



Light Signal Decoder

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

LS-DEC-DB

>> Assembled Module <<

Suitable for Digital Systems:
Märklin-Motorola (Märklin-Digital~) and NMRA DCC

For direct digital control of:

- ⇒ up to four 2- or 3-light-type signals
- ⇒ up to two 7-light-type signals (main and distant signal on one pylon)
- ⇒ for light signals with LED and common anode or cathode

Realistic switching of all signal lights by **dimming** and short **dark phases** between different signal lights

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 years of age! Improper use will imply danger of injuring due to sharp edges and tips! Please carefully store these instructions.



Introduction / Safety Information:

Thank you for buying the light signal decoder **LS-DEC** for your model railway. The **LS-DEC** a high quality product which is supplied within the **Digital Professional Series** of Littfinski Daten Technik.

All our products are either available as kits or assembled modules.

With an easy to fit **jumper you can choose** if your want to use the decoder either with **Märklin-Digital~** or the **NMRA DCC** digital standard.

The assembled modules come with a 1-year **warranty**.

- Please read the following instructions carefully. Warranty will expire due to damages caused by disregarding the operating instructions. LDT will also be not liable for any consequential damages caused.

Connect the decoder with your digital model railway:

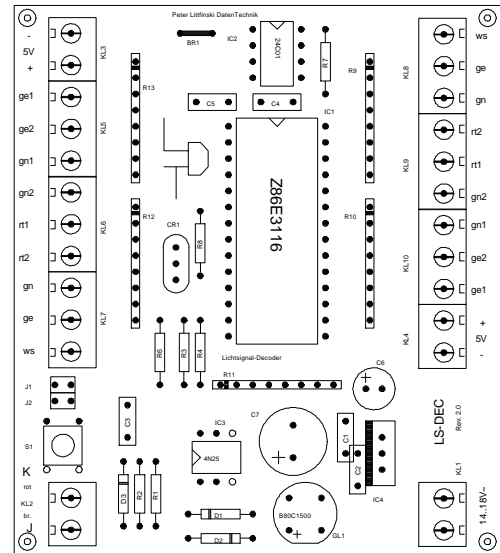
- **Important:** Please disconnect your digital model from digital voltage ("stop" key on your digital control unit or unplug from current) before starting your work.

The light signal decoder **LS-DEC** can be used with the **NMRA DCC digital system**, as it is used in systems like **Arnold-Digital**, **Lenz-Digital Plus**, **Roco-Digital** (Switching by keyboard; by Lokmouse is not possible). **Zimo**, **LGB-Digital** and **Märklin-Digital=**. In these cases jumper position **J2** must be open (no jumper set).

With a jumper set on position **J2 (closed)** the decoder can be used with **Märklin-Digital~** or **Märklin-Motorola** systems.

The **digital information** will be supplied to the decoder via connection clip **KL2**. This can either be done by connecting the decoder directly with the track or, for an interference-free data transfer, with the digital control unit or booster.

Please pay attention to the marks at clip **KL2**. The color information "red" and "brown" is common for **Märklin-Motorola** systems (**Märklin-Digital~**).



Other systems use the letters "J" and "K".

If you use the decoder with **Arnold-Digital (old)** or **Märklin-Digital=** systems please connect "black" with clip "K" and "red" with clip "J".

The **electrical power** will be supplied via the two-pole clip **KL1**. Voltages from 14 to 18V~ are necessary (alternating current exit of an model railway transformer).

If you do **not** wish to **feed the LD-DEC by a separate transformer**, you can **bridge clips KL1 and KL2**. The decoder will then **fully be operated by digital current**.

Connect the decoder with your light signals:

General information:

The **light signal decoder LS-DEC** can be connected with **4 signals**. **Two signals at each 11 pole clips**. The following introduction often describes the connection with only one clip but can be used for the identical second clip as well.

Common connection:

All signals fitted with LED are build the same way, regardless of the manufacturer of these signals. In principle one of the two connections of all LED's are bunched in one cable. Depending on the bunching of all anodes or cathodes one says **common anode** respectively **common cathode**.

If you use signals with a **common anode** please connect the cable to the clip marked with "+". The **jumper J1 must be open** in this case. If you use signals with a **common cathode** please connect the cable to clip marked "-" and **set the jumper on J1 (closed)**.

The second connection of each LED is often marked with a color at the end and is fitted with a resistor.

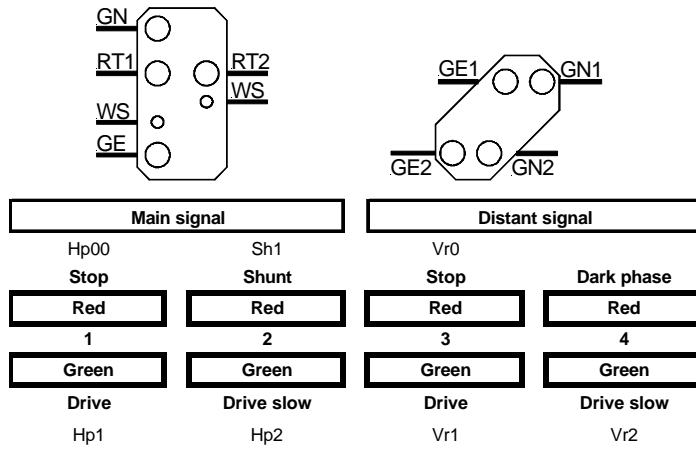
Drop resistor:

LED's have always to be **operated** with a suitable **drop resistor**, otherwise it would be destroyed. To avoid this **all outputs** on the **LS-DEC** are **already fitted with drop resistor of 330 Ohm**. Without another external resistor the voltage of the diodes is 10mA.

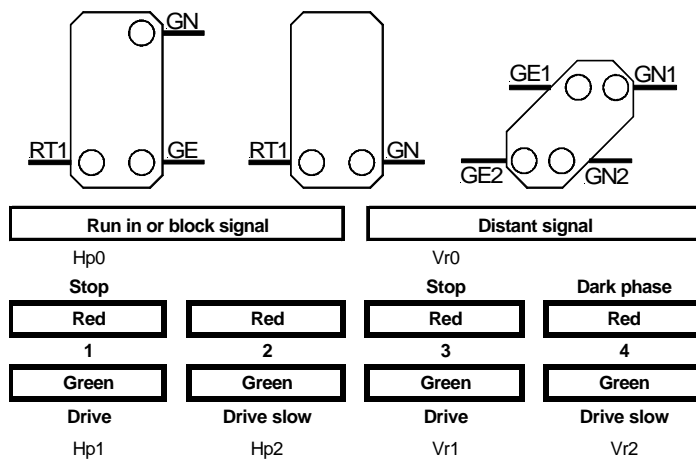
This is enough for a **sufficient brightness**. If this is **too bright** for you further **external resistors of some 100 Ohm** can help to adjust brightness to your **individual needs**.

In order to **assign each cable of the LED's** to its **correct clip** please use the following **figure**. **Designations** next to the LED's of the signals do not comply with the real colors but **mark the connection at the light signal decoder LS-DEC**.

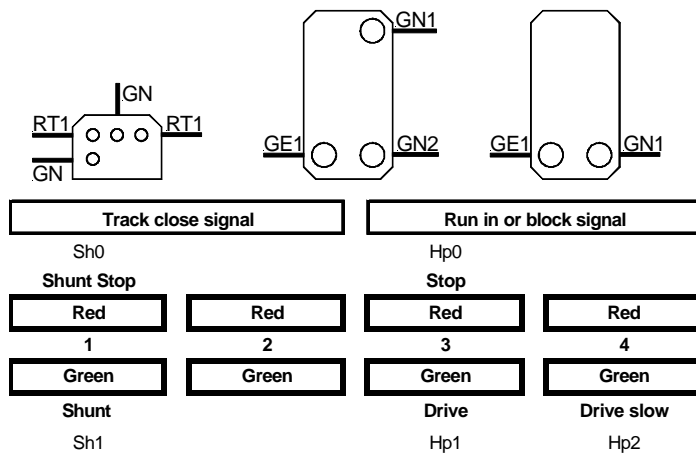
1. Main and distant signal:



2. Run in or block and distant signal:



3. Run in or block and track close signal:



If you do not exactly know the assignment of each cable of the LED's you can **connect the cables with clips RT1 or RT2 for testing**. As the decoder will switch all signals to red after first operation, these exits are active.

For further examples of connecting light signals please visit our web-site (www.ldt-infocenter.com) and download the file "LSDEC_DB_INFO" to your PC.

Programming the decoder addresses:

- **Switch on the power supply** of your model railway.
- Push the **programming key S1**. Please to not touch the integrated circuits of the decoder board as it can be destroyed by electrostatic discharge.
- At least **two LED's** of the **signal** connected to the left clip will **automatically flash every 1,5 seconds**. Your decoder is in the **learning mode** now.

- **Push the key** (of the **group of keys** you want to assign to) of the signal which is connected to the **left clip** of the decoder now. You can also program the decoder address by releasing a switch command on your PC.

Remark: The accessories **decoder addresses for turnouts**, which are also **used to switch signals**, are combined in groups of 4. Addresses 1 to 4 are building the first group, the addresses 5 to 8 the second group etc. Each **LS-DEC** decoder at one clip can be assigned to any requested group. You can push any of the 8 keys of a group to program the decoder address. The whole group of keys is programmed in that case.

- The decoder will **confirm** that the **addresses** have been **learned** by flashing the LED's a **bit faster**. After some seconds flashing will return to 1,5 seconds mode. If the decoder is not able to learn the addresses please check if the cables at clip KL2 (digital information) are eventually connected in reversed order. To test this please exchange both cables at KL2 and start programming again.
- Confirm the programming key S1 again. At least **2 LED's** of the signal connected to the **right clip** will **flash**. Proceed with programming as described above.
- By **pushing** the programming key S1 the **third time** you will **leave the programming mode**. All signals are **switched automatically to STOP** now.

Switching the signals:

The figures beside show signals assigned to one group of keys with the addresses 1 to 4 and the keys **red** and **green**. The events assigned to each key are mentioned below or above the key symbols. This is only an example. The real addresses are depending on your personal programming.

If you have connected a main and a distant signal to one of the clips, as shown as example, you can switch with address 1 and key **green** the main to **GO (Hp1)**.

The LED marked with **GN** will show this on the signal now.

Dark phases:

If **main and distant signal** are installed **on the same pylon** the **distant signal should show no signal lights** when the **main signal** shows **STOP (Hp00)** or **SHUNT STOP (Sh1)**.

To activate the dark phase switch the main signal to Hp00 or Sh1. If you push key 4 (**red**) now you can switch the distant signal to ON or OFF or vice versa. If the distant signal shows no lights the dark phase is activated.

Like the **programmed addresses**, the **light signal decoder** **permanently saves** the latest settings. All settings can be changed again.

As soon as the main signal was switched to Hp1 or Hp2 the distant signal will change from the dark phase to realistic signal lights.

Accessories:

For safe **installation** of the decoder we supply an **installation set** (Order code: **MON-SET**) or a stable **plastic case** (Order code: **LDT-01**).

Important note:

The **light signal decoder LS-DEC** does not simply switch signal lights on or off. The LED's are realistically dimmed with a short dark phase between the different signal lights. New digital information to switch the lights cannot be processed during this short period (ca. 0,25 sec.). Therefore please do not change to another signal light to fast. It's even not realistic.

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