



Light-Signal Decoder

for light-signals with LED

from the *Digital-Professional-Series* !

LS-DEC-SBB-F Part-No.: **513012**

>> finished module <<

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.



Label:
white point
or SBB



Introduction/Safety instruction:

You have purchased the Light-Signal Decoder **LS-DEC-SBB** for your model railway as a kit or as finished module.

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 **24 month 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.
- Also, note that electronic semiconductors are very sensitive to electrostatic discharges and can be destroyed by them. Therefore, discharge yourself before touching the modules on a grounded metal surface (e.g. heater, water pipe or protective earth connection) or work on a grounded electrostatic protection mat or with a wrist strap for electrostatic protection.
- We designed our devices for indoor use only.

Connecting the decoder to your digital model railway layout:

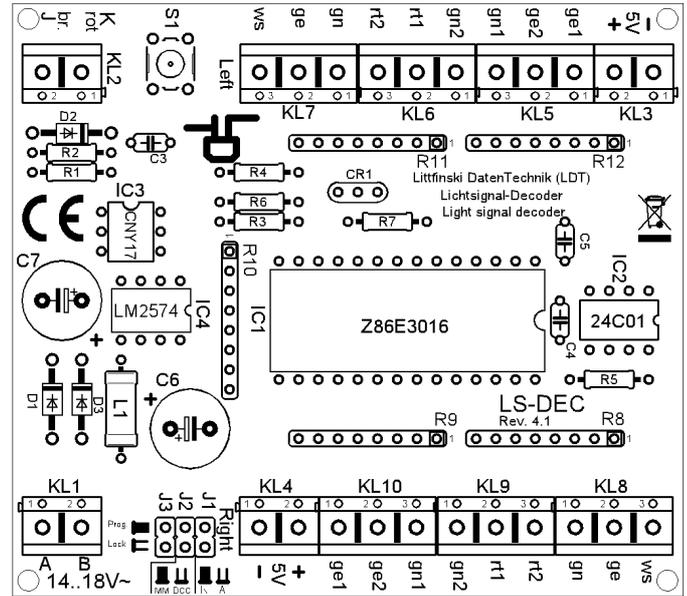
- **Attention:** Before starting the installation-work switch off the layout voltage supply (switch-off the transformers or disconnect the main supply).

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 to an own digital main ring supply 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 DiCoStation / EasyControl**).



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 signals 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 a 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** (e.g. supplied from Viessmann or alphamodell) 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 diode is separated and mostly color marked at the end and contains a series resistor.

Series resistor:

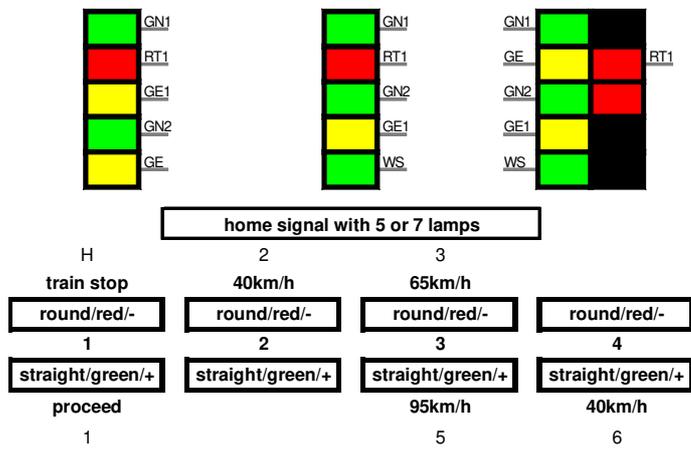
Light emitting diodes have always to be operated with a suitable **series resistor** to prevent that they will be destroyed. For this prevention **all outputs** have already a **series resistor of 330 Ohm integrated** on the printed circuit board of the **Light-Signal Decoder LS-DEC**. Is there no further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

This provides **sufficient brightness**.

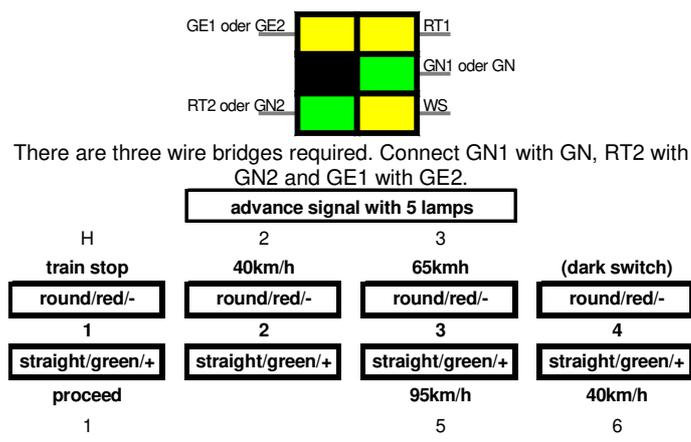
For assigning the **single cables of the light diodes** to the **correct clamp connection** please attend to the below **signal images**. The **marks** next to **signal light diodes** are not corresponding to the actual light color but to the marking of the **connection at the Light-Signal Decoder LS-DEC**.

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**.

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.

Further sample connections are available at the internet on our Web-Site (www.ltd-infocenter.com) at the section "Sample Connections". Additionally you can find detailed information about the Light-Signal Decoder LS-DEC-SBB at our Web site within the section "Digital-Compendium".

Programming the decoder address:

- The jumper J3 has to be inserted for the programming of the decoder addresses.
- Switch on the power supply of your model rail way.
- Activate the programming key S1.
- At least two light emitting diodes on a signal connected to the left clamp block (on this decoder side is the programming key S1) 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 the 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 "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 switched to STOP by the decoder.

Signal switching:

The opposite sample connections show how the fourfold address-group can be set by use of 8 keys of the push button panel for setting the turnouts or signals. Between each pair of keys are e.g. the addresses 1 to 4. The two keys red and green for each address are assigned to the turnout position round or straight respectively the corresponding signal aspect which is indicated above or below key.

The actual address section is related to which fourfold address-group has been selected during the programming.

If you use a remote control LH100 of Company Lenz Elektronik then red will be the minus key and green the plus key.

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 keystroke. 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. The dark switching can be activated or deactivated only if the jumper J3 has been inserted.

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.

Accessory:

For easy assembly of the printed circuit board below your model rail road layout base plate we offer a set of assembly material under the order identification: MON-SET. Under LDT-01 you can purchase a low priced durable suitable case for the LS-DEC.

Attention:

The Light-Signal Decoder LS-DEC switches the signal aspect 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.

If the jumper J3 will be removed after programming of the decoder addresses and after adjusting the dark switching mode the memory storage of the Light-Signal Decoder LS-DEC will be protected against any alteration.

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