Littfinski DatenTechnik (LDT)

Operating Instruction

Light-Signal Decoder
for light-signals with LED
from the *Digital-Professional-Series* !
LS-DEC-KS-F Part-No.: 519012

>> finished module <<

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

For direct digital control of:

⇒ **two Ks-Signals** of the **Ks-Signal-system** from the **Deutsche Bahn** (**Ks-Entry-**, **Ks-Exit-**, **Ks-Advance signals** as well as **Ks-Entry-** and **Ks-Exit-Multiple section signals** with **up to 16 signal aspects**).

⇒ **LED light signals with common anodes or common cathodes.**

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.

CE ⊠ Multi-Digital

Label: KS

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Introduction/Safety instruction:

You have purchased the Light-Signal Decoder **LS-DEC-KS** 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 **L**ittfinski **D**aten**T**echnik (**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).**
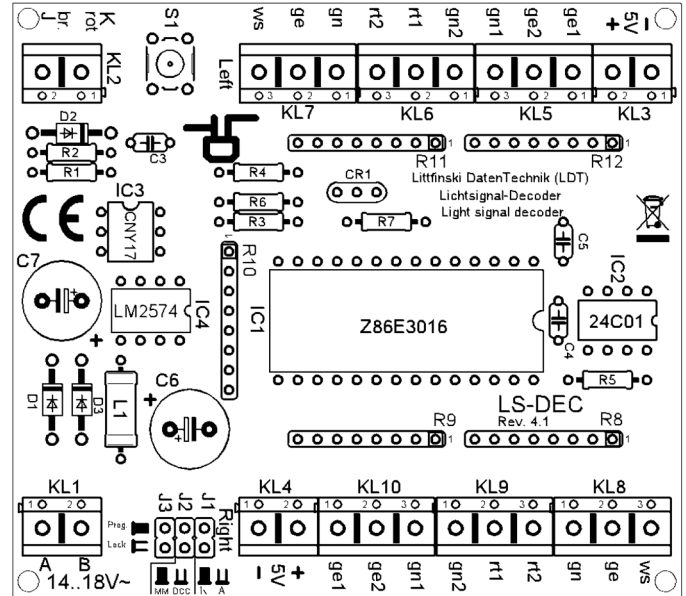
Lenz-Digital systems are using the letters **'J'** and **'K'.**

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:
2 Ks-signals can be connected to the **Light-Signal Decoder LS-DEC**. **One signals per each 11poles clamp block**. 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 **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 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.
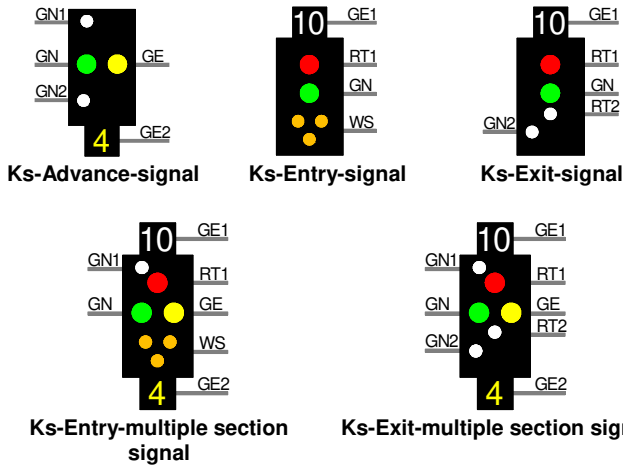
Series resistors:
Light emitting diodes have **always** to be **operated** with a suitable **series resistor** to prevent that they will be destroyed. For this prevention **all outputs** contain already a **series resistor** of **330 Ohm integrated** on the printed circuit board of the **Light-Signal Decoder LS-DEC.** Is there no further external resistor available the diode-current will be about 10 mA. 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**.

Connecting the Ks-Signals to the Light-Signal Decoder LS-DEC-KS:

Ks-Advance-signal   **Ks-Entry-signal**   **Ks-Exit-signal**

Ks-Entry-multiple section signal   **Ks-Exit-multiple section signal**

Further colored sample connections are available at the internet on our Web-Site (**www.ldt-infocenter.com**) at the section "**Sample Connections**".

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 the model railway software.
  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 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 **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**.

For switching **16 Ks-signal-aspects** via **4 addresses** this **4 addresses** have been divided. Via **address 3 and 4** will be one of the **4 groups selected**. Via the **addresses 1 and 2** will be the **real signal aspects** controlled.

For a **signal change** will be therefore **max. 2 aspect-commands required**. **At first** will be the **command** send for the **group** which includes the **signal aspect**. Within the **second command** will be the **actual signal aspect** transmitted and the signal will be **set** by the **Light-Signal Decoder LS-DEC-KS**. If the next signal aspect will be already inside the active group, the command for the group has not necessarily renewed.

Signal aspect- and Address-table:

Ks-signal aspect		group selection	
HP0	**Ks1**		
round/red/-	**round/red/-**	**round/red/-**	round/red/-
1	**2**	**3**	**4**
straight/green/+	**straight/green/+**	straight/green/+	straight/green/+
HP0/Sh1	Ks1/Zs3		
Ks1bl/Zs3v	**Ks2/Zs3**		
round/red/-	**round/red/-**	round/red/-	round/red/-
1	**2**	**3**	**4**
straight/green/+	**straight/green/+**	**straight/green/+**	straight/green/+
KS1bl/Zs3/Zs3v	Ks2/Zs3v		
Zs1	**Ks1bl/Zs3v I.D.light**		
round/red/-	**round/red/-**	round/red/-	**round/red/-**
1	**2**	**3**	**4**
straight/green/+	**straight/green/+**	straight/green/+	straight/green/+
Zs7	Ks1bl/Zs3/Zs3v I.D. light		
Ks2/Zs3 I.D.light	**Ks1bl/Zs3v left bottom**		
round/red/-	**round/red/-**	round/red/-	round/red/-
1	**2**	**3**	**4**
straight/green/+	**straight/green/+**	straight/green/+	**straight/green/+**
Ks2/Zs3v I.D. light	Ks2/Zs3v left bottom		

After **switching-on** the **Light-Signal Decoder LS-DEC-KS** all connected signals will show the **signal-aspect HP0 (Stop)**.

If now e.g. the signal aspect **Proceed (Ks1)** shall be shown, this aspect can be simply set via the address **2** key **red** because the old and the new aspect will be within the same group.

For setting the signal aspect **Stop expected (Ks2/Zs3)** shall be at first changed to the second group with the address **3** key **green**. Then shall be the **signal aspect Ks2/Zs3** activated with address **2** key **red**.

With **16 signal aspects** is the **Ks-Signal system** a **complete** system with difficult manual adjustment via keys. It is rather a system for **PC supported model railway layouts**.

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 to fast sequence. The impression is absolutely realistic if the switching is considerable slow.
Between the **command** for the **group** and the **command** for the **real signal aspect** are **no waiting** intervals required.

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.

Ks-Signals of the **Company alphamodell** contain integrated serial resistors which can not be removed. To provide sufficient brightness of the LED`s is it possible to extend the **Light-Signal Decoder LS-DEC-KS** with the adapter **Adap-LS-A.**

You can find on our **Web-Site** at the section "**Digital-Compendium**" **additional information with sample connections** for the **Light-Signal Decoder LS-DEC-KS.**