The Mobile Radio Compact Installation Guide provides critical safety information and instructions for installing the SCG22. It is intended to be used as a quick reference guide in conjunction with the Mobile Radio Full Installation Guide.

The Mobile Radio Full Installation Guide (SPR-DOC-04384) provides all the additional information and instructions required to install the SCG22, including:

- Full safety information
- Parts supplied
- Model variants and options
- Connector sealing
- Connecting leads
- Mounting options
- Fitting a SIM Card or SIM card reader
- SCG22 mounting options
- Cable and connection information
- SCC3 mounting options
- Connecting, mounting and configuring the HBC3
- Programming, customising and data connections

To view, download or print the Mobile Radio Full User Guide, visit:

https://ic.sepura.com/login

Safety Information

READ THE TETRA PRODUCT SAFETY GUIDE (SPR-DOC-00170) SUPPLIED WITH THE SCG22 FOR IMPORTANT INFORMATION ABOUT SAFELY OPERATING THIS PRODUCT.

ALWAYS POWER OFF the mobile radio 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 antenna when the mobile radio is powered on. In order to reduce the risk of RF burns, the antenna must always remain connected when the equipment is powered on. DO NOT connect or disconnect the antenna whilst the equipment is powered on.

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

ONLY fit an approved accessory. If a non-approved accessory is fitted, it may compromise the product safety ratings and may void any product warranty.

DO NOT attempt to dismantle this product. Servicing and repairs to this product 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

This product 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. Consoles or accessories are not shipped in the container with the SCG22 mobile radio 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.

Installation Precautions

CAUTION! Risk of product damage. When carrying out installation requiring the removal of product covers, ESD precautions must be taken.

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 SCG22. 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 product. 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 SCG22 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 3.

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 SCG22 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 mobile radio into land based vehicles (not marine based vehicles or motorcycles).

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

This product 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 the console in a position where the operator has easy access to the controls and the microphone when wearing a seat belt. The controls must also be within the driver's normal field of vision.

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

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).

Temperature and Orientation Considerations

Reliable transmit operation will be achieved if the SCG22 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 vertical orientation with no restriction to the flow of convected air. For any other orientation, varying degrees of degradation may result.

Fitting the SCG22 or console 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 SCG22 close to a heat source, e.g., in front of a heater vent.

Location Considerations

The SCG22 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 SCG22 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 SCG22 should be positioned so that it does not obstruct, or become at risk of damage from, any occupant or carried items. Ensure sufficient space is provided above the installation to allow fitment and removal of the SCG22.

Protect the rear panel connectors and connecting cables from the risk of impact damage. If a connector is not in use, the dust covers or seal bungs provided must be fitted to reduce the risk of damage or dust/moisture ingress.

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 SCG22 installation should be rendered inoperative and the vehicle manufacturer should be contacted before any further use is made of the SCG22 installation. Unqualified persons should not attempt to modify these units in any way

The transmitter should be operated only for the time required to make an observation. Ideally these checks should be performed on the TETRA system. If this is not possible, perform the checks 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.

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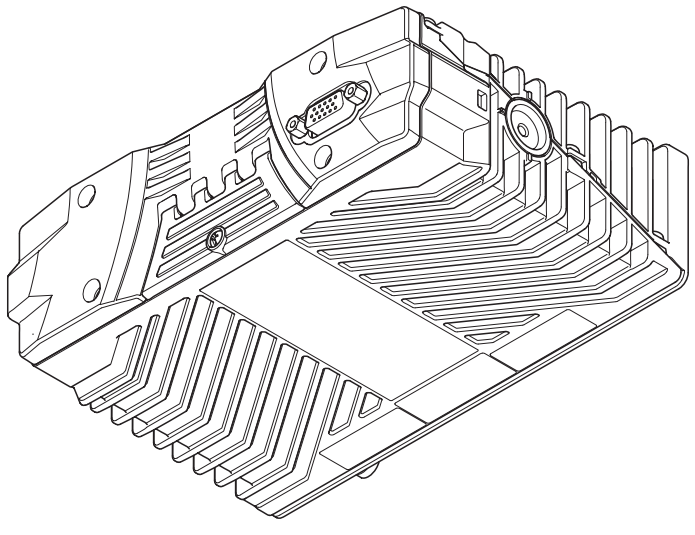
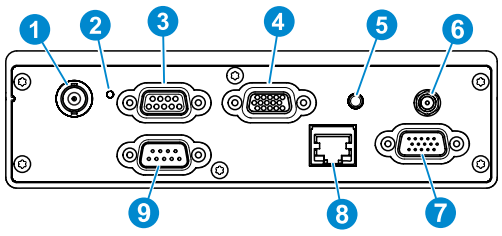


Mobile Radio Compact Installation Guide

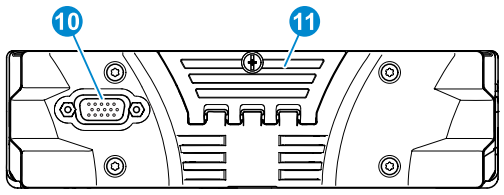
SCG22 Series Transceiver

SCG22 Components and Connections

Rear Panel



Front Panel



1	TETRA Antenna	5	GNSS Antenna	9	Power
2	LED Indicator	6	Bluetooth & Wi-Fi Antenna*	10	Console 2*
3	I/O1/SPK1/PRG	7	I/O2/SPK2*	11	SIM Card Cover
4	Console 1	8	Ethernet*		

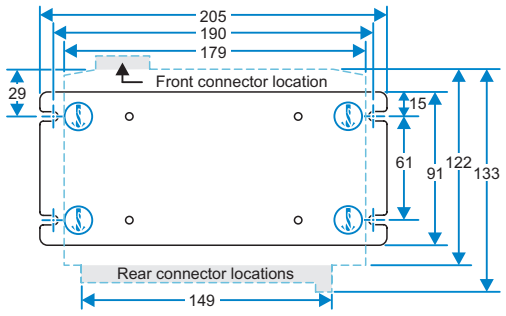
*Optional connections depending on the model variant.

Mounting Bracket

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

If the SCG22 needs to be installed on a flat surface, such as in a car boot, the fixed mounting bracket option supplied (in the box) can be used. Fit the mounting plate to the bottom of the SCG22 using the four screws supplied. Secure the mounting bracket and SCG22 assembly to the desired surface using four screws. The bracket can be used as a template to mark and pre-drill the holes if required.

IMPORTANT! Allow sufficient space around the SCG22 for cables and access to connectors.



⟷	All dimensions are in millimetres
- - - -	Outline of SCG22 profile.
	Drill four holes at the fixing centres indicated to suit the fastener type (5 mm MAX diameter)

SCG22 Cabling and Connections

WARNING! 12V 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. Ensure that the colour console cable and any 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. Secure all cabling to eliminate the possibility of damage by sharp edges or moving parts. All cabling should be hidden and not left loose.

Note: Both the remote console and loudspeaker extension cables are colour coded blue at the SCG22 end to aid installation before the SCG22 is installed.

DC Supply Connection

CAUTION! The transceiver is designed for nominal 12V negative earth systems. DO NOT use on other supply systems because this will result in damage to the product.

The following lead options provide connection to the DC supply:

- SCG Power / Ignition Lead
- SCG Power / Ign / IO Adapter Lead

It is recommended that the power cable runs are kept as short as possible. In a new installation where the SCG Power / Ignition Lead is used:

1. With the SCG22 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 necessary (include the blue wire where ignition switching is not required, see 3 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 connection (not directly to the battery) and must not include a fuse.

3. 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.
4. Check the installation and fit the blade fuses. Fuse rating:
   - Positive supply 10A, Ignition sense 1A (Automotive 19 mm blade type - Littelfuse ATO®).

Loudspeaker Connections

The following lead options provide connection to loudspeakers:

- SCG Loudspeaker / IO Lead
- SCG Loudspeaker / IO USB Host Lead
- SCG Loudspeaker / IO USB Slave Lead
- SCG Expansion Board Loudspeaker / 8 GPIO Lead

CAUTION! 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.

Digital I/O Connections

The following lead options provide programmable IO connection lines:

- SCG Power / Ign / IO Adapter Lead
- SCG Loudspeaker / IO Lead
- SCG Loudspeaker / IO USB Host Lead
- SCG Loudspeaker / IO USB Slave Lead
- SCG Expansion Board Loudspeaker / 8 GPIO Lead

USB Connections

A host* connection lead is available for connecting approved USB devices:

- SCG Loudspeaker / IO USB Host Lead

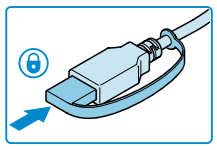
CAUTION! *Do not exceed the maximum current rating when powering USB devices.

Note: The USB host mode is not currently supported on the SCG platform and will be included in a future software release.

USB connection leads are available for programming the SCG22:

- SCG Loudspeaker / IO USB Slave Lead
- SCG USB Programming Lead

CAUTION! The protective cap must be fitted over the USB plug when the lead is not in use. The SCG22 may be prone to adverse performance or failure if the metal body of the USB plug touches the vehicle's metal body.



After programming is completed, fit the retained protective cap over the metal body of the USB plug. Ensure the lead is folded away where it cannot be damaged, but is still accessible for future programming operations.

Ethernet Connection (optional)

The SCG Ethernet connector provides an additional connection for data.

TETRA Antenna

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.

GNSS Antenna Installation

Depending on the model, the SCG22 has the option to support GNSS capability. Please note that when configured, the transceiver can track one or a combination of GLONASS, GPS, Galileo, and BeiDou2 satellites.

The antenna unit connects to a SMC connector on the rear panel 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 the manufacturer's installation instructions. It is recommended to fit the GNSS antenna connector before connecting the Remote Console Cable.

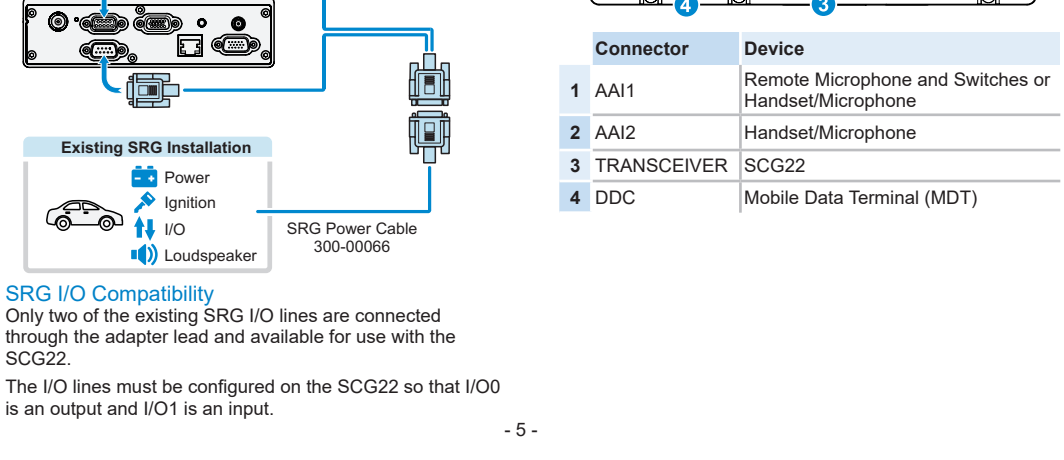
An active antenna is recommended, the supply of which is on the centre pin, 5 V nominal, 40 mA maximum. This supply feed is short circuit protected.

Bluetooth/Wi-Fi Antenna Installation (optional)

If a Bluetooth/Wi-Fi receiver is fitted at the time of manufacture, a Bluetooth/Wi-Fi antenna socket will be fitted.

The antenna unit connects to a SMA connector on the rear panel of the transceiver and should, ideally, be mounted on the highest point of the vehicle (i.e., roof), and as far from the TETRA antenna as possible. For mounting, follow the manufacturer's installation instructions. It is recommended to fit the Bluetooth/Wi-Fi antenna connector before connecting the Remote Console Cable.

Cabling and Connections Overview - All Models



Programmable I/O

The SCG22 supports the following programmable digital I/O lines, depending on the variant:

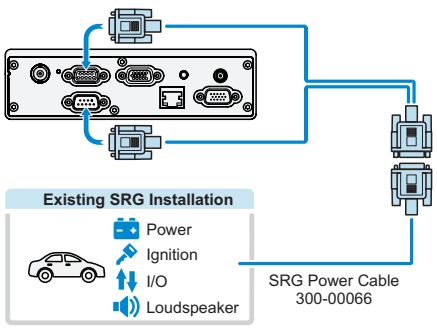
GPIO 1 Connector	Two I/O lines available
GPIO 2 Connector	Eight I/O lines available

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

Cabling and Connections to an SRG Installation

If the vehicle was previously fitted with an SRG mobile radio installation, the SCG22 can be connected to the existing SRG power cable using one of the optional adapter cables available. Existing ignition, IO and loudspeaker functions from the current installation will be retained.

SCG Power / Ign / IO Adapter Lead (300-02007)



SRG I/O Compatibility

Only two of the existing SRG I/O lines are connected through the adapter lead and available for use with the SCG22.

The I/O lines must be configured on the SCG22 so that I/O0 is an output and I/O1 is an input.

SCC3 Console

The SCG22 can accommodate up to two SCC3 consoles, or a combination of an SCC3 and an HBC3 handset-based console.

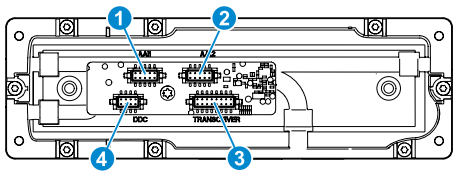
WARNING! Before starting to install the SCC3 console, see the section "Installation Precautions" on page 1.

SCC3 Connections and Cabling

WARNING! Ensure that the transceiver is powered OFF before making any connections to the SCC3.

IMPORTANT! If the SCC3 is mounted directly to the SCG22 the internal connectors are not accessible.

The SCC3 has four internal connectors that are used to provide connection to the transceiver and accessories as shown:



	Connector	Device
1	AAI1	Remote Microphone and Switches or Handset/Microphone
2	AAI2	Handset/Microphone
3	TRANSCEIVER	SCG22
4	DDC	Mobile Data Terminal (MDT)

Cabling the SCC3

CAUTION! ESD precautions must be taken during replacement of the rear cover.

1. Connect the colour console cable into the connector marked TRANSCEIVER on the SCC3. Press the strain relief grommet into the recess in the channel. Connect the 16-way D-type connector to either the Console 1 connector on the rear panel, or the optional Console 2 connector on the front panel of the SCG22.Connect all other accessories to the SCC3.

   Note: If the SCC3 is being fitted with the DIN Mount Kit, refer to the full installation guide for details on routing and securing the cables.

2. Route the cables through the channels on the internal moulding. Fit the split bung and the cable tie (supplied) around the cables (as shown). Tighten the cable tie behind the bung to secure the cables and allow slack at the 10-way plug termination.

CAUTION! Cables must be routed correctly using the channels to prevent damage. Press the cable bung into the recess in the channel. Fit the bungs provided into any unused channels.

Note: If a handset or fist-microphone accessory is used, the hands free kit must be plugged into the Audio Accessory Interface 1 connector (back left) to allow all cables to be routed correctly.

Fist Microphone/Handset

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 SCC3 so that the grommets seal correctly. Specific accessories attach to the Vehicle Accessory Connector (VAC). These should be used when mounting in a DIN slot.

Note: If replacing a rear connecting handset with a front connecting handset, also replace the magnetic hook rest with the one supplied.

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

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

Only one hands free microphone can be used in an installation, which can be connected to either audio accessory interface socket on the rear panel of the SCC3.

See "SCC3 Connections and Cabling" on page 5.

Connector Wiring Terminations

The remote microphone is supplied unterminated for ease of installation. Terminate to the SCC3 as shown after the switch unit and microphone are positioned.