

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.



blue point

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 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 a **2 years limited 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.

Connecting the decoder to your digital model railway layout:

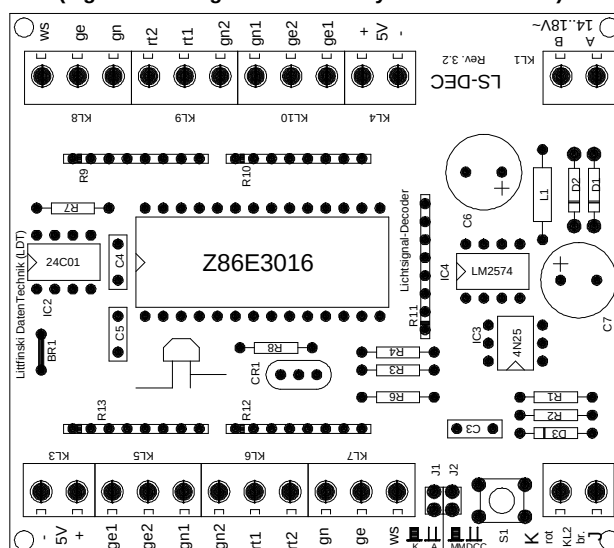
- **Attention:** Before starting the installation-work switch off the layout voltage supply (switch-off the transformers or disconnect the main supply).

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**, **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**, **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 directly to the command station or a booster 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**).



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** (as most signals) 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 10mA.

This provides **sufficient brightness**. In case your **light diodes** are to **bright** you can correct the brightness by assembling additionally the series resistors supplied by the signal manufacturer.

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**.

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



first signal		second signal	
train stop	train stop	train stop	train stop
red	red	red	red
1	2	3	4
green	green	green	green
proceed	slow approach	proceed	slow approach

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



first signal		second signal	
train stop	train stop	train stop	train stop
red	red	red	red
1	2	3	4
green	green	green	green
proceed	proceed	proceed	proceed

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**.

Further sample connections are available at the internet on our Web-Site (www.ltd-infocenter.com) under "Downloads". Please load the file "LSDEC-NS_INFO_engl" onto your PC.

Programming the decoder address:

- **Switch on the power supply** of your model rail way.
- Activate the **programming key S1**. Do not touch the integrated circuits of the pc-board because any electrostatic discharge can destroy the IC's.
- At **least two light emitting diodes** on a **signal** connected to the **left clamp block** 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 key-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:

Below the drafts of the above signal aspects you can find a respective key-group for the addresses 1 to 4 and the corresponding keys '**red**' and '**green**'. Additionally is the meaning of the signal position indicated above or below. The addresses 1 to 4 are indicated as a sample only. The actual addresses are corresponding to the assignment of the clamp bar you choose during programming. 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 **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 too fast sequence. The impression is absolutely realistic if the switching is considerable slow.

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