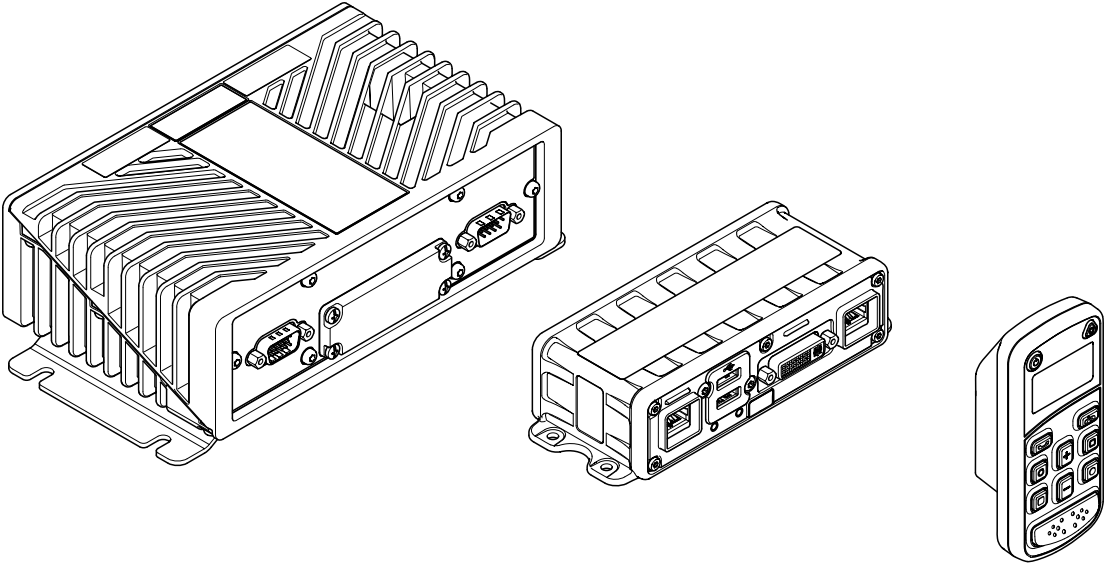


Mobile Broadband Control Unit Full Installation Guide

SCU3 Series Control Unit

SAH3 Series Accessory Hub



Original Instructions: ENGLISH

Document Number: SPR-DOC-04539

Issue 1.0

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Disclaimer

Sepura's policy is to continually improve its products. The features and facilities described in this document were correct at publication, but are subject to change without notice.

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Safety Information

READ THE BROADBAND PRODUCT SAFETY AND COMPLIANCE GUIDE (SPR-DOC-04558) SUPPLIED WITH THE SCU3 FOR IMPORTANT INFORMATION ABOUT SAFELY OPERATING THIS PRODUCT.

ALWAYS POWER OFF the products in environments where RF wireless devices could potentially cause an explosion. Potentially hazardous areas are not always signed. Obey all signs and instructions relating to the usage of RF wireless devices.

DO NOT touch the antennas when the SCU3 is powered on.

In order to reduce the risk of RF burns, the antennas must always remain connected when the equipment is powered on. DO NOT connect or disconnect the antennas whilst the equipment is powered on.

Potential risk of burn injury. DO NOT touch the heatsink fins when the SCU3 is powered on.

ONLY fit compatible accessories. If incompatible accessories are fitted, it may compromise the product safety ratings and may void any product warranty.

A Sepura DVI-I Cable must be used for connecting the SCU3 to the SAH3.

Sepura supplied microphones must be used.

DO NOT attempt to dismantle the products. Servicing and repairs to the products must be performed by trained service technicians at Sepura approved service centres.

Exposure to RF Energy

Sepura designs and manufactures products to meet strict guidelines and international standards relating to Radio Frequency (RF) energy and the potential health risks associated with using RF wireless devices. If you have any concerns relating to long term health risks associated with using RF wireless devices, you should obtain advice from your employer.

Operation

It is the responsibility of the person operating the product to ensure that it is operated safely at all times, and that local laws and regulations governing the usage of Radio Frequency (RF) wireless devices are observed. Obey all signs and instructions relating to the usage of RF wireless devices.

Regulatory Compliance

The products must be installed in accordance with national and local radio

communications authorities and/or Health and Safety regulations.

This product may affect public broadcast radio, security code alarm systems and some engine management systems.

Unpacking

Unpack the container(s) and ensure that all items specified on any delivery note are present and received in good condition.

If any of the goods are damaged or not supplied, contact your service provider within 10 days of receipt of equipment.

Accessories are not shipped in the containers with the products due to the many combinations available.

Note that the accessory pack must be specified at the time of ordering.

ALWAYS keep documentation supplied with the product for future reference and pass on to any person who is responsible for operating the product.

SCU3 Model Variant Options

The SCU3 is supplied in model variants, with different functions and connections to suit the installation. This installation guide describes all the functionality and connections available, highlighting options where appropriate.

Displays and Accessories

There are many options available for the installation of the products.

The products can accommodate two compatible displays and additional accessories such as a microphone or PTT switch connected through the SAH3.

The products are designed to be installed within a vehicle.

There are a number of accessories that can be attached to the SCU3 and SAH3. Refer to the installation instructions supplied with these products. See our website for more information (sepura.com).

Isolating Power



CAUTION! The fuses in the power supply lines must be used as the isolation mechanism and removed before any connections are made to the SCU3 or SAH3.

Installation Precautions



WARNING! DO NOT smoke or use naked flames when working near the vehicle's fuel system.



WARNING! This equipment is not suitable for use in locations where children are likely to be present.



CAUTION! Only use hand tools and do not over-tighten screws and fixings.

READ ALL THE INSTRUCTIONS before attempting to install the products. If you do not understand the instructions, STOP and contact your service provider or Sepura for assistance.

Always read the vehicle manufacturer's handbook before starting to install the products. Installation of this product may affect the vehicle electrical systems. Contact the vehicle manufacturer if you are not certain if it is safe to install this product.



CAUTION! Prolonged operation of the products with the vehicle engine powered OFF, may drain the vehicle's battery.

Disconnect the vehicle's battery before commencing installation (be aware of the effect on the public broadcast radio security code, alarm systems and some engine management systems).

Ensure that fuel lines, hydraulic lines and existing cables are not damaged during installation.

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.

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 is suspected, consult the vehicle's dealer.

ALWAYS perform RF compatibility checks after installation. See "RF Compatibility Checks" on page 9.

Certified Antennas

The SCU3 is certified for use with a 2 dBi gain Bluetooth / Wi-Fi antenna. Higher gain antennas should not be used to ensure compliance with RF field strength limits. Minimum distances from antenna to users are given in the following table:

Region	Occupational Minimum Distance	General Public Minimum Distance
Canada	0.4 m	1.2 m
USA	1 m	1 m
EU / UK	0.5 m	1 m

RF Energy

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.

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/Diesel Powered Vehicles

Ensure that there are no petrol/diesel leaks before commencing an installation involving the use of electric tools as these can produce sparks. Ensure that no damage to the fuel 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 an SCU3 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

This installation guide provides basic information about installing the products into land based vehicles (not marine based vehicles or motorcycles).

The installation of the products must be performed by a suitably skilled and technical competent person such as a qualified vehicle installation technician.

The products can be installed into various makes and models of vehicles and therefore these instructions are not a definitive guide to installing the product into vehicles.

The installation should comply with *FCS1362 CODE OF PRACTICE for the installation of mobile radio and related ancillary equipment in land based vehicles* (see <http://www.fcs.org.uk>).

Before you start the installation, ensure that you have all the accessories, including cables.

Operator Access and Safety

Install any additional accessories in a position where the operator has easy access to controls, displays or microphones when wearing a seat belt. The controls must also be within the driver's normal field of vision.

DO NOT fit accessories above the driver's or passenger's head, or in other positions where they would become a hazard in an accident or are at risk of damage from any occupant or carried items.

The microphone must be fitted such that the it 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).

Temperature and Orientation Considerations

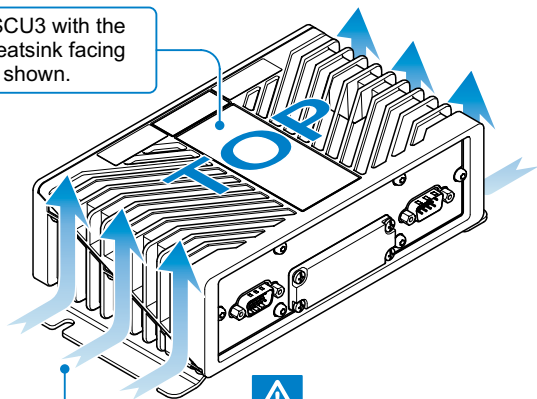


WARNING! The heatsink may become hot after long periods of operation. Ensure accidental contact with the heatsink is not possible.

Reliable operation will be achieved if the SCU3 is mounted such that the heat sink fins receive a free flow of air, i.e., if it is mounted within 15° of the normal horizontal orientation with no restriction to the flow of convected air. For any other orientation, varying degrees of degradation may result.



Mount the SCU3 with the top of the heatsink facing upwards as shown.



Ensure the heatsink fins are in free air as much as possible.

Fitting the products on top of the dashboard is not recommended. Exposure to direct sunlight may cause the temperature to rise to over 80 °C (176°F). Prolonged exposure to these temperatures may damage the equipment and invalidate any product warranty.

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

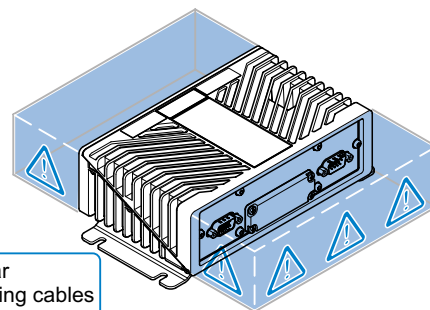
Location Considerations

The products must be fitted within the interior of the vehicle (excluding the engine compartment) and protected from the external environment and vehicle cleaning operations.

Locate the products away from sources of strong electromagnetic interference including cables powering the starter motor or the electric traction motor in electric vehicles.

Ensure that the installation does not impede the normal operation of the vehicle, including the operation of any safety devices such as airbags and seatbelt retainers.

The products should be positioned so that they do not obstruct, or become at risk of damage from, any occupant or carried items.



Protect the front and rear connectors and connecting cables from the risk of impact damage.

Ensure sufficient space is provided above the installation to allow fitment and removal of the products.

Connector Sealing



CAUTION! To maintain the product's IP54 rating to protect against dust and moisture ingress, the products must be fitted with connector seals. Any unused connectors must be fitted with a sealing bung or cap.

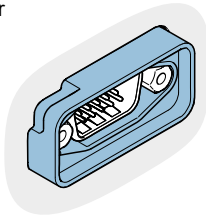
Cable sealing Kits are provided with the SCU3 and SAH3, consisting of all the sealing parts required.

D-Connectors (SCU3)

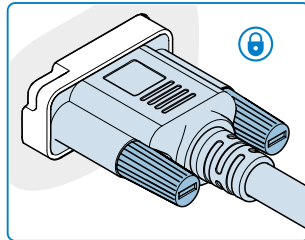


CAUTION! To maintain an IP54 rating, only Sepura D-connector leads must be used.

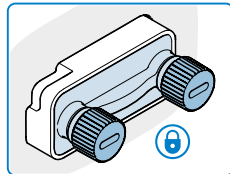
1. Fit the connector seals fully over both D-connector housings.



2. Insert the D-connector lead and fully tighten the thumbscrews.



3. If the serial connector is unused, fit the D-connector bung and fully tighten the thumbscrews.

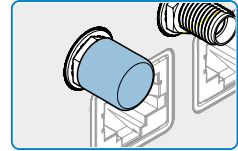


Antenna Connectors (SCU3)

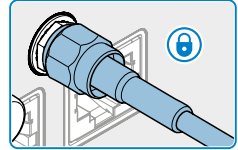


CAUTION! To maintain an IP54 rating, any SMA connectors fitted must provide a seal.

1. Fit SMA connector bungs to any unused antenna sockets.



2. Insert any antenna leads in the appropriate sockets and fully tighten the connectors to seal.

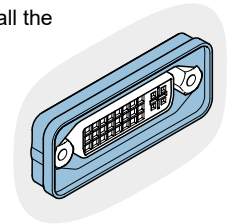


DVI Connectors (SCU3/SAH3)

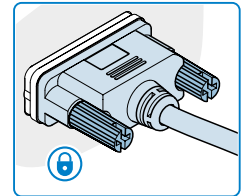


CAUTION! To maintain an IP54 rating, only Sepura DVI interconnect leads must be used.

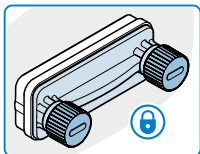
1. Fit the connector seals fully over all the DVI connector housings.



2. Insert the DVI interconnect leads in the appropriate sockets and fully tighten the thumbscrews.



3. If any of the DVI connectors are unused, fit the DVI connector bungs and fully tighten the thumbscrews.

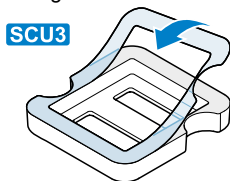


USB Connectors (SCU3/SAH3)

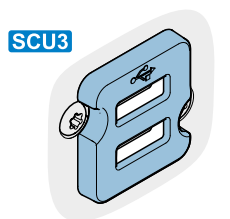


CAUTION! To maintain an IP54 rating, USB bungs must be fitted to any unused sockets and the USB face seal must be fitted to the SCU3.

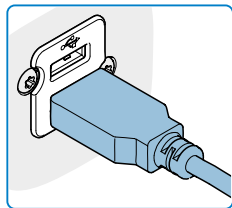
1. Carefully peel the film off the rear of the USB face seal to expose the self-adhesive backing.



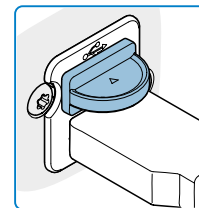
2. Align the USB face seal with the sockets and press firmly to attach.



3. Insert any USB leads or devices into the appropriate sockets.



4. Insert the USB bungs in any unused sockets.

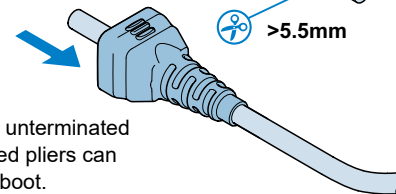
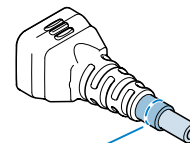


RJ45 Connectors (SCU3/SAH3/VCU)

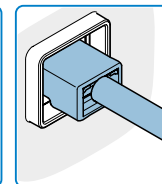
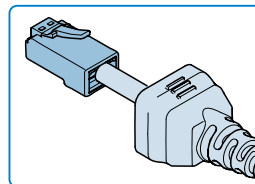


CAUTION! To maintain an IP54 rating, the RJ45 seal boots must be fitted over RJ45 connector leads. The cable used must be a minimum of **4.4mm** and a maximum of **6.8mm** in diameter.

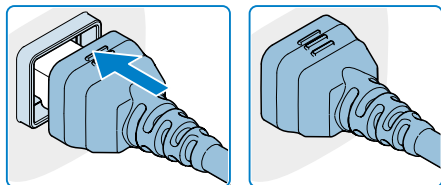
1. The strain relief section of the boot is stepped and the narrow section can be cut off to accommodate cables with a diameter larger than 5.5 millimetres.



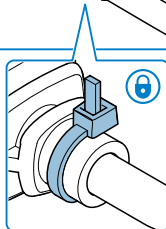
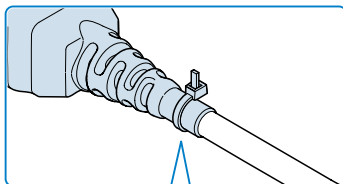
2. Slide the seal boot over the unterminated cable. A pair of three pronged pliers can be used to assist fitting the boot.
3. Terminate the cable with a suitable RJ45 connector. Insert the connector into the appropriate socket ensuring it clicks into position.



4. Pull the boot forward over the connector ensuring the clip is engaged and the boot is fitted fully over onto the raised wall.

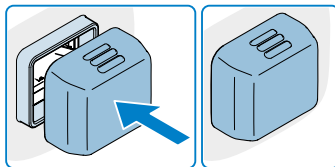


5. Secure the sealing boot in position on the cable firmly, using the cable tie provided.



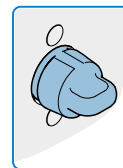
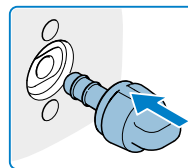
CAUTION! To prevent the IP54 seal being compromised, the cable must be installed with a minimum bend radius of 25mm to prevent any sideways force in the final installation location.

6. Insert RJ45 bungs into any unused sockets, ensuring the bung seal channel is fully seated in the outer wall of the socket.



3.5mm Jack Connector (SAH3)

1. If the microphone socket is not used in the installation, insert the 3.5mm jack bung.

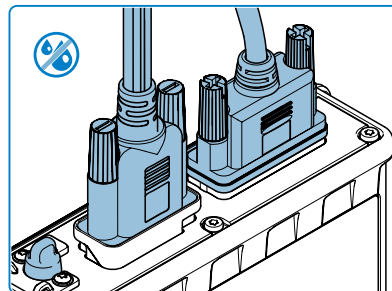


Important Sealing Information



CAUTION! To prevent damage to the products by moisture ingress, the following instructions must be adhered to.

If water is present on the product, sealing bungs and connectors must be fully dried before removing. This is particularly critical with connectors facing upwards.



RF Compatibility Checks

On completion of the installation, the following checks must be carried out if the vehicle is equipped with electronic anti-skid, electronic ignition or engine management systems.



WARNING! In the event of an apparent malfunction in the braking or any other systems during RF compatibility checks, the SCU3 and SAH3 installation should be rendered inoperative and the vehicle manufacturer should be contacted before any further use is made of the installation. Unqualified persons should not attempt to modify these units in any way.

The SCU3 LTE transmitter should be operated only for the time required to make an observation. These checks should be performed by connecting to an LTE network and performing a high data rate transfer function such as a broadband speed test.

An assistant will be required for the following checks:

1. With the vehicle stationary and the engine running at fast idle, operate the SCU3. 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, operate the SCU3 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), operate the SCU3 and press the brake pedal simultaneously. Check that the braking action is normal and that the engine does not surge or cut out.

Parts Supplied

The following items are supplied with the SCU3 and SAH3.

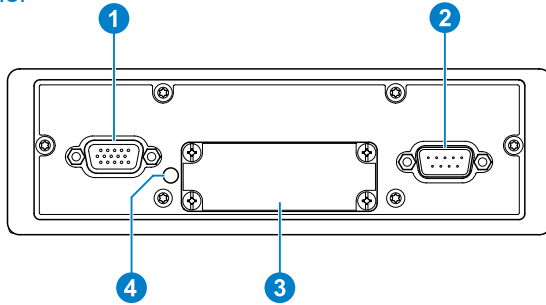
Part no.	Description	Qty
5-30002	SCU3 Power Cable + GPIO 5m	1
5-30003	SAH3 Power Cable 5m	1
300-00086	Transceiver Plate Mount Kit	1
5-30011	SAH3 Connector Sealing Kit	1
5-30012	SAH3 Cable Retention Kit	1
5-30016	Cables Sealing Kit (SCU)	1
SPR-DOC-04439	Mobile Radio Compact Installation Guide	1
SPR-DOC-04558	Product Safety and Compliance Guide	1

Additional Equipment

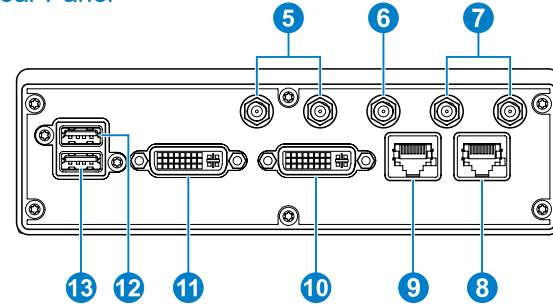
Part no.	Description
SPR-10570	SCU3 USB Clip Kit
5-30004	SCU3-SAH DVI Interconnect 1m
5-30005	SCU3-SAH DVI Interconnect 3m
5-30006	SCU3-SAH DVI Interconnect 5m
5-30007	SAH3 PTT Switch
5-30008	SAH3 PTT Switch Flexi-Stalk
300-00227	Mouse Mic, 5m lead
300-00225	Remote Short-Stalk Mic, 5m lead
300-00719	SRG Low Profile Loudspeaker

SCU3 Components and Connections

Front Panel

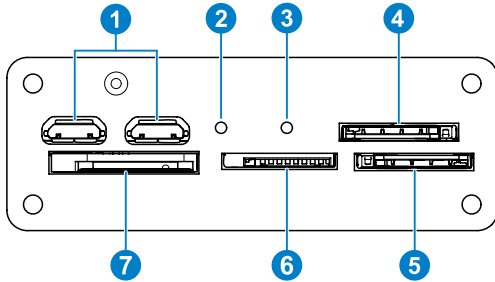


Rear Panel



Component/Connector	Type	Description	
1	Power I/O	15 Way D-sub, male	DC power input to the SCU3 with ignition sense (e.g. from a vehicle) and six GPIO lines
2	Serial	9 Way D-sub, male	Serial data connection
3	Protective Cover	N/A	See the section "Covered Panel" on page 11 for more details
4	LED Indicator	Red LED	Indicates the current status of the SCU3
5	Wi-Fi/Bluetooth Antenna	SMA sockets	Main and Diversity connections for a suitable Wi-Fi / Bluetooth antenna
6	GNSS Antenna	SMA socket	Connection for a suitable external GNSS antenna (e.g., GPS)
7	LTE1 Antenna	SMA sockets	Main and Diversity connections for a suitable LTE antenna
8	Eth 1	RJ45 socket	Connection for Ethernet devices or a Network
9	Eth 2	RJ45 socket	Connection for Ethernet devices or a Network
10	Console 1	DVI-I socket	Connection for interface with the SAH3
11	Console 2	DVI-I socket	Not currently in use.
12	USB 1	USB Type A socket	Connection for USB devices
13	USB 2	USB Type A socket	Connection for USB devices

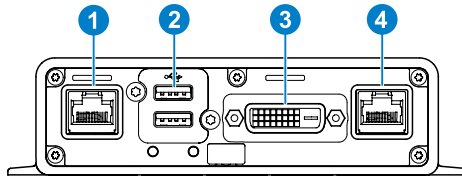
Covered Panel



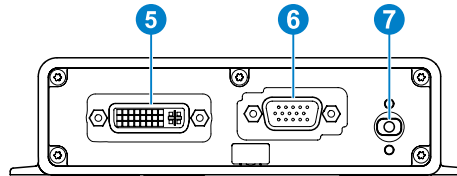
Component/Connector	Type and Description
1	Micro USB sockets Diagnostic sockets - Not for customer use
2	Reset Recessed button for resetting the SCU3
3	Power Recessed button for powering the SCU3 on and off
4	Micro SIM 2 Secondary Micro SIM card slot - optional
5	Micro SIM 1 Primary Micro SIM card slot
6	Micro SD Micro SD card slot
7	Mini SIM 3 Mini SIM card slot - not currently in use

SAH3 Components and Connections

Front Panel



Rear Panel

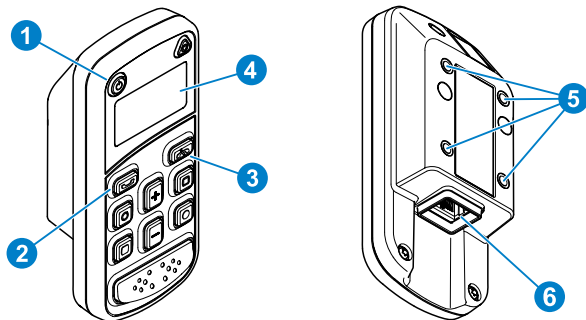


Component/Connector	Type	Description
1	CONTROL RJ45 socket	Connection for control accessories such as a PTT switch
2	USB-A USB Type A sockets	Connections for USB devices
3	DVI (DISPLAY) DVI-D socket	Connection for a visual display unit
4	Eth 3 RJ45 socket	Connections for Ethernet devices or a Network
5	DVI (SCU3) DVI-I socket	Interface connection to the SCU3
6	POWER/LS 15 Way D-sub, Male	DC supply input to the SAH3 and connection for a loudspeaker
7	MIC 3.5mm jack socket	Connection for a microphone

VCU Components and Connections

Front

Rear



- | | |
|---|---------------------|
| 1 | Power button |
| 2 | Green accept key |
| 3 | Red reject key |
| 4 | Backlit screen |
| 5 | AMPS mounting holes |
| 6 | RJ45 connector |



For more information about key functions and operating the VCU, see the Broadband User Guide (MOD-21-2502).

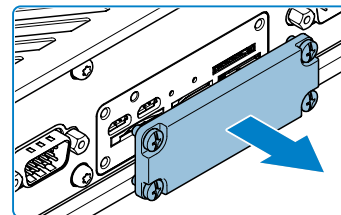
Fitting SIM or SD Cards

The SCU3 is fitted with slots to accommodate Mini or Micro SIM cards or a Micro SD card. The slots are concealed by the protective cover fitted to the front of the SCU3.

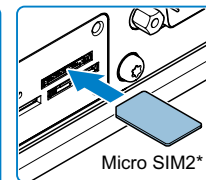
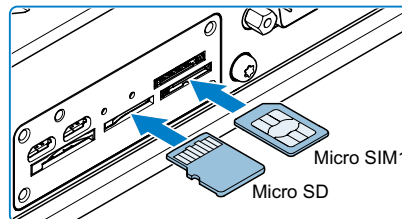


CAUTION! Power OFF the SCU3 before fitting or removing SIM or SD cards.

1. Undo the four retaining screws to remove the protective cover from the front panel of the SCU3.



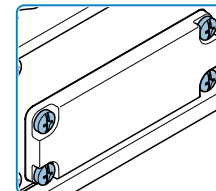
2. Carefully insert any cards in the appropriate slots observing the correct orientation. Push the cards in until they click into position.



- * An optional second Micro SIM can be inserted for the SCU3 to operate in a Dual SIM/Dual Standby configuration.



CAUTION! To maintain the product IP54 seal rating, ensure that the protective cover is refitted and the securing screws are fully hand-tightened.



Mounting the SCU3 and SAH3



CAUTION! Ensure fixing screws are of an appropriate type and length for the surface material the products are being mounted on to.



IMPORTANT! Allow sufficient space around the products for cables and access to connectors.

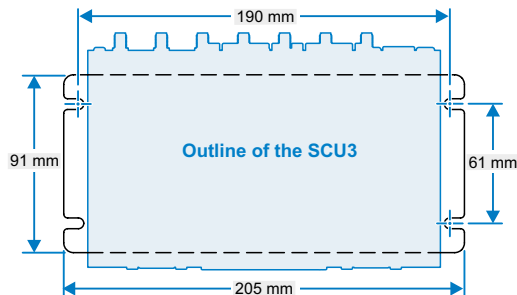


IMPORTANT! It is recommended that larger cables (such as DVI and HDMI) are connected and secured before the SCU3 and SAH3 are fitted to the final mounting positions.

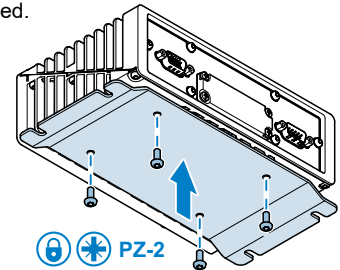
Mounting the SCU3

The SCU3 needs to be installed on a flat surface, such as in a car boot, using the mounting plate supplied (in the box).

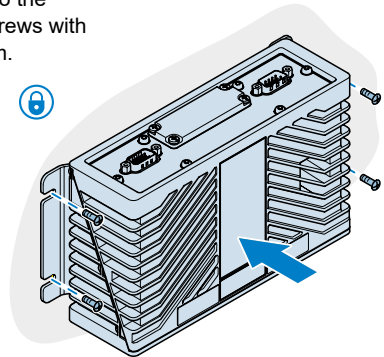
1. Mark and pre-drill the mounting holes using the dimensions provided. Alternatively the mounting plate can be used as a template if required.



2. Fit the mounting plate to the bottom of the SCU3 using the four screws supplied.



3. Secure the SCU3 assembly to the desired surface using four screws with a maximum diameter of 5 mm.



CAUTION! To maintain the product's IP54 rating, the SCU3 must be mounted with the USB sockets facing downwards as shown.

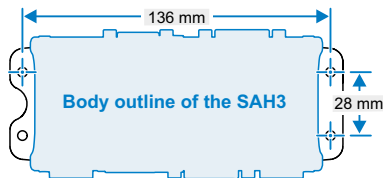
Mounting the SAH3

The SAH3 needs to be installed on a flat surface, typically concealed behind the dashboard or in a glove box compartment.

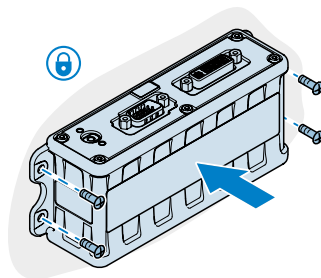


IMPORTANT! In some installations the user may require regular access to the USB sockets on the SAH3 and this must be considered when choosing a suitable mounting location.

1. Mark and pre-drill the mounting holes using the dimensions provided. Alternatively the SAH3 can be used as a template if required.



2. Secure the SAH3 to the desired surface using four screws with a maximum diameter of 4 mm.



CAUTION! The USB receptacle is rated to IP54 to ensure there is no ingress into the product's casework. However to ensure no moisture enters the socket itself, the SAH3 should be mounted with the USB sockets facing downwards as shown.

SCU3 and SAH3 Cabling and Connections



WARNING! DC supply leads, antenna cables and speaker wiring must 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.



CAUTION! Ensure that the cables are routed so that they are kept clear of any existing vehicle system cabling. Secure all cabling to eliminate the possibility of damage by sharp edges or moving parts. All cabling should be hidden and not left loose.



CAUTION! Ensure that any data cables and loudspeaker cables are routed so that they are kept well clear of antenna cables and of any other electronic devices such as electromagnetic systems or AM/FM radios.



IMPORTANT! Take care not to obscure access to product connectors:

- Connect and secure the most inaccessible connection leads first
- Do not route cables across the faces of other connectors
- Ensure cables connected to the unit have enough slack to maintain the recommended bend radius when the unit is secured in position

DC Supply Connection



CAUTION! The products are designed for nominal 12/24V negative earth systems. DO NOT use on other supply systems because this will result in damage to the products.

The following leads provide connection to the DC supply:

- SCU3 Power Cable
- SAH3 Power Cable

It is recommended that the power cable runs are kept as short as possible.

1. With the D connector ends of the power leads (SCU3 and SAH3) resting in their intended final positions, route the wires to a fused distribution box near to the vehicle battery, threading through the bulkheads as necessary (include the blue wire in the SCU3 Power Cable where ignition switching is required, see Step 3).
2. The positive power lines must include a fuse as close as possible to the power source. The negative power lines must be connected to a ground point close to the battery-to-vehicle-body connection (not directly to the battery) and must not include a fuse.

CAUTION! The SAH3 and SCU3 negative lines **MUST** be connected to the same ground point. **DO NOT** ground to different points on the vehicle.

3. The blue wire in the SCU3 Power Cable provides an ignition sensing input for the SCU3. 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.
4. Check the installation and fit the blade fuses. Fuse ratings:
 - **SCU3:** Positive supply 10A, Ignition sense 2A
 - **SAH3:** Positive supply 5A

*Fuses are automotive Littlefuse MINI® 58V series.

Loudspeaker Connection

The SAH3 Power Cable provides connection to a suitable loudspeaker.

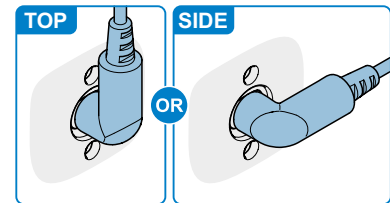
CAUTION! Loudspeaker recommendation - 4Ω impedance, 7W continuous rated power or greater. Speakers with a lower power rating may be prone to damage.

CAUTION! The audio output will not function 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.

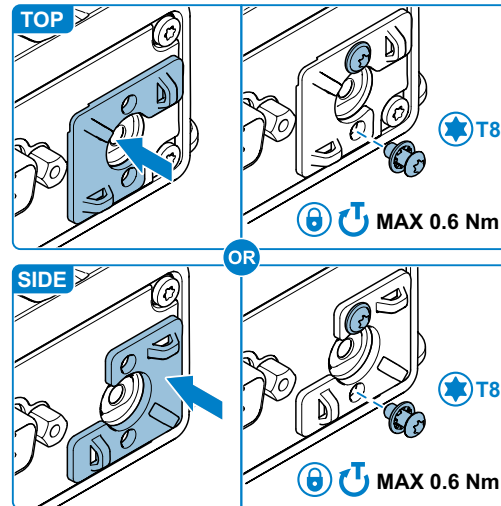
Microphone Connection

The SAH3 provides a standard 3.5mm jack socket for connection of a suitable microphone. To prevent accidental removal, the microphone's connector should be secured in place using the retention bracket provided. The bracket can be fitted to retain the connector for either top or side entry of the cable.

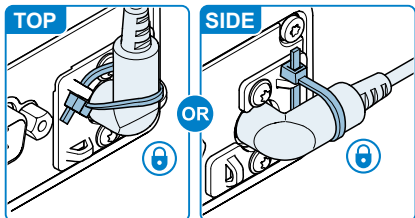
1. Choose which connector orientation is most suitable for the installation (top or side cable entry).



2. Fit the retention bracket around the jack socket in the desired orientation and secure with the screws and washers provided.



3. Insert the microphone jack plug into the socket and rotate to either a top or side entry position. Secure the jack plug in position with a cable tie, threaded through the loops in the retention bracket as shown.



USB Connections

USB sockets are provided on the SCU3 and SAH3 for connecting accessories such as a camera or USB stick.



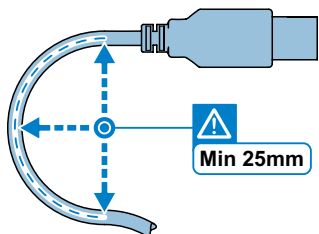
CAUTION! Do not exceed the maximum current rating when powering USB devices:

- **SCU3:** 2 x USB-A, 735mA maximum combined current
 - **SAH3:** 2 x USB-A, 500mA maximum combined current
- Not rated for continuous operation at maximum current.

USB Cable Routing Precautions



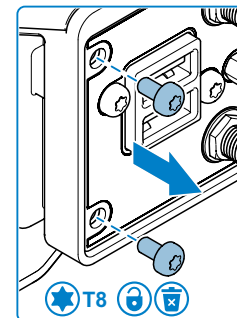
CAUTION! Do not exceed a minimum cable bend radius of 25mm when routing and securing USB cables. Exceeding this figure may damage the cables or cause impaired performance.



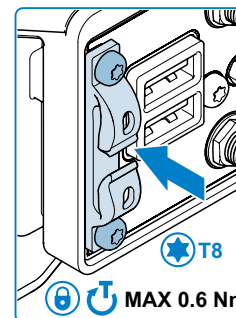
To prevent accidental removal, the USB cables on the SCU3 and SAH3 should be secured in place using the retention brackets available.

SCU3 USB Retention

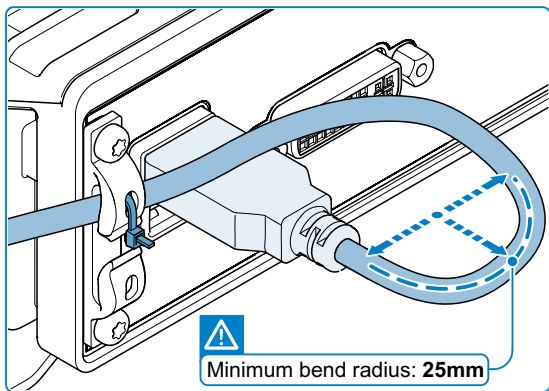
1. Remove and discard the two panel screws from the left side of the USB connectors.



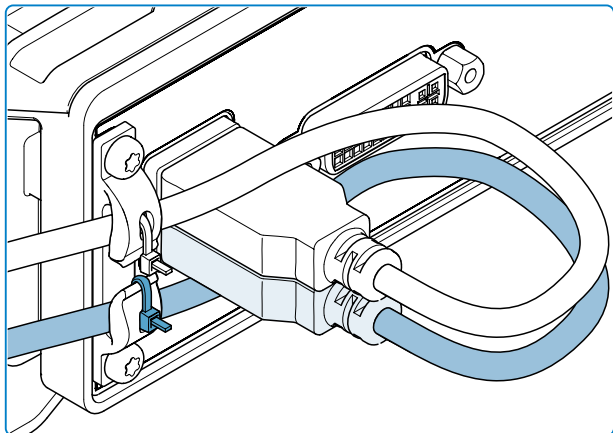
2. Fit the retention clip as shown, using the longer screws (M3x8) supplied.



3. Insert the USB connector into one of the sockets and route the cable through the retention clip, ensuring the minimum specified bend radius is not exceeded. Secure the cable in position with a cable tie threaded through the slot in the retention clip.

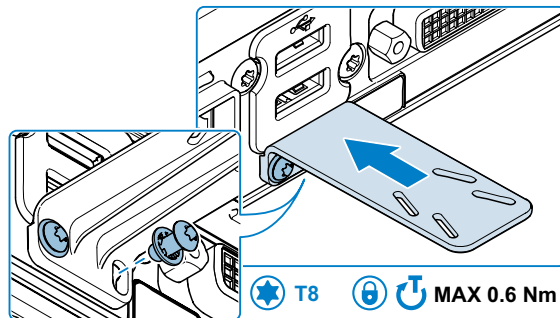


4. If required, connect and secure a second cable as shown below.

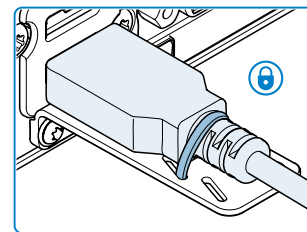


SAH3 USB Retention

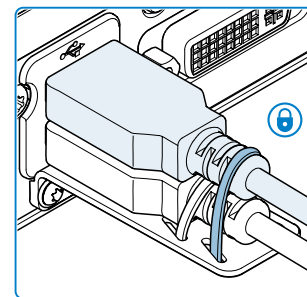
1. Fit the retention bracket below the USB sockets in the correct orientation and secure with the screws and washers provided.



2. Insert a USB cable into the lower socket and secure in position with a cable tie, threaded through the slots in the retention bracket as shown.



3. Another USB cable can be inserted in the upper socket and secured using a cable tie threaded through the second set of holes.



CAUTION! To ensure the connectors are reliably retained, the cable ties must be fully tightened.

Ethernet Connections



CAUTION! Do not connect accessories such as a VCU or PTT to any of the Ethernet sockets.

Ethernet sockets are provided on the SCU3 and SAH3 for connecting Ethernet data devices. There are two sockets on the SCU3 and one socket on the SAH3. All three sockets are RJ45 standard types.

Control Accessories Connection



CAUTION! Do not connect Ethernet cables or devices to the CONTROL socket on the SAH3.

An RJ45 socket is provided on the SAH3 for connecting control accessories such as a Vehicle Control Unit (VCU) or a PTT / Power switch unit.

DVI Connections

Two DVI-I sockets are provided on the SCU3 for:

- Interface connection to the SAH3
- Potential connection of a second visual display unit (Display 2) (typically a touchscreen)

A DVI-I socket is provided on the SAH3 for:

- Interface connection to the SCU3

A DVI-D socket is provided on the SAH3 for:

- Connection of a visual display unit (Display 1) (typically a touchscreen)

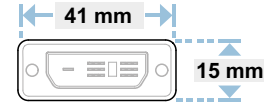


IMPORTANT! The DVI cables used to connect displays must conform to the DVI Standard Digital Video Interface Rev 1.0.

Sepura DVI Connector Dimensions



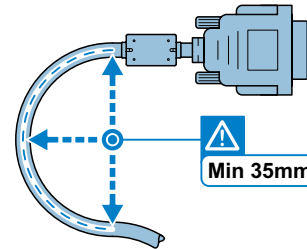
IMPORTANT! When planning the installation, consider the dimensions of Sepura DVI connectors for routing cables through bulkheads and conduits.



DVI Cable Routing Precautions



CAUTION! Do not exceed a minimum cable bend radius of 35mm when routing and securing DVI cables. Exceeding this figure may damage the cables or cause impaired performance.



Digital I/O Connections

The SCU3 power lead provides connection wires for six I/O lines.

If any of these I/O connection options are to be used, see the section "Programmable I/O" on page 22.



CAUTION! If not used, fold and insulate any unterminated I/O line wires so that they are tidy and cannot make electrical connection with other components or conductive surfaces.



Serial Connection



CAUTION! Risk of product damage. Do not connect the power lead from an SCG22 installation or any other unapproved cables to the serial connector.

Antenna Connections



WARNING! Observe all safety warnings relating to the location and use of the antennas.



CAUTION! To maintain an IP54 rating, the SMA connectors must provide a seal.

LTE Antenna

The antenna unit connects to SMA connectors on the rear panel of the SCU3. 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 feeders should be secured along their length to eliminate the possibility of damage by sharp edges or moving parts.

GNSS Antenna Installation

The SCU3 provides a GNSS antenna socket. Please note that the SCU3 tracks GLONASS and GPS satellites simultaneously.

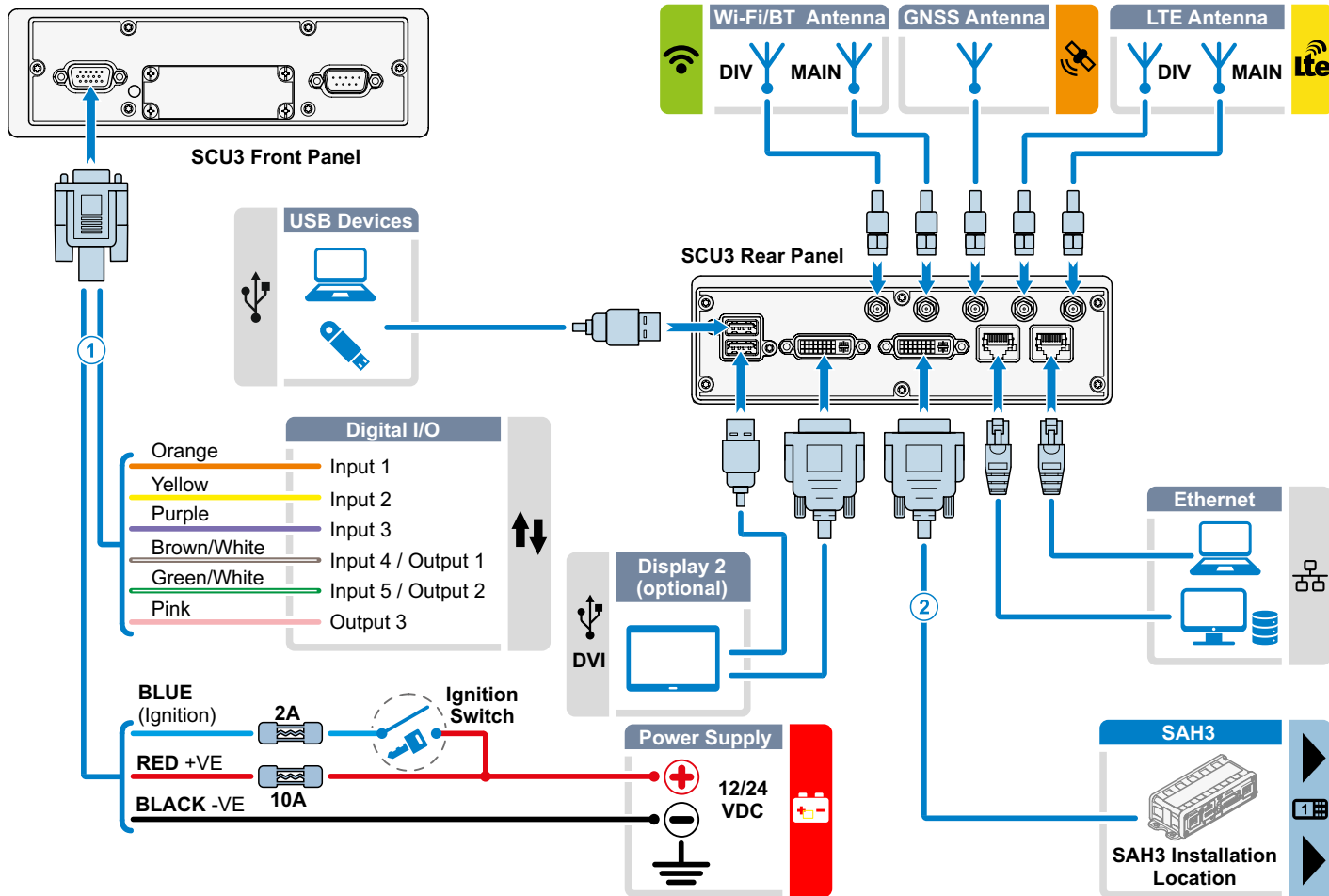
The antenna unit connects to an SMA connector on the rear panel of the SCU3 and should, ideally, be mounted on the highest point of the vehicle (i.e., roof) with an uninterrupted view of the sky, and as far from other antennas as possible. For mounting, follow the manufacturer's installation instructions. It is recommended to fit the GNSS antenna connector before connecting the Remote Console 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.

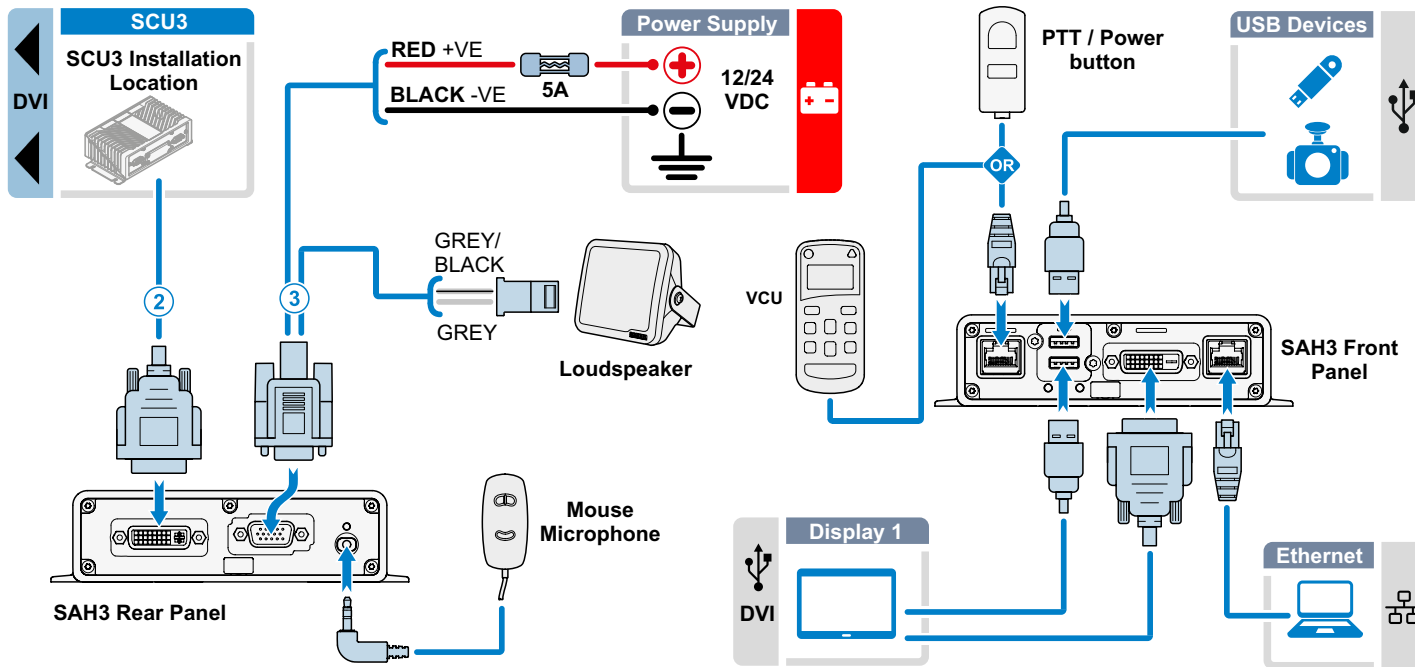
Bluetooth/Wi-Fi Antenna Installation

The antenna unit connects to a SMA connectors on the rear panel of the SCU3 and should be mounted on an interior surface, with the antenna not in direct contact to metal vehicle body parts. It should be located as far from other antennas as possible. For mounting, follow the manufacturer's installation instructions.

SCU3 Cabling and Connections Overview



SAH3 Cabling and Connections Overview



Main Interconnecting Cables

①	SCU3 Power Cable + GPIO	5m	5-30002
②	SCU3-SAH3 DVI Interconnect	1m	5-30004
		3m	5-30005
		5m	5-30006
③	SAH3 Power Cable	5m	5-30003

Programmable I/O



WARNING! Before connecting devices to the Programmable I/O connection, please ensure the SCU3 has had a valid configuration applied using Sepura Device Manager (SDM). This ensures the software parameters required to operate the Programmable I/O are provisioned correctly and avoids incorrect operation of connected devices.

The SCU3 supports the following programmable digital I/O:

- Three dedicated input lines
- Two lines configurable as either input or output lines
- One dedicated output line

The following example functions may be allocated on the input lines:

- External Alarm Input
- External Input Triggered Status Messages
- Mute the loudspeaker
- Trigger the radio to switch stack
- Change talk group remotely

The following example functions may be allocated to an output line:

- External Alert Output
- Status Message Triggered External Outputs
- Switch on emergency vehicle lights
- Operate a vehicle horn or siren
- Open an automated gate or barrier

For details of how to program the functions refer to the Sepura DM documentation. For details of the signals and their characteristics, see the table in the next section.



WARNING! To control devices from the programmable outputs which require more than 1.5 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 outputs are used to drive external alert devices such as horns or sirens.

Hardware Characteristics for the I/O Lines

The following characteristics apply to the individual I/O lines, dependent on whether they are configured as inputs or outputs:

Configuration	Performance
Input	<ul style="list-style-type: none">• 23kΩ impedance• VIH min = 2.7V• VIL max = 0.5V• Protected against accidental application of external supply voltage, 36 V maximum• Assertion time: >100ms
Output	<ul style="list-style-type: none">• 23kΩ in high impedance state• Max sink current = 1.5A, active low• Max external voltage = 36V• Internally protected against inductive loads, and with a re-settable fuse• VOL max = 200mV @ 0.5A

Microphone and PTT Installation

It is recommended that the microphone is located away from any wind noise in a position suitable for the user, such as near the internal rear view mirror.

The PTT/Power switch unit should also be located centrally for the user to access. A self-adhesive hook and loop pad is provided for mounting on a flat surface, such as the dashboard.

VCU Installation

The VCU is connected to the SAH3 and is typically mounted where the user can access the keypad controls and clearly read information on the built-in display.

VCU Connection and Cabling



CAUTION! Ensure that the SCU3 is powered OFF before making any connection to the VCU.

The VCU is connected to the SAH3 using an Ethernet cable made to the required length by the installer, terminated with RJ45 connectors. To maintain the products' IP54 rating, seal boots must be fitted to the cable before the connectors are terminated. For more information see the section "RJ45 Connectors (SCU3/SAH3/VCU)" on page 7.

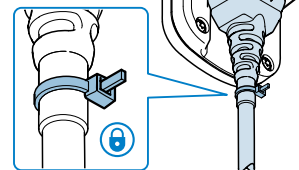


IMPORTANT! The Ethernet cable used must be of the type F/UTP (Foiled with Unshielded Twisted Pairs).



CAUTION! Allow sufficient slack in the Ethernet cable for angle adjustments when the VCU has been installed on an adjustable mount.

1. Insert the connector into the socket on the rear of the VCU, ensuring it clicks into position.
2. Pull the boot forward over the connector ensuring the clip is engaged and the boot is fitted fully over onto the raised wall.
3. Secure the sealing boot in position on the cable firmly, using the cable tie provided.



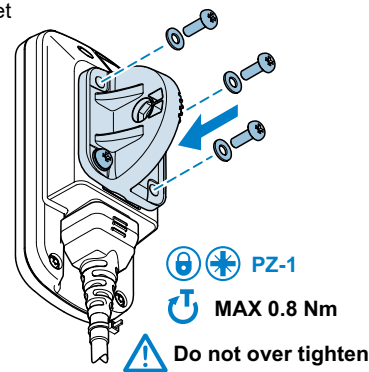
VCU Mounting Options

The VCU can be fitted into the vehicle using a range of AMPS mounts available to suit installation requirements.

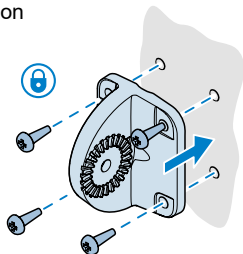
AMPS Ratchet Hinge Mount

The optional Ratchet Hinge Mount secures the VCU to the vehicles interior and provides viewing angle adjustment in the horizontal plane.

1. Fit one half of the AMPS bracket to the mounting holes on the rear of the VCU, using the screws and washers provided.

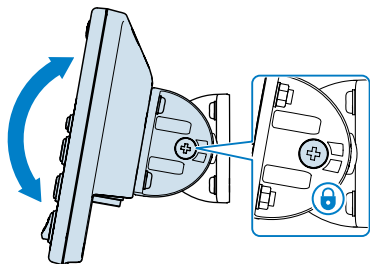


2. Fit the other half of the bracket into position on a suitable surface using four screws.



CAUTION! Ensure fixing screws are of an appropriate type and length for the surface material the bracket is being mounted on to.

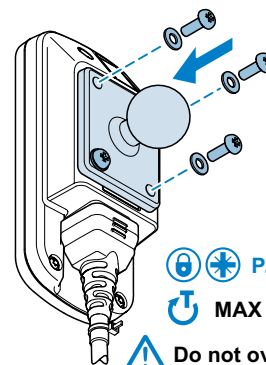
3. Fit the two brackets together using the screw and nut provided. Before fully tightening, adjust the VCU to the desired angle.



AMPS Ball Mount

The optional ball mount provides flexible mounting options for the VCU when used in conjunction with the range of compatible mounting arms and brackets.

1. Fit the AMPS ball mount to the mounting holes on the rear of the VCU using suitable screws and washers.



2. Fit a compatible mounting kit to the ball mount, such as a double socket arm. Ensure any mounting components are fully tightened after adjustments.



Powering On/Off

Depending on the installation, the SCU3 can be powered on by:

- Turning on the vehicle's ignition
- Pressing the Power button on the connected VCU or PTT Switch

The SCU3 is powered off by:

- Turning off the vehicle's ignition
- Pressing the Power button on the PTT Switch until an Android Power Off menu appears on the connected display
- Using the power button on the VCU



Note: The connected SAH3 is automatically powered on or off by the SCU3.

Powering Off using the VCU

1. Press and hold the power button until the on-screen message is displayed:

**SCU3 Power
Shutdown SCU3?**








2. Either:

- (a) Press the red reject button to cancel the power off.
- (b) Press the green accept button to confirm the power off and shutdown the SCU3.

**SCU3 Power
Shutting down...**

SCU3 LED Indicator

The red LED on the front panel indicates the current status of the SCU3:

LED Status	Type
 Off	The SCU3 is off and cannot be powered on. The input DC supply is either not connected or is below the minimum threshold.
 Flashing on 1 and off 4 seconds	The SCU3 is connected to a suitable DC supply and can be powered on.
 On	The SCU3 had been powered on and is booting up.
 Flashing on 2 and off 2 seconds	The SCU3 is operational and running in Normal mode.
 Two 0.5 second flashes then off 2 seconds	The SCU3 is running in Fastboot mode.
 Three 0.5 second flashes then off 2 seconds	The SCU3 is running in Recovery mode.
 Flashing on 0.5 and off 0.5 seconds	The SCU3 is in a fault state (low voltage supply or host failed to start).

SCU3 Basic Configuration

Basic configuration can be performed using the Android system to change:

- The connected display resolution and orientation
 - The microphone gain settings
 - The VCU screen timeout and brightness settings
1. Ensure the SCU3 is powered on and Android has booted up and is available for use on the connected display.
 2. Tap to select **Settings > Sepura Settings**.
 3. Make the required configuration changes:
 - (a) Tap to select **Display** to change the resolution or orientation for the connected display(s).
 - (b) Tap to select **Accessory Hub** to adjust the microphone gain as required.
 - (c) Tap to select **VCU** to change:
 - The timeout of the VCU screen (in seconds)
 - VCU screen brightness
 - VCU keypad brightness



For more detailed information about configuring the SCU3, see the Broadband User Guide (MOD-21-2502).

SCU3 Programming/Customising

Before re-programming or customising the internal software in the SCU3 you will need the following items:

- Access to Sepura MDM
- Power connection to the SCU3



IMPORTANT! The SCU3 must be connected to the Internet, either using LTE or Wi-Fi.

Display Compatibility Specification

When choosing a display to connect to the installation, the technical specification requirements in the following table must be followed to ensure full operational compatibility.

Feature	Description
Input Connector	DVI-D (or HDMI with standard DVI-HDMI conversion cable/adaptor)
Accepted input signal resolution	<ul style="list-style-type: none">• 720p (1280×720), 16:9• 800p (1280×800), 16:10• XGA (1024x768), 4:3 (All 30Hz)
Screen aspect ratio	Aspect ratio 16:9,16:10 or 4:3 with auto scaling. (See Note 1)
Touch Screen	Multi-touch capacitive screen (minimum 5 points, 10 preferable) with USB interface
Operating Temperature range*	0°C to 50°C

Note 1: 16:10 will auto scale from the SCU3 16:9 output with no visible issues. Other screen ratios such as 4:3 will not be displayed at native resolution and will be scaled to fit the screen. Consequently this will result in black bars above and below the output image (letterbox mode).

Note 2: The DVI GND should be isolated from Power GND inside the screen (Screen power supplies should have a 'Y' capacitor coupling with the monitor 'chassis' connections to meet the DVI and USB standards).

Technical Information

Physical Data

SCU3:

Dimensions: 180mm x 55mm x 108mm

SAH3:

Dimensions: 147mm x 37mm x 59mm

Electrical Data

Voltage Input (SCU3/SAH3)

Input Voltage Range:..... 6.0 - 36.0V DC

Nominal Input Voltage (12V Vehicle) 13.8V DC

Nominal Input Voltage (24V Vehicle) 27.6V DC

Current (SCU3)

Operating Current (max):.....8.0A

Standby Mode Current..... < 55mA

Off Current < 5 mA

Current (SAH3)

Operating Current (max):.....4.0A

Off Current < 1 mA

Environmental Data

Operating Temperature (min./max.)-20°C to +60°C

Storage Temperature-40°C to +85°C



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