Rako RAK-4 Instruction Manual

Overview

The Rako RAK-4 system is designed for use as a single 4 channel dimmer pack or to be joined together to give 8, 12 or a maximum 16 channel dimmer 'stack' (4 RAK-4s linked together).

Whether forming a single 4 channel rack or multiples each assembly requires to be connected to an Rx Link receiver unit (not included) and is controlled by any of the Rako transmitter products. RAK-4 systems can also be used seamlessly in conjunction with Rako's RDL series dimmer modules.

Each RAK-4 has a maximum capacity of 10A box load and the supply to each should be protected by an MCB with a current capacity of no more than 10A.

Each of the 4 circuits in a RAK-4 has a maximum capacity of 1200w (5A) with a maximum of 1500w (6.25A) per heat sink pair (see Fig.2)

Before commencing installation of a Rako dimmer module first read this instruction manual carefully.

Rako Controls Ltd accepts no responsibility for any damage or injury caused by incorrect installation of a Rako product.

Installation should only be carried out by a qualified electrician.

Always install RAK-4 units in a well ventilated room, with a minimum clearance of 50mm on the sides in the correct orientation i.e. vents top and bottom.

Warning: Each RAK-4 unit must be earthed.

Installation

Step 1 - Secure Case to wall or secure mounting position. The RAK-4 system relies on being vertically mounted to allow the ventilation system to work properly.

Step 2 - If multiple RAK-4s are to be joined to form a larger 'stack' (maximum of four to be connected together) then mount the other cases to join the original case using the joining brackets to align and secure the casings (see fig.1). Ensure that adequate knockouts are removed and grommeted to allow cable access.

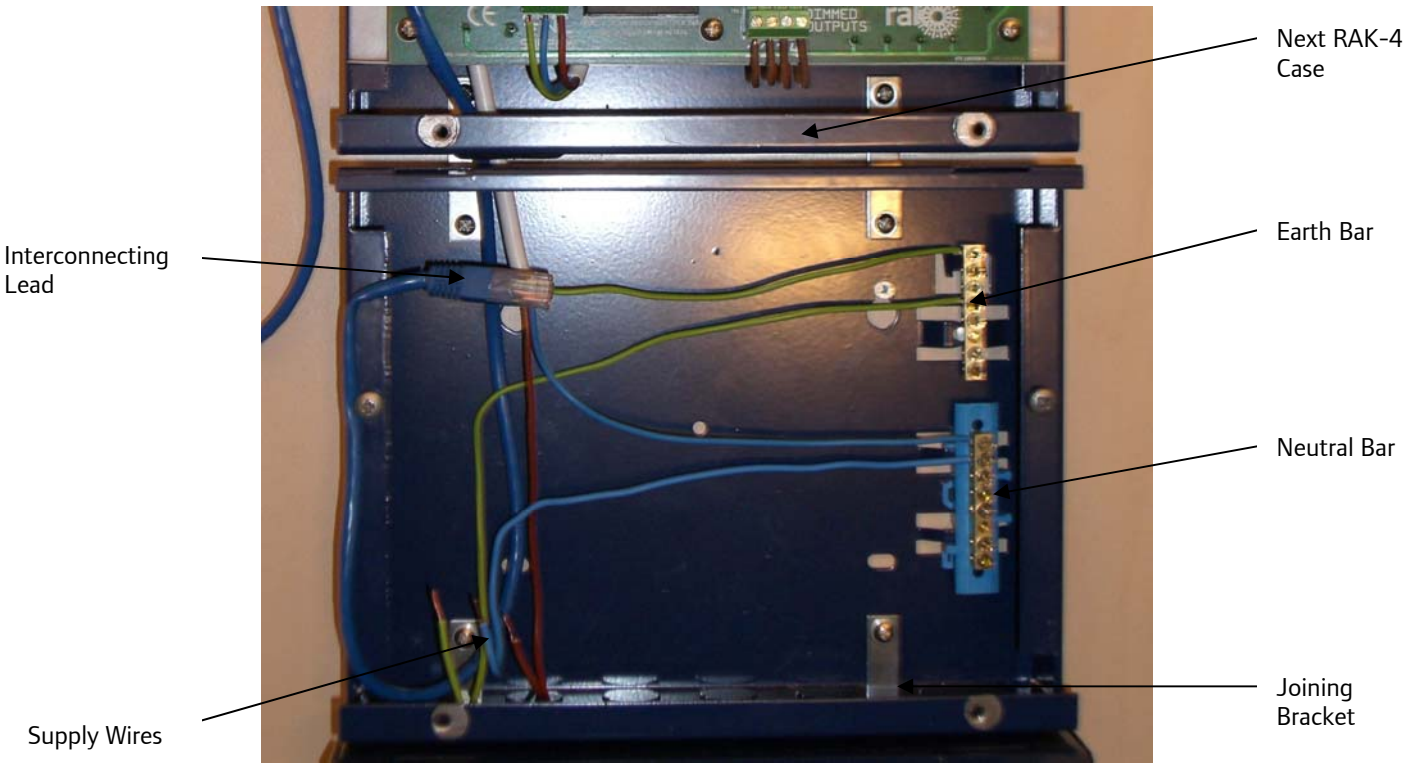
Step 3 - Bring a separate 10A MCB protected supply to each RAK-4 case. Connect the Earth and Neutral supply to the appropriate connector block and leave the Live ready to connect to the circuit board. Bring a feed from both the Earth and Neutral bars ready to connect to the circuit board (see Fig.1) Also feed the load Lives and prepare ready for connection to the circuit board and connect the load Neutral and Earths to the appropriate connector block.

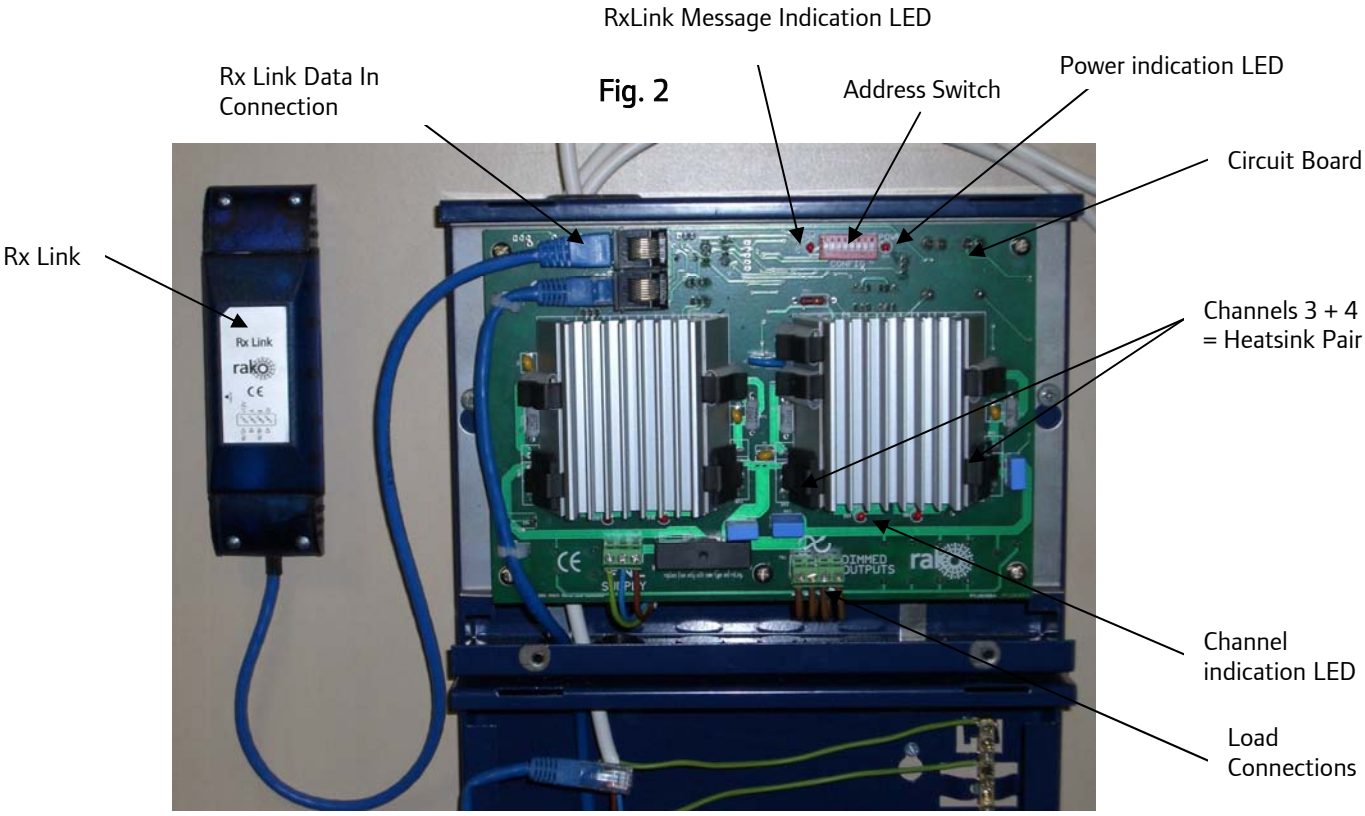
Step 4 - Secure the circuit boards into position using the two fixing screws supplied and connect the Supply (LN&E) and the Live feeds to the loads. Do not connect more than 1500w to either channels 1and 2 or 3 and 4. 1500w is the maximum load for each of the two heat sinks in the unit.

Step 5 - On multiple assemblies of RAK-4s interconnect the circuit boards using the interconnecting leads supplied ensuring that the cable guides are used to avoid the data cable from touching the heat sink and the IN OUT topology is adhered to. Connect the Rx Link using a CAT 5 cable into the IN socket of the top RAK-4 circuit board (see Fig.2)

Step 6 – Fit Lid

Fig. 1





Addressing and Programming

RAK4's & Rx Links can only be programmed using RASOFT software (version 1.6.0 or later) and a RAUSB or RAV232 RF Interface.

Up to 4 RAK-4's can be run from one Rx Link, giving 16 separate fully addressable dimming channels. Multiple stacks of RAK-4s can be used in one system.

RAK-4's connected to each Rx Link should always be addressed as Boxes 0 to 3 using the Address Switches at the top of the card (see Fig. 2) Settings are shown below. Each RxLink should then also be given a unique address so that each uniquely addressed RxLink will have its own set of RAK-4s address from 0-3.

Box Address	Dip 1	Dip 2	Dip 3	Dip 4	Dip 5	Dip 6	Dip 7	Dip 8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF

Rx-Link Addressing

The default address of an RX-Link is House 1, room 255, receiver channel 1, in a multiple Rx Link installation it is strongly advised to address all Rx Link with the same receiver room address but with unique and sequential receiver channel numbers. To address an Rx-Link open RASOFT, making sure that the correct House number for the project is selected. From the drop down menu under 'controls' select Mapping (Rx Link), the mapping page is then displayed. Use the magnet to put the unit into programming mode (see Rx Link instruction manual), select a suitable receiver channel number and click the ident button in the receiver mapping window.

Rx-Links require a separate and unique address in installations using multiple Rx-Links, enabling communication with individual Rx-Links whilst mapping. This address has no bearing on the addressing of wall-panels or channels throughout the house, hence the suggestion and default of Room 255 which is not often used as a Room address.

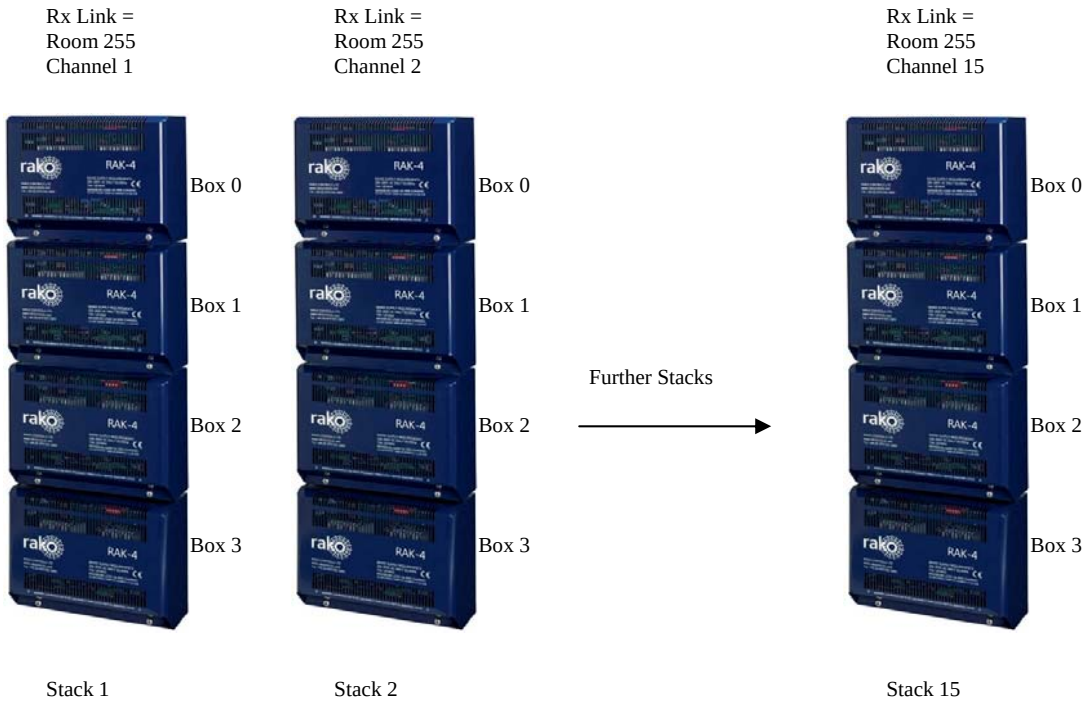
To address additional Rx Links simply select the next logical channel, then click 'Add New Receiver' and follow the procedure above.

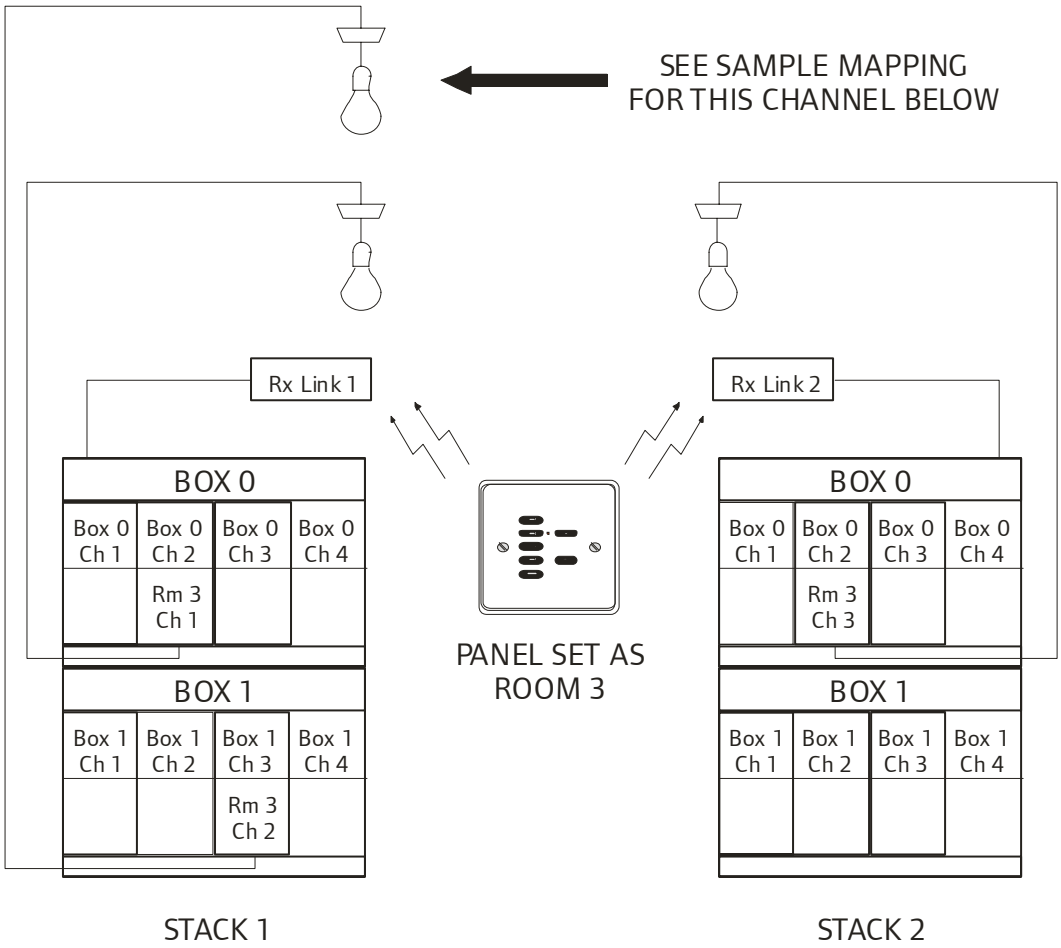
As each new receiver is added to the list in the top of the window, a new mapping sheet is displayed in the lower half of the window for that Rx Link and it's associated RAK4's.

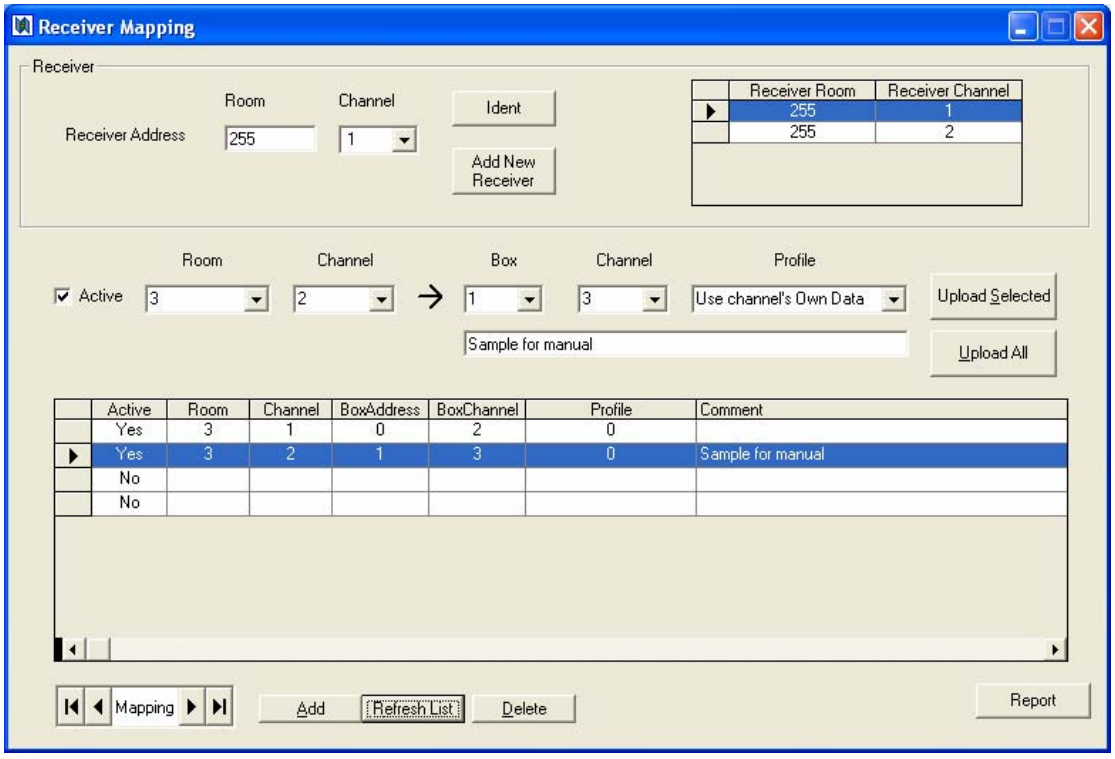
Channel Mapping

Once the RAK-4 boxes and Rx-Links are addressed logically the channels in the RAK-4s need to mapped to the Rako Room and Channel addresses. To do this, select the appropriate receiver in the top right hand box in the mapping window. Then in the line below enter, for each RAK-4 channel, the corresponding Rako Room and Channel address. This mapping information will be stored in the Rx Link and needs to be uploaded by either clicking 'Upload Selected' to upload line by line or by clicking 'Upload All' to upload all the mapping information in one go. A pictorial example of how the mapping is arranged is given in the example overleaf.

Note: It may be helpful to fill in the mapping worksheet (see appendix 2) before commencing the mapping




SEE SAMPLE MAPPING
FOR THIS CHANNEL BELOW
Rx Link 1
Rx Link 2
BOX 0
Box 0 Ch 1
Box 0 Ch 2
Box 0 Ch 3
Box 0 Ch 4
Rm 3 Ch 1
BOX 1
Box 1 Ch 1
Box 1 Ch 2
Box 1 Ch 3
Box 1 Ch 4
Rm 3 Ch 2
PANEL SET AS
ROOM 3
BOX 0
Box 0 Ch 1
Box 0 Ch 2
Box 0 Ch 3
Box 0 Ch 4
Rm 3 Ch 3
BOX 1
Box 1 Ch 1
Box 1 Ch 2
Box 1 Ch 3
Box 1 Ch 4
STACK 1
STACK 2


Receiver Mapping
Receiver
Room
Channel
Receiver Address
255
1
Ident
Add New Receiver
Receiver Room
Receiver Channel
255
1
255
2
Room
Channel
Box
Channel
Profile
Active
3
2
1
3
Use channel's Own Data
Upload Selected
Sample for manual
Upload All
Active
Room
Channel
BoxAddress
BoxChannel
Profile
Comment
Yes
3
1
0
2
0
Yes
3
2
1
3
0
Sample for manual
No
No
Mapping
Add
Refresh List
Delete
Report

LED Feedback

Rx-Links and RAK-4s are fitted with a number of LED's which give tellback information which can assist in on-site commissioning and fault finding. These LED's are:

RX-Link

Blue internal LED which blinks rapidly when any Rako message is received.

RAK-4

Red Power LED - lit when there is power to a RAK-4 card.

Link LED - blinks when a RAK-4 card (or any of the RAK-4s in a stack) receives a message from an Rx-Link. (If this LED does not blink when expected to, and assuming that the LED in the appropriate Rx-Link does blink, then the most likely problem is that there is an error in the mapping and there is no message being directed to that stack of RAK-4s)

Channel indication LED - illumination level roughly mimics the output level of that channel. Channel indication LED will also pulse when that channel receives a command and when that channel receives a channel ident command. The ident command is useful for checking mapping has been achieved correctly.

Hints and Tips.

Before addressing the Rx-Links or mapping to the RAK-4 boxes take a Rako control panel and with the default address of House 1, Room 4, press buttons on the control panel and confirm that the blue LED in the Rx-Link flashes to confirm that the Rx-Link is receiving messages. Check that the Link LED on each RAK-4 card flashes to confirm communication from the Rx-Link and check that the channel LEDs will dim up and down. Once correct operation of the system has been proved proceed with addressing the Rx-Link. Again once the Rx-Link has been addressed, set the DIL switches on the control panel to the new house address but set and re-confirm correct operation before starting the mapping. If at any point during mapping it appears as though one channel/channels is not working then check operation from the panel set as Room 0, assuming that the channel then works the problem will be with the mapping of that channel/channels.

Leading Edge/Trailing Edge

Rak-4 dimmers use transistor based technology operating by default in a mode known as 'Trailing Edge'. Trailing edge dimming typically gives quieter operation with mains tungsten and electronic low voltage transformers. This mode of dimming does NOT however work well with large wire wound transformers or inductive loads. These loads are typically electric motors or transformers for suspended wire runs or low-voltage lighting or chandeliers with many low voltage lighting points. It is possible to change a RAK-4 dimming channel to leading edge mode. To do this, open Rasoft programming software and make sure that in the opening screen the correct House, Room and Channel is selected. Click on the Help menu and select 'Diagnostic', in the command line type add 20 then carriage return. The display should respond with 'ok'. Then type DA 1and then carriage return and again the display should respond with 'ok'.
To return a channel to trailing edge mode the second command should be DA 0.

Appendix 1 - Factory Default Settings

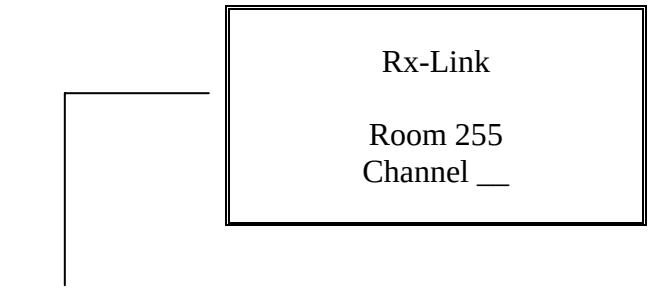
The way in which the channels are linked by default are given in the table below. These can be changed to suit the installation as necessary by using the RASOFT software package and either a RAV232 or RAUSB interface.

Default Rx-Link Room address 255	Default Rako room address		RAK-4 Box number	RAK-4 Physical channel number
	Room	Channel		
1	4	1	0	1
1	4	2	0	2
1	4	3	0	3
1	4	4	0	4
1	5	1	1	1
1	5	2	1	2
1	5	3	1	3
1	5	4	1	4
1	6	1	2	1
1	6	2	2	2
1	6	3	2	3
1	6	4	2	4
1	7	1	3	1
1	7	2	3	2
1	7	3	3	3
1	7	4	3	4

Note: in the above table Rx-Link channels refer to mapping pages in RASOFT. The Rako address refers to physical room numbers and channels (circuits) within each room.

By default the RAK-4 box numbers are set to zero so from power up with an RX-Link module connected the dimmers can be controlled from a Rako RCP07 control pad or other control device. If more than one RAK-4 unit is controlled from an Rx-Link by default channels 1-4 on each box will work in parallel until the box addresses are set to reflect the table above, i.e 2nd RAK-4 set to box 1, 3rd RAK-4 set to box 2, 4th RAK-4 set to box 3.

Appendix 2 – Mapping Worksheet



Box 0 Channel 1 _____ Room __ Channel __	Box 0 Channel 2 _____ Room __ Channel __	Box 0 Channel 3 _____ Room __ Channel __	Box 0 Channel 4 _____ Room __ Channel __
Box 1 Channel 1 _____ Room __ Channel __	Box 1 Channel 2 _____ Room __ Channel __	Box 1 Channel 3 _____ Room __ Channel __	Box 1 Channel 4 _____ Room __ Channel __
Box 2 Channel 1 _____ Room __ Channel __	Box 2 Channel 2 _____ Room __ Channel __	Box 2 Channel 3 _____ Room __ Channel __	Box 2 Channel 4 _____ Room __ Channel __
Box 3 Channel 1 _____ Room __ Channel __	Box 3 Channel 2 _____ Room __ Channel __	Box 3 Channel 3 _____ Room __ Channel __	Box 3 Channel 4 _____ Room __ Channel __

Specifications

Dimensions	253 x 192 x 102mm (w x h x d)
Supply	200-230VAC +/- 10% 50-60Hz 10A Type C MCB protected supply per RAK-4
Output	10A total over the 4 channels (5A max per single channel load)
Protection	Auto resetting over current protection Auto thermal shutdown Voltage surge protection
Minimum Load	20W (per channel)
Terminal sizes	$4mm^2$
Standards	EMC-EN 5001-1:1992 Immunity-EN 50082-1:1997 Data
Communication	Rakom coded FM radio
Memory	Flash memory (non volatile)
In the Box	Housing x 1 Circuit board and mounting plate x 1 Lid & retaining screws x 1 Joining brackets x 2 Interconnecting lead x 1

For more information contact Rako Controls Ltd 0870 043 3905 www.rakocontrols.com