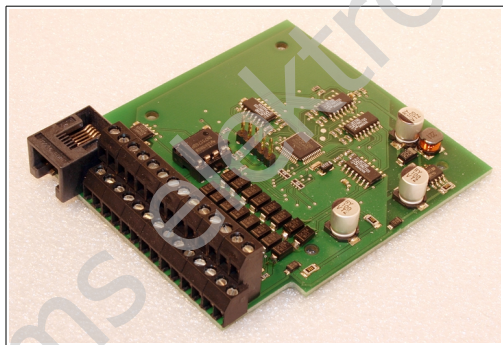


Manual

RCD-8

Item no. 45-01086 | 45-01087



8-fold RailCom detector
with integrated 8-fold track occupancy indicator



tams elektronik



Table of contents

1. Getting started	3
2. Safety instructions.....	5
3. Background information: RailCom.....	6
4. Operating mode of the RCD-8.....	8
5. Technical specifications.....	10
6. Connections.....	11
7. LED display of the RCD-8.....	14
8. Programming the RCD-8	14
9. Check list for troubleshooting.....	16
10. Guarantee bond.....	18
11. EU declaration of conformity.....	19
12. Declarations conforming to the WEEE directive.....	19

© 07/2013 Tams Elektronik GmbH

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, without prior permission in writing from Tams Elektronik GmbH.

Subject to technical modification.

Remark: RailCom® is the registered trademark of the Lenz Elektronik GmbH, Hüttenbergstraße 29, D-35398 Gießen. To increase the text's readability we have refrained from referring to this point in each instance.

1. Getting started

How to use this manual

This manual gives step-by-step instructions for safe and correct connecting of the device, and operation. Before you start, we advise you to read the whole manual, particularly the chapter on safety instructions and the checklist for trouble shooting. You will then know where to take care and how to prevent mistakes which take a lot of effort to correct.

Keep this manual safely so that you can solve problems in the future. If you pass the device on to another person, please pass on the manual with it.

Intended use

The RailCom detector RCD-8 is designed to be operated according to the instructions in this manual with digital model railways. Any other use is inappropriate and invalidates any guarantees.

The RCD-8 should not be mounted by children under the age of 14.

Reading, understanding and following the instructions in this manual are mandatory for the user.

Checking the package contents

Please make sure that your package contains:

- one detector,
- a CD (containing the manual and further information).

Required materials

In order to connect the device you need wire. Recommend diameters:

- data bus: $\geq 0,1 \text{ mm}^2$. It is recommended to use twin wire (e.g. LiYz, $2 \times 0,19 \text{ mm}^2$, red-brown, item no. 73-30037);
- connections to the rails and the booster: $\geq 0,25 \text{ mm}^2$;
- connections to the integrated track occupancy indicator: $\geq 0,1 \text{ mm}^2$.

If you intend to display and / or transfer the read-out data to a PC, you need external display devices resp. a PC interface, e.g.

- single display device RCA-1 (item no. 45-02016);
- 24-fold display device RCA-24 (item no. 45-02247);
- PC interface RC-Link (item no. 45-02257 with USB interface or 45-02267 with V24 interface).

2. Safety instructions

Mechanical hazards

Cut wires can have sharp ends and can cause serious injuries. Watch out for sharp edges when you pick up the PCB.

Visibly damaged parts can cause unpredictable danger. Do not use damaged parts: recycle and replace them with new ones.

Electrical hazards

- Touching powered, live components,
- touching conducting components which are live due to malfunction,
- short circuits and connecting the circuit to another voltage than specified,
- impermissibly high humidity and condensation build up

can cause serious injury due to electrical shock. Take the following precautions to prevent this danger:

- Never perform wiring on a powered module.
- Mounting the device should only be done in closed, clean, dry rooms. Beware of humidity.
- Only use low power for this module as described in this manual and only use certified transformers.
- Connect transformers only in approved mains sockets installed by an authorised electrician.
- Observe cable diameter requirements.
- After condensation build up, allow a minimum of 2 hours for dispersion.
- Use only original spare parts if you have to repair the kit or the ready-built module.

3. Background information: RailCom

Feedback with RailCom

RailCom is a standard for bi-directional communication in digital model railway layouts controlled in DCC-format. It allows e.g. the feedback of the address and the CV values from RailCom decoders to the digital control unit or to special receivers (so-called detectors).

To transfer the RailCom messages special RailCom boosters supplying the so-called RailCom cutout have to be used.

Data transfer between RailCom components

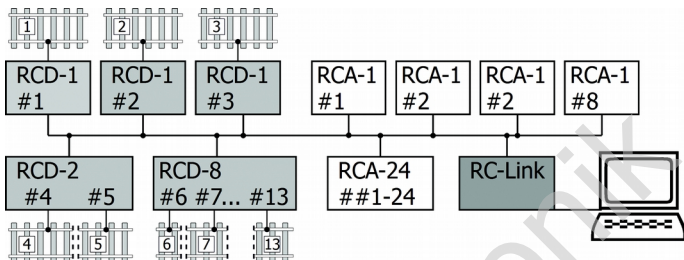
The RailCom standard is the basis of the communication between RailCom compatible decoders and RailCom detectors, which allows you to use detectors and decoders of different manufacturers together. On the other hand, a manufacturer specific data bus is used to communicate between detectors, display devices and PC interfaces. That is the reason why the use of detectors, display devices and PC interfaces of one manufacturer is mandatory.

The data bus used by Tams Elektronik for the communication between detectors, display devices and PC interfaces allows you

- to control up to 24 separate track sections and
- to connect up to 32 RailCom devices (detectors RCD-1, RCD-2 or RCD-8, display devices RCA-1 or RCA-24, PC interfaces RC-Link).

In order to assign the detectors, display devices and PC interfaces to each other, they get addresses between 1 and 24.

Example for the data transfer in the Tams specific data bus



There are five different detectors connected to the data bus, all together controlling 13 separate track sections. In order to display and exploit the data there are used:

- four single display devices RCA-1 displaying the data from one section each,
- one 24-fold display device RCA-24, displaying the data from all 13 track sections,
- one RailCom PC interface RC-Link.

Bus line

For technical reasons, there are two wires with a diameter of minimum 0,10 mm² mandatory as a bus line for the communication between detectors, display devices and PC interfaces (lines A and B). In order to minimise the vulnerability towards disturbances from other cables, the two wires should be twisted. It is recommended to use twin wire (e.g. LiYz, 2x0,19 mm², red-brown, item no. 73-30037)

The bus line has to be looped through from one to the other device. When connecting them the lines A and B always have to be assigned to the corresponding connection points A and B of the devices.

4. Operating mode of the RCD-8

Supervising track sections with RailCom

The RailCom detector RCD-8 picks up the RailCom signals from maximum eight track sections separated from each other. These are possibly:

- Addresses of the vehicle decoders in the rail section. The decoder's address is sent permanently.
- CV-values of the vehicle decoders in the rail section. The CV-values are sent only after a read out command (i.e. sent by the control unit).

Displaying and transferring the data

There is no display for the RailCom feedback signals integrated in the RCD-8. In order to display the received data special RailCom display devices have to be connected (e.g. single display device RCA-1 or 24-fold display device RCA-24). These display devices can be mounted in those places of the railway layout where needed.

In addition to display devices or instead of display devices, units passing on data to a PC (e.g. RC-Link) or to the digital control unit can be connected.

The RCD-8 verifies the signals it receives and sends the "clean" signals via a Tams specific databus to the downstream devices.

Integrated track occupancy indicator

There is an integrated track occupancy indicator for each of the eight track sections of the RCD-8 which is able to detect also loads not sending a RailCom signal. There are eight LEDs on the board, lighting when a load is detected in the assigned track sections.

The messages "track occupied" are displayed as well in assigned display modules (e.g. RCA-1 or RCA-24) or transferred by an interface (e.g. RC-Link) to a PC.

The eight outputs of the integrated track occupancy indicators have been carried to the outside and thus can be used for the connection of

conventional feedback modules. This allows you to integrate the track sections into a conventional feedback system controlling only the busy condition of the track sections (e.g. s88).

Detection of the rerailing direction

In 2-rail systems the detector detects the direction in which the locomotive has been rerailed. This information is of importance e.g. when the locomotive's direction has to be detected in invisible sections or serves as a basis for a PC software. The rerailing direction is displayed in assigned display devices (e.g. RCA-1 or RCA-24) or transferred by an interface (e.g. RC-Link) to a PC

5. Technical specifications

Supply voltage	Digital voltage of the control unit
Digital format	DCC
Feedback log	RailCom
Number of sections controlled by RailCom	8
Number of outputs of track occupancy indicators max. current / output	8 100 mA
Current consumption without connected loads approx.	100 mA
Protected to	IP 00
Ambient temperature in use	0 ... +60 °C
Ambient temperature in storage	-10 ... +80 °C
Comparative humidity allowed	max. 85 %
Dimensions of the PCB (approx.) Dimensions including housing (approx.)	72 x 82 mm 100 x 90 x 35 mm
Weight of the assembled board (approx.) Weight including housing (approx.)	43 g 91 g

6. Connections

Separating the controlled track sections

The track sections (maximum 8) controlled by the RCD-8, have to be separated from the remaining tracks. For that purpose

- one conductor with 2-rail systems or
- the middle conductor with 3-rail systems

has to be cut through at both ends of the track section. When connecting several rail sections to RailCom detectors be sure to always cut the same conductor.



Attention:

If you don't cut the same conductor in layouts controlled by several RailCom detectors, a short circuit is going to occur as soon as the cut-off point is traversed. Normally, the layout will be switched off automatically in these cases.

Connecting the RCD-8

There are terminal strips soldered to the modules' connecting points which allow you to insert and screw the connecting cables.

Connecting the booster and the track sections

Mount the RCD-8 into the feed line from the booster to the track sections. Check the right assignment to the continuous and the interrupted conductors.

U1	Track connection of the booster continuous conductor (earth) = S1-1 Track section 1 continuous conductor (earth)
U2	Track connection of the booster interrupted conductor

S1-1	Track section 1 continuous conductor (earth)
S1-2	Track section 1 interrupted conductor
S2-1	Track section 2 continuous conductor (earth)
S2-2	Track section 2 interrupted conductor
...	...
S8-1	Track section 8 continuous conductor (earth)
S8-2	Track section 8 interrupted conductor

Connecting the integrated track occupancy indicator

In order to integrate the RCD-8 into conventional feedback systems controlling nothing but the busy condition of the track sections, you can connect the eight integrated track occupancy indicators to the inputs of external feedback modules (e.g. s88).

T1	output 1 of the integrated track occupancy indicators (e.g. to input 1 of an external s88 feedback module)
T2	output 2 of the integrated track occupancy indicators
...	
T8	output 8 of the integrated track occupancy indicators
⊥	Earth connection for the integrated track occupancy indicator and external feedback modules

Connecting RailCom display devices

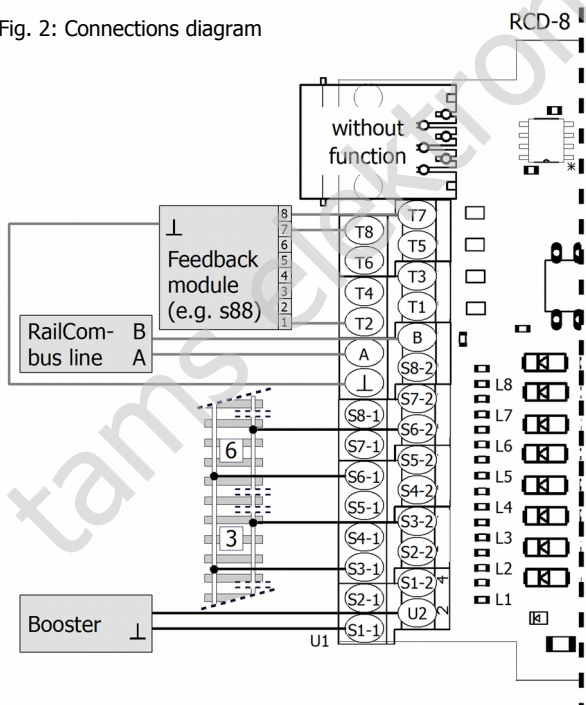
You can connect display devices (e.g. RCA-1 or RCA-24) or a PC interface (e.g. RC-Link) to the RCD-8 according to your needs. As the data transfer between the detectors on the one side and the display devices and PC interfaces on the other side is run on a Tams specific data bus, you cannot connect devices from other manufacturers to the data bus.

Loop through the bus lines A and B from one device to the other. When connecting the lines A and B always be sure to assign them to the corresponding connection points A and B of the devices.

A	Tams specific RailCom bus line A
B	Tams specific RailCom bus line B

Hint: You assign the display devices to the RCD-8 by programming the address (see section 8).

Fig. 2: Connections diagram



7. LED display of the RCD-8

There are eight LEDs on the RCD-8, assigned to the eight integrated track occupancy indicators. They light when the track section is occupied by a load. A RailCom feedback signal is not necessary for the occupancy indication.

When programming the address of the RCD-8, LED1 flashes and thus indicates the change into the programming mode.

8. Programming the RCD-8

With the RCD-8 you can define the addresses of the eight controlled track sections by programming a configuration variable. You set the address for detector 1, the other seven detectors automatically get the following seven numbers as their addresses.

For that purpose you have to make a programming on main (POM) for the RCD-8, corresponding to the programming of locomotive decoders. With control units not allowing programming on main, it is not possible to program the RCD-8.

Preparations

Remove all loads from the connected rail sections, as the RCD-8 can only be programmed when there is no load in any of the eight sections. In order to prevent another RCD-8 connected to the same data bus from being programmed, it is sufficient to occupy one section controlled by this RCD-8.

Programming

1. Choose any DCC locomotive address at the control unit for programming on main. For safety reasons you should not choose the address of a locomotive situated on the layout.
2. In order to change into the programming mode, enter the value "62" for CV#7 of the DCC locomotive address. Proceed as described in the manual for your control unit. LED1 starts to flash.
3. In order to start the programming of the address, next enter the value "1" for CV#7 of the DCC locomotive address. LED1 flashes more quickly.
4. Now enter the address for detector 1 into CV#7. Values between 1 and 17 are allowed. The addresses for the other seven detectors are assigned automatically. After the input, LED1 stops to flash.
5. In order to finish the programming mode, switch off the power supply for the track (control unit to stop) for a short interval.

Notice: Normally, entering a value for CV#7 of a locomotive address has no consequences to a locomotive decoder, as there is no input allowed for CV#7 of locomotive decoders according to DCC standard.

9. Check list for troubleshooting

- Parts are getting too hot and/or start to smoke.



Disconnect the system from the mains immediately!

Possible cause: The device is defective. → Return the device for check.

- When passing the sectioning point between two booster sections a short circuit occurs.

Possible cause: The two connections of the detector to the rail (interrupted conductor / continuous conductor) have been reversed. → Check and alter the connections.

Possible cause: The two connections of the booster / the detectors (interrupted conductor / continuous conductor) are not consistent. → Check and alter the connections.

- An accessory display device assigned to the RCD-8 does not show data.

Possible cause: The RCD-8 and the display device have not been programmed to the same address. → Program the addresses of the two devices anew.

Possible cause: The connection A of the RCD-8 is connected to the connection B of the display device (or the other way round). → Exchange the connections A and B at one of the devices.

Possible cause: The booster connected to the controlled rail section is switched off or does not supply the RailCom cutout. → Check the booster.

Possible cause: The vehicle decoder in the supervised rail section does not send a RailCom message, e.g. when in the corresponding CV the RailCom function is set to off. → Check the vehicle decoder.

- A RailCom message displayed at the display device is for another track section than expected.

Possible cause: The address having been programmed for detector 1 is another than supposed. → Programm the address anew.

Hotline: If problems with your module occur, our hotline is pleased to help you (mail address on the last page).

Repairs: You can send in a defective module for repair (address on the last page). In case of guarantee the repair is free of charge for you. With damages not covered by guarantee, the maximum fee for the repair is 50 % of the sales price according to our valid price list. We reserve the right to reject the repairing of a module when the repair is impossible for technical or economic reasons.

Please do not send in modules for repair charged to us. In case of warranty we will reimburse the forwarding expenses up to the flat rate we charge according to our valid price list for the delivery of the product. With repairs not covered by guarantee you have to bear the expenses for sending back and forth.

10. Guarantee bond

For this product we issue voluntarily a guarantee of 2 years from the date of purchase by the first customer, but in maximum 3 years after the end of series production. The first customer is the consumer first purchasing the product from us, a dealer or another natural or juristic person reselling or mounting the product on the basis of self-employment. The guarantee exists supplementary to the legal warranty of merchantability due to the consumer by the seller.


The warranty includes the free correction of faults which can be proved to be due to material failure or factory flaw. With kits we guarantee the completeness and quality of the components as well as the function of the parts according to the parameters in not mounted state. We guarantee the adherence to the technical specifications when the kit has been assembled and the ready-built circuit connected according to the manual and when start and mode of operation follow the instructions.

We retain the right to repair, make improvements, to deliver spares or to return the purchase price. Other claims are excluded. Claims for secondary damages or product liability consist only according to legal requirements.

Condition for this guarantee to be valid, is the adherence to the manual. In addition, the guarantee claim is excluded in the following cases:

- if arbitrary changes in the circuit are made,
- if repair attempts have failed with a ready-built module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

11. EU declaration of conformity

 This product conforms with the EC-directives mentioned below and is therefore CE certified.

2004/108/EG on electromagnetic. Underlying standards: EN 55014-1 and EN 61000-6-3. To guarantee the electromagnetic tolerance in operation you must take the following precautions:

- Connect the transformer only to an approved mains socket installed by an authorised electrician.
- Make no changes to the original parts and accurately follow the instructions, connection diagrams and PCB layout included with this manual.
- Use only original spare parts for repairs.

2011/65/EG on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS). Underlying standard: EN 50581.

12. Declarations conforming to the WEEE directive

This product conforms with the EC-directive 2012/19/EG on waste electrical and electronic equipment (WEEE).



DE 37847206

The Tams Elektronik GmbH is registered with the WEEE-no. DE 37847206, according to. § 6 sect. 2 of the German electro regulations from the responsible authority for the disposal of used electro equipment.

Don't dispose of this product in the house refuse, bring it to the next recycling bay.

Information and tips:

<http://www.tams-online.de>

Warranty and service:

Tams Elektronik GmbH

Fuhrberger Straße 4

DE-30625 Hannover

fon: +49 (0)511 / 55 60 60

fax: +49 (0)511 / 55 61 61

e-mail: modellbahn@tams-online.de



DE 37847206