PRELIMINARY

Installation Guide

L951LP Locator
L951A1 Antenna Unit
L951A2 Antenna Unit
L951A2/2 Antenna Unit
L951PA Power Amplifier
L951TP Transient Protection Unit

7 May 2012 / Ver. PB7

PRELIMINARY

Contents

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1 Introduction

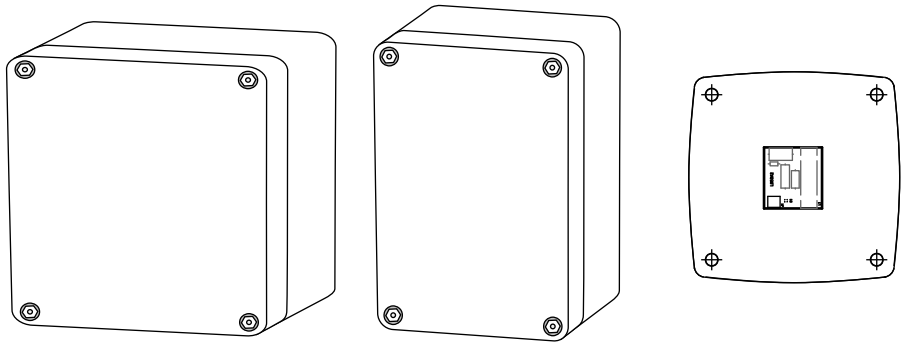

Figure 1. L951LP Locator, L951A1 Antenna Unit and L951A2 Antenna Unit.

The Locator L951LP is a dual output low frequency (LF) inductive location transmitter. It is used in the Ascom Paging System and Ascom IP-DECT System, when location function is required. It generates coded signals to modulate a magnetic field carrier. Alarm Transmitters designed for LF can be used to identify the location from where an alarm is generated.

L951LP has two antenna channels. Either the internal antenna and one external Antenna Unit (L951A1, L951A2, L951A2/2, indoor or outdoor loops) or two external Antenna Units can be used for transmission. The Antenna Units connected to L951LP can either cover a larger or additional area with the same code, or different areas with code and code + 1. When L951LP is used to drive outdoor loops, the L951TP (Transient Protection) must be mounted for protection against lightning strikes.

L951PA Power Amplifier is used when the transmitting range compared to L951LP has to be extended. The Power Amplifier is connected to the Locator unit and can feed one Antenna Unit (L951A1, L951A2, or L951A2/2). The Power Amplifier does not have any internal antenna.

The following procedure describes the installation of L951LP Locator, Antenna Units (L951A1, L951A2, L951A2/2), L951PA Power Amplifier, and L951TP Transient Protection Unit.

As a complement to this *Installation Guide*, see the *System Installation* document.

Unit	**Supply voltage**	**Power consumption**
L951LP	15–28 V AC or 16–40 V DC	3 W
L951A1	none (passive)	
L951A2	none (passive)	
L951A2/2	none (passive)	
L951PA	15–28 V AC or 16–40 V DC	5.7 W
L951TP	none (passive)	

IMPORTANT: Protect the unit against current exceding 20 A. Use power cables with cross-section 3 mm^2.

Tools, etc., required

- Screwdrivers for Phillips and slotted screws
- Cutting pliers
- Multimeter
- a71 Alarm Transceiver, with system test menu enabled
- Torx bits, (¼'' hexagon) TX–25H
- Torx screw, button head A2 4.8X38 PS (4 included with special plug)

1.1 Regulatory Compliance Statements (EU/EFTA only)

Hereby, Ascom (Sweden) AB, declares that this equipment is in compliance with the essential requirements and other relevant provisions of R&TTE Directive 1999/5/EC.

The declaration of conformity may be consulted at:
http://www.ascom.com/ws/products_ws.htm

This equipment uses frequencies referring to different rules in the various EU&EFTA countries.
A radio communications licence is in most cases necessary for the use of the equipment. The frequencies required for operation of the radio equipment must be notified and assigned prior to usage of the equipment.

1.2 Regulatory Compliance Statements (USA and Canada only)

Information to User

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Modifications

Changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Requirements

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe B conforme á la norme NMB-003 du Canada.

2 Board Descriptions

2.1 L951LP Locator

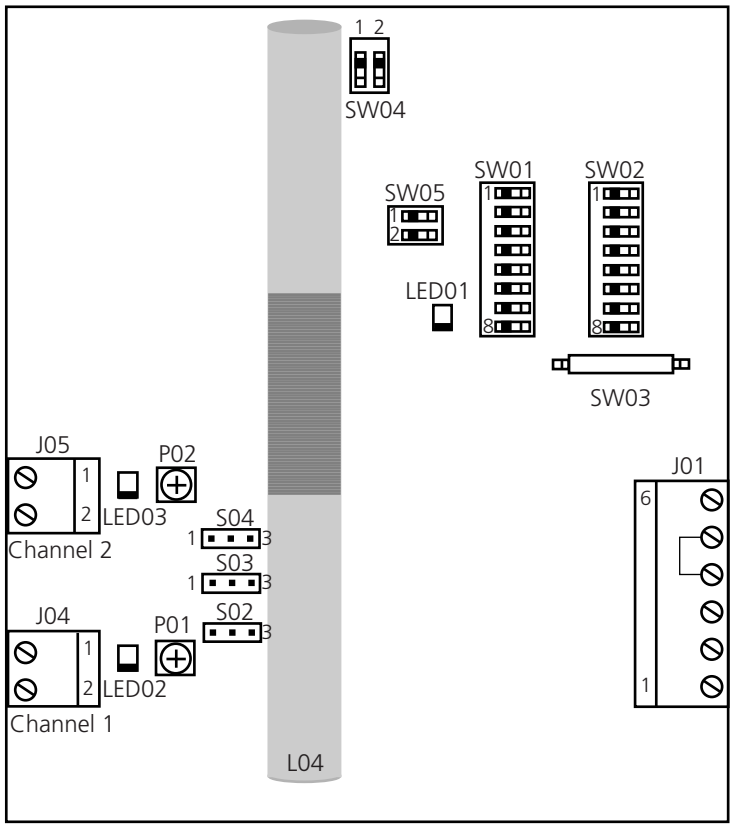

Figure 2. Circuit board L951LP Locator.

Connectors

J01:	Pin 1 and 2: Supply voltage (polarity independent) Pin 3 and 4: Monitor in Pin 5 and 6: Monitor out (For example Alarm Module T941AM8 or T941AM32 can be used for monitoring)
J04:	Antenna connection, channel 1
J05:	Antenna connection, channel 2

LEDs

LED01:	Indicates with a flashing light that the master processor and software are functioning.
LED02:	Indicates with a steady light that channel 1 is functioning.
LED03:	Indicates with a steady light that channel 2 is functioning.

Potentiometers

P01:	To adjust the output power of channel 1.
P02:	To adjust the output power of channel 2.

Jumpers

S02: 1 – 2: When using internal antenna (L04).
2 – 3: When connecting L951PA Power Amplifier or external antenna A1, A2, A2/2, or loops to channel 1.

S03: 1 – 2: Channel 2 sends same code as channel 1.
2 – 3: Channel 2 sends code + 1.

S04: 1 – 2: When channel 1 only is being used.
2 – 3: When channel 2 is being used.

Switches

SW01 and SW02: To set the location code.

SW03: Reed relay – for tamper protection

SW04: Pin 1, ON: Indicates that immediate transmission is required when the Alarm Transmitter receives the location code.
Pin 2 should be set to OFF position (ON indicates test mode – only used in production).

SW05: Pin 1 controls channel 1:
OFF: When feeding loops.
ON: When using L951PA, L951A1, L951A2 or L951A2/2
Pin 2 controls channel 2:
OFF: When feeding loops from channel 2.
ON: When using L951PA, L951A1, L951A2 or L951A2/2

2.2 L951A1 Antenna Unit

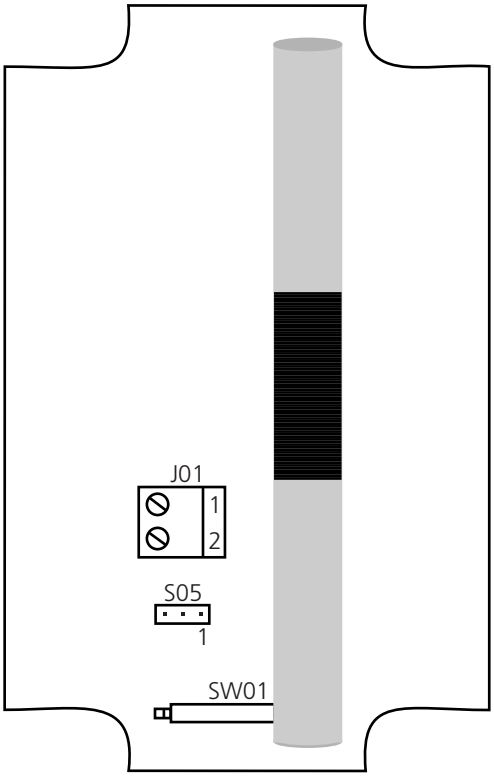

Figure 3. Circuit board L951A1 Antenna Unit.

Connectors

J01: Input signal from driver.

Jumpers

S05: If the tamper protection is to be disabled, a jumper should be placed on pins 1 and 2.
If the tamper protection is active, the cover plate must be in place for the Locator to function.

Switches

SW01: Reed relay – for tamper protection

2.3 L951A2 and L951A2/2 Antenna Units

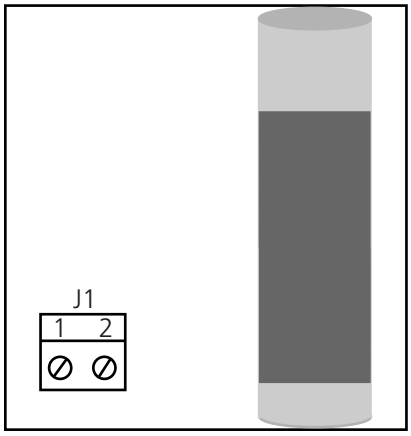

Figure 4. Circuit board L951A2 and L951A2/2 Antenna Units.

Connectors

J1: Input signal from driver.

2.4 L951PA Power Amplifier

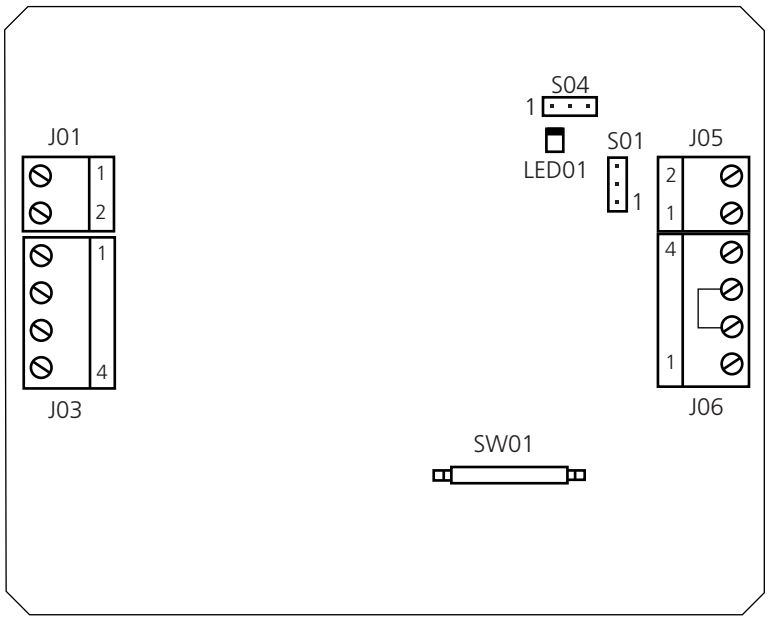

Figure 5. Circuit board L951PA Power Amplifier.

Connectors

J01:	Input signal from driver (L951LP)
J03:	Supply voltage (polarity independent)
J05:	Antenna connection, to L951A1, L951A2, or L951A2/2
J06:	Pin 1 and 2: Monitor out Pin 3 and 4: Monitor in (For example Alarm Module T941AM8 or T941AM32 can be used for monitoring)

LEDs

LED01:	Indicates with a steady light that antenna channel is functioning.

Jumpers

S01:	Should not be jumpered.
S04:	A jumper should always be placed on pins 1 and 2.

Switches

SW01:	Reed relay – for tamper protection

3 Installation

The L951LP, L951A1, and L951TP are housed in heavy-duty splash-proof plastic case, L951PA is housed in an aluminium case, and L951A2 and L951A2/2 are for flush mounting. The Power Amplifier (L951PA) and the flush mounted antennas (L951A2 and L951A2/2) have to be mounted indoors. Preferably, all units should be placed indoors, in a dry, room tempered environment. Maximum allowed temperature range is –20°C to +55°C.

Up to two external LF antennas can be connected to an LF master locator. Max total wiring length is about 20 metres. Only twisted-pairs are to be used.

3.1 Mounting

3.1.1 L951LP Locator

The Locator is delivered with three IP65 classified cable entries. At delivery none of the cable entries are mounted, nor are cable entry holes drilled, thus making it possible to find the most appropriate cable entry positions upon installation (figure 6 shows an example).

Drill hole diameter: 13.0 mm

Cable diameter: 3 – 5 mm

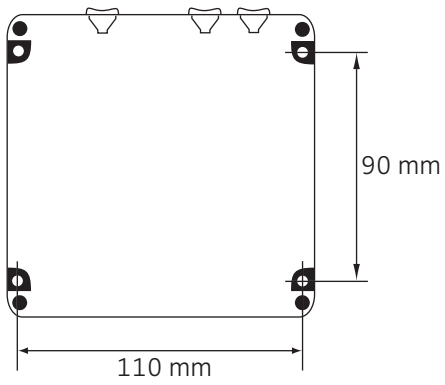

Figure 6. Mounting dimensions, L951LP Locator.

1 Open the plastic case by removing the four screws on the cover plate.

2 Mount the case with the cable entries upwards:

Fasten the back plate of the case on desired surface with four screws.

IMPORTANT: L951LP must be mounted to a vertical wall. Cable entries must be used. No cable entries must be directed downwards.

NOTE: L951LP must be mounted with the ferrite antenna in vertical orientation to achieve maximum coverage.

NOTE: When the case of the L951LP is put together make sure that the reed relay and the tamper protection magnet are placed opposite to each other.

3.1.2 L951A1 Antenna Unit

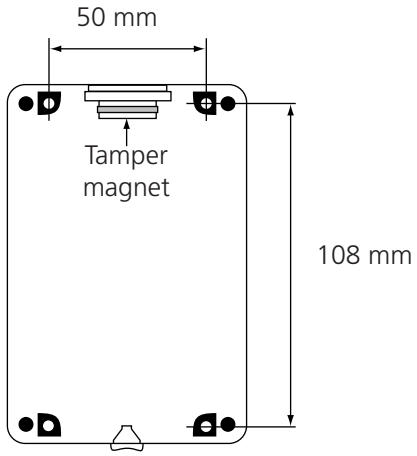

Figure 7. Mounting dimensions, L951A1 Antenna Unit.

1 Open the plastic case by removing the four screws on the cover plate.

2 Fasten the back plate of the case on the desired surface with four screws, see figure 7 for mounting dimensions. Mount the case with the cable entry downwards.

NOTE: L951A1 must be mounted with the ferrite antenna in vertical orientation to achieve maximum coverage.

NOTE: When the case of the L951A1 is put together, make sure that the reed relay and the tamper protection magnet are placed opposite to each other.

3.1.3 L951A2 Antenna Unit

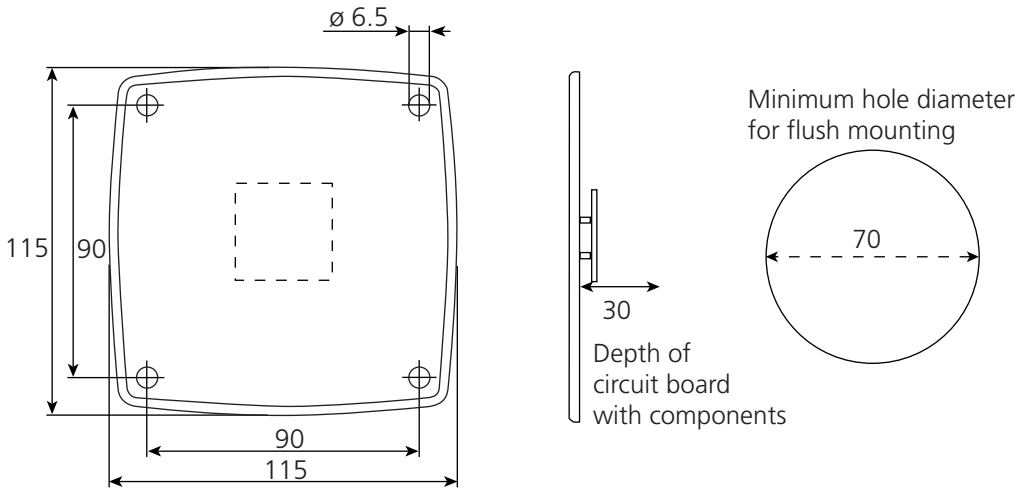

Figure 8. Mounting dimensions in mm.

The Antenna Unit L951A2 is for flush mounting. See figure 8 for mounting dimensions.

NOTE: L951A2 must be mounted with the ferrite antenna in vertical orientation to achieve maximum coverage.

3.1.4 L951A2/2 Antenna Unit

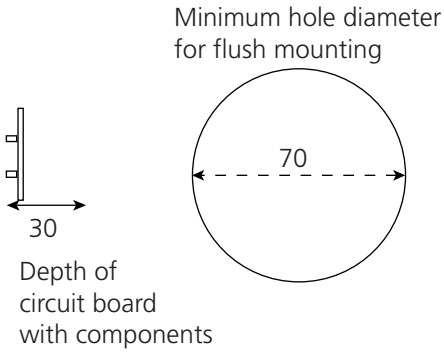

Figure 9. Mounting dimensions in mm.

The Antenna Unit L951A2/2 is for flush mounting. See figure 9 for mounting dimensions.

Fasten the holders to the circuit board.

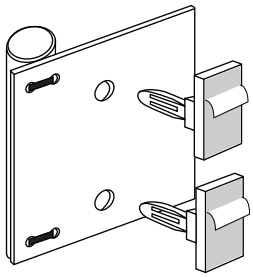

Figure 10. Fastening of holders to L951A2/2 circuit board.

Remove the protecting film from the double sided sticky tape and fasten the antenna on the desired surface.

NOTE: L951A2/2 must be mounted with the ferrite antenna in vertical orientation to achieve maximum coverage.

3.1.5 L951PA Power Amplifier

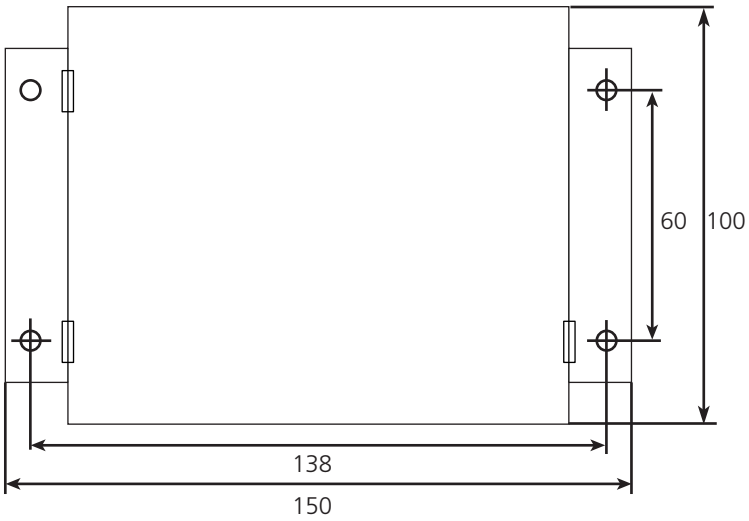

Figure 11. Mounting dimensions for L951PA in mm.

1 Fasten the case on the desired surface with four screws, see figure 11 for mounting dimensions.

IMPORTANT: L951PA must be mounted to a vertical wall. No cable entries must be directed downwards.

NOTE: When the case of the L951PA are put together, make sure that the reed relay and the tamper protection magnet are placed opposite to each other.

3.1.6 L951TP Transient Protection Unit

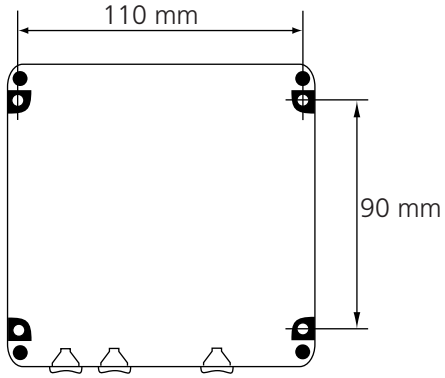

Figure 12. Mounting dimensions for L951TP in mm.

1 Open the plastic case by removing the four screws on the cover plate.

2 Fasten the back plate of the case on the desired surface with four screws, see figure 12 for mounting dimensions. Mount the case with the cable entries downwards.

3.2 L951LP Locator

3.2.1 Connecting Supply Voltage

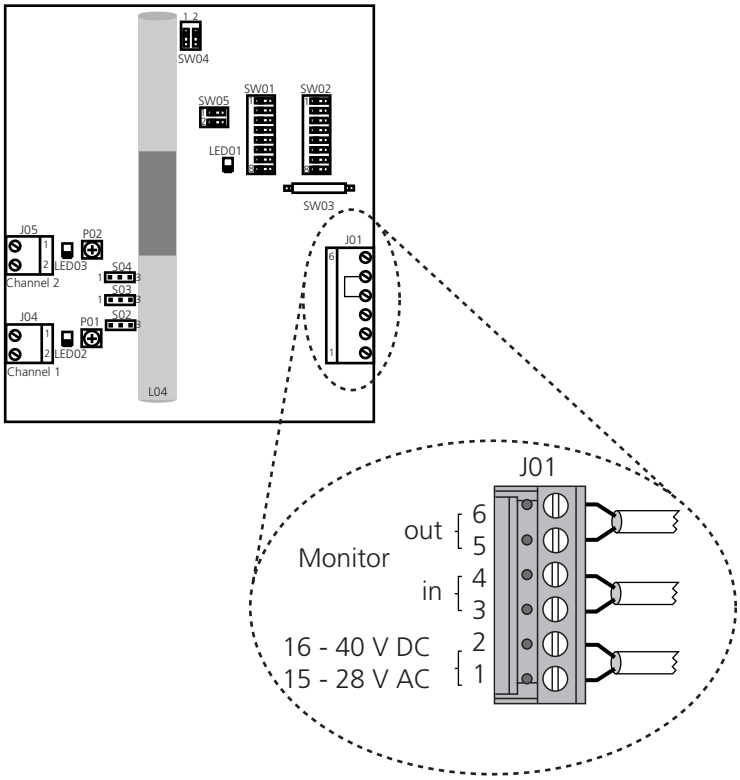

Figure 13. Connector J01, L951LP

Connect supply voltage to pin1 and 2 on J01 as shown in figure 13.

3.2.2 Setting Location Code

The location code consists of four hexadecimal digits (0000 – FFFE) and is set with switches SW01 and SW02. If a jumper is placed on S03 pins 2 and 3, channel 2 sends the master's code +1. Otherwise, both channels send the same code.

SW01 and SW02 have eight switches each, divided into two groups 1–4 and 5–8. Each group corresponds to one hexadecimal digit.

- Switches 5 – 8 (SW01) = first hexadecimal digit (most significant)
- Switches 1 – 4 (SW01) = second hexadecimal digit
- Switches 5 – 8 (SW02) = third hexadecimal digit
- Switches 1 – 4 (SW02) = fourth hexadecimal digit (least significant)

Switch 1 on SW02 is the least significant bit and switch 8 on SW01 is the most significant.

See example of the switches in figure 14.

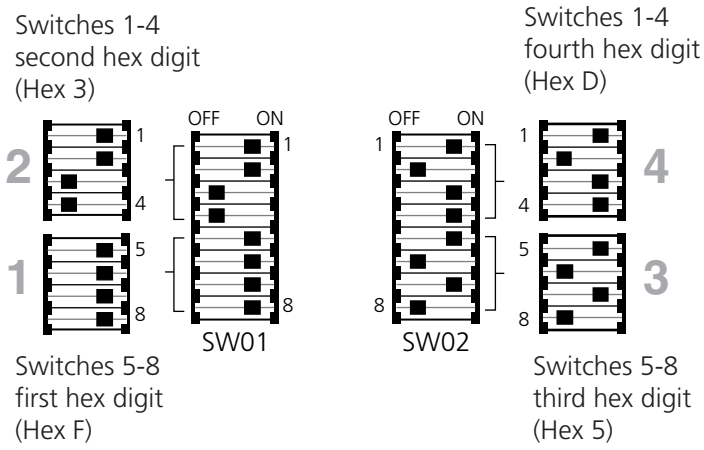

Figure 14. Example with SW01 and SW02 set to location code F35D. The digits gives the order of the hex code, where 1 points out the first (most significant) digit and 4 the last (least significant) digit.

A total of 65 535 different location codes are available in the system. If needed, the Addressing chapter in the *System Installation* document shows how to set the four switches in each group for the hexadecimal digits 0-F.

NOTE: Code FFFF is reserved, and should not be used as a location code.

3.2.3 Enabling Immediate Alarm Transmission

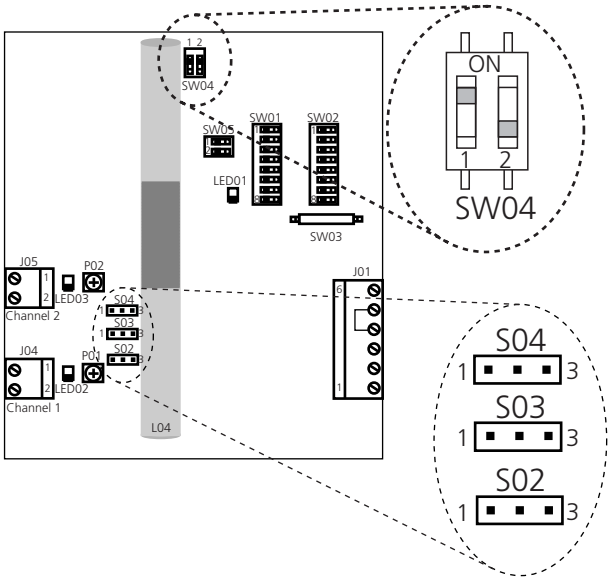

Figure 15. Switch SW04, and jumpers S02 to S04 on L951LP.

If immediate alarm transmission is required when the Alarm Transmitter receives the location code, pin 1 on switch SW04 must be in ON position.

3.2.4 Enabling Internal Antenna

1 To use internal antenna L04, place a jumper on pin 1 and 2 on S02. See figure 15 above.

3.2.5 Connecting Antenna Units

L951LP can feed two Antenna Units.

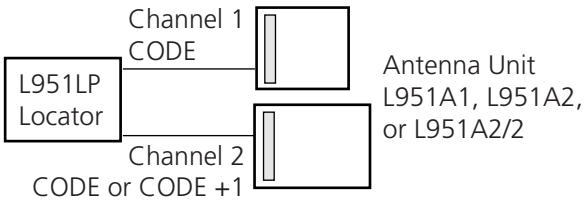

Figure 16. Connection of Antenna Units.

Connection of Channel 1

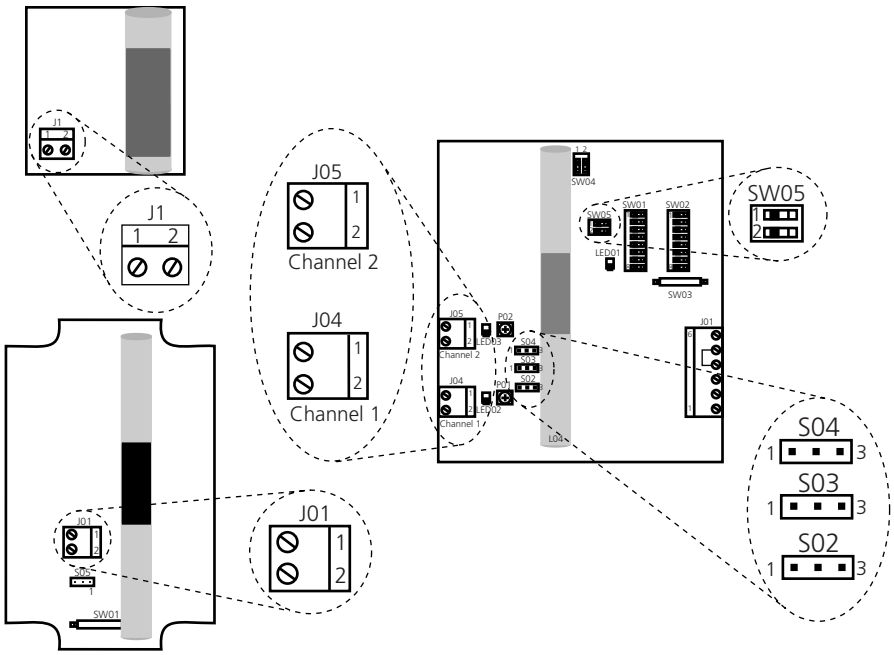

Figure 17. Overview of Locator and Antenna Units.

1 Connect J04 on L951LP to J01 on L951A1 or J1 on L951A2 or L951A2/2.

2 On S02, place a jumper on pin 2 and 3.

3 Set pin 1 on SW05 to ON.

4 If channel 2 is not to be used, place a jumper on pin 1 and 2 on S04, else place a jumper on pin 2 and 3.

Connection of Channel 2

Channel 2 can be set to have the same code as channel 1 for extending the coverage or code +1 for information on direction.

1 For the same code, jumper pin 1 and 2 on S03 and for code +1 pin 2 and 3.

2 On SW05, set pin 2 to ON.

3 Connect J05 on L951LP to J01 on L951A1 or J1 on L951A2 or L951A2/2.

3.2.6 Connecting Loops

L951LP can feed two indoor or outdoor loops.

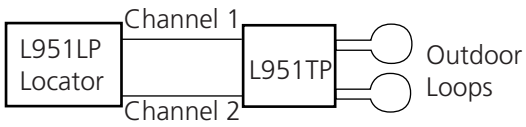

Figure 18. Connection of Transient Protection Unit and loops.

L950TP (Transient Protection) is required when the loops are mounted outdoors. It is mounted between the L951LP Locator Unit and the loop antennas.

Connection of Channel 1

1 Connect J04 on L951LP to indoor loop or a contact unit in the L951TP for outdoor loops, see 3.4 L951TP Transient Protection Unit on page 18 for more information.

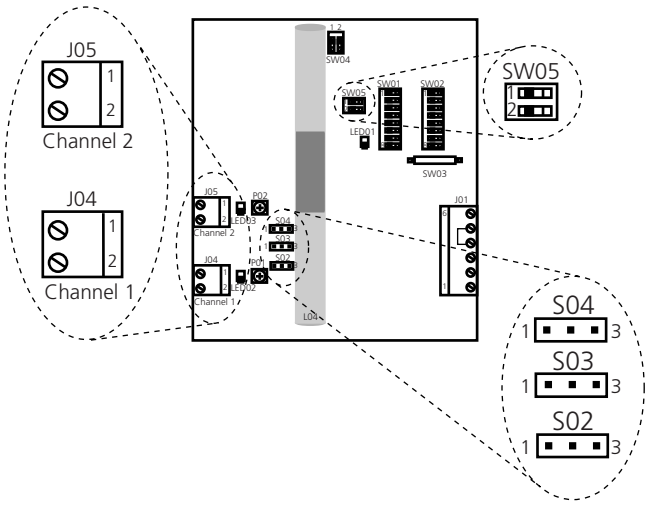

Figure 19. Overview of Locator.

2 On S02, place a jumper on pin 2 and 3.

3 If channel 2 is not to be used, place a jumper on pin 1 and 2 on S04, else place a jumper on pin 2 and 3.

4 On SW05, set pin 1 to OFF.

Connection of Channel 2

Channel 2 can be set to have the same code as channel 1 for extending the coverage or code +1 for information on direction.

1 For the same code, jumper pin 1 and 2 on S03, and for code +1 pin 2 and 3.

2 Connect J05 to indoor loop or a contact unit in the L951TP for outdoor loops, see 3.4 L951TP Transient Protection Unit on page 18 for more information.

3 On SW05, set pin 2 to OFF.

3.2.7 Connecting Power Amplifier

1 Connect J04/J05 on L951LP to J01 on L951PA.

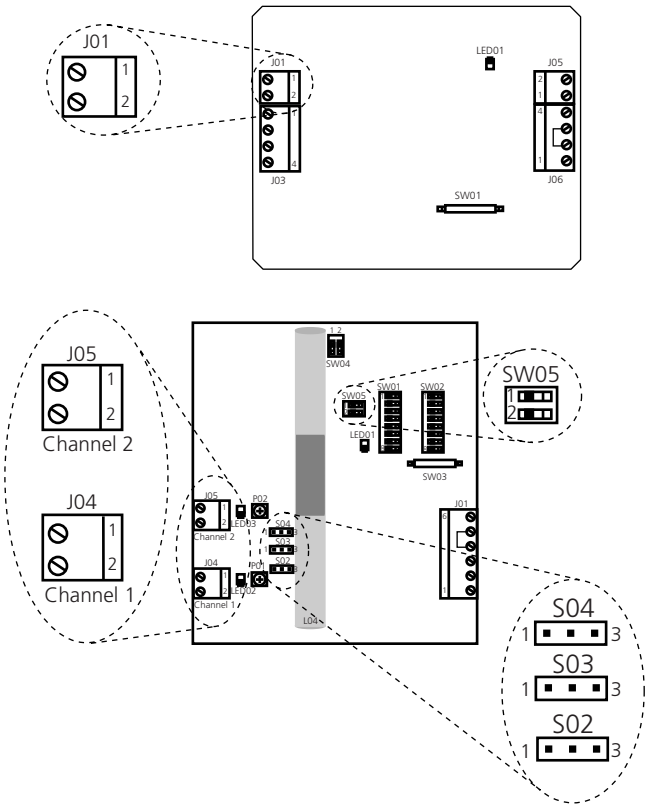

Figure 20. Overview of Locator and Power Amplifier.

2 On S02, place a jumper on pin 2 and 3.

3 On SW05, set pin 1 and 2 to ON.

4 If channel 2 is not to be used, place a jumper on pin 1 and 2 on S04, else place a jumper on pin 2 and 3. Channel 2 can be set to have the same code as channel 1 for extending the coverage or code +1 for information on direction. Jumper pin 1 and 2 on S03 for the same code and pin 2 and 3 for code +1.

3.2.8 Adjusting the Range

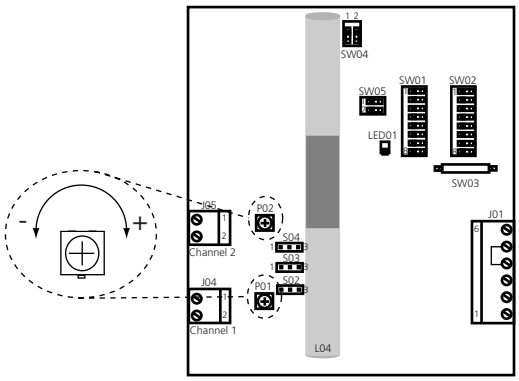

Figure 21. P01 and P02 (P02 uppermost), L951LP.

The range for channel 1 and channel 2 is set by adjusting potentiometers P01 and P02 respectively. The maximum range for the Locator and Antenna Units are approximately 3 meters.

- Adjust the output power until the required range is achieved.
- Test the obtained range with the a71 Alarm Transceiver.

3.3 L951PA Power Amplifier

NOTE: When the case of the L951PA is put together, make sure that the reed relay and the tamper protection magnet are placed in opposite to each other.

3.3.1 Connecting Supply Voltage

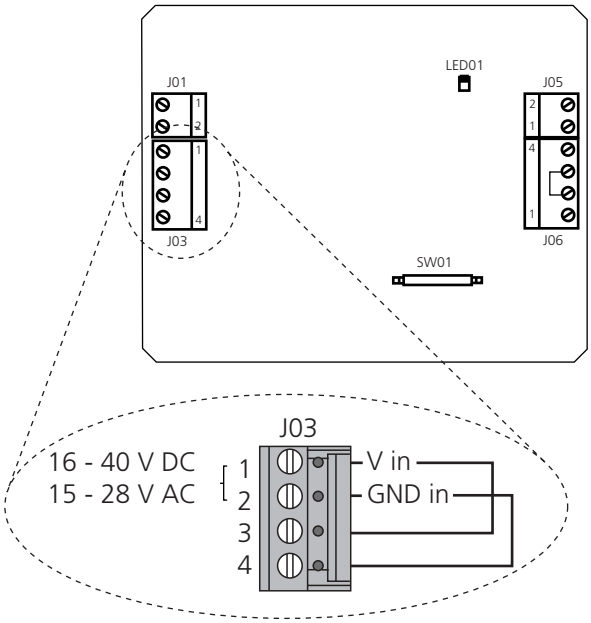

Figure 22. Connector J03, L951PA

Connect supply voltage to J03 as shown in figure 22.

3.3.2 Connecting Antenna Unit

L951PA can feed one Antenna Unit. Loops should not be connected to the Power Amplifier.

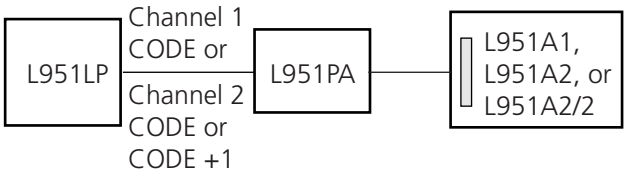

Figure 23. Connection of Antenna Unit.

The range for the Power Amplifier is adjusted in the Locator Unit, see 3.2.8 Adjusting the Range on page 16. The maximum range for the Power Amplifier is approximately 5 meters.

1 Connect J05 on L951PA to J01 on L951A1 or J1 on L951A2 or L951A2/2.

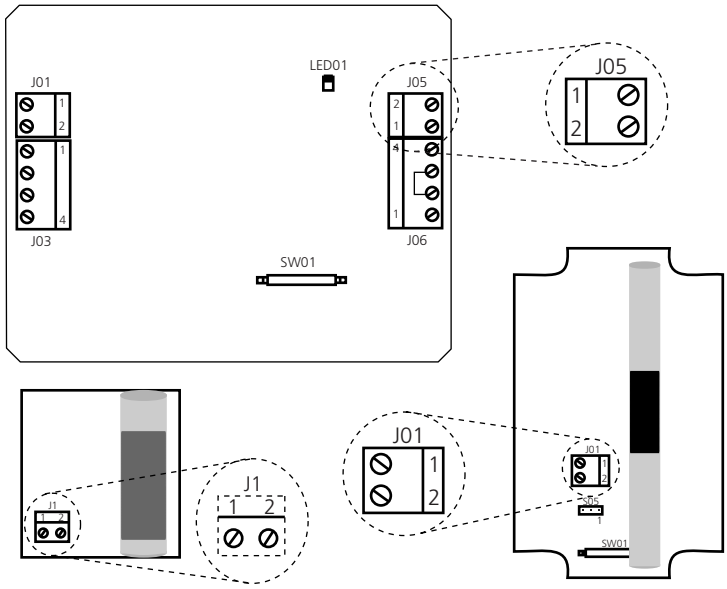

Figure 24. Overview of Power Amplifier and Antenna Units.

3.4 L951TP Transient Protection Unit

Connection of L951LP and Loops

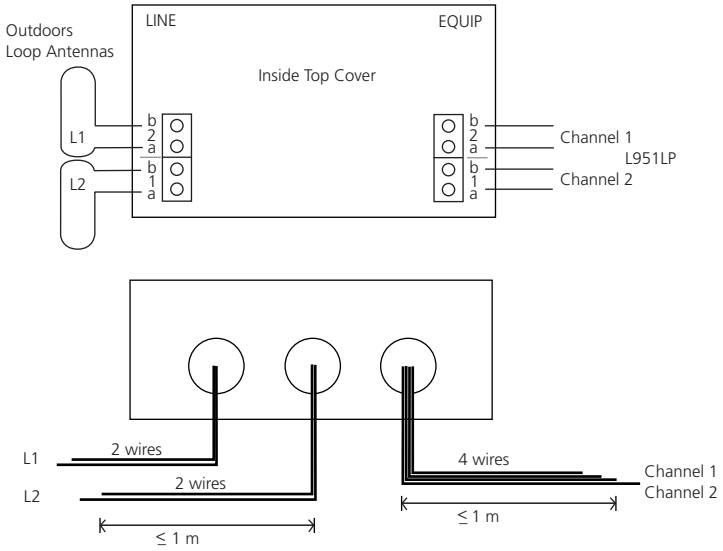

Figure 25. Connection of channel 1 and 2 to L951TP.

NOTE: The LINE connector should be connected to the Loop Antenna and the EQUIP connector to the Locator.

3.5 Locator Monitoring

The monitor output is a galvanically isolated relay contact (< 15 ohm) used for supervision of the locators. The relay contact becomes open circuit (> 1 M ohm) if a fault is detected. It can be a collapse of the magnetic field due to a discontinuity in the antenna loop, or the tamper protection has been triggered.

The Antenna Units L951A1, L951A2, and L951A2/2 are monitored from the Locator or Power Amplifier by measuring if the antenna is open circuit or short circuit. Loops are monitored from the Locator by measuring if the loops are open circuit.

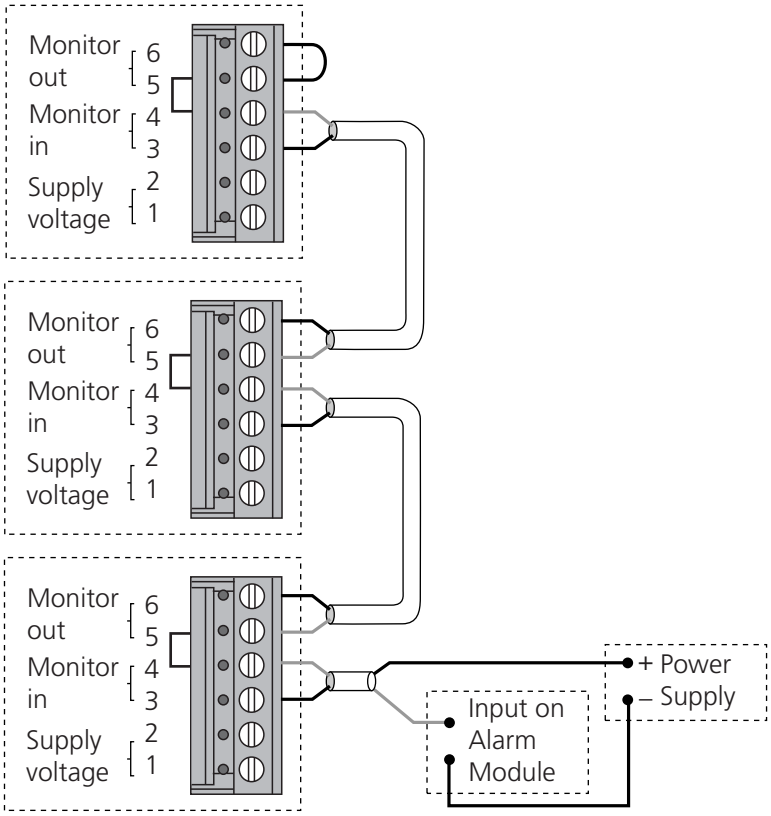

Figure 26. Connection of locator monitoring for L951LP units.

1 Connect J01:3 on the Locator or J06:4 on the Power Amplifier to the positive pole on the external Power Supply (+12 or +24 V DC). Connect J01:4 on a Locator or J06:3 on a Power Amplifier, and the negative pole on the external Power Supply to the Alarm Module (T941AM8 or T941AM32 – see *Installation Guide* for the Alarm Modules). See figure 26 above for more information.

2 The monitor outputs can be connected in series. Connect J01:6 on a Locator or J06:1 on a Power Amplifier to J01:3 on a Locator or J06:4 on a Power Amplifier. The last unit in the series has to be strapped. Strap J01:5–6 on a Locator and J01:1–2 on a Power Amplifier.

Depending on the type of Alarm Module and the supply voltage in the monitor loop, the following number of units can be connected to the same input:

	Supply Voltage	
	12 V DC	24 V DC
T941AM32 Max no of units:	2	9
T941AM8 Max no of units:	5	12

3 Reed relay (SW03 on Locator and SW01 on Power Amplifier) is connected in series with the monitor output. The relay closes if a magnet is placed near to and parallel to it. The magnet is placed so that the relay will open in case of any physical damage or tampering.

4 Installation Check

1 Switch the power on.

2 Check, on the L951LP Locator, that LED01 flashes and LED02 lights steady. If channel 2 is connected LED03 should also have a steady light.

3 If a L951PA Power Amplifier is connected, check that LED01 on it has a steady light.

4 Use the a71 Alarm Transceiver to check that the required coverage is obtained. Check that correct location code is transmitted/received.

When all other units are installed, perform the system test described in the *System Installation* document.