



# Light-Signal Decoder

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

**LS-DEC-OEBB-F** Part-No.: **511012**

>> finished module <<

Suitable for the digital systems:  
**Märklin-Motorola** and **DCC**

For the direct digital control of:

- ⇒ up to four 2- or 3-aspect signals
- ⇒ up to two 7-aspect signals (home- and advance signal on one signal post)
- ⇒ for LED light signals with common anodes or common cathodes

**Realistic operation** of the signal aspects by implemented **dimming function** and a short **dark phase** between the switching of 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:  
**orange point**  
or **ÖBB**



## Introduction/Safety instruction:

You have purchased the Light-Signal Decoder **LS-DEC-OEBB** 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 wish 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:

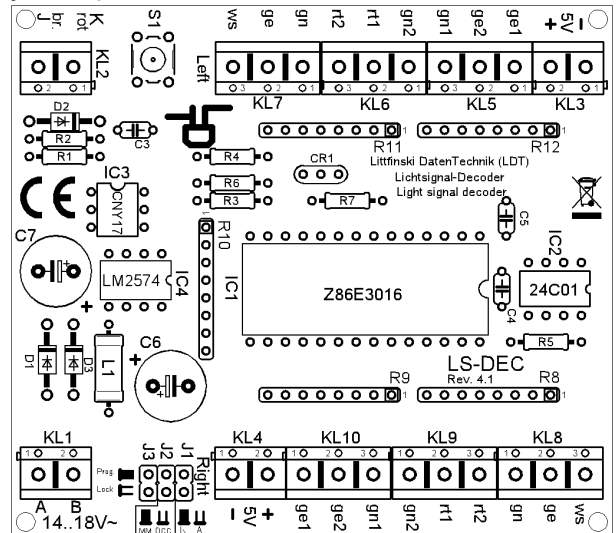
- **Attention:** Before starting the installation-work **switch-off the layout voltage supply** (switch-off the transformers or disconnect the main supply).

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 **4 signals** can be connected to the **Light-Signal Decoder LS-DEC**. **Two signals per each 11poles 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 cable. 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 cable 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 cable 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.

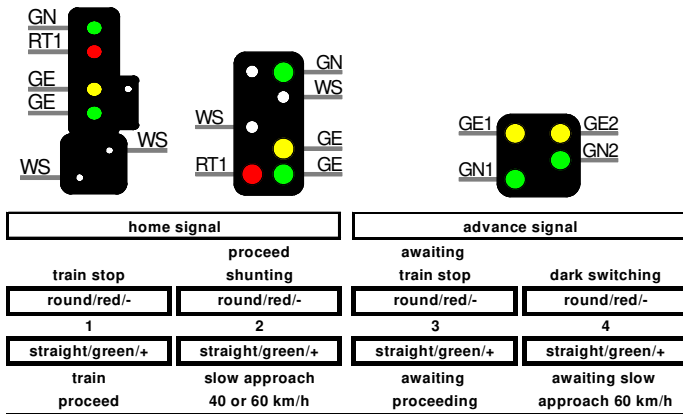
This provides **sufficient brightness**. Light signals of **alphamodell** contain integrated serial resistors which can not be removed or changed in value. The integrated resistors are suitable to provide a realistic brightness of the LED's when connected to the **Light-Signal Decoder LS-DEC**.

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**.

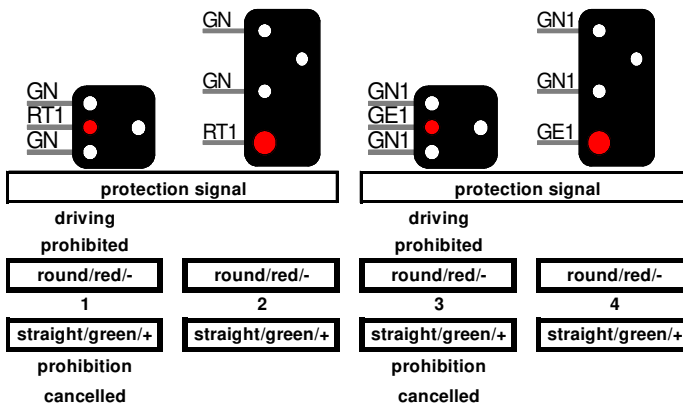
By **alphamodell** all **shunting-** and **protection-signals** as well as **home signals** with **shunting display** have no light emitting diodes for the white signal lights but small integrated **incandescent lamps**. As incandescent lamps require a considerable larger current than LED's those light signals can only be operated at the **Light-Signal Decoder LS-DEC** by using the adapter **Adap-LS-A**.

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**. This output is **active** because the decoder switches **all signals to red after switching on**.

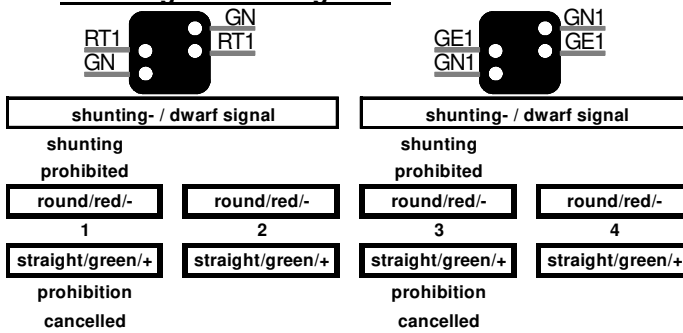
### 1. Home- and advance signal:



### 2. Protection signals:



### 3. Shunting- / Dwarf-signals:



Further sample connections are available at the internet on our Web-Site ([www.ldt-infocenter.com](http://www.ldt-infocenter.com)) at the section "Sample Connections". Additionally you can find detailed information about the Light-Signal Decoder LS-DEC-OEBB 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**.
- Press now **one key** of the **fourfold address-group** to be assigned to the **left clamp** block of the decoder. For programming the decoder address you can also release a turnout switch signal via a personal computer.

**Remarks:** The **decoder addresses for magnet accessories** also to be used for 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. Each clamp block of a **LS-DEC** decoder can be assigned to any of these groups. It does not matter which of the eight possible keys used for programming will be activated. The decoder stores always the complete group of keys.

- 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. At least **two light emitting diodes** connected to the **right clamp** block will flash now. Repeat the programming as described above.
- Now **press** the programming key S1 a **third time** for **leaving the programming mode**. All signals will be **automatically** switched to **STOP**.

### 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**.

Have you connected a home- and an advance-signal as per first sample to one of the clamps you can switch the exit-signal to **proceed** with the address 1 and the key **green**.

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

### Special features for the signal aspect "slow proceed":

**Home- and advance -signals** can indicate the aspect "**slow proceed with 40 km/h**" and "**slow proceed with 60 km/h**".

The **Light-Signal Decoder LS-DEC** indicates at the **advance signal** always the aspect "**slow proceed with 60 km/h**". For the **home signal** is it possible to select one of the two aspects for **slow proceed**.

**Either the yellow** or the **green lower LED** of the **home signal** has to be connected to the **connection GE** of the **Light-Signal Decoder LS-DEC**.

### Dark switching:

In case a **home- and an advance-signal** are on **one common signal**

**post** the **advance-signal** has to remain **dark** if the **home-signal** indicates **train stop** or **shunting prohibited cancelled**.

To **activate the dark-switching-mode** switch the **home signal** to **train stop**". 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 commands received during the signal is switched to dark will be indicated when the home signal will be switched to proceed or slow proceed.

### Accessory:

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

### Attention:

The **Light-Signal Decoder LS-DEC** switches the signal aspect not just 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 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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