

RRM02

Remote Radio Microphone Receiver



RRM02 FITTED WITH ANT03 WHIP ANTENNA
(ANT03B shown for illustrative purposes.)





This equipment is designed and manufactured to conform to the following EC standards:

EMC: EN 55103-1:1997, EN 55103-2:1997, EN 50121-4:2006, ENV 50204:1996

Safety: EN 60065:2002

Failure to use the equipment in the manner described in the product literature will invalidate the warranty.

A 'Declaration of Conformity' statement to the above standards, and a list of auxiliary equipment used for compliance verification, is available on request.



This product must be disposed of in accordance with the WEEE directive.

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Application Solutions (Safety and Security) Limited
Unit 17 Cliffe Industrial Estate
Lewes - East Sussex
BN8 6JL - UK
Tel: +44(0)1273 405411 Fax: +44(0)1273 405415
www.asl-control.co.uk



QUALITY ASSURED FIRM
CERTIFICATE NUMBER 96-LON-AQ-041

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1 Description

The RRM02 Remote Radio Microphone Receiver provides a method of implementation of RPA (Roving Public Address) functions to defined loudspeaker zones. This unit is a convenient and compact method of providing a radio microphone receiver when a SAP02 Station Announcement Point is not required. This would be particularly desirable for zones where there is no additional requirement for a fixed fist microphone such as the SAP02.

The RRM02 is designed to work with the whole range of ASL Voice Alarm and Public Address systems, while the provision of the closing contact select output from the RRM02 also enables it to be connected to PA (Public Address) systems other than those provided by ASL.

Where localised radio microphone coverage is required the RRM02 can be installed without any antenna cabling, using antenna mounting points on its upper face. If a larger area is to be covered then remote antennae can be used, and antenna combiners can be used to add further antennae, or multiple RRM02 units can be used in one zone. This functionality may be particularly useful in installations where several radio microphone antennae are required due to the topology of the zone, e.g. for a long and winding passenger walkway.

The RRM02 is physically implemented as an IP65 sealed enclosure, and is designed to be mounted against a vertical wall or other surface in the PA zone. The lower face of the unit provides 'Power', 'Active', and 'Busy' status indicators.

Internally the RRM02 comprises a Radio Microphone Receiver and a microphone PCB (Printed Circuit Board). A processor on the microphone PCB interfaces all LED indicators and the PTT (Press To Talk) signal to the ASL PA system by means of a serial interface, while microphone audio is provided as a balanced 0 dBu (nominal) analogue signal. The microphone's processor is also responsible for generating an outgoing low-frequency surveillance tone which is used to monitor the audio connection to the Router. The processor also interfaces the PTT (Press to Talk) signal to non-ASL PA systems by means of a relay closing contact.

The Radio Microphone Receiver is a high quality, fully synthesised diversity receiver, capable of working on ten frequencies that are selectable via a rotary switch. Additional circuitry for pilot tone detection prevents announcements from unauthorised transmitters. The pilot tone frequency is unique to this receiver. Thus only announcements from transmitters able to provide the same pilot tone, such as the ASL RPA01 Transmitter, are broadcast to the system, while announcements from unauthorised transmitters are blocked. This security feature can however be disabled for compatibility with transmitters that do not provide the pilot tone.

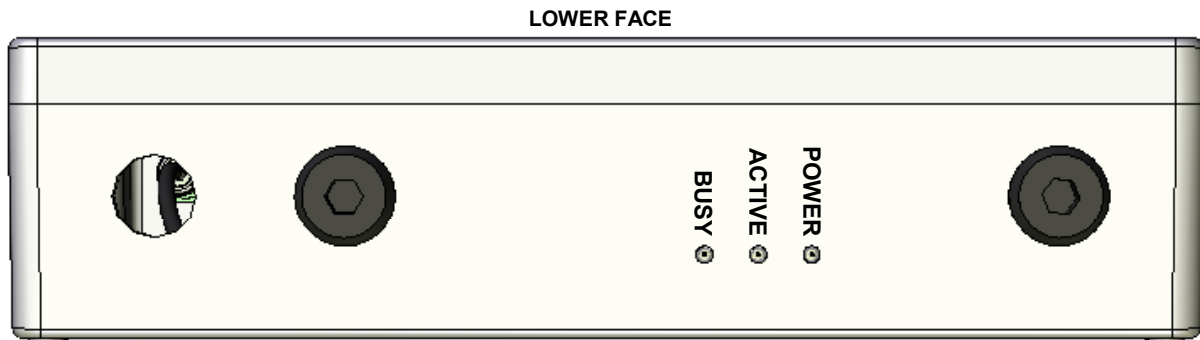
The Radio Microphone Receiver provides phantom power for mast-head antenna amplifiers, which is ideal for demanding RF environments. The phantom power is current limited so that a short circuit on one antenna does not disable the other.

The RRM02 is designed to mount two ASL ANT03 Whip Antenna on the upper face, or remotely connected to the RRM02. The ASL ANT04 Low Profile Antenna can also be used as a remote antenna, if required, as can other suitable antennae.

Note that no antennae are supplied with the RRM02, and the appropriate type needs to be ordered separately.

Field connections are provided by DIN rail terminals mounted on the inside rear panel of the back box.

2 Indicators

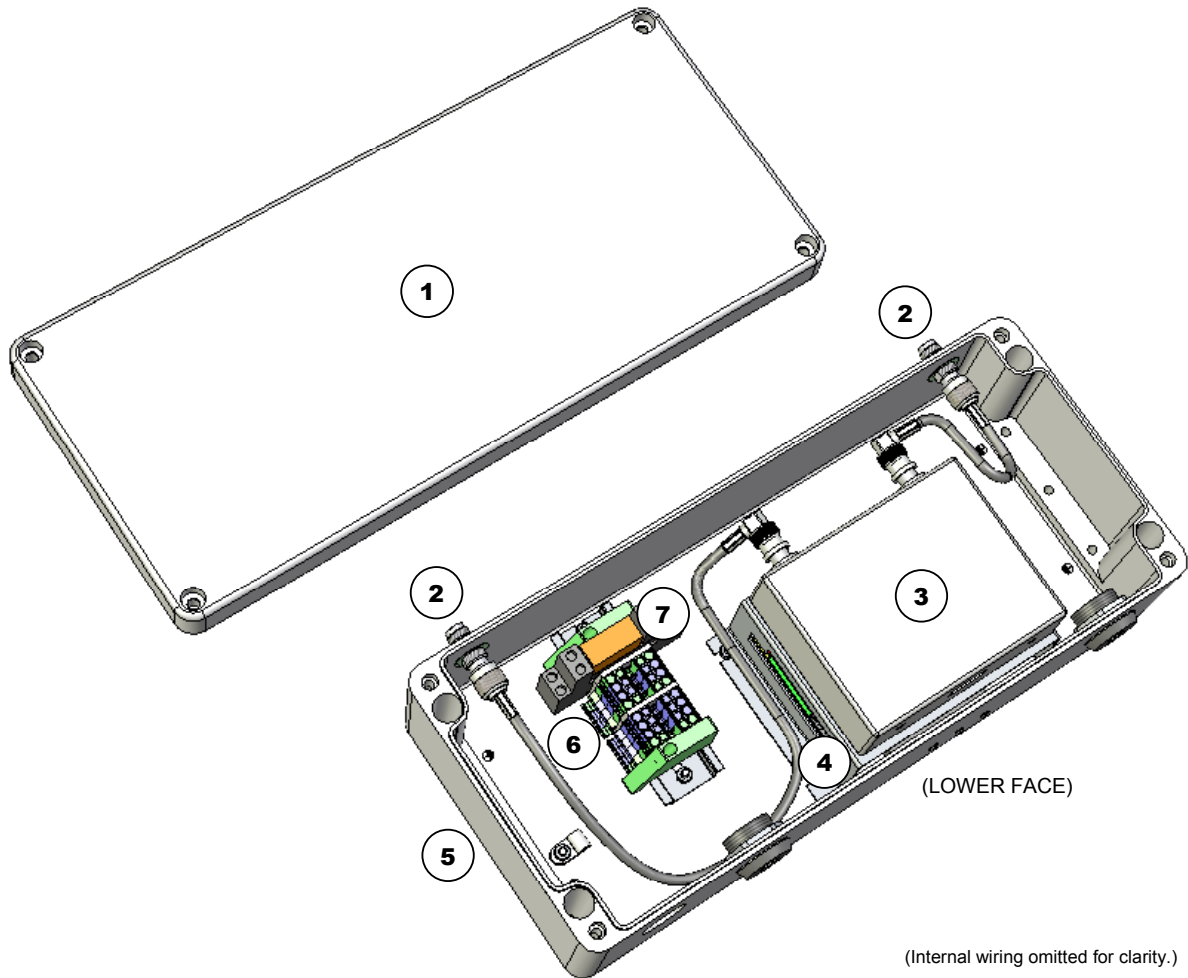


Indicator	Type	Indication
POWER	Yellow LED	Indicates that the unit is powered.
ACTIVE	Red LED	<ul style="list-style-type: none"> When the RRM02 is connected to an ASL PA/VA system using the serial microphone data interface the ACTIVE LED illuminates to indicate that a route has been made and an announcement from a Radio Microphone is in progress. When multiple RRM02 units are used on a single loudspeaker zone or when used with other manufacturer's PA systems, the ACTIVE LED illuminates to indicate that the PTT button is being held down, however it does not necessarily indicate that a route has been made.
BUSY	Red LED	<p>The BUSY LED only operates when the RRM02 is connected to an ASL PA/VA system using the serial microphone data interface. Therefore the BUSY LED will not operate when multiple RRM02 units are used on a single loudspeaker zone or when used with other manufacturer's PA systems.</p> <p>When the BUSY LED is lit this indicates that the zone (or one or more of the group of zones) addressed by the microphone is already in use by another input. This microphone can only select the zone if the other input is of a lower priority.</p> <p>If a higher priority input selects a zone during a paging announcement from the RRM02, then the zone will be deselected for the RRM02, and the BUSY LED will illuminate. The announcement will continue to any other zones if the RRM02 addresses a group of zones.</p>

3 Installation

3.1 Main Components

Figure 1 Main Components



- 1** Cast aluminium lid
- 2** Antenna connections:
TNC connectors for antenna connection direct to the upper face of the unit. Pre-fitted adaptor leads provide internal connection to the Radio Microphone Receiver.
- i** Cable entry holes are provided on the lower face of the unit as alternative antenna cable entry points; refer to Section “[3.2.2.3 Antenna Cabling](#)” (page 10) for connection details.
- 3** Radio Microphone Receiver
- 4** Microphone PCB underneath and protected by a metal bracket
- 5** Cast aluminium box
- 6** DIN rail terminals for field cabling
- 7** Relay for interfacing to other manufacturer’s PA systems, and for connection of multiple RRM02 units

3.2 Installation Requirement

3.2.1 Equipment and Tool Requirements

- The RRM02 unit.
- The antennae if they are to be directly connected to TNC connectors on the upper face of the RRM02.



The antennae are not supplied with the RRM02 and need to be ordered separately. The antenna type to be used for direct connection to the RRM02 is the ASL type ANT03B.

- Cabling as specified in Section “[3.3 Cabling Requirements](#)” (page 9) to suit your system design.
- Suitable fixings for the RRM02, and a screwdriver, nut spinner, or other appropriate tool to fix these.



It is suggested that the fixings are M6 pozipan head screws, with a thread length of the required fixing length plus 20 mm, as the length of the screw inside the RRM02 unit will be 20 mm.

If M6 screws are not used for the fixings, then the unit fixings need to be able to be inserted down the spaces provided for them in the RRM02 base casing. Therefore their heads must not be of a diameter greater than 13.0 mm. The shafts of the unit fixings need to be able to be passed through the holes provided for them in the RRM02 base. Therefore their shafts must not be of a diameter greater than 6.0 mm. The length of the shaft that will be within the RRM02 is 20 mm, so this will need to be allowed for.



- Pozidriv (M3 and M6) and flat-blade (small and large) screwdrivers.
- Nut spanners (M4 and M25).
- A pair of wire cutters/strippers.
- A large Allen key (10 mm).
- IP65 glands/conduit suitable for the field wiring cable entry hole (25 mm diameter) and for any optional antenna installation cabling.

3.2.2 Cabling Requirements

3.2.2.1 Cabling for Serial Data and Audio Connection to an ASL VAR Router, DAU, or ACU Microphone Input

Signals	Cable Description	Suggested Type
Audio	1 x 2 core, twisted, screened	Overall foil screened. Low Smoke and Fume (LSF).
Microphone Data (Mic Data)	1 x 2 core, twisted, screened	CAT5 STP can be used up to 500 m without adverse cross-talk. Fire Rated equivalent can be used.
Power	1 x 2 core, screened, 1 mm	Overall foil screened. Low Smoke and Fume (LSF). Fire Rated equivalent can be used.
 For cable-run limitations and alternative cable types, please refer to Application Solutions (Safety and Security) Limited for advice.		
 For EMC compliance: <ol style="list-style-type: none"> 1. Screened cables must be used where specified. 2. All field cable screens must be connected to the back box. 3. All screen tails must be <3 cm. 		

3.2.2.2 Cabling for Relay PTT and Audio Connection to an ASL or Other PA System

Signals	Cable Description	Suggested Type
Audio	1 x 2 core, twisted, screened	Overall foil screened. Low Smoke and Fume (LSF). CAT5 STP can be used up to 500 m without adverse cross-talk. Fire Rated equivalent can be used.
Relay PTT Signal	1 x 2 core, screened, 1 mm	Overall foil screened. Low Smoke and Fume (LSF). Fire Rated equivalent can be used.
Power	1 x 2 core, screened, 1 mm	Overall foil screened. Low Smoke and Fume (LSF). Fire Rated equivalent can be used.
 For cable-run limitations and alternative cable types, please refer to Application Solutions (Safety and Security) Limited for advice.		
 For EMC compliance: <ol style="list-style-type: none"> 1. Screened cables must be used where specified. 2. All field cable screens must be connected to the back box. 3. All screen tails must be <3 cm. 		

3.2.2.3 Antenna Cabling



Antenna cabling is required when remote antennae are connected to the RRM02.



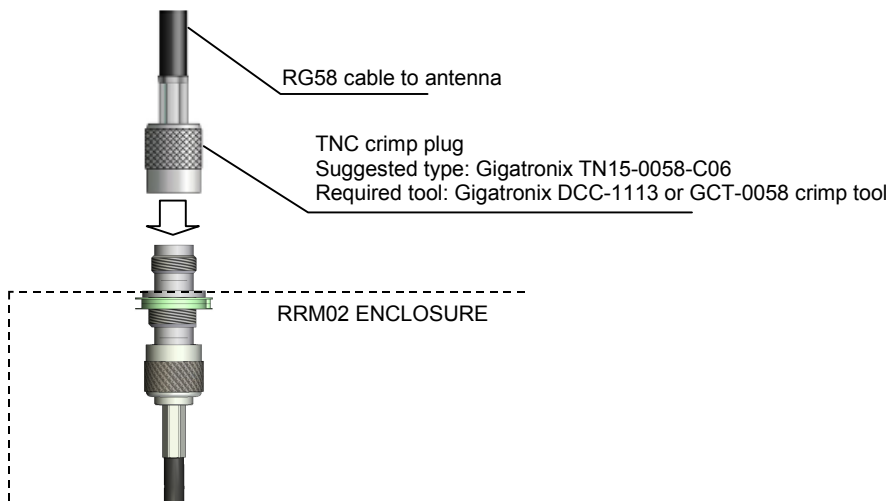
The antenna cabling must not be kinked or folded at any part of the run, including inside the RRM02 back box, or it will impair or prevent reception of the microphone signal.

The following coaxial antenna cables are recommended.

1. RG58 type (recommended for short runs of up to 10 m)

- a.** Antenna cables connected to the TNC connectors on the upper face of the unit; see [Figure 2](#).

Figure 2 RG58 Cable: Connection to Connectors on Upper Face of Unit

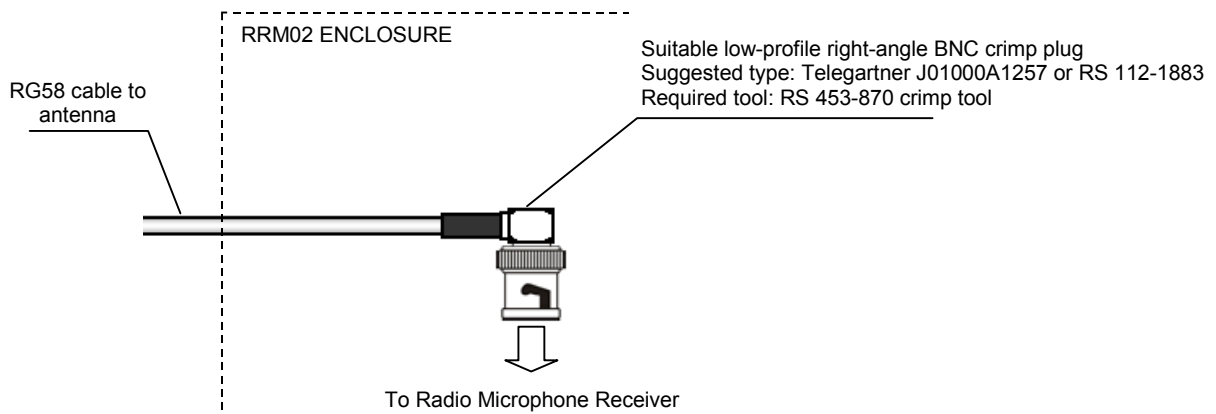


- b.** Antenna cables fed through the cable entry point on the lower face of the unit and connected directly to the BNC connectors on the Radio Microphone Receiver; see [Figure 3](#).



Preferred method if it is required to prevent water ingress into the antenna cabling.

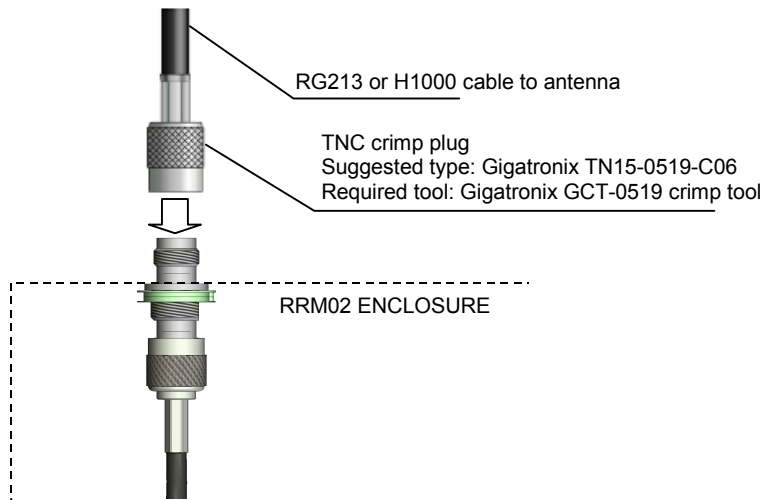
Figure 3 RG58 Cable: Connection to Receiver Connectors



2. RG213 or H1000 type (recommended for longer runs of up to 30 m)

- a.** Antenna cables connected to the TNC connectors on the upper face of the unit; see [Figure 4](#).

Figure 4 RG213 or H1000 Cable: Connection to Connectors on Upper Face of Unit



- b.** Antenna cables fed through the hole on the lower face of the unit and connected to the BNC connectors on the Radio Microphone Receiver; see [Figure 5](#).

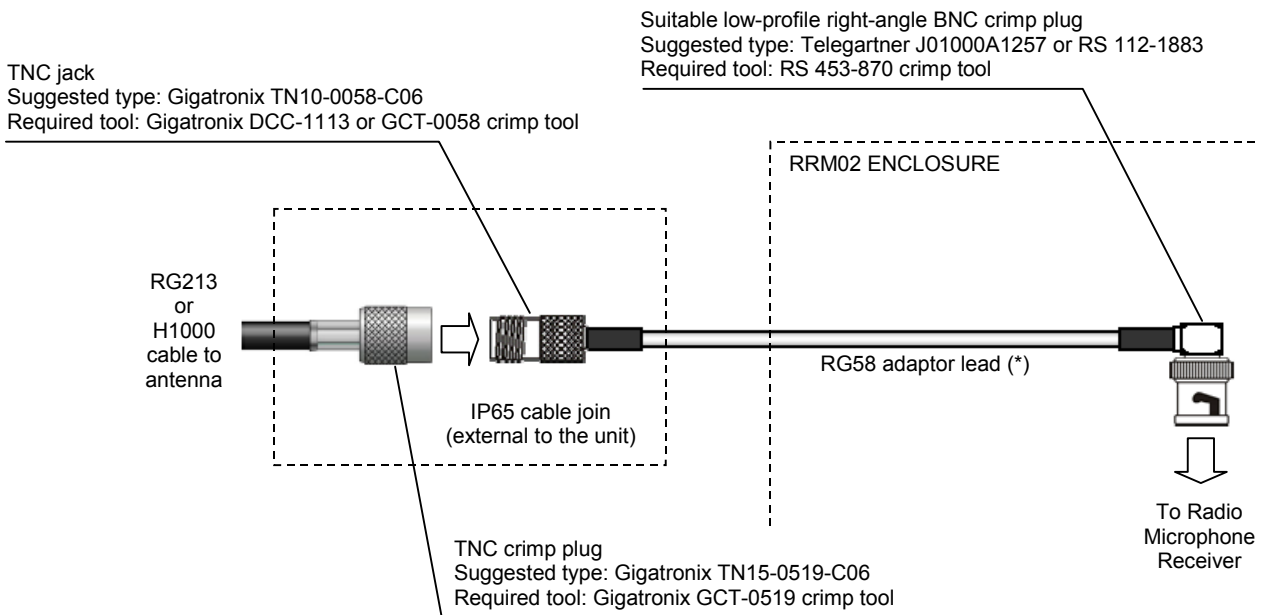


Large cables such as the RG213 or H1000 type must be connected externally to the unit to short flexible RG58 adaptor leads due to the restricted space inside the unit. The adaptor leads should then be terminated to the Microphone Receiver with a right-angle BNC crimp plug.



The cable joint must be IP65 sealed or in an IP65 enclosure if it is required to prevent water ingress into the antenna cabling.

Figure 5 RG213 or H1000 Cable: Connection to Receiver Connectors



(*) A pre-assembled 23 mm adaptor lead is available from ASL which may suit the gland/conduit being used for the antenna cabling. This adaptor lead needs to be ordered separately by quoting part A0464660 (two adaptor leads will be required).

3.3 Installation Procedure



1. Failure to follow this installation procedure can result in damage to the equipment or operational failure.
2. Please read and observe the Section “11 Safety and Precautions” (page 59) prior to installation. Failure to follow these precautions may cause personal injury and/or damage to the equipment.

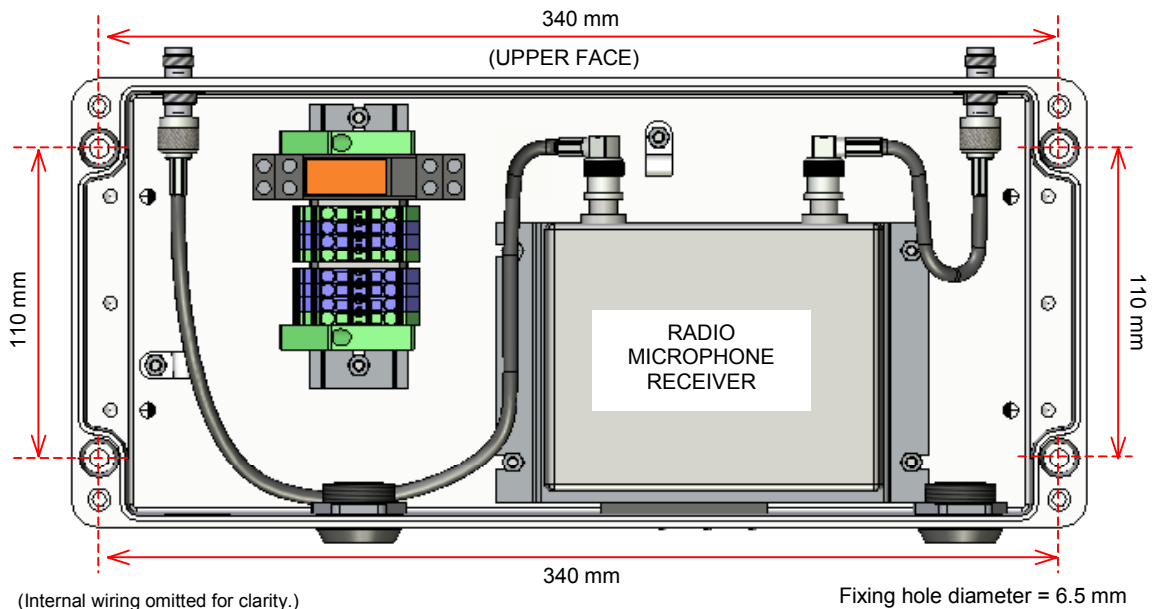
1. Remove the lid of the unit by unscrewing the four corner fixings.

2. Mark the surface on which the RRM02 unit will be fitted with the fixing hole positions.

The RRM02 unit is approximately 90 mm x 160 mm x 360 mm in size, excluding the glands and conduit entries, and has the four fixing holes on 110 mm x 340 mm centres (see Figure 6).

See Figure 27 (page 57) for mechanical dimension details.

Figure 6 Fixing Hole Position



3. Prepare the mounting holes appropriately.

4. Adjust the Radio Microphone Receiver as follows (see Figure 7):

- a.** Select the correct RF frequency via the internal rotary switch.
- b.** The Receiver is supplied with pilot tone detection enabled for secure use with the ASL RPA01 Radio Microphone Transmitters. This configuration will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone (non-tone locked transmitters)¹.

The pilot tone detection can be disabled via DIP switch 1 on the microphone PCB in order to allow announcements from non-tone locked transmitters.

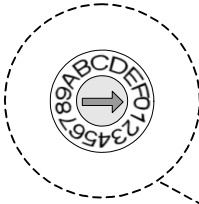
- c.** Select the squelch level via DIP switches 3 and 4 on the microphone PCB in order to minimise the interference of in-band signals.

¹

Announcements from non-tone locked transmitters are completely blocked with Radio Microphone Receiver modules of Build Standard (BS) 2B or later. With earlier Build Standards of Radio Microphone Receiver module the audio from non-tone locked transmitters is muted but they can still make chimes and silent routes. These silent routes can be blocked as detailed in ASL Technical Note 39; please refer to Application Solutions (Safety and Security) Limited for further details.

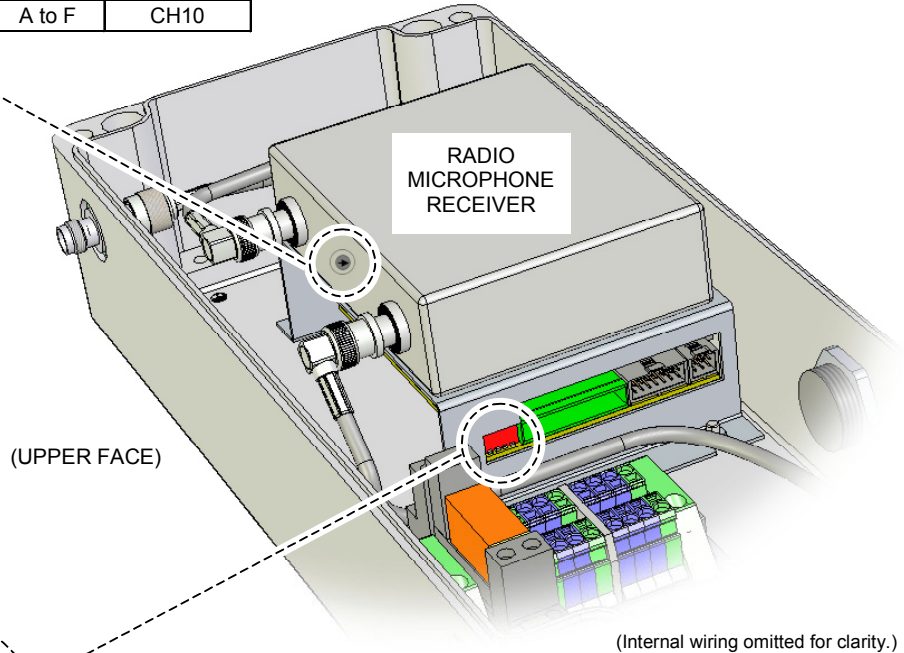
Figure 7 Radio Microphone Receiver Controls

FREQUENCY SELECTION
ROTARY SWITCH

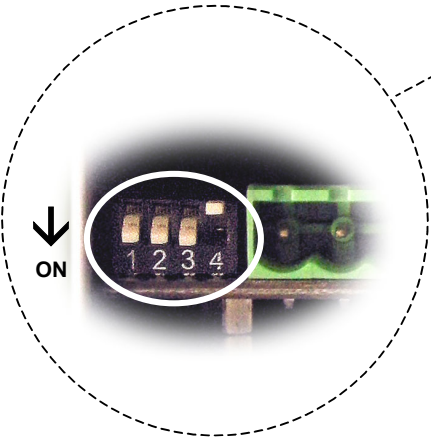


Switch Position	Transmitter Channel
0	CH 01
1	CH 02
.	.
.	.
9	CH 10
A to F	CH10

(Refer to Section
“5.1 Radio Microphone
Receiver Frequency
Selection” (page 34) for
further details.)



(Internal wiring omitted for clarity.)



DIP SWITCH:

- PILOT TONE DETECTION CONFIGURATION:

Switch 1	Pilot Tone Detection
↑	Disabled
↓	Enabled (default)

Refer to Section
“5.2 Radio Microphone
Receiver Pilot Tone
Detection Configuration”
(page 26) for further details.

- CONFIGURATION VIA ROUTER:

Switch 2	Router Configuration
↑	Enabled (for future use)
↓	Disabled (default) Do not change.

- SQUELCH LEVEL SELECTION:

Switches		Squelch Level
3	4	
↑	↑	Least sensitive -76 dBm
↑	↓	-86 dBm
↓	↑	-93 dBm (default)
↓	↓	Most sensitive-99 dBm

(Refer to Section
“5.3 Radio Microphone
Receiver Squelch Level
Configuration” (page 27)
for further details.)

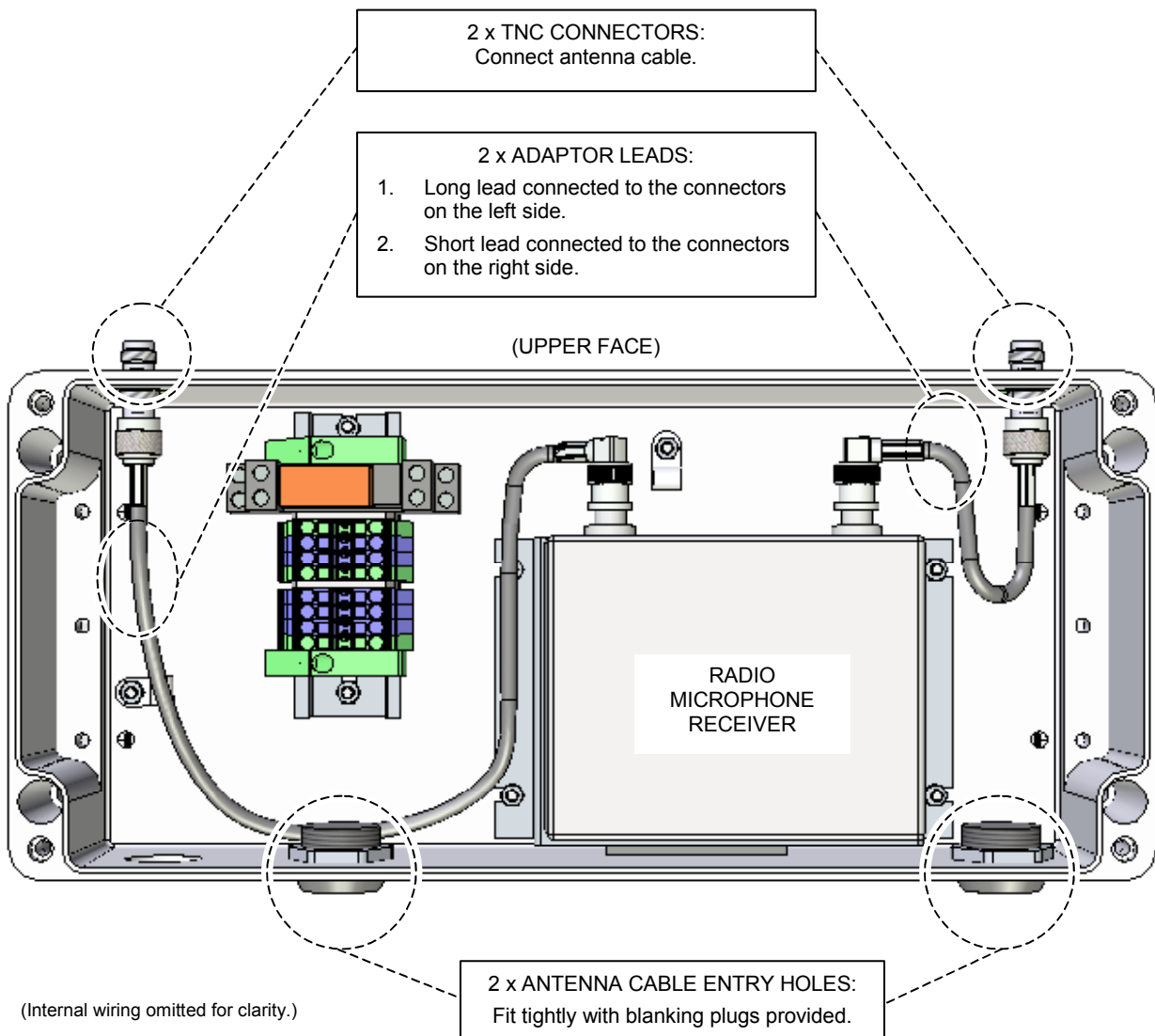
5. Fix the RRM02 unit in its mounting position using the selected fixings and appropriate tools.
6. If antennae, or antenna cabling, are to be directly connected to the TNC connectors located on the upper face of the unit, ensure that the internal adaptor leads are connected, and then connect the antennae or antenna cabling in place (see [Figure 8](#)).

These leads are supplied fitted as standard. If they have been removed during the installation, then re-connect the adaptor leads as shown in [Figure 8](#).

See Section “[3.2.2.3 Antenna Cabling](#)” (page 10) for cabling and connector details.


i The antennae are not supplied with the RRM02 and need to be ordered separately. The antenna type to be used for direct connection to the RRM02 is the ASL type ANT03B.

Figure 8 Internal Coaxial Lead Connection



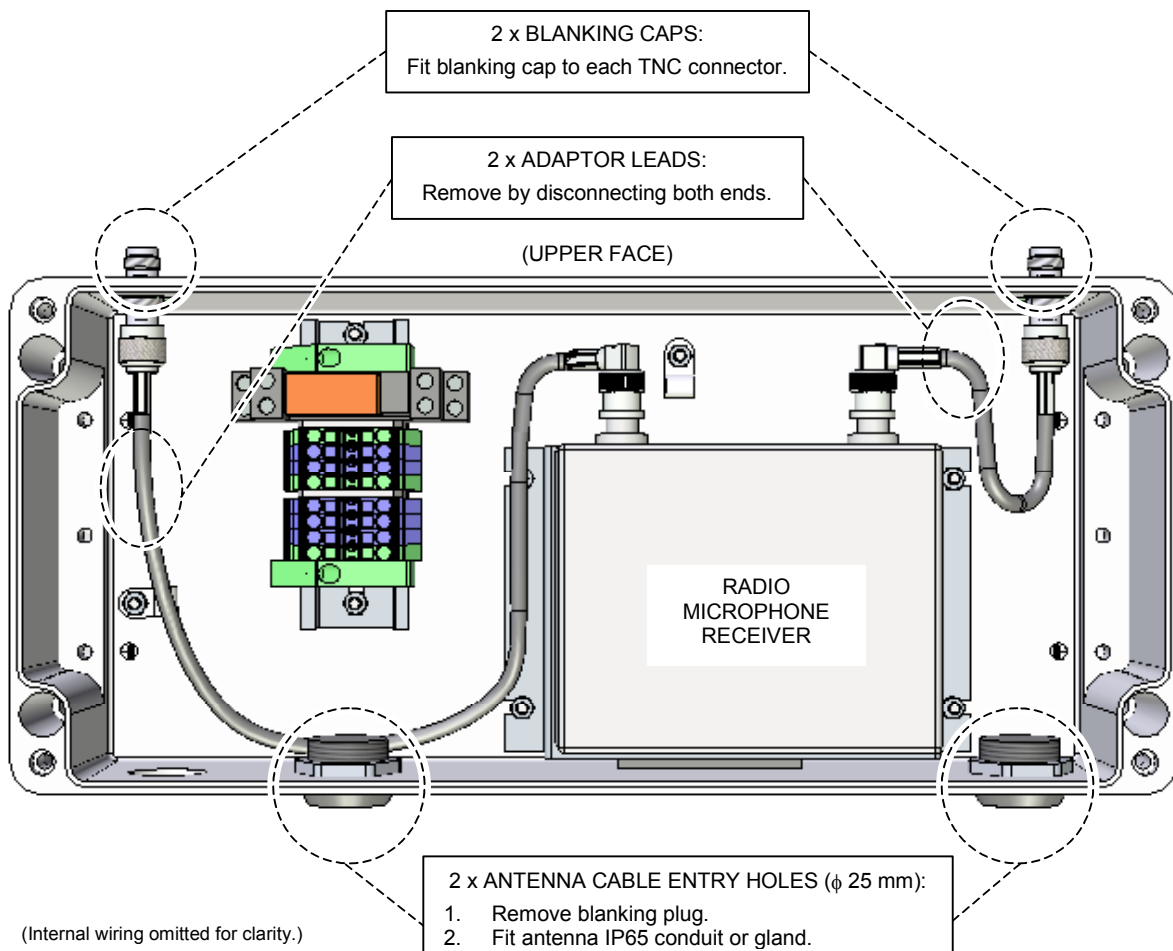
7. If antenna cables are used, and these are passed into the RRM02 through the holes provided on the lower face of the unit, then proceed as follows.

See Section “3.2.2.3 Antenna Cabling” (page 10) for cabling and connector details. See Figure 28 (page 58) for approximate cable length inside the unit.

	<ol style="list-style-type: none"> 1. Large cables such as the RG213 or H1000 type must be connected externally to the unit to short flexible RG58 adaptor leads due to the restricted space inside the unit. 2. The antenna cabling must not be kinked or folded at any part of the run, including inside the RRM02 back box, or it will impair or prevent reception of the microphone signal.
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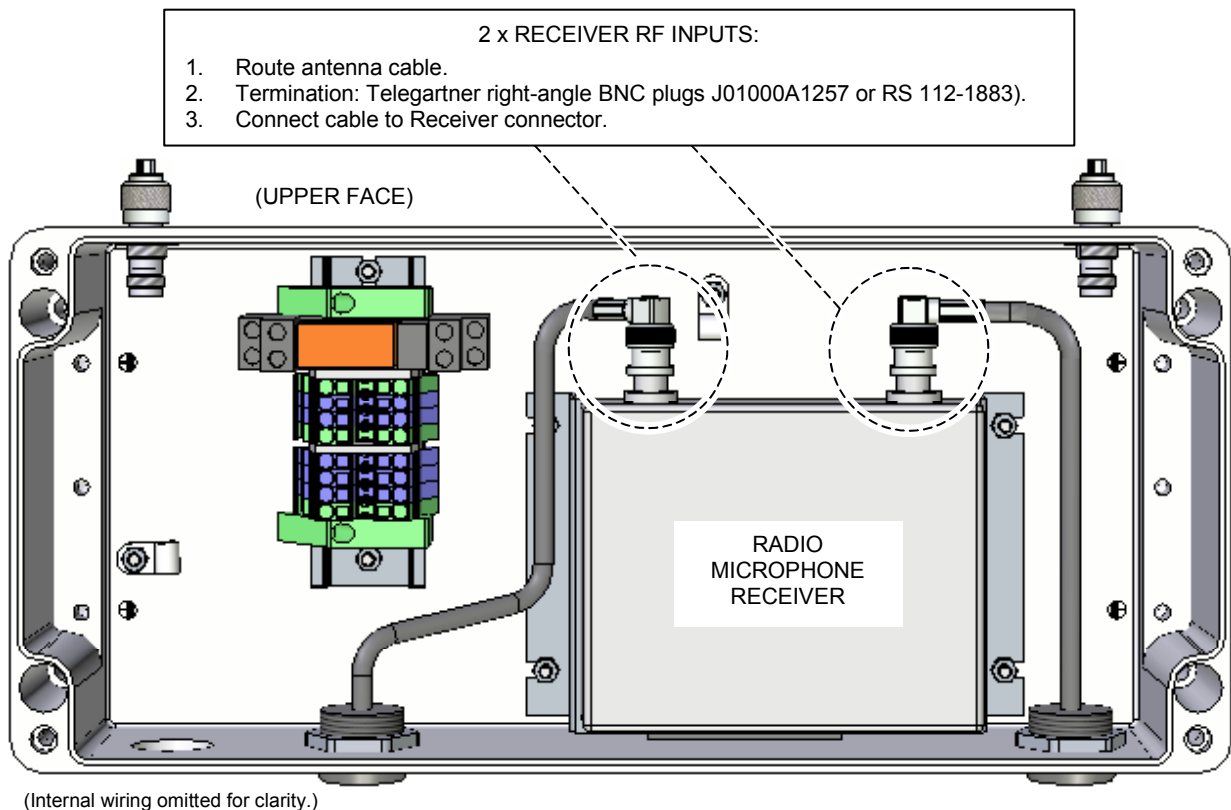
- a. Remove the M25 blanking plugs on the lower face of the unit, and install the antenna cable glands or conduits (see Figure 9).
- b. Disconnect the adaptor leads connecting the TNC connectors on the upper face of the unit, if not already done (see Figure 9).
- c. Fit a blanking cap to each unused TNC connector on the upper face of the unit (see Figure 9). Note that blanking caps are not supplied with the RRM02, and can separately be ordered from Application Solutions (Safety and Security) Limited quoting part 207036.

Figure 9 Antenna Cabling Entry Points at Unit's Lower Face



- d. Feed the antenna cables through the cable glands or conduits, cut to length, and terminate to the Radio Microphone Receiver using low-profile Telegartner right-angle BNC plugs.
- e. Route the antenna cables as shown in [Figure 10](#), and then connect the cables to the Radio Microphone Receiver RF inputs.

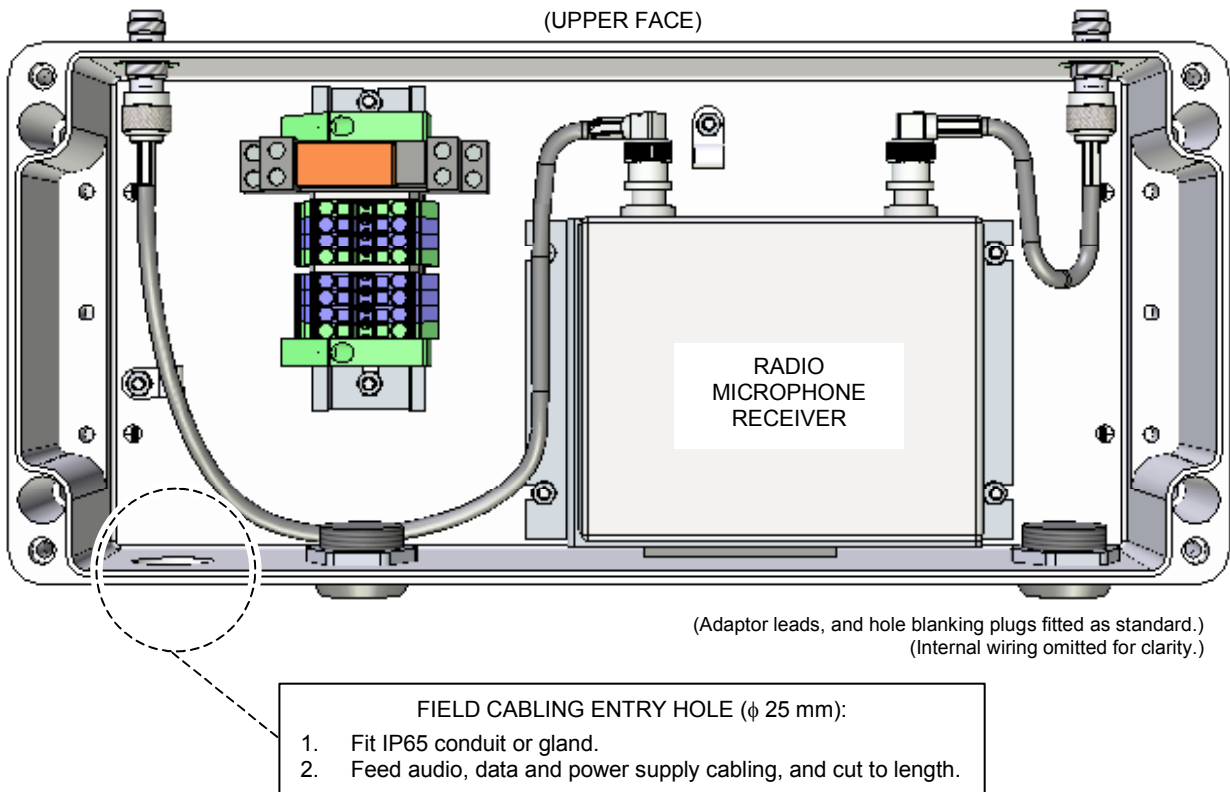
Figure 10 Antennae Cabling Routing



8. Ensure that the power supply from the central equipment rack, or wall mount Intellevac DAU or ACU is turned off.

9. Install the field cabling gland or conduit in the hole provided on the lower face of the unit, and then feed the field cabling through into the RRM02 (see [Figure 11](#)).


Figure 11 Field Cabling Entry Point



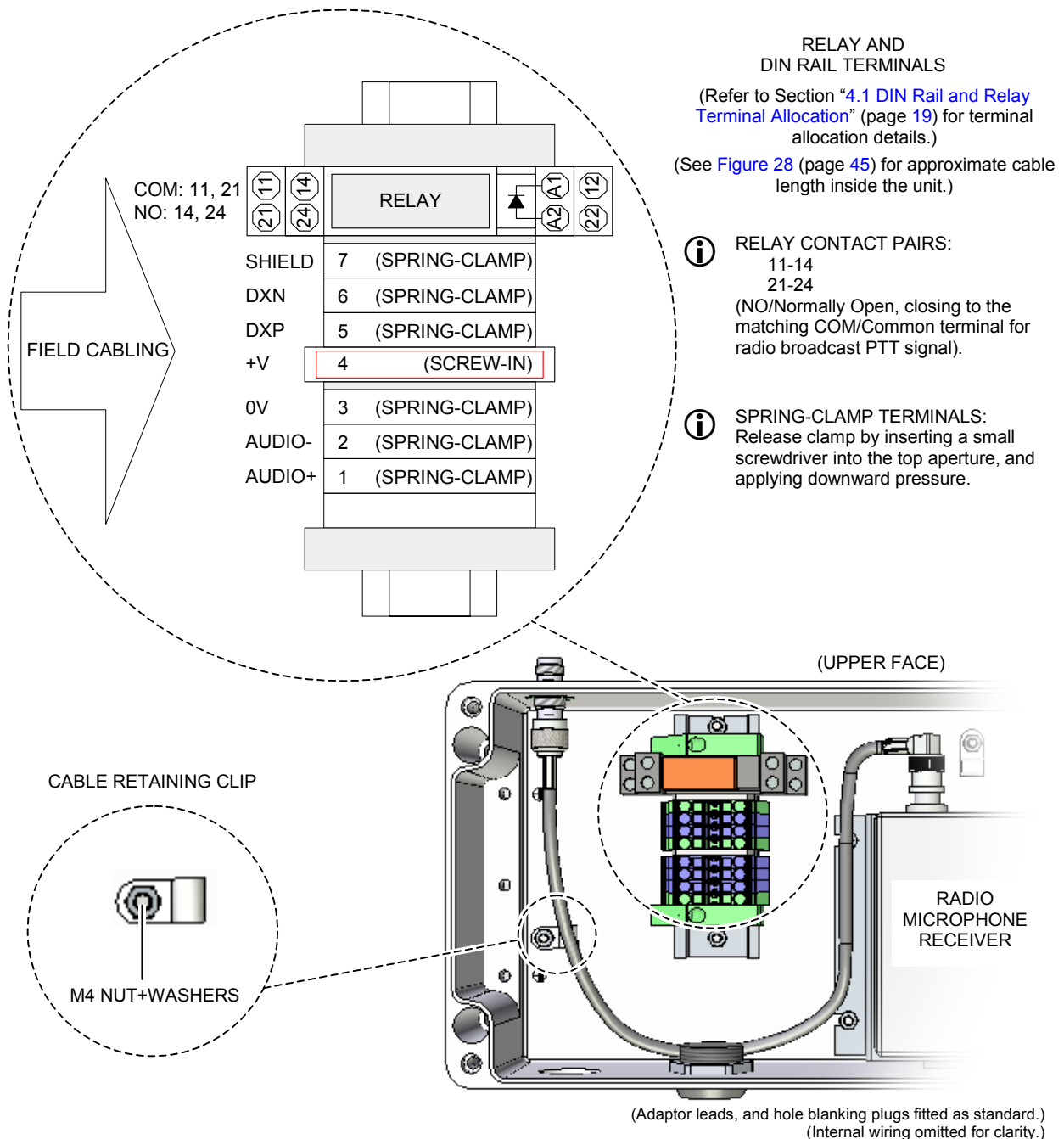
10. Connect the field cabling to the DIN rail terminals, and to the relay output (if required); see [Figure 12](#).

A cable retaining clip is provided in order to secure the field cabling to the back box if required.

Figure 12 DIN Rail Terminals and Relay Outputs

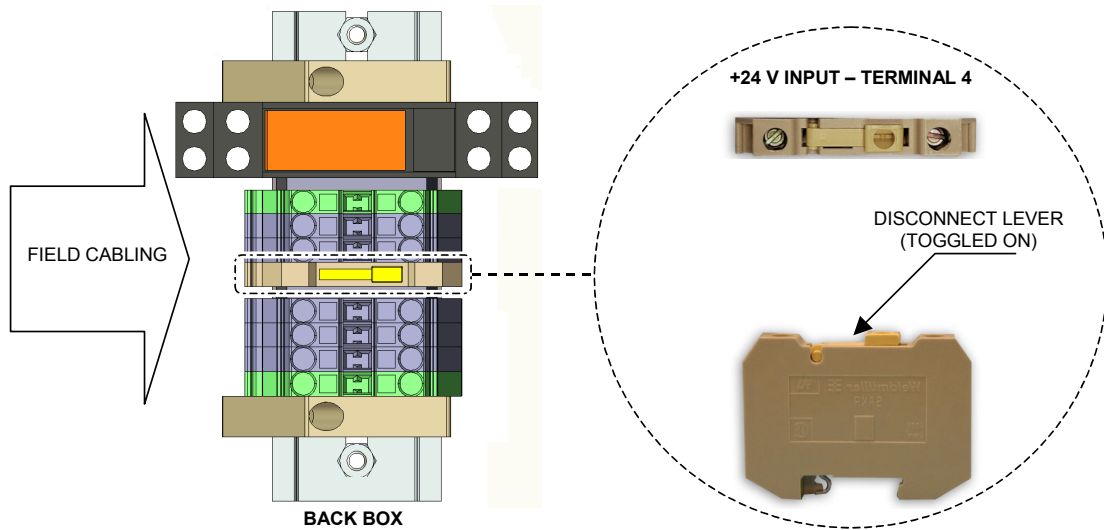
 For EMC compliance ensure that:

1. All field cabling screens (apart from the coaxial cables) are connected to the back box. This should be via the DIN rail SHIELD terminal.
2. All screen tails are <3 cm.



11. Ensure that the DIN rail power supply disconnect lever is toggled on (see [Figure 13](#)).

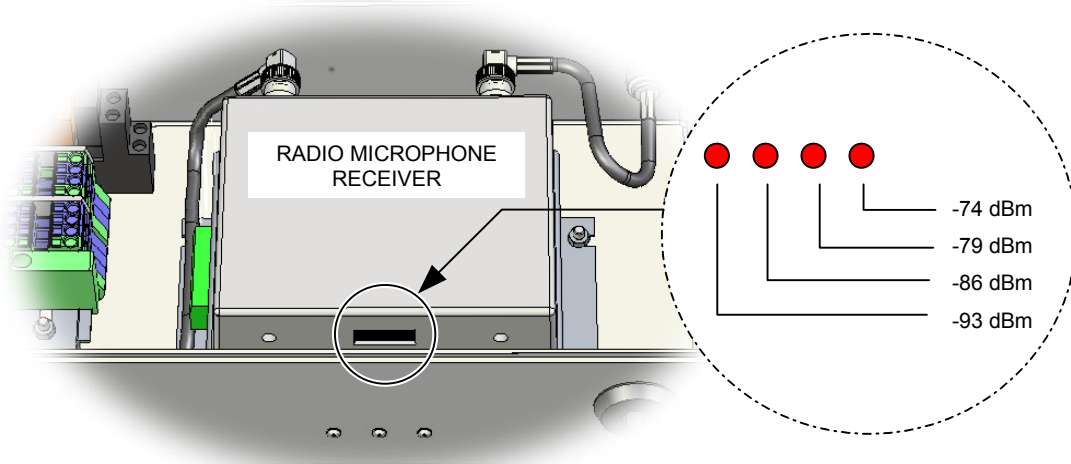
Figure 13 Power Supply Terminal



12. Fix the RRM02 lid back in position, screwing it tight to provide an IP65 seal, but not excessively tight so that any of the fixing threads are stressed, as this may cause them to weaken and shear.

i This can be done after commissioning the unit, if desired. Leaving the lid off at this stage enables the RF signal strength LEDs on the lower face of the Radio Microphone Receiver to be seen during unit commissioning (see [Figure 14](#)).

Figure 14 Radio Microphone Receiver RF Level Indicators

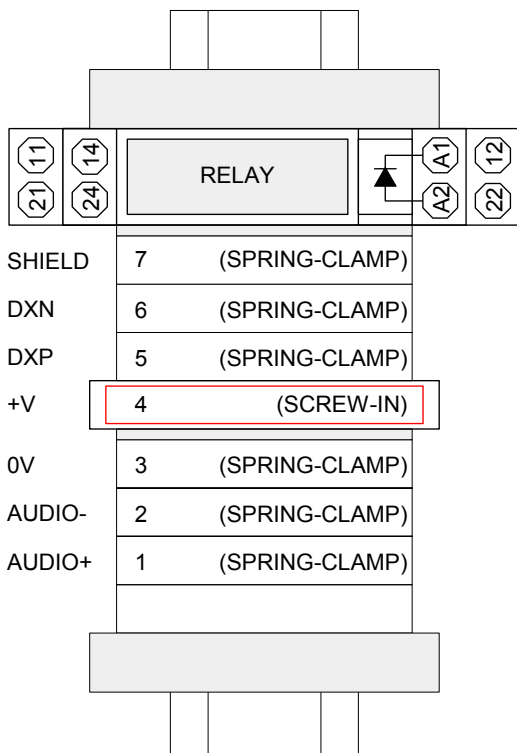


13. Power the unit on from the central equipment rack, or wall mount Intellevac DAU or ACU.
14. Commission the microphone as described in Section “[6 Commissioning](#)” (page [36](#)).

4 Connections

4.1 DIN Rail and Relay Terminal Allocation

Table 1 Terminal Allocation

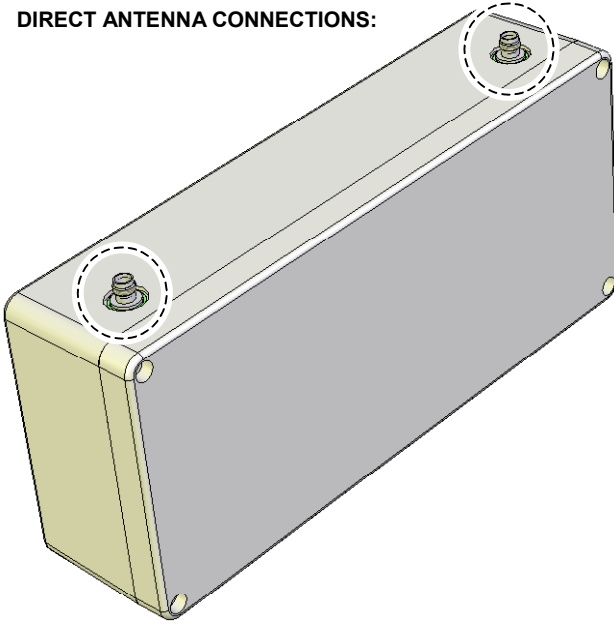


Relay Terminals	
Terminals	Description
A1	COIL + No user connection
A2	COIL – No user connection
11/ 21	Common (COM) Contact select output
12/ 22	Normally Closed (NC) No user connection
14/ 24	Normally Open (NO) Contact select output
1) The protection diode is pre-fitted. 2) The pair contacts for connection of PTT to other manufacturer's PA systems or for connection of multiple RRM02 units are: 11-14, or 21-24. NO/Normally Open, closing to the matching COM/Common terminal for radio broadcast PTT signal.	

DIN Rail Terminals		
Signal	Description	Internal Wiring Colour
SHIELD	Connection for cable screen (bonded to DIN rail)	Black
DXN	Data– ASL Microphone control data EIA RS485 19200 baud	Yellow
DXP	Data+ As above	Orange
+V	+V supply (18 V - 40 V)	Green
0V	0 V supply from system	Blue
AUDIO–	–VE Balanced Audio Output Level: 0 dBu (nominal) Output impedance: 66 Ω	Red
AUDIO+	+VE As above	Brown
SHIELD	Connection for cable screen (bonded to DIN rail)	–

4.2 Antenna Connection

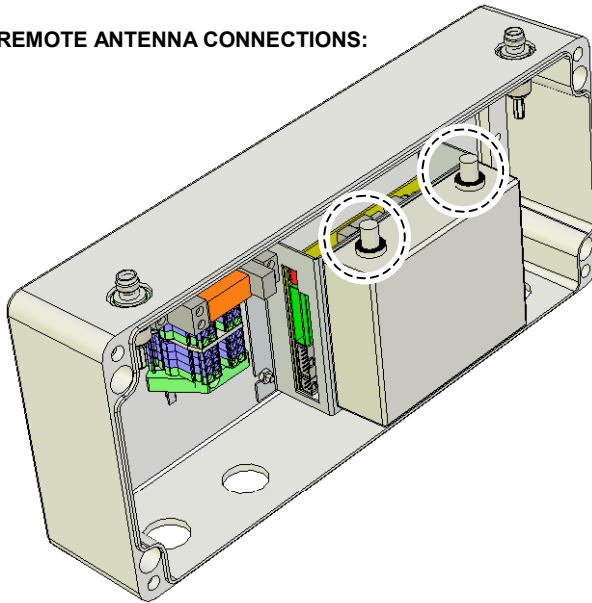
DIRECT ANTENNA CONNECTIONS:



TNC CONNECTOR:

- 2 x 50 Ω (jack)
- External upper face of unit
- For direct connection of antennae or antenna cabling
- Internal adaptor leads are supplied fitted as standard

REMOTE ANTENNA CONNECTIONS:



BNC CONNECTOR:

- 2 x 50 Ω (jack)
- Internal on top of Radio Microphone Receiver
- For connection of antenna cabling
- Alternative to external TNC connectors on upper face of unit
- Adaptor leads to be removed

4.3 Connection to ASL PA/VA Systems

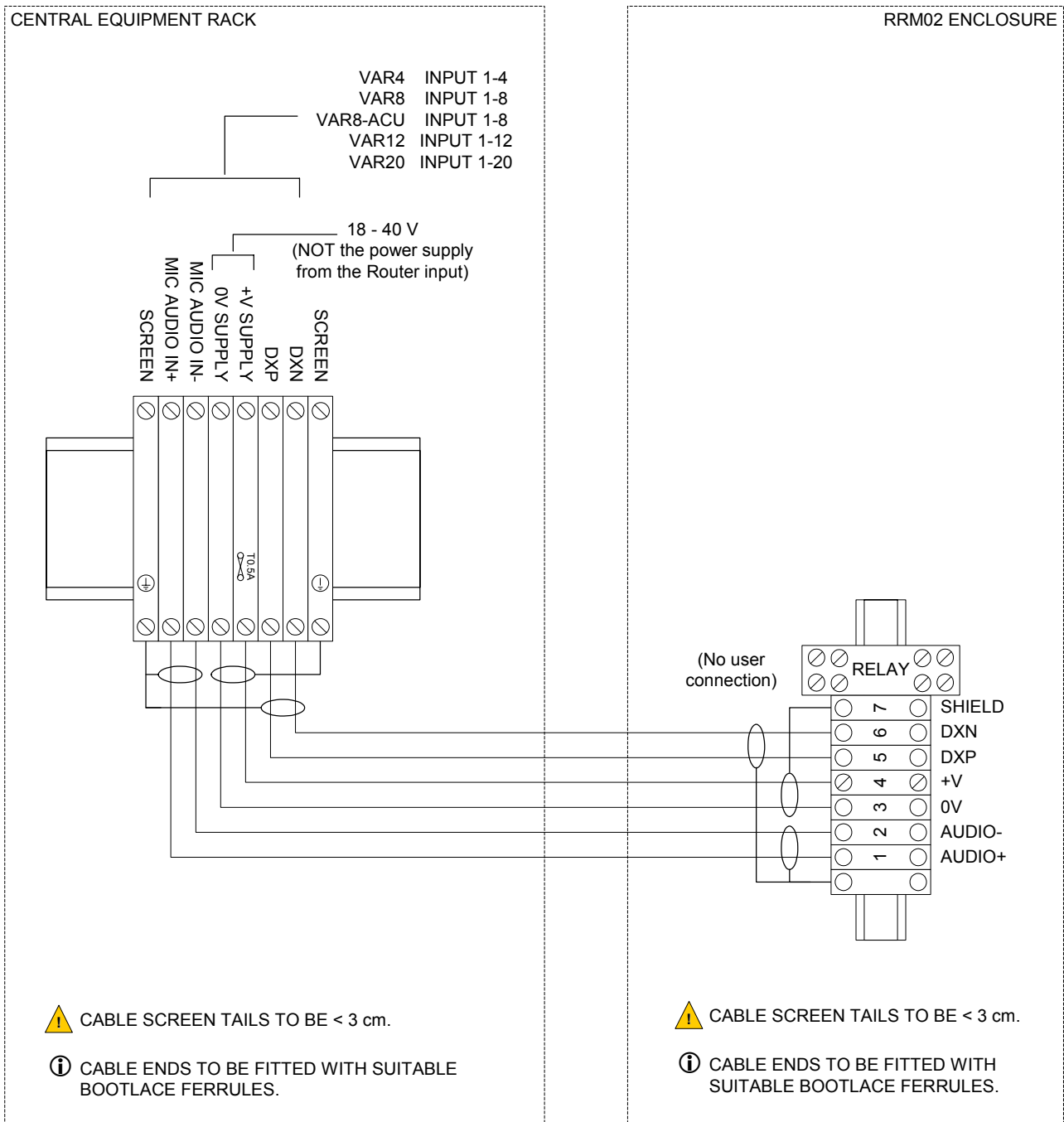
4.3.1 Connection of a Single RRM02 Unit

4.3.1.1 Serial Data and Audio Connection to a VAR Router Microphone Input

Figure 15 shows an example of DIN rail terminal layout and connection to the equipment rack where the VAR Router is installed. Note that the actual DIN rail and terminal position in the rack depends on the rack specific design, cable entry direction, etc.

Refer to Section “3.2.2.1 Cabling for Serial Data and Audio Connection to an ASL VAR Router, DAU, or ACU Microphone Input” (page 9) for recommended cabling.

Figure 15 Connection to the VAR Router (Example)

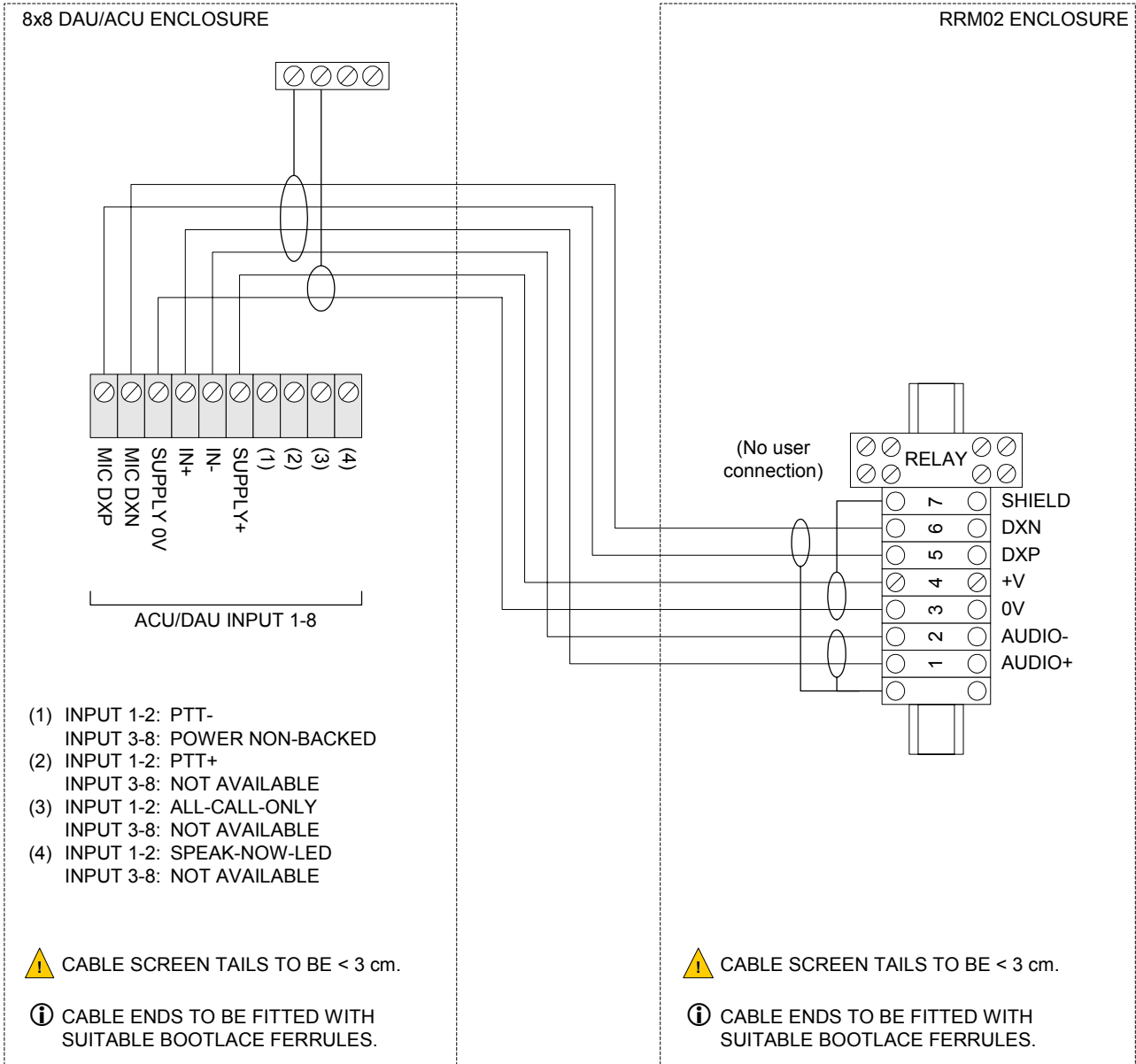


4.3.1.2 Serial Data and Audio Connection to an Intellevac DAU or ACU's Microphone Input

Figure 16 shows an example of connection to an Intellevac DAU (Distributed Amplifier Unit) or ACU (Audio Control Unit).

Refer to Section “3.2.2.1 Cabling for Serial Data and Audio Connection to an ASL VAR Router, DAU, or ACU Microphone Input” (page 9) for recommended cabling.

Figure 16 Connection to the Intellevac ACU or DAU (Example)



4.3.2 Connection of Multiple RRM02 Units for Single Audio Zone Group

Multiple RRM02 units can be used with ASL PA/VA systems to provide larger radio microphone coverage areas than is available with a single unit with or without antennae combiners and further antennae.

The connection methods described in the following sections provide this function with ability for a user to move from one RRM02's range to the next RRM02's range while making a broadcast.

Multiple RRM02 applications where chime is not required are implemented using the PTT relay outputs of the RRM02 to trigger the routes to required audio zone, as described in Section [“4.3.2.1 Multiple RRM02 Units on One Zone \(Without Chime\)”](#) (page 24).

Similar connections are used in applications requiring chime. Chime is implemented by using one spare Router output, one spare Router input, and a BMB01 Remote I/O Unit, as described in Section [“4.3.2.2 Multiple RRM02 Units on One Zone \(With Chime\)”](#) (page 27).

4.3.2.1 Multiple RRM02 Units on One Zone (Without Chime)

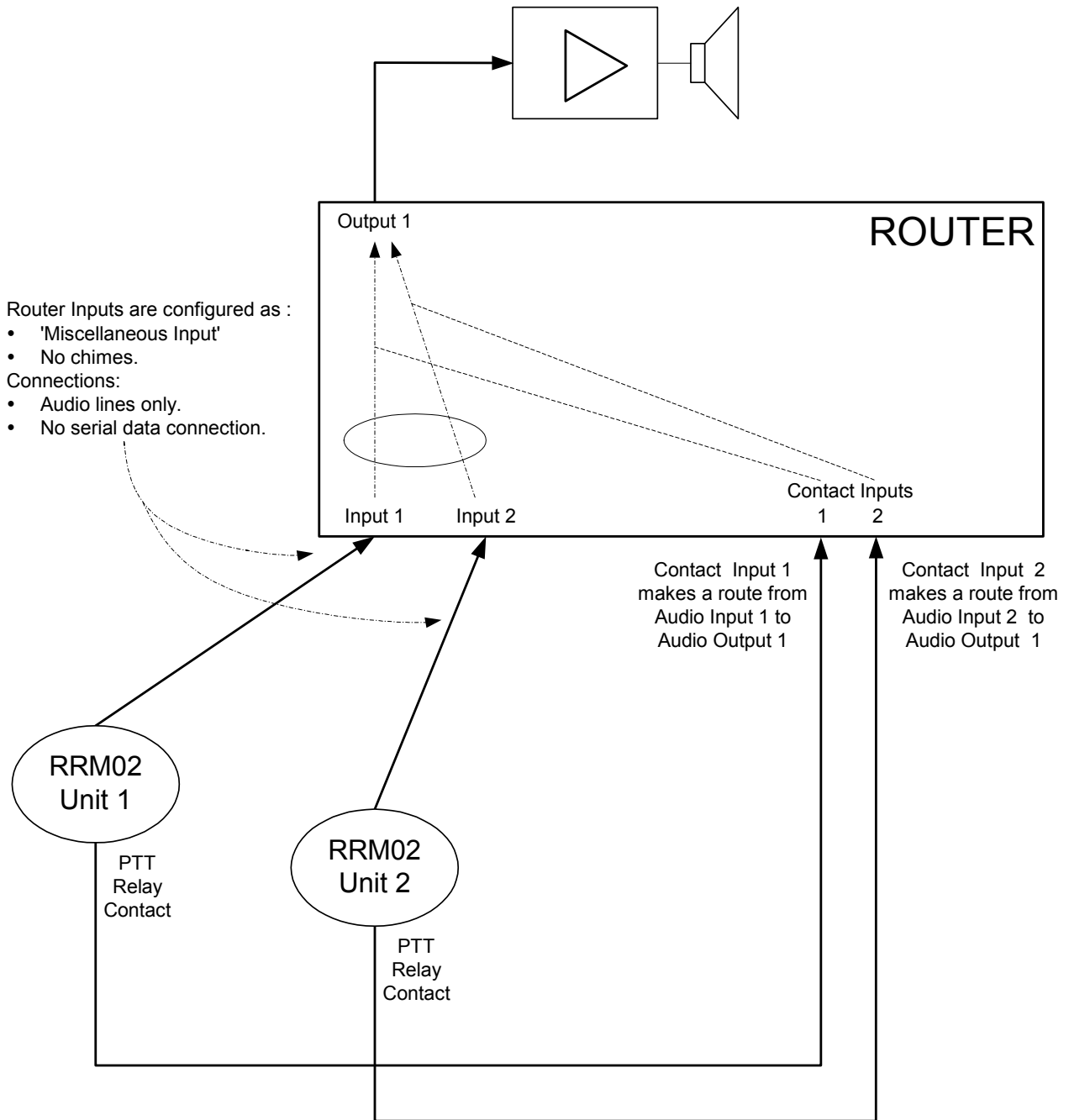
If the multiple RRM02 units for a single zone do not need to have a chime configured then they each have their audio outputs connected to a Router audio input, with their PTT relay outputs connected to Router contact inputs. The serial data lines are not connected to the Router with the contact inputs being used to make the routes, and the audio inputs are set to 'Miscellaneous Input' with equal priority. This scheme is illustrated in [Figure 17](#) for two RRM02 units, and the connection diagram is shown in [Figure 18](#).

Refer to Section [“6.2.1 Multiple RRM02 Units on One Zone \(Without Chime\)”](#) (page 45) for ASL PA/VA system commissioning details.



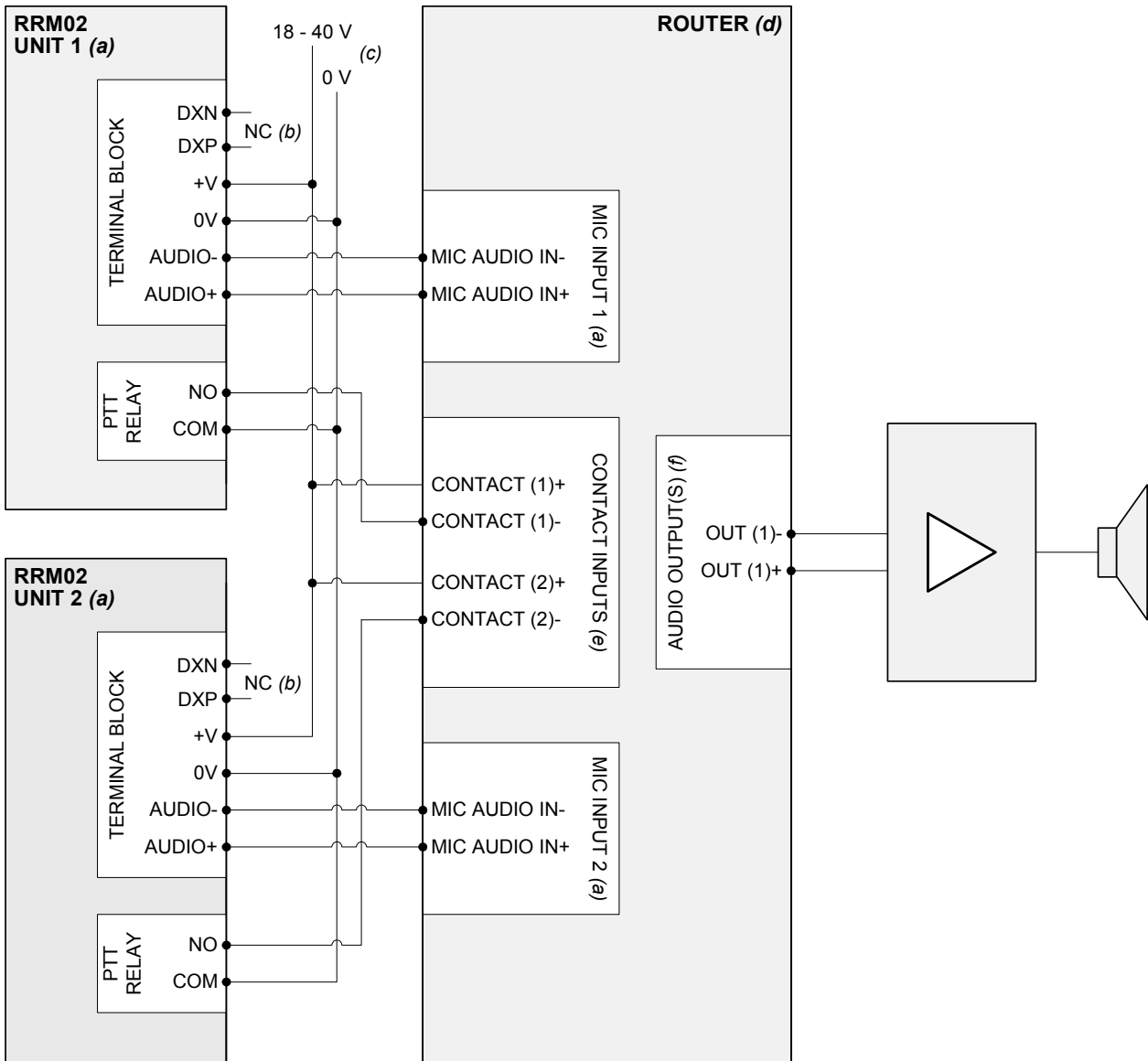
- A very short dip in audio occurs when the Router switches from one RRM02 to the other.
- The BUSY LED will not operate, and the ACTIVE LED will not necessarily indicate that an announcement is in progress on the RRM02 units. The ACTIVE LED will only indicate that the PTT button is being held down.
- The Router can be a VAR Router, a DAU (Distributed Amplifier Unit) or an ACU (Audio Control Unit).
- The RRM02 internal microphones faults will not be reported at the Router although the audio connections will still be monitored.
- The maximum number of RRM02 units is limited by the available number of Router inputs.

Figure 17 Two RRM02 Units on One Zone Group without Chime



i Busy LED will not operate on the RRM02 units.

Figure 18 Connection of Two RRM02 Units on One Zone Group without Chime (Example)



- i** (a) The RRM02 can be connected to any available Router inputs.
- The Router inputs are to be programmed as 'Miscellaneous Input'.
 - Miscellaneous inputs used by multiple RRM02 units are to have the same priority as each other and be set to 'No Chime'.
- (b) RRM02 serial data not connected to the Router.
The BUSY LED will not operate, and the ACTIVE LED will only indicate that the PTT button is being held down.
- (c) VAR4/VAR12/VAR20, VAR8, and VAR8-ACU: the power supply from the Router input should not be used.
DAU or ACU: the power supply from the Router input can be used.
- (d) The Router can be either a rack mounted or a wall mounted ASL PAVA system.
- Rack mounted system: VAR4, VAR12, VAR20, VAR8, or VAR8-ACU
 - Wall mounted system: DAU (Distributed Amplifier Unit), or ACU (Audio Control Unit)
- Please refer to the user documentation specific to your Router for pinout details.
- (e) Any available Router digital inputs can be used, connected as a simple contact closure to ground.
The contacts are to be programmed to route the relevant Router input to the required audio zone output(s).
In this example:
- Contact 1 routes Input 1 to Output 1 when the contact is closed.
 - Contact 2 routes Input 2 to Output 1 when the contact is closed.
- (f) Router output(s) serving the required PA zone(s). In this example, Output 1.



Cable screen tails to be connected to system ground and to be < 3 cm.

4.3.2.2 Multiple RRM02 Units on One Zone (With Chime)

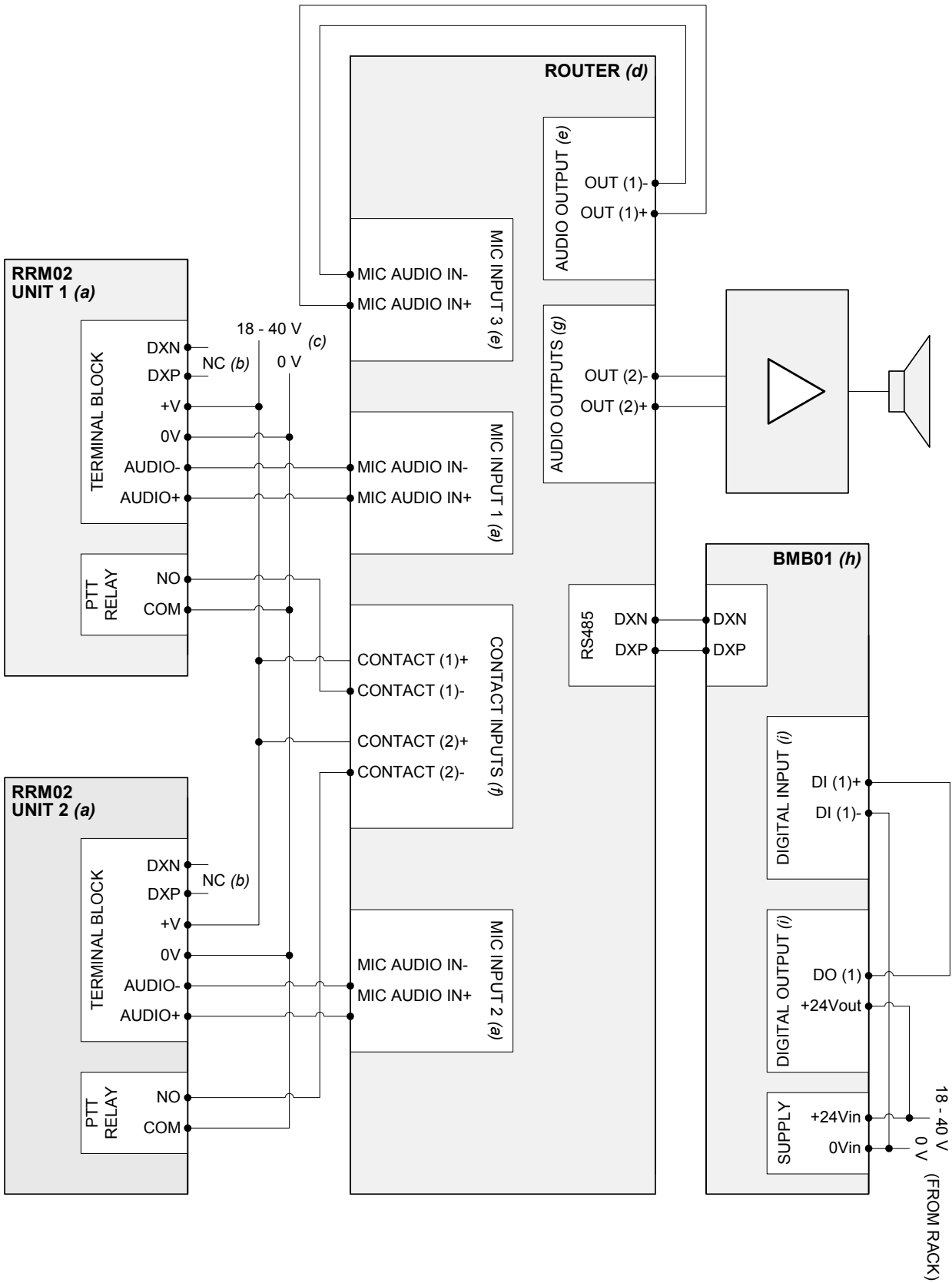
If the multiple RRM02 units for a single zone needs to have a chime configured then they each have their audio outputs connected to a Router audio input, with their PTT relay outputs connected to Router contact inputs which trigger the routes to an intermediate output. This intermediate output is connected to an intermediate audio input, which is then routed to the actual required audio zone by a routing contact on a BMB01 Remote I/O Unit. The BMB01 contact closure is provided by a BMB01 digital output which is configured to indicate busy when any of the RRM02 audio inputs is routed to the intermediate output. The serial data lines are not connected to the Router, and the audio inputs are set to 'Miscellaneous Input' with equal priority. This scheme is illustrated in [Figure 19](#) for two RRM02 units, and the connection diagram is shown in [Figure 20](#).


Refer to Section “[6.2.2 Multiple RRM02 Units on One Zone \(With Chime\)](#)” (page 47) for ASL PAVA system commissioning details.



- This scheme requires a spare audio input and output at the Router.
- A brief pause in audio occurs when the Router switches from one RRM02 to the other.
- The BUSY LED will not operate, and the ACTIVE LED will not necessarily indicate that an announcement is in progress on the RRM02 units. The ACTIVE LED will only indicate that the PTT button is being held down.
- The Router can be either a VAR Router, or a DAU (Distributed Amplifier Unit).
- The RRM02 internal microphones faults will not be reported at the Router although the audio connections will still be monitored.
- The maximum number of RRM02 units is limited by the available number of Router inputs.

Figure 20 Connection of Two RRM02 Units on One Zone Group with Chime (Example)



-  (a) The RRM02 can be connected to any available Router inputs.
- The Router inputs are to be programmed as 'Miscellaneous Input'.
 - Miscellaneous inputs used by multiple RRM02 units are to have the same priority as each other and be set to 'No Chime'.
- (b) RRM02 serial data not connected to the Router.
The BUSY LED will not operate, and the ACTIVE LED will only indicate that the PTT button is being held down.
- (c) VAR4/VAR12/VAR20, VAR8, and VAR8-ACU: the power supply from the Router input should not be used.
DAU: the power supply from the Router input can be used.
- (d) The Router can be either a rack mounted or a wall mounted ASL PA/VA system.
- Rack mounted system: VAR4, VAR12, VAR20, or VAR8
 - Wall mounted system: DAU (Distributed Amplifier Unit)
- Please refer to the user documentation specific to your Router for pinout details.
- (e) Audio inputs from RRM02 units are to be routed to an intermediate Router output (any available), which is then connected to any available Router input. In this example, Output 1 and Input 3.
This intermediate Router input to be programmed as 'Miscellaneous Input', with chime programmed. This audio input is then routed to the required audio zone output(s).
- (f) Any available Router intermediate digital inputs, connected as a simple contact closure to ground.
The contacts to be programmed to route the appropriate audio inputs from the RRM02 units to the intermediate Router output which will be fed back into the Router.
In this example:
- Contact 1 routes Input 1 to Output 1 when contact is closed.
 - Contact 2 routes Input 2 to Output 1 when contact is closed.
- (g) Router output(s) serving the required audio zone output(s).
In this example, Output 2.
- (h) Refer to the BMB01 Remote I/O Unit user documentation for connection details.
- (i) Any available BMB01 digital inputs, connected as a contact closure to a supply, which is provided by any available BMB01 digital output configured for Busy Indication.
- The digital input is to be programmed to route the intermediate audio input to the required audio zone output(s).
In this example, Digital Input 1 routes Input 3 to Output 2 when the contact is closed.
 - The digital output is to be programmed for a Busy Indication when the Router inputs connected to the multiple RRM02 units are routed to the intermediate output.
In this example, Digital Output 1 indicates Busy when audio Input 1 or audio Input 2 is routed to Output 1.



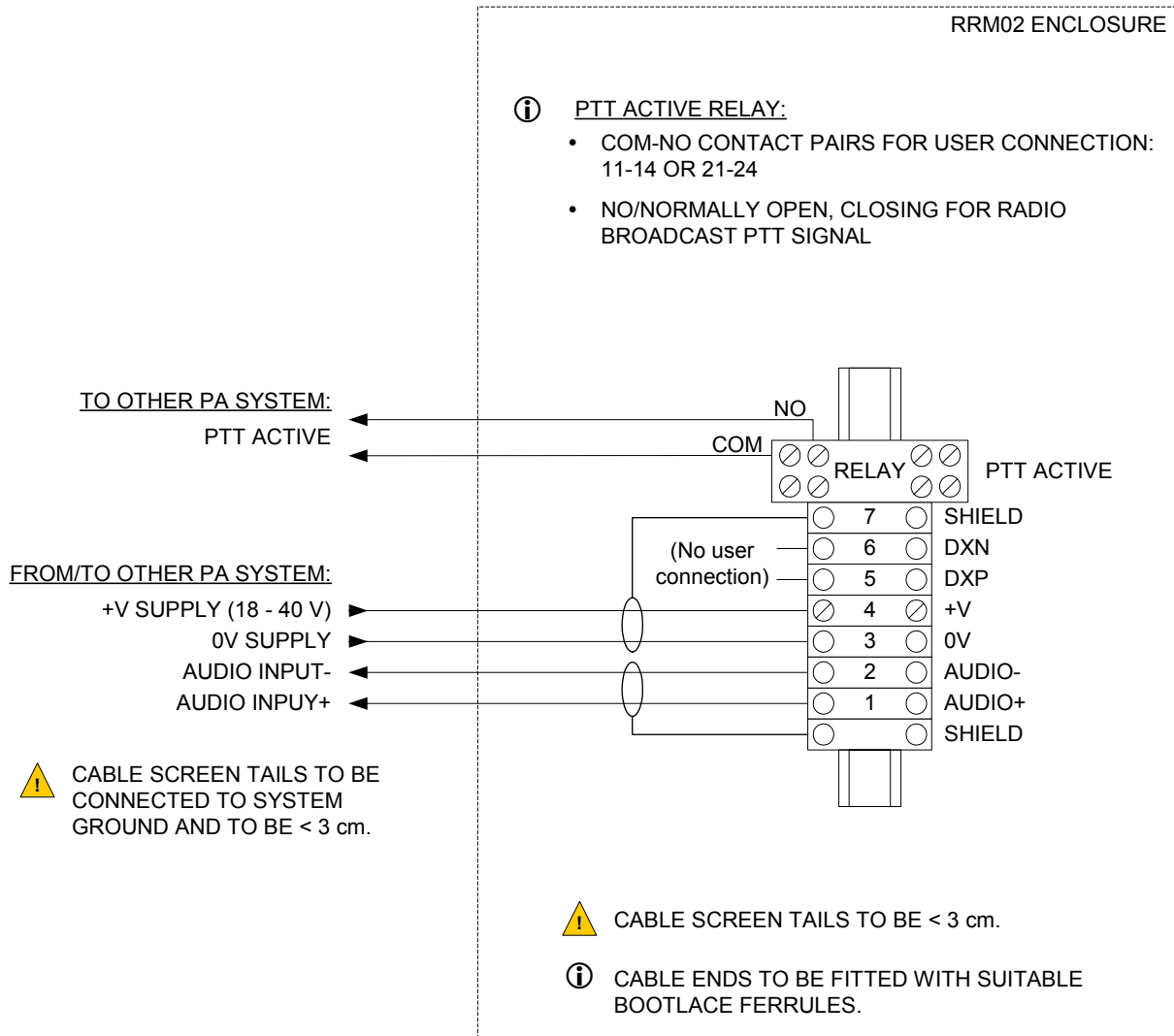
Cable screen tails to be connected to system ground and to be < 3 cm.

4.4 Connection to Other PA Systems

Figure 21 shows an example of a connection to other manufacturer's PA system.

Refer to Section "3.2.2.2 Cabling for Relay PTT and Audio Connection to an ASL or Other PA System" (page 9) for recommended cabling.

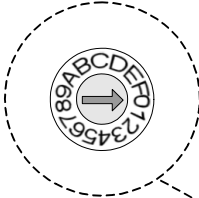
Figure 21 Connection to Other PA Systems (Example)



5 Radio Microphone Receiver Settings

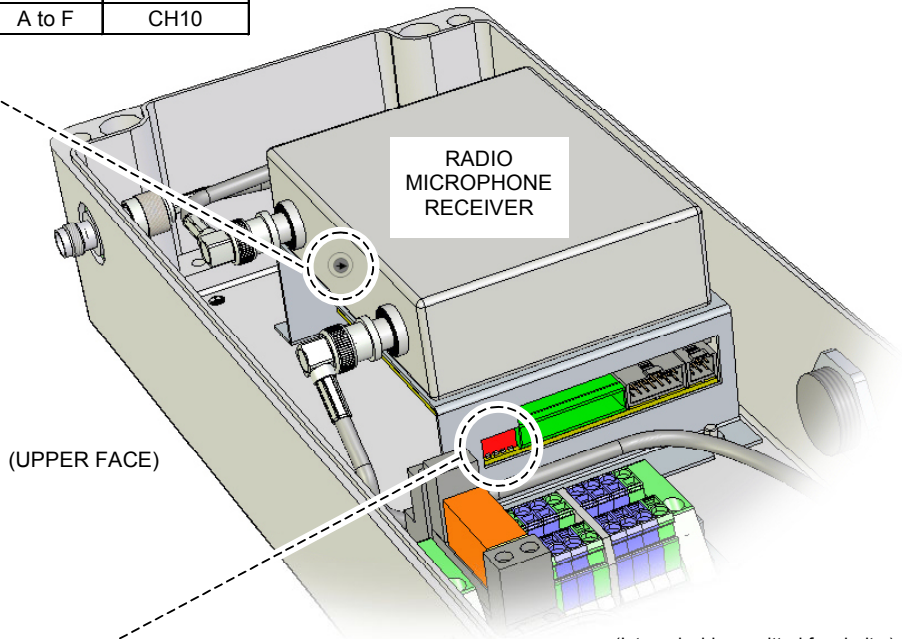
Figure 22 Radio Microphone Receiver Controls

FREQUENCY SELECTION
ROTARY SWITCH

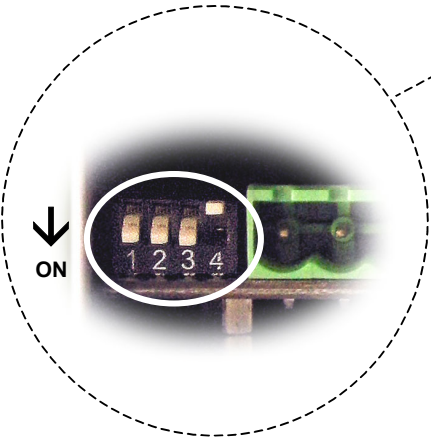


Switch Position	Transmitter Channel
0	CH 01
1	CH 02
.	.
.	.
.	.
9	CH 10
A to F	CH10

(Refer to Section
“5.1 Radio Microphone
Receiver Frequency
Selection” (page 34) for
further details.)



(Internal wiring omitted for clarity.)



DIP SWITCH:

- PILOT TONE DETECTION CONFIGURATION:

Switch 1	Pilot Tone Detection
↑	Disabled
↓	Enabled (default)

Refer to Section
“5.2 Radio Microphone
Receiver Pilot Tone
Detection Configuration”
(page 26) for further details.

- CONFIGURATION VIA ROUTER:

Switch 2	Router Configuration
↑	Enabled (for future use)
↓	Disabled (default) Do not change.

- SQUELCH LEVEL SELECTION:

Switches		Squelch Level
3	4	
↑	↑	Least sensitive -76 dBm
↑	↓	-86 dBm
↓	↑	-93 dBm (default)
↓	↓	Most sensitive -99 dBm












(Refer to Section
“5.3 Radio Microphone
Receiver Squelch Level
Configuration” (page 27)
for further details.)

5.1 Radio Microphone Receiver Frequency Selection

The Receiver frequency is selected using the rotary switch; with the future option of setting it by the Router configuration by positioning the DIP switch 2 as described in [Table 3](#) (page 34) and [Table 4](#) (page 35).

The switch is located on the upper face of the Radio Microphone Receiver module inside the RRM02, as shown in [Figure 22](#) (page 32).

Table 2 Radio Microphone Receiver Frequency Selection

Frequency Selection Switch Position	Corresponding Radio Microphone Transmitter Channel Number	
	0	1
	1	2
	2	3
	3	4
	4	5
	5	6
	6	7
	7	8
	8	9
	9	10
	A to F	10

i Frequencies in the Channel 70 license free band. Available from Application Solutions (Safety and Security) Limited on request.

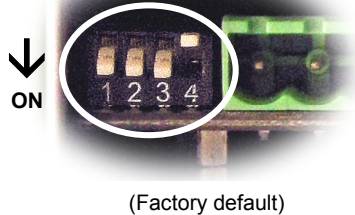
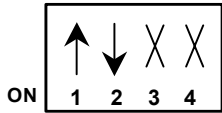
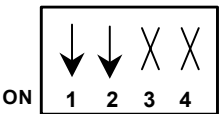
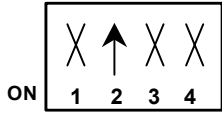
5.2 Radio Microphone Receiver Pilot Tone Detection Configuration

The Receiver is supplied with pilot tone detection enabled as standard. This means that announcements from Radio Microphone Transmitters that do not provide the required pilot tone will be blocked². The pilot tone detection can be disabled in order to allow announcements from non-tone locked transmitters, and the squelch level can be adjusted in order to minimise the interference of in-band signals although this should not be necessary with the pilot tone detection enabled.

The pilot tone detection is enabled or disabled by DIP switch 1 on the microphone PCB (see [Figure 22](#), page 32), with the future option of setting it via the Router configuration; see [Table 3](#).

The squelch level is adjusted as described in Section “[5.3 Radio Microphone Receiver Squelch Level Configuration](#)” (page 35).

Table 3 Radio Microphone Receiver Pilot Tone Detection Selection

DIP Switch Positions		Pilot Tone Detection Setting
 <p>(Factory default)</p>	 <p>ON</p>	<p>Pilot tone detection disabled.</p> <p>This configuration enables announcements from Radio Microphone Transmitters regardless of whether they provide the pilot tone or not.</p>
	 <p>ON</p> <p>(Factory default)</p>	<p>Pilot tone detection enabled.</p> <p>This is the factory default setting, for secure use with the ASL RPA01 Radio Microphone Transmitters.</p> <p>This configuration will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone (non-tone locked transmitters)².</p>
	 <p>ON</p>	<p>For future use.</p> <p>This switch position will be used to set the pilot tone detection, the squelch level, and the frequency selection to be controlled through the Router configuration.</p>

² Announcements from non-tone locked transmitters are completely blocked with Radio Microphone Receiver modules of Build Standard (BS) 2B or later. With earlier Build Standards of Radio Microphone Receiver module the audio from non-tone locked transmitters is muted but they can still make chimes and silent routes. These silent routes can be blocked as detailed in ASL Technical Note 39; please refer to Application Solutions (Safety and Security) Limited for further details.

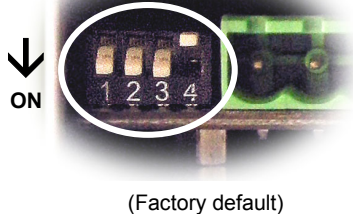
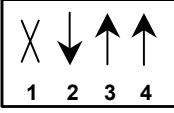

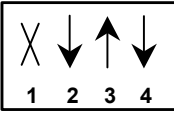
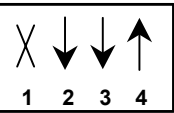
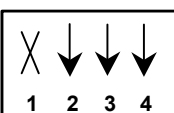
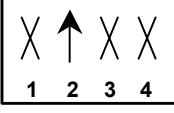
5.3 Radio Microphone Receiver Squelch Level Configuration

The squelch level switch sets the minimum RF signal strength that can be received. This is set to a level that receives the Radio Microphone transmissions, while rejecting external interference.

If there is any interference then the squelch level should be set to the least sensitive setting in order to minimise interference. However if this causes the Radio Microphone transmissions to not be received then it can be made more sensitive in steps until the Radio Microphone transmissions are received correctly.

The squelch level is set by DIP switches 3 and 4 located on the microphone PCB (see [Figure 22](#), page 32), with the future option of setting it by the Router configuration.

Table 4 Radio Microphone Receiver Squelch Level Selection

DIP Switch Positions		Receiver Squelch Level		Received RF Signal Strength
 <p>(Factory default)</p>	 <p>ON</p>	Least sensitive -76 dBm		Strong signal required
	 <p>ON</p>	-86 dBm		Weak signals received
	 <p>ON</p> <p>(Factory default)</p>	-93 dBm		
	 <p>ON</p>	Most sensitive -99 dBm		
	 <p>ON</p>	For future use. This switch position will be used to set the squelch level, the pilot tone detection, and the frequency selection to be controlled through the Router configuration.		

6 Commissioning the RRM02

6.1 For a Single RRM02 Unit with Serial Data and Audio Connection to an ASL Router Audio Input

For operational details refer to your system specific documentation; see [Table 10](#) (page 64).



The following details are correct for the current VAR Router, DAU, and ACU software versions at the time of publication:

- VAR4/12/20 Router: CP 4.1.471
- Intellevac DAU/VAR8: CP V1.6.124
- Intellevac ACU/VAR8-ACU: CP V1.5.115

If any difficulties are encountered, then refer to Application Solutions (Safety and Security) Limited for advice quoting the software version of your system. The software version is displayed via the **Configuration**→**System**→**Misc**→**Software** menu.

Configure the RRM02 from the Router Configuration Tool, or system front panel as described in the following sections.

6.1.1 Obtaining the Router Input Number

Check the system design documentation to find the Router audio input number being used for the RRM02.

This input number will be required throughout this commissioning procedure, being referred as *nn*.

6.1.2 Configuring the Microphone Type

Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**→<I/P #*nn* – *input name*>

Where *nn* is the Router input number found in Section “[6.1.1 Obtaining the Router Input Number](#)” (page 36).

Configure the RRM02 as **Single Button Microphone**.

6.1.3 Configuring the PTT Button

6.1.3.1 PTT Button Zone Selection

Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**→<I/P #*nn* – *input name*>

→**Single Button Microphone**→**PTT**→**PTT Zones**

Possible values: ‘Not-Selected’ or ‘Selected’

System default configuration: ‘Not-Selected’

Select the output or group of outputs to which the microphone is to be routed when the PTT button is pressed.

Consult the system design documentation for which outputs are used for which audio zones. Note that to simplify this process the Router may have had the output names changed to zone names in the **Configuration**→**System**→**Router**→**Outputs** menu.

6.1.3.2 PTT Button Cough Timeout (only on VAR4/12/20)

Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**→<I/P #nn – input name>
 →**Single Button Microphone**→**PTT**→**Cough**

Possible values: 0 to 50. Multiply by 0.1 to have the time in seconds.

System default configuration: '0'

The cough timeout is the time that the PTT button may be released before the route is closed down. The audio path is muted immediately when the PTT button is released, allowing the operator to cough without it being broadcast. If the PTT button is re-pressed within the coughing time, the announcement will continue as normal. By default the timeout is set to '0' i.e. immediate route closing, and may be modified up to 5 seconds as required.

6.1.4 Configuring the Microphone Audio Parameters

6.1.4.1 Microphone Input Gain

VAR4/12/20 Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**
 →<I/P #nn – input name>→**Single Button Microphone**→**Audio**→**Gain**→**PreAmp**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**
 →<I/P #nn – input name>→**Single Button Microphone**→**Audio**→**Gain**→**Input**

Possible values: –63dB to 0dB (1dB steps)

System default configuration: –14 dB on VAR4/VAR12/VAR20

–20 dB on ACU and VAR8-ACU

The input gain of each audio input should normally be set so that all inputs are balanced, and give the same output level on any one output. The output gains are then balanced to give the required broadcast volume on each output.

1. Initially ensure that the microphone input gain is set to its default value of:
 - VAR4/12/20: –14 dB
 - DAU/ACU/VAR8/VAR8-ACU: –20 dB
2. Ensure that the line sensitivity (**Sens.**) is set to its default option, which is 'Line'.

This setting is only available on VAR4/12/20.

6.1.4.2 Microphone Surveillance Tone Detection

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>
→Single Button Microphone→Audio→Surv**

Possible values: –40dB to 0dB (1dB steps)

System default configuration: ‘–40dB’

If this surveillance is enabled, then in the absence of a surveillance tone, an Input Audio fault will be raised and logged. This would indicate that the microphone audio connection is broken, or is a poor connection.



On VAR4/12/20 the microphone input gain affects the surveillance tone, therefore the surveillance tone detection should only be set after configuring the microphone input gain; see Section “[6.1.4.1 Microphone Input Gain](#)” (page [37](#)).

The detection threshold level is adjustable as follows.

1. Configure **Mode=LF** and **Level (dB)=–40**, enabling the Router to detect the presence of the low frequency surveillance tone that is generated by ASL microphones.
2. Clear any existing faults by pressing the FAULT CLEAR button on the system front panel.
3. Make sure that no fault is reported for the RRM02. Any fault reported by the RRM02 at this stage should be cleared; see Section “[7 Fault Finding](#)” (page [52](#)).
4. Raise the surveillance tone level slowly (1 dB step) from –40 dB until the “IPXX AUDIO INPUT” fault is reported. Where XX is the Mic/Line input to which the RRM02 is connected.
5. Set the surveillance tone level to 4 dB below the level that caused the fault to be reported.
E.g. if a –18 dB level causes the fault, then set the surveillance tone level to –22 dB.
6. Make sure that no fault is reported for the RRM02.

6.1.4.3 Microphone Relative Output Gain

VAR4/12/20 Menu: **Configuration→System→Router→Inputs→Mic/Line**

→<I/P #nn – input name>→**Single Button Microphone→Audio→Gain→O/pGains**

DAU/VAR8 Menu: **Configuration→System→Router→Inputs→Mic/Line**

→<I/P #nn – input name>→**Single Button Microphone→Audio→Gain→Output**

Possible values: –40dB to 0dB (1dB steps)

System default configuration: '0dB'

Normally all input gains will be set to 'balance' each of the inputs, and the output gain will be set to give the required level at each output. However, if any input is desired to have a different gain for a particular output or outputs, then these inputs can be given a different gain relative to each appropriate output. This is the 'Relative Output Gain' setting, and can be used to e.g. avoid feedback for a microphone which is located in one of its own output zones.



- This setting is not required on Audio Control Units (ACU).
- Before carrying out this adjustment the input gains of all audio sources and the output gains for all zones and other audio outputs must be set-up to 'balance' each input and output.

Ensure that the Relative Output Gain for each output is set to the default level (0 dB), and then for each output in the system configure the Relative Output Gain as follows:

1. Disable any ANS for the output associated with the RRM02, by setting it to 'Off':

Menu: **Configuration→System→Router→Outputs→<O/P #nn – output name>→ANS**

nn is the output number.

Note that to simplify this process the Router displays the output name, and that the output names may have been changed to zone names in the **Configuration→System→Router→Outputs** menu.

2. Ensure that the Night Time Volume Control is inactive, by setting it to 'Off':

Menu: **Configuration→System→Router→Noise→Off**

3. Ensure that all Volume Controls are set to maximum volume, i.e., control at position '11'.
4. Make broadcasts from the RRM02 microphone and confirm that they are playing at the required volume level.
5. If volume adjustment is required in a particular zone (or one or more of the group of zones) even though all inputs have been balanced, and all outputs have been set to the correct volume for all other inputs, then reduce the Relative Output Gain for the associated output until the volume is at the required level.

VAR4/12/20 Menu: **Configuration→System→Router→Inputs→Mic/Line**

→<I/P #nn – input name>→**Single Button Microphone→Audio→Gain→O/pGains**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Inputs→Mic/Line**

→<I/P #nn – input name>→**Single Button Microphone→Audio→Gain→Output**

6. Re-enable any ANS for the output associated with the RRM02, by setting it to 'On':

Menu: **Configuration→System→Router→Outputs→<O/P #nn – OUTPUT nn>→ANS**

7. If required, activate the Night Time Volume Control, by setting it to 'On':

Menu: **Configuration→System→Router→Noise→On**

8. Set all Volume Controls to the required volume.

6.1.4.4 Microphone Equalisation

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>
→Single Button Microphone→Audio→EQ**

Possible values: HF (High Frequency) section: –12dB to +12dB (1dB steps)
 MID (Mid Frequency) section: –12dB to +12dB (1dB steps)
 LF (Low Frequency) section: –12dB to +12dB (1dB steps)

System default configuration: '0dB'

A 3-band equaliser is provided on Mic/Line inputs in order to balance the input tone. This equaliser has a shelving HF (treble) adjustment, shelving LF (bass) adjustment, and a fixed MID section adjustment.

A High Pass filter is also configurable. This would typically be used on microphone inputs to prevent excessive 'pop' noise.

Configure the 3-band equaliser and the High Pass filter as required.



This setting should not be used to set the equalisation for a particular output. Outputs have their own equaliser setting.

6.1.4.5 Microphone Fade Up and Down Times

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>
→Single Button Microphone→Audio→Fade**

Possible values: 00 to 50 (Time in tenths of a second. Divide by ten for the time in seconds.)

System default configuration: 'Up=00' and 'Down=00'

It is possible to specify a fade up and fade down time for each Mic/Line input or Music input. This can be set to provide the desired changeover fading, e.g. when a broadcast interrupts background music, or a lower priority broadcast.

This is typically used on background music where a slow fade-up, in particular, is desirable.

The Fade Down time is:

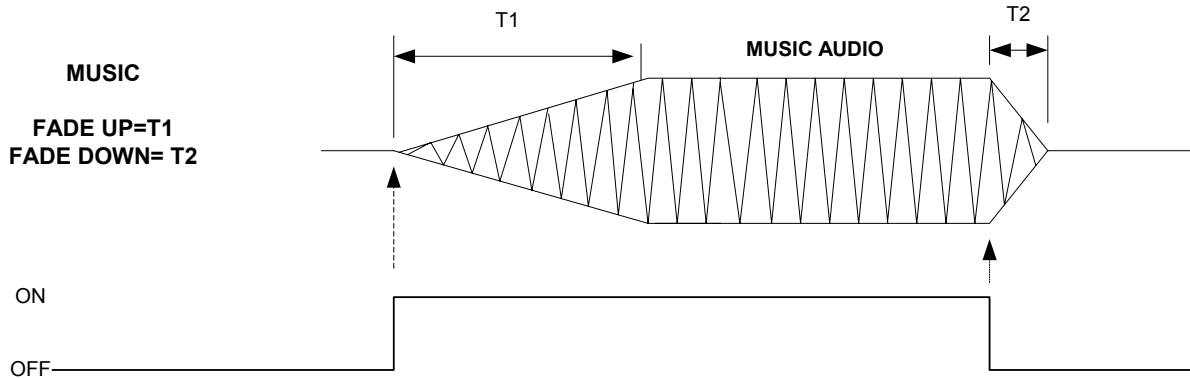
- The time it takes for the signal to fade down when turned off (un-routed);
- The time it takes for the signal to fade down before an overriding broadcast is made in its place

The Fade Up time is the time the signal takes to fade up when:

- Turned on (routed);
- Override removed.

The diagram in [Figure 23](#) illustrates the sequence of events during the enabling and disabling of a single audio source (e.g. background music).

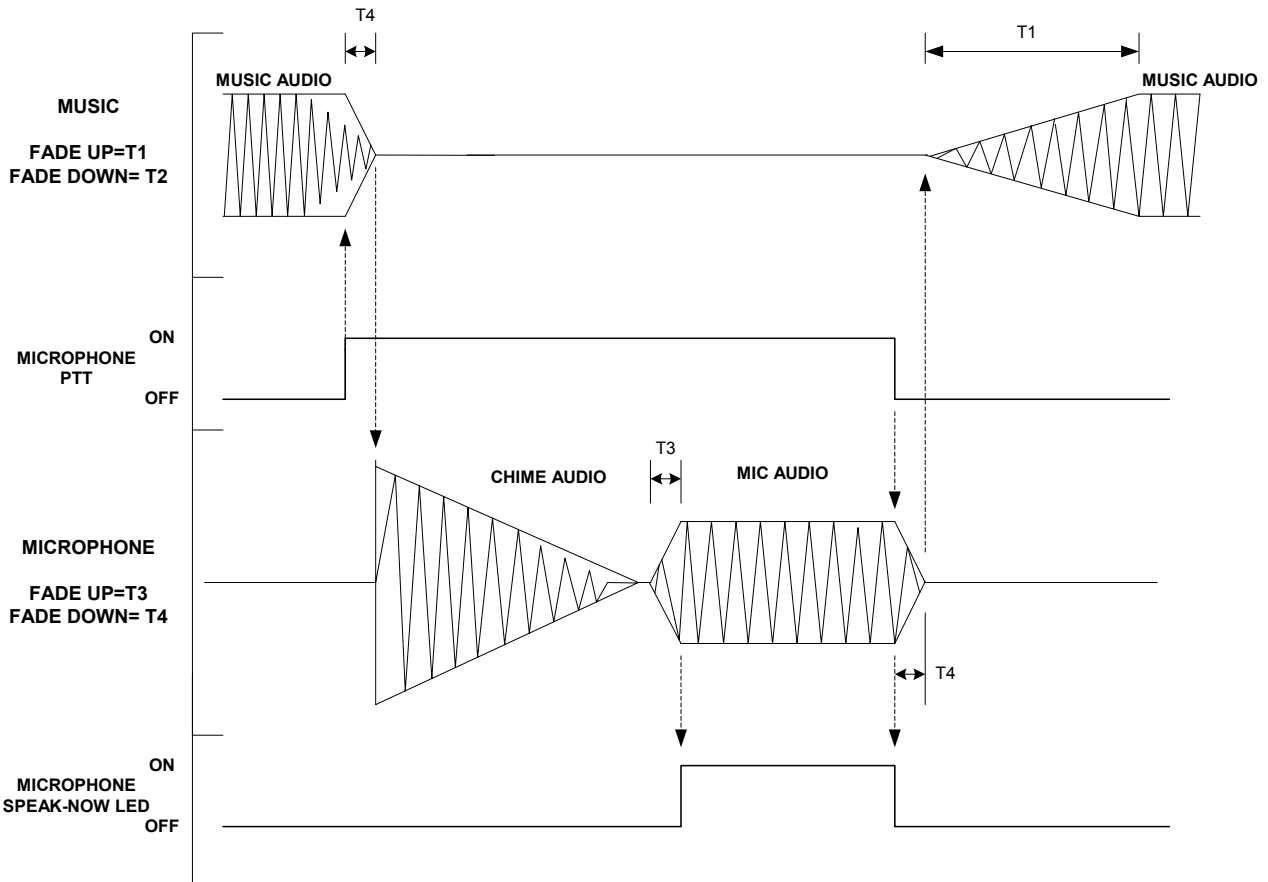
Figure 23 Sequence of Events for Single Audio Source



The diagram in [Figure 24](#) illustrates the sequence of events during the override of a background music source by a Paging Microphone with chime.

Note that the background music Fade Down time (T2) is not used in this instance. Instead the microphone Fade Down time (T4) is used to fade out the background music before the microphone broadcast starts, as well as to fade out the microphone at the end of its broadcast.

Figure 24 Sequence of Events for Paging Microphone Chime Overriding a Background Music



Configure the microphone signal fade up and down times as required.

6.1.4.6 Microphone Pre-Announcement Chime

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>**

→Single Button Microphone→Audio→Chime

Possible chime level: –40dB to 0dB (1dB steps)

Possible chime types: 'Chime-1': one chime
 'Chime-2': two chimes
 'Chime-3': three chimes
 'Off': none

System default configuration: 'Type=Off' and 'LEVEL (dB) –12'

A pre-announcement chime may be configured to any Mic/Line input. If configured, then the chime will be triggered when the input source is routed. However the actual audio input will only be routed when the chime is complete. The chime level is also configurable.

6.1.5 Configuring the Microphone Control Parameters

6.1.5.1 Microphone Priority

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>**

→Single Button Microphone→Ctrl→Pri

Possible priority levels: 01 to 19 (01 is the highest priority)

System default configuration: Fire or Zoned Fire Microphone on input 1 – '01'
 Fire or Zoned Fire Microphone on input 2 – '02'
 Paging Microphone on VAR4/VAR12/VAR20 – '07'
 Paging Microphone on DAU/VAR8/ACU/VAR8-ACU – '11'

The input priority is used to resolve conflicts when two or more inputs try to broadcast to the same output. In this case the input with the highest priority will be able to broadcast to this particular output, and the others will not. The priority also determines if the user may be overridden by other users during broadcast to an output.

Note that when the microphone is connected to an ACU, the ACU uses the priority to arbitrate the use of the network channels, and then each slave unit (DAU or VAR Router) in the network uses its own priority configuration for local arbitration.

If an announcement from a Fire Microphone is overridden by a higher priority Fire Microphone, the lower priority Fire Microphone will be restored immediately after the higher priority Fire Microphone has completed the announcement.

Set the priority of the microphone input as required. Consult the system design documentation to find the correct priority.



Care should be taken in ensuring that Fire Microphones, and Alarm and Emergency DVAs have a high priority, and non-emergency sources, such as non-emergency DVAs, Paging Microphones, and music sources, have low priorities. This is to ensure that these emergency inputs can override normal inputs.

The system default priorities are set to help this by ensuring that by default Fire Microphones have the highest priorities in the system: priority '01' being assigned to a Fire Microphone connected to input 1, and priority '02' to a Fire Microphone connected to input 2.

6.1.5.2 Microphone Class

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>**

→Single Button Microphone→Ctrl→Pri→Class

Possible values: 'High Priority Emergency', 'Low Priority Emergency', or 'Non Emergency'

System default configuration: EVACUTE DVA: 'High Priority Emergency'

ALERT DVA: 'Low Priority Emergency'

Other inputs: 'Non Emergency'

This setting is explained below, however for the RRM02 this setting should be configured to 'Non Emergency'.

- On VAR4/VAR12/VAR20:

The emergency class is used to provide a visual indication when an emergency DVA message is being broadcast, and to control the VAR Router's Remote Fault Output, when this is configured as an 'Emergency DVA Active Indicator', as follows:

- The "VOICE ALARM" message flashes on the left side of the LCD display, and the 'Emergency DVA Active' Output signal is activated if an emergency DVA input such as ALERT or EVACUATE DVAs is routed to any output.
- The LCD display shows standard displays, and the 'Emergency DVA Active' Output signal is not activated if all outputs are routed to non-emergency audio inputs such as Paging Microphones or music, or are not routed.

- In an Intellevac Network:

The emergency class is also used by any Zoned Fire Microphone connected to the ACU or VAR8-ACU to indicate the emergency DVA message status of any zone group which is configured for a Zone Select button. This indication is done by control of the zone's 'Busy' and 'Select' LEDs, as described in Section "6.1.5.4 Busy and Select Indication LEDs Mode (ACU and VAR8-ACU only)" (page 44).



All microphone types including fire and emergency microphones should be set to 'Non Emergency' class in order to provide the appropriate indication of the emergency DVA message status.

6.1.5.3 Microphone Name

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>**

→Single Button Microphone→Name

Possible values: alphanumeric string of up to 12 characters

System default configuration: The default input name may vary according to software version.

nn is the Router input number found in Section "6.1.1 Obtaining the Router Input Number" (page 36).

This name is for reference in the Router settings only; however, we recommend that it be modified in order to aid the system configuration and operation. It can be any alphanumeric string of up to 12 characters.

6.1.5.4 Busy and Select Indication LEDs Mode (ACU and VAR8-ACU only)

Menu: **Configuration→System→Router→Inputs→Mic/Line→<I/P #nn – input name>
→<Single Button Microphone>→Ctrl→LEDs**

Possible values: 'Busy Standard', or 'Busy Class'

System default configuration: 'Busy Class' on Zoned Fire Microphones

'Busy Standard' on Fire, Paging, and Single Button Microphones

This setting is explained below, however for the RRM02 this setting should be configured to 'Busy Standard'.

Normally a Zoned Fire Microphone (such as the standard SMC01 units) connected to an ACU (Audio Control Unit) is configured to drive the 'Busy' and 'Select' LEDs of a zone select button to indicate the emergency DVA message status of the zone (either one or more of the group of zones controlled by this button). Whereas Single Button Microphones (such as the RRM02 and SAP02) and Paging Microphones (such as the DMS series) are configured to drive these LEDs in the standard mode, i.e., to indicate the zone 'Busy' in similar fashion to when the microphone is connected to a VAR Router. These modes are detailed as follows.

- 'Busy Class' mode:

The 'Busy' and 'Select' LEDs of a zone select button indicate the emergency DVA message status of the zone (either one or more of the group of zones controlled by this button) configured for this zone select button according to the emergency class of the currently routed audio sources.

The 'Busy' and 'Select' LEDs are driven as follows:

- The 'Busy' LED is turned ON continuously if any output in the group configured for the button is connected to an input that has been configured as a High Priority Emergency source.
The 'Select' LED is turned ON continuously.
- The 'Busy' LED flashes ON and OFF repeatedly if any output in the group configured for the button is connected to an input that has been configured as a Low Priority Emergency source, and no output in the group is connected to a High Priority Emergency source.
The 'Select' LED is turned ON continuously.
- The 'Busy' LED is turned OFF if any output in the group configured for the button is connected to an input that has been configured as a Non Emergency Priority source, and no output in the group is connected to a High or Low Priority Emergency source.
The 'Select' LED is turned ON continuously.
- The 'Busy' LED is turned OFF if all outputs in the group configured for the button are not connected to any input.
The 'Select' LED is turned OFF.

As standard the emergency class is set-up as follows:

- EVACUATE DVA: High Priority Emergency
- ALERT DVA: Low Priority Emergency
- Other audio sources (microphone, auxiliary DVAs, music): Non Emergency

Therefore the ACU (or the Zoned Fire Microphone) will show all evacuation zones with a steady 'Busy' LED, all alert zones with a flashing 'Busy' LED, and all other zones without the 'Busy' LED lit.

This is the default setting for Zoned Fire Microphones.

- 'Busy Standard' mode:

The 'Busy' LED of a zone select button is turned ON continuously to indicate that the zone (either one or more of the group of zones controlled by this button) configured for this zone select button is already in use by another input, and the 'Select' LED indicates the zone selection state.

The input emergency class has no effect on the LED indication.

This is the default setting for Single Button Microphones (such as the RRM02), Fire Microphones, and Paging Microphones.

Ensure that the RRM02 is configured to the 'Busy Standard' mode in order that the 'Busy' LED is driven to indicate the zone status.

6.2 For Multiple RRM02 Units on Single Audio Zone Group with Audio and PTT Relay Connection to an ASL Router

6.2.1 Multiple RRM02 Units on One Zone (Without Chime)

If multiple RRM02 units for a single zone do not have a chime configured as illustrated in [Figure 17](#) (page 25) then they can each be configured in similar fashion to a single microphone configuration but with a type of 'Miscellaneous Input'; see Section "6.1 For a Single RRM02 Unit with Serial Data and Audio Connection to an ASL Router Audio Input" (page 36). [Table 5](#) lists all parameters available for a single microphone with applicable configuration for multiple RRM02 units for a single zone.

In addition to the microphone input configuration the Router contacts connected to the PTT relay outputs need to be configured for routing as described in Section "6.2.1.2 Router Contact Configuration" (page 45).

6.2.1.1 Router Microphone Input Configuration

Table 5 Router Microphone Input for Multiple RRM02 Units for a Single Zone – Without Chime

Section		Page	Configuration of Multiple RRM02s for a Single Zone
6.1.1	Obtaining the Router Input Number	36	For each RRM02 unit.
6.1.2	Configuring the Microphone Type	36	Configure microphone input as 'Miscellaneous Input'.
6.1.3.1	PTT Button Zone Selection	36	Not available for 'Miscellaneous Input'.
6.1.3.2	PTT Button Cough Timeout (only on VAR4/12/20)	37	Not available for 'Miscellaneous Input'.
6.1.4.1	Microphone Input Gain	37	As described for single microphone.
6.1.4.2	Microphone Surveillance Tone Detection	38	As described for single microphone.
6.1.4.3	Microphone Relative Output Gain	39	As described for single microphone.
6.1.4.4	Microphone Equalisation	40	As described for single microphone.
6.1.4.5	Microphone Fade Up and Down Times	40	As described for single microphone.
6.1.4.6	Microphone Pre-Announcement Chime	42	Configure chime as 'Off', i.e., no chimes.
6.1.5.1	Microphone Priority	42	As described for single microphone. Configure inputs used by multiple RRM02 units to have equal priority.
6.1.5.2	Microphone Class	43	As described for single microphone.
6.1.5.3	Microphone Name	43	As described for single microphone.
6.1.5.4	Busy and Select Indication LEDs Mode (ACU and VAR8-ACU only)	44	As described for single microphone.

6.2.1.2 Router Contact Configuration

Configure each contact as described in the following sections.

6.2.1.2.1 Obtaining the Router Output Number

Check the system design documentation to find the Router audio output(s) number being used for the RRM02.

6.2.1.2.2 Obtaining the Router Contact Number

Check the system design documentation to find the Router contact(s) number being used by each RRM02. Note that you will also need the microphone input used by the RRM02 unit controlled by each contact.

6.2.1.2.3 Configuring Router Contact for Routing

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts→<Contact #nn>→Routing**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing

Where *nn* is the Router contact number found in Section “6.2.1.2.2 Obtaining the Router Contact Number” (page 46).

Once a contact is configured for ‘Routing’, it is necessary to define the route(s) that it controls, and to set the routing control parameters as described in the following steps.

1. Configure the route(s) by associating the microphone input used by the relevant RRM02 to each output found in Section “6.2.1.2.1 Obtaining the Router Output Number” (page 45).

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Zoning

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Zoning

2. Configure the route(s) for non-latching operation, i.e., the activation of the contact initiates the route. When the contact is released, the route is cleared.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→Latching→Not-Latched

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→Latching→Not-Latched

3. Configure the route(s) to be terminated immediately when the contact is released.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→DVA-Part

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→DVA-Part

4. Configure the route(s) to cause busy indication on LEDs associated with microphone zone select buttons.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→Busy=On

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→Busy=On

6.2.2 Multiple RRM02 Units on One Zone (With Chime)

If multiple RRM02 units for a single zone do not have a chime configured as illustrated in [Figure 19](#) (page 28) then they can each be configured in similar fashion to a single microphone configuration but with a type of 'Miscellaneous Input'; see Section "6.1 For a Single RRM02 Unit with Serial Data and Audio Connection to an ASL Router Audio Input" (page 36). [Table 6](#) lists all parameters available for a single microphone with applicable configuration for multiple RRM02 units for a single zone with chime.

In addition to the microphone input configuration:

- The Router contacts connected to the PTT relay outputs need to be configured for routing; see Section "6.2.2.2 Router Contact Configuration" (page 47).
- The intermediate microphone input needs to be configured in order to enable chimes; see Section "6.2.2.3 Microphone Input Configuration for Intermediate Input" (page 49).
- The BMB01 Remote I/O Unit needs to be configured to provide additional routing controls; see Section "6.2.2.4 BMB01 Configuration" (page 49).

6.2.2.1 Microphone Input Configuration for Input Connected to RRM02

Table 6 Router Microphone Input for Multiple RRM02 Units for a Single Zone – With Chime

Section		Page	Configuration of Multiple RRM02s for a Single Zone
6.1.1	Obtaining the Router Input Number	36	For each RRM02 unit.
6.1.2	Configuring the Microphone Type	36	Configure microphone input as 'Miscellaneous Input'.
6.1.3.1	PTT Button Zone Selection	36	Not available for 'Miscellaneous Input'.
6.1.3.2	PTT Button Cough Timeout (only on VAR4/12/20)	37	Not available for 'Miscellaneous Input'.
6.1.4.1	Microphone Input Gain	37	As described for single microphone.
6.1.4.2	Microphone Surveillance Tone Detection	38	As described for single microphone.
6.1.4.3	Microphone Relative Output Gain	39	As described for single microphone.
6.1.4.4	Microphone Equalisation	40	As described for single microphone.
6.1.4.5	Microphone Fade Up and Down Times	40	As described for single microphone.
6.1.4.6	Microphone Pre-Announcement Chime	42	Configure chime as 'Off', i.e., no chimes.
6.1.5.1	Microphone Priority	42	As described for single microphone. Configure inputs used by multiple RRM02 units to have equal priority.
6.1.5.2	Microphone Class	43	As described for single microphone.
6.1.5.3	Microphone Name	43	As described for single microphone.
6.1.5.4	Busy and Select Indication LEDs Mode (ACU and VAR8-ACU only)	44	As described for single microphone.

6.2.2.2 Router Contact Configuration

Configure each contact as described in the following sections.

6.2.2.2.1 Obtaining the Router Intermediate Output Number

Check the system design documentation to find the Router audio output number being used as intermediate output by multiple RRM02 units.

6.2.2.2.2 Obtaining the Router Contact Number

Check the system design documentation to find the Router contact(s) number being used by each RRM02. Note that you will also need the microphone input used by the RRM02 unit controlled by each contact.

6.2.2.2.3 Configuring Router Contact for Routing

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts→<Contact #nn>→Routing**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing

Where *nn* is the Router contact number found in Section “[6.2.1.2.2 Obtaining the Router Contact Number](#)” (page 46).

Once a contact is configured for ‘Routing’, it is necessary to define the route(s) that it controls, and to set the routing control parameters as described in the following steps.

1. Configure the route(s) by associating the microphone input used by the relevant RRM02 to the intermediate output found in Section “[6.2.2.2.1 Obtaining the Router Intermediate Output Number](#)” (page 48).

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Zoning

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Zoning

2. Configure the route(s) for non-latching operation, i.e., the activation of the contact initiates the route. When the contact is released, the route is cleared.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→Latching→Not-Latched

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→Latching→Not-Latched

3. Configure the route(s) to be terminated immediately when the contact is released.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→DVA-Part

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→DVA-Part

4. Configure the route(s) to cause busy indication on LEDs associated with microphone zone select buttons.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Contacts**

→<Contact #nn>→Routing→Control→Busy=On

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Contacts**

→<Digital #nn>→Routing→Control→Busy=On

6.2.2.3 Microphone Input Configuration for Intermediate Input

The intermediate microphone input is configured in similar fashion to a single microphone configuration but with a type of 'Miscellaneous Input'; see Section "6.1 For a Single RRM02 Unit with Serial Data and Audio Connection to an ASL Router Audio Input" (page 36). Table 7 lists all parameters available for a single microphone with applicable configuration for the intermediate microphone input.

Table 7 Intermediate Router Microphone Input

Section		Page	Configuration of Multiple RRM02s for a Single Zone
6.1.1	Obtaining the Router Input Number	36	For intermediate microphone input.
6.1.2	Configuring the Microphone Type	36	Configure microphone input as 'Miscellaneous Input'.
6.1.3.1	PTT Button Zone Selection	36	Not available for 'Miscellaneous Input'.
6.1.3.2	PTT Button Cough Timeout (only on VAR4/12/20)	37	Not available for 'Miscellaneous Input'.
6.1.4.1	Microphone Input Gain	37	As described for single microphone.
6.1.4.2	Microphone Surveillance Tone Detection	38	Configure surveillance tone detection to 'Off'.
6.1.4.3	Microphone Relative Output Gain	39	As described for single microphone.
6.1.4.4	Microphone Equalisation	40	As described for single microphone.
6.1.4.5	Microphone Fade Up and Down Times	40	As described for single microphone.
6.1.4.6	Microphone Pre-Announcement Chime	42	Configure chime to 'Chime-1', 'Chime-2', or 'Chime-3', as required.
6.1.5.1	Microphone Priority	42	As described for single microphone. Configure a priority higher than the priority configure for the inputs connected to the multiple RRM02 units.
6.1.5.2	Microphone Class	43	As described for single microphone.
6.1.5.3	Microphone Name	43	As described for single microphone.
6.1.5.4	Busy and Select Indication LEDs Mode (ACU and VAR8-ACU only)	44	As described for single microphone.

6.2.2.4 BMB01 Configuration

Initially configure the BMB01 unit by assigning a unit address to it, if not already done. Then configure the required digital input and output, as described in the following sections.

In order to configure the BMB01 unit check the system design documentation to find the BMB01 unit address and its physical connection to the Router, and then proceed as follows:

- VAR4/12/20:
Menu: **Configuration**→**System**→**Router**→**Control**→**Remote**→<Remote I/O Unit=*n*>→**Bus-1**
Select the unit address, and then select the RS485 bus which the BMB01 is connected to.
- DAU/ACU/VAR8/VAR8-ACU (BMB01 connected to RS485 port):
Menu: **Configuration**→**System**→**Control**→**Remote**→<Unit Address #*n*>→**Expand I/O**
Select the unit address, and then select 'Expand I/O'.
- ACU/VAR8-ACU (BMB01 connected to Microphone Input):
Menu: **Configuration**→**System**→**Router**→**Inputs**→**Mic/Line**→<I/P #*nn* – *input name*>
Select 'Remote I/O Unit(s)', and then select the unit address.

6.2.2.4.1 Obtaining the Router Output Number

Check the system design documentation to find the Router audio output(s) number connected to the audio zone.

6.2.2.4.2 Obtaining the Intermediate Router Input Number

Check the system design documentation to find the intermediate Router audio input number being used to set-up the chime.

6.2.2.4.3 Obtaining the BMB01 Digital Input Number

Check the system design documentation to find the BMB01 digital input number being used to route the audio to single audio zone.

6.2.2.4.4 Obtaining the BMB01 Digital Output Number

Check the system design documentation to find the BMB01 digital output number being used for busy indication.

6.2.2.4.5 Configuring BMB01 Digital Input for Routing

VAR4/12/20 Menu: **Configuration**→**System**→**Router**→**Control**→**Remote**

→<Remote I/O Unit=*n*>→**Digital In**→<Contact #*ii*>→**Routing**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration**→**System**→**Router**→**Ctrl**→**Remote**

→<Unit Address #*n*>→**Digital In**→<>→<Digital #*ii*>→**Routing**

Where *n* is the BMB01 unit address, and *ii* is the BMB01 digital input number found in Section “[6.2.2.4.4 Obtaining the BMB01 Digital Input Number](#)” (page 50).

Once a digital input is configured for ‘Routing’, it is necessary to define the route(s) that it controls, and to set the routing control parameters as described in the following steps.

1. Configure the route(s) by associating the intermediate microphone input to the audio zone output(s) found in Section “[6.2.2.4.1 Obtaining the Router Output Number](#)” (page 50).

VAR4/12/20 Menu: **Configuration**→**System**→**Router**→**Control**→**Remote**

→<Remote I/O Unit=*n*>→**Digital In**→<Contact #*ii*>→**Routing**→**Zoning**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration**→**System**→**Router**→**Ctrl**→**Remote**

→<Unit Address #*n*>→**Digital In**→<>→<Digital #*ii*>→**Routing**→**Zoning**

2. Configure the route(s) for non-latching operation, i.e., the activation of the contact initiates the route. When the contact is released, the route is cleared.

VAR4/12/20 Menu: **Configuration**→**System**→**Router**→**Control**→**Remote**

→<Remote I/O Unit=*n*>→**Digital In**→<Contact #*ii*>→**Routing**→<Control>→<Latching>→<Not-Latched>

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration**→**System**→**Router**→**Ctrl**→**Remote**

→<Unit Address #*n*>→**Digital In**→<>→<Digital #*ii*>→**Routing**→<Control>→<Latching>→<Not-Latched>

3. Configure the route(s) to be terminated immediately when the contact is released.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Remote**

→<Remote I/O Unit=*n*>→**Digital In**→<Contact #*ii*>→**Routing**→**Control**→**DVA-Part**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Remote**

→<Unit Address #*n*>→**Digital In**→<>→<Digital #*ii*>→**Routing**→**Control**→**DVA-Part**

4. Configure the route(s) to cause busy indication on LEDs associated with microphone zone select buttons.

VAR4/12/20 Menu: **Configuration→System→Router→Control→Remote**

→<Remote I/O Unit=*n*>→**Digital In**→<Contact #*ii*>→**Routing**→**Control**→**Busy=On**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Remote**

→<Unit Address #*n*>→**Digital In**→<>→<Digital #*ii*>→**Routing**→**Control**→**Busy=On**

6.2.2.4.6 Configuring BMB01's Digital Output for Busy Indication

VAR4/12/20 Menu: **Configuration→System→Router→Control→Remote**

→<Remote I/O Unit=*n*>→**Digital Out**→<Output #*ii*>→**Busy-Indication**

DAU/ACU/VAR8/VAR8-ACU Menu: **Configuration→System→Router→Ctrl→Remote**

→<Unit Address #*n*>→**Digital Out**→<>→<Digital #*ii*>→**Busy-Indication**

Where *n* is the BMB01 unit address, and *ii* is the BMB01 digital output number found in Section [“6.2.2.4.4 Obtaining the BMB01 Digital Output Number”](#) (page 50).

Select the Router inputs connected to the RRM02 units to cause Busy Indication when routed to the intermediate output found in Section [“6.2.2.2.1 Obtaining the Router Intermediate Output Number”](#) (page 48).

6.3 For Connection to Other PA Systems

Commissioning of the RRM02 depends on the PA system which the RRM02 is connected to, therefore consult your PA system relevant documentation for details.

7 Fault Finding

Table 8 RRM02 Faults – VAR4/12/20

Operational Fault Symptom	Fault Description	Fault(s) Reported at VAR4/12/20	Suggested Action
Total loss of live audio announcement from a single microphone, though the microphone still appears to be functional.	Input audio surveillance	IPXX AUDIO INPUT XX=01 to 20	<ul style="list-style-type: none"> • Check audio cabling or power supply cabling between microphone and Router. • Replace microphone console. • Replace Router.
Total loss of all functionality on a single microphone.	Mic comms fault	IPXX MIC COMMS XX=01 to 20	<ul style="list-style-type: none"> • Check data cabling or power supply cabling between microphone and Router. • Replace microphone console. • Replace Router.
No operational failure on initial fault report. Total loss of all functionality on a single microphone if subsequent fault reports within one hour.	Mic CPU reset	IPXX MIC COMMS XX=01 to 20	<ul style="list-style-type: none"> • A one-off occurrence may be experienced due to EMI or transients. • Repeated occurrences indicate faulty microphone electronics, so replace microphone console.
Total loss of all functionality on a single microphone.	Mic RAM error	IPXX MIC FAULT-09 XX=01 to 20 (Mic Processor stops)	<ul style="list-style-type: none"> • A one-off occurrence may be experienced due to EMI or transients. • Repeated occurrences indicate faulty microphone electronics, so replace microphone console.
Total loss of all functionality on a single microphone.	Mic ROM error	IPXX MIC FAULT-09 XX=01 to 20 (Mic Processor stops)	<ul style="list-style-type: none"> • Replace microphone console.

Table 9 RRM02 Faults – DAU, ACU, VAR8, and VAR8-ACU

Operational Fault Symptom	Fault Description	Fault(s) Reported at DAU/ACU/ VAR8/VAR8-ACU	Suggested Action
Total loss of live audio announcement from a single microphone, though the microphone still appears to be functional.	Input audio surveillance	IPXX AUDIO INPUT XX=01 to 08	<ul style="list-style-type: none"> • Check audio cabling or power supply cabling between microphone and Router. • Replace microphone console. • Replace Router.
Total loss of all functionality on a single microphone.	Mic comms fault	MIC<n> MIC COMMS n=01 to 08	<ul style="list-style-type: none"> • Check data cabling or power supply cabling between microphone and Router. • Replace microphone console. • Replace Router.
No operational failure on initial fault report. Total loss of all functionality on a single microphone if subsequent fault reports within one hour.	Mic CPU reset	MIC<n> MIC COMMS n=01 to 08	<ul style="list-style-type: none"> • A one-off occurrence may be experienced due to EMI or transients. • Repeated occurrences indicate faulty microphone electronics, so replace microphone console.
Total loss of all functionality on a single microphone.	Mic RAM error	MIC<n> FAULT 09 n=01 to 08 (Mic Processor stops)	<ul style="list-style-type: none"> • A one-off occurrence may be experienced due to EMI or transients. • Repeated occurrences indicate faulty microphone electronics, so replace microphone console.
Total loss of all functionality on a single microphone.	Mic ROM error	MIC<n> FAULT 09 n=01 to 08 (Mic Processor stops)	<ul style="list-style-type: none"> • Replace microphone console.

8 Maintenance

The RRM02 should be tested with the PA system for correct operation, at maximum intervals of three months, and as part of the system maintenance schedule.

There are no routine maintenance tasks for the RRM02 except for operational testing.

The following sections describe maintenance tasks, which can be carried out when required.



Please read and observe the Section “[11 Safety and Precautions](#)” (page [59](#)) when carrying out any maintenance tasks. Failure to follow these precautions may cause personal injury and/or damage to the equipment.

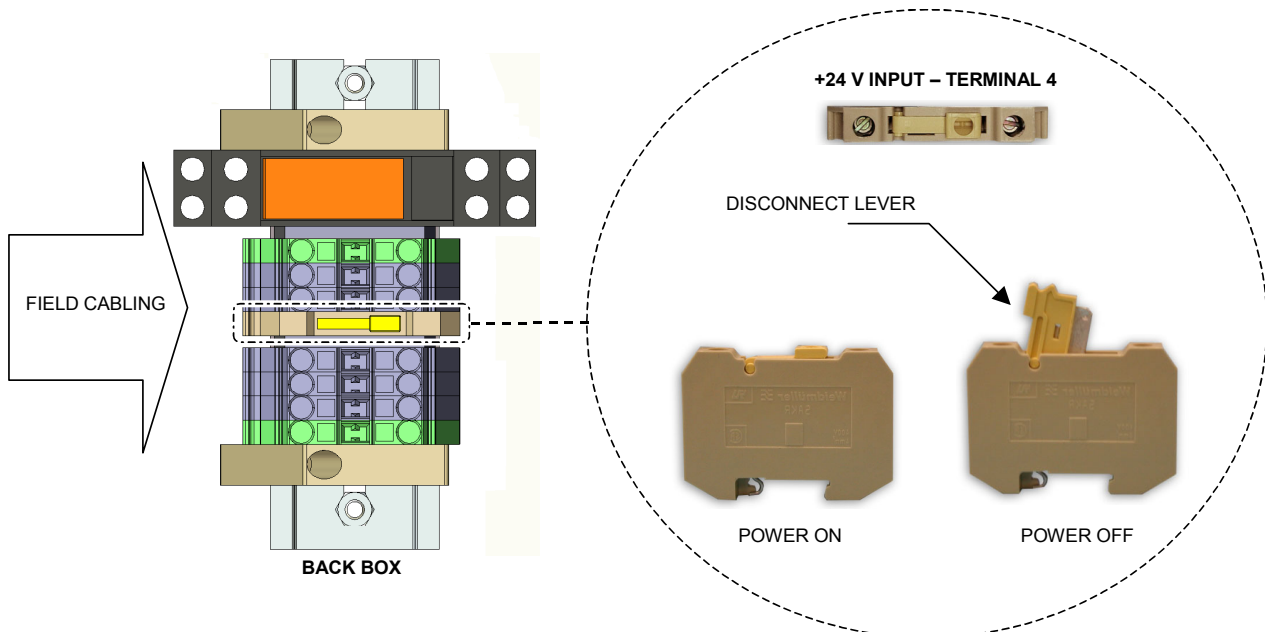
8.1 Powering the RRM02 On and Off



The RRM02 should always be powered off before being disconnected. Failure to do so may damage the VAR Router, DAU, or ACU connected to the RRM02.

Powering the RRM02 is done by toggling the disconnect lever of the power supply DIN rail terminal (4) in or out, as shown in [Figure 25](#).

Figure 25 Power Supply Terminal



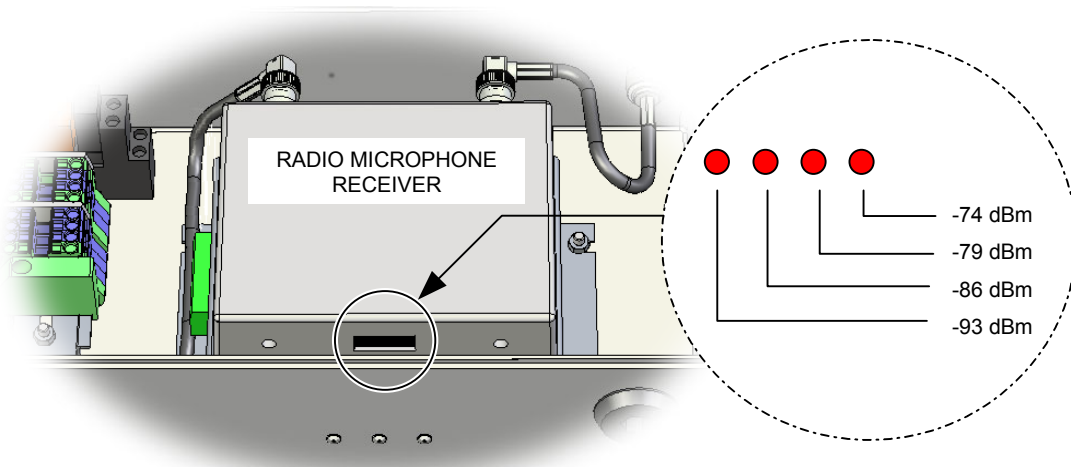
8.2 Radio Microphone Receiver Adjustments and Monitoring

The following procedure describes how to modify the Radio Microphone Receiver settings after installation. The Radio Microphone Receiver also provides indication of the received RF signal level.

Adjusting and Monitoring the Radio Microphone Receiver:

1. Remove the lid of the unit by unscrewing the four corner fixings.
2. Power the unit off as described in Section “[8.1 Powering the RRM02 On and Off](#)” (page 54).
3. The controls required in the following configurations are shown in [Figure 22](#) (page 32):
 - a. If required, select the new Receiver Channel RF frequency via the internal rotary switch. Refer to Section “[5.1 Radio Microphone Receiver Frequency Selection](#)” (page 33) for frequency configuration.
 - b. If required, enable or disable the pilot tone detection by setting DIP switch 1 on the microphone PCB. Refer to Section “[5.2 Radio Microphone Receiver Pilot Tone Detection Configuration](#)” (page 34) for pilot tone detection configuration.
 - c. If required, select the squelch level by setting DIP switches 3 and 4 on the microphone PCB. Refer to Section “[5.3 Radio Microphone Receiver Squelch Level Configuration](#)” (page 35) for squelch level configuration.
4. If required, the strength of the received RF signal can also be monitored from indicators provided on the lower face of the Radio Microphone Receiver (see [Figure 26](#)).

Figure 26 Radio Microphone Receiver RF Level Indicators



5. When finished, power the unit on as described in Section “[8.1 Powering the RRM02 On and Off](#)” (page 54).
6. Fix the lid back in position, screwing it tight to provide an IP65 seal, but not excessively tight so that any of the fixing threads are stressed, as this may cause them to weaken and shear.

9 Product Specification

General

Supply Voltage Range.....	18 – 40 V DC
Current Consumption	
Min., no announcement.....	260 mA @ 24 V DC supply
Max., all LEDs on	295 mA @ 24 V DC supply
Audio Output.....	0 dBu balanced (nominal)
Output Impedance	66 Ω
Microphone Control Data.....	EIA RS485 / 19200 baud
Antenna Connections	50 Ω
	2 x TNC (jack) on unit's upper face
	2 x BNC (jack) on Radio Microphone Receiver
Other Connections.....	internal DIN rail mounted terminals
Interface to non-ASL Systems.....	2 x relay contact pairs (NO – Normally Open) ³
	8 A / 250 V AC relay
	PTT active indication
Format	cast aluminium box
Colour	agate grey RAL7038
	Low Smoke and Fume, Zero Halogen

Radio Microphone Receiver

Phantom Power	9.3 V nominal
Phantom Power Current Limit	44 mA
Total Harmonic Distortion (THD).....	< 1.3%
Audio Frequency Response	70 Hz – 18 kHz, –3 dB
Sensitivity.....	Better than –107 dBm for 12 dB SINAD
Signal/Noise Ratio	>100 dBA
Squelch Level	4 levels (selectable)
Operating Frequencies	10 frequencies in the Channel 70 license free band
	selectable by internal rotary switch
	<i>Frequencies available from ASL on request</i>

Environmental

Temperature Range (storage and operating).....	–5 °C to +50 °C
Humidity Range	0% to 93% non-condensing
Ingress Protection.....	IP65

Safety and EMC

EMC.....	EN 55103-1:1997, EN 55103-2:1997, EN 50121-4:2006, ENV 50204:1996
Safety.....	EN 60065:2002

Dimensions and Weight

Dimensions (H x W x D)	160 mm x 360 mm x 90 mm (excluding antennae and connectors)
Weight.....	3.6 kg
Gland/Conduit Hole	25 mm

³ PTT relay contacts can also be used for connection of multiple RRM02 units for single audio zone group.

10 Mechanical Dimensions

Figure 27 Mechanical Dimensions

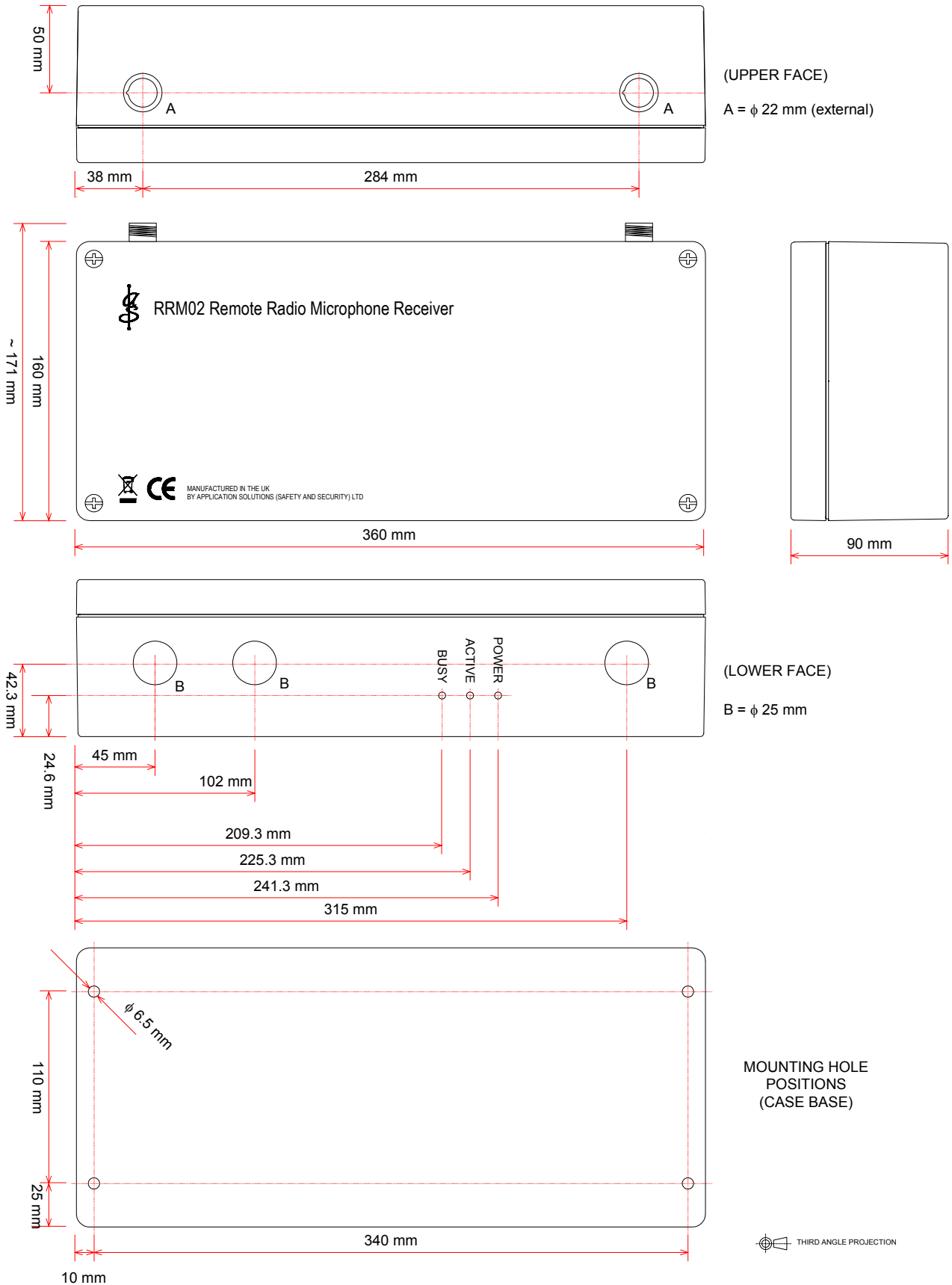
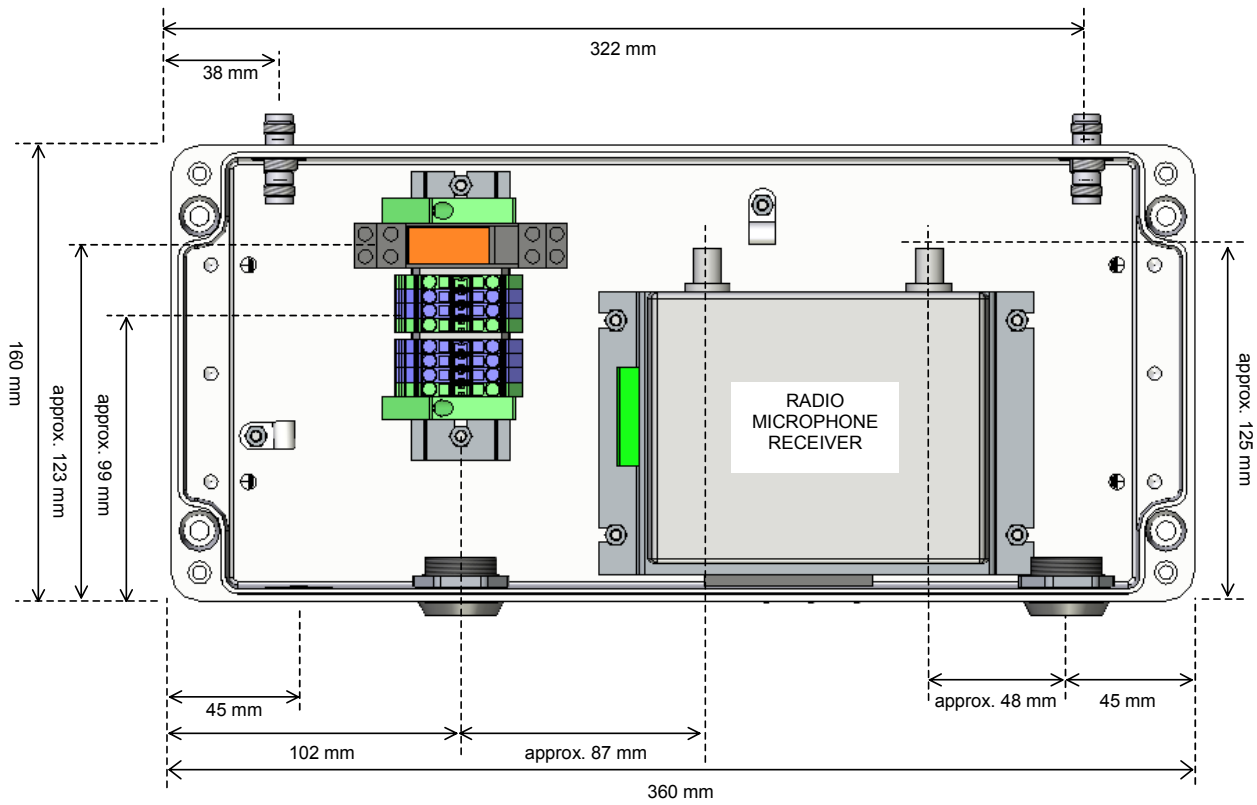


Figure 28 Dimensions for Cabling Inside the Unit



(Internal wiring omitted for clarity.)

11 Safety and Precautions

11.1 Environmental

The temperature and humidity ranges shown in the specifications for this product must not be exceeded.

This equipment must not be installed in an area that is subject to a corrosive atmosphere.

When installed in accordance to the instructions in this document, the unit provides IP65 ingress protection.

11.2 Electrical Safety

Always replace blown fuses in the supply to this equipment with the correct type and rating. Ensure power supply cabling is adequately rated.

11.3 ESD Precautions

This product contains static-sensitive devices. Observe ESD precautions when handling this product.

11.4 EMC

In the close proximity of some radio frequency transmitters, the signal to noise ratio of this product may be reduced. If this occurs, re-location of the equipment or the signal cables is recommended.

11.5 Unpacking and Handling

The equipment should be unpacked and inspected immediately on receipt. If damage has occurred please advise your carrier or supplier.

It is advisable to retain the original equipment packing in the event that the equipment ever needs returning for service.

Ensure that the name and address of the Authorised Distributor from whom you purchased the unit is recorded on the "[Service and Warranty](#)" page of this manual for future reference.

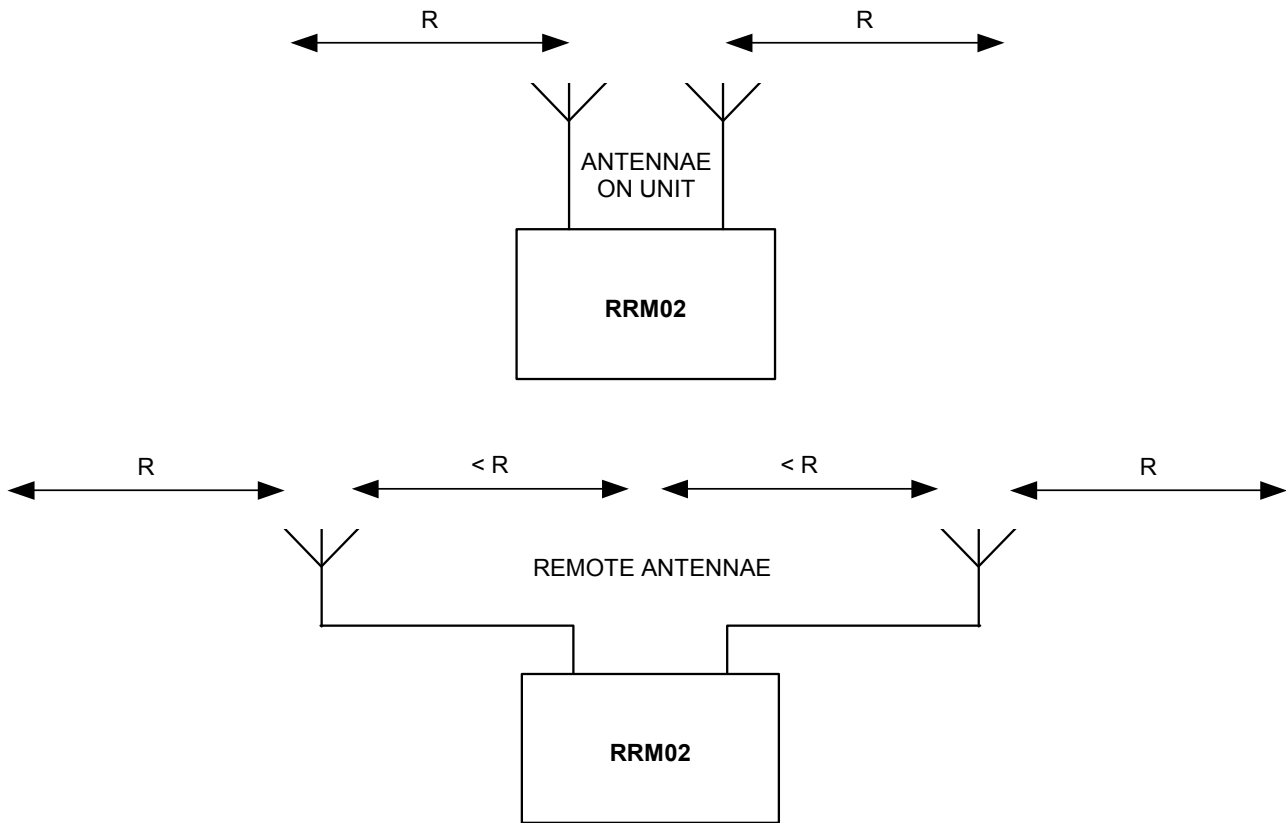
Advice on packing the product for return can be provided by Application Solutions (Safety and Security) Limited.

12 Appendix A – Antenna Coverage

The RRM02 features a diversity receiver, which takes the strongest of the received signals from the two antennae.

The diagram below shows the coverage distance with local antennae and remote antennae.

Figure 29 Antennae Coverage




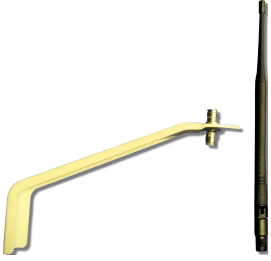

R is the range of 'good' reception for a single antenna.

R can be up to 300 m in free air; however this figure is strongly modified (reduced) by building infrastructure.

The attenuation of the cables should be considered when remote antennae are deployed. Thicker cables offer lower attenuation but cannot be routed inside the unit when fed through the holes located on the lower face of the unit.

Site trials are therefore recommended to ascertain the coverage in a particular environment.

13 Appendix B – Antenna Types

ASL Antenna Type	Description
<p>ANT03B</p> 	<ul style="list-style-type: none"> • Whip radio microphone antenna (without bracket) • For direct connection to the upper face of the RRM02 • Frequency: 840 – 875 MHz • Connector: TNC, plug • Antenna size: 242 mm length • For further details refer to the Product Overview, [Table 10-1].
<p>ANT03</p> 	<ul style="list-style-type: none"> • Whip radio microphone antenna (with bracket) • For remote antenna connection • Frequency: 840 – 875 MHz • Connector: TNC, jack • Antenna size: 242 mm length • Bracket size: max-48 mm min-35 mm x 244 mm • For further details refer to the Product Overview, [Table 10-1].
<p>ANT04</p> 	<ul style="list-style-type: none"> • Low profile omnidirectional radio microphone antenna • For remote antenna connection • Flame retardant LSZH ABS enclosure • Frequency: 840 – 880 MHz • Connector: N type, jack • Antenna size: 27.98 mm x 70.61 mm x 193.26 mm • For further details refer to the Product Manual, [Table 10-2].

14 Accessories

ASL Part Number	Additional Information
207036	TNC Connector Blanking Cap Function: Antenna connector protection cap. Location: Unused RF inputs Manufacturer/Supplier: Gigatronix Manufacturer/Supplier Part No.: TN15X1A06 Manufacturer/Supplier Description: TNC terminator

15 Spare Parts

ASL Part Number	Additional Information
204091	<p>Nut</p> <p>Function: Retain the blanking plug.</p> <p>Location: Antenna cable entry hole at the lower face of the unit.</p> <p>Manufacturer/Supplier: Farnell</p> <p>Manufacturer/Supplier Part No.: 1178937</p> <p>Manufacturer/Supplier Description: Locknut (M25)</p>
206399	<p>Blanking Plug</p> <p>Function: Cable entry blanking plug.</p> <p>Location: Unused cable entry holes.</p> <p>Manufacturer/Supplier: RS Components</p> <p>Manufacturer/Supplier Part No.: 809-116</p> <p>Manufacturer/Supplier Description: Cable entry blanking plug (M25)</p>
A0464668	<p>Adaptor Lead – Short</p> <p>Function: Short adaptor lead to connect the Microphone Receiver to the TNC connectors on the upper face of the unit.</p> <p>Location: Inside the box</p> <p>Manufacturer/Supplier: Application Solutions (Safety and Security) Limited</p> <p>Manufacturer/Supplier Part No.: A0464668</p> <p>Manufacturer/Supplier Description: Adaptor lead A (160 mm)</p>
A0464669	<p>Adaptor Lead – Long</p> <p>Function: Long adaptor lead to connect the Microphone Receiver to the TNC connectors on the upper face of the unit.</p> <p>Location: Inside the box</p> <p>Manufacturer/Supplier: Application Solutions (Safety and Security) Limited</p> <p>Manufacturer/Supplier Part No.: A0464669</p> <p>Manufacturer/Supplier Description: Adaptor lead B (370 mm)</p>
203659	<p>Fuse</p> <p>Function: Power supply fuse.</p> <p>Location: +V Power supply terminal at the equipment rack.</p> <p>Manufacturer/Supplier: Farnell</p> <p>Manufacturer/Supplier Part No.: 1123206</p> <p>Manufacturer/Supplier Description: Antisurge fuse 500 mA (glass)</p>
205398	<p>Relay</p> <p>Function: Provide contact for equipment interface.</p> <p>Location: DIN rail inside the back box (relay base).</p> <p>Manufacturer/Supplier: Tyco Schrack</p> <p>Manufacturer/Supplier Part No.: RTE24005</p> <p>Manufacturer/Supplier Description: General purpose industrial relay</p>
204327	<p>Diode</p> <p>Function: Protection.</p> <p>Location: DIN rail inside the back box (relay base).</p> <p>Manufacturer/Supplier: Tyco Schrack</p> <p>Manufacturer/Supplier Part No.: RPMT00A0</p> <p>Manufacturer/Supplier Description: Protective diode module</p>
RMR02	<p>Radio Microphone Receiver</p> <p>Function: Receiver.</p> <p>Location: Underneath bracket and PCB assembly.</p> <p>Manufacturer/Supplier: Application Solutions (Safety and Security) Limited</p> <p>Manufacturer/Supplier Part No.: RMR02</p> <p>Manufacturer/Supplier Description: Radio Microphone Receiver</p>

16 Reference Documents

Additional reference information may be found in the following documentation, available from the “Data Downloads” page of Application Solutions (Safety and Security) Limited website:

www.asl-control.co.uk

Table 10 Reference Documents

Ref. No	Title	Filename Ref	Origin
1	ANT03 Product Overview	U-0464-0322	ASL
2	ANT04 Product Manual	U-0464-0248	ASL
3	RPA01 Radio Microphone Transmitter Product Manual	U-0618-0086	ASL
4	RCS01 Charging Station Product Manual	U-0618-0103	ASL
5	VAR4 Installation Guide	450_VAR-4_Guide	ASL
6	VAR12/20 Installation Guide	450_VAR-12.20 Guide	ASL
7	VAR Router Operation Manual	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
8	VAR8 Installation Guide	U-0450-1360	ASL
9	VAR8 Operation, Commissioning, Fault Finding, and Maintenance Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
10	VAR8-ACU Installation Guide	U-0450-1430	ASL
11	VAR8-ACU Operation, Commissioning, Fault Finding, and Maintenance Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
12	8x8 DAU200 / DAU400 Installation Guide	U-0518-0852	ASL
13	8x8 ACU and ACS Series Installation Guide	U-0518-0854	ASL
14	Intellevac SW Commissioning and Operation Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
15	BMB01 Remote I/O Unit Installation Guide	450_BMB01_Guide	ASL



The above documents are the user documentation available at the time of the publication of this document. The website has the latest releases of the user documentation for each product. If you find any difficult in locating any document, please refer to Applications Solutions (Safety and Security) Limited.

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Service and Warranty

Name and Address of Authorised Distributor:

This product carries a full warranty. For full details of warranty and service agreements, please contact the Authorised Distributor who supplied the product to you.

Exclusions

The warranty does NOT cover:

1. Customer misuse, including incorrect installation.
2. Damage other than manufacturing defects.
3. Transit / Courier damage.
4. Incorrect voltage or power supply used.
5. Incorrect input signal.
6. Abnormal environmental operating conditions.
7. Damage incurred by accident, fire, lightning or other hazard.
8. Modification to the unit or inexpert / attempted repair.
9. No fault found – where no fault can be found after extensive testing, indicating user error or failure in ancillary equipment.
10. Electronic assemblies which are improperly packed when returned for repair or service.

Should any of the above apply, Application Solutions (Safety and Security) Limited reserves the right to raise any relevant charges to the customer.

Application Solutions (Safety and Security) Limited shall not be liable for any indirect, special or consequential loss or damage (including without limitation any loss of profits) arising from the use of this product or for any breach of this warranty.

In the interest of continual product development, Application Solutions (Safety and Security) Limited reserves the right to make changes to product specification without notice or liability.



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