Manual

RCA-24

Item no. 45-02247

24-fold RailCom display

tams elektronik

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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 refering 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 display RCA-24 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 RCA-24 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 display RCA-24,
- 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 mm². It is recommended to use twin wire (e.g. LiYz, 2x0,19 mm², red-brown, item no. 73-30037);
- connections to the voltage supply of the display device: $\geq$ 0,25 mm².

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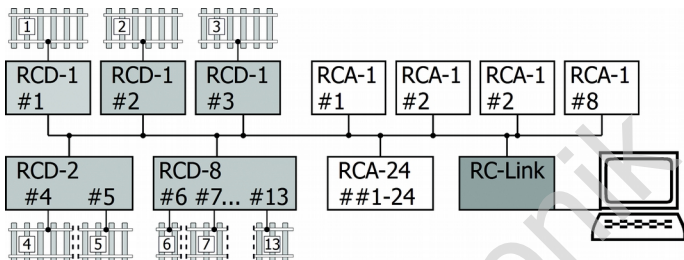
There are five different detectors connected to the data bus, all together controlling 13 separate track sections. In order to display and exploit the data there are used:

- 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 RCA-24

The RailCom display device RCA-24 can show RailCom feedback signals from 24 assigned rail sections controlled by local detectors. The following detectors are suitable for the operation with the RCA-24:

- single RailCom detector RCD-2 (Art.-Nr. 45-0101x);
- 2-fold RailCom detector RCD-2 (Art.-Nr. 45-0102x);
- 8-fold RailCom detector RCD-8 (Art.-Nr. 45-0108x).

As a standard the vehicle decoder´s address and with 2-rail-systems the rerailing direction of the locomotive are displayed as long as the vehicle is in the controlled section. When a reading out command has been sent, the value of the read out CV is displayed for a short time.

The RCA-24 also displays a locomotive or another load (e.g. a lighted carriage) in the rail section that has no RailCom-compatible decoder, provided that the assigned RailCom detector is able to detect loads not sending a RailCom signal.

In case more than one vehicle decoder is sending RailCom messages in one section, the following displays are possible:

- There is displayed the message from one vehicle decoder only.
- The messages of the vehicle decoders in the section are displayed alternatingly.
- A faulty message is displayed.

The 24 detectors you can assign as a maximum to the RCA-24, are divided into three groups of 8 detectors to be displayed simultaneously:

- detectors no. 1 - 8
- detectors no. 9 – 16
- detectors no. 17 – 24

You can toggle between the three groups with a push-button.

5. Technical specifications

Attention: The RCA-24 should not be supplied by a transformer used to supply the digital control! If possible you should use a transformer as a power supply which supplies the RailCom components only.

|	
Supply voltage	12 - 18 Volt d.c. or a.c. voltage
Digital format	DCC
Feedback log	RailCom
Number of displayed RailCom sections	24
Current consumption approx.	50 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 including housing approx.	100 x 90 x 35 mm
Weight including housing approx.	107 g

6. Connections
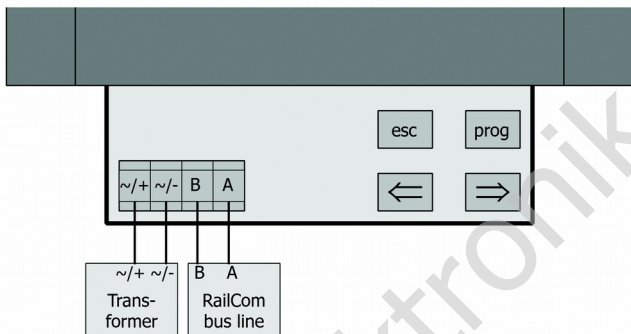
Fig.1: Connections of the RCA-24

Connecting RailCom detectors

You can assign a maximum of 24 detectors to one RCA-24 according to your needs (e.g. RCD-1, RCD-2 or RCD-8). 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 detectors to the RCA-24 by programming the addresses (see section 7).

Connecting the power supply

⚠ **Attention**: As a power supply for the RCA-24 you should not use the transformer supplying the digital control. If possible you should use a separate transformer supplying only the RailCom components on your layout.

If you use a d.c. transformer for the power supply of the RCA-24, you have to regard the polarity when connecting it, if using an a.c. transformer the polarity is of no importance. If you supply several RailCom components by one a.c. transformer you have to pay attention to connect all devices with the same polarity.

⚠ **Attention**: If you supply several RailCom components by one a.c. transformer, the connections of all devices have to be polarized in the same way. Otherwise a short circuit will occur which possibly can damage the connected devices.

| ~/+ | Voltage supply. With d.c. transformers: + |
| ~/- | Voltage supply. With d.c. transformers: - |

7. Programming

By giving an identical address between 1 and 24 to the detector and the accessory display device (or devices) you assign the devices to each other. This enables the connection of several detectors and display devices to one common databus line (and to minimize the cabling) and the changing of the assignments any time.

Programming an accessory detector RCD-1

Push-button	Display	Programming step
		Put the detector you intend to program into the programming mode as described in the detector´s manual.
prog	Detektor-adresse 1	Push the key-switch "prog" on the RCA-24 in order to start the address programming of the detector. The display shows "Detektoradresse 1".
⇒|⇐	Detektor-adresse + chosen address	Now choose the address you want to assign to the detector by pushing the buttons "⇒" (for one number higher) or "⇐" (for one number lower). The display shows "Detektoradresse" and the chosen number.
prog		In order to confirm the choice, push the RCA-24´s key-switch "prog" again. The detector confirms the taking over of the address as described in its manual.
		Finish the programming mode for the detector as described in its manual.
		In order to program the addresses of further detectors, repeat the described procedure by pushing the key switch "prog" once again. You complete the programming of detectors addresses by pushing the key switch "esc".

8. Operation

In the RCA-24´s display, the data the detectors are reading out are shown. They are displayed in blocks of eight (e.g. 9 to 16). In order to display the data of the next block of eight, push the keys "⇐" or "⇒". Using "⇐" the display shifts to the lower numbers, using "⇒" to the higher numbers.

Display	Meaning
-----	No detector connected / assigned or no vehicle decoder or load in the supervised rail section.
13: <<>>	Detector section 13 occupied, but no RailCom signal. Hint: This information is only displayed when the assigned RailCom detector is also able to detect loads not sending a RailCom signal.
19▶ 3	Vehicle decoder 3 in detector section 19, rerailing direction A. As a matter of principle no leading zeros are displayed.
21◀ 10003	Vehicle decoder 10003 in detector section 21, rerailing direction A.
* CV angefordert * Detektor: 4 Adresse: 3 CV-Inhalt: 14	Address of the detector: 4 Address of the vehicle decoder: 3 Value of a CV read out: 14 The value read out is displayed for approx. 10 seconds, then the decoder address is displayed again.

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.

- The display does not show data.

  Possible cause: The detector whose data should be displayed has another address than supposed. → Check if you have assigned an address from another block of eight to the detector by accident by shifting to the display of the other blocks using the keys "⇐" or "⇒".

  Possible cause: The connection A of the RCA-24 is connected to the connection B of the detector (or the other way round). → Exchange the connections A and B on 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.

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

CE 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:

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