-12V Converter**

In vehicles with a supply voltage larger than 16.0V, such as many trucks, it is essential to provide a suitably rated 24V-to-12V converter. This will isolate the radios from excessive battery voltage and provide the correct DC operating conditions. Note that most 24V-to-12V converters already fitted are not rated sufficiently.

### **Standby Current**

When using the ignition signal to turn off the radio system, the standby current is reduced to <6mA. Otherwise, the standby current is approximately 100mA.

### **Connecting the Power Cable**



### **Important**

Although it is possible to connect the radio system in line with the vehicle ignition, this is not recommended, as it may draw too much current and damage the vehicle wiring and steering column or ignition switch. This may also cause

the supply voltage of the radio to drop below the specified level.



**Important**

Disconnecting the vehicle's battery may cause problems with some electronic equipment, such as vehicle alarms, engine management systems, and in-car entertainment systems. Check that the vehicle owner has the necessary information to make all electronic equipment function correctly after battery reconnection.



**Important**

If the battery is not disconnected, exercise extreme caution during the installation and install the fuses only when the installation is ready to be checked. For more information, refer to [“Checking the Installation” on page 28](#).

1. Disconnect the vehicle's battery unless specifically prohibited from doing so by the customer, vehicle manufacturer, agent, or supplier.



**Important**

Route the cables in a manner that minimizes coupling of electric vehicle systems such as alternators into the radio.



**Important**

Protect the power cables from engine heat, sharp edges and from being pinched or crushed.

2. Run the power cable between one radio's mounting position and the power source and cut it to length, allowing approximately 20 cm (8 in.) excess at the radio end.
3. Plug the power cable into the power connector of the radio.
4. Cut the negative (black) and the positive (red) wires where the in-line fuse holders will be placed (as close to the power source as possible).



**Important**

Do not install the fuses until the installation is ready to be checked. For more information, refer to [“Checking the Installation” on page 28](#).

5. Insert each end of the negative wire into each of the fuse crimp-terminals and crimp them to force the metal contacts onto the wires.
6. Push the two crimp-terminals into the clear plastic fuse cover. Close the cover while the next steps are completed.
7. Repeat steps 5 and 6 for the positive wire.
8. Connect the negative wire to the battery ground terminal.
9. Connect the positive wire to the battery positive terminal.
10. Repeat steps 2 to 9 for the other radio body.



**Important**

Do not install the fuses until the installation is ready to be checked. For more information, refer to [“Checking the Installation” on page 28](#).

### Power During Radio Operation

The power to both radio bodies must be present before turning the radio on. It is not recommended that you plug or unplug power to one radio body while operating the radio.

In the event that power to one radio body is disrupted, and immediately following first application of power after installation, the radio must be switched off and on again via the on/off key on the control head.

If there is no power supply to one radio body after the radio system is switched on, the other body and control head will continue to operate as a single radio unit.

## 2.2 Advanced Dual-Radio Installation

This section contains the following information about additional features:

- Connecting Remote Speakers
- Connecting the Cross-band Linking, GPS, and External Interface Cable

### 2.2.1 Connecting Remote Speakers

Remote speakers can be installed with one or both radio bodies, to operate in parallel with the control head's existing internal speaker. The remote speakers can be installed at some distance from the control head, or can be used to increase the volume of the audio from the internal speaker.

The remote speaker will only sound audio from the radio that it is connected to. Audio is never fed to a remote speaker from the other radio body. If a radio is at the background and dual receive is activated, the attached remote speaker will sound received audio from that radio at a reduced volume. If a radio is at the foreground, the attached remote speaker will sound received audio from that radio at full volume, and audible indicators.



The following high-power remote speakers are recommended:

- TMAA10-06 high-power remote speaker for 40W/50W radios
- TMAA10-03 high-power remote speaker for 25W radios.



If a different speaker is used, receptacles for the speaker pins of the power connector are provided with the installation kit. The installation kit also contains a flying lead connector that, when installed, enables the speaker to be easily removed and re-installed as required.

The speaker is connected to pins 2 (SPK-) and 3 (SPK+) of the power connector. See [Table 2.3 on page 25](#). For more information, refer to the installation instructions provided with the speaker, or to the relevant section of the service manual.

## 2.2.2 Connecting the Cross-band Linking, GPS, and External Interface Cable

To enable cross-band repeater operation, a linking cable TMAA04-06 must be attached between the auxiliary connectors of the radio bodies. Programmable I/O and external PTT 1 settings must also be programmed using the programming application.



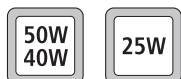
**Important** If the cable's auxiliary connectors have jackscrew-type locks, make sure they are tightly fastened.

To enable dual-body GPS operation, the linking cable also provides a single-point connection to a GPS antenna. The GPS connector is the correct type for the antenna, therefore the adaptor that is supplied with the GPS antenna is not required. For GPS information to be displayed on the radio, you must purchase and program the software feature enabling (SFE) key for GPS Support (TMAS015).

The cable also provides access to certain programmable I/O lines. These lines can be used to power a TM8260 system on using ignition sense, and provides an output for a dual-body external alert.

For more information, refer to the installation instructions included with the cable (IPN: 402-00032-xx).

## 2.3 Checking the Installation



**Warning!!** Danger of fire. The radio's protection mechanisms rely on the correct fuses on both the negative and positive power supply leads being present. Failure to fit the correct fuses may result in fire or damage to the radio. 40 W/50 W radios use 20 A fuses; 25 W radios use 10 A fuses. For part numbers of the fuses, refer to [“Unpacking and Checking the Equipment for Completeness” on page 11.](#)

1. Insert the fuses into the power leads. The radio will turn on automatically at this point.
2. Switch the radio off then on again using the front panel control, but do not transmit.
3. Connect an in-line power meter between one radio and its antenna.
4. Transmit and measure the forward and reflected power levels. Less than 4% of the forward power should be reflected. If this is not achieved, check the installation, including the antenna length.
5. Start reducing the length of the antenna in steps of 0.1 inches to 0.2 inches (2 to 5 mm). Measure the power levels at each step.



**Important** Some antennas are pre-tuned and must not be cut. Check with the manufacturers' instructions.

6. Once the reflected power levels are within tolerance, repeat steps 3, 4 and 5 for the second radio.
7. Test the dual-radio functions.
  - Compare the receive functions (such as sensitivity) of one radio, while the other radio is and is not transmitting. Ensure there is no significant difference.
  - Compare the transmit functions (such as coverage) of one radio, while the other radio is and is not transmitting.
  - Test all other functions, such as dual-receive and cross-band repeater operation. Check that those functions operate as expected.

If issues are found, move the radio bodies and/or antennas further apart and re-test.



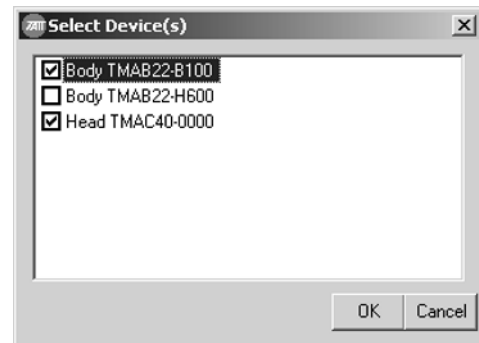
## 3 Programming the Radio System

After you have downloaded MAC addresses and assembled the system, you can select individual devices to read or program. Each time you attempt to communicate with the radio system, the Select Device(s) dialog appears (Figure 3.1).

This section contains the following information:

- Programming a Dual-Radio System
- Recommended Dual-Radio Settings
- Upgrading Radio Firmware
- Troubleshooting.

Figure 3.1 Select Device(s) dialog



### 3.1 Programming a Dual-Radio System

The following steps for programming a dual-radio system assume:

- all the devices in the system have unique MAC addresses assigned. For more information, see [“Downloading MAC Addresses” on page 16](#).
- all radio bodies in the system have the optional feature for dual-radio operation enabled. see [“Checking the Optional Feature for Multi-Body Support” on page 35](#).

#### Step 1—Create a template file

1. Using the Programming Application, enter the information into the fields that are common between the radios. See [“Recommended Dual-Radio Settings” on page 32](#).
2. Click File > **Save**.
3. Enter a descriptive name for the template, for example, "TM8260\_Master\_File".

#### Step 2—Program each device in the system

1. Using the Programming Application, open the template file created for the radio system.
2. Set the radio's **Band** (Global > Specification form).
3. Enter a **Radio Name**.



**Note** The length of the radio name restricts the length of all channel and group labels. Therefore a three-character radio name such as "UHF" or "VHF" is recommended, as it will allow group and channel labels up to 10 characters (such as "Channel 99").

4. Add all information relating to the band selected in step 2, including channels (Conventional > Channel Setup > Channels form) and groups (Scan Groups form).
5. Click File > **Save As** to save the device's file to disk as a new file.
6. Click Radio > **Program**.
7. In the Select Device(s) dialog, select the radio body that matches the Band selected in step 2, and optionally, the control head. See [Figure 3.1](#).



**Note** You cannot select more than one of the same device type (for example, two radio bodies). The Select Device(s) dialog will automatically select the radio body with the matching operating band (step 2).



**Note** The recommended sequence for programming a dual-radio system is a radio body (TMAB22-) in the first session, then the other body (TMAB22-) and the head (TMAC40-) together in the second session.

8. Repeat steps 1 to 7 and program the other radio body and the control head.

## 3.2 Recommended Dual-Radio Settings

The programming configuration of all devices must be as similar as possible, with the exception of the operating band, radio name, channels and groups. If features relating to the user interface (such as function keys, radio menus, and backlighting), and other features like the security lock are different, there may be unexpected behaviour when powering on or switching between the radios.

The following settings are recommended for a dual-radio system. Use this table when setting up a template file, before programming the system (see [“Programming a Dual-Radio System”](#) on page 31).

Field/Feature	Location	Comments
Radio Name	Global > Specifications form	The radio name should be different for both radio bodies in the system.
Power On Mode	Global > Start-up form	The power on mode must be set to "Power On" for all devices in the system.
Reset on Error	Global > Start-up form	All devices must be programmed to reset on a system error (Reset on Error check box selected).
Security Lock on Power Up and Security PIN	Global > Start-up form	If the security PIN is enabled, it must be enabled (and have the same PIN) for all devices in the system.



Field/Feature	Location	Comments
PTT fields	Global > PTT form	PTT settings for both radio bodies are used when in dual-transmit mode and the radio user presses the PTT. Care should be taken if programming PTT behaviour differently between the radio bodies. PTT settings are typically set the same for all devices in the system.
Startup (Channel or Group)	Conventional > Conventional UI form	You can program this option for the foreground radio (the radio body with the lowest MAC address) to start on a specific channel or group each time the radio system is turned on. You can also program this option for the background radio to default to a specific channel or group after the radio system is turned on, and the radio user subsequently switches the active radio or enables dual receive.
Selcall Stun and Revive	Conventional > Selcall > Control Status form	Selcall stun and revive functionality is currently not supported for TM8260 radio systems. If the stun and revive control status types are used, set the equivalent Rx Processing fields to No for all devices.
Emergency Operation	Conventional > Networks > Emergency form	Emergency operation is currently not supported for TM8260 radio systems. Clear the Emergency Enabled check box for all networks and devices.
Conv Key Settings	Conventional > Conv Key Settings form	Dual body functionality such as dual transmit and receive, and changing the foreground radio, can only be accessed via function keys. Add the Dual Body Mode and Single Body Mode actions to separate keys, or Dual/Single Body Mode to a single key. Add the Switch Active Radio action to a different function key.
Other Function Key Settings and the Radio Menu	Conventional > Conventional Menu form	The radio's function key settings (Conv Key Settings form) and menu (Conventional Menu form) must be the same for all devices in the system.
Left Selection Key and Scroll Keys	Conventional > Conv Key Settings form	If options are programmed for the left selection key and/or scroll keys, they must be the same for all devices in the system.

Field/Feature	Location	Comments
UI Preferences and Conventional UI	Global > UI Preferences form, and Conventional > Conventional UI form	UI preferences must be configured identically for all devices in the system. For example, backlighting, keypress tones, the RSSI icon, and the default dialling type.
Programmable I/O	Programmable I/O form	Programmable I/O is only supported with the cross-band linking, GPS, and external interface cable, and is limited to certain actions such as Power Sense (Ignition) and External Alert 1. See <a href="#">“Connecting the Cross-band Linking, GPS, and External Interface Cable”</a> on page 28.
Trunked MPT		Trunked MPT settings are currently not supported with TM8260 radio systems. Do not attempt to program these fields or enable the optional feature for MPT 1327 Trunking.

### 3.3 Upgrading Radio Firmware

The download dialog (from the programming application, click Tools > **Download**) contains a column called NTID. This shows the MAC (media access control) address for each device. When reporting a radio system's configuration, the table will list the various types of firmware for all devices in the system.



**Important** Reporting the configuration will also show SCT (System Configuration Table) files for each device, which must exist for a radio system. These files are the result of downloading MAC addresses (see [“Downloading MAC Addresses”](#) on page 16). Do not attempt to delete these files.

When you download firmware to hardware of a particular type (for example, the target hardware shows as a radio body), it will be sent to all devices in the system of the same hardware type. The firmware will be downloaded to each device in sequence.

### 3.4 Calibrating the Radio System

TM8260 dual radio systems do not support calibration of the radio system as a whole. The system must first be disassembled to a single head / single body configuration. If calibration is required after repair, the radio body must be calibrated outside of the system before re-installation.

## 3.5 Troubleshooting

If reporting the configuration shows only two devices when three are expected, or the Select Device(s) dialog does not appear when reading or programming the radio system:

- Make sure all cables are connected correctly, and securely.
- Make sure power is applied to both radio bodies.
- One or more devices may not have the correct system configuration table of MAC addresses. Re-download the table to all devices in the system. See [“Downloading MAC Addresses” on page 16](#).

If an “incorrect band” message appears when attempting to program a radio body, the band of the selected device to program is different to the band selected in the programming application. Either change the **Band** field on the Specifications form, or select the matching radio body in the Select Device(s) dialog.

If an “unlicensed feature” message appears in the programming application, or the LEDs on one or both radio bodies flash on and off when powering up the system, the optional feature for Multi-Body Support may not be enabled. To check this, refer to the steps below.

### Checking the Optional Feature for Multi-Body Support

1. Click Tools > **Optional Features** from the programming application.
2. Connect the control head directly to one radio body, and to your PC.
3. Click the **Read Radio** button.
4. Check that the Status is showing **Enabled** next to Multi-Body Support.
5. Repeat steps 2 to 4 for the other radio body.

If this feature is showing as **Disabled** for one or both radios, you will need obtain and program SFE (software feature enabling) keys. Contact Tait Electronics Limited for more information.



## 4 Checklist: Dual-Radio System

---

- The system configuration table has been downloaded to the control head and radio bodies. See [“Downloading MAC Addresses”](#) on page 16.
- Link J4 has been removed from the radio body connected to the control head. See [“Removing Link J4”](#) on page 17.
- Both radio bodies have the optional feature for Multi-Body Support enabled. See [page 35](#).
- The remote interfaces are installed on the radio bodies and control head. See [page 19](#) and [page 20](#).
- For each body remote interface, the earthing tag is attached onto the radio chassis. See [page 19](#).
- Antennas are connected to both radio bodies. See [page 21](#).
- The cables are attached into the correct ports. See [page 23](#).
- There is a power supply to both radio bodies. See [page 25](#).
- The radio system has been programmed so the user can access dual-radio features. See [“Programming a Dual-Radio System”](#) on page 31.



## 5 Glossary

---

<b>background radio</b>	The radio in a <a href="#">dual-radio system</a> that is not currently showing on the radio display, or is showing in a smaller font.
<b>control head</b>	The <a href="#">device</a> in a <a href="#">radio system</a> that provides the user-interface.
<b>cross-band linking, GPS, and external interface cable</b>	A cable used to connect the auxiliary ports of the two radio bodies in a <a href="#">dual-radio system</a> . The cable enables the radio system to be used as a cross-band repeater, provides an RJ45 socket to connect to a GPS antenna, and also provides an external interface connector.
<b>cross-band repeater</b>	A mode in a <a href="#">dual-radio system</a> where the system receives on one <a href="#">radio</a> , and immediately re-transmits that reception on the other radio.
<b>device</b>	A component ( <a href="#">control head</a> or <a href="#">radio body</a> ) in a <a href="#">radio system</a> . A <a href="#">device</a> is known as target hardware when upgrading radio firmware.
<b>dual body mode</b>	The function on a <a href="#">dual-radio system</a> that enables you to turn on dual receive and dual transmit
<b>dual-radio system</b>	A <a href="#">control head</a> connected to two <a href="#">radio bodies</a> .
<b>dual receive</b>	A state in a <a href="#">dual-radio system</a> where the system receives on both the <a href="#">foreground radio</a> and <a href="#">background radio</a> simultaneously.
<b>dual transmit</b>	A state in a <a href="#">dual-radio system</a> where the system transmits on both the <a href="#">foreground radio</a> and <a href="#">background radio</a> simultaneously. Dual transmit includes <a href="#">dual receive</a> .
<b>foreground radio</b>	The radio in a <a href="#">dual-radio system</a> that is currently showing on the radio display, or showing in a larger font.
<b>MAC address</b>	The unique identifier that is assigned to each <a href="#">device</a> in a <a href="#">radio system</a> .
<b>primary radio</b>	The radio body in a <a href="#">dual-radio system</a> with the lowest MAC address. The primary radio is at the foreground each time the system is turned on.
<b>radio</b>	A <a href="#">radio body</a> , when connected directly or indirectly with a <a href="#">control head</a> .
<b>radio body</b>	The <a href="#">device</a> in a radio system that provides standalone transmit and receive on a single operating band, and also other functionality such as digital processing. Also known as a torso.
<b>radio system</b>	See <a href="#">dual-radio system</a> .
<b>single body mode</b>	The function on a <a href="#">dual-radio system</a> that enables you to return to single receive and single transmit.

<b>single receive and single transmit</b>	A state in a <a href="#">dual-radio system</a> where the system transmits and receives on the <a href="#">foreground radio</a> only.
<b>system configuration table</b>	The table that is downloaded to every <a href="#">device</a> in a <a href="#">radio system</a> . The table contains information about the system, including all devices, device names, MAC addresses, and priorities.



# Tait General Software Licence Agreement

This legal document is an Agreement between you (the "Licensee") and Tait Electronics Limited ("Tait"). By using any of the Software or Firmware items prior-installed in the related Tait product, included on CD or downloaded from the Tait website, (hereinafter referred to as "the Software or Firmware") you agree to be bound by the terms of this Agreement. If you do not agree to the terms of this Agreement, do not install and use any of the Software or Firmware. If you install and use any of the Software or Firmware that will be deemed to be acceptance of the terms of this licence agreement.

The terms of this Agreement shall apply subject only to any express written terms of agreement to the contrary between Tait and the Licensee.

## Licence

TAIT GRANTS TO YOU AS LICENSEE THE NON-EXCLUSIVE RIGHT TO USE THE SOFTWARE OR FIRMWARE ON A SINGLE MACHINE PROVIDED YOU MAY ONLY:

1. COPY THE SOFTWARE OR FIRMWARE INTO ANY MACHINE READABLE OR PRINTED FORM FOR BACKUP PURPOSES IN SUPPORT OF YOUR USE OF THE PROGRAM ON THE SINGLE MACHINE (CERTAIN PROGRAMS, HOWEVER, MAY INCLUDE MECHANISMS TO LIMIT OR INHIBIT COPYING, THEY ARE MARKED "COPY PROTECTED"), PROVIDED THE COPYRIGHT NOTICE MUST BE REPRODUCED AND INCLUDED ON ANY SUCH COPY OF THE SOFTWARE OR FIRMWARE;  
AND / OR

2. MERGE IT INTO ANOTHER PROGRAM FOR YOUR USE ON THE SINGLE MACHINE (ANY PORTION OF ANY SOFTWARE OR FIRMWARE MERGED INTO ANOTHER PROGRAM WILL CONTINUE TO BE SUBJECT TO THE TERMS AND CONDITIONS OF THIS AGREEMENT).

THE LICENSEE MAY NOT DUPLICATE, MODIFY, REVERSE COMPILATE OR REVERSE ASSEMBLE ANY SOFTWARE OR FIRMWARE IN WHOLE OR PART.

## Important Notice

THE SOFTWARE OR FIRMWARE MAY CONTAIN OPEN SOURCE SOFTWARE COMPONENTS ("OPEN SOURCE COMPONENTS"). OPEN SOURCE COMPONENTS ARE EXCLUDED FROM THE TERMS OF THIS AGREEMENT EXCEPT AS EXPRESSLY STATED IN THIS AGREEMENT AND ARE COVERED BY THE TERMS OF THEIR RESPECTIVE LICENCES WHICH MAY EXCLUDE OR LIMIT ANY WARRANTY FROM OR LIABILITY OF THE DEVELOPERS AND/OR COPYRIGHT HOLDERS OF THE OPEN SOURCE COMPONENT FOR THE PERFORMANCE OF THOSE OPEN SOURCE COMPONENTS. YOU AGREE TO BE BOUND BY THE TERMS AND CONDITIONS OF EACH SUCH LICENCE. FOR MORE INFORMATION SEE:

<http://support.taitworld.com/go/opensource>

## Title to Software

THIS AGREEMENT DOES NOT CONSTITUTE A CONTRACT OF SALE IN RELATION TO THE SOFTWARE OR FIRMWARE SUPPLIED TO THE LICENSEE. NOTWITHSTANDING THE LICENSEE MAY OWN THE MAGNETIC OR OTHER PHYSICAL MEDIA ON WHICH THE SOFTWARE OR FIRMWARE WAS ORIGINALLY SUPPLIED, OR HAS SUBSEQUENTLY BEEN RECORDED OR FIXED, IT IS A FUNDAMENTAL TERM OF THIS AGREEMENT THAT AT ALL TIMES TITLE AND OWNERSHIP OF THE SOFTWARE OR FIRMWARE, WHETHER ON THE ORIGINAL MEDIA OR OTHERWISE, SHALL REMAIN VESTED IN TAIT OR THIRD PARTIES WHO HAVE GRANTED LICENCES TO TAIT.

## Term and Termination

THIS LICENCE SHALL BE EFFECTIVE UNTIL TERMINATED IN ACCORDANCE WITH THE PROVISIONS OF THIS AGREEMENT. THE LICENSEE MAY TERMINATE THIS LICENCE AT ANY TIME BY DESTROYING ALL COPIES OF THE SOFTWARE OR FIRMWARE AND ASSOCIATED WRITTEN MATERIALS. THIS LICENCE WILL BE TERMINATED AUTOMATICALLY AND WITHOUT NOTICE FROM TAIT IN THE EVENT THAT THE LICENSEE FAILS TO COMPLY WITH ANY TERM OR CONDITION OF THIS AGREEMENT. THE LICENSEE AGREES TO DESTROY ALL COPIES OF THE SOFTWARE OR FIRMWARE AND ASSOCIATED WRITTEN MATERIALS IN THE EVENT OF SUCH TERMINATION.

## Limited Warranty

THE SOFTWARE OR FIRMWARE (INCLUDING OPEN SOURCE COMPONENTS) IS SUPPLIED BY TAIT AND ACCEPTED BY THE LICENSEE "AS IS" WITHOUT WARRANTY OF ANY KIND EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT BEING LIMITED TO ANY IMPLIED WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. THE LICENSEE ACKNOWLEDGES THAT THE SOFTWARE OR FIRMWARE (INCLUDING OPEN SOURCE COMPONENTS) IS USED BY IT IN BUSINESS AND ACCORDINGLY TO THE MAXIMUM EXTENT PERMITTED BY LAW NO TERMS OR WARRANTIES WHICH ARE IMPLIED BY LEGISLATION SHALL APPLY TO THIS AGREEMENT. TAIT DOES NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THE SOFTWARE OR FIRMWARE (INCLUDING OPEN SOURCE COMPONENTS) WILL MEET THE LICENSEE'S REQUIREMENTS OR THAT THE OPERATION OF THE SOFTWARE OR FIRMWARE (INCLUDING OPEN SOURCE COMPONENTS) WILL BE UNINTERRUPTED OR ERROR FREE.

## Exclusion of Liability

IN NO CIRCUMSTANCES SHALL TAIT BE UNDER ANY LIABILITY TO THE LICENSEE, OR ANY OTHER PERSON WHATSOEVER, WHETHER IN TORT (INCLUDING NEGLIGENCE), CONTRACT (EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT), EQUITY, UNDER ANY STATUTE, OR OTHERWISE AT LAW FOR ANY LOSSES OR DAMAGES WHETHER GENERAL, SPECIAL, EXEMPLARY, PUNITIVE, DIRECT, INDIRECT OR CONSEQUENTIAL ARISING OUT OF OR IN CONNECTION WITH ANY USE OR INABILITY OF USING THE SOFTWARE OR FIRMWARE (INCLUDING OPEN SOURCE COMPONENTS).

THE LICENSEE'S SOLE REMEDY AGAINST TAIT WILL BE LIMITED TO BREACH OF CONTRACT AND TAIT'S SOLE AND TOTAL LIABILITY FOR ANY SUCH CLAIM SHALL BE LIMITED AT THE OPTION OF TAIT TO THE REPAIR OR REPLACEMENT OF THE SOFTWARE OR FIRMWARE OR THE REFUND OF THE PURCHASE PRICE OF THE SOFTWARE OR FIRMWARE.

## General

THE LICENSEE CONFIRMS THAT IT SHALL COMPLY WITH THE PROVISIONS OF LAW IN RELATION TO THE SOFTWARE OR FIRMWARE.

## Law and Jurisdiction

THIS AGREEMENT SHALL BE SUBJECT TO AND CONSTRUED IN ACCORDANCE WITH NEW ZEALAND LAW AND DISPUTES BETWEEN THE PARTIES CONCERNING THE PROVISIONS HEREOF SHALL BE DETERMINED BY THE NEW ZEALAND COURTS OF LAW. PROVIDED HOWEVER TAIT MAY AT ITS ELECTION BRING PROCEEDINGS FOR BREACH OF THE TERMS HEREOF OR FOR THE ENFORCEMENT OF ANY JUDGEMENT IN RELATION TO A BREACH OF THE TERMS HEREOF IN ANY JURISDICTION TAIT CONSIDERS FIT FOR THE PURPOSE OF ENSURING COMPLIANCE WITH THE TERMS HEREOF OR OBTAINING RELIEF FOR BREACH OF THE TERMS HEREOF.

## No Dealings

THE LICENSEE MAY NOT SUBLICENSE, ASSIGN OR TRANSFER THE LICENCE OR THE PROGRAM EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT. ANY ATTEMPT OTHERWISE TO SUBLICENSE, ASSIGN OR TRANSFER ANY OF THE RIGHTS, DUTIES OR OBLIGATIONS HEREUNDER IS VOID.

## No Other Terms

THE LICENSEE ACKNOWLEDGES THAT IT HAS READ THIS AGREEMENT, UNDERSTANDS IT AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS. THE LICENSEE FURTHER AGREES THAT SUBJECT ONLY TO ANY EXPRESS WRITTEN TERMS OF AGREEMENT TO THE CONTRARY BETWEEN TAIT AND THE LICENSEE THIS IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN IT AND TAIT IN RELATION TO THE SOFTWARE OR FIRMWARE WHICH SUPERSEDES ANY PROPOSAL OR PRIOR AGREEMENT, ORAL OR WRITTEN AND ANY OTHER COMMUNICATIONS BETWEEN THE LICENSEE AND TAIT RELATING TO THE SOFTWARE OR FIRMWARE.