



„Relay Add-on“ for LightControl

„Manual for relay add-on module“



Introduction

This manual refers to the BiDiB / DCC Decoder "Light Control" from OpenDCC and Fichtelbahn. The decoder is not a finished commercial product, but it is a development and DIY kit for the technical interested model railroad enthusiast.

General information:

The decoder and the related documents have been carefully checked and are believed to be accurate. However we do not claim that the information provided is complete, timeliness, correct or accuracy. We do not take any responsibility for any direct or indirect damages caused by the use of the circuit, the decoder or the contents of this documentation.

The decoder software can be downloaded from our website and may be used, expanded and enhanced by everyone. Commercial use of the software, even partly, is not allowed!

Warranty:

The use of this manual is only allowed for personal reasons and for assembling of the described circuit. Any other use requires the written permission of the author. No responsibility will be taken for the construction and the functions of the described DIY-kit. Only the operator of this product is responsible for the compliance with existing regulations.

Hint: RailCom® is a registered trademark of Lenz Electronic GmbH, Hüttenbergstraße 29, D-35398 Gießen. To increase the readability of the text, we have refrained to refer to it, on every usage of this term.



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1. LightControl „Relay Add-on“:

1.1 *Technical parameter / functions:*

This module is not a complete decoder but only an extension board for the Light Control. This relay add-on board can be directly connected to the power outputs and offers the possibility to switch higher loads or implement a polarization for turnouts or servos.

The light control assembly is able to switch a maximum current of 300mA at each power output.

This relay module allows higher loads than 300mA and is able to drive also AC solenoid accessories and motor turnouts with high currents.

- **8x miniature relays for low voltage range**
(Coil voltage 12V / maximum contact voltage and current: 60V / 1A)
- **8x SMD-LEDS for signalization** (optional)
- **PCB size:** 35mm x 60mm

1.2 *Part list*

8x	LED1 - LED8	SMD-LED 0603	SMD-LED
2x	RN1, RN2	BCN16 4,7k-Ohm	Parallel resistor
1x	X10	WSL16G	Recessed connector
8x	X1 - X8	AKL 059-02	Screw terminal
8x	K1 - K8	G5V-1 12V	12V Relay
1x	PCB	Relay Add-on PCB	

2. Building instructions:



Only a few tools are needed to complete the board. A soldering iron with a fine tip, solder tin with a maximum of 1mm thickness and a pair of small tweezers.

If you have purchased this kit from Fichtelbahn, you can use the attached layout to locate the parts.

You will find the associated part number for each component on the parts list.

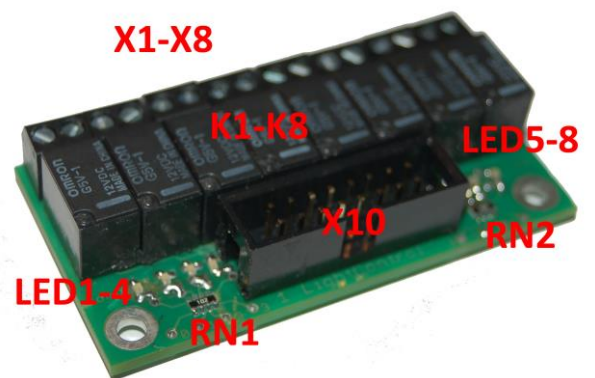
First of all, we fit the 2 parallel resistors **RN1**, **RN2** followed by the recessed connector **X10**.

Important:

Now fit the 8 SMD-Led's **LED1** until **LED8**.

Please note the mounting direction of the LED's.

The cathode (marked with a triangle or line) shows towards the parallel resistor.



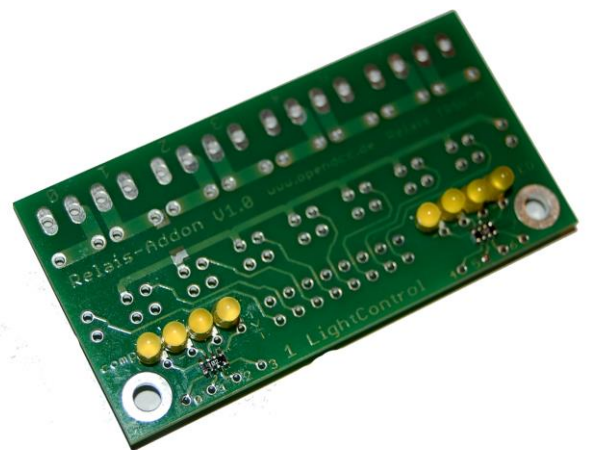
Reason: If a recessed connector is used, the connector covers the solder points from **LED3** and **LED4**. But you can overcome this problem if you solder the SMD-LED directly on the holes which are used for through-hole LED's.

Finally, fit the eight relays **K1** to **K8** and the screw terminals **X1** to **X8**.

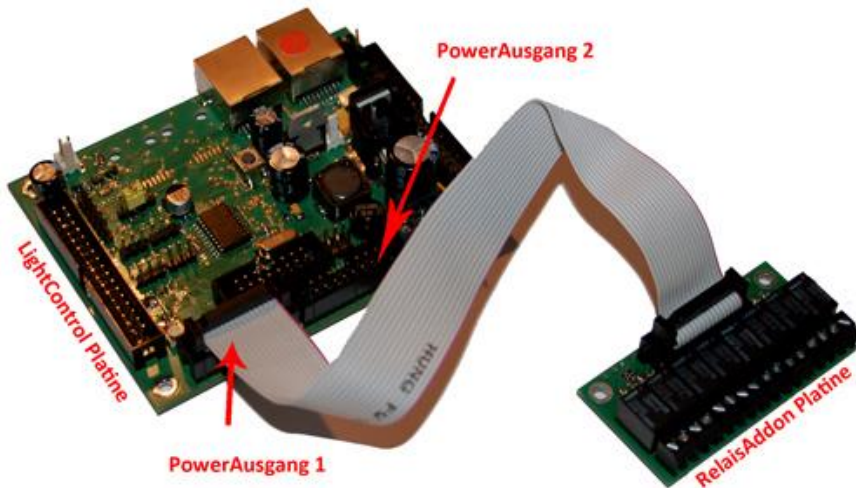
Hint:

The relay board can also be equipped with 3mm through-hole LEDs. In this case it is not possible to use a recessed connector because of the missing space.

The alternative for the recessed connector is a double row pin header.



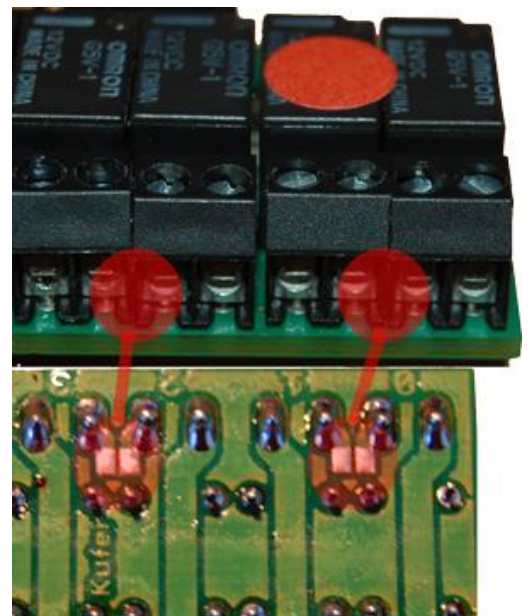
3. Commissioning at LightControl



The add-on relay board can be connected to one of the two power outputs at the Lightcontrol PCB. Connection is made with a 16-pin ribbon cable.

Take care of the polarity when you assemble the ribbon cable. Pin1 at the recessed connector and the recessed female connector is marked with an arrow.

For controlling solenoids accessories, motor switches or for turnout polarization, the shown solder bridges must be closed in order to connect the 2 screw terminals.

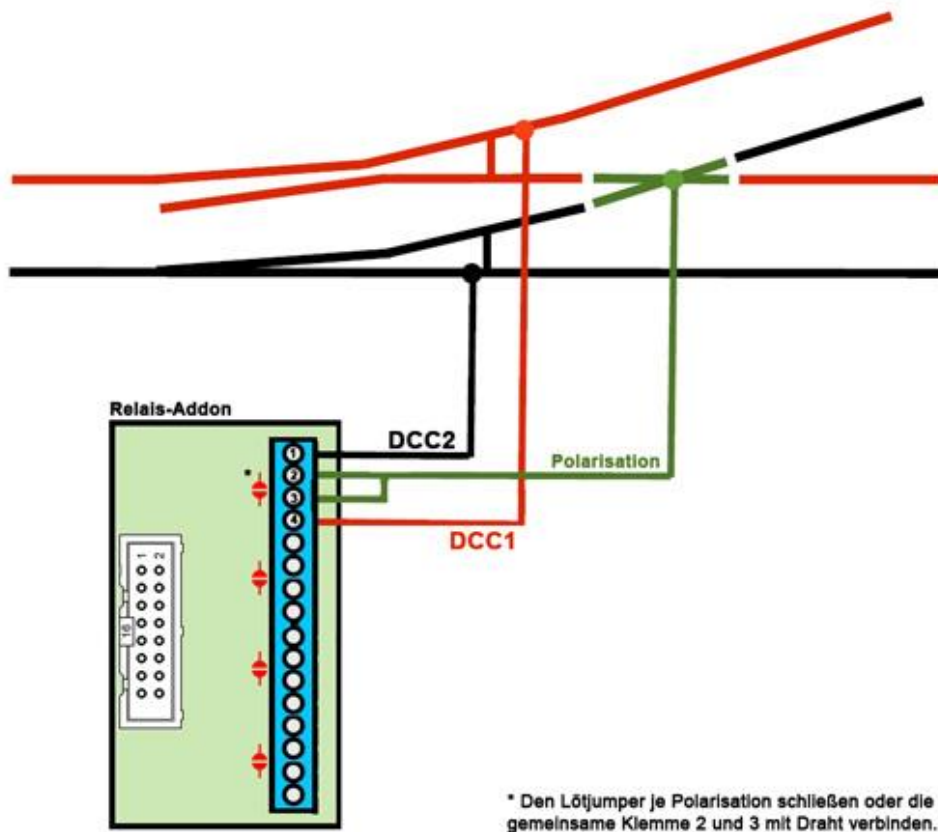


4. Example: Turnout Polarization

You know the situation: The locomotive drags 2 freight cars in a prototypically slow speed but suddenly, the locomotive stops abruptly in the middle of the turnout. You may probably also know the reason: The locomotive has become de-energized on the turnout frog and can only be move "manually" until he gets energy from the tracks again. This problem happens primarily on locomotive with a relatively short power purchase basis. What to do to overcome this problem?

The isolated frog of the switch must be connected to the track voltage. Since the frog must be connected to the inner or outer rail, depending on the turnout state, a change-over switch is required.

Turnout polarization shown at a simple turnout:



The 2 middle screw terminals 2 and 3 must be connected to the turnout frog. The other 2 contacts (1 and 4) from the relay add-on board must be connected to the corresponding rails of the track.

Alternatively you can also close the solder jumper at the bottom of the PCB which is also described at the previous page. This will connect screw terminal 2 and screw terminal 3. In this case, only one wire needs to be connected to one of the 2 screw terminals.

Attention:

The "slicing" of turnouts by the moving train produces a short circuit, so the turnout must be set to the correct direction at any time.



The relay add-on module is connected to a switching output of an BiDiB device (it's the Light Control in this example) and must be configured with the BiDiB Wizard software.

Turnout direction:

Both relays of the polarization (in this example, output 0 and output 1) are turned off, the frog has no DCC voltage anymore. In the next step, servo1 is going to move the turnout to the new desired position. Then, output 1 turns on again after a waiting time of x ticks and the frog polarization fits.

Inhalt:								
Bitte einen Namen vergeben.	tt	Wartezeit:	0	Ticks	Schaltausgang	ausschalten	Ausgang_0	
2. Schritt		Wartezeit:	0	Ticks	Schaltausgang	ausschalten	Ausgang_1	
3. Schritt		Wartezeit:	0	Ticks	Servoausgang	anfahen	Servo_1	Zielwert: 33 %
4. Schritt		Wartezeit:	140	Ticks	Schaltausgang	einschalten	Ausgang_1	

Straight direction:

The macro for the movement to the "Straight" direction is equal to the above example, just a different target position value must be set for servo. At the end, the other output (output 0) will be switched on for the correct polarization of the frog.

Assigning the 2 macros to an accessory:

The created macros must be permanently stored and also mapped to an "Accessory" term. This accessory and the terms will then be entered in a control program and also launched from this software.

Begriff	Makro	Testen
Begriff_0	Weiche 7 gerade	starten
Begriff_1	Weiche 7 abweig	starten

The advantage from this accessory-function:

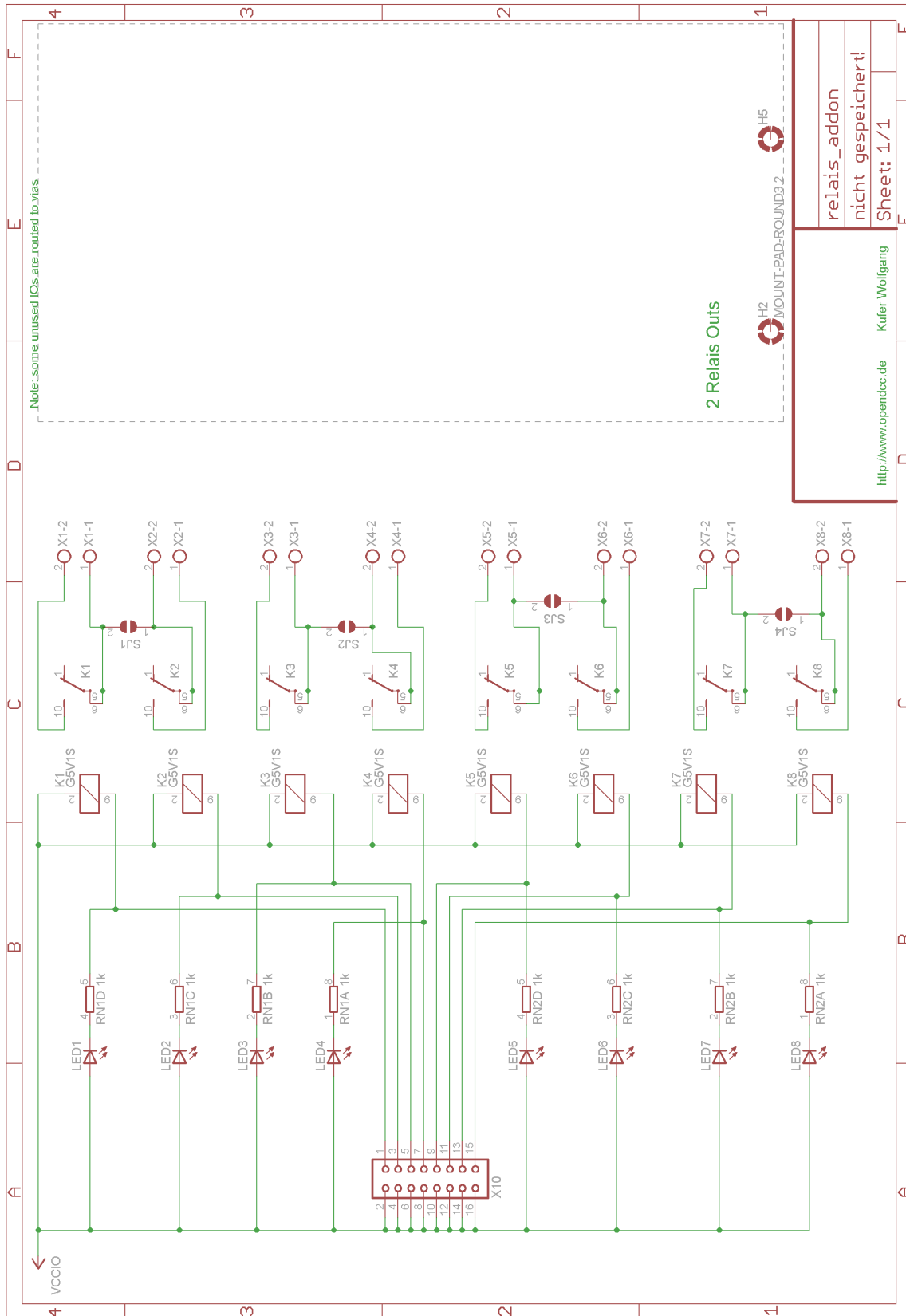
Die LC remembers the last status. After power off/on, a defined status is achieved.

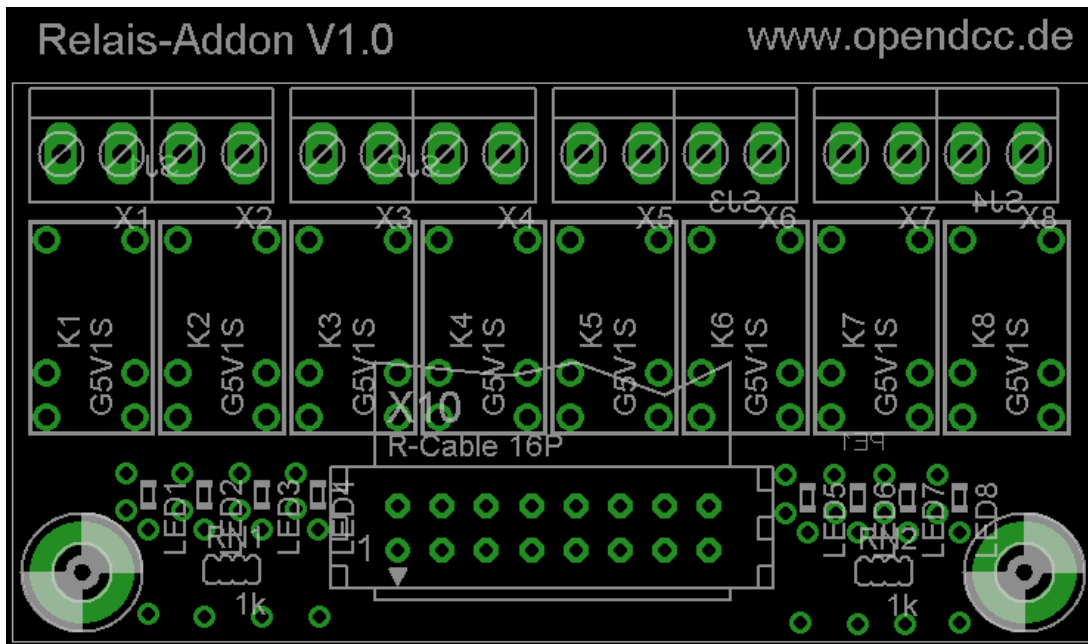
Hint:

This turnout polarization is an example for the use of the relay add-on module. According to this method also double slip switches or crossings can be polarized. This add-on module can also be used to switch other electrical loads including AC loads.

There is also an independent solution of the polarization inside the **Rocrail control-software** (Turnout: Tab Frog). Here, only the servo and switching outputs will be defined for the frog polarization. The macro-and accessory program can be omitted here because the PC program performs these steps independently.

5. Schematics / Layout





The author is always grateful for improvement suggestions and any information about errors.

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For further questions please contact our support forum!
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