

## *To be a Digital-Professional!*

### Ks Light-Signals digital controlled by the Light-Signal Decoder LS-DEC-KS

Detailed constructed light signals with a realistic digital control are a real eye-catcher not only on digital model railway layouts. Particularly whenever light emitting diodes will be switched with up- and down-dimming including a short dark phase as in reality.

All this advantages will be offered within our Light-Signal Decoder *LS-DEC-KS*. The read-in of the directly assigned decoder addresses is possible via the programming key S1 as on all our other accessory decoders.

#### BASICS

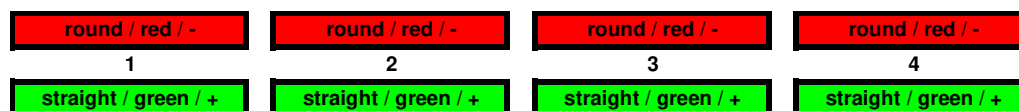
It is possible to connect 2 Ks-Signals to one Decoder Module *LS-DEC-KS*. This enables the digital control of Ks-Entry-, Ks-Exit- and Ks-Advance-signals as well as Ks-Exit-Multiple section signals with up to 16 signal aspects.

A complete light signal-decoder occupies therefore 8 decoder addresses (4 addresses on each 11 poles clamp bar).

2 signal aspects can be assigned to each decoder address.

The 4 addresses and 8 adjustment possibilities on each clamp bar can control either 8 signal aspects if one advance- and one home signal will be controlled or even 14 signal aspects by using one HI-home signal.

The following sample connections show how the fourfold address-group can be set by use of 8 keys of the push button panel for setting the turn-outs or signals.



The centerline between two keys indicates the decoder address. The two keys **red** and **green** of each address are assigned to the turnout position **round** and **straight** or the signal aspect **red** and **green**.

If you use a remote control LH100 of Company Lenz Elektronik then **red** will be the minus key and **green** the plus key.

## THE DIGITAL SYSTEM

All Light-Signal Decoders “*LS-DEC*” are suitable for the DCC data format (e.g. Lenz-, Roco-, LGB-Digital, Intellibox, TWIN-CENTER, PIKO Digi-Power-Box and Smartbox, DiCoStation, ECoS, EasyControl, RedBox, Commander, KeyCom-DC, ZIMO, Märklin Digital= or Central Station 1, 2 and 3) as well as for the MOTOROLA-format (e.g. Märklin Digital~ [Control Unit, Central Station 1, 2 and 3] Intellibox, DiCoStation, ECoS, EasyControl, RedBox, Commander, KeyCom-MM).

■ Adjusting the correct data format!

The data format will be selected via the jumper J2. If there is no jumper J2 inserted the DCC-format has been adjusted. By an inserted jumper has been the MOTOROLA-Format adjusted.

Please switch-off the model railway layout whenever connection work has to be carried out (switch-off the transformers or unplug the mains supply).

The digital voltage will be supplied via the 2-poles clamp KL2. The colored marks **red / brown** next to the clamp are usually used by MÄRKLIN-Motorola. Other systems such as Lenz Digital are using the letters “J” and “K”.

The external alternated voltage supply of 14 ... 18 Volt ~ (e.g. light-output of a model railway transformer) will be supplied via the two poles clamp KL1 to the decoder. It is possible to supply power to the decoder by the digital current (directly connection of clamp KL1 to clamp KL2). But this will be recommended by small layouts only because in this case will be “valuable” and “expensive” digital current wasted for the supply of the modules and for switching the drives.

■ Booster

If the digital current intensity will not be sufficient (command stations with included integrated booster supply mostly 2.5 to 3 Ampere) for the driving and operation of the layout it is required to use additional digital amplifiers (=booster e.g. “DB-2” or “DB-4”). This will certainly require additional wiring and further cost (therefore “expensive” digital current).

As well for the Light-Signal Decoder is it recommended to install a separate second ring conductor for the digital current as by the turnout decoders and a third ring conductor for the supply voltage.

The digital information for the accessory decoders should never be taken directly from the rails. The traveling locomotives can influence the digital signal by producing continually a kind of loose contact signal. This can result to the problem that the decoder cannot understand the transmitted signal. For this reason will be the loc commands continually repeated. Especially for the switch commands that will not be transmitted several times as done by the loc commands is it possible that commands will be getting lost if the digital information has been taken directly from the rails.

## SIGNAL TECHNIQUE

The most LED equipped light signals available on the market contain a common anode connection (positive terminal) and integrated serial resistors at the colored LED-wires. The common wire shall be connected at the Light Signal-Decoder to the “+” terminal and the jumper J1 shall not be inserted!

■ LED – Light Emitting Diode

On all our Light-Signal Decoders is a connection of light signals with common cathode (negative terminal) possible. For this assembly shall the common wire connected to the “-“ terminal and the jumper J1 has to be inserted!

■ General Note

All our decoder modules contain an integrated serial resistor of 330 Ohm on each output. The light emitting diode will take then a current of about 10 mA. The brightness of the light emitting diodes should be sufficient. If individual LED`s will be to bright is it possible to match the brightness to your requirement by assembly of additional external resistors within the LED connection wire. The actual resistor value of several 100 Ohm has to be determined by test.

The different Ks-signal types allow various connection possibilities. The following paragraphs shall explain exemplary these connection samples. As the two 11-poles connection clamps are wired identical will be the following explanations of the corresponding signal images refer mostly to one clamp bar only.

To assure that you are able to assign the wires of the light emitting diodes of the light signals correctly to the clamps of the light signal-decoder you should attend to markings (e.g. *RT1* or *GE1*) at the following signal images.

The marks next to the light emitting diodes of the signals do not always correspond to the real signal colors but refer to the connection at the Light-Signal Decoder *LS-DEC*.

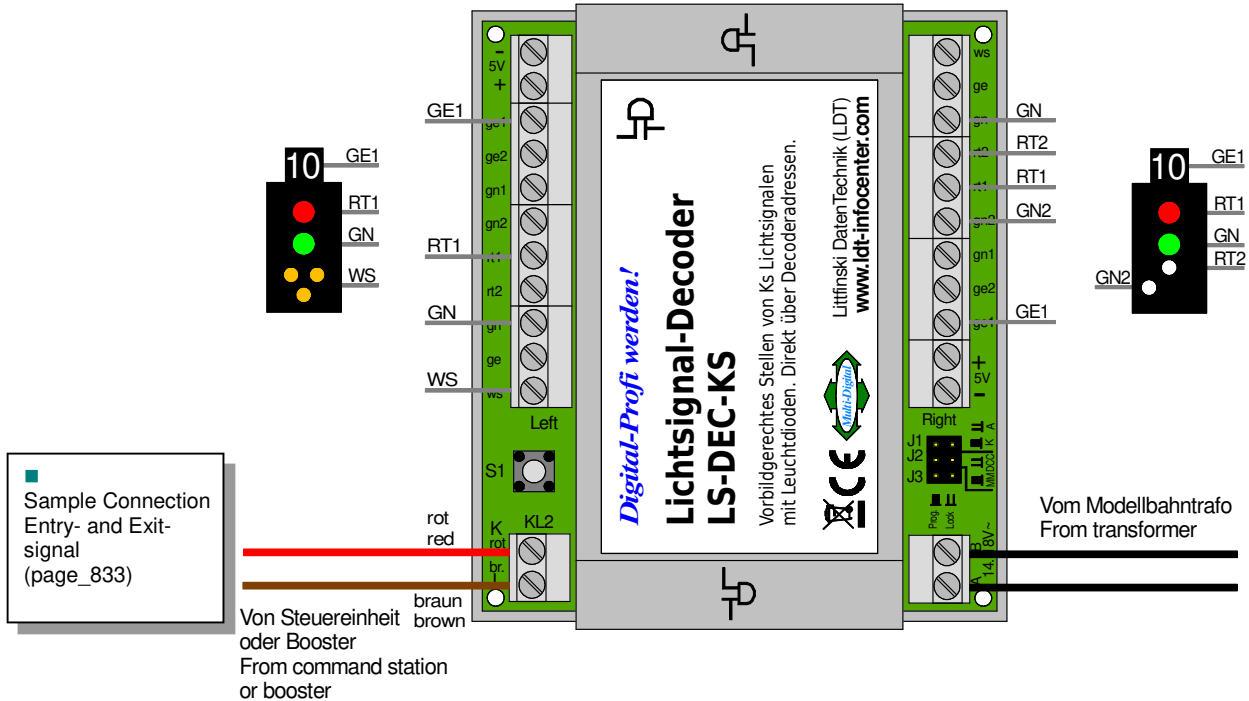
Please notice that the Light-Signal Decoder does not simply switchover the signal aspects but is dimming the light emitting diodes realistic up- and down. Additionally there will be a dark phase of about 0.4 sec. between the signal aspects. During the dark phase is it not possible for the decoder to process incoming digital commands. Therefore you should not send switch commands at a very fast sequence. In any case will it be more realistic if the commands will be released with a little delay.

■ Important Tip

The following sample connections refer to the different light signals of the Ks-Signal system used by the German Federal Railways. Within our delivery range we offer as well Light-Signal Decoders for signals of the German Federal Railways (DB), the Austrian Federal Railways (OEBB), the Swiss Federal Railways (SBB), the Dutch National Railways (Nederlandse Spoorwegen – NS), the Belgian National Railways (National Maatschappig of the Belgian Spoorwegen –NMBS) and furthermore. The connection of these signals will be explained within separate pages of our Digital-Compendium.

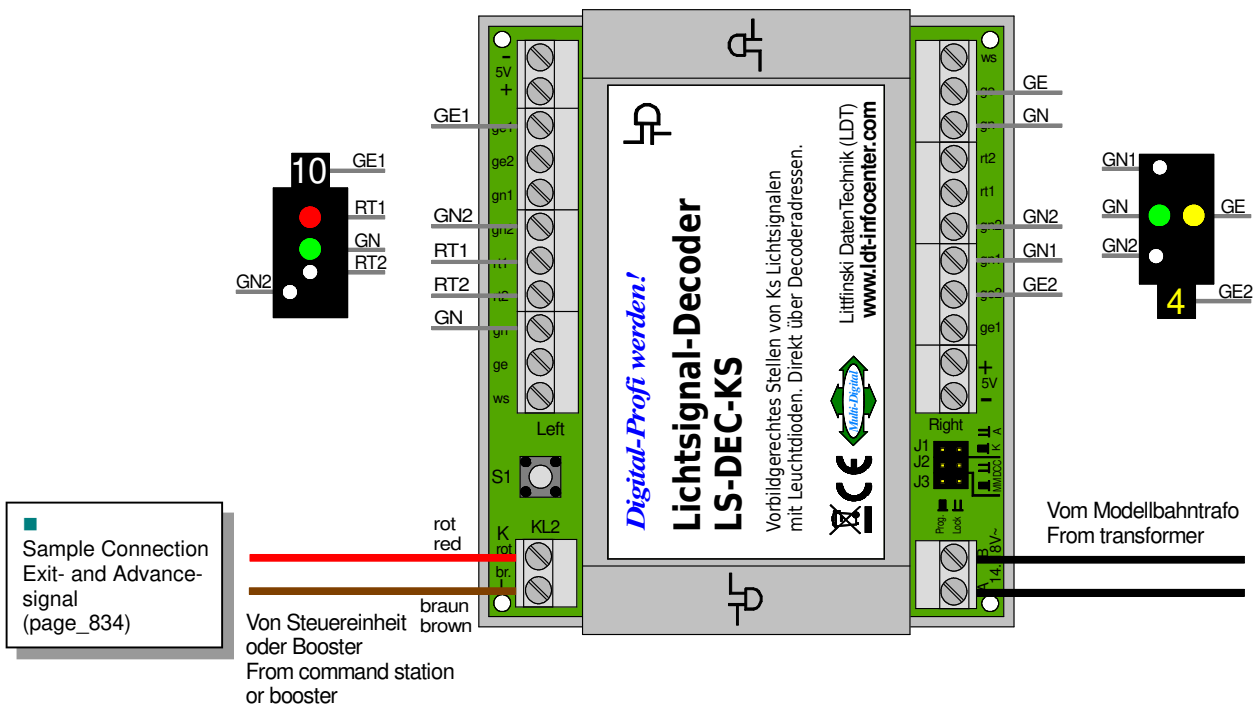
### KS-ENTRY- AND KS-EXIT-SIGNAL

The following sample shows the connection of one Ks-Entry-Signal to the left and one Ks-Exit-Signal to the right clamp bar of a Light-Signal Decoder *LS-DEC-KS*:



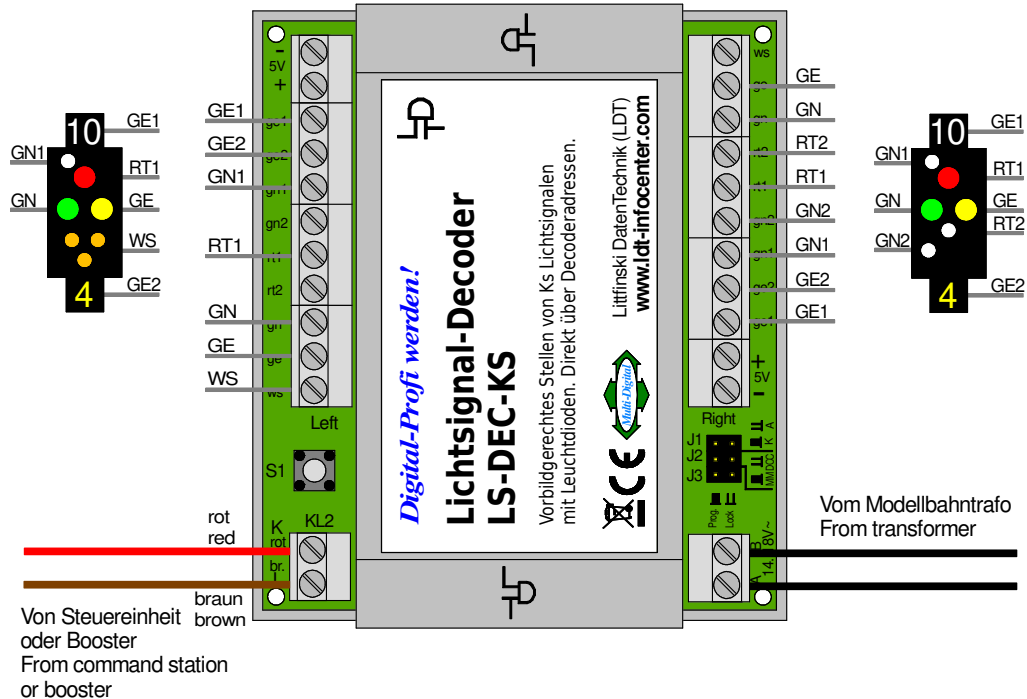
### KS-EXIT- AND KS-ADVANCE-SIGNAL

With the Light-Signal Decoder *LS-DEC-KS* is as well the digital operation of one Ks-Exit- (left) and one Ks-Advance-Signal (right) via each clamp bar possible. The connection is shown within the following sample:



## KS-ENTRY- AND KS-EXIT-MULTIPLE SECTION SIGNALS

If you want to operate Ks-Entry- and Ks-Multiple section signals with the Light-Signal Decoder LS-DEC-KS please proceed as per following sample:



At the above sample connection has been the Ks-Entry-Multiple section signal connected to the left and the Ks-Exit-Multiple section signal to the right clamp bar.

As both 11-poles clamp bars of the left and the right decoder side are identical is it possible to operate the Ks-Signals shown at the above three samples on either of the two decoder sides.

## SIGNAL OPERATION

As mentioned above, each signal occupies 4 addresses.

For switching 16 Ks-Signal aspects via 4 addresses are the 4 addresses divided. With the addresses 3 and 4 will be one of four groups selected. With the addresses 1 and 2 will be the real signal aspect switched.

For a signal change are max. 2 adjusting commands required. Art first will be a command sent for the group which includes the signal aspect. With the second command will be the actual signal aspect transmitted and the signal from the Light-Signal Decoder LS-DEC-KS will set a corresponding command to the signal. If there is the signal aspect already within the active group is it not necessarily required that the command has to be sent again.

The following signal aspects and the address table show the group-selection via the address 3 and 4 and the group related Ks-signal aspects which can be selected via the addresses 1 and 2.

Only the colored keys are for the switching of signals required:

Ks-Signal aspect		Group selection	
<b>HP0</b>	<b>Ks1</b>		
red / round / -	red / round / -	red / round / -	red / round / -
1	2	3	4
green / straight / +	green / straight / +	green / straight / +	green / straight / +
HPO/Sh1	Ks1/Zs3		
<hr/>			
<b>Ks1bl/Zs3v</b>	<b>Ks2/Zs3</b>		
red / round / -	red / round / -	red / round / -	red / round / -
1	2	3	4
green / straight / +	green / straight / +	green / straight / +	green / straight / +
Ks1bl/Zs3/Zs3v	Ks2/Zs3v		
<hr/>			
<b>Zs1</b>	<b>Ks1bl/Zs3v</b>		
I.D. light	I.D. light		
red / round / -	red / round / -	red / round / -	red / round / -
1	2	3	4
green / straight / +	green / straight / +	green / straight / +	green / straight / +
Zs7	Ks1bl/Zs3/Zs3v		
<hr/>			
<b>Ks2/Zs3</b>	<b>Ks1bl/Zs3v</b>		
I.D. light	left bottom		
red / round / -	red / round / -	red / round / -	red / round / -
1	2	3	4
green / straight / +	green / straight / +	green / straight / +	green / straight / +
Ks2/Zs3v	Ks2/Zs3v		
I.D. light	left bottom		

After switching-on the layout will switch the Light-Signal Decoder *LS-DEC-KS* both signals at first to red (Hp0 “Stop”).

If e.g. a signal aspect Drive (Ks1) shall be shown, this aspect can be simply switched via the address 2 key red because the old and the new aspect are within the same group.

For switching now to the signal aspect Stop Expected (Ks2/Zs3) has to be at first changed into the second group with the address 3 key green. Then will be the address 2 key red for the signal aspect Ks2/Zs3 activated.

With 16 signal aspects is the Ks-Signal-System a very complex system which is difficult to operate via manual keys. This is rather a system for the control by a PC-supported model railway software.

## PROGRAMMING

From version 4 the Light-Signal Decoder contains a third Jumper (J3) which has to be inserted for programming the unit.

The Jumper J3 can be removed after successful programming.

This action will protect the memory of the Light-Signal Decoder *LS-DEC-KS* against overwriting.

The assigning (learning) of digital addresses has to be done for each module individually. After activating the decoder programming key S1 two light emitting diodes at the left clamp bar will lighten-up at a 1.5 sec. interval. The module has now been set into the learning mode. Now is it required to activate at the command station one key of the wanted group of four (1 - 4, 5 – 8 etc.). The module takes over those four addresses and confirms this by flashing the light emitting diodes a little faster. By activating again the programming key S1 the two light emitting diodes will flash at the right clamp bar of the module. Again is it required to activate a key of a group of four at the command station. The decoder will confirm again the addressing by a faster flashing. The third activation of the programming key S1 will complete the learning process. The addresses are now being stored permanently at the decoder and all signals will be switched automatically to red.

Our recommendation at this point: Carry out the programming of decoder addresses before you install the decoder module below your layout. It is obvious that it is much easier to handle the module with all the connection on a workbench instead overhead below the layout. After completing the programming please mark the particular module with the assigned digital addresses (e.g. label with pencil letters “5 – 8” for the second group of four).

■ General Note

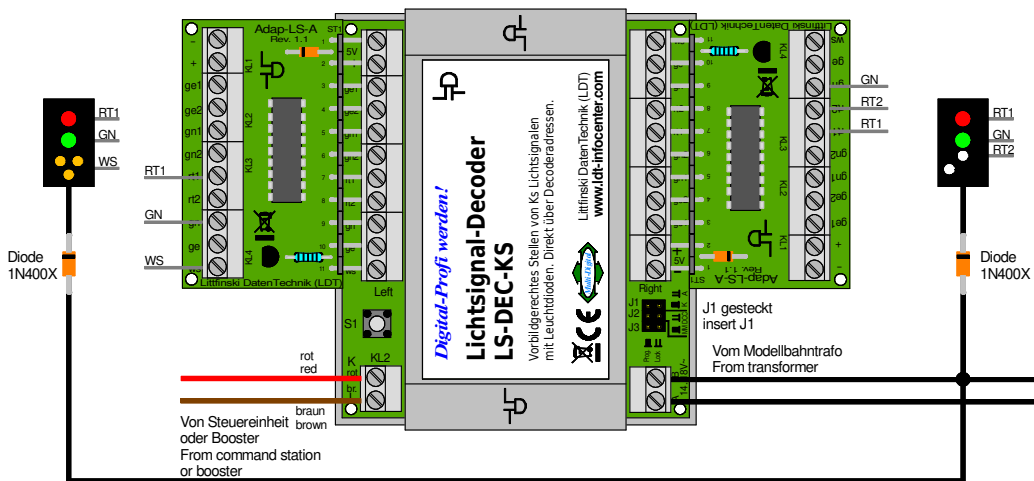
A first functional test of the decoder has now already been completed. Eventually possible failures (e.g. module defect) excluded in advance. After complete assembly of the module at the layout it would be very difficult to undertake this procedure.

## KS-SIGNALS OF COMPANY ALPHAMODELL

Ks-Signals from company alphamodell contain integrated serial resistors which can not be removed. For providing that the LED's of this signals will be bright enough is it possible to extend the Light-Signal Decoder *LS-DEC-KS* with the Adapter *Adap-LS-A*.

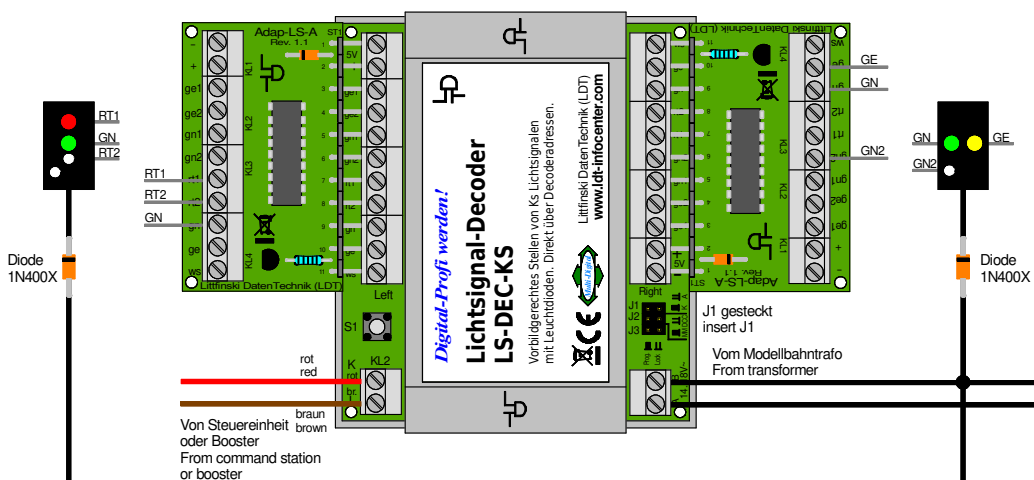
The first sample connection shows a Ks-Entry-Signal of the company alphamodell with part number 6070. The signal has been adapted to the left decoder side by the connection via an Adapter *Adap-LS-A*. At the right decoder side has been a Ks-Exit-Signal connected with the alphamodell part number 6060.

■ Sample Connection Entry- and Exit-signal (page\_836)



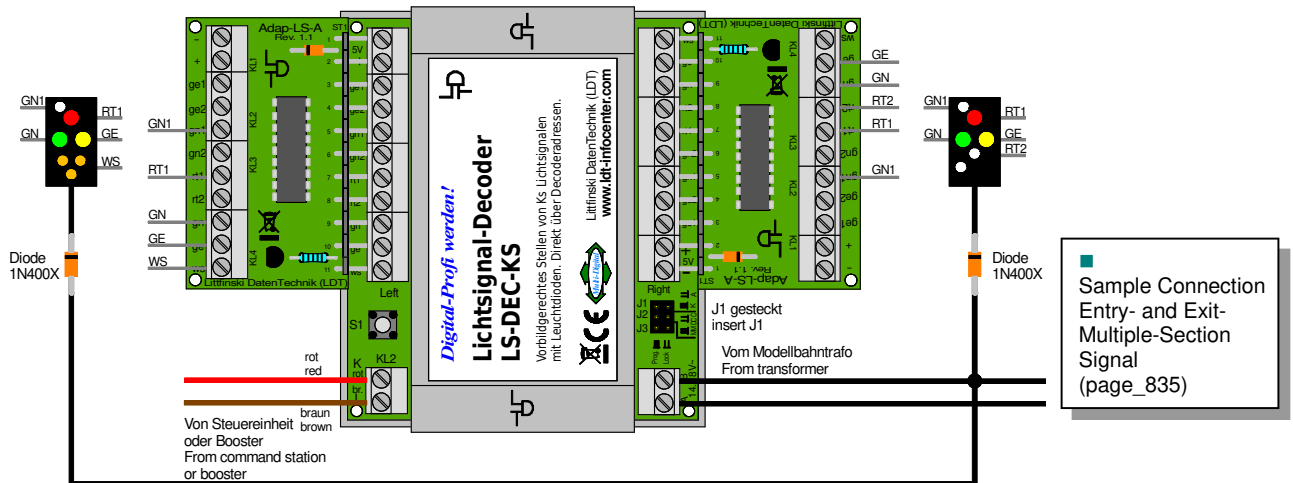
The second sample connection shows a Ks-Exit-Signal of company alphamodell with part number 6060 on the left decoder side, connected via the Adapter *Adap-LS-A*. At the right decoder side is a Ks-Advance Signal with part number 6050 connected.

■ Sample Connection Exit- and Advance-signal (page\_837)





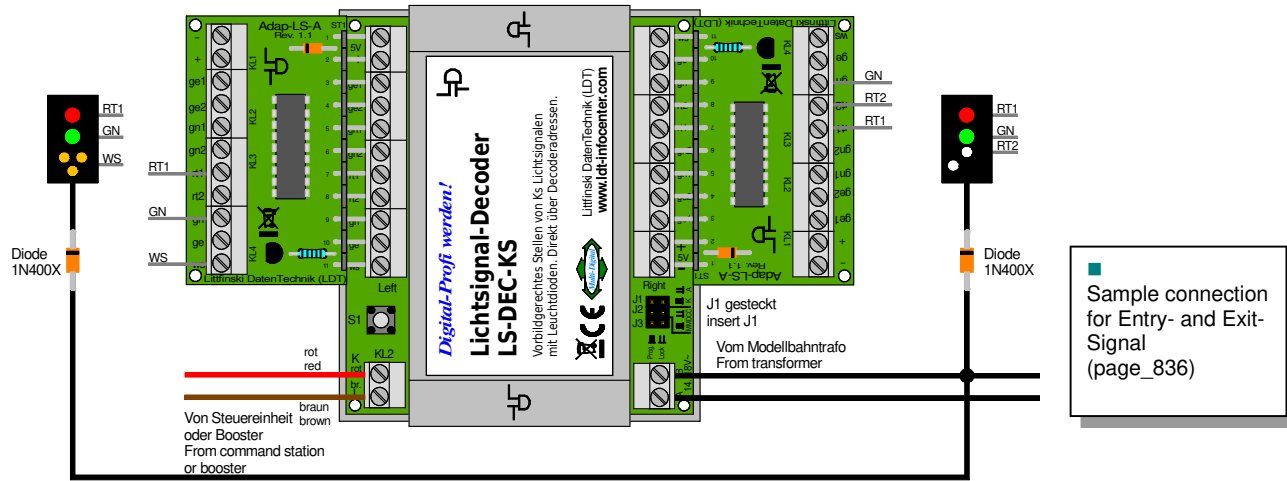
At the following sample connection is a Ks-Entry-Multiple Section Signal of the company alphamodell with part no. 6090 connected to the left decoder side via the Adapter *Adap-LS-A*.  
 At the right decoder side is a Ks-Exit-Multiple Section Signal of company alphamodell part number 6080 connected.



**Ks-SIGNALS OF COMPANY MODELLBAHNBAU-REINHARDT**

Ks-Signals of company Modellbahnbau-Reinhardt are equipped with serial resistors which cannot be removed. To achieve an acceptable brightness of the LED`s the Light-Signal Decoder *LS-DEC-KS* can be extended with the Adapter *Adap-LS-A*.

The following sample connection shows the basic structure with a Ks-Entry-Signal of company Modellbahnbau-Reinhardt at the left decoder side which has been connected via the Adapter *Adap-LS-A*.  
 At the right decoder side has been an Exit-Signal connected.



## ADDITIONAL INFORMATION

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Internet: [www.ldt-infocenter.com](http://www.ldt-infocenter.com)

Additional Information about installation and operation of our digital components and various helpful sample connections are available within our operation instructions, which will be supplied with each module and are available at our Internet Site. All shown sample connections can be loaded down as PDF-files (e.g. page\_833.pdf) and printed at an A4 format.

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**Subject to technical changes and errors.  
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