



Sample Connections:

Light Signal-Decoder and Swiss SBB-Signals

(Version 1.7)

(For the digital systems **Märklin-Motorola~** and **DCC**)

For the first time is it now possible to switch SBB light signals equipped with light emitting diodes (LED) such as turnout- or semaphore-signals with our **Light Signal-Decoder LS-DEC** directly via decoder addresses.

The decoder does not only switch-over the light emitting diodes but is **dimming** them **realistic up and down**. Between the switch positions is there a short **dark period**.

If a **home- and an advance signal** is equipped **onto one signal post** it is possible to switch the **advance signal to dark** whenever the home signal has been shifted to the **aspect of H or 6**.

The **setting** (or **programming**) of the **decoder address** is just as **simple** as with our other decoders. For this task serves the **programming key S1** at the decoder.

The **operation instruction** supplied with every decoder describes this operation in detail. The operating instruction can also be found at the **Internet** on our **Web-Site** for your information.

It is possible to connect signals with **3 and 4 lamps and dwarf signals** to the **Light Signal-Decoder LS-DEC-DB**. If you require to switch signals with **5 or 7 lamps** you can operate the signals with the **Light Signal-Decoder LS-DEC-SBB**.

1. SBB-Signals with 3 and 4 Lamps and Dwarf-Signals on the LS-DEC-DB:

If you use signals with **3 and 4 lamps** the **Light Signal-Decoder LS-DEC-DB** comes into action.

Up to **4 signals** can be connected to the **Light Signal-Decoder LS-DEC-DB**. Two signals onto each 11-poles clamp bar. Both clamp bars are build up identical therefore if sample connections are shown for one decoder side it will apply to the other side as well.

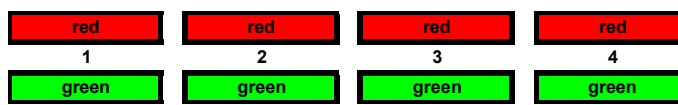
2 signal aspects can be assigned to each **decoder address** because it is possible to shift one turnout or one semaphore signal into two positions with one address. As the light signal decoder has to process at most 6 signal aspects for each clamp bar there are 4 decoder addresses required for each clamp bar. This will be 8 setting possibilities. The seventh possibility will be used for the dark switching.

A complete Light Signal-Decoder LS-DEC-DB occupies therefore 8 decoder addresses (for each clamp bar 4 addresses).

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The imaging of the decoder addresses of the following sample connections are corresponding to the keys of a keyboard.



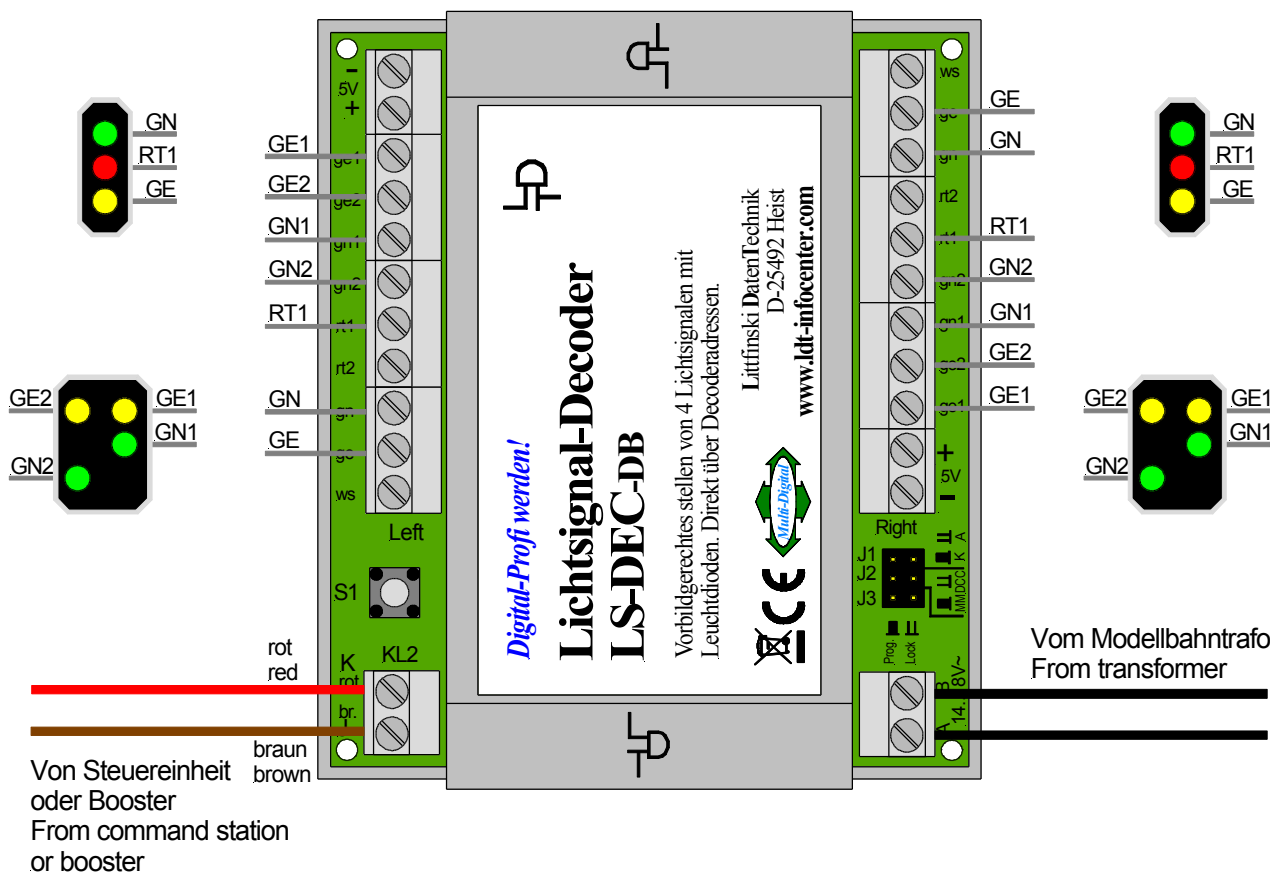
At the middle is the decoder address indicated. The two keys for each address are **red** for turnout **round** or signal **red** and **green** for turnout **straight** or signal **green**.

1.1. Home- and Advance Signal with 3 or 4 Lamps:

The first sample connection shows 2 home- and advance signals.

At first something to the general decoder wiring connections: The decoder receives the **digital information** via the left 2-poles clamp KL2. The **power supply** will be connected to the right 2-poles clamp KL1. The voltage can be within a range between 14 to 18 Volt~.

To each side of the decoder (left and right) has been one home- and one advance signal connected.



home signal		advance signal		home signal		advance signal	
H	H	H	H	H	H	H	H
train stop	train stop	train stop	dark switch	train stop	train stop	train stop	dark switch
red	red	red	red	red	red	red	red
1	2	3	4	5	6	7	8
green	green	green	green	green	green	green	green
proceed	slow approach	proceed	slow approach	proceed	slow approach	proceed	slow approach
1	2	1	2	1	2	1	2

The left home- and advance signals assign exemplary the decoder addresses 1 to 4. The addresses 5 to 8 will be assigned to the two signals on the right side.

Each signal assigns two decoder addresses. All signals can be shifted independently.

After **switching-on** the layout the light signal decoder will switch **all signals** at first to **H**.

If you want to shift the home signal to green (1) you have to activate the green key of the first address. The table below the connection draft shows the relations.

If there will be advance signals and home signals installed onto one signal post you can activate the dark switching. For this task you have to switch the home signal which is installed together with the advance signal onto one post at first to red (at the sample **key 1 red**). If you activate now the **key 4 red** you can switch the advance signal to **on** and **off** with each key stroke. If the advance signal has been switched to dark is the dark switching adjusted. The **light signal decoder stores** this **setting permanently** as well as the **programmed addresses**. All adjustments can be changed at any time.

Advance signal commands received during the dark switching will be temporarily stored and only indicated if the home signal will be shifted to 1 or 2.

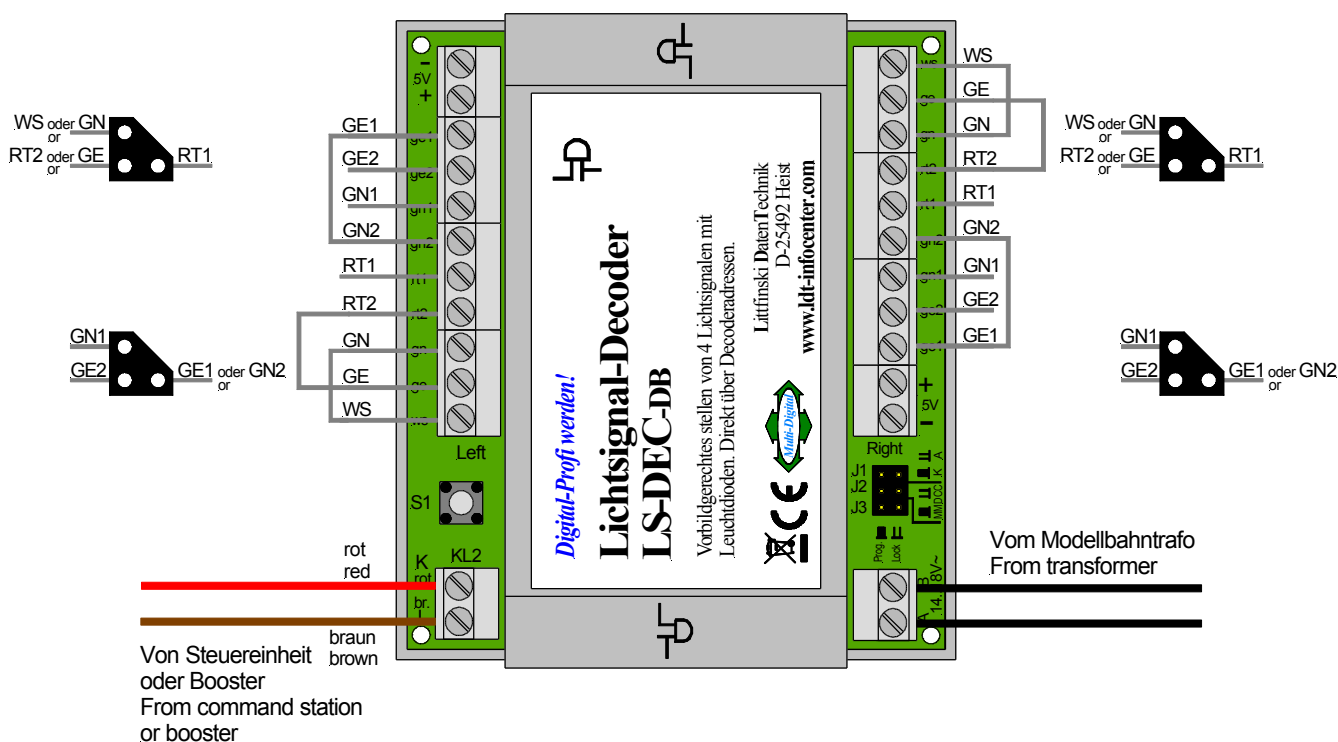
If the **Light Signal-Decoder LS-DEC-DB** shall control the **advance signals** as shown above it is possible to switch **three signal aspects (train stop, proceed and slow approach)**.

The **advance signal** enables the indication of **four aspects (train stop, proceed, slow approach 40 km/h and slow approach 60 km/h)**. Those can be switched via the **light signal decoder LS-DEC-SBB**. The sample connection can be found within the **chapter 2.5** of this instruction.

1.2. SBB-Dwarf Signals:

Up to 4 SBB-dwarf signals can be digital controlled by the **Light Signal-Decoder LS-DEC-DB**. On each clamp bar will it be 2 dwarf signals.

3 cable bridges will be required for each clamp. They have to be inserted between the connection **GE1 and GN2**, between **RT2 and GE** as well as between **GN and WS**. The corresponding light emitting diode of the dwarf signal shall be connected with **one of the two clamps** in accordance to the connection sample.



Each **dwarf signal** occupies 2 decoder addresses. The **address occupancy corresponds not to the standard** for switching with the first address always **train stop** and **train proceed** and with the second address **slow approach**.

dwarf signal (above)		dwarf signal (below)		dwarf signal (above)		dwarf signal (below)	
H	2	H		H	2	1	
train stop	slow approach	train stop		train stop	slow approach	train stop	
red	red	red	red	red	red	red	red
1	2	3	4	5	6	7	8
green	green	green	green	green	green	green	green
	train proceed	slow approach	train proceed	train proceed	train proceed	slow approach	train proceed
	1	2	1	1	2	2	1

It is no problem to control dwarf signals by a **keyboard** or a **manual control**.

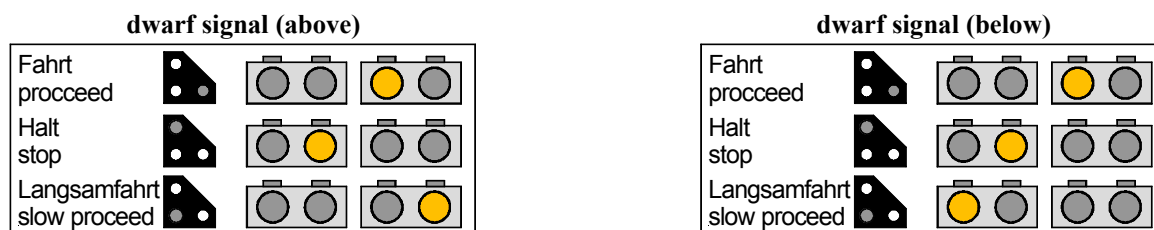
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If dwarf signals shall be controlled by a **PC model-software** a **free alteration** of the **address assignment** within the program is required.

This is possible e.g. with the PC-Program **TrainController**.

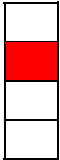

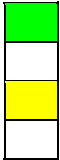

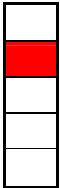
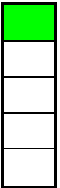
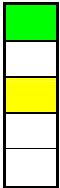

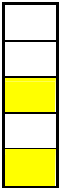
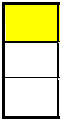

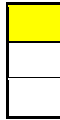


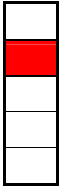
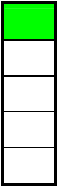
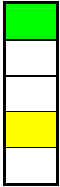
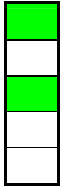






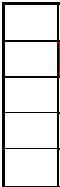
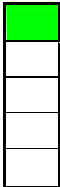




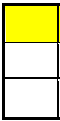





The following draft shows on the **left side the adjustments** at the **TrainController** for the **upper dwarf signal** and on the **right the adjustments** for the **lower dwarf signal** as per sample connection.



2. SBB-Signals with 5 and 7 Lamps on LS-DEC-SBB:

If Swiss signals with 5 or 7 lamps shall be installed the **Light Signal-decoder LS-DEC-SBB** comes into action.

Swiss signal aspects for signals with 5 and 7 lamps:

Drive aspect	H	1	2	3	5	6
Home signal 4 lamps						
Home signal 5 lamps (Version 1)						
Advance signal 4 lamps						
Drive aspect	H	1	2	3	5	6
Home signal 5 lamps (Version 2)						
Advance signal 5 lamps						
Drive aspect	H	1	2	3	5	6
Home signal 7 lamps						
Advance signal 5 lamps						

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Up to **2 signals** can be **connected** to the **Light Signal-Decoder LS-DEC-SBB**. One signals onto each 11-poles clamp bar. Both clamp bars are build up identical therefore if sample connections are shown for one decoder side it will apply to the other side as well.

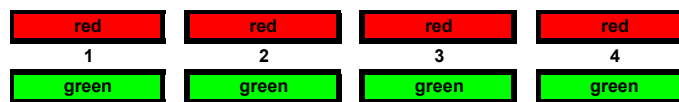
The Light Signal-Decoder **LS-DEC-SBB** can be set onto **two operation modes**: "**single-function**" and "**master/slave-function**".

Both signals connected to the left clamp bar and connected to the right clamp bar can be independently shifted at the operation mode "**single-function**".

The mode "**master/slave-function**" shall be used for shifting both signals simultaneous (home- and advance signal shifted with one command).

The required operation mode will be set together with the decoder address.

The imaging of the decoder addresses of the following sample connections and descriptions are corresponding to the keys of a keyboard.



At the middle is the decoder address indicated. The two keys for each address are **red** for turnout **round** or signal **red** and **green** for turnout **straight** or signal **green**.

The **decoder addresses** are divided into **groups of four**. For programming of the decoder address at the Light Signal-Decoder LS-DEC it is sufficient to activate just one key of the required group of four.

The **operation instruction** supplied with every decoder describes this operation in detail. The operation instruction can also be found at the **Internet** on our **Web-Site** for your information.

If the decoder address will be programmed with the command turnout **straight** or signal **green** the operation mode "**single-function**" will be selected. For the command turnout **round** or signal **red** the operation mode "**master/slave-function**" has to be selected.

Single-function:

- Address to be programmed with "**green-key**".
- Each clamp bar controls one complete signal. Both signals can be shifted independently.
- Is the dark switching activated (advance- and home signal on one post) the advance signal remains dark as long as the home signal shows the drive aspect H or 6.
- The Light Signal-Decoder LS-DEC occupies 8 decoder addresses. On each clamp bar one "group of four".

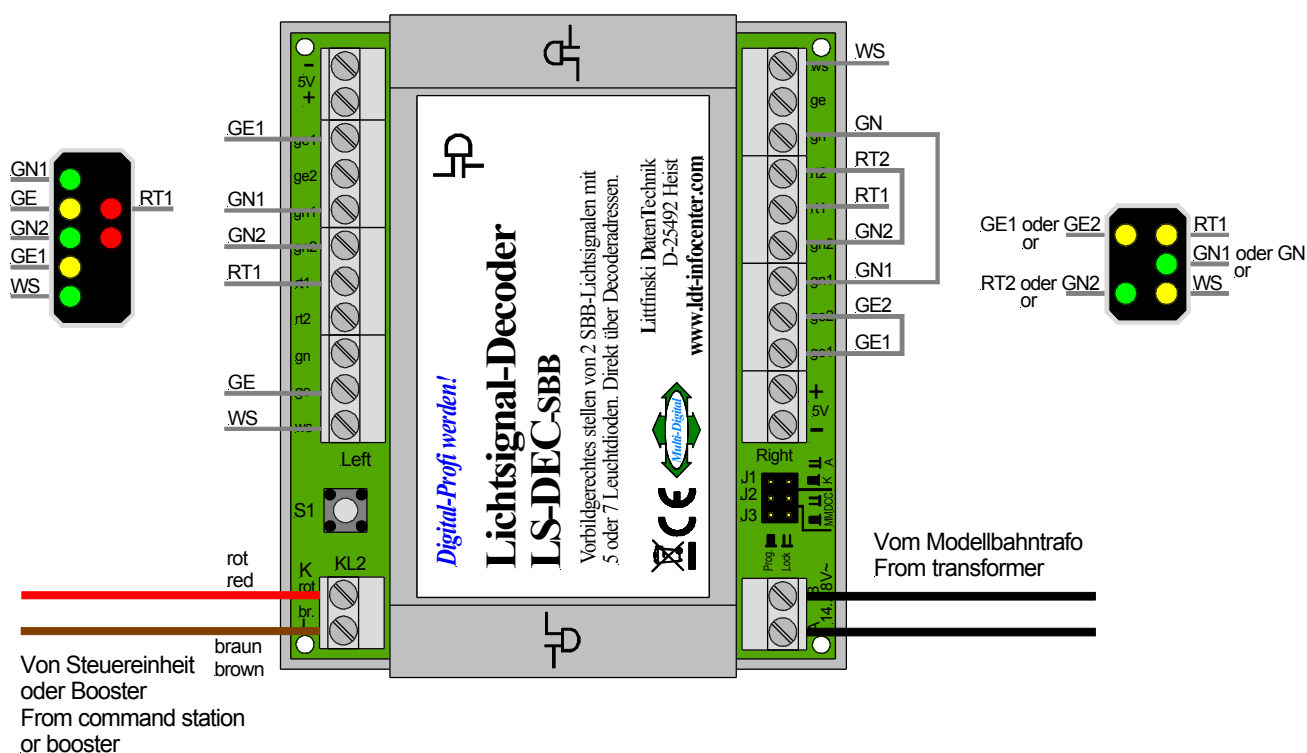
Master/Slave-function:

- Address to be programmed with "red-key".
- Home- and advance signal will be shifted together via four decoder addresses (one "group of four").

2.1. Connecting one Home Signal with 7 Lamps and one Advance Signal with 5 Lamps:

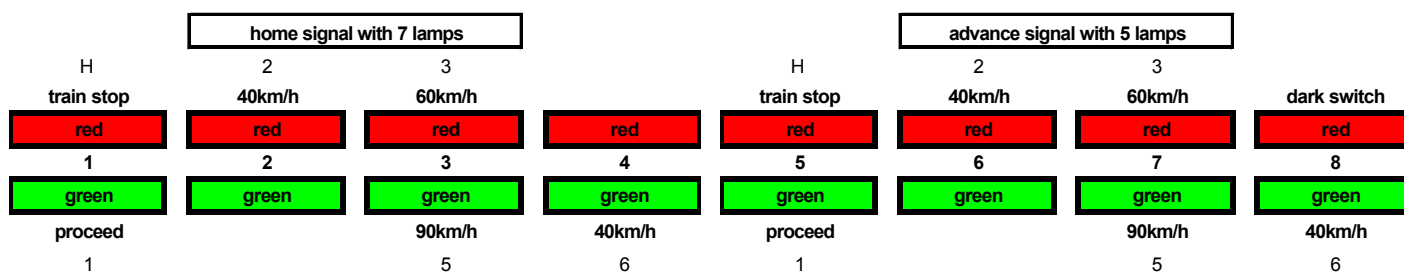
At first something to the general decoder wiring connections: The decoder receives the **digital information** via the left 2-poles clamp KL2. The **power supply** will be connected to the right 2-poles clamp KL1. The voltage can be at a range between 14 to 18 Volt~.

At the clamp bar with the connected **advance signal** always **3 wire bridges** have to be installed. The wires of the light emitting diodes can now be connected to one of the two clamps.



Both operation modes (single-function and master/slave-function) are possible.

Operation Mode: Single-Function



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If the Light Signal-Decoder **LS-DEC-SBB** shall operate at the **single-function mode** the decoder address has to be set with a "green-key". Then both signals can operate independent with a total of 8 decoder addresses.

If there will be advance signals and home signals installed onto one signal post you can activate the **dark switching**. The advance signal remains dark if the home signal shows the drive aspects H or 6.

For this task you have to switch the home signal, which is installed together with the advance signal onto one post at first to red (at the sample **key 1 red**). If you activate now the **key 8 red** you can switch the advance signal to **on** and **off** with each key stroke. Is the advance signal switched to dark the dark-switching mode has been adjusted. The **light signal decoder stores this setting permanently** same as the **programmed addresses**. All adjustments can be changed at any time.

Advance signal commands received during the dark-switching will be temporarily stored and only indicated if the home signal will be shifted to 1, 2, 3 or 5.

Operation Mode: Master/Slave-Function

home signal with 7 lamps and advance signal with 5 lamps			
H	2	3	
train stop	40km/h	60km/h	
red	red	red	red
1	2	3	4
green	green	green	green
proceed		90km/h	40km/h
1		5	6

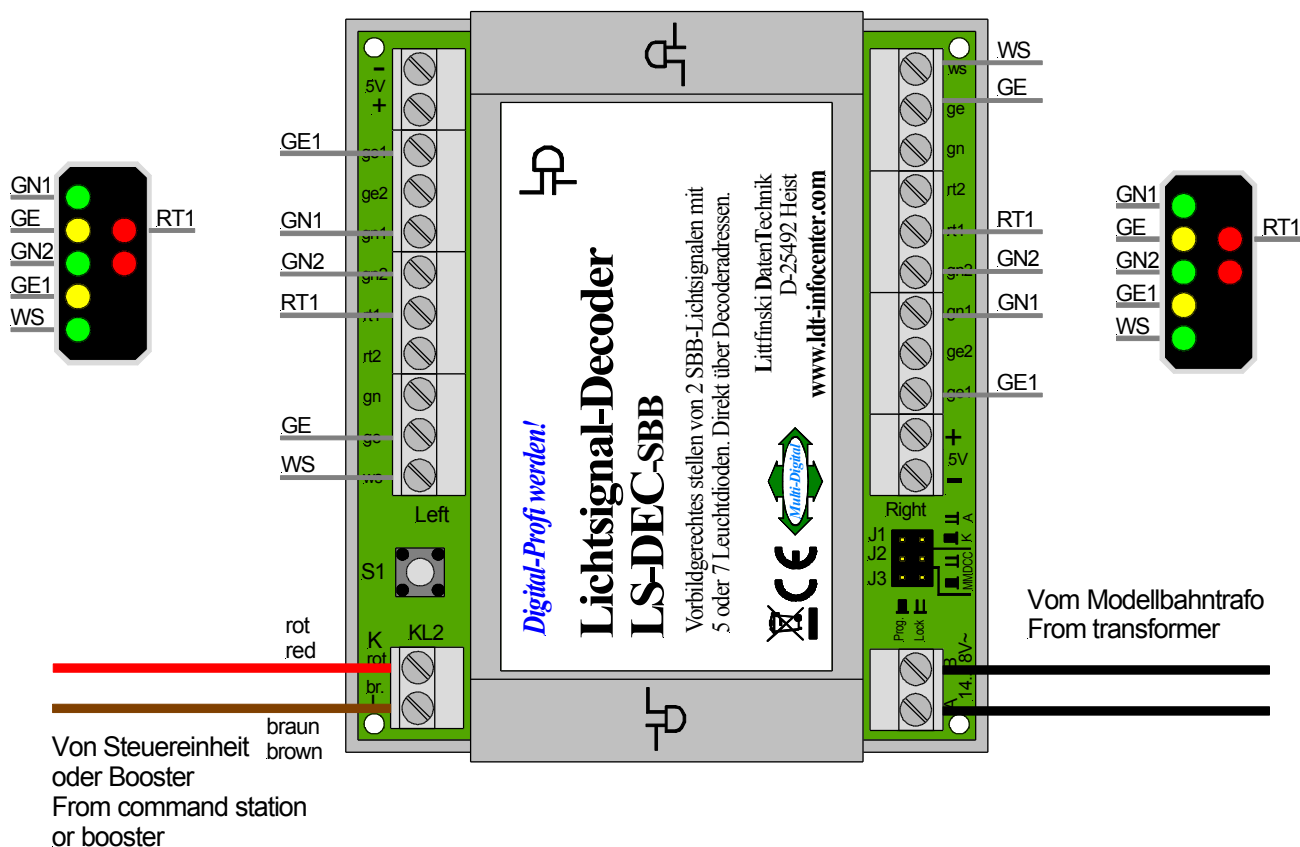
If you choose during programming the decoder address the **Master/Slave-function** via a "red key" the signal aspects of the home- and advance signal will be shifted together via 4 decoder addresses. The dark-switching mode can not be set because at this operation mode because the two signals will not be installed onto one signal post.

2.2. Connecting 2 Home Signals with 7 Lamps:

Only the operation mode "single-function" should be considered.

The decoder address of the Light Signal-Decoder LS-DEC-SBB will be programmed with a "green-key".

Both signals can be operated **independently** by 8 decoder addresses.



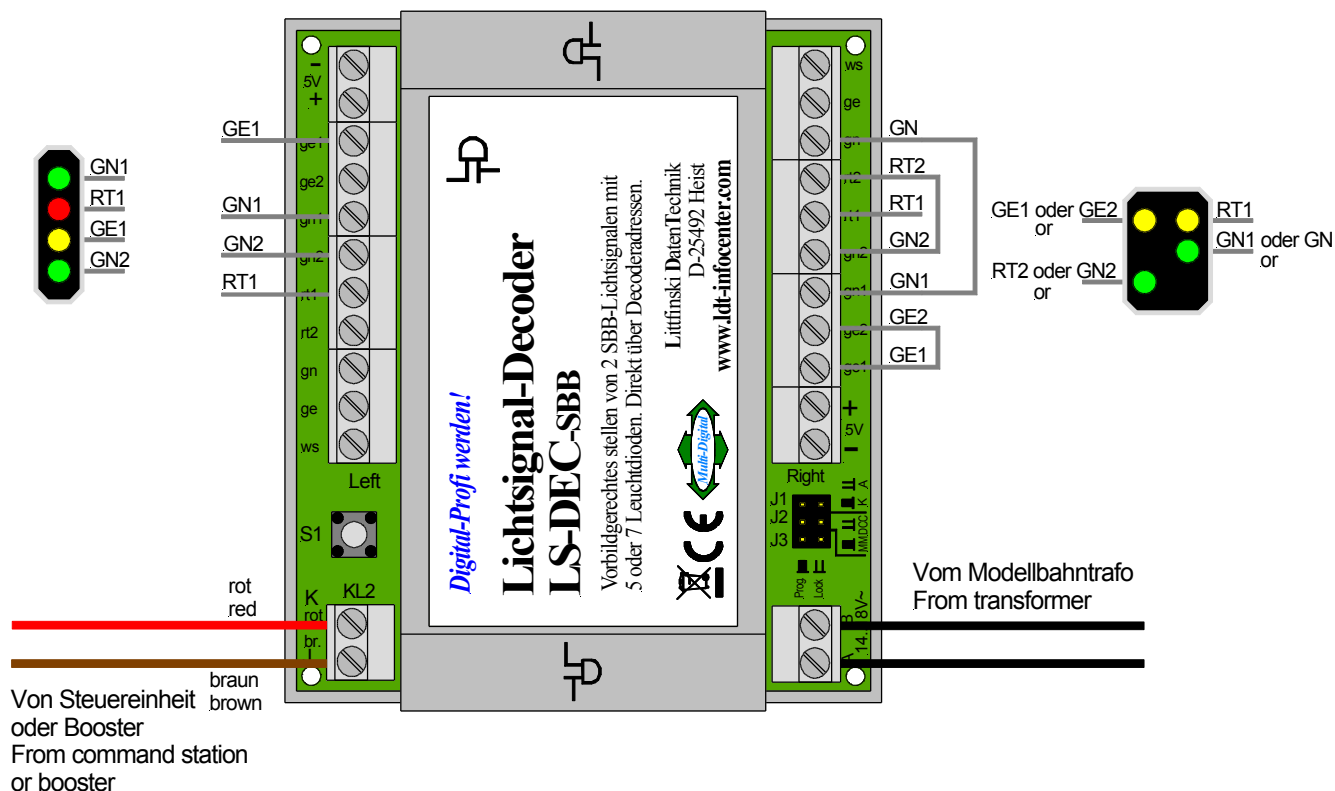
Operation Mode: Single-Function

	home signal with 7 lamps				home signal with 7 lamps			
H	2	3		H	2	3		
train stop	40km/h	60km/h		train stop	40km/h	60km/h		
1	2	3	4	5	6	7	8	
red	red	red	red	red	red	red	red	
1	2	3	4	5	6	7	8	
green	green	green	green	green	green	green	green	
proceed		90km/h	40km/h	proceed		90km/h	40km/h	
1		5	6	1		5	6	

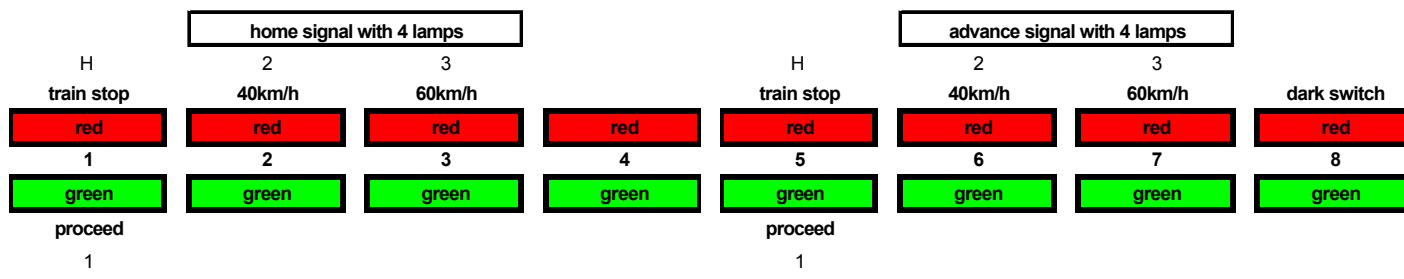
2.3. Connecting one Home Signal with 4 Lamps and one Advance Signal with 4 Lamps:

Both operation modes (single-function and master/slave-function) are possible.

If the Light Signal-Decoder **LS-DEC-SBB** shall operate at the **single-function** the decoder address has to be programmed with a "green-key". Both signals can be operated independently by 7 decoder addresses.



Operation Mode: Single-Function

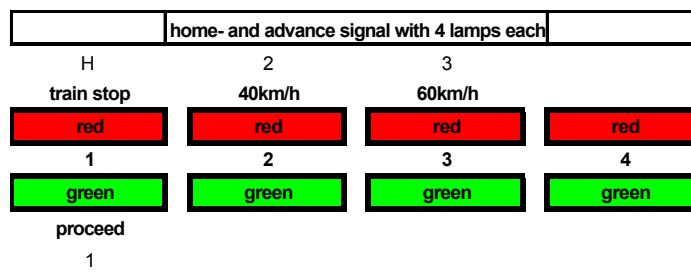


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If the **master/slave-function** will be set with a "red-key" during programming the decoder address the signal aspects of the home- and advance signal will be operated together via 3 decoder addresses. The dark-switching mode can not be set because the two signals are not installed onto one post.

Operation Mode: Master/Slave-Function

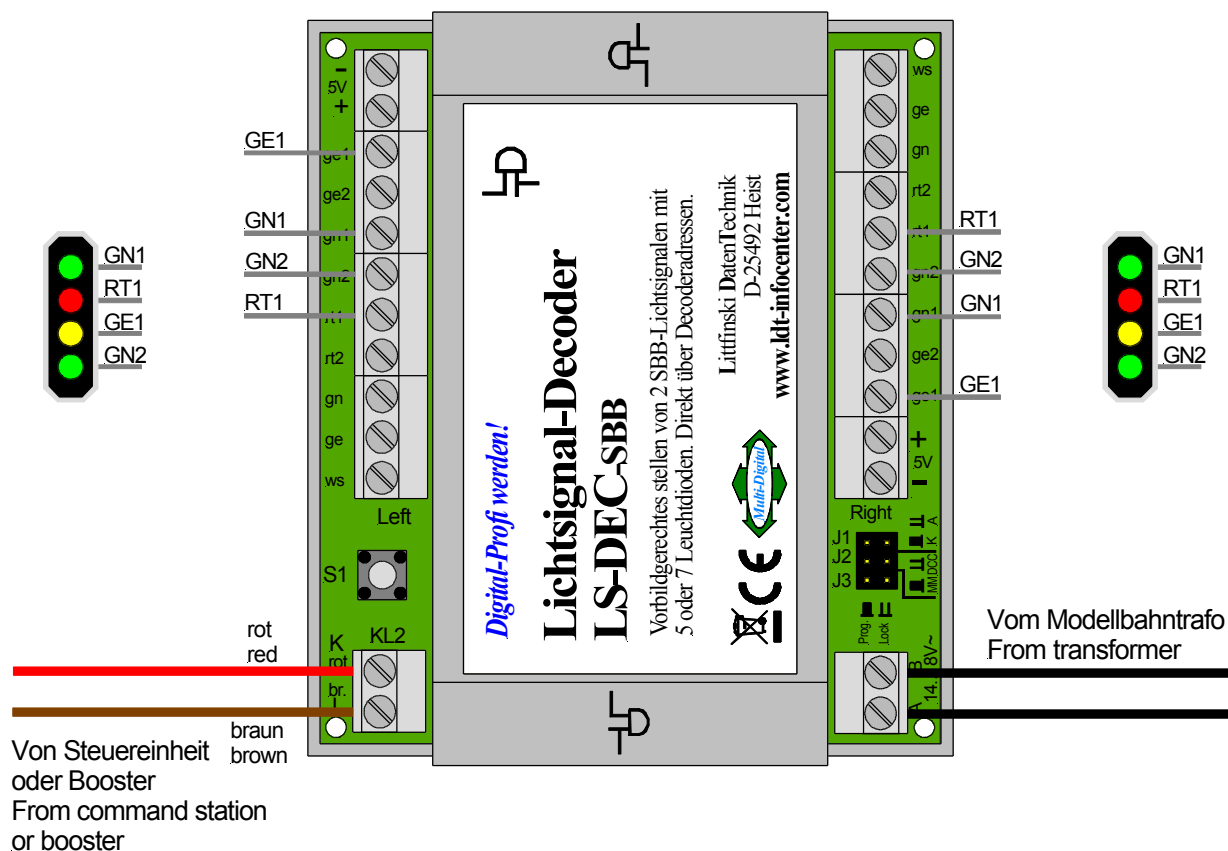


2.4. Connecting 2 Home Signals with 4 Lamps:

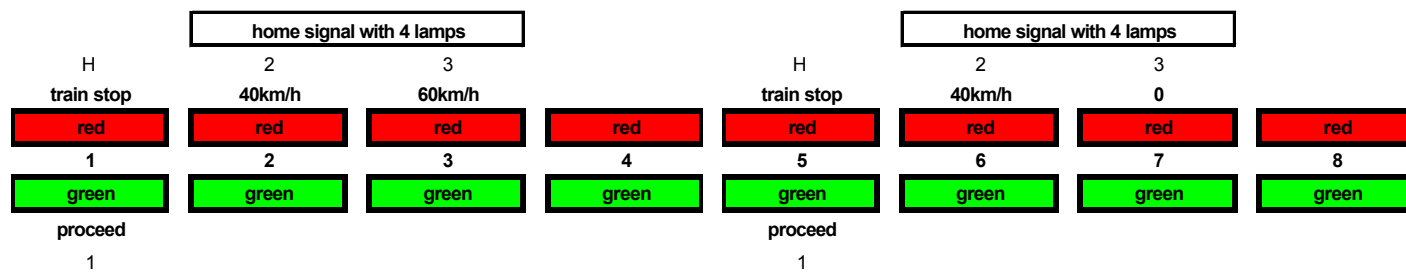
Only operation mode "single-function" should be considered.

The decoder address of the Light Signal-Decoder LS-DEC-SBB shall be programmed with a "green-key".

Both signals can be operated **independently** via a total of **8 decoder addresses**.



Operation Mode: Single-Function

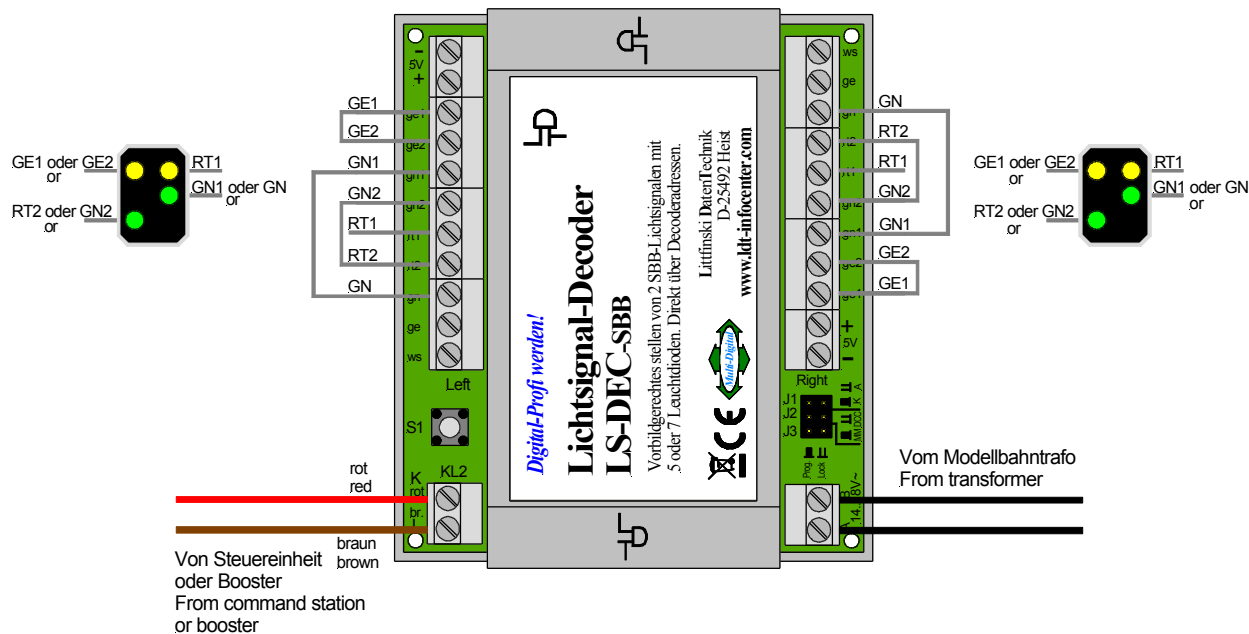


2.5. Connection of 2 Advance Signals with 4 Lamps:

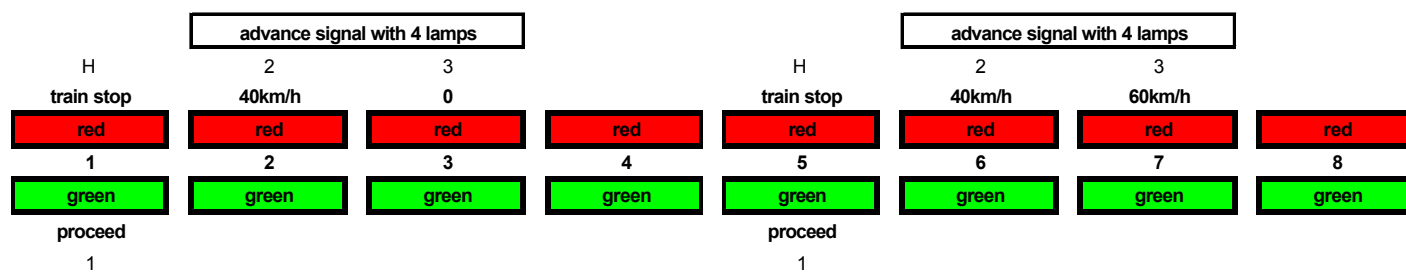
Only operation mode "single-function" should be considered.

The decoder address of the Light Signal-Decoder **LS-DEC-SBB** shall be programmed with a "green-key".

Both signals can be operated **independently** via a total of **8 decoder addresses**.



Operation Mode: Single-Function



Subject to technical changes and errors.
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