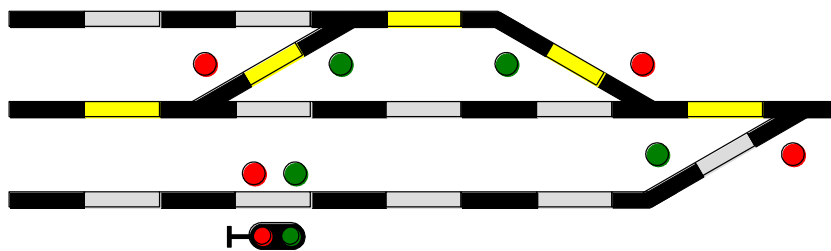


## *Be a Digital-Professional!*

### External Switchboard Panel for layouts with PC-Model Railway Software and ECoS 2 Part 1: Key info via s88-feedback bus and switchboard panel illumination via DCC or Märklin-Motorola

The exemplary conversion of a tracking-control within a model railway switch tower for the control of the own model railway is a request of many model railway users. By using a switch board panel is it possible to control the components of a model railway layout fast, very simple and not at least exemplary and clear.



If your model railway layout will be controlled by a PC with a model railway software (e.g. Railware, TrainController or Win-Digipet) there will be the track layout of your model layout available at the PC-screen. Unfortunately will be the control of turnouts or driveways uncomfortable controlled by mouse clicks.

An external switchboard panel for a part or the total layout controlled by the model railway software will be a comfortable solution. It makes no difference if you construct an own switchboard panel or you combine components of available switchboard panel systems.

But how is the transfer of the key information from the switchboard to the PC possible and how will work the switchboard illumination for the turnout-position and track occupancy information?

#### GENERAL

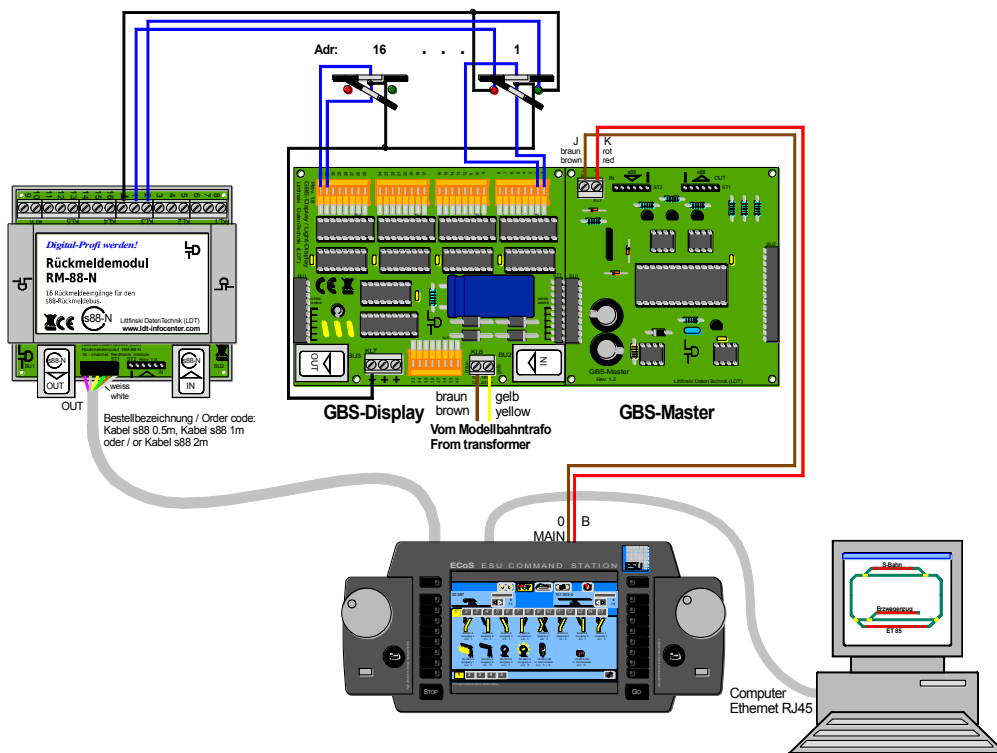
The sample connection at the next page will show you the general set-up.

The first requirement (turnout- or signal key information of the switchboard panel to the PC respectively to the model railway software) can be easily realized via the s88-feedback bus. At the switchboard panel has to be the standard feedback modules "RM-88-N" installed. Onto each module can be up to 16 push buttons for 8 turnouts of the switchboard panel connected.

The second requirement (illumination of turnout- or signal position and track occupancy information) will be covered by the decoder for switchboard lights "GBS-DEC".

There are three different variances of decoder for switchboard lights available:

- the “*GBS-DEC-DC*” will switch the illumination of the control-panel by using the DCC-data format,
- the “*GBS-DEC-MM*” will switch the illumination of the control panel by using the Märklin-Motorola-data format and
- the “*GBS-DEC-s88*” will respond to the s88-feedback bus and will directly illuminate the track occupancy reports or the turnout positions information received from a turnout feedback. This possibility will be described in detail within the second part of this compendium article under “Switch panel illumination directly via the s88-feedback reports”.



## CONNECTING TURNOUT PUSHBUTTONS OF THE SWITCH PANEL

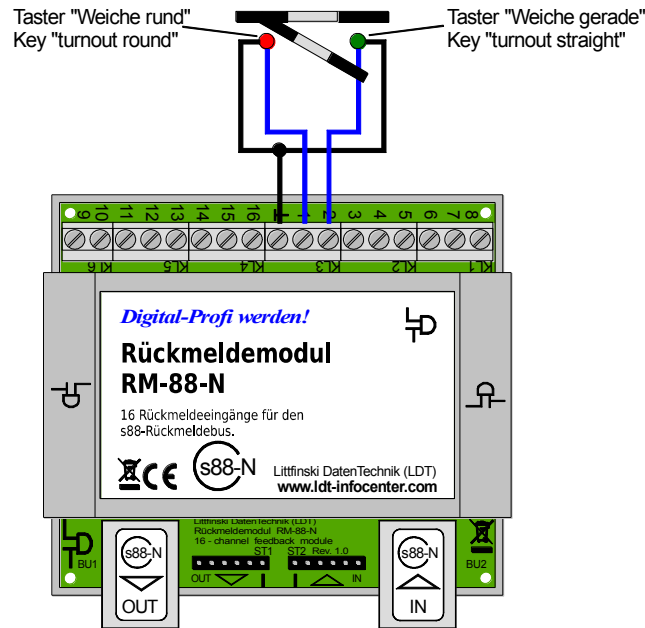
Each feedback module “*RM-88-N*” contains 16 inputs for the connection of 16 push buttons for 8 turnout symbols.

The common wire of all push buttons will be connected to the ground clamp (center clamp of the 17 poles clamp bar of the “*RM-88-N*”) (black wire to the “*RM-88-N*” shown at the sample connection).

At the control panel will be normally a push button for “**turnout round**” and a push button for “**turnout straight**” for each turnout symbol available. Instead of push buttons can be switches used whenever the switch panel controlling model railway software is able to support this.

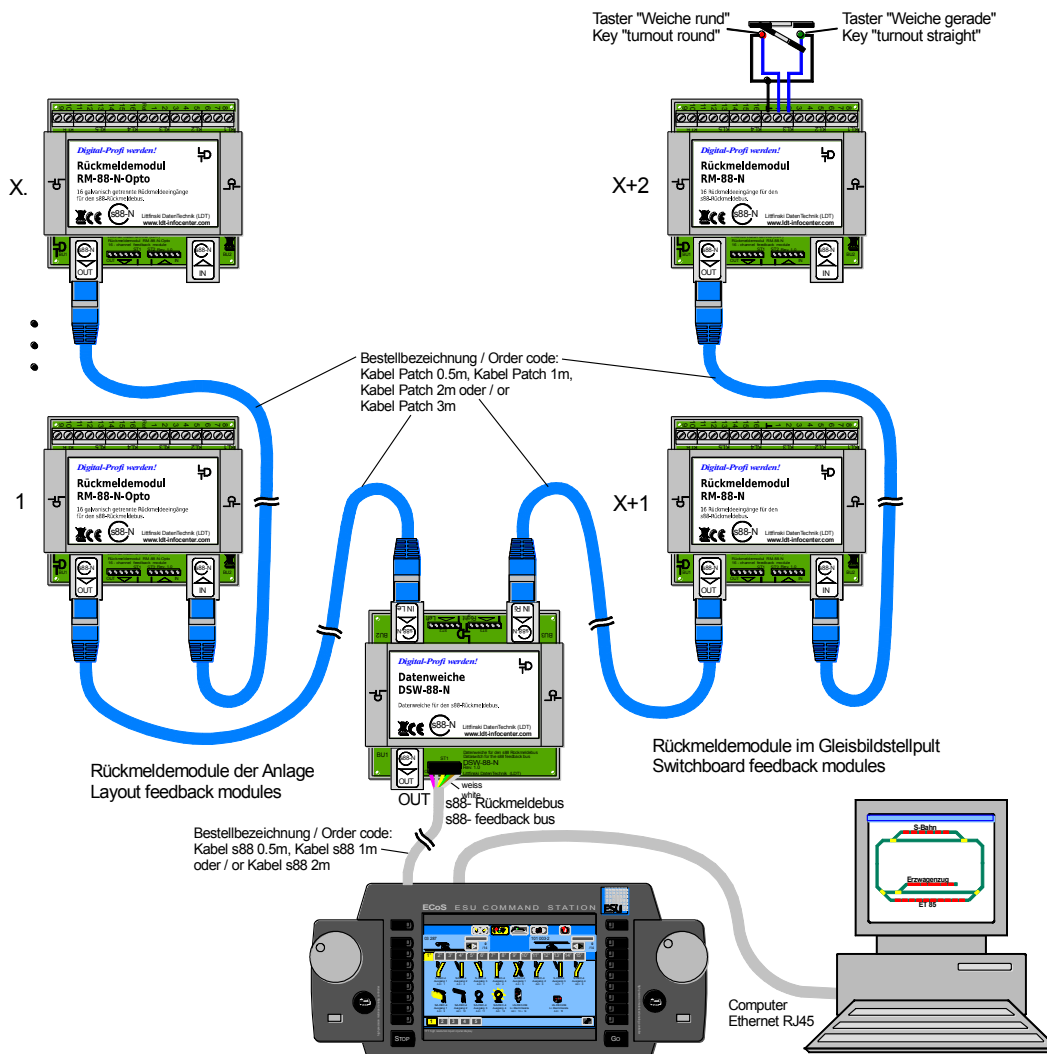
The second connection of each push button will be connected to one of the inputs 1 to 16 of the feedback module (blue wires to the “*RM-88-N*”).

If the control panel contains more than 8 turnouts is it required to connect several feedback modules “*RM-88-N*” in series.



the key information from turnout or signal keys will be received by the PC via the feedback modules.

Because the control panel will be normally installed near the digital central unit is a simple distribution of the s88-feedbackbus via the data switch "DSW-88-N" possible. In this case is a re-numbering of the already assembled feedback modules not required.



branching of the s88-feedback bus via data switch "DSW-88-N". (page\_1223)

The connection sample shows that the feedback modules 1 to X are the feedback modules of the layout.

The s88-feedback bus will be branched via the data switch “DSW-88-N” to the feedback modules X+1 and X+2. These feedback modules are included within the switch control panel and will transfer the key information of the control panel to the model railway software, which controls the switch panel.

## ILLUMINATION OF THE SWITCH CONTROL PANEL

The decoder for switchboard lights “GBS-DEC” illuminates the control panel. The decoder consists out of three components:

The **GBS-Master-Module** (right module at the sample connection on page 2) is the “brain” of the control and shall be connected to the digital current circuit or the feedback bus s88 (attend to part 2) of the digital central unit. It evaluates the digital information of the central unit or from the feedback bus and transfers them to the display units.

With the **GBS-Service-Module** (attend to the below chapter “Programming and Address Section”) will be the addresses of the system assigned. For operation is the connection of the GBS-Service Module not required. The Service-Module can be detached from the GBS-Master-Module until address assignments on further master modules are required.

One **GBS-Display-Module** (left modules at the sample connection on page 2) can illuminate up to 16 turnout symbols, 32 track occupancy symbols or various 2- to 4-aspect light-signals at the switchboard control panel. At a total is it possible to connect up to 4 display modules onto one master-module. With this 4 modules is it possible to illuminate 64 turnouts or 128 track occupancies.

■  
attend to the current consumption of the display elements!

The GBS-Display-Module is identical to the Light-Display of the **Light@Night** system for the light control.

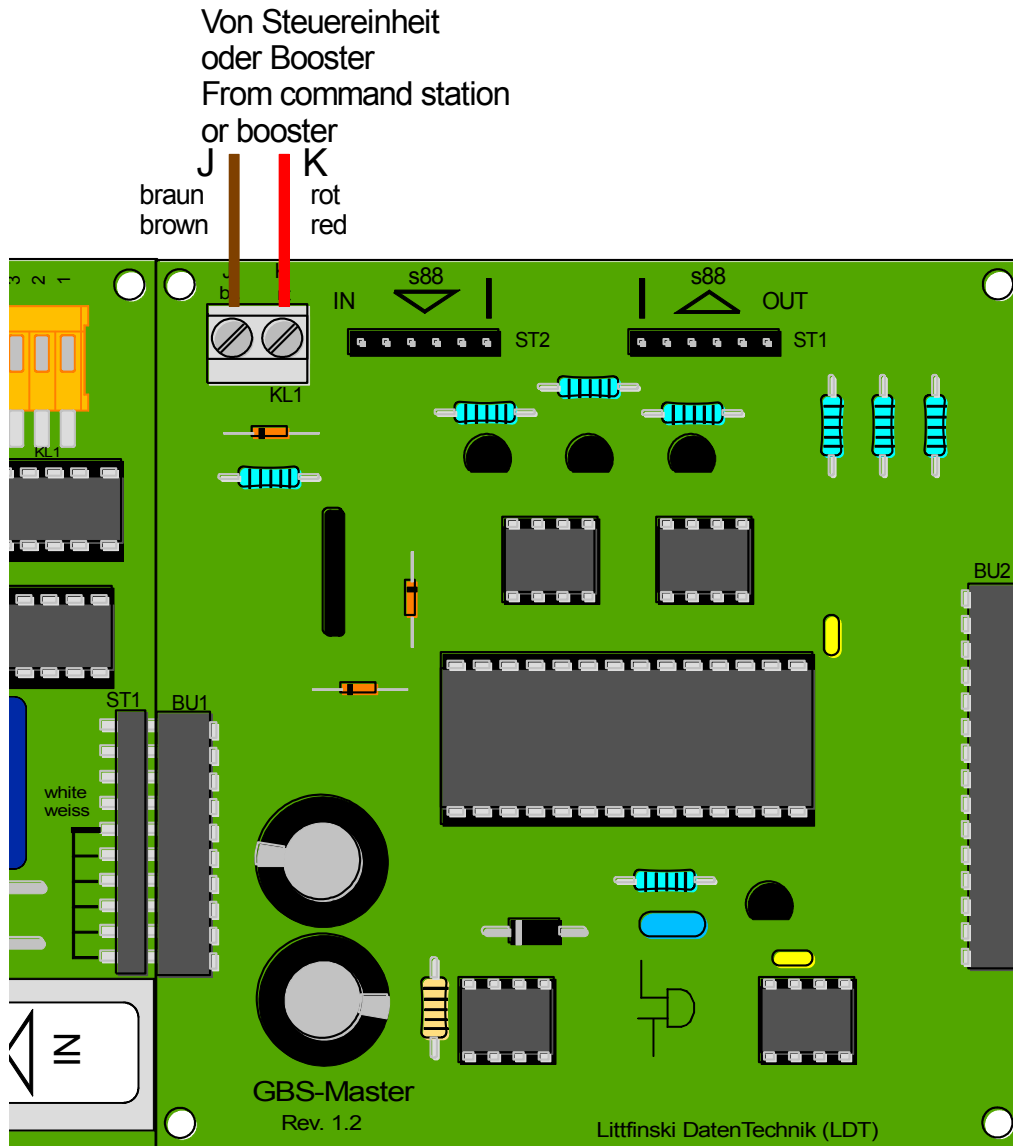
Every single display output is able to supply a current of up to 0.5 Ampere (A). The total current of one display module shall not exceed 3 Ampere.

■  
LED – Light Emitting Diode

Not only light emitting diodes (LED) with serial resistor can be used at the switchboard but incandescent lamps as well.

## THE CONNECTION OF MODULES

The decoder for switchboard lights “GBS-DEC” respectively the GBS-Master-Module shall be connected to the digital current circuit as any other decoder. The decoder receives therefore the switch information for the illumination of turnouts or signals from the central digital unit or from the PC.



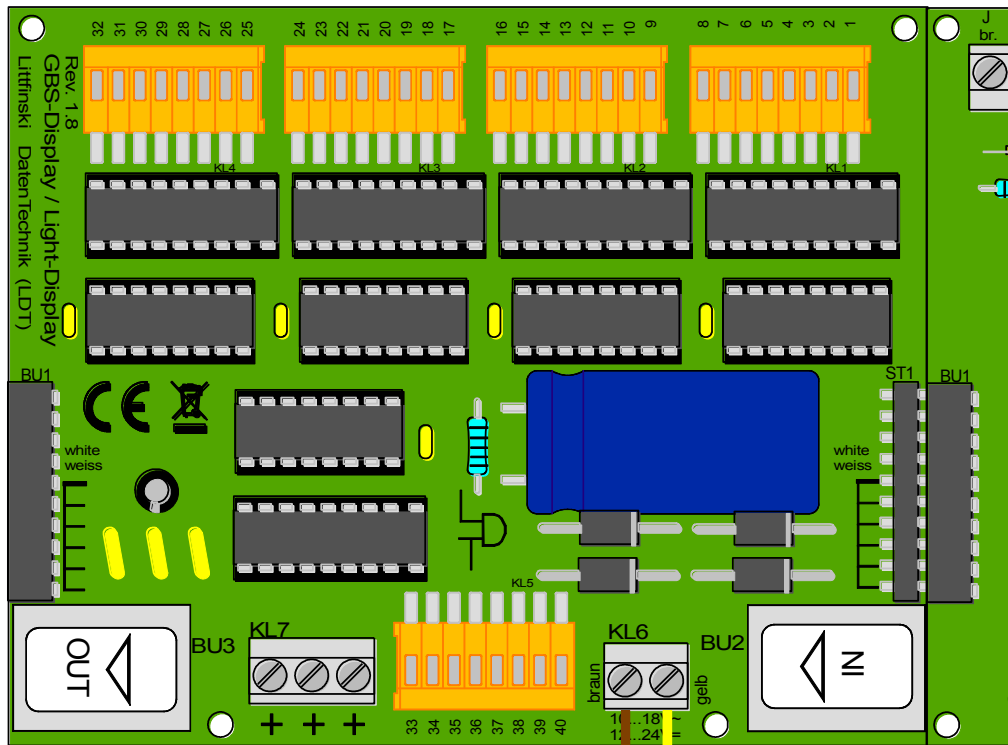
■ the GBS-Master-Module shall be connected to the digital ring conductor (page 1491)

The digital current will be supplied at the two poles clamp KL1. The indicated colors **red / brown** correspond to the cable colors for the digital current recommended by us and be used by company ESU for the ECoS 2.

The turnout decoder (e.g. turnout decoder “S-DEC-4”) actually switches a turnout after receiving a corresponding command from the digital central unit. At the same time will switch the “GBS-DEC” the light for the corresponding turnout at the switchboard.

The “GBS-DEC” is available for the digital formats of Märklin-Motorola and DCC: If you switch the turnouts at your layout with the Märklin-Motorola format you should select the Master Module GBS-Master-MM. If you switch the turnouts with the DCC-format you should select the GBS-Master-DC Module.

The GBS-Display-Modules will be connected to the left side of the Master-Module. To prevent an excessive digital current consumption for the illumination of the control panel is it recommended to supply the GBS-Display-Modules from a simple light transformer.



■ each GBS-Display-Module receives the supply from a light transformer (page\_1491)

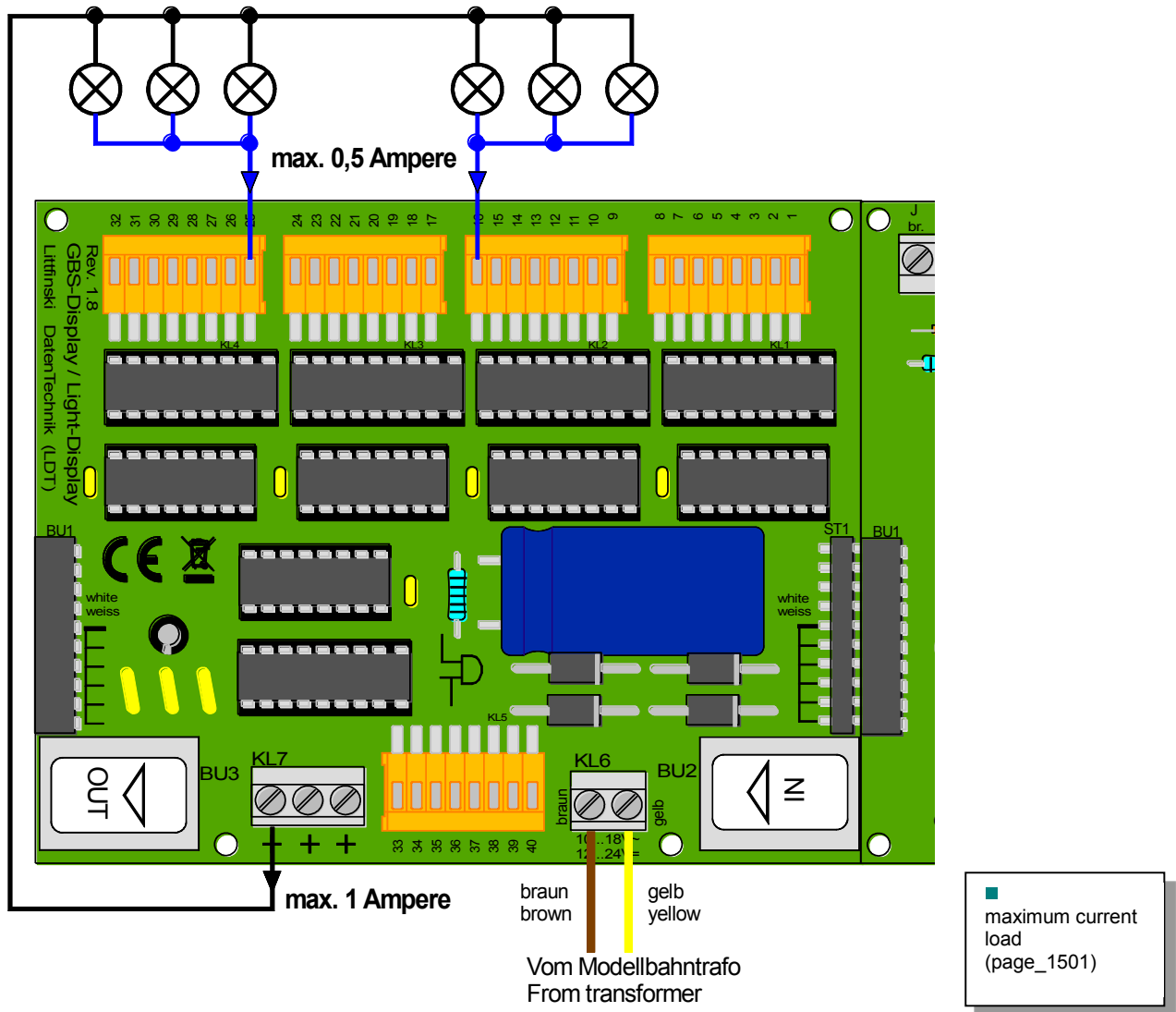
braun brown  
 gelb yellow  
 Vom Modellbahntrafo  
 From transformer

The external AC voltage supply of 14...18 V ~ (e.g. light output of a model railway transformer) will be connected to the two-pole clamp KL6.

## CONNECTING SWITCH BOARD SYMBOLS

Proceed with any electrical connections only after switching-off the layout (switch-off the transformers or disconnect the main plug)!

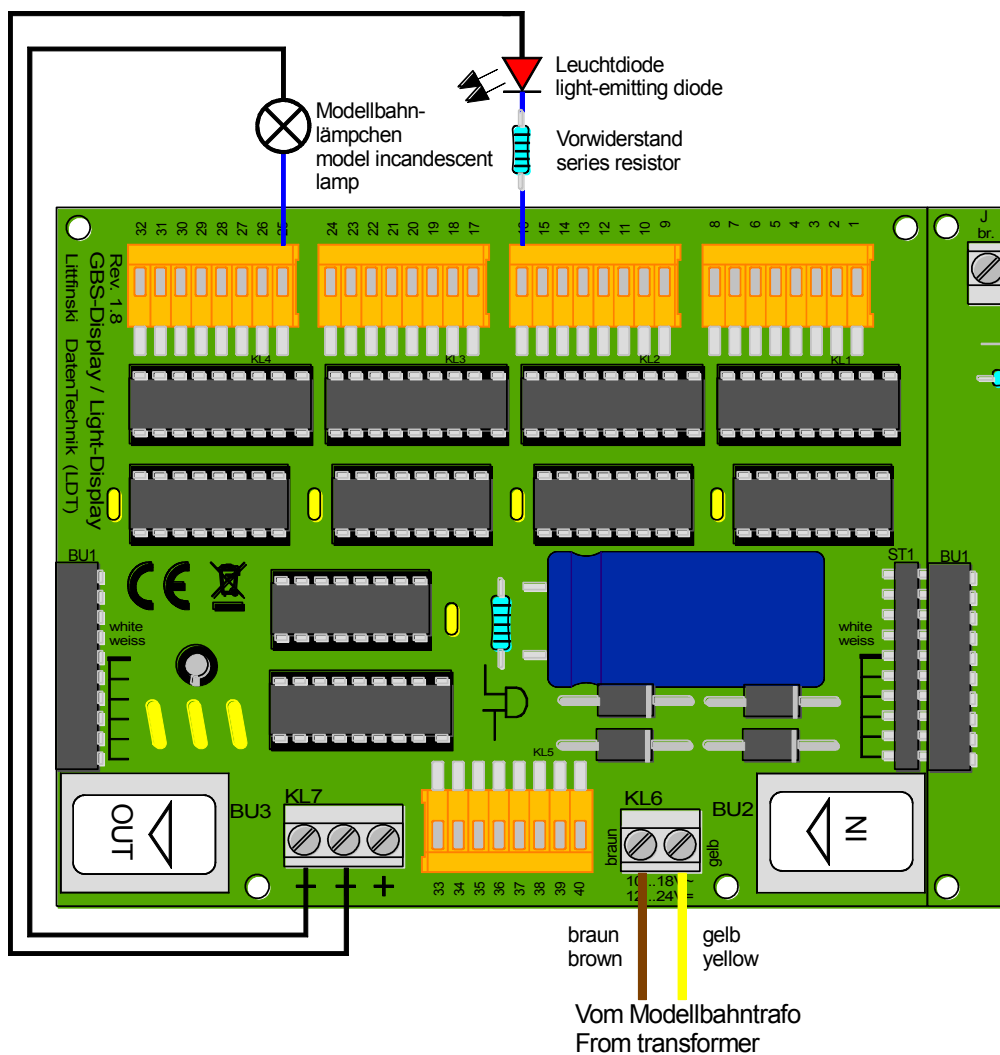
The maximum current load will be 0.5 Ampere on each output. The common connection of all lamps or light emitting diodes is the three poles clamp **KL7**. Each positive connection of the clamp **KL7** can cover a load of 1 Ampere and therefore a total load of a complete Display-Module can be up to 3 Ampere.



Apart from incandescent lamps for model railways is it possible to connect light emitting diodes (LED) for the indication of occupancy reports, turnout positions or signal aspects at the Display-Module.

By using LED lamps is a serial resistor absolutely required (normally 4.7 to 10 kOhm). The common positive connection for all outputs is the clamp **KL7**. On LED lamps will be the plus pole (anode) marked by one longer connection wire.

It is as well possible to use **two-colored** LEDs with three connections and one **common anode**.



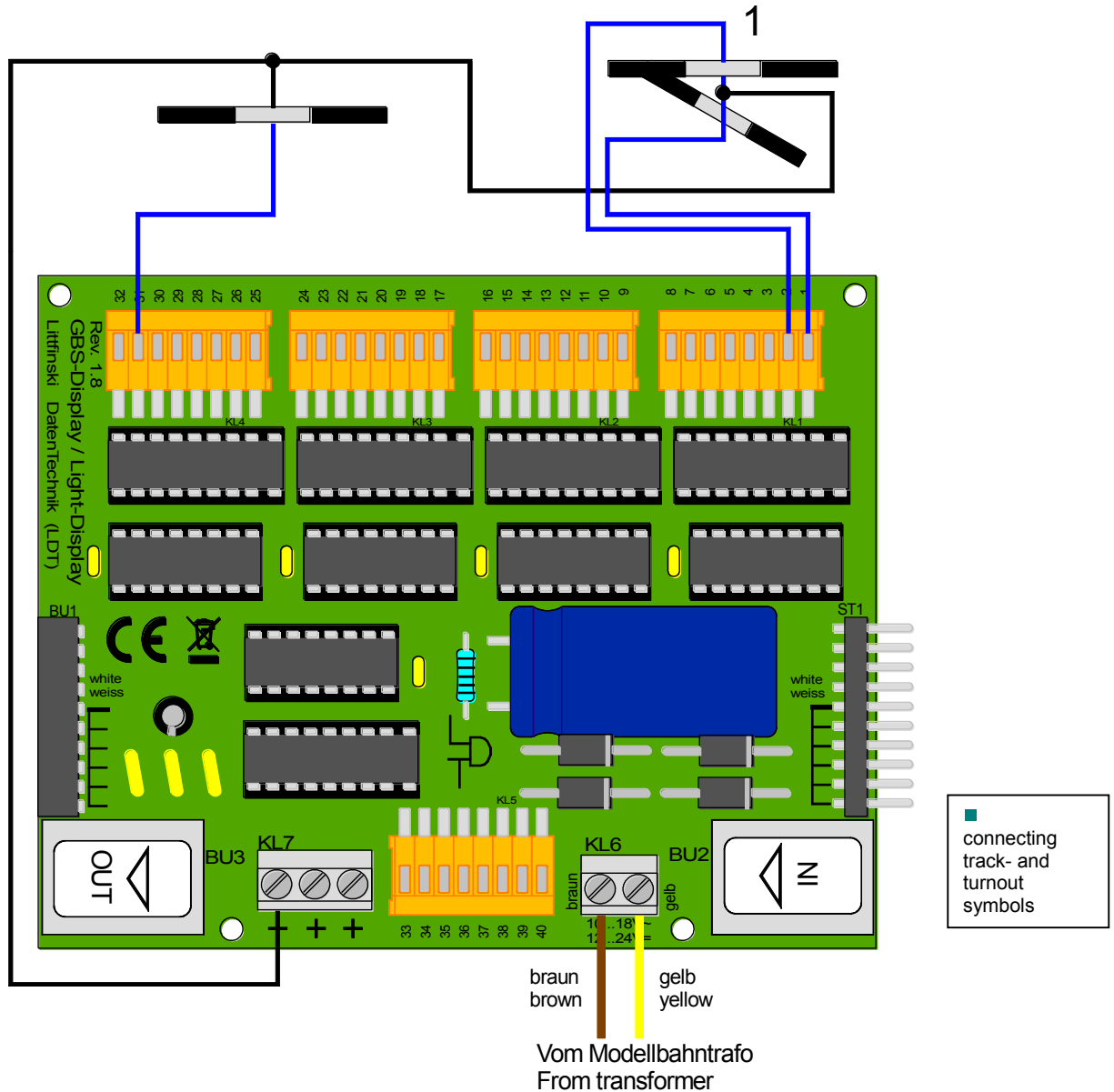
■ connecting incandescent model railway lamps and LED's (page\_1489)

Not only turnout symbols but also track symbols for occupancy reports can be connected to the Display-Modules.

On this way is it possible to illuminate driveways via turnout addresses. For this issue will be turnout addresses used which will not be used for switching turnouts within the layout.



Contrary to the above is it possible to use the “*GBS-DEC-s88*” for track occupancy reports or turnout positions received from turnout feedback reports. This possibility will be described within part 2 of this compendium under “switch panel illumination directly via s88-feedback reports”.

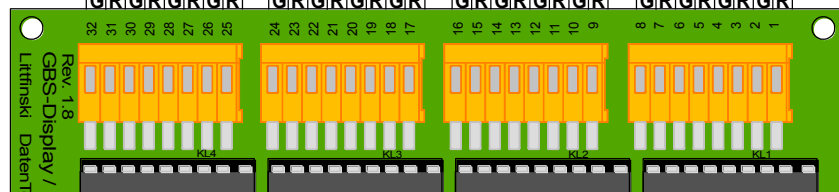


### ADDRESS- AND FUNCTION ADJUSTMENTS

Each of the four Display-Modules to be connected to one Master-Module receives 16 coherent addresses (=group of addresses). For each address of 1-256 will be two outputs assigned i.e. **G** (for turnout straight) and **R** (for turnout round).

Dis1 Adr:256-241	256 255 254 253	252 251 250 249	248 247 246 245	244 243 242 241
Dis1 Adr:240-225	240 239 238 237	236 235 234 233	232 231 230 229	228 227 226 225
Dis1 Adr:224-209	224 223 222 221	220 219 218 217	216 215 214 213	212 211 210 209
Dis1 Adr:208-193	208 207 206 205	204 203 202 201	200 199 198 197	196 195 194 193
Dis1 Adr:192-177	192 191 190 189	188 187 186 185	184 183 182 181	180 179 178 177
Dis1 Adr:176-161	176 175 174 173	172 171 170 169	168 167 166 165	164 163 162 161
Dis1 Adr:160-145	160 159 158 157	156 155 154 153	152 151 150 149	148 147 146 145
Dis1 Adr:144-129	144 143 142 141	140 139 138 137	136 135 134 133	132 131 130 129
Dis1 Adr:128-113	128 127 126 125	124 123 122 121	120 119 118 117	116 115 114 113
Dis1 Adr:112-097	112 111 110 109	108 107 106 105	104 103 102 101	100 99 98 97
Dis1 Adr:096-081	96 95 94 93	92 91 90 89	88 87 86 85	84 83 82 81
Dis1 Adr:080-065	80 79 78 77	76 75 74 73	72 71 70 69	68 67 66 65
Dis1 Adr:064-049	64 63 62 61	60 59 58 57	56 55 54 53	52 51 50 49
Dis1 Adr:048-033	48 47 46 45	44 43 42 41	40 39 38 37	36 35 34 33
Dis1 Adr:032-017	32 31 30 29	28 27 26 25	24 23 22 21	20 19 18 17
Dis1 Adr:016-001	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1

possible address ranges of the GBS-Display-Modules (page\_1490)



At the GBS-Service-Module connected to the right side of the Master-Module for the programming process (please attend as well to the below section “Programming and Address Ranges”) is it possible to set the quantity of Display-Modules (maximum 4), which shall be controlled by the Master-Module, respectively how many Display-Modules are connected.

Now you can enter the address range and the function of the outputs for each Display-Module:

Dis1	Adr:016–001
Dis1	K08-01:****
Dis1	K16-09:****
Dis1	K24-17:****
Dis1	K32-25:****

The above table indicates that the first Display-Module (Dis1) left from the GBS-Master-Module will use the address range 1 to 16. All four block clamps KL1 to KL4 with the addresses K08-01, K16-09, K24-17 and K32-25 will be standard switch outputs.

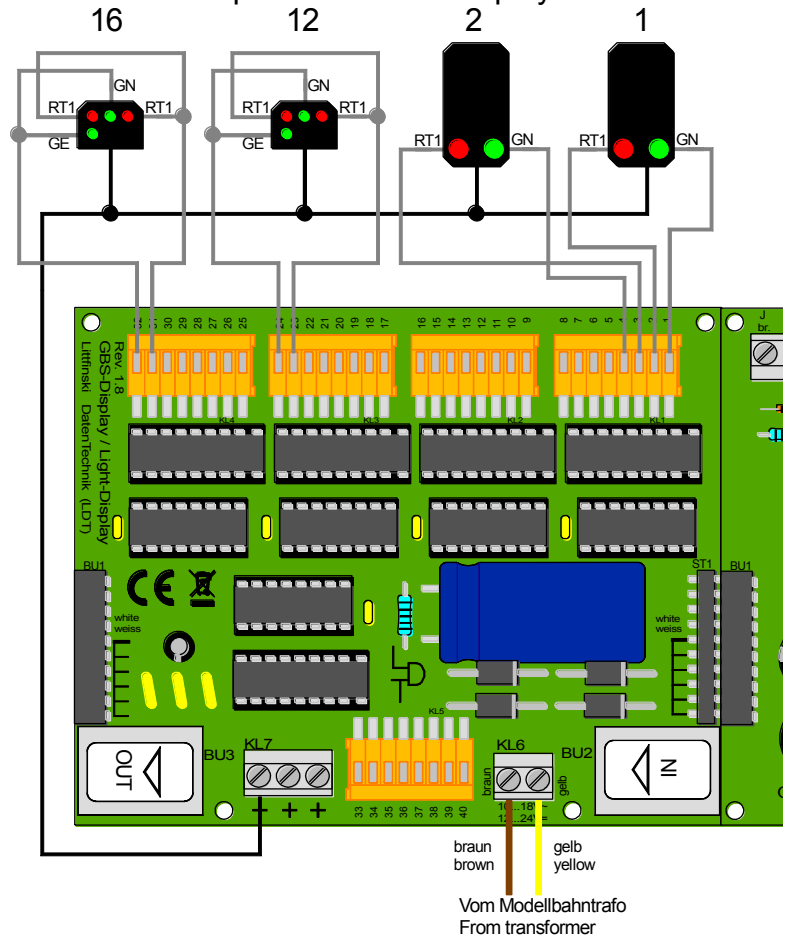
With the adjustment “\*\*\*\*” will be indicated that the outputs at the contacts 1 to 32 will be switched as pairs.

This follows that turnout symbols or block signals which are connected at the clamps 1/2, 3/4, 5/6, etc. can be switched from round to straight respectively red to green by using the addresses 1 to 16.

## CONNECTING LIGHT SIGNALS

Light signals used at the layout and on the switch panel can be controlled by the “*GBS-DEC*” as well. The placing of addresses at the “*GBS-DEC*” works on the same way on the layout as on the Light Signal-Decoder LS-DEC-DB.

In this case will be each of the two clamp bars of the LS-DEC-DB comply with one of the four clamp blocks of the Display-Module.



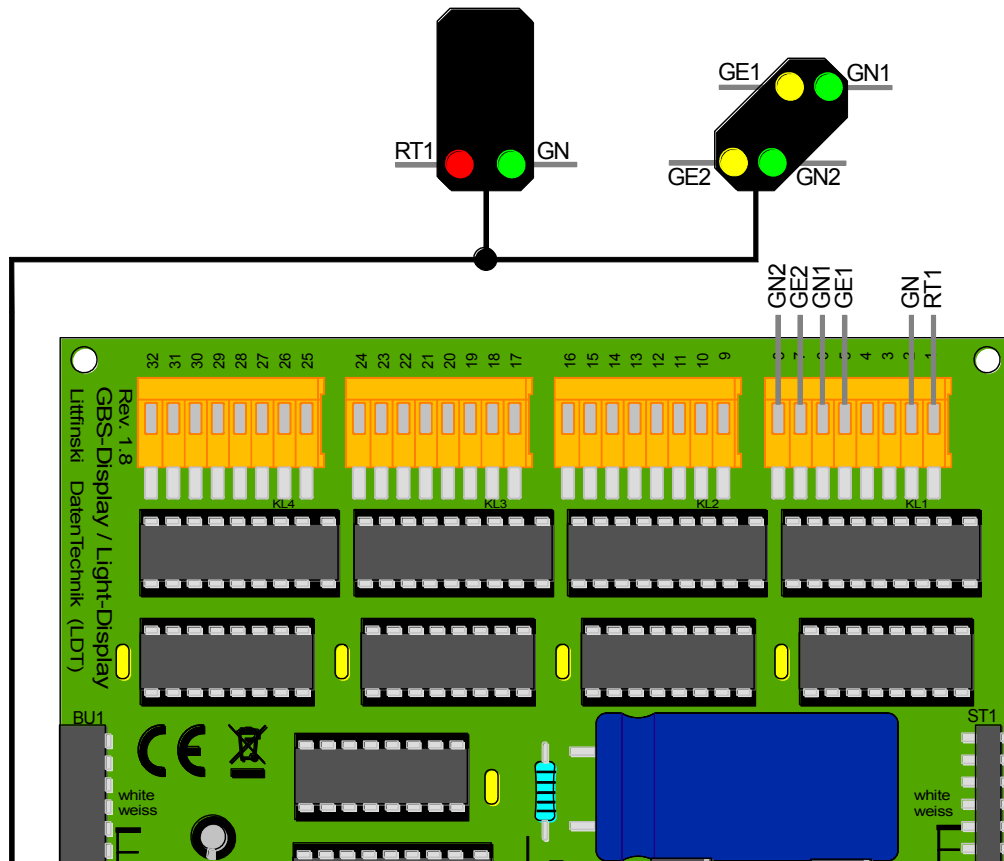
Each block- and line-close-signal needs one digital address for the indication of the signal aspects **Hp0**, **Hp1**, **Sh0** and **Sh1**. The light emitting diodes or incandescent lamps of signals will be connected at the clamps **KL1** to **KL4** for example to the contacts **1–8**, **9–16**, **17–24** and **25–32**. With the GBS-Service-Module is it possible to enter the following adjustments for the control of block- and line-close-signals:

<b>Dis1</b>	<b>Adr:016–001</b>
<b>Dis1</b>	<b>K08-01:****</b>

The above table indicates that the first Display-Module left from the GBS-Master-Module will use the address range 1 to 16 and the outputs of the clamp bars (at the table exemplary shown for the clamp bar **KL1 (K08-01)** ) have been set to switch at pairs (**red** and **green**) “\*\*\*\*” at the contacts **1/2**, **3/4**, **5/6** etc.

The next sample shows the connection of one block- and one advance-signal and indicates the correct settings for the digital control.

The block signal requires again one digital address for the indication of the signal aspects **Hp0** and **Hp1**. The advance signal requires for all aspects **Vr0**, **Vr1** und **Vr2** two digital addresses.



control of DB  
 Block- and Ad-  
 vance-Signal  
 Symbols  
 (page\_1494)

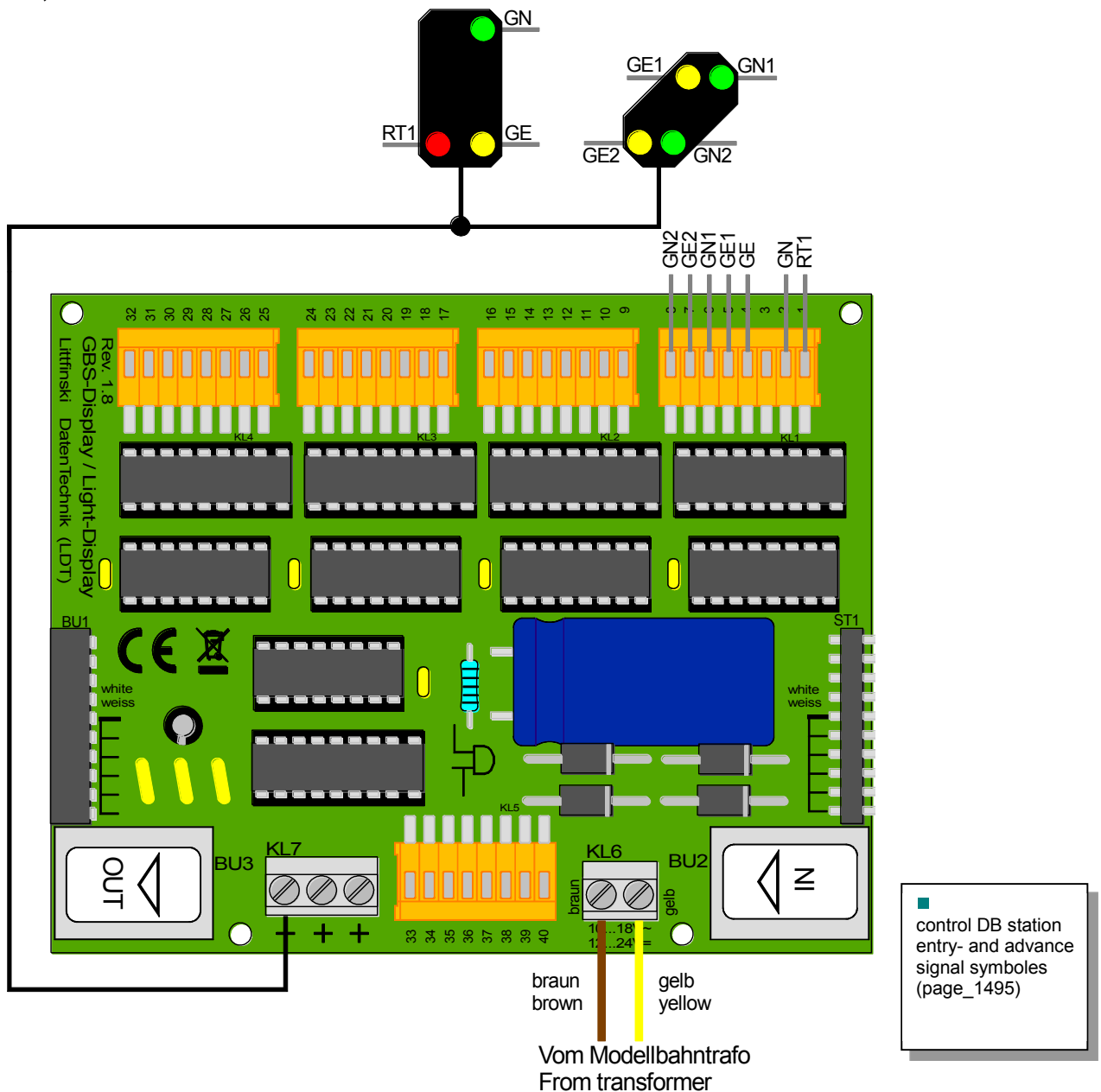
The block- and advance-signal will occupy one clamp bar for 4 digital addresses. At the sample will it be the clamp **KL1** with the contacts **08** to **01**. The following adjustments shall be entered via the service module:

Dis1	Adr:016-001
Dis1	K08-01:Vo**

The above table will indicate that the first Display-Module at the left side off the GBS-Master-Module uses the addresses 1 to 16.

“Vo\*\*“ indicates that on the clamp **KL1** has been one advance signal connected at the contacts **5-8**. The block signal shall be connected to the contacts **1/2** as described above.

For each Station Entry- and Advance-Signal are two digital addresses required for the indication of the signal aspects **Hp0, Hp1, Hp2**, and **Vr0, Vr1** and **Vr2**.

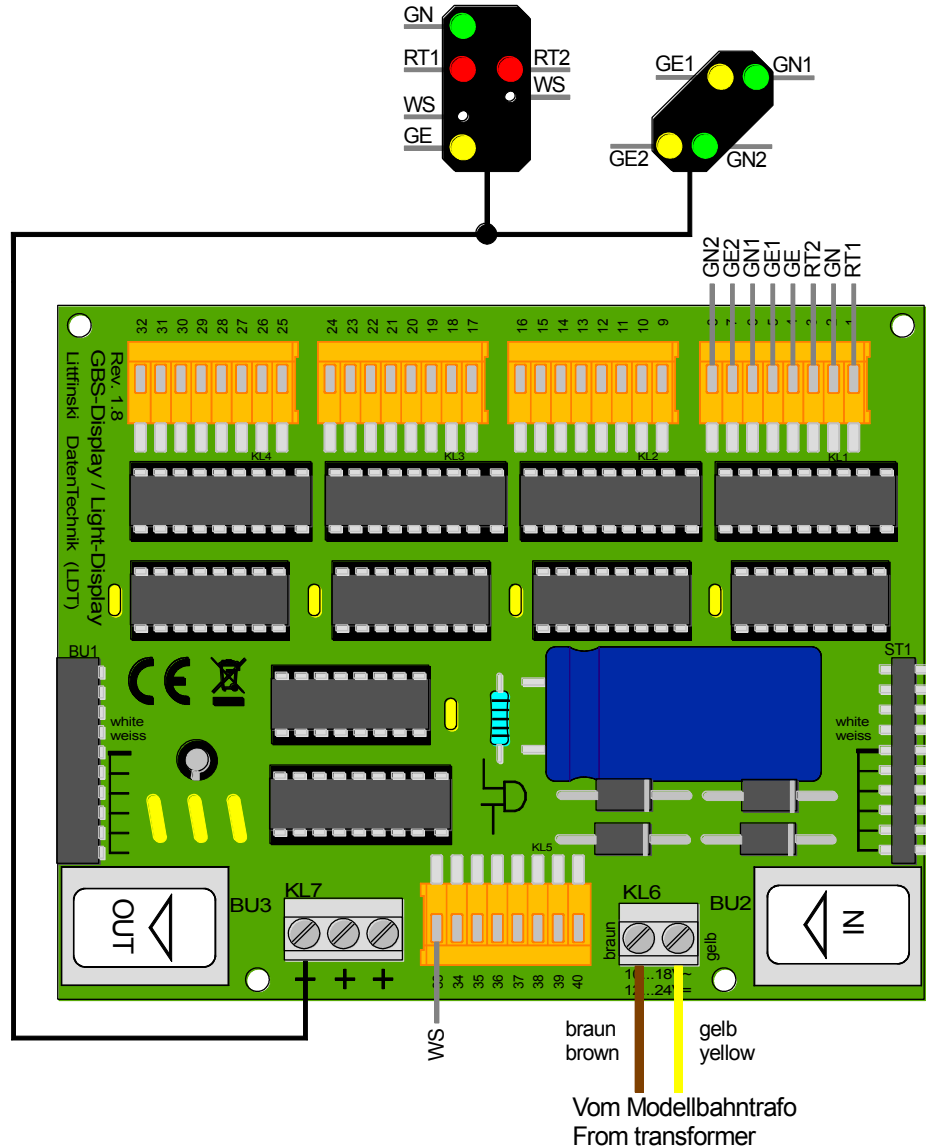


With the GBS-Service-Module is it possible to enter the following adjustments for the control of one station entry- and one advance-signal which are for example connected to the clamp bar **KL1**:

<b>Dis1</b>	<b>Adr:016-001</b>
<b>Dis1</b>	<b>K08-01:VoHE</b>

This table shows that the first Display-Module on the left side of the GBS-Master-Module uses the address range 1 to 16. The adjustment at the first clamp KL1 with "**VoHE**" indicates that at the contacts **5-8** is an advance-signal connected and at the contacts **1,2** and **4** a station entry-signal with **red, green**, and **yellow**.

At the next sample will be two digital addresses each used for the control of one home-signal with the signal aspects **Hp0**, **Hp1**, **Hp2** and **Sh1** and two digital addresses for one advance-signal with the aspects **Vr0**, **Vr1** and **Vr2** connected and established.



enlarged connection drawing at the sample connection (page\_1496)

The following settings at the clamp block **KL1** for the home- and advance signal can be adjusted with the GBS-Service-Module:

<b>Dis1</b>	<b>Adr:016-001</b>
<b>Dis1</b>	<b>K08-01:VoHE</b>

The above table indicates that the first Display-Module connected to the left side of the GBS-Master-Module uses the digital addresses 1 to 16.

„**VoHE**” indicates that at the contacts **5 – 8** is one advance signal connected and at the contacts **1 – 4** one home signal.

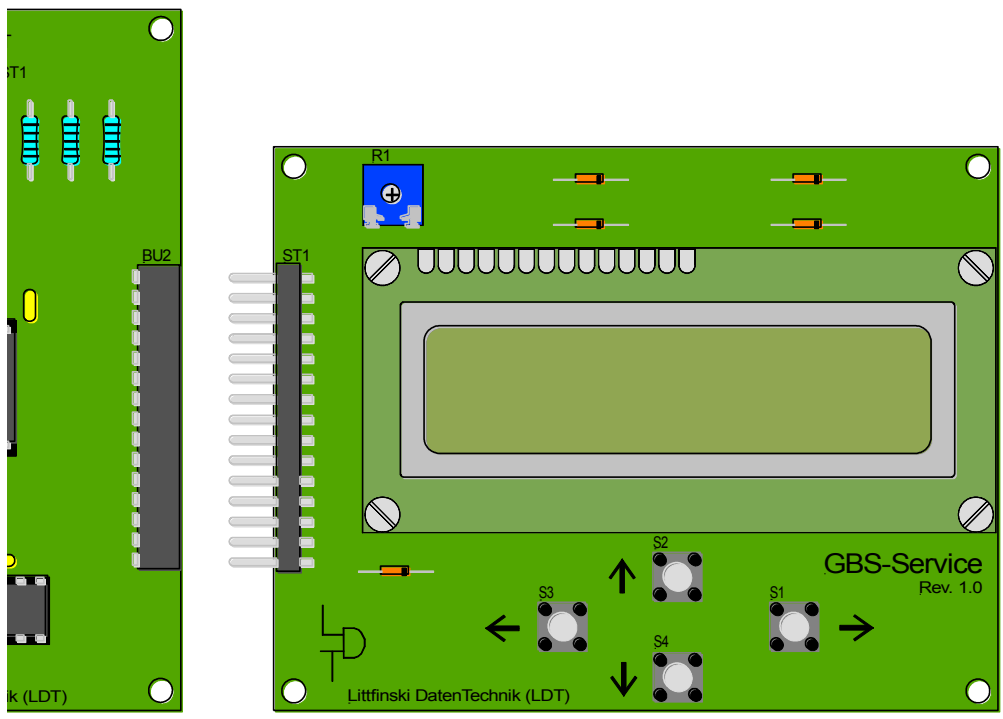
The two white light emitting diodes for the first clamp block **K08-01** shall be connected at the clamp **KL5** onto the contact **33**.

## PROGRAMMING AND ADDRESSES

The GBS-Service-Module has to be used for the setting of the addresses according to the tables shown above. The Service-Module has to be connected to the right side of the Master-Module for this process.

Before connecting the Service-Module to the Master-Module is it absolutely required to switch-off all model railway transformers, which supply current to the “*GBS-DEC*”.

During the first start will it be eventually required to set a correct contrast of the LC-Display. For doing this is it necessary to turn carefully the trimmer **R1** (blue component at the drawing) with help of a small screw driver a half turn to the left or right until the information on the display is easily readable.



■ attend as well to the drawing at the sample connection (page\_1488)

← GBS-Service Modul aufstecken  
 connect GBS-Service Module

For the single turnout- and track-occupied symbols will be different address ranges required. Those have been shown above within the small tables. The assignment of the address ranges (**001-016**, **017-032** ... **241-256**) and the functions („\*\*\*\*“, „Vo\*\*“, „VoHE“) will be done via the LC-Display.

For further details please read the operation instruction for the GBS-Master-Module.

## FURTHER INFORMATION

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

Additional information about the operation of digital model railway components and very helpful sample connections can be found at the operation instructions which will be supplied together with the components and modules as well as on our large informative Internet pages.

All operation instructions can found at the section “Downloads“ of our Web-Site and all sample connection shown within this article can be downloaded as PDF-files (e.g. page\_1532.pdf) and printed at an A4 format.

**Authors: Harry Kellner / Peter Littfinski**

Subject to technical changes and errors.  
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