

To be a Digital-Professional!

Light-Signals of Czechoslovakian National Railway (CSD) digital controlled by the Light-Signal Decoder LS-DEC-CSD

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 short dark phases as in reality.

The Light-Signal Decoder *LS-DEC-CSD* supports two- to four-aspect exit- and shunting signals and as well block signals.

Multiple aspect CSD station-entry-signals with their advance signals can be as well digital switched via the decoder.

The reed-in of the directly assigned decoder addresses is possible via the programming key S1 as on all our other accessory decoders.

BASICS

Up to 4 light signals can be controlled by one Light-Signal Decoder. Two signals on each 11-poles clamp bar. 2 signal aspects can be assigned to each decoder address and max. 8 signal aspects can be indicated with each clamp bar. One Light-Signal Decoder occupies therefore 8 decoder addresses (4 addresses on each clamp bar).

The 8 key combinations at one clamp bar (4 addresses with **red** / **green** each) can control 8 signal aspects.

The following sample connections show how the fourfold address-groups can be set by use of 8 keys of a push button panel for switching turnouts or signals.

round / red / -	round / red / -	round / red / -	round / red / -
1	2	3	4
straight / green / +	straight / green / +	straight / green / +	straight / green / +

At the centerline between two keys is the decoder address indicated. 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).

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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 complete model railway layout power supply 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 decoders by the digital current (directly connection between clamp KL1 and 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.

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Booster

If the digital current intensity will not be sufficient (command stations with included integrated booster supply mostly 2.5 to 5 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 of 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 which 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 LEDs will be too 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 some 100 Ohm has to be determined by test.

The different CSD-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 the explanation of the corresponding signal aspects refer mostly to one clamp bar only.

To assure that you are able to assign the single wires of the light emitting diodes of the light signals correctly to the clamps of the light signal-decoder you should attend to the 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*.

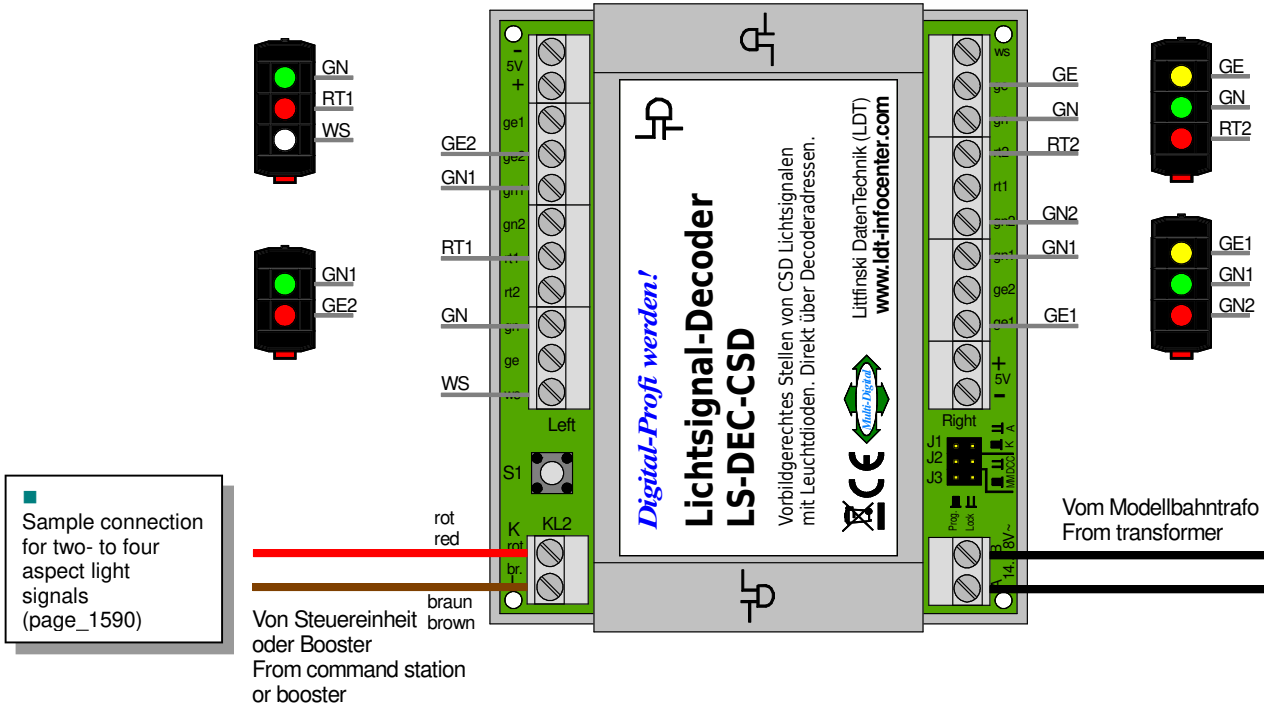
Please notice that the Light-Signal Decoder does not simply switchover the signal aspects but is dimming the light emitting diodes realistic up- and down. Additionally there will be a dark phase of about 0.4 sec. between the signal aspects. During the dark phase is it not possible for the decoder to process incoming digital commands. Therefore you should not send switch commands at a very fast sequence. In any case it will 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 Czechoslovakian National Railway (CSD). Within our delivery range we offer as well Light-Signal Decoders for signals of the German Railway (DB and KS), the Austrian Federal Railways (OEBB) the Swiss Federal Railways (SBB), the Nederlandse Spoorwegen (NS), and the Nationale Maatschappij of the Belgium Spoorwegen (NMBS) and furthermore. The connection of these signals will be explained within separate pages of our Digital-Compendium.

TWO 2- TO 4-ASPECT SIGNALS ON EACH CLAMP BAR

At our first sample-connection are 2 exit- and shunting signals connected to the left clamp bar and to the right clamp bar 2 block signals:



The signals connected to the left side occupy e.g. the decoder addresses 1 to 4. The addresses 5 to 8 will be used by the right signals. Each signal occupies therefore 2 decoder addresses and all signals can be switched independently.

After switching-on the layout the light signal decoder will switch all signals at first to red (stop).

For switching the exit signal with 3 lamps on the left clamp bar to green (proceed) you have to activate the key **green** of the address 1. The following key-table shows the relation of keys to the corresponding digital addresses:

Exit signal left top		Shunting signal left bottom	
stop	proceed substitute signal	stop	
round / red / -	round / red / -	round / red / -	round / red / -
1	2	3	4
straight / green / +	straight / green / +	straight / green / +	straight / green / +
proceed	shunting drive	proceed	

The signal aspects `proceed` for the substitute signal and `proceed` for shunting drive signal will be switched via the keys **red** and **green** of the address 2.

To switch e.g. the lower exit- and shunting signal with 2 lamps on the right clamp bar to green (proceed) you have to activate the **green** key of the address 3.

At the right clamp bar are two block signals connected. The following table shows the setting of keys and the assignment of digital addresses for the signal aspects:

block signal right top		block signal right bottom	
stop (dark)	flashing / dark	stop (dark)	flashing / dark
round / red / -	round / red / -	round / red / -	round / red / -
5	6	7	8
straight / green / +	straight / green / +	straight / green / +	straight / green / +
proceed	caution 40 km/h expected	proceed	caution 40 km/h expected

After switching-on the layout the Light-Signal Decoder switches both block signals at first to red (stop).

To switch the upper block signal at the right clamp bar to the signal aspect `caution` it has to be the **green** key of the address 6 activated. To switch the lower signal the **green** key of address 8 has to be activated.

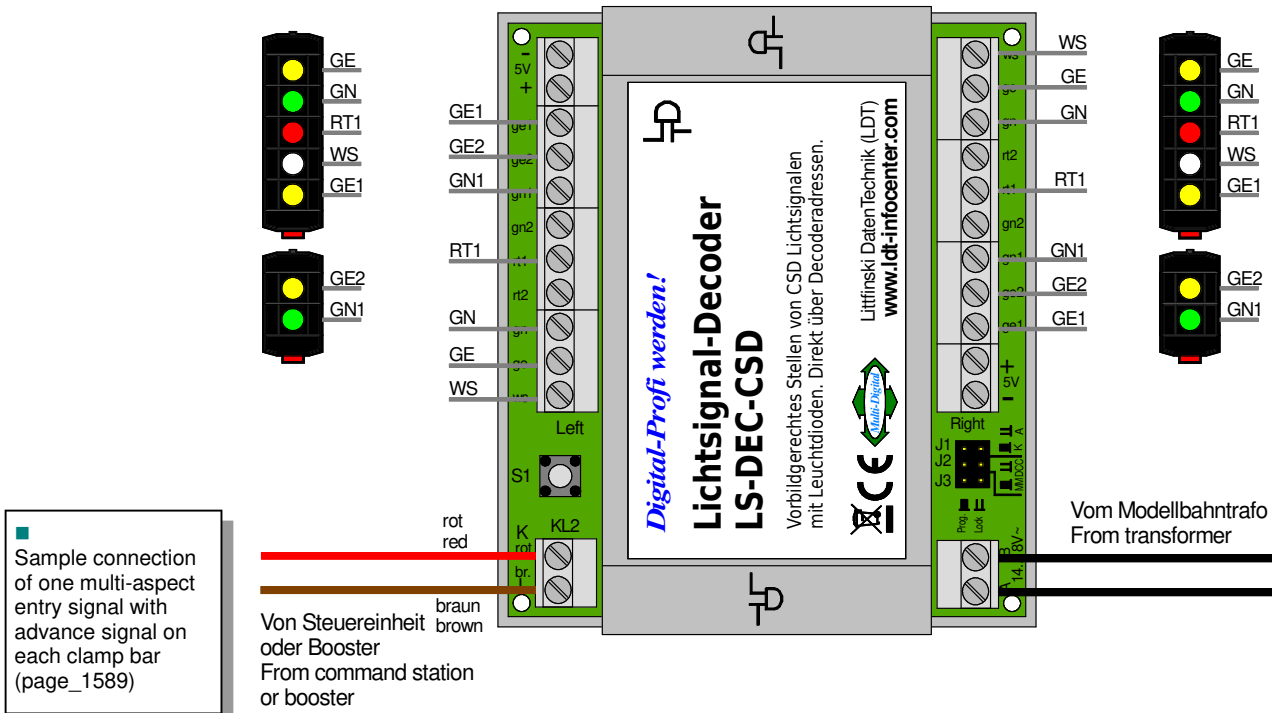
After activating the key **red** of the address 6 the upper block signal indicates the aspect 40 km/h expected.

If the signal has been switched to stop and receives the switch command **red** of the address 6 then will be the upper block signal dark and all LED are switched off.

ONE MULTI-ASPECT STATION-ENTRY- WITH ADVANCE SIGNALS ON EACH CLAMP BAR

During programming of the decoder addresses of one clamp bar is it possible to arrange that via this clamp bar one multi-aspect station-entry signal with advance signal can be controlled. At the next section “Programming” you can find for this feature detailed information under “Important Information”.

The next sample connection shows this possibility:



Sample connection of one multi-aspect entry signal with advance signal on each clamp bar (page_1589)

The signals of the left clamp bar will be e.g. again switched via the decoder addresses 1 to 4.

Entry signal with advance signal at the left clamp bar			
stop	40 km/h, then proceed	proceed for shunting drive	flashing
round / red / -	round / red / -	round / red / -	round / red / -
1	2	3	4
straight / green / +	straight / green / +	straight / green / +	straight / green / +
proceed	caution	40 km/h, caution	proceed on substitute signal
	40 km/h expected	40 km/h, 40 km/h	

The combination of station-entry- and advance-signals on the right clamp bar receive the address 5 to 8.

Entry signal with advance signal at the right clamp bar			
stop	40 km/h, then proceed	proceed for shunting drive	flashing
round / red / -	round / red / -	round / red / -	round / red / -
5	6	7	8
straight / green / +	straight / green / +	straight / green / +	straight / green / +
proceed	caution	40 km/h, caution	proceed on substitute signal
	40 km/h expected	40 km/h, 40 km/h	

In total can be 9 signal aspects indicated.

After switching-on, all signals will indicate the aspect stop. The red LED of the station-entry signal and the yellow LED of the advance signal will be switched-on.

If you activate the key **green** of the address 2 there will be the signal aspect `caution` at the left clamp bar indicated and the yellow LED of the `station-entry signal` will be switched-on. If the decoder receives now the command **red** of the address 4 the yellow LED for the signal aspect `40 km/h expected` will flash.

Via the key **green** of the address 3 will be the signal aspect 40 km/h and then caution indicated. The yellow LED of the station-entry signal will be switched-on and the yellow LED of the advance signal will flash. If now will be the command **red** of the address 4 transmitted the upper yellow LED of the station-entry signal will flash for the signal aspect 40 km/h and then 40 km/h.

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-CSD* 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 one key of the wanted group of four (1 - 4, 5 – 8 etc.) at the command station. 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.

■
Important
information

If the Light-Signal Decoder *LS-DEC-CSD* shall control on one clamp bar two 2- up to 4-aspect signals or one multi-aspect station-entry signal with advance signal this has to be selected together with the decoder address. If the decoder address will be programmed with the command turnout **straight** or signal **green** you should arrange the clamp bar so that the control of two 2- up to 4-aspect signals will be possible. For the other case (turnout **round** or signal **red**) you should program the clamp bar that a multi-aspect station-entry signal with advance signal can be controlled.

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General Note

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).

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

ADDITIONAL INFORMATION

Additional Information about installation and operation of our digital components and various helpful sample connections are available with-in 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_1590.pdf) and printed at an A4 format.

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