Littfinski DatenTechnik (LDT)

Operating Instruction

Light-Signal Decoder

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

LS-DEC-NS-F Part-No.: 515012

>> finished module <<

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

For digital control of:
⇒ up to four 3-aspect signals of the Nederlandse Spoorwegen (NS).
⇒ speed sign is illuminated by slow speed.
⇒ realistic switching from stop (red) via slow speed (yellow) to proceed (green).

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

CE ☒ **Multi-Digital**

Label: blue point or NS

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Introduction/Safety instruction:
You have purchased the Light-Signal Decoder **LS-DEC-NS** 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 **L**ittfinski **D**aten**T**echnik (**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).**
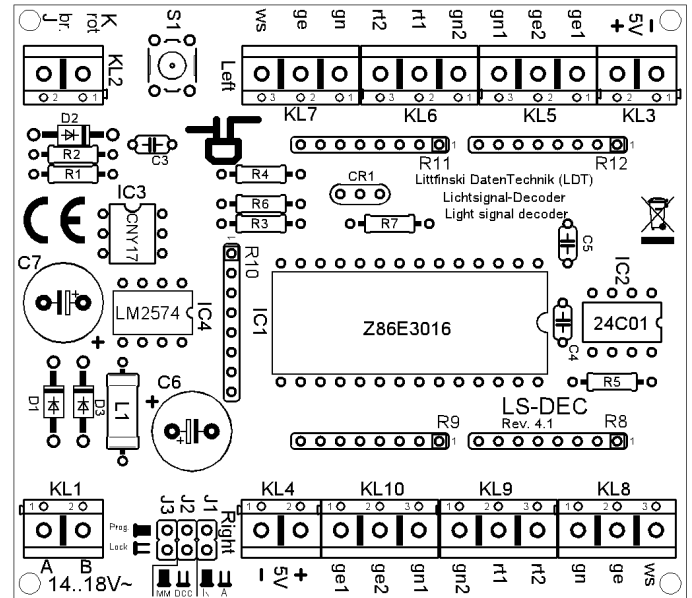
Lenz-Digital systems are using the letters **'J'** and **'K'**.
In case you assemble the decoder to an **Arnold-Digital (old)-** or **Märklin-Digital=** system, you have to connect **'black'** to **'K'** and **'red'** to **'J'**.
The decoder receives the **power supply** via the two poles clamp **KL1**. 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 **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.
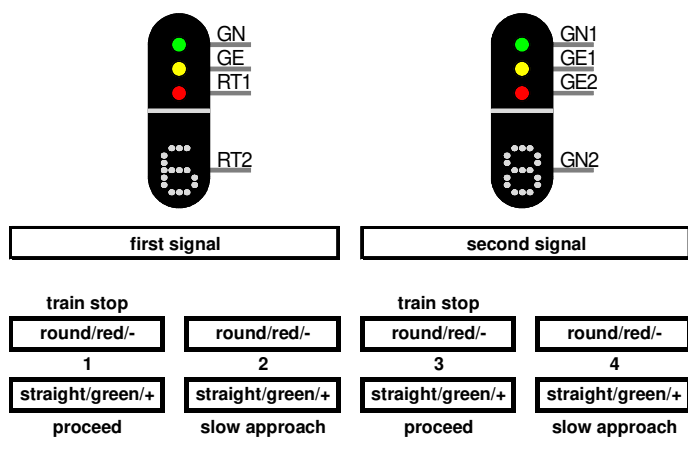
Series resistor:
Light diodes have **always** to be **operated** with a suitable **series resistor** to prevent that they will be destroyed. For this prevention **all outputs** have already a **series resistor** of **330 Ohm** integrated on the printed circuit board of the **Light-Signal Decoder LS-DEC**. 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 GE2**. These outputs are **active** because the decoder switches **all signals to red after switching on**.

3-aspect signal of the Nederlandse Spoorwegen (NS) with illuminated numeric sign:

first signal		**second signal**	

train stop		train stop	
round/red/-	round/red/-	round/red/-	round/red/-
1	**2**	**3**	**4**
straight/green/+	straight/green/+	straight/green/+	straight/green/+
proceed	**slow approach**	**proceed**	**slow approach**

2-aspect signal of the Nederlandse Spoorwegen (NS):

first signal		**second signal**	

train stop		train stop	
round/red/-	round/red/-	round/red/-	round/red/-
1	**2**	**3**	**4**
straight/green/+	straight/green/+	straight/green/+	straight/green/+
proceed		**proceed**	

Further sample connections are available at the internet on our Web-Site (**www.ldt-infocenter.com**) at the section "**Sample Connections"**. Additionally you can find detailed information about the Light-Signal Decoder **LS-DEC-NS** 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**.
The draft regards to one respective clamp bar only. As both clamp bars are built up identical you can connect 4 signals to one decoder.
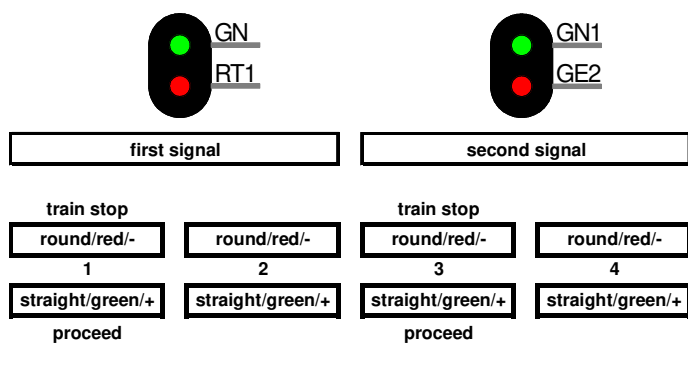
If e.g. the first home signal stays on **red** you can switch with address **1** and the key **green** the exit signal to **proceed**.

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

You can observe the switching of the signal aspects from stop (red) via slow approach (yellow) to proceed (green) as usual for Nederlandse Spoorwegen signals.

If you use signals with **illuminated numerical signs** this sign will be illuminated together with the yellow light emitting diode for **slow approach**.

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 to 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.