

Remote Microphone and Switches Installation (optional)

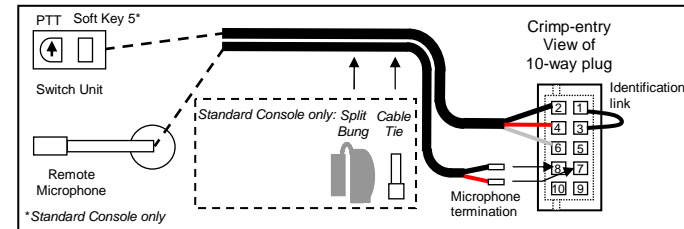
It is recommended that the microphone is located away from any wind noise in a position suitable for the operator(s), e.g., near internal rear view mirror.

The switch unit should also be located centrally for the operator(s) to access. A self adhesive hook and loop pad is provided for mounting the remote PTT on a flat surface, e.g., dashboard.

Only one hands free microphone can be used in an installation, which can be connected to either audio accessory interface.

Termination to console connector

The remote microphone is supplied un-terminated for ease of installation. Terminate to the console as shown below after the switch unit and microphone are positioned.



Cable entry - Standard Console

Dress the cables via the small guide channel at the bottom of the console. Fit the *split bung* and the *cable tie* (supplied) around the cables. Press the bung into the recess in the channel. Tighten the cable tie behind the bung to secure the cables and allow slack at the 10-way plug termination.

Note: when used in conjunction with a handset or fist-microphone accessory the hands free kit must be plugged into the Audio Accessory Interface 1 connector (back left) to allow all cables to be routed correctly (see front page illustration).

Cable entry - Handset Based Console

Dress the cables via the small guide channels at the bottom end of the cradle box (the microphone channel is slightly smaller). The cables are gripped when the lid is secured.

Fist Microphone/Handset (optional)

The Fist microphone and/or Handset should be located centrally for the operator(s) to access, using the screws provided. Ensure that the cables are placed in the rear of the console so that the grommets seal correctly.

Multiple Fist Microphones and/or Handsets may be connected in an installation, which may be connected to either audio accessory interface.

Loudspeaker

The loudspeaker should be positioned so that it faces the operator, but is out of the line of sight of the Remote Microphone.

Programmable I/O

The transceiver supports 4 programmable digital I/O lines: 3 inputs and 1 output. The following functions may be allocated on the input lines:

- External Alarm Input
- External Input Triggered Status Messages

The following functions may be allocated on the output line:

- External Alert Output
- Status Message Triggered External Outputs

For details of how to programme the functions refer to the Sepura Programmer. For details of the signals and their characteristics, see table below.

Wire Colour	Description	Performance
Orange	Programmable input 1	$V_{IH} \text{ min} = 2.0 \text{ V}$ $V_{IL} \text{ max} = 0.8 \text{ V}$ Protected against accidental application of vehicle supply voltage Assertion time: >100 ms
Yellow	Programmable input 2	$V_{IH} \text{ min} = 2.0 \text{ V}$ $V_{IL} \text{ max} = 0.8 \text{ V}$ Protected against accidental application of vehicle supply voltage Assertion time: >100 ms
Green	Programmable input 3	$V_{IH} \text{ min} = 2.0 \text{ V}$ $V_{IL} \text{ max} = 0.8 \text{ V}$ Protected against accidental application of vehicle supply voltage Assertion time: >100 ms
Pink	Programmable output	Open drain, active low. 500 mA max sink current 15.8 V max external voltage Internally protected against inductive loads, and with a re-settable fuse. $V_{OL} \text{ max} = 200 \text{ mV @ } 0.5 \text{ A}$

WARNING

To control devices from the programmable output which require more than 0.5 A, use a suitable automotive relay to ensure correct operation. Connect the relay coil between the output wire and the vehicle positive supply. The device must be protected by an appropriate fuse in its positive supply. Check with the local regulatory authority where the output is used to drive external alert devices such as horns or sirens.

Installation with a Mobile Data Terminal (MDT)

This guide does not include specific details about installing with a MDT. However, it is recommended that the 15-way D-type connector on either the console or an unused console interface on the transceiver, is used to connect an MDT with a Sepura data lead (300-00065).

If a spare 15-way interface is not available, connect a Console Interface Box (300-00221) between the transceiver and console using remote console cables not exceeding 10 m in total length. Connect the MDT to the spare 15-way connector on the interface box.

Customising/Programming the Mobile Radio

To customise or re-program the internal software in the mobile radio you will need the following items:

- Sepura Programmer Kit
- Mobile Radio Power/Audio lead
- Mobile Radio Data lead

Connect the power lead to the power connector on the rear of the transceiver. The red and black wires in the power lead should be connected to a suitable power supply set to 12 V nominal with a rating of 5 A. The blue ignition wire in the power lead should be connected to the positive terminal on the power supply. All other wires may be left unconnected.

Connect the Data Lead to either of the 15-way D-type Interfaces on the transceiver or to the Data Connector on a console, if connected. Connect the other end of the data lead to a COM port on a PC loaded with the Programmer.

RF Compatibility Checks

The following checks must always be carried out if the vehicle is equipped with electronic anti-skid, electronic ignition or engine management systems.

The transmitter should be operated only for the time required to make an observation.

The transmitter should be operated on a TETRA System, or these checks will have to be carried out in DMO.

An assistant will be required for the following checks.

- 1 With the vehicle stationary and the engine running at fast idle, operate the transmitter. Check that the brake lights do not illuminate and that the engine continues to run normally, i.e., with no surging or cutting out.
- 2 Operate the brake pedal, key the transmitter and check that the brake lights do not extinguish.
- 3 Put the vehicle into motion at a speed of 15 - 25 km/h (10 - 15 mph), key the transmitter and operate the brake pedal simultaneously. Check that the braking action is normal and that the engine does not surge or cut out.

WARNING

In the event of an apparent malfunction in the braking or any other systems during RF compatibility checks, the transceiver installation should be rendered inoperative and the vehicle manufacturer should be contacted before any further use is made of the transceiver installation.

Unqualified persons should not attempt to modify these units in any way.

NOTICE

Sepura Mobile Transceivers have a small rechargeable internal back-up battery. This battery powers the internal Real Time Clock in the event that the main power to the product is removed. The battery may have discharged during the manufacturing process or if the product has been in storage for some time. Once the product is connected to its main supply, the back-up battery will charge regardless of whether the product is turned on or not. The charge period for a full charge may be up to 48 hours.

Mobile Radio Series Vehicle Accessories

Part Number	Description
300-00061	Handset (for use with standard console only)
300-00062	Fist Microphone (for use with standard console only)
300-00064	Small Loudspeaker
300-00088	Large Loudspeaker
300-00082	Loudspeaker Extension Cable
300-00065	Data Lead
300-00066	Power Cable (supplied with transceiver)
300-00067	Console Cable 0.5m
300-00068	Console Cable 2m
300-00664	Console Cable 3m
300-00069	Console Cable 5m
300-00665	Console Cable 7m
300-00079	Remote Microphone and 2 Switches
300-00080	Standard Console Rear Panel Kit
300-00081	DIN Fascia Kit
300-00083	Standard Console
300-00084	Standard Console Pivot Mount Kit
300-00086	Transceiver Mounting Kit (supplied with transceiver)
300-00087	Applications Interface Unit (see supplementary install guide)
300-00629	Car Cradle Fixing Kit
300-00721	4-Hole AMPS Mounting Kit 1
300-00668	Handset Based Console (HBC) Kit
300-00669	Handset Based Console (HBC)
300-00670	Handset Based Console (HBC) Interface and Handsfree Box
300-00671	Handset Based Console (HBC) Mounting Bracket Kit
-	Antenna (band dependent, contact sales)

Installation Guide

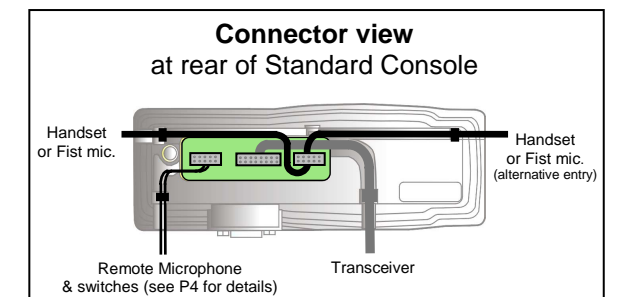
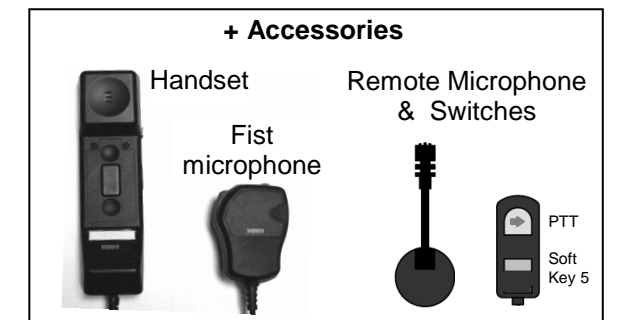
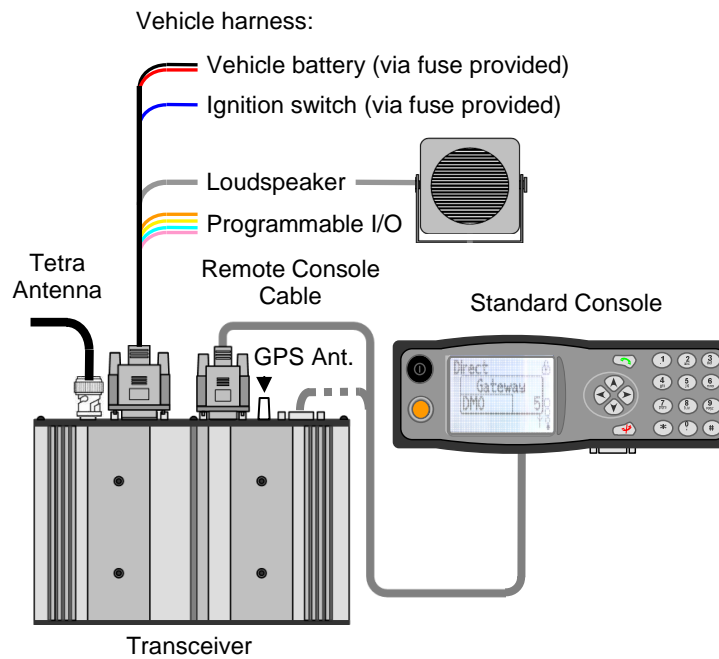
Sepura Mobile Transceivers

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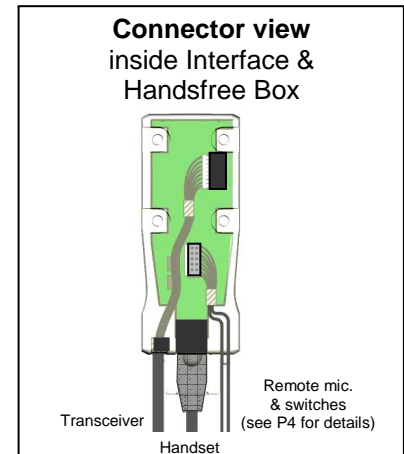
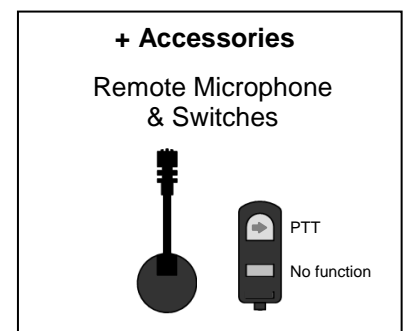
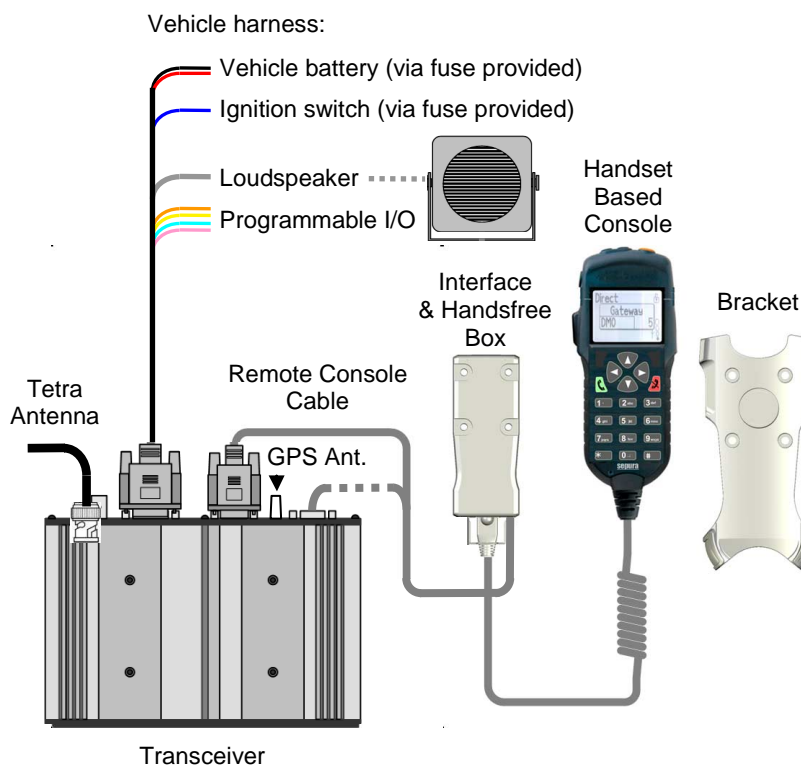
Console options and accessories

Any combination of two consoles may be connected.

Standard Console option



Handset Based Console option



WARNING

Do NOT operate your Sepura mobile radio in an explosive atmosphere. Obey "Turn OFF Two-Way Radios" signs where posted. Do NOT touch the antenna when the radio is turned on.

Important Information

The transceiver is designed for nominal 12 V negative earth systems.

The equipment is to be installed in accordance with the requirements of local radio communications authorities and/or Health and Safety regulations.

12 V supply leads, antenna cables and speaker wiring is to be routed as far away as possible from gas or fuel lines, and any in-vehicle electrical wiring. This reduces the risk to safety in the event of a leak.

The transceiver should be positioned so that it does not obstruct, or become at risk of damage from, any occupant or carried items. All cabling should be hidden and not left loose.

Unpacking

Unpack the container(s) and ensure all items specified on any delivery note are present.

The manufacturer, or their authorised agents, must be notified within ten days of receipt of equipment if any damage or shortages are found (customer.support@sepura.com).

No accessories are shipped in the box with the transceiver, except the Power Cable Assembly and the Transceiver Mounting Kit. Due to the many combinations available the accessory pack must be specified at time of ordering.

Note: the Handset Based Console option is packed separately.

Operator Access and Safety

The console must be fitted in such a position that the operators have easy access to the controls and the microphones when wearing a seat belt. The controls must also be within the driver's normal field of vision.

Fitting positions above the driver's or passenger's head, or in other positions where the unit would present a hazard in an accident, must be avoided.

The microphone/handset hook mount must be fitted such that the microphone/handset is easily accessible and the cable cannot interfere with the vehicle control, or with the driver's feet.

Preferably, the loudspeaker should be installed such that the grille is facing the operator, but out of sight of the remote hands-free microphone (if fitted).

Installation

This installation guide provides basic installation information and is not intended to be definitive, as different types of vehicles will require different installation configurations.

The installer must ensure that fixing screws of an appropriate length are used (some installations may require different screws). The information given here is general and for guidance only.

The installation should comply with FCS 1362 *CODE OF PRACTICE for the installation of mobile radio and related ancillary equipment in land based vehicles* - see <http://www.fcs.org.uk>.

Installation Precautions

Motor vehicle manufacturers make use of electronic vehicle control systems, e.g., ignition, anti-skid devices etc.

The following information is supplied to ensure that there is no radio frequency interference effect upon the vehicle's electronic systems.

To prevent interference with any other electronic systems in the vehicle, the antenna should be mounted as far away as possible from these units and their associated cables. Refer to the vehicle manufacturer's handbook to locate these items.

Consult the manufacturer's handbook to establish whether it is practical to disconnect the vehicle battery without affecting devices, such as central locking mechanisms, engine management computers, security-coded in-car entertainment units etc.

WARNING

1. Disconnect the vehicle's battery before commencing installation (be aware of effect on public broadcast radio security code, alarm systems and some engine management systems).
2. Do not smoke, or use naked flames, when working near the vehicle's fuel system.
3. Ensure that fuel lines, hydraulic lines and existing cables are not damaged during installation.
4. Ensure that the installation does not impede the normal operation of the vehicle, including the operation of any safety device, e.g., airbags and seatbelt tensioners.
5. Speed control, fuel injection, anti-lock braking, navigation, air bag and other electronic systems are relatively immune to RF interference. However, if difficulty is experienced or faulty operation suspected, consult the vehicle's dealer.
6. This equipment is suitable for 12 V negative earth vehicles only. Use on other supply systems will result in damage to the equipment.
7. No part of the equipment should be mounted such that injury to the occupants is likely during an accident.
8. Prolonged operation of the transceiver with the vehicle engine switched off, could drain the vehicle's battery.
9. In order to reduce the risk of RF burns the antenna must always remain connected whilst the equipment is switched on. Under no circumstances should the antenna connection be connected or disconnected whilst the equipment is switched on.

Specialised Vehicles

The installation on certain specialised vehicles, such as fuel tankers and fire-fighting vehicles may be subject to additional safety regulations which must be closely observed. Prior to commencing an installation on such a vehicle, make sure that any relevant safety regulations are fully understood.

Petrol Powered Vehicles

Ensure that there are no petrol leaks before commencing an installation involving the use of electric tools as these can produce sparks. Ensure that no damage to the petrol tank or fuel lines occurs when drilling holes.

Gas Powered Vehicles

Before installation starts ensure that there are no gas leaks before commencing an installation involving the use of electric tools as these can produce sparks. **DO NOT USE A NAKED FLAME.** Butane and propane are heavier than air, so if there is a leak the gas may lay on the floor of the boot. The gas is detectable by its characteristic smell. The point of escaping gas may show signs of frosting. The vehicle owner should arrange for the leak to be repaired before the installation is commenced.

Ensure that no damage to the gas tank or gas lines occurs when drilling holes. Supply cables should be run, if possible, on the opposite side of the vehicle to the gas fuel pipe.

Vehicles Fitted with Electronic Devices

In theory, any vehicle electronic systems could be affected by the presence of an RF field of sufficient intensity, which when detected may cause the device to malfunction. The source of RF may be a mobile transceiver installed in the vehicle itself or one operating in another vehicle in close proximity. If interaction did occur, loss of control could result for the duration of the transmission.

In the interests of safety, the user must be asked to test the vehicle when the installation is complete.

Installation Guidelines and Recommendations

Temperature Considerations

Reliable transmit operation will be achieved if the transceiver is mounted such that the finned heatsink receives a free flow of air, i.e., if it is mounted in the normal vertical orientation with no restriction to the flow of convected air. For any other orientation, varying degrees of degradation may result.

Fitting the transceiver or console on top of the dash is not recommended. Exposure to direct sunlight may cause the temperature to rise to over 100 °C. Prolonged exposure to these temperatures may damage the equipment and invalidate the warranty.

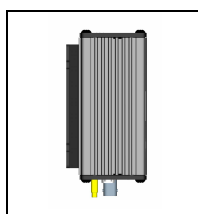
Do not mount the transceiver close to a heat source, e.g., in front of a heater vent.

Installing the Transceiver

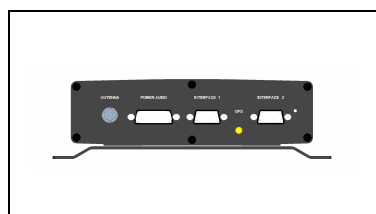
Orientation Considerations

It is recommended that the transceiver is mounted within 15 ° of the vertical with the connectors at the bottom; this reduces the effects of vibration and likelihood of dust/moisture ingress. Ensure the heatsink fins are in free air as much as possible. The heatsink may become hot after long periods of transmission; therefore, make sure that accidental contact with the heatsink is not possible. Ensure sufficient space is provided above the installation to allow fitment and removal of transceiver (see diagrams below).

Preferred Orientation



Alternative Horizontal Orientation



Location Considerations

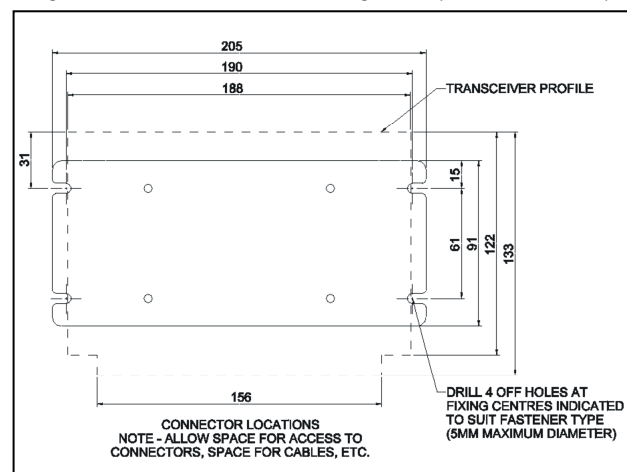
The transceiver must be fitted within the interior of the vehicle (excluding the engine compartment) and protected from the external environment and vehicle cleaning operations. When fitted, no part of the transceiver may be allowed to obstruct the operation of the vehicle or impair the safety of any occupant.

Locate the transceiver away from cables carrying very high currents, e.g., the starter motor cable or the electric traction motor, and its cables, of electric vehicles.

Transceiver Mounting Bracket Installation

The transceiver mounting bracket must be screwed to the desired surface using at least four screws. The bracket may be used as a template.

Fixing Hole Positions for Transceiver Mounting Bracket (all dimensions in mm)



Transceiver profile includes small clearance allowance; additional allowances should be made for cables depending on installation configuration.

Cables

Both the remote console and loudspeaker extension cables are colour coded blue at the transceiver end to aid pre-installation before the transceiver is available.

Ensure that the remote console cable is routed so that it is kept well clear of the antenna cable and of any other electronic devices such as electromagnetic systems or AM/FM radios. One end of the remote console cable is plugged into the 16-way header on the rear of the Standard Console (or Interface & Handsfree Box of Handset Based Console) and the strain relief/environmental grommet located in place within the moulding. The other end plugs into either of the "D-type" interface sockets on the rear of the transceiver.

Do not connect or disconnect the console(s) while the transceiver is powered.

If a connector is unused, fit the dust cover provided.

Power/Audio Connector Wiring Colour Code

Wire Colour	Description
Red	Positive connection +12 V
Black	Negative connection GND
Blue	Ignition Sense
Grey	Loudspeaker
Orange	Programmable input 1
Yellow	Programmable input 2
Light Green	Programmable input 3
Pink	Programmable output

WARNING

The transceiver will be damaged if either of the loudspeaker conductors (grey twin conductor cable) is connected to ground. If the loudspeaker output is to be connected to other audio systems, an audio isolation transformer must be used.

DC Supply Connection

The power cable plugs into the rear of the transceiver utilising a 15 way D-type connection. The cable also provides an ancillary connection point for function such as loudspeaker and other special I/O functions.

1. With the transceiver end of the power connector resting in its intended final position, route the wires to the vehicle battery; threading the cable through the bulkheads if required (include the blue wire where ignition switching is not required, see 4 below).
2. The positive power line must include a fuse as close as possible to the power source. The negative power line must be connected close to the battery-to-vehicle-body connexion (not directly to the battery) and must not include a fuse.
3. It is recommended that the power cable runs are kept as short as possible.
4. The blue wire provides an ignition sensing input. If ignition switching is required, trim the wire to length so that it can be wired, via a fuse, to the ignition switch, using the splicing connector provided. Otherwise this wire must be connected, via a fuse, to the permanent positive supply. A fuse must always be fitted close to where the wire is connected.
5. Check the installation and fit the blade fuses.

Fuse Ratings

Positive supply	10 A	Ignition sense	1 A
Automotive 19 mm blade type (Littelfuse ATO®)			

Antenna Installation

For best all round performance of the product, the antenna should be fitted on the centre of the vehicle roof. Alternative positions, such as wing mounting, will give degraded performance. The coaxial feeder should be secured along its length to eliminate the possibility of damage by sharp edges or moving parts.

Antenna Installation - GPS (optional)

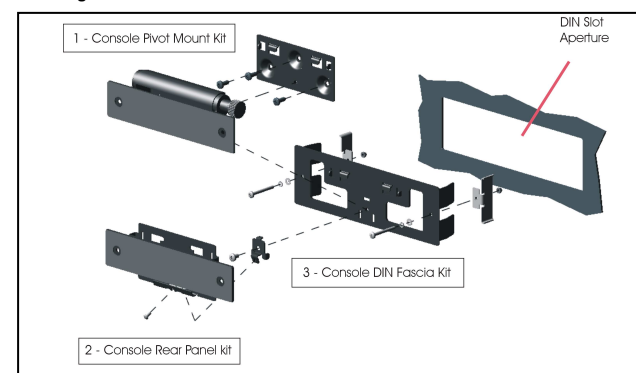
If a GPS receiver is fitted at time of manufacture, a GPS antenna socket will be fitted.

The antenna unit connects to a SMC connector on the rear of the transceiver and should, ideally, be mounted on the highest point of the vehicle (i.e., roof) with an uninterrupted view of the sky, and as far from the TETRA antenna as possible. For mounting, follow manufacturer's installation instructions. It is recommended to fit the GPS antenna connector before connecting the Remote Control Cable.

An active antenna is recommended, the supply of which is on the centre pin, 5 V nominal, 40 mA maximum. This supply feed is short circuit protected.

Standard Console Installation

Mounting Kits for Standard Console



Mounting the Standard Console on the Dash

The standard console is mounted into the desired position utilising the Console Pivot Mount Kit.

This consists of two main parts:

The dash mount bracket onto which the support bracket is attached. An adjustable support bracket onto which the console is fixed.

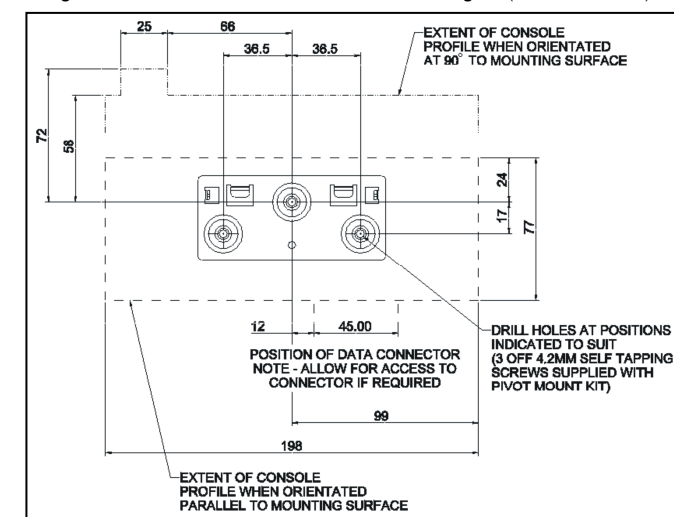
The dash mount bracket should be fixed to a suitable surface, using the three screws provided. Ensure orientation is correct for the viewing situation (i.e., tilt up or tilt down) and access is considered to the RS232 data connector, if required.

Ensure that the microphone(s) are connected and cables laid in the cable exits on the rear of the standard console (see illustration on P4). Any unused cable exits should have the provided bungs fitted. Fix the support bracket to the rear of console using screws provided (tightening torque = 0.8 Nm). Avoid trapping the wire with the bracket during assembly.

The support bracket then slots into the mounting bracket and is held by a single, fixed sprung screw.

The viewing angle of the standard console can be adjusted by loosening the release knob until the tilt mechanism is free enough to move, a ratchet action provides incremental positioning. The knob should then be re-tightened fixing the console in place.

Fixing Hole Positions for Standard Console Pivot Mounting Kit (all dimensions mm)



Console profile includes small clearance allowance; additional allowances should be made for cables depending on installation configuration.

Mounting the Console in a DIN Slot

A DIN slot mounting bracket is also available for vehicles that have a spare DIN slot. Following the diagram, above, fit the DIN fascia kit into the DIN slot using the screws provided.

A self-locking nut should be fitted to the end of each of the two screws that secure the DIN fascia, so that if the fascia is subsequently removed, the two grip plates are prevented from fully detaching from the securing screws.

Either the rear panel kit or the pivot mount kit may be fitted with the DIN fascia. The dash mount bracket supplied with the pivot mount kit is not required in this case.

Ensure that Microphone(s) are connected and cables laid in the cable exits on the rear of the console (See illustration on P4). Any unused cable exits should have the bungs provided fitted.

Fit either the Rear Panel Kit or the Pivot Mount Kit to the Console and then fit this assembly to the DIN Fascia Kit. Fix either support bracket, or console rear panel, to rear of console using screws provided. Avoid trapping wire with bracket during assembly.

Handset Based Console Installation

The handset based console is supplied with a magnetic mounting bracket and interface box. The mounting bracket can be mounted separately or over the box using the screws provided.

Note: the interface box is not sealed – avoid positions with risk of water or dust entry.

Connect the transceiver to the 16-way header in the interface box to the with the console cable supplied. Ensure that the strain relief bung is seated at the cable entry in the box front with flat face down. Refer also to "Cables" section at the top of this page.

(Refer to "Remote Microphone and Switches Installation" on P4 if this option is supplied.) Press the inner wires of the Remote Console Cable into the clips on the PCB. Screw the box halves together securely, taking care not to trap any wires.

Plug the handset based console into the interface box through the retaining clip and fold the clip back over the plug body.

Place the handset in the mounting bracket with the display facing the user.

Additional mounting kits available separately:

300-00629 Car Cradle Fixing Kit: a knuckle joint which provides vertical tilt adjustment.

4-Hole AMPS Mounting Kit 1: additional brackets providing versatile mounting options.

IMPORTANT

The hole pattern of the mounting bracket for the handset based console is compatible with AMPS standard mounting kits. If these are to be used, the installer should check that the chosen kit is sufficiently rugged to suit the user's operating environment.