**L**ittfinski **D**aten**T**echnik

**Operating Instructions**

**LDT**

# Feedback Module
## with integrated detection of
# occupied tracks
### from the *Digital Professional Series* !
## RS-8

### >> assembled module <<

⇒ **controls up to 8 different tracks**
(voltages 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 LENZ digital plus system (RS-feedback bus)**
(can be operated with LS100 and LV101)

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 years of age! Improper use will imply danger of injuring due to sharp edges and tips! Please carefully store these instructions.

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## Introduction / Safety Information:

Thank your for buying the feedback module **RS-8** with integrated detection of occupied tracks for your model railway.

The **RS-8** is a high quality product that is supplied within the *Digital Professional Series* of **L**ittfinski **D**aten**T**echnik (**LDT**).
All our products are either available as kits or assembled modules.

• 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.

## Connection of the RS-8 with your digital model railway:

• **Important: Please disconnect your digital model from digital voltage ("stop" key on your digital control unit or unplug from current) before starting your work.**

• **Power Supply: Connect the feedback module at the 4-pole clamp with your model train transformer (14 to 18V AC). It is also possible to connect the RS-8 module directly with the digital circuit. In this case clamps J and K have to be connected with the booster LV101.**
**Feedback bus: Connect the 4-pole input clamps R and Switch the identically marked clamps of the digital unit LZ100. Further feedback modules (RS-8, LR101, LS110 etc.) are simply connected in parallel.**
**Digital Power Supply: Connect 18-poles clamps J and K with the identically marked clamps on the booster LV101.**

## General Functions:

The **RS-8** combines the feedback function with the detection of occupied tracks. The 8 detectors for occupied tracks work by detection of voltage. In cases where the track is occupied by an object with a minimum of 0,001 Ampere (1mA) consuming voltage, the track will be detected as occupied
Locomotive decoder, coach lights or axis with electrical resistance are consuming electrical power and therefore induce the detection of an occupied track.
The maximum voltage on the track is 3 Ampere.
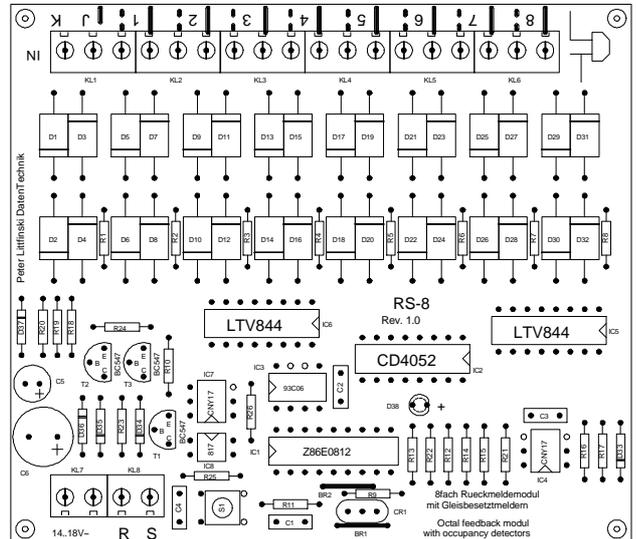


The **voltage** of the tracks and the **feedback bus** are **separated** by **galvanic** means, namely **opto isolation**.

Voltage for the tracks can therefore safely be supplied from different transformers without having a negative effect on the digital control unit LV101.

The **modular concept** of **occupied track detector** and **feedback decoder** implements one considerable disadvantage: As soon as there is no electrical power on the tracks, all tracks are detected as free. Some available products on the market use auxiliary voltage to solve this problem, but these sometimes causing disturbances within the locomotive decoder and therefore do not supply a suitable solution.

The feedback module **RS-8** has a build-in intelligence (microprocessor Z86. [IC1]), which supplies a solution by integrated **monitoring of voltage**. In case of loosed power or short circuit there is no inaccurate detection and notification of a "free track" reported back via the feedback bus to the digital control unit or the PC. All conditions on the tracks are "frozen" during this phase.
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 **RS-8** is suitable for decentralize installation on the model railway. There are 4-drilled holes on the edges of the modules for quick and easy installation. The modules are connected with each other's via the **RS-feedback bus** (cables connecting clamps R and S). Therefore each feedback module gets it's own individual address which is unique and cannot be allocated a second time by another module.

## Assigning addresses of the feedback module RS-8:

**Addresses** for feedback tasks are located in the **area** from **1** to **128** within the LENZ digital plus system. Each address can only be assigned on time.

In addition the feedback address area is subdivided. Area **1** to **64** is reserved for **switch decoders with feedback function**. Feedback modules like the **RS-8** should therefore be addressed in the area between **65 and 128** to avoid overlapping.

Therefore the LDT **RS-8** feedback module is delivered with the default address **65**.

To change the address the RS-8 is equipped with a **programming key S1** and a **light diode**. By pushing the **programming key** once the diode will **flash** which means that the **RS-8** is **ready for programming**.

Programming mode will only work, if clamps **J** and **K** are properly connected to the **digital circuit** (see description above).

While the diode is flashing, you can assign the address with the hand controller LH100. Press the keys >**F**< and >**5**< to get into the mode "switch magnet articles". Enter the requested **feedback address** now (e.g. >**7**< >**4**< for 74) and press **ENTER**. By pressing key >+< or >-< the feedback address will be saved. The diode will go out and the **RS-8** is in the operation mode again.

By pressing the keys >**ESC**<, >**F**< and >**6**< on the LH100 you will get into the mode "feedback". Enter the previously assigned address (e.g. >**7**< and >**4**< for 74) and press **ENTER**.



Vom Leistungs-verstärker LV101    RS-Rückmeldebus
Vom Modellbahntrafo

Therefore the OUTPUT clips are marked with a continuous and a non-continuous line. Cables marked with **J** always connected with the clips with a continuous line.
In case of a short circuit when crossing the transition (control unit will switch to STOP) please change the cables at the respective OUTPUT clips.

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

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

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If the **RS-8** was connected properly, the display of the hand control LH100 will show a "**b**" left below the assigned feedback address.

When there was no feedback information received from the **RS-8** the display of the LH100 shows a hyphen behind the address. Check the connection of your **RS-8** and repeat programming as described above.

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

## Connecting the modules with a track:

Following figure shows how to connect the feedback module **RS-8** with a track.
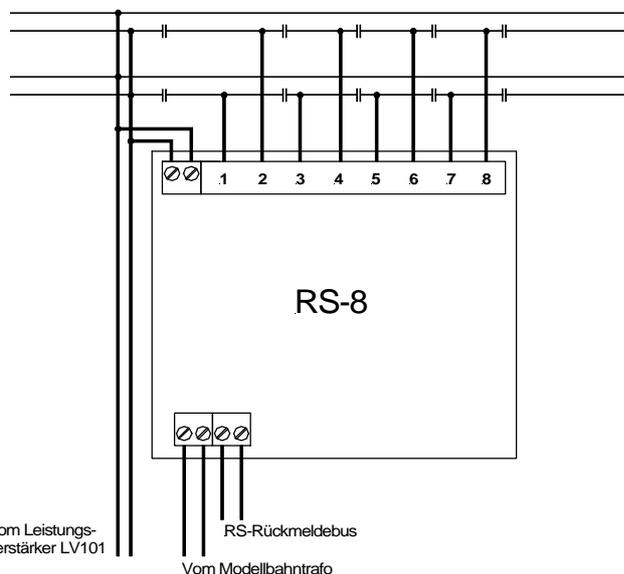
The **first two clips** of the **18-pole clipboard** are the **INPUT clips**. They are located on the right hand side of the board and are marked with **"IN"**. The digital power from the control unit or booster LV101 is connected to these clips.
Please pay attention to clamps J and K on the **RS-8** and the LV101.
**Clips 1 to 8** are connecting the **isolated tracks**, which should be **detected**.
As shown on the drawing it is sufficient to isolate one track.
Further detailed installation drawings can be found on our Internet Site (www.ldt-infocenter.com) on the download page.

To avoid short circuits when locomotives are crossing the transitions of each detected track, the order of connecting the tracks has to be strictly followed.

A resistor between **5** and **10 KΩ** will guarantee a safely detection by **RS-8** of the trains on your tracks.
Normally used **resistant axis** with a resistant value of **18 KΩ** is only detected, if the **tracks are very clean**.
It is **recommended** to fit at least **two resistant axes** on a coach to reach a total resistant value of **9 KΩ**, which will be sufficient for a proper detection even on dirty tracks.

## Trouble shooting:

What to do if something is not working as described above?
If you have purchased the **RS-8** as a kit, please carefully check all parts and all soldered joints.
Possibly test the detecting function of the modules first before connecting it to the tracks.
Do to this you can use a resistor (some hundred Ohm) which will simulate the occupied situation on each 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.