



Light-Signal Decoder

for light-signals with LED

from the *Digital-Professional-Series* !

LS-DEC-CFL-F Part-No.: 514012

>> finished module <<

Suitable for the digital systems:
Märklin-Motorola and DCC

For direct digital control of:

⇒ up to four CFL Main-, Advance- or Line-Close signals.

⇒ up to two combined CFL Main-/ Line-Close signals.

Realistic operation of the signal aspects by implemented **dimming function** and 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:
CFL



Introduction/Safety instruction:

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

The **LS-DEC** decoders are 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:

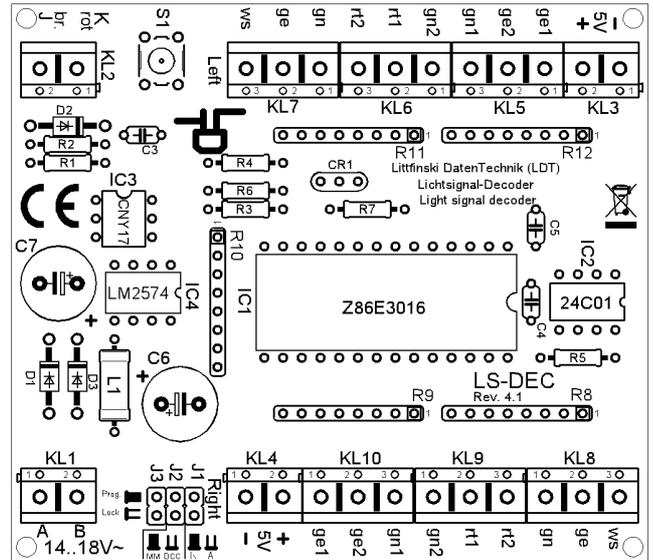
- **Attention:** Before starting the installation-work switch off the layout voltage supply (switch-off the transformers or disconnect the main supply).

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 to be 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 within 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 **connect** the clamp **KL1** to clamp **KL2** with two wires. In this case the decoder will get the power supply **completely** from the **digital network**.

Connecting the signals:

General:

To the **Light-Signal Decoder LS-DEC** can be up to **4 signals** connected. **Two signals onto each 11poles clamp bar**. The connection sequence of the two clamps is identical. The following description refers mainly to one clamp only. As you can see at the identical markings 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 **alphanode**) 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 this case you shall **insert** the **connection plug bridge** in **J1**.

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

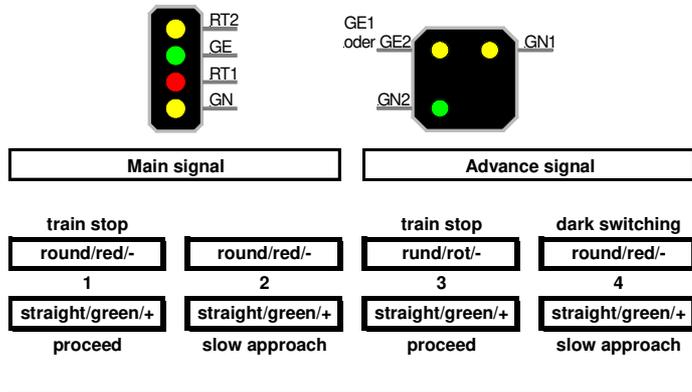
Series resistors:

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** contain 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 available the diode-current will be about 10mA. This provides **sufficient brightness**.

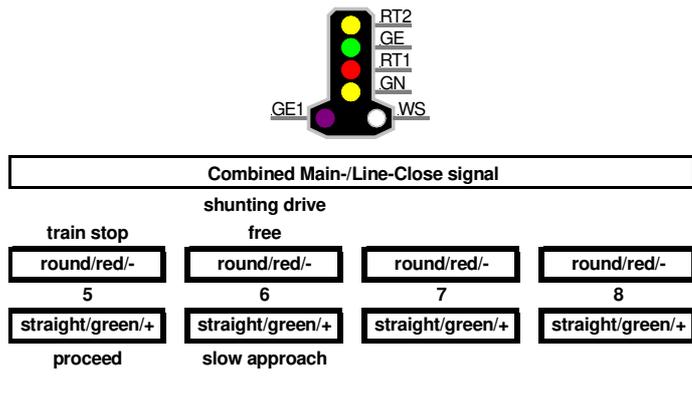
For assigning the **single cables of the light emitting diodes** to the **correct clamp connection** please attend to the below **signal images**. The **marks** next to **signal light diodes** are not corresponding to the actual light-color but to the marking of the **connection at the Light-Signal Decoder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

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. Connection of Main- and Advance signal:



2. Combined Main-/Line-close signal:



Colored operation instructions and sample connections can be found at the Internet on our Web-Site (www.ldt-infocenter.com) at the sections "Downloads" and "Sample Connections". Additionally you can get detailed information about the Light-Signal Decoder LS-DEC-CFL on our Web-Site at 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 layout.
- 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 located) will be automatically switched-over every 1.5 seconds in a flashing mode. This indicates that the decoder will be 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 PC.
Remarks: 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 will be the first group. The address 5 to 8 will be 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 Light-Signal Decoder LS-DEC-CFL shall switch two main-, advance- or line-close-signals via this clamp bar this will be programmed with the decoder address. If you activate during the programming process a key of the selected fourfold group for switching a turnout straight or switching a signal to green you will adjust the decoder for the switching of two main-, advance- or line-close signals.
If you activate a key for switching a turnout round or a signal to red you select the control of one combined main/line-close signal. For both programming processes (left and right clamp bar) you can individually select if two main-, advance- or line-close signals or a combined main/line-close signal shall be digital controlled.
- 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 (clamp 2) 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 for this clamp block 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 beside shown sample connections shows how the fourfold address-groups can be set by use of 8 keys of the push button control 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 of the 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.

1. Two Main-, Advance- or Line-Close signals on each clamp bar:

If you have set the Light-Signal Decoder LS-DEC-CFL by programming of one clamp bar to the switching of two main- advance- or line-close signals as shown at the left side sample under 1 you can e.g. switch with the address 1 and the key green the main-signal onto proceed. The light emitting diode marked with GE will indicate this at the main-signal.

Activate now the key green of the address 3 and the advance signal will be switched to proceed. The light emitting diode of the signal marked GN2 will lighten up.

The first signal will be always switched via the addresses 1 and 2 and the second signal of the clamp bar via the addresses 3 and 4 of the programmed fourfold address group.

Dark switching:

If there are main- and advance signals assembled on one pole the advance signal shall remain dark during the main signal has been switched to train stop.

To activate the dark-switching-mode switch the main signal to 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 switching-commands received during the advance signal stays on dark position will be indicated after the main signal will be switched to proceed or slow approach.

2. One combined Main-/Line-Close signal on each clamp bar.

If you have set the LS-DEC-CFL by programming of the addresses of one clamp bar that one combined main-/line-close signal shall be controlled you should assemble as per sample 2.

With the two first addresses of the programmed fourfold address group of this clamp-bar can be the four signal aspects controlled. At the sample 2 will it be e.g. the addresses 5 and 6.

Attention:

The Light-Signal Decoder LS-DEC switches the signal aspects 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 the memory storage of the Light-Signal Decoder LS-DEC will be protected against any alteration.

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