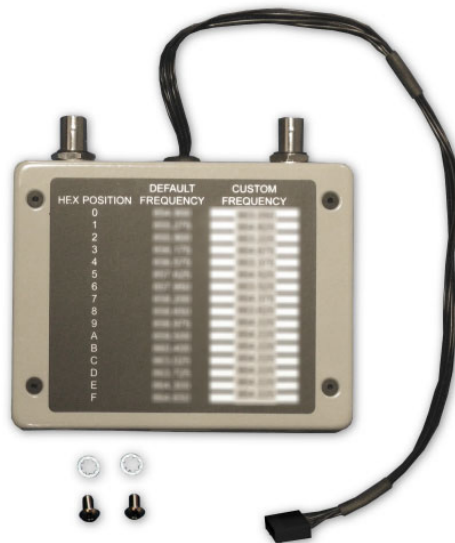


RMR01 and RMR02 Radio Microphone Receiver Kit





This equipment, when installed into the SAP according to the instructions in this document, conforms to the following EC standards:

EMC EN55103-1, EN55103-2, EN50121-4, EN61000-6-2, EN61000-6-3

Safety EN60065

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.



This product is RoHS compliant.

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



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Information contained in this document is believed to be accurate, however no representation or warranty is given and Application Solutions (Safety and Security) Limited assumes no liability with respect to the accuracy of such information.

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1 Description

The RMR01 and RMR02 Radio Microphone Receivers are self-contained high quality, fully synthesised diversity receivers, designed to fit within the ASL SAP Station Announcement Points. Both units are identical except for the connector on the lead which connects to the SAP unit:

- RMR02: 14-way connector to be connected to SAP02
- RMR01: 6-way connector to be connected to SAP01

The Receivers enable remote (Radio Microphone) announcements to be made in addition to the SAP's standard local (Fist Microphone) announcements.

The Receivers are capable of working on ten frequencies that are selectable via a rotary switch. They fit to the SAP front panel and connect directly to the SAP PCB. They feature a LED RF signal strength meter, which is visible through the SAP front panel.

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 blocked¹. This security feature can however be disabled for compatibility with transmitters that do not provide the pilot tone.

The RMR01 and RMR02 provide phantom power for mast-head 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.

Four Radio Microphone Receiver squelch levels are available to enable optimum RF set-up².

Antenna cabling connections are through twin BNC connectors.

Each kit comprises the receiver and its fixing bolts/washers and is for retrofitting into SAP units supplied without receivers. Alternatively, the SAP can be supplied with the Radio Microphone Receiver fitted.

The ASL ANT04 Low Profile Antenna and ANT03 Whip Antenna are choices of antenna for use with the Radio Microphone Receiver. The ANC01 Radio Microphone Antenna Combiner unit can be used with the Radio Microphone Receiver when more than two antennae are needed to provide adequate coverage in the PA zone.

Refer to the ANT03 Product Overview [Table 6-5], ANT04 Product Manual [Table 6-6], and ANC01 Product Manual [Table 6-7] for further details.

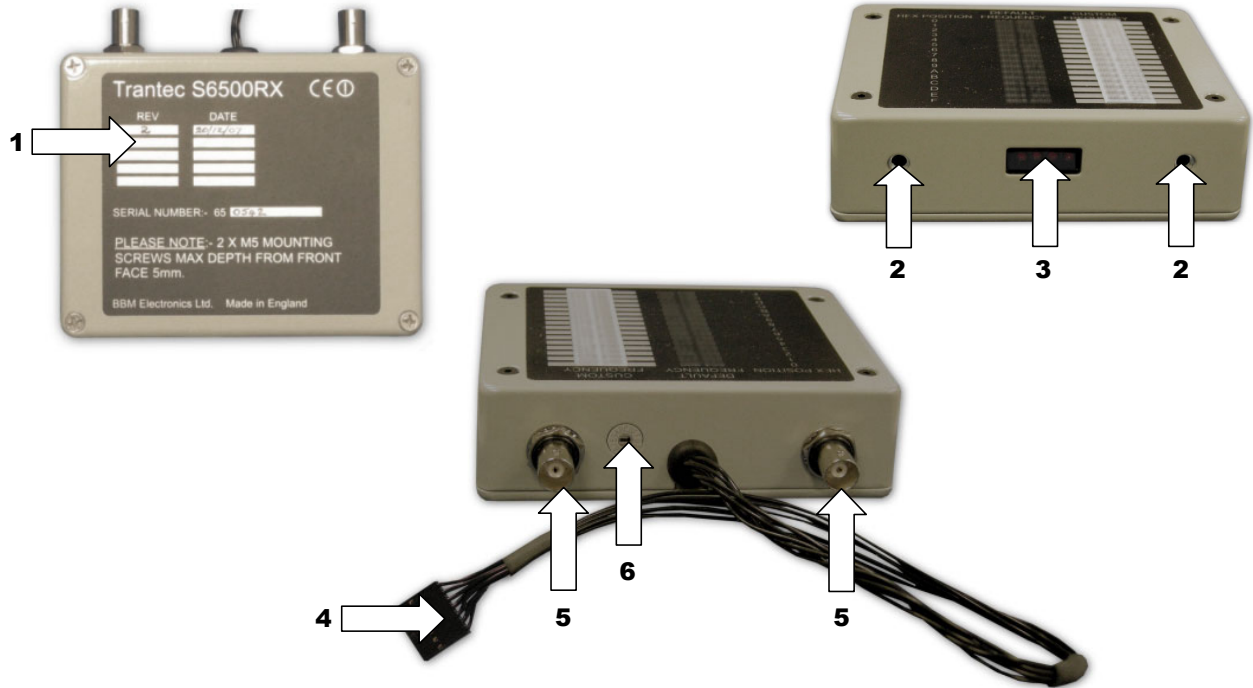
¹ Announcements from non-tone locked transmitters are completely blocked with Radio Microphone Receiver modules of Build Standard (BS) 2B or later. With earlier Build Standards of Radio Microphone Receiver module the audio from non-tone locked transmitters is muted but they can still make chimes and silent routes. These silent routes can still be blocked; please refer to Application Solutions (Safety and Security) Limited for further details.

² Squelch level selection is available on any SAP02 Build Standard Versions, and on SAP01 Build Standard Version 8C or later.

2 Installation

2.1 Radio Microphone Receiver Components

Figure 1 Radio Microphone Receiver Components



1 Revision label

Externally the RMR01 and RMR02 are identical to the legacy Radio Microphone Receivers (RADIO-MIC-RX) except for the connector on the RMR02 flying lead. The revision label can be used to identify the unit:

- REV < 2: Legacy units (RADIO-MIC-RX)
- REV >=2: RMR02 and RMR01

2 Fixing holes (2 off): M5 screw with maximum thread depth = 8 mm

3 Received RF signal level indicator:

LED 4 = -74 dBm (uppermost when the receiver is fitted in the SAP), high signal strength

LED 3 = -76 dBm

LED 2 = -86 dBm

LED 1 = -93 dBm, low signal strength

No LEDs lit = no signal

4 Flying lead for connection to SAP PCB:

- RMR02: 14-way connector to fit into SAP02
- RMR01: 6-way connector to fit into SAP01

Spare leads can be separately ordered in order to convert the unit type, if required:

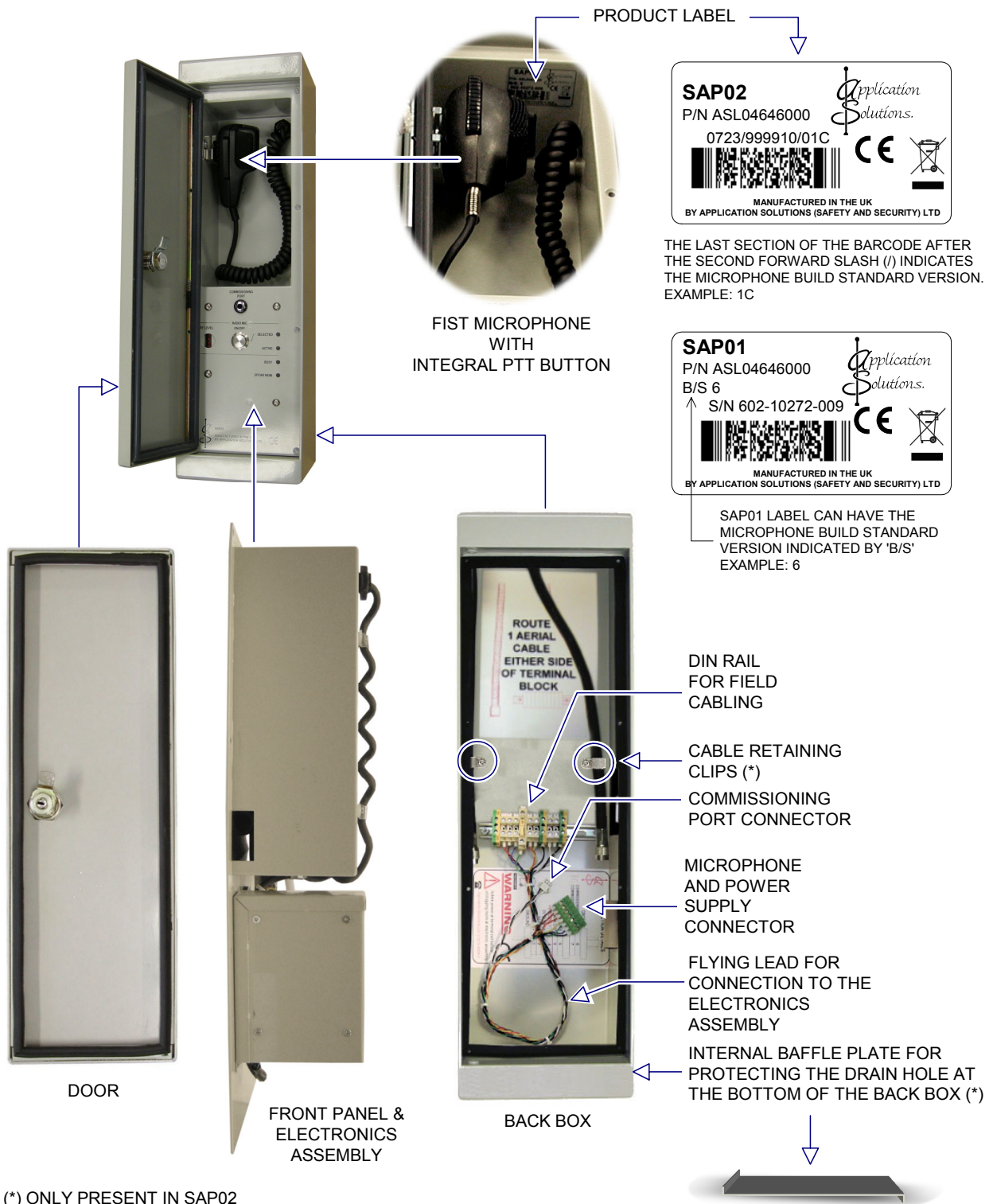
- A0464641: to convert from a RMR01 to a RMR02, and to connect the Receiver to SAP02
- A0464644: to convert from a RMR02 to a RMR01, and to connect the Receiver to SAP01

5 RF input for antenna connection (2 off): 50 Ω BNC jack.

6 Radio Microphone RF frequency selection rotary switch.

2.2 SAP Components

Figure 2 SAP02 Main Components



(*) ONLY PRESENT IN SAP02



- Pictures shown [Figure 2](#) are from SAP02, however similar main components are present in SAP01.
- The SAP's preferred Line Replaceable Unit (LRU) is the whole front panel and the electronics assembly, including the Radio Microphone Receiver when it is fitted.

2.3 Installation Requirements

2.3.1 Equipment and Tool Requirements

- The SAP unit.
- The Radio Microphone Receiver kit:
 - RMR02: for installation within the SAP02
 - RMR01: for installation within the SAP01
- Suitable cable glands/conduit fixings, preferably with cable screen earthing facilities.
- A stripping tool and cable connectors for the preparation of the co-axial Radio Microphone antenna cables.
Suggested tools: RS 453-870 for RG58 cable, or Gigatronix GCT-0519 for H1000/RG213 cable.
- A small flat bladed screwdriver.
- A 2.5 mm Allen key or driver.
- A No. 1 Phillips screwdriver.
- Suitable wire cutters, strippers and cable ferrules.
- A drill with bits and hole cutters suitable for cutting 2 mm mild steel, for the cable glands.
- Suitable fixings and tools for wall mounting.
- Sealant.
- For installation within a SAP01 the following items are required in addition to the above listed equipment and tools:
 - RADIO MIC/LOCAL MIC key-switch assembly
 - A 32 mm spanner
 - A 7 mm spanner

2.3.2 Cabling Requirements



Please note that the following coaxial antenna cables have been chosen for their compact size and ease of assembly. Failure to use these parts may make final assembly difficult or impossible.



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



Section “[11 Appendix – Antenna Types](#)” provides information on antenna choices and mounting.

The following coaxial antenna cables are recommended:

- RG58 type (recommended for short runs up to 10 m):
 - Required connectors: Two suitable low-profile right-angle BNC crimp plugs
Type: Telegartner J01000A1257 or RS 112-1883
 - Required tools: Crimp tool for these plugs, e.g. RS 453-870
- H1000 type (recommended for longer runs up to 30 m):
 - Required connectors: Two TNC crimp plugs
Type: Gigatronix TN15-0519-C06
 - Required tools: Gigatronix GCT-0519 crimp tool for the TNC plugs
 - Required accessories: A pair of ASL RG58 adaptor leads



- 1) The pair of RG58 adaptor leads is NOT supplied either with the SAP02 or the Radio Microphone Receiver, and need to be ordered separately from Application Solutions (Safety and Security) Limited quoting RADIO-MIC-LEADS.

The leads are specified as follows:

- Long lead length: approx. 270 mm
- Short lead length: approx. 190 mm
- Termination to the Radio Microphone Receiver: right-angle BNC crimp plug
- Termination to the RG213 or H1000 antenna cabling: straight TNC jack
- Cable: RG58



- 2) RG213 type may also be used for longer runs but generally has poorer performance than H1000 type.

2.4 RMR02 Recommended Installation Procedure



This procedure is to be used when installing the Receiver within a SAP02.



Please read and observe the instructions and guidelines in Section “9 Safety and Precautions” (page 36) prior to installation. Failure to follow these instructions and guidelines may cause personal injury and/or damage to the equipment.



The SAP02 Build Standard Version is indicated on the label located on the top part of the first microphone enclosure as shown in Figure 2. This should be quoted in all enquiries regards the unit.

1. Ensure that the Radio Microphone Receiver is fitted with the correct lead for connection to the SAP02:
 - SAP02 requires the lead to be terminated with a 14-way connector

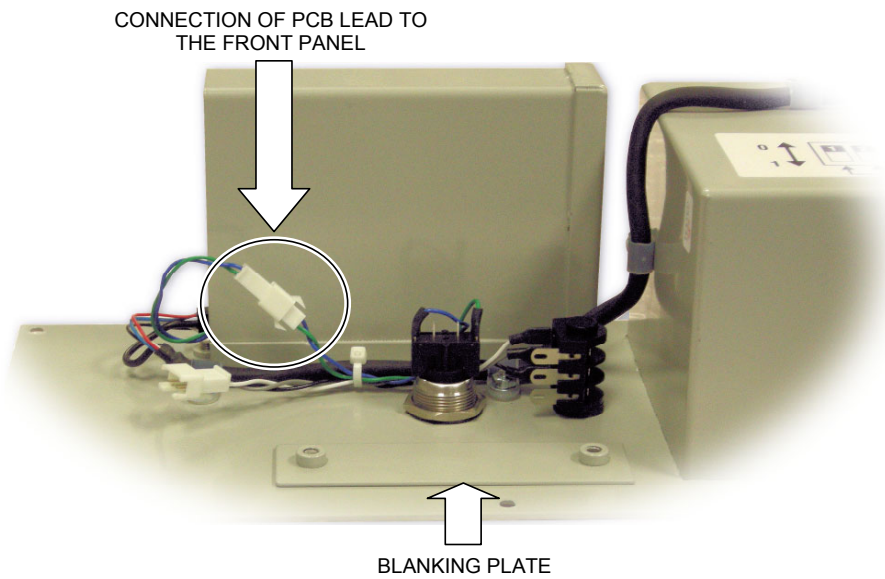
The Receiver lead can be swapped as described in Section “6.1 Converting the Unit Type” (page 32). Note that the appropriate spare lead will be required.
2. Open the SAP02 door using the associated KABA key.
3. Remove the SAP02 door by compressing the hinge pin; see Figure 3.
This can be done by inserting a small screwdriver into the holes in the pin.
Take care to ensure that the hinge pin’s plastic bushes in the back box are not loosened.

Figure 3 SAP02 Door and Front Panel Fixing



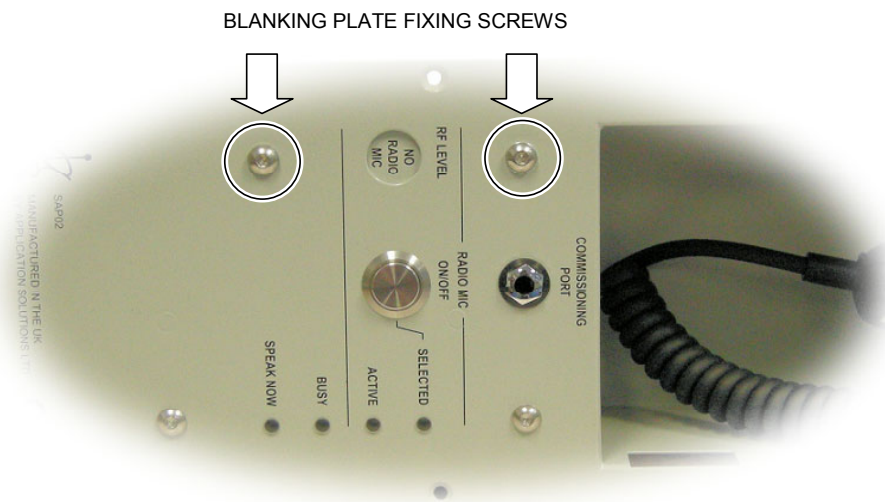
4. Remove the SAP02 front panel assembly by removing the 8 off M4 Allen screws; see [Figure 3](#).
5. Ensure that the SAP02 is powered off.
Section “[3 Powering the SAP On and Off](#)” (page 24) describes how to power the unit off according to the internal DIN rail terminal assembly.
6. Disconnect the SAP02 front panel assembly by unplugging the flying lead from the multi-way connectors on the electronics assembly.
7. Store the door and fixing screws safely.
8. Connect the lead from the SAP02 PCB to the front panel; see [Figure 4](#).

Figure 4 SAP02 – Connection to PCB and Blanking Plate



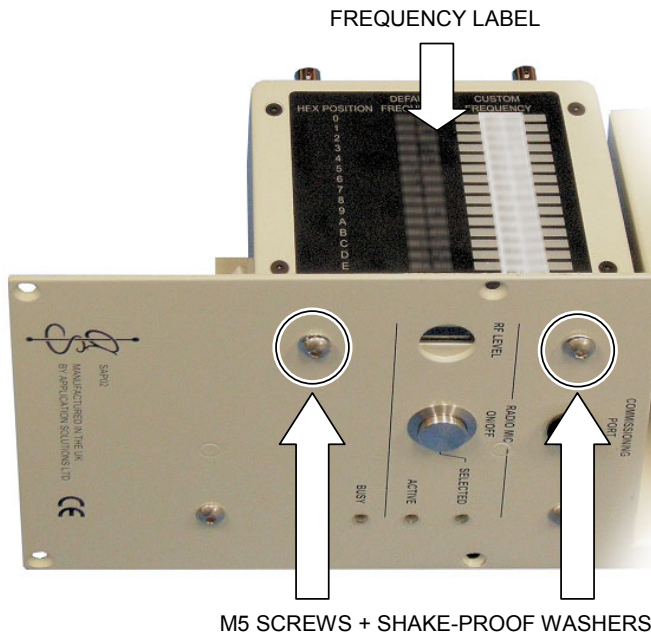
9. Remove the blanking plate which protects the Radio Microphone Receiver LED window by undoing the 2 off screws; see [Figure 5](#).

Figure 5 SAP02 – Blanking Plate Fixings



- 10.** Fit the Radio Microphone Receiver to the front panel (note orientation as shown in [Figure 6](#)) using the M5 screws and shake-proof washers provided.

Figure 6 SAP02 – Radio Microphone Receiver Fixing



! THE FREQUENCY LABEL MUST BE OUTERMOST.

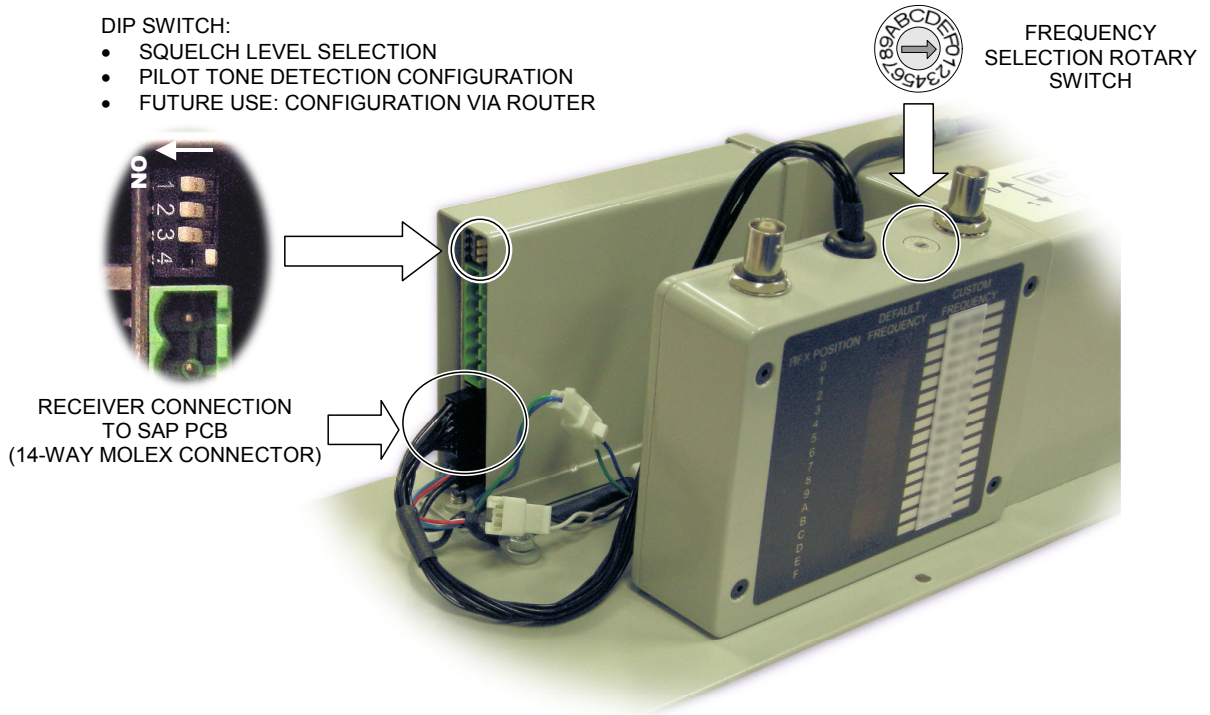
! USE ONLY THE PROVIDED M5 SCREWS AND SHAKE-PROOF WASHERS.

ALTERNATIVE SCREWS MUST NOT EXCEED 8 MM.
USING SCREWS WITH THREAD DEPTH ABOVE 8 MM MAY CAUSE DAMAGE TO INTERNAL PARTS OF THE UNIT.

- 11.** Connect the Radio Microphone Receiver flying lead to the SAP02 PCB connector shown in [Figure 7](#).

Figure 7 SAP02 – Controls and Connection on SAP02

- DIP SWITCH:
- SQUELCH LEVEL SELECTION
 - PILOT TONE DETECTION CONFIGURATION
 - FUTURE USE: CONFIGURATION VIA ROUTER



- 12.** Select the correct RF frequency via the internal rotary switch; see [Figure 7](#).

Refer to Section “[4.1 Radio Microphone Receiver Frequency Selection](#)” (page 26) for frequency configuration details.

- 13.** Disable (or enable) the pilot tone detection as required by setting DIP switch 1 on the SAP02 PCB; see [Figure 7](#).

Refer to Section “[4.2 Radio Microphone Receiver Pilot Tone Detection Set-up \(SAP02 only\)](#)” (page 27) for pilot tone detection set-up details.



The Radio Microphone Receiver is supplied with pilot tone detection **enabled** as standard for secure use with the ASL RPA01 Radio Microphone Transmitters.

This configuration will block or mute announcements from Radio Microphone Transmitters that do not provide the required pilot tone (non-tone locked transmitters) as follows:

- Radio Microphone Receiver modules of Build Standard (BS) 2B or later:
This will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone, such as the ASL RADIO-MIC-TX.
- Earlier Build Standards of Radio Microphone Receiver module:
The audio from non-tone locked transmitters is muted but they can still make chimes (if programmed at the Router) 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.

- 14.** Select the squelch level via DIP switches 3 and 4 on the SAP02 PCB as required; see [Figure 7](#).

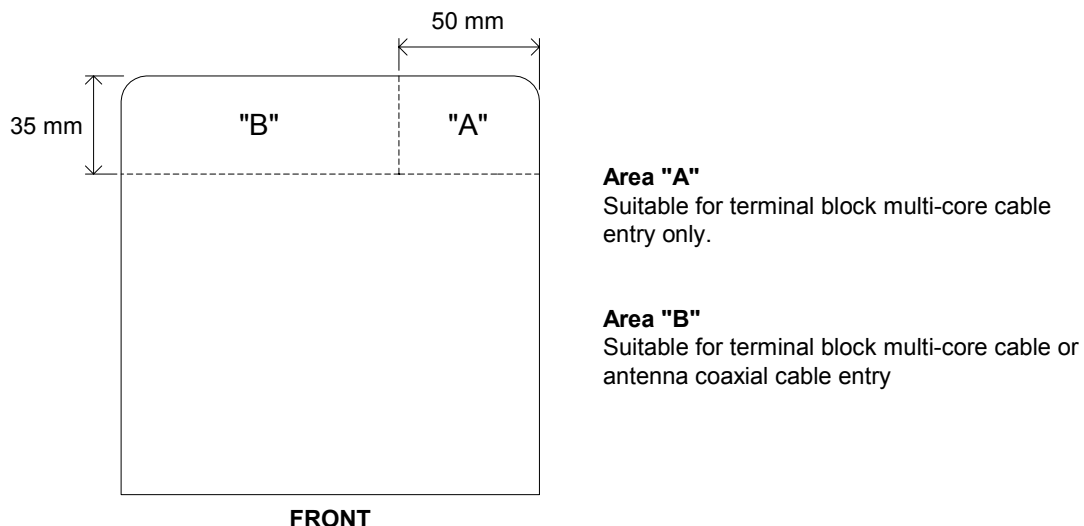
Refer to Section “[4.3.1 SAP02 Squelch Level Set-up](#)” (page 28) for squelch level set-up details.

- 15.** Drill holes in the back box for cable gland or conduit entry holes (if not already done), according to the particular installation conditions.




- The SAP02 is primarily designed for top entry of cables. Please refer to Application Solutions (Safety and Security) Limited if a different cable entry positioning is required.
- It is vital that the cable glands are positioned within the area shown in [Figure 8](#). Failure to do so will cause difficulty when fitting the front panel/electronics assembly.

Figure 8 Positioning of Cable Glands or Conduits (outside view of top from above)




- 16.** Deburr all newly drilled holes to prevent damage to the cabling.
- 17.** Feed in the antenna cables through the cable glands or conduits, cut to length, and terminate according to the cable type being used:
- a.** RG58 type:
Terminate to the Receiver unit using low-profile Telegartner right-angle BNC plugs or equivalent.
 - b.** H1000 (or RG213) type:
Terminate using Gigatronix TNC plugs or equivalent, and then connect to the Receiver unit using ASL long and short adaptor leads.

Note that the pair of adaptor leads is not supplied either with the SAP02 or the Radio Microphone Receiver and need to be ordered separately from ASL quoting RADIO-MIC-LEADS.

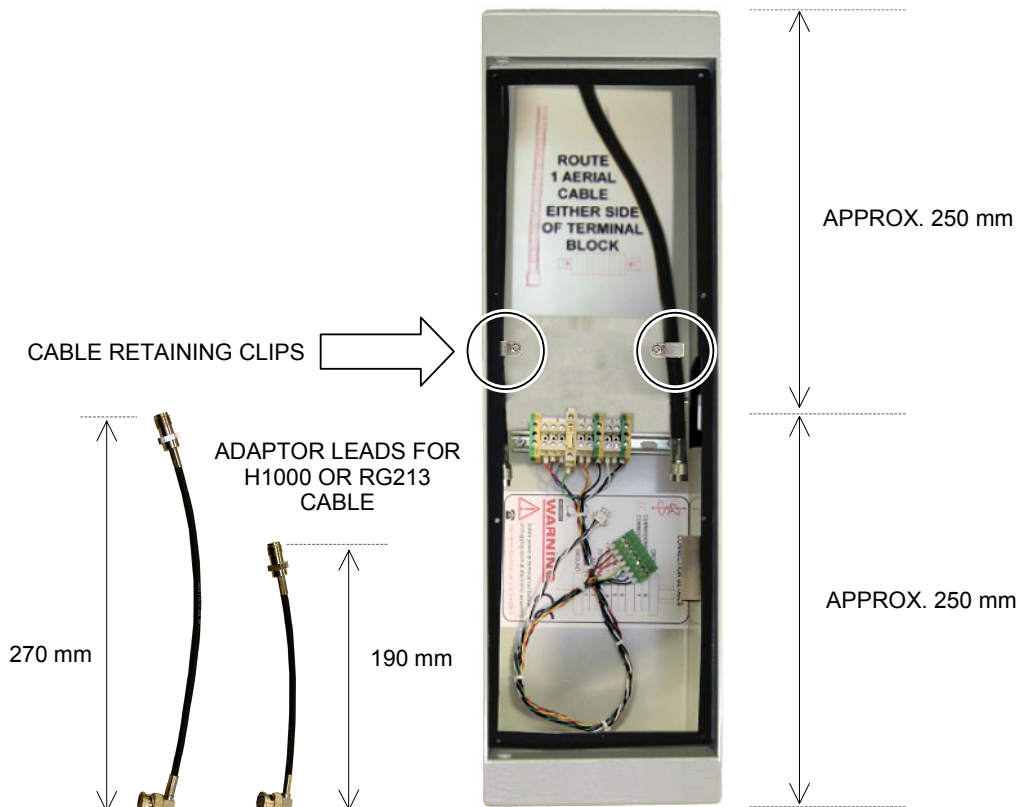


- Ensure that the antenna cables are routed either side of the terminal block as shown in [Figure 9](#). Failure to do so will cause difficulty when fitting the front panel/electronics assembly.
- The antenna cabling must not be kinked or folded at any part of the run, including inside the SAP02 back box, or it will impair or prevent reception of the microphone signal.



The SAP02 back box has provision for cable retaining clips to secure the antenna cables to the back box, as shown in [Figure 9](#).

Figure 9 SAP02 – Recommended Routing of Antenna Cables



18. Ensure all swarf is removed from the enclosure.
19. Seal the mounting holes and cable entry points.



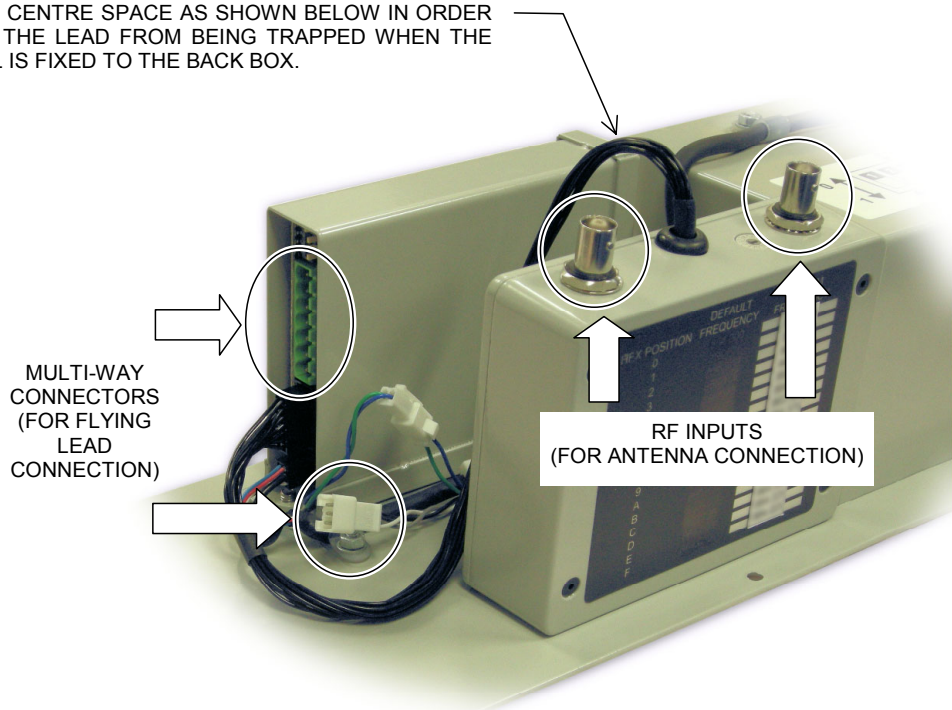
Ensure that mounting holes and cable entry points are adequately sealed to preserve the unit's IP rating.

20. Connect the antenna cables to the Receiver RF inputs; see [Figure 10](#).
21. Reconnect the front panel assembly by plugging the flying lead to the multi-way connectors on the electronics assembly; see [Figure 10](#).

Figure 10 SAP02 – Electronics Assembly and Radio Microphone Receiver



POSITION THE LEAD CONNECTING THE RMR02 TO THE SAP02 PCB IN CENTRE SPACE AS SHOWN BELOW IN ORDER TO PREVENT THE LEAD FROM BEING TRAPPED WHEN THE FRONT PANEL IS FIXED TO THE BACK BOX.



22. Power the SAP02 on.
Section “[3 Powering the SAP On and Off](#)” (page 24) describes how to power the unit on according to the internal DIN rail terminal assembly.
23. Fix the front panel assembly back in place using the 8 off M4 Allen screws; see [Figure 3](#) (page 10).
24. Re-fit the door; see [Figure 3](#) (page 10).



Make sure that BOTH plastic bushes are tightly fitted to the door fixing holes in order to preserve the unit's IP rating.

25. Re-commission the SAP02 as described in Section “[5 Commissioning the SAP with Radio Microphone Receiver](#)” (page 30).
26. Close and lock the door using the KABA key.

2.5 RMR01 Recommended Installation Procedure



This procedure is to be used when installing the Receiver within a SAP01.



Please read and observe the “[Safety and Precautions](#)” section on page 36 of this manual.



The SAP01 Build Standard Version is indicated on the label located on the top part of the first microphone enclosure as shown in [Figure 2](#). This should be quoted in all enquiries regards the unit.

1. Ensure that the Radio Microphone Receiver is fitted with the correct lead for connection to the SAP01:
 - SAP01 requires the lead to be terminated with a 6-way connector

The Receiver lead can be swapped as described in Section “[6.1 Converting the Unit Type](#)” (page 32). Note that the appropriate spare lead will be required.
2. Open the SAP01 door using the associated KABA key.
3. Remove the SAP01 door by compressing the hinge pin; see [Figure 11](#). This can be done by inserting a small screwdriver into the holes in the pin. Take care to ensure that the hinge pin’s plastic bushes in the back box are not loosened.

Figure 11 SAP01 Door and Front Panel Fixing



4. Remove the SAP01 front panel assembly by removing the 8 off M4 Allen screws; see [Figure 11](#).

5. Ensure that the SAP01 is powered off.


Section “3 Powering the SAP On and Off” (page 24) describes how to power the unit off according to the internal DIN rail terminal assembly.

6. Disconnect the SAP01 front panel assembly by unplugging the flying lead from the multi-way connectors on the electronics assembly.
7. Store the door and fixing screws safely.
8. Pilot tone detection.


i 1) The Radio Microphone Receiver is supplied with pilot tone detection **enabled** as standard for secure use with the ASL RPA01 Radio Microphone Transmitters. This configuration will block or mute announcements from Radio Microphone Transmitters that do not provide the required pilot tone (non-tone locked transmitters) as follows:

- Radio Microphone Receiver modules of Build Standard (BS) 2B or later:
This will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone, such as the ASL RADIO-MIC-TX.
- Earlier Build Standards of Radio Microphone Receiver module:
The audio from non-tone locked transmitters is muted but they can still make chimes (if programmed at the Router) 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.

2) There is no need to carry out this procedure if using with ASL RPA01 Radio Microphone Transmitters. However if using with the older RADIO-MIC-TX transmitters then make this changes.



RPA01

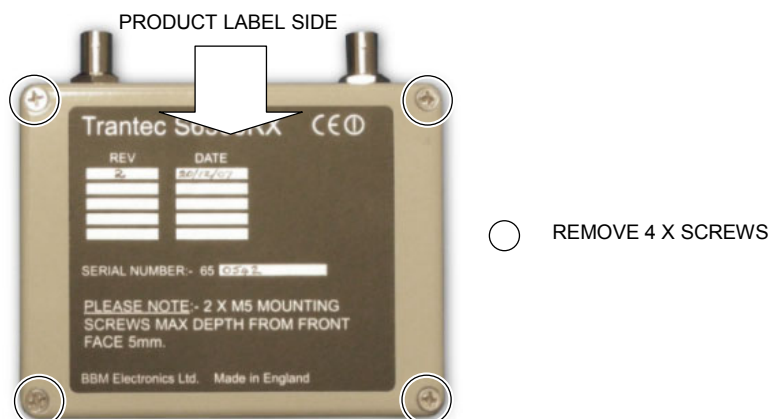


RADIO-MIC-TX

Disable the pilot tone detection as required by following these steps (a to c).

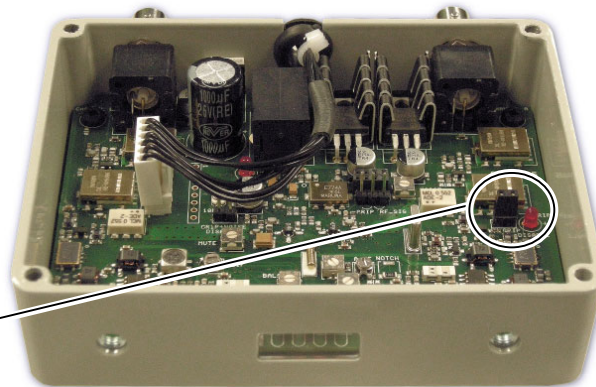
- a. Remove the lid by unscrewing the 4 off screws located on the product label side of the unit shown in Figure 12. Store the fixing screws and washers safely.

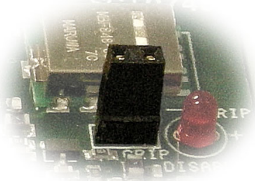
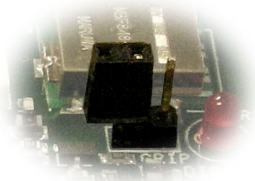
Figure 12 Radio Microphone Receiver – Lid



- b.** Position the link shown in [Figure 13](#) to disable (or enable) the pilot tone detection as required.

Figure 13 Radio Microphone Receiver – Pilot Tone Link

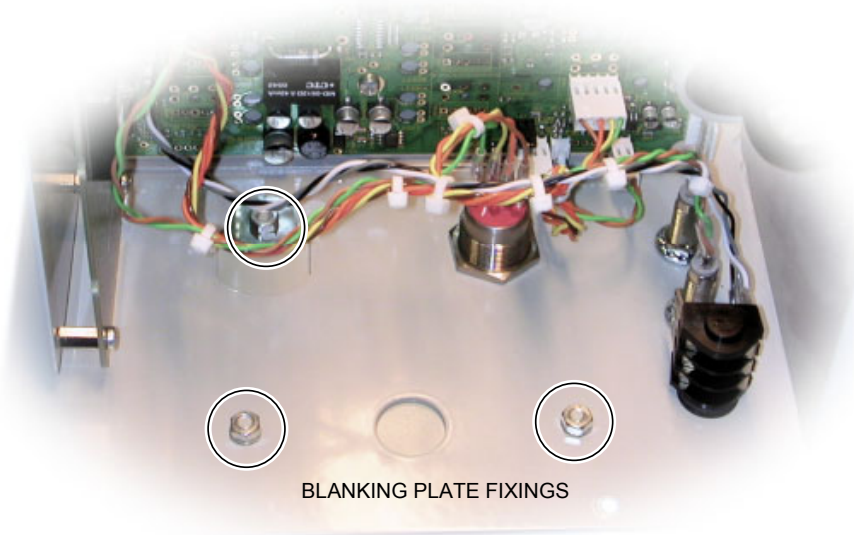


Link	Setting
<p>Fitted</p> 	<p>Pilot tone detection disabled.</p> <p>Enables announcements from Radio Microphone Transmitters regardless of whether they provide the pilot tone or not.</p>
<p>Not Fitted (Factory default)</p> 	<p>Pilot tone detection enabled.</p> <ul style="list-style-type: none"> Radio Microphone Receiver modules of Build Standard (BS) 2B or later: This will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone, such as the ASL RADIO-MIC-TX. Earlier Build Standards of Radio Microphone Receiver module: The audio from non-tone locked transmitters is muted but they can still make chimes (if programmed at the Router) 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.

- c.** Fix the lid back in position, screwing it tight, but not excessively tight so that any of the fixing threads are stressed, as this may cause them to weaken and shear; see [Figure 12](#).

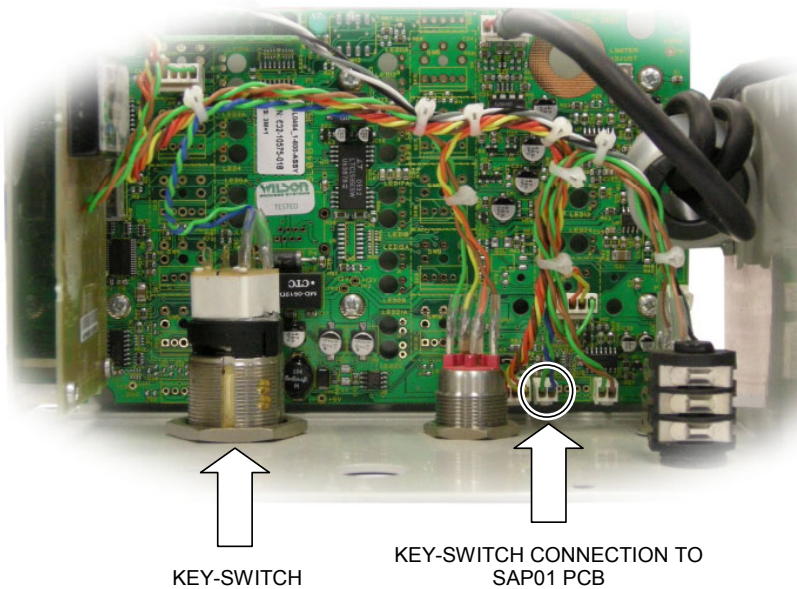
9. Remove the blanking plate which protects the Radio Microphone Receiver LED window by undoing the 3 off nuts; see [Figure 14](#).

Figure 14 SAP01 – Blanking Plate



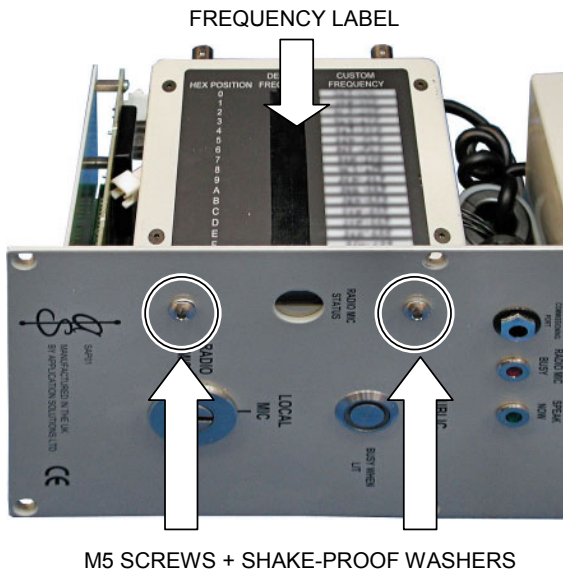
10. Install the RADIO MIC/LOCAL MIC selection key-switch, and connect its lead to the SAP01 PCB; see [Figure 15](#).


Figure 15 SAP01 – Key-switch Installation and Connection to SAP01




- Fit the Radio Microphone Receiver to the front panel (note orientation as shown in [Figure 16](#)) using the M5 screws and shake-proof washers provided.

Figure 16 SAP01 Radio Microphone Receiver Fixing

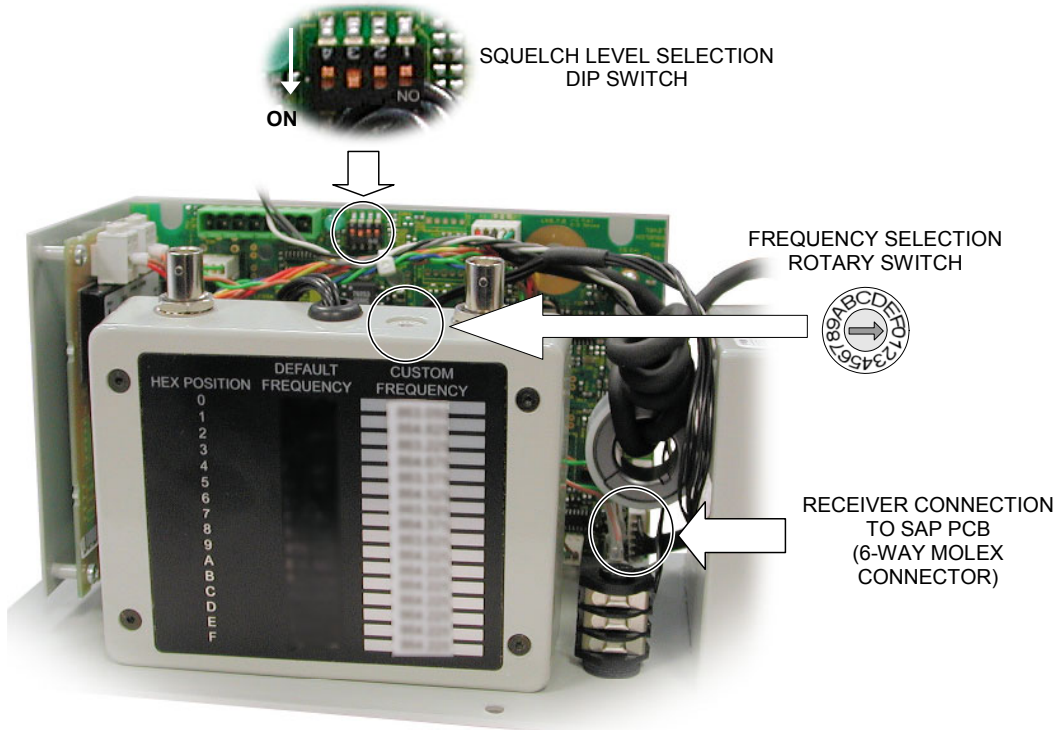


 THE FREQUENCY LABEL MUST BE OUTERMOST.

 USE ONLY THE PROVIDED M5 SCREWS AND SHAKE-PROOF WASHERS. ALTERNATIVE SCREWS MUST NOT EXCEED 8 MM. USING SCREWS WITH THREAD DEPTH ABOVE 8 MM MAY CAUSE DAMAGE TO INTERNAL PARTS OF THE UNIT.


- Connect the Radio Microphone Receiver flying lead to the SAP01 PCB connector shown in [Figure 17](#).

Figure 17 SAP01 – Controls and Connection




- Select the correct RF frequency via the internal rotary switch; see [Figure 17](#). Refer to Section “[4.1 Radio Microphone Receiver Frequency Selection](#)” (page 26) for frequency configuration.

- 14.** Select the squelch level via DIP switches on the SAP01 PCB as required; see [Figure 17](#). Refer to Section “[4.3.2 SAP01 Squelch Level Set-up](#)” (page 29) for squelch level set-up.

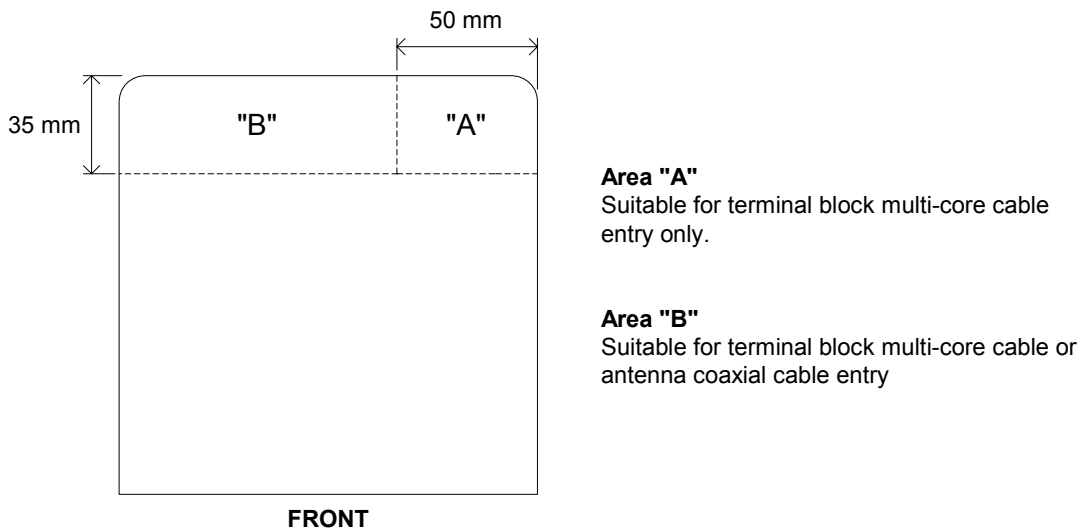
 Squelch level selection is only available on SAP01 Build Standard Version 8C or later.

- 15.** Drill holes in the back box for cable gland or conduit entry holes (if not already done), according to the particular installation conditions.

 • The SAP01 is designed for top entry of cables. Please refer to Application Solutions (Safety and Security) Limited if a different cable entry positioning is required.

• It is vital that the cable glands are positioned within the area shown in [Figure 18](#). Failure to do so will cause difficulty when fitting the front panel/electronics assembly.

Figure 18 Positioning of Cable Glands or Conduits (outside view of top from above)



- 16.** Deburr all newly drilled holes to prevent damage to the cabling.

17. Feed in the antenna cables through the cable glands or conduits, cut to length, and terminate according to the cable type being used:


a. RG58 type:

Terminate to the Receiver unit using low-profile Telegartner right-angle BNC plugs or equivalent.

b. H1000 (or RG213) type:

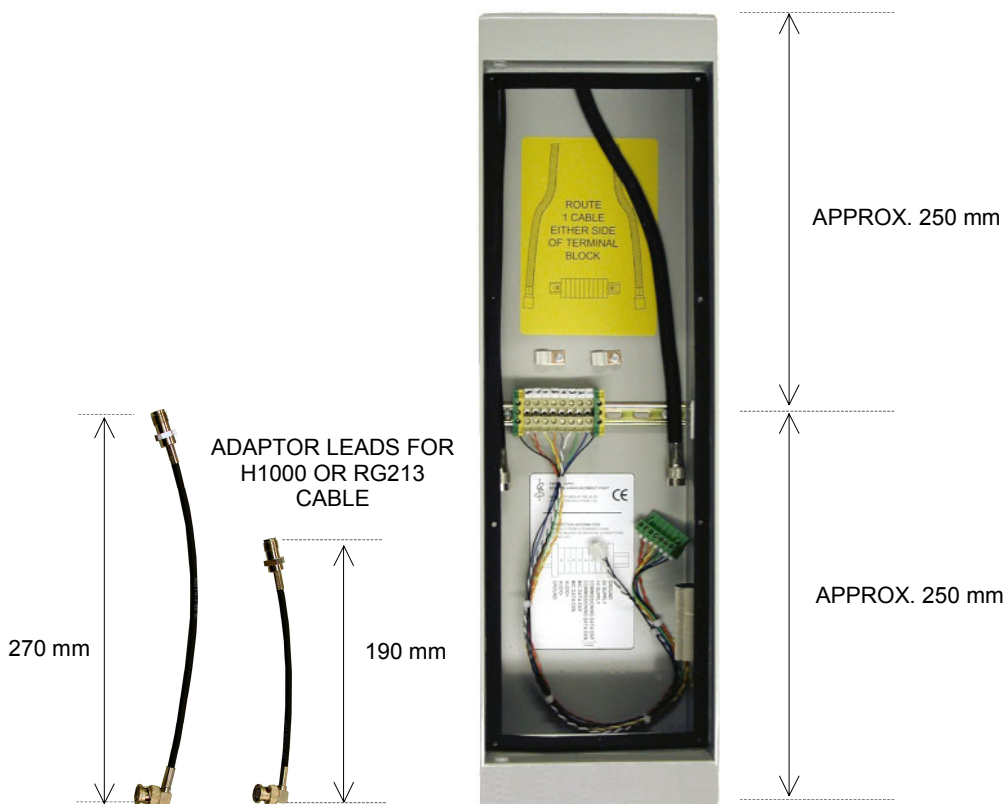
Terminate using Gigatronix TNC plugs or equivalent, and then connect to the Receiver unit using ASL long and short adaptor leads.

Note that the pair of adaptor leads is not supplied either with the SAP01 or the Radio Microphone Receiver and need to be ordered separately from ASL quoting RADIO-MIC-LEADS.




- Ensure that the antenna cables are routed either side of the terminal block as shown in [Figure 19](#). Failure to do so will cause difficulty when fitting the front panel/electronics assembly.
- The antenna cabling must not be kinked or folded at any part of the run, including inside the SAP01 back box, or it will impair or prevent reception of the microphone signal.

Figure 19 SAP01 – Recommended Routing of Antenna Cables



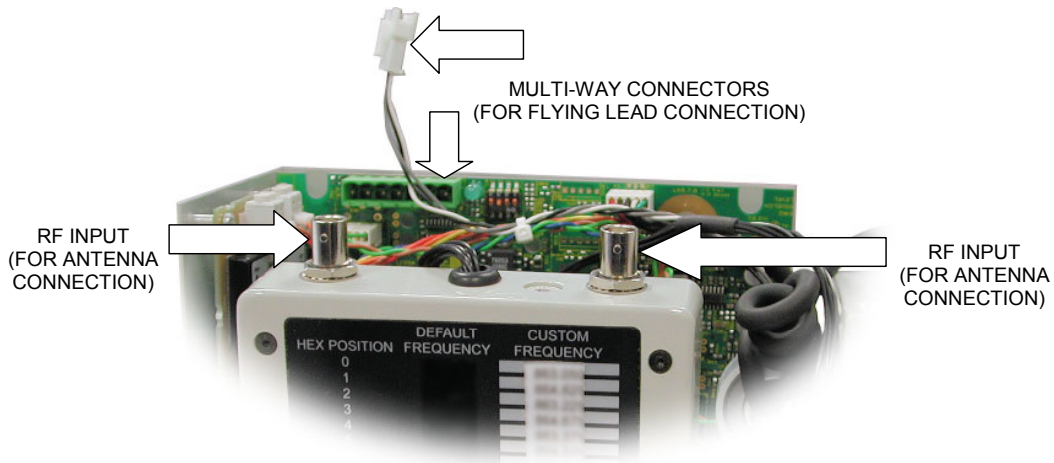
18. Ensure all swarf is removed from the enclosure.

19. Seal the mounting holes and cable entry points.


 Ensure that mounting holes and cable entry points are adequately sealed to preserve the unit's IP rating.

20. Connect the antenna cables to the Receiver RF inputs; see [Figure 20](#).

Figure 20 SAP01 – Electronics Assembly and Radio Microphone Receiver



21. Reconnect the front panel assembly by plugging the flying lead to the multi-way connectors on the electronics assembly; see [Figure 20](#).
22. Power the SAP01 on.
Section “[3 Powering the SAP On and Off](#)” (page 24) describes how to power the unit on according to the internal DIN rail terminal assembly.
23. Fix the front panel assembly back in place using the 8 off M4 Allen screws; see [Figure 11](#) (page 16).
24. Re-fit the door; see [Figure 11](#) (page 16).

 Make sure that BOTH plastic bushes are tightly fitted to the door fixing holes in order to preserve the unit's IP rating.

25. Re-commission the SAP01 as described in Section “[5 Commissioning the SAP with Radio Microphone Receiver](#)” (page 30).
26. Close and lock the door using the KABA key.

3 Powering the SAP On and Off

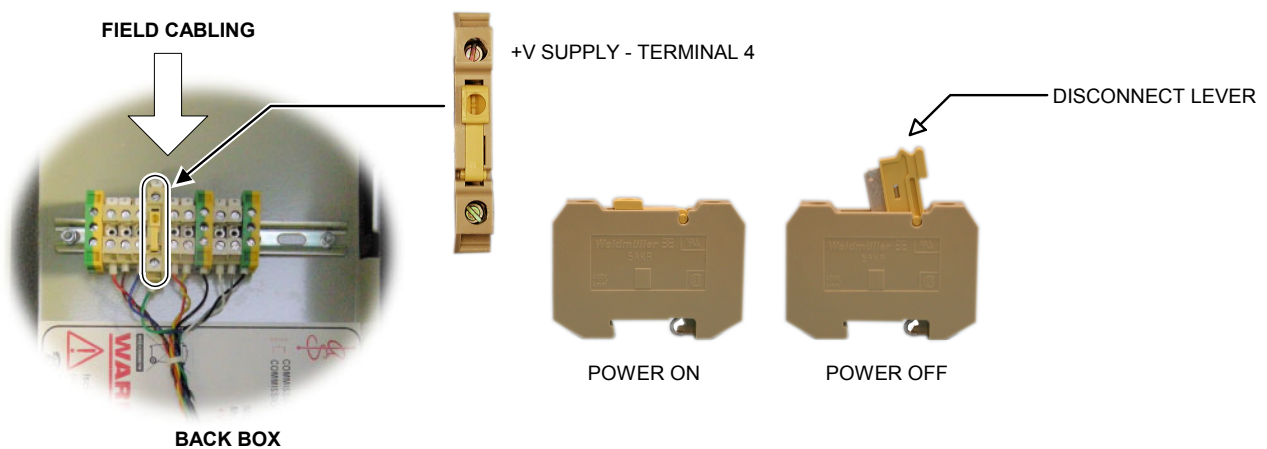


- The SAP should always be powered off before being disconnected. Failure to do so may damage the VAR Router, DAU, or ACU connected to the SAP02.
- Note that the SAP02 front panel may be fitted into a SAP01 back box as replacement unit.
- Original SAP02 back boxes differ from the SAP01 back boxes in that the DIN rail terminal allocation for the site wiring connections are different. Beware of this if working with both SAP02 and SAP01 back boxes. Observe carefully the DIN rail terminal allocation on the back box before powering the unit on and off:
 - Original SAP02 back box: Power supply terminal = 4
 - SAP01 back box: Power Supply terminal = 2

3.1 Original SAP02 Back Box – Terminal 4

Powering the SAP02 is done by toggling the disconnect lever of the power supply DIN rail terminal in or out, as shown in [Figure 21](#).

Figure 21 Power Supply via Disconnect Terminal

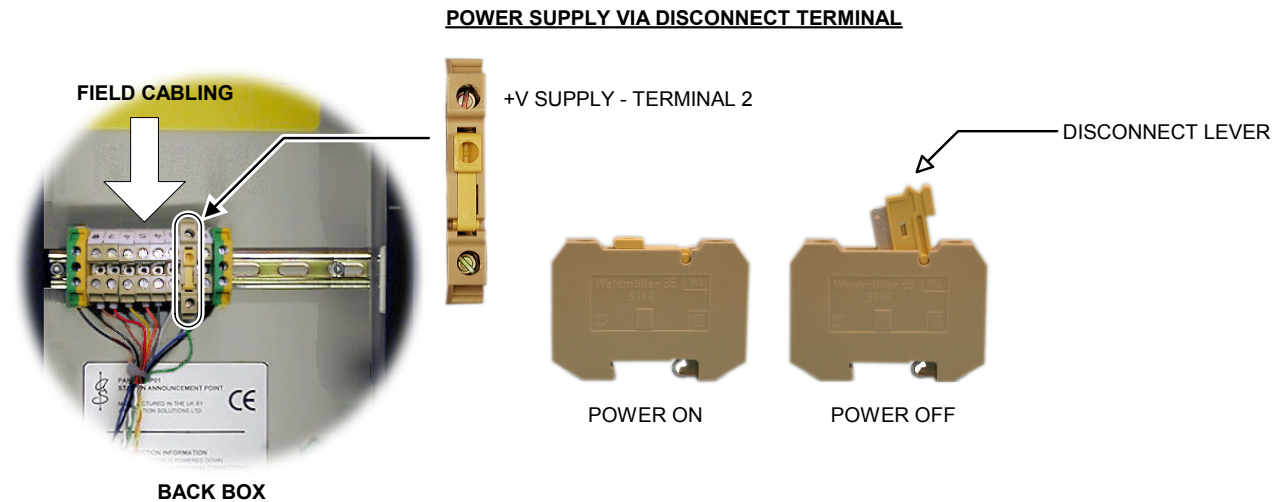


3.2 SAP01 Back Box – Terminal 2

3.2.1 Power Supply via Disconnect Terminal

With later versions of the SAP01, powering the SAP is done by toggling the disconnect lever of the power supply DIN rail terminal (2) in or out, as shown in [Figure 22](#).

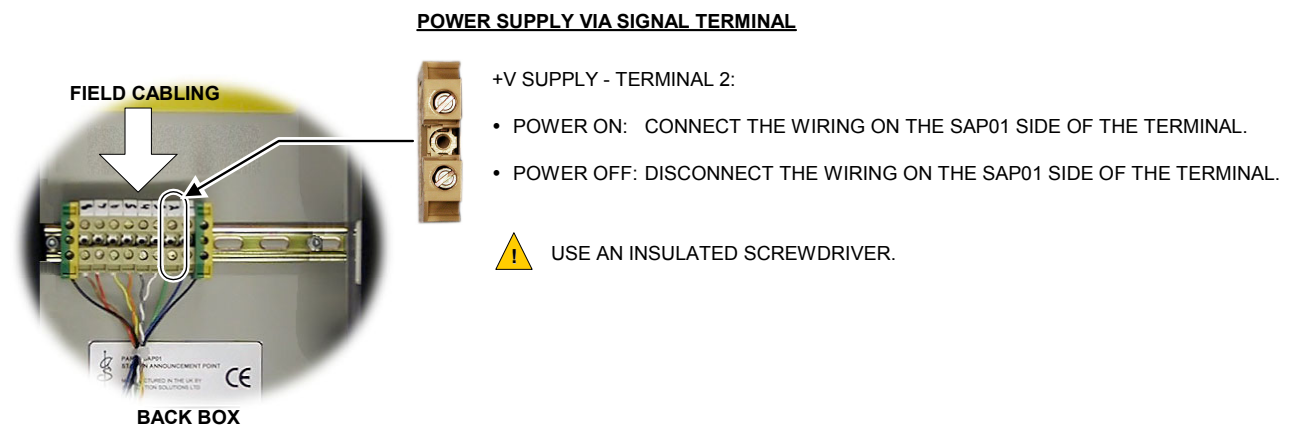
Figure 22 Power Supply via Disconnect Terminal



3.2.2 Power Supply via Signal Terminal

With earlier versions of the SAP01, where there is no disconnect terminal on the power supply, power the SAP on or off by connecting or disconnecting the power supply wiring from DIN rail terminal 2 as shown in [Figure 23](#). Alternatively where the installation permits, powering on or off can be done by connecting or isolating the power using fused DIN rail terminals at the equipment rack.

Figure 23 Power Supply via Signal Terminal














4 Radio Microphone Receiver Settings

4.1 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 on SAP02 as described in [Table 2](#) and [Table 3](#).

The switch is located on the upper face of the Radio Microphone Receiver module inside the SAP.

Table 1 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 licence free band. Available from Application Solutions (Safety and Security) Limited on request.

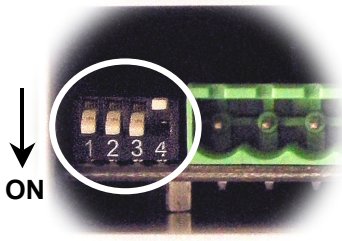
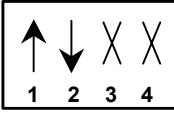
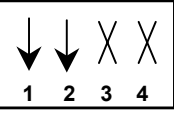
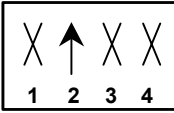
4.2 Radio Microphone Receiver Pilot Tone Detection Set-up (SAP02 only)

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 blocked. 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, with the future option of setting it via the Router configuration; see [Table 2](#).

The squelch level is adjusted as described in Section “[4.3 Radio Microphone Receiver Squelch Level Selection](#)” (page 28).


Table 2 Radio Microphone Receiver Pilot Tone Detection Selection

DIP Switch Positions		Pilot Tone Detection Setting
<p style="text-align: center;">SAP02</p>  <p style="text-align: center;">(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> <ul style="list-style-type: none"> Radio Microphone Receiver modules of Build Standard (BS) 2B or later: <p>This will completely block announcements from Radio Microphone Transmitters that do not provide the required pilot tone, such as the ASL RADIO-MIC-TX.</p> Earlier Build Standards of Radio Microphone Receiver module: <p>The audio from non-tone locked transmitters is muted but they can still make chimes (if programmed at the Router) 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.</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>

4.3 Radio Microphone Receiver Squelch Level Selection

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.

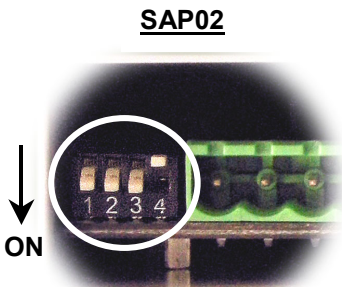
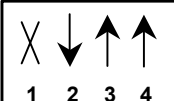
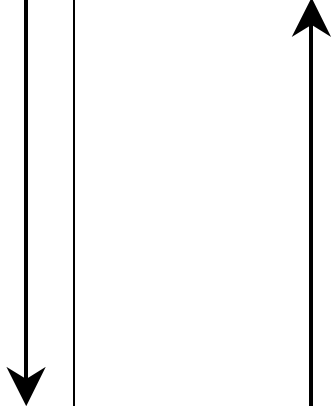
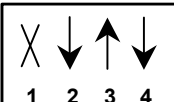
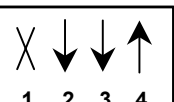
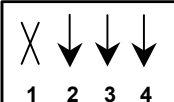

If there is any interference then the squelch level should be set to the least sensitive setting in order to minimise interference. However if this causes the Radio Microphone transmissions to not be received then it can be made more sensitive in steps until the Radio Microphone transmissions are received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

	<p>The squelch level selection is available on:</p> <ul style="list-style-type: none"> SAP02 – All Build Standard Versions See Section “4.3.1 SAP02 Squelch Level Set-up” (page 28). SAP01 – Build Standard Version 8C or later See Section “4.3.2 SAP01 Squelch Level Set-up” (page 29).
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4.3.1 SAP02 Squelch Level Set-up

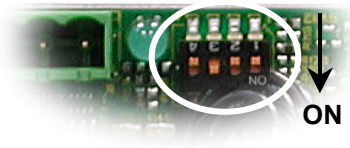
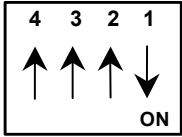

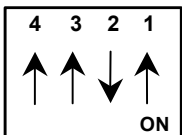
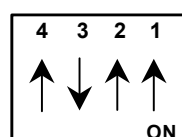
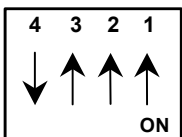
The squelch level is set by DIP switches 3 and 4; with the future option of setting it by the Router configuration.

Table 3 Radio Microphone Receiver Squelch Level Selection – SAP02

DIP Switch Positions		Receiver Squelch Level	Received RF Signal Strength
 <p>SAP02</p> <p>ON</p> <p>(Factory default)</p>	 <p>ON</p>	Least sensitive -76 dBm	
	 <p>ON</p>	-86 dBm	
	 <p>ON</p> <p>(Factory default)</p>	-93 dBm	
	 <p>ON</p>	Most sensitive -99 dBm	
	 <p>ON</p>	<p>For future use.</p> <p>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.</p>	

4.3.2 SAP01 Squelch Level Set-up

Table 4 Radio Microphone Receiver Squelch Level Selection – SAP01

DIP Switch Positions		Receiver Squelch Level		Received RF Signal Strength
 <p>SAP01</p> <p>(Factory default)</p>		Least sensitive -76 dBm		Strong signal required
		-86 dBm		Weak signals received
	 <p>(Factory default)</p>	-93 dBm		
		Most sensitive -99 dBm		

5 Commissioning the SAP with Radio Microphone Receiver

For operational details refer to your system specific documentation:

- VAR4/12/20 Routers: [Table 6-8]
- VAR8 Router: [Table 6-9]
- VAR8-ACU: [Table 6-10]
- Intellevac ACU or DAU: [Table 6-11]



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

- VAR Router: CP 4.1.470
- Intellevac DAU: CP V1.5.115
- Intellevac ACU: CP V1.5.114
- VAR8: CP V1.5.115
- VAR8-ACU: CP V1.5.114

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.

For optimum performance using the Fist Microphone or the Radio Microphone the SAP Relative Output Gain may be re-adjusted from the Router Configuration Tool or Router front panel, after commissioning the SAP as part of the installation set-up process. This is done as follows.

1. Microphone Relative Output Gain menu:

Note that this is not available on Audio Control Units (ACU).

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**

2. Ensure that the relative gain for each output is set to the default level (0 dB).

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.

3. For each output associated with the SAP configure the Relative Output Gain as follows:

- a.** Disable any ANS for the zone associated with the SAP, by setting it to 'Off':

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

Where *nn* is the output number and the *output name* is the configured output name, which may have been changed to zone names.

Consult the system design documentation for zones associated with the SAP.

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

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

Note that ACU and VAR8-ACU do not support Night Time Volume Control.

- c.** Ensure that all Volume Controls are set to maximum volume, i.e., control at position '11'.

Note that ACU and VAR8-ACU do not support Volume Controls.

- d.** Make broadcasts from both the Fist Microphone and Radio Microphone and confirm that they are free of acoustic feedback.

- e.** If feedback is encountered or 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 feedback is eliminated.

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**

- f.** Re-enable any ANS for the output associated with the SAP, by setting it to 'On':

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

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

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

Note that ACU and VAR8-ACU do not support Night Time Volume Control.

- h.** Set all Volume Controls to the required volume.

Note that ACU and VAR8-ACU do not support Volume Controls.

6 Fault Finding and Maintenance

Once the Radio Microphone Receiver is installed into the SAP01 or SAP02, fault finding and maintenance are carried out as part of the SAP fault finding and maintenance procedures.

Refer to the SAP Product Manual appropriate to your installation [Table 6].

6.1 Converting the Unit Type

If required it is possible to convert a RMR02 into a RMR01, or vice-versa, by replacing the lead as described in the following procedure.



The appropriate spare lead is required in order to convert one unit to the other. The lead is ordered separately from Application Solutions (Safety and Security) Limited by quoting:

- A0464641
This lead is used to convert from a RMR01 to a RMR02, and connects the Receiver to SAP02.
- A0464644:
This lead is used to convert from a RMR02 to a RMR01, and connects the Receiver to SAP01.



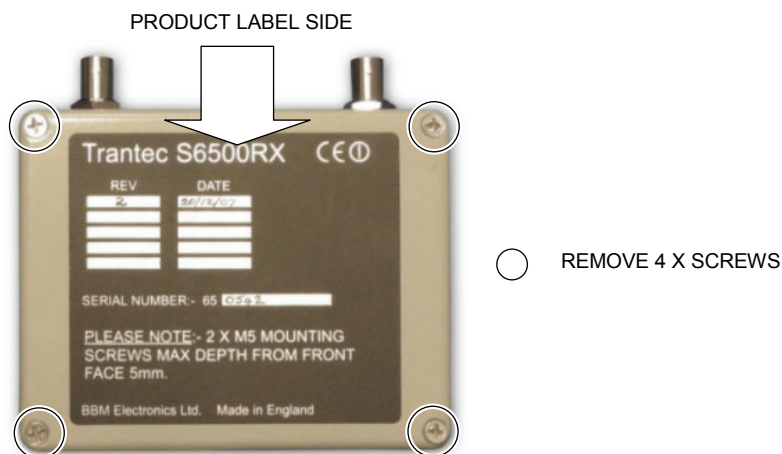
Please read and observe the instructions and guidelines in Section “9 Safety and Precautions” (page 36) when carrying out this procedure. Failure to follow these instructions and guidelines may cause personal injury and/or damage to the equipment.

Replacing the Receiver Lead:

1. Remove the lid by unscrewing the 4 off screws located on the product label side of the unit; see Figure 24.

Store the fixing screws and washers safely.

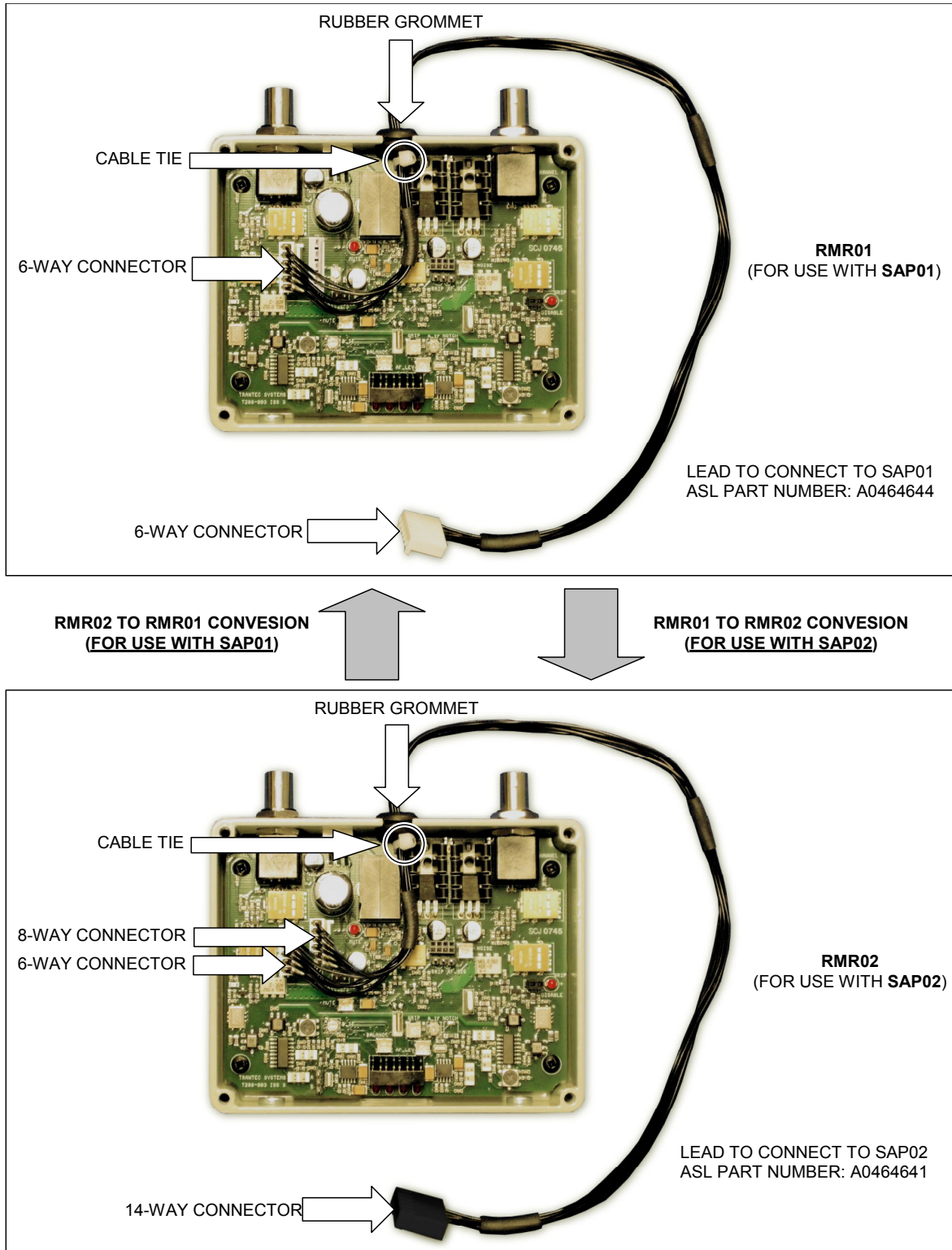
Figure 24 Radio Microphone Receiver – Lid



2. Remove the fitted lead and replace it with the other type of lead; see Figure 25.
3. Note that the cable tie must be inside the box.

4. If required adjust the rubber grommet position so that the internal length is approximately the length shown in see [Figure 25](#).
5. Fit the rubber grommet tightly into the slot.

Figure 25 Radio Microphone Receiver – Lead Installation



6. Fix the lid back in position, screwing it tight, but not excessively tight so that any of the fixing threads are stressed, as this may cause them to weaken and shear; see [Figure 24](#).

7 Product Specification

General

Supply Voltage Range.....	12 – 18 V DC
Current Consumption	
Idle.....	245 mA@ 12 V
Max. (all LEDs on).....	265 mA @ 12 V
Phantom Power.....	9.3 V nominal
Phantom Power Current Limit.....	44 mA
Audio Output Level.....	-10 dBu (± 1.5 dB) for 22 kHz deviation, 1 kHz mod
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)
Status LED Thresholds	
LED4 (uppermost when the Receiver is mounted in the SAP).....	-74 dBm
LED3.....	-79 dBm
LED2.....	-86 dBm
LED1.....	-93 dBm
Operating Frequencies.....	10 frequencies in the Channel 70 licence free band selectable by internal rotary switch <i>Frequencies available from ASL on request</i>

Dimensions and Weight

Dimensions (H x W x D).....	116 mm x 34 mm x 107 mm (incl. connectors)
Weight.....	370 g

Environmental

Temperature (Storage and Operating).....	-5 °C to +50 °C
Humidity Range.....	0% to 93% Non-condensing

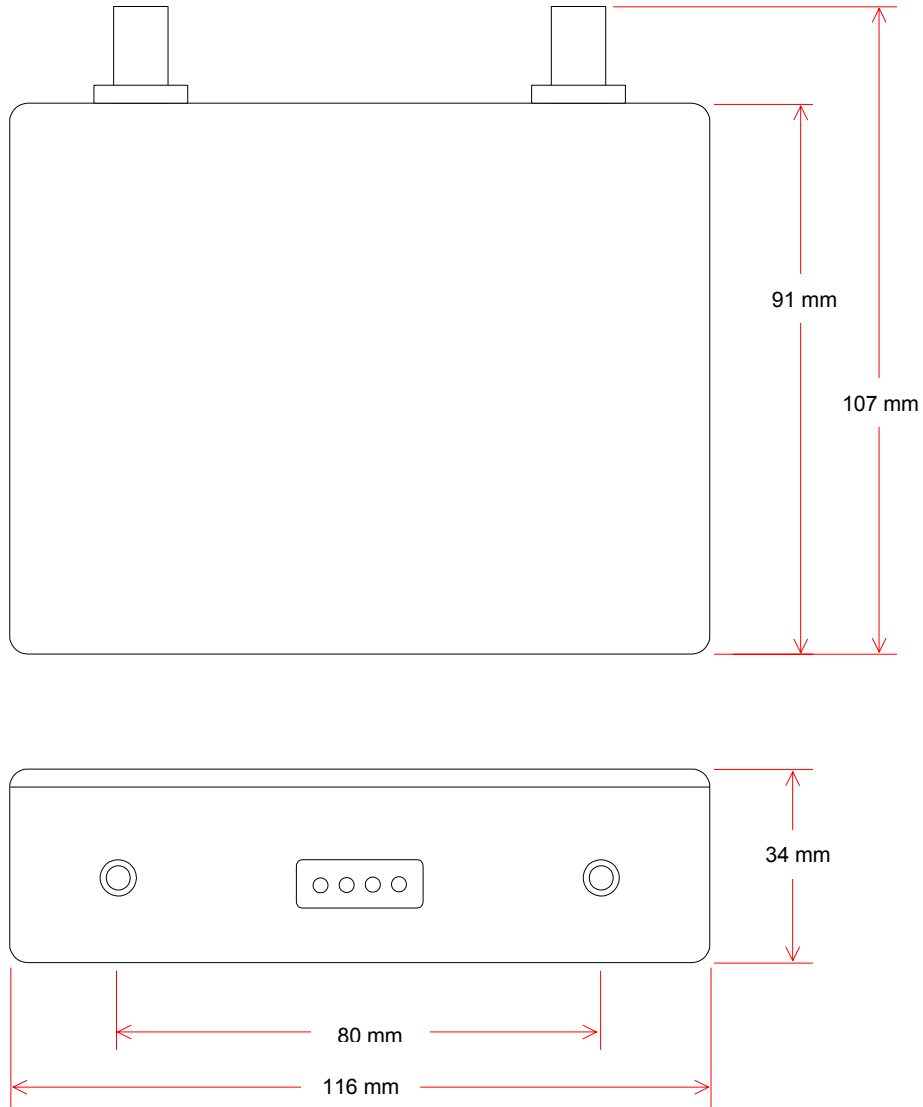
Safety and EMC

This equipment, when installed into the SAP according to the instructions in this document, conforms to the following EC standards:

EMC.....	EN55103-1, EN55103-2, EN50121-4, EN61000-6-2, EN61000-6-3
Safety.....	EN60065

8 Mechanical Dimensions

Figure 26 Radio Microphone Receiver Mechanical Dimensions



9 Safety and Precautions

9.1 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.

This equipment is designed for installation within the SAP, and when installed according to the instructions in this document the unit will be protected by the SAP enclosure. The SAP provides IP65 ingress protection with door closed and back box fixing and cable entry holes sealed.

In the close proximity of some radio frequency transmitters, the signal to noise ratio of this product may be reduced. If this occurs, ensure adequate system RF earthing or re-locate the equipment or signal cables.

9.2 ESD

This product contains static-sensitive devices. Observe ESD precautions when working on the equipment with the cover removed.

9.3 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.

9.4 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 "[Safety and Precautions](#)" page of this manual for future reference.

This equipment contains electronic devices that are sensitive to electrostatic discharge. Please take precautions to avoid damage to the electronics by static electricity.

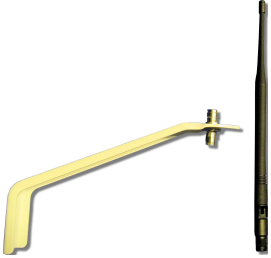

Advice on packing the product for return can be provided by Application Solutions (Safety and Security) Limited.

10 Spare Parts and Accessories

Table 5 RMR01 and RMR02 Spare Part List

ASL Part Number	Additional Information
A0464641	Lead to connect to SAP02 Function: Connects the Receiver to the SAP02 PCB Location: RMR02 Radio Microphone Receiver Manufacturer/Supplier: Application Solutions (Safety and Security) Limited Manufacturer/Supplier Part No.: A0464641 Manufacturer/Supplier Description: Lead to connect to SAP02
A0464644	Lead to connect to SAP01 Function: Connects the Receiver to the SAP01 PCB Location: RMR01 Radio Microphone Receiver Manufacturer/Supplier: Application Solutions (Safety and Security) Limited Manufacturer/Supplier Part No.: A0464644 Manufacturer/Supplier Description: Lead to connect to SAP01
K0464640	SAP02 Front panel blanking plate Function: Blanking plate used when the Radio Microphone Receiver is not fitted. Location: Front panel Manufacturer/Supplier: Application Solutions (Safety and Security) Limited Manufacturer/Supplier Part No.: K0464640 Manufacturer/Supplier Description: Blanking plate
 RMR01: Receiver with A0464644 lead RMR02: Receiver with A0464641 lead	

11 Appendix – Antenna Types

Type	Description
<p>ANT03</p> 	<ul style="list-style-type: none"> • Whip radio microphone antenna • 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 6-5].
<p>ANT04</p> 	<ul style="list-style-type: none"> • Low profile omnidirectional radio microphone antenna • 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 6-6].

12 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/downloads

Table 6 Reference Documents

Ref. No	Title	Filename Ref	Origin
1	SAP01 Product Manual	U-0464-0414	ASL
2	SAP02 Product Manual	U-0464-0454	ASL
3	RPA01 Radio Microphone Transmitter Product Manual	U-0618-0086	ASL
4	RADIO-MIC-TX Radio Microphone Transmitter Product Manual	U-0464-0515	ASL
5	ANT03 Product Overview	U-0464-0322	ASL
6	ANT04 Product Manual	U-0464-0248	ASL
7	ANC01 Product Manual	U-0464-0247	ASL
8	VAR Router Operation Manual	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
9	VAR8 Commissioning, Fault Finding, and Maintenance Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
10	VAR8-ACU Commissioning, Fault Finding, and Maintenance Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL
11	Intellevac SW Commissioning and Operation Guide	Refer to ASL quoting the SW version of your unit for appropriate guide	ASL

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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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