Manual

RC-Link

Item no. 45-02257 | 45-02267

RailCom PC Interface

tams elektronik

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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 PC interface RC-Link 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 RC-Link 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 RC-Link with USB interface and one USB cable (length: 5,00 m) (item no. 45-02257) or
- one RC-Link with V.24 interface and one V.24 cable (length: 5,00 m) (item no. 45-02267);
- one jumper (short circuit plug);
- a CD (containing the manual, softwre 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 interface´s power supply: $\geq$ 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 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 RC-D-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
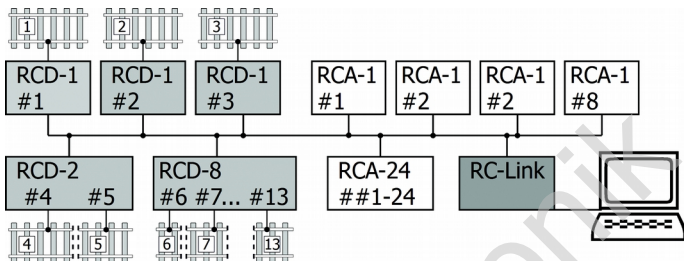
- There are five different detectors connected to the data bus, all together controlling 13 separate track sections. In order to display and exploit the data there are used:
- four single display devices RCA-1 displaying the data from one section each,
- one 24-fold display device RCA-24, displaying 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 RC-Link

Transferring RailCom messages to the PC

The RC-Link transfers the feedback signals from a maximum of 24 local RailCom detectors (e.g. RCD-1, RCD-2 or RCD-8) to the PC. These RailCom messages refer clearly to a particular detector (or track section) as the detectors are identified by addresses.

Most PC programs for model railroading support feedback by RailCom. Depending on the features the PC software is providing the incoming messages are displayed on the PC monitor or are used a basis for the automatic control of operating schedules, for example.

Transferring busy signals to the PC

Many RailCom detectors are designed to detect loads in the supervised rail section not sending a RailCom signal, as well. The RC-Link also transfers these pure busy signals to the PC.

Performance at a breakdown of the track voltage

When a breakdown of the track voltage occurs (e.g. after an automatic cut-off of the track voltage after a short circuit), the detectors cannot read out and transfer RailCom messages or busy signals to the RC-Link. If the RC-Link would transfer the message "track section is disengaged" to the PC in this case, failures in operational procedures and accidents could occur.

In order to meet with this problem, the RC-Link checks via a port for the connection to the rails if a track voltage is applied. Only when a track voltage is applied, current disengaged reports are transferred to the PC. In case the track voltage breaks down, the (in most cases) false disengaged reports are suppressed and the RailCom messages last received before the voltage breakdown are saved.

With certain constellations (e.g. when the detectors are located in different booster sections reacting in varied ways to short circuit messages) suppressing the disengaged reports at a voltage break down can be unnecessary or disturbing. When performing functional tests connecting the RC-Link to the rails may involve a high effort.

For that reasons it is possible to do without connecting the RC-Link to the rails as well. With an open track port (and thus supposed broken down track voltage) the RC-Link however supresses the transfer of disengaged reports, which is unwelcome in this constellation. That is why in this case a track voltage being applied has to be simulated by shunting a connection on the module with a jumper.

5. Technical specifications

Attention: As a power supply for the RC-Link 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.

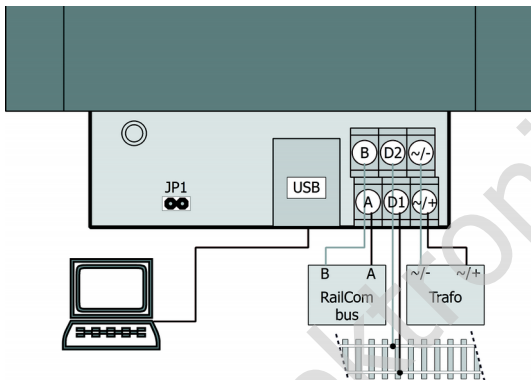|	
Supply voltage	12 - 18 Volt Gleich- oder Wechselspannung
Digital format	DCC
Feedback log	RailCom
Current consumption approx.	20 mA
Protected to	IP 00
Ambient temperature in use	0 ... +60 °C
Ambient temperature in storage	-10 ... +80 °C
Comparative humidity allowed	max. 85 %
Dimensions including housing (approx.)	100 x 90 x 35 mm
Weight including housing (approx.) RC-Link with USB interface RC-Link with V.24 interface	 100 g 108 g

6. Connections and funcitonal tests

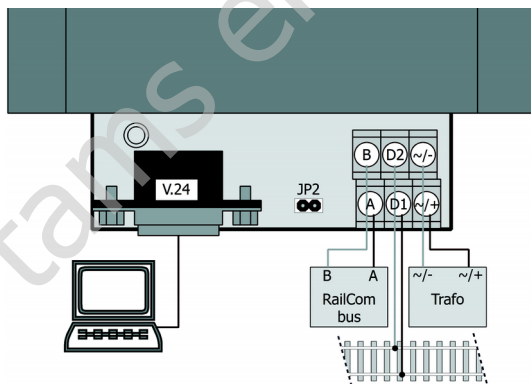Fig. 2: Connection RC-Link with USB interface.

Fig. 3: Connection RC-Link with V.24 interface.

RC-Link	Connection to
USB | V.24	PC (via USB or V.24 interface)
~/+	Voltage supply. With d.c. transformers: +
~/-	Voltage supply. With d.c. transformers: -
A	Tams specific RailCom bus line A
B	Tams specific RailCom bus line B
D1 and D2	Rails. At a break down of the track voltage disengaged reports are suppressed. Or:
JP1	Jumper onto JP1 (version with USB-port) or
JP2	Jumper onto JP2 (version with V24-port).

It is recommended to make the connections and functional tests step-by-step according to the manual.

Step 1: Connection to the PC

Connect the RC-Link to the PC with the USB or V.24 cable enclosed in the package.

Step 2: Connecting the power supply

⚠ **Attention:** As a power supply for the RC-Link 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 RC-Link, 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 be careful 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.

Step 3: Functional test (part 1)

Start the program "RC-PC" – either directly from the included CD or after having copied it on to the hard disk of your PC from the PC – and click to the field "Sys-Info". The numbers of the software and the hardware version of the RC-Link are shown on the monitor. This shows you the communication between PC and RC-Link is working.

Nr.	Adresse	Letzte Rohdaten	Letzte Meldezeit		CV	Letzte Rohdaten	Letzte Meldezeit
1	11	FC 01 00 0B FF	11:54:34	Anfordern			
2	24	FC 02 00 18 FF	11:54:35	Anfordern			
3				Anfordern			
4				Anfordern			
5				Anfordern			
6				Anfordern			
7				Anfordern			
8				Anfordern			
9				Anfordern			
10				Anfordern			
11				Anfordern			
12				Anfordern			
13				Anfordern			
14				Anfordern			
15				Anfordern			
16				Anfordern			
17				Anfordern			
18				Anfordern			
19				Anfordern			
20				Anfordern			
21				Anfordern			
22				Anfordern			
23				Anfordern			
24				Anfordern			

Schnittstelle

COM 4 | Verbinden | Trennen | 🟢 | Reset Anzeige | Sys-Info Roh | Hw.-Version | Sw.-Version | Seriennummer

Sys-Info | Initialisiere Detektoren | FD 00 10 0A 0AFF | 1.0 | 1.0 | 16

Detektor 1 | Detektoradresse programmieren

Fig. 4: Screen layout after starting the program

Step 4: Connecting local RailCom detectors

You can assign a maximum of 24 detectors (e.g. RCD-1, RCD-2 or RCD-8) to the RC-Link. 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.

For the functional test part 2 it is sufficient to connect one RailCom detector to the RC-Link.

Step 5: Functional test (part 2)

Plug-in the included jumper to JP1 (when using a version with USB port) or JP2 (when using a version with V.24 port).

Then drive a locomotive with RailCom capable decoder into the track section connected via a detector to the RC-Link. The locomotive´s address should be shown on the PC monitor in the particular track section.

Next drive the locomotive out of the supervised section. The section should be displayed as "disengaged" on the monitor.

Step 6: Connection to the rails

In order to suppress – possibly false – disengaged reports when a break down of the track voltage occurs, you have to connect the RC-Link to the rails.

In case you do not want to suppress disengaged reports at a track voltage break down, you can do without connecting the RC-Link to the rails. This can be of advantage e.g. with layouts where the RailCom detectors have been placed in different booster sections with varied short circuit switching-off. In order to simulate an applied track section

when doing without a connection to the RC-Link to the rails, you have to plug-in the included jumper:

version with USB-port: JP1

version with V24-port: JP2

In case the jumper has not been plugged-in, the RC-Link suppresses the transfer of disengaged reports.

7. Programming the detectors´ addresses

You can use the PC to program the addresses of the connected detectors (no. 1 to 24) via the RC-Link. You need a special software for that (e.g. PC-RC on the included CD). Proceed as follows:

- Put the detector you intend to program into the programming mode as described in the detector´s manual.
- Start the software and proceed according the instructions.
- 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.

8. 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 PC monitor does not show data.

  Possible cause: The connection between the RC-Link and the PC is interrupted. → Check the connection.

  Possible cause: The power supply of the RC-Link is interrupted (and the LED on the device does not light). → Check the connection to the power supply.

  Possible cause: When installing the software another interface has been choosen other than the one connected with the RC-Link. → If necessary alter the interface at the PC.

  Possible cause: The connection A of the RC-Link is connected to the connection B of the detector (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.

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.

9. 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.

10. EU declaration of conformity

$C \in$ 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.

11. Declarations conforming to the WEEE directive

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

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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