Littfinski **D**aten**T**echnik (**LDT**)

Operating Instruction

8-fold feedback module

with integrated

occupancy detectors

for the s88-feedback bus

from the *Digital-Professional-Series* !

RM-GB-8 Part-No.: 320012

>> finished module <<

⇒ **controls up to 8 different tracks**
(current detection from 0,001[1mA] up to 3 ampere)

⇒ **integrated voltage control**
(avoiding "track free" feedback in case of power failures)

⇒ **separated by opto isolation**
(between track and feedback bus)

⇒ **compatible with s88 feedback bus**
(can be combined with our RM-DEC-88[Opto], s88)

⇒ **suitable for following digital systems:**
Märklin Digital~/=, Arnold Digital, Intellibox, TWIN-CENTER, High Speed Interface HSI-88

This product is not a toy! Not suitable for children under 14 years of age! The kit contains small parts, which should be kept away from children under 3! Improper use will imply danger of injuring due to sharp edges and tips! Please store this instruction carefully.

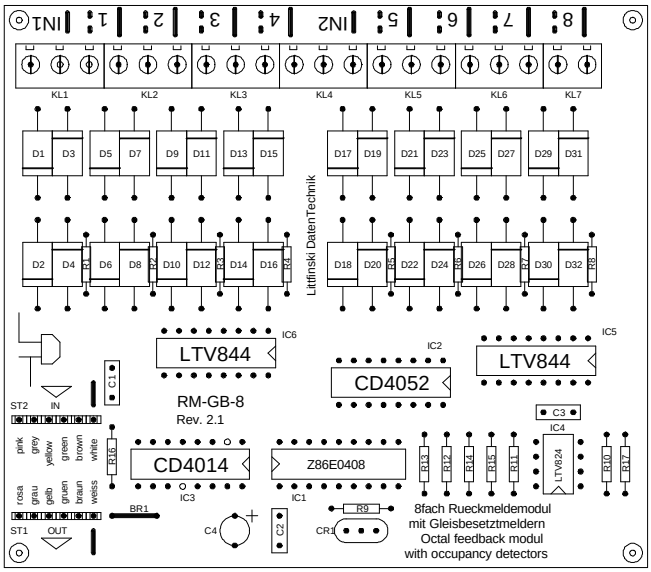
Multi-Digital

General Functions:

The **RM-GB-8** combines the occupied track detection and the feedback function. The 8 detectors for occupied tracks work by detection of current. In cases a connected track is occupied by an object with a minimum of 0,001 Ampere (1mA) consuming current, the track will be detected as occupied.

Locomotive decoder, coach lights or axles with electrical resistance are consuming electrical power and therefore induce the detection of an occupied track.

The maximum DC current on the tracks can be up to 3 Ampere.



Introduction / Safety Information:

You have purchased the 8-fold feedback module **RM-GB-8** with integrated detection of track occupancy for your model railway. The **RM-GB-8** is a high quality product that is supplied within the ***Digital-Professional-Series*** of **L**ittfinski **D**aten**T**echnik (**LDT**).

We wish you having a good time using this product.

Our products are either available as kits or as finished modules. The finished module comes with a **2-years limited warranty**.

- Please read the following instructions carefully. Warranty will expire due to damages caused by disregarding the operating instructions. **LDT** will also be not liable for any consequential damages caused by improper use or installation.

Connecting the RM-GB-8 to your digital model railway:

- **Attention: Please switch off your digital control unit and unplug transformer from AC-current before starting assembling the unit.**
- **Connect the 6-pole plug to your HSI-88, INTERFACE, MEMORY, Intellibox, TWIN-CENTER or s88 feedback module with the connection cable to the bottom side. The plugs of further feedback modules RM-GB-8 or feedback decoder RM-DEC-88 respectively RM-DEC-88 Opto have to be connected to the 6-pole pin-socket that the cable will show to the middle of the pc-board. The white indicator on the one side of the socket/pc-board has to correspond with the white cable of the plug.**

The **track voltage** and the **feedback bus** are separated by **optogalvanic**. The current for the tracks can therefore safely be supplied from different transformers without having a negative effect on the digital control units.

The **modular concept** of **occupied track detectors** and **feedback decoders** implements a considerable problem: As soon as there is no electrical power on the tracks, all tracks are detected as free because no consuming current is detected. There are track occupied detectors available on the market which use an auxiliary voltage to solve this problem, but this can influence sometimes the locomotive decoder causing disturbances and is therefore no suitable solution.

As the feedback module **RM-GB-8** has a build-in intelligence (microprocessor Z86... [IC1], we have integrated a solution called **voltage monitor**. In case of voltage drop or short circuit there is no inaccurate "free track" detection and report back via the feedback bus to the digital control unit or the PC. All track occupancies will be "frozen" during this phase of voltage interruption.
As soon as there is current on the tracks again the actual situations on the tracks will be detected and reported back via the feedback bus.

The **RM-GB-8 feedback module** is suitable for decentralize installation underneath the model railway installation. There are 4-bores on the edges of the modules for quick and easy installation. The modules can be connected with each other or with our **RM-DEC-88 (Opto)** by using the 75 cm control cables. In case the standard cable is to short an optional cable extension of **2 meters** is available.

Connecting the RM-GB-8 to Digital Central Units respectively Interfaces:

Up to 6 feedback modules **RM-GB-8** can be connected to each Märklin **MEMORY.**

Signals of 62 modules can be evaluated when connecting to Märklin **INTERFACE, Intellibox, TWIN-CENTER Center and HSI-88.**

Electrical power is supplied via the feedback bus to the feedback modules **RM-DEC-88 (Opto)** or s88 and to the feedback decoder **RM-GB 8**. Power consumption of the **RM-DEC-88 (Opto)** is not traceable. The **RM-GB-8** uses 0,003 Ampere (3mA) only.

The s88 feedback bus of **MEMORY**, **INTERFACE, Intellibox TWIN-CENTER** and **HSI-88** can supply up to 0,5A. If the maximum quantity of 62 feedback modules **RM-GB-8** are connected, the bus has to supply 62 x 0,003A = 0,186A.

If you want to extend your model railway with **RM-GB-8** feedback modules you can easily combine these with our **RM-DEC-88 (Opto)** or s88 feedback decoder of other manufacturers.

After switching on the power of the digital control units like **MEMORY**, **INTERFACE, Intellibox** or **TWIN-CENTER** the input of the connected feedback decoders **RM-DEC-88 (Opto)** and feedback modules **RM-GB-8** will automatically be detected and addressed in the order of the sequence of connection.

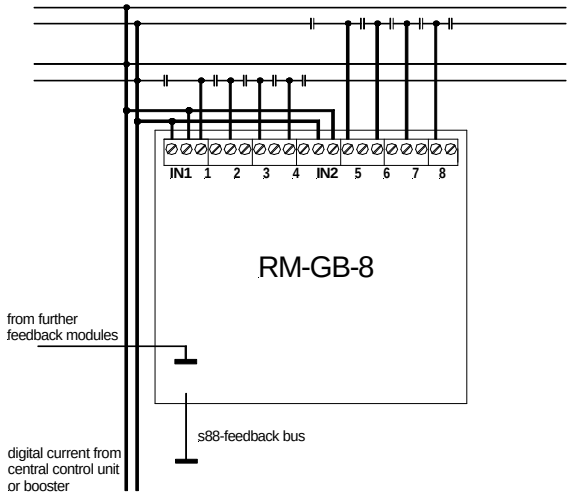
Example: You have connected three feedback units i.e. two **RM-DEC-88 (Opto) Decoder** and one **RM-GB-8 Module**. These modules are connected in the following sequence: **RM-DEC-88 (Opto)**, **RM-GB-8** and **RM-DEC-88 (Opto)**.

In this case the outputs of the first **RM-DEC-88 (Opto)** decoder will get the addresses 1 to 16, the track occupied detection of the **RM-GB-8** the addresses 17 to 24 and the second feedback decoder **RM-DEC-88 (Opto)** the addresses 25 to 40.

Please make sure that the digital control unit is switched off when connecting the decoders with the 6-pole plug! Check the correct orientation of the plugs (see above).

Connecting a track section:

Below draft clarifies how to connect the feedback module **RM-GB-8** to a track.



Digital current will be supplied to the **RM-GB-8** via input **IN1** and **IN2. IN1** provides current to the output **1** to **4** and **IN2** provides current to the out put **5** to **8**. The two inputs **IN1** and **IN2** are **electrical separated**. Therefore it will be possible for example to supply **IN1** from the digital central unit (control unit) and **IN2** from a booster. In the draft both inputs have one supply.
Additionally it will be possible to connect **a reversing-loop-module** before the input **IN1** or **IN2.** This enables the monitoring of **up to 4 track sections** and one **reverse loop**.
By using the control unit or a booster on **IN1** or **IN2** connect the **digital current** for the **supply** of the **continuous rail** to the clip with the **continuous white mark**.

Output clamps 1 to 8 shall be connected to those **isolated tracks**, which shall be **monitored**. As indicated in the draft it is sufficient to **isolate one rail.**
The clamp with the **dotted line** shall be connected to the rail **track section** to be **monitored**. Details for connection samples can be downloaded from our web-site (www.ldt-infocenter.com**)** within the section **"Downloads"**.

To avoid short circuits when locomotives are crossing the transitions of each monitored track, always the same connecting sequence of the tracks has to be strictly followed.

In case of a short circuit when crossing the transition (control unit will switch to EMERGENCY STOP) please check the connections and eventually change the cables of the monitored track at the respective OUTPUT clamps.

Anti-interference capacitors can lead to an erroneous occupied detection of the track and should therefore not be used within the monitored track.

If you apply **electrical resistant coating** to the **axles** of your trains you should measure the resistance value with a Multimeter afterwards.

A resistance between **5** and **10 KOhm** will guarantee a safe monitoring by the occupied track detection of the feedback module **RM-GB-8**.

Customary used **resistance axles** with a resistance value of **18 KOhm** will just be monitored, provided that the rails **are very clean** and the railway coaches have a sufficient contact to the rails. In such case it will be recommended, to fit **two resistance axles** to the coach to receive a total resistance value of about **9 KOhm**. This will assure a save monitoring even when the rails are not perfect clean.

Trouble shooting:

What to do if something is not working as described above?

If you have purchased the **RM-GB-8** module as a kit, please carefully check all parts and all soldered joints.

Important: Both inputs (**IN1** and **IN2**) have to be connected to a digital current.
Possibly test the single monitoring function of the modules first before connecting it to the tracks.

To do this you can use a resistor (couple of hundred Ohm) or a small model lamp to simulate the occupied situation on each output clip.

Without resistor the detection of the input should be “free”, with a resistor your digital control unit or PC should show an “occupied” situation.

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