



Light signal decoder

for light-signals with LED
from the *Digital-Professional-Series* !

LS-DEC-SBB-G Part-No.: **513013**

>> finished module in a case <<

Suitable for the digital systems:
Märklin-Motorola and DCC

For digital control of:

- ⇒ up to two Swiss SBB signals with 5 or 7 lamps
- ⇒ signals can be switched together or independent
- ⇒ for LED-signals with common anode or cathode

Realistic operation of the signal aspects by implemented **dimming function** and **dark phase** between the signal aspects.

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.



Introduction/Safety instruction:

You have purchased the light signal decoder **LS-DEC-SBB** as finished module in a case for your model railway.

The **LS-DEC** is a high quality product that is supplied within the *Digital-Professional-Series* of Littfinski DatenTechnik (LDT).

We are wishing you having a good time using this product.

The light signal decoder **LS-DEC** of the *Digital-Professional-Series* can be easily operated on your digital model railway.

By using a **connector plug bridge** you can **choose** if you want to connect the decoder to a **Märklin-Motorola** system or to a digital system with **DCC** standard.

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 not be liable for any consequential damages caused by improper use or installation.

Connecting the decoder to your digital model railway layout:

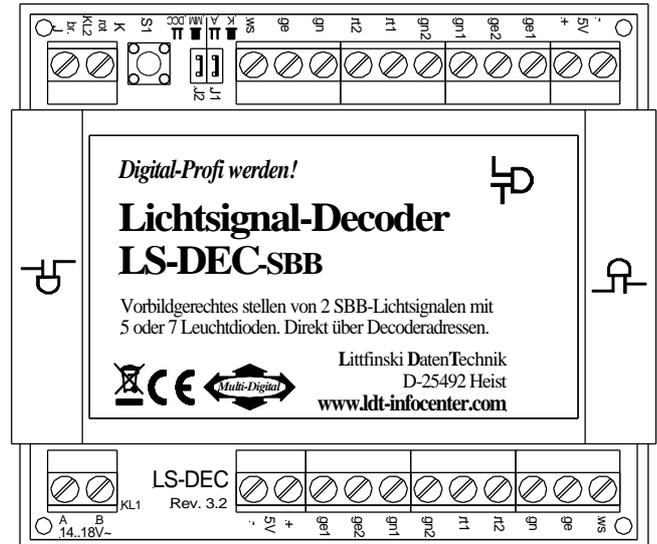
- **Attention:** Before starting the installation-work switch off the layout voltage supply (switch-off the transformers or disconnect the main supply).

The Light signal decoder **LS-DEC** is suitable for the **DCC data format** as used e.g. by **Lenz-Digital Plus**, **Roco-Digital** (switching via **Keyboard** or **multiMAUS** only; switching via **Lokmaus 2®** and **R3®** is not possible), **Zimo**, **LGB-Digital**, **Intellibox**, **TWIN-CENTER**, **DiCoStation**, **ECoS**, **EasyControl**, **KeyCom-DC** and **Arnold-Digital / Märklin-Digital=** whenever **no connector plug bridge** is inserted in position **J2**.

The decoder is suitable for **Märklin-Digital~ / Märklin Systems** or **Märklin-Motorola** (e.g. **Control-Unit**, **Central Station**, **Intellibox**, **DiCoStation**, **ECoS**, **EasyControl**, **KeyCom-MM**) if you insert a **connector plug bridge** on **J2**.

The decoder receives the **digital information** via the clamp **KL2**. Connect the clamp with a rail or even better connect the clamp directly to the command station or a booster assuring the supply of digital information free from any interference.

Please attend to the marking on clamp **KL2**. The colors '**red**' and '**brown**' next to the clamp are usually used by **Märklin-Motorola** systems (e.g. **Märklin-Digital~ / Märklin Systems / Intellibox**).



Lenz-Digital systems are using the letters '**J**' and '**K**'.

In case you assemble the decoder to an **Arnold-Digital (old)** or **Märklin-Digital=** system, you have to connect '**black**' to '**K**' and '**red**' to '**J**'.

The decoder receives the **power supply** via the two poles clamp **KL1**. The voltage shall be in a range of 14..18V~ (alternate voltage output of a model rail road transformer).

If you do **not** want to supply voltage **separately from a transformer** to the **LS-DEC decoder** you can **shorten** the clamp **KL1** and **KL2** with two wires. In this case the decoder will get the power supply **completely from the digital network**.

Connecting the signals:

General:

Up to **2 signals** with 5 or 7 lamps can be connected to the **light signal decoder LS-DEC**. One signal per clamp block. The build up of the two clamps is identical. The following description refers mainly to one clamp only. As you can see on the identical marking the description is also valid for the second clamp.

Common connection:

All LED-signals of any manufacturer are designed in accordance to the same principle. One wire of all light emitting diodes of a signal will be generally connected to one common wire. Depending if all anodes or all cathodes are connected together the signals will be called as **common anodes**- respectively **common cathodes-signal**.

If you use signals with **common anodes** you have to clamp this wire to the connection marked '+'. In addition you shall **not insert** the **connection plug bridge** in **J1** in this case.

If you use signals with **common cathodes** you have to clamp this wire to the connection marked '-'. In addition you shall **insert** the **connection plug bridge** in **J1** in this case.

The second connection of each light emitting diode is separated and mostly color marked at the end and contains a series resistor.

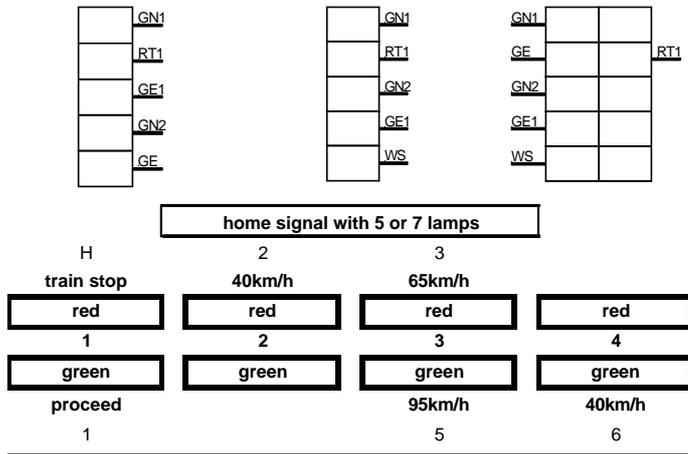
Series resistor:

Light emitting diodes have **always** to be **operated** with a suitable **series resistor** to prevent that they will be destroyed. For this prevention **all outputs** have already a **series resistor of 330 Ohm integrated** on the printed circuit board of the **light signal decoder LS-DEC**. Is there no further external resistor the diode-current will be about 10mA.

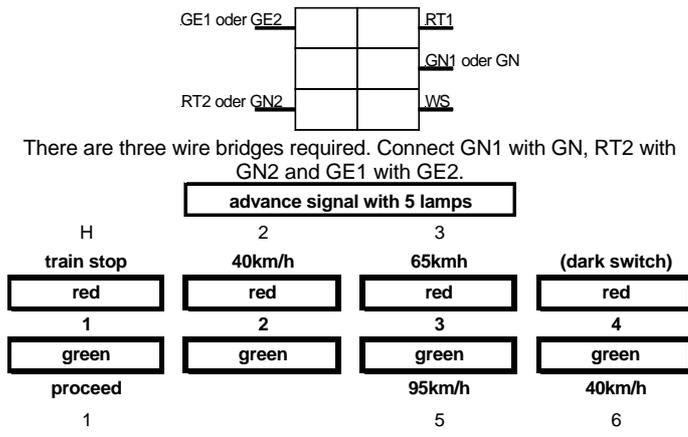
This provides **sufficient brightness**. In case your **light emitting diodes** are to **bright** you can correct the brightness by assembling **external resistors of some 100 Ohms to your personal requirement**.

For assigning the **single cables of the light emitting diodes** to the **correct clamp connection** please attend to the below **signal images**. The **marks** next to **signal light diodes** are not corresponding to the actual light color but to the marking of the **connection at the light signal decoder LS-DEC**.

1. Home signal with 5 or 7 lamps:



2. Advance signal with 5 lamps:



There are three wire bridges required. Connect GN1 with GN, RT2 with GN2 and GE1 with GE2.

If you do not know the correct allocation of the single wires to the light emitting diodes you can **test** the function by connecting the wires to **clamp RT1 or RT2**. These outputs are **active** because the decoder switches **all signals to red after switching on**.

Further sample connections are available at the internet on our Web-Site (www.ldt-infocenter.com) under "Downloads". Please load the file "LSDEC-SBB_INFO_engl" onto your PC.

Programming the decoder address:

- Switch on the **power supply** of your model rail way.
- Activate the **programming key S1**.
- **Two light emitting diodes** on a **signal** connected to the **left clamp block** will be **automatically** switched over **every 1,5 seconds** in a flashing mode. This indicates that the decoder is in the **programming mode**.
- The decoder addresses for magnet accessories also to be used for switching the **signal-aspects** are combined into **groups of four**. The address **1 to 4** build the **first** group. The address **5 to 8** build the **second** group etc. In accordance to the operation mode 4 or 8 addresses will be assigned to the decoder. At the mode "**single function**" **both signals** connected to the light signal decoder can be operated absolute independent. The decoder requires for this operation mode 8 addresses (4 addresses for each clamp bar). At the "**master/slave-function**" **both signals** will be switched with **one command**. Therefore will it be possible e.g. to switch **home- and advance signals together**. In this operation mode the light signal decoder requires only 4 addresses. The operation mode has to be entered together with the decoder address. If you activate during address-programming a key of the required group of four which would switch a turnout **straight** or a signal to **green** the decoder will go into the "**single function mode**". If you activate a key which would switch a turnout round or switch a signal to red you choose therefore the "**function master/slave**".

- If the decoder has **recognized the assignment** correctly the connected **light emitting diode** will flash a little **faster**. Afterwards the flashing slows down to the initial 1,5 seconds again. In case the decoder will not recognize the address it could be that the two digital information connections (clamp2) are wrong connected. For testing this, switch off the power supply, exchange the connection on KL2 and start addressing again.
- Press now the **programming key S1** again. Have you chosen the operation mode "**master/slave function**" the decoder will leave the programming mode because the programming of the group of four has been completed. All signals will be **automatically switched to stop**. The programming of the "**master/slave function**" has now been completed. Have you chosen the operation mode "**single function**" you have assigned the address group of the left clamp bar with the **first programming step**. Therefore **two light emitting diodes** will flash at the signal connected to the **right clamp bar**. Now **activate any key** of the **address group** assigned for this signal. The decoder will **confirm the programming** with a faster flashing. Then **press the programming key S1** again. The programming for the "**single function**" has now been completed. Both connected signals will be **switched to STOP** by the decoder.

Signal switching:

Below the drafts of the above signal aspects you can find a respective key-group for the addresses 1 to 4 and the corresponding keys '**red**' and '**green**'. Additionally is the meaning of the signal position indicated above or below. The addresses 1 to 4 are indicated as a sample only. The actual addresses are corresponding to the assignment of the clamp bar you choose during programming. If you have connected an advance- and an exit-signal to one of the two clamp bars (as shown at the first sample) you can switch with the address 1 and the key **green** the exit signal to **proceed** (1).

The light emitting diode marked with **GN** will now indicate this at the signal.

Dark switching:

In case a **home- and an advance-signal** are on **one common signal post** the **advance-signal** can remain dark if the **home-signal indicates H or 6**.

To **activate the dark-switching-mode** switch the home signal to **H or 6**. If you press now the key 4 '**red**' you can switch the advance-signal-aspect to 'on' respectively to 'off' with each key stroke. If the advance-signal is in 'off' position the dark-switching mode is activated. The **light signal decoder stores this mode permanently** as well as the **programmed addresses**. All programmed modes can be changed at any time.

Advance signal aspects received during the signal has been switched to dark will be indicated whenever the exit signal has been switched to 1, 2, 3 or 5.

Attention:

The **Light signal decoder LS-DEC** switches the signal aspects not just quickly on and off but is dimming the light emitting diodes realistic up and down. Even between the signal aspects a short off-phase is provided. Further digital commands received during this switch-over-time of about 0,4 seconds will not be taken up from the decoder. Please take care that the switching-commands are not in a too fast sequence. The impression is absolutely realistic if the switching is considerable slow.

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