

Basic Manual

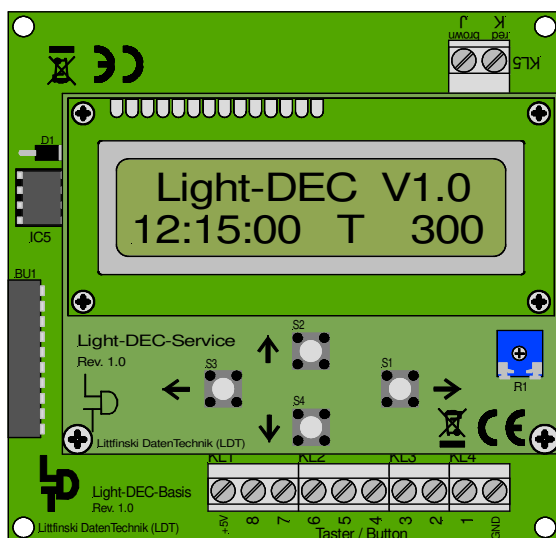
Light-DEC

The **Light-DEC** is a **universal Layout-Light-Control** for **analogue** and **digital model railway layouts** from the *Digital-Professional-Series!*

Various **light-functions** can be assigned to up to **160 light-outputs** and can be **automatically** controlled **within the daylight-cycle** or can be switched **ON or OFF** via **push buttons** or **DCC-Commands**.

Light-DEC-Basic-F Part-No.: **810222**

>> Basic-Module as finished module <<



The universal Layout-Light-Control Light-DEC consist of one Basic-Module and as minimum of one Light-Module (Light-Display or Light-Power) which has to be plugged onto the side of the Basic-Module.

Light-Display-Modules contain 40 outputs, which can cover a load of 0.5 Ampere each. Light-Power-Module with 24 outputs can supply a current of max. 2.5 Ampere each output.

With one Basic-Module can be up to 160 light outputs via max. 7 Light-Modules controlled. The various light effects (Neon-lamps, Flash-lights, Running-lights, Traffic-light control and many others) can be assigned individual to the particular outputs.

This product is not a toy! Not suitable for children under 14 years. Improper use will imply danger or injuries due to sharp edges and tips! Please store this instruction carefully.



Layout-Light-Control Light-DEC – Manual

Content:	Page
1. Introduction / Safety Instruction	2
2. Connect the Basic-Module to the first Light-Module	3
2.1. Using further Light-Modules	4
2.2. Connect light sources to the Light-Modules	5
3. Connect push-buttons or switches to the Basic-Module	7
4. Connect the Basic-Module with the digital layout	7
5. First starting-up / selecting language	8
5.1. Register external push-buttons or switches	9
5.2. Register used Light-Modules at the Basic-Module	10
5.3. Light source test	11
6. Adjusting start time for day-sequence of the light control	11
6.1. Selecting start options of the light control	12
6.1.1 Start/stop of Light-DEC via external push buttons/switches	13
6.1.2 Start/stop of Light-DEC via DCC-Addresses	13
7. Day-phases: select start timing and time-factors for daybreak, day, dusk and night	14
8. Setup of switch groups and switch times	15
9. Available light functions	17
10. Light adjustment: individually matching of parameters of light-functions	17
10.1. Light adjustments: traffic light pedestrian, traffic light cross-road, traffic light circuit	18
11. Output function: assign light functions to the output of light-modules	19
11.1. Output function: properties always active	20
11.2. Output function: properties switch group	20
11.3. Output function: properties push button/switch	21
11.4. Output function: properties DCC-address	21
11.5. Output function: night function for traffic light pedestrian and traffic light cross road	22
12. Adjusting the connected Digital Command Station	22
13. Factory setting	22

Layout-Light-Control Light-DEC – Manual

1. Introduction/Safety instruction

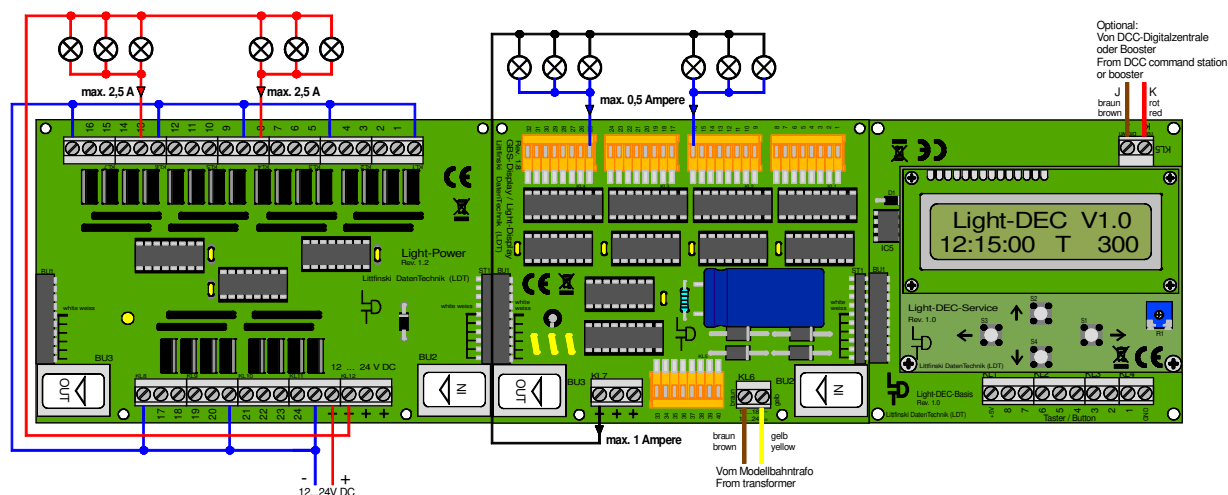
You have purchased the **Basic-Module** for the Layout-Light Control **Light-DEC** for your model railway.

The **Basic-Module** is a high quality product that is supplied within the assortment of **Littfinski DatenTechnik (LDT)**.

We are wishing you having a good time using this product.

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.
- Each **Light-DEC-Basic**-Module will be supplied together with a **Technical Manual**. It contains a **graphic menu navigation** and **tables**. We have separated those information at your ease to **prevent** the requirement of **searching on different pages** within **this manual**.
- At the section “**Downloads**” on **our Web-Site** (www.ldt-infocenter.com) you can find this **Basic Manual** and the **Technical Manual** as **PDF-File with colored illustrations**. You can open, download and print it with the **Acrobat Reader**. Many **illustrations** at this **manual** are **identified** with a **file name** (e.g. **page_1611**). You can find those files on **our Web-Site** at the section “**Sample Connections**” of the **Layout-Light-Control Light-DEC**. You can **download** the files as **PDF-File** and make a **colored print** at the **DIN A4** format.
- **Attention:** Perform all connection-work only after disconnect the model railway layout from mains (disconnect all main-plugs of model railway transformers and switched mode power supplies or switch off the socket strips).
- The **Light-Display-Modules** contain a large capacitor, which has to be completely discharged before the **Light-Display-Module** can be connected or disconnected. Please wait a couple of minutes after switching off the supply transformer before you connect or disconnect the **Light-Display-Module**.



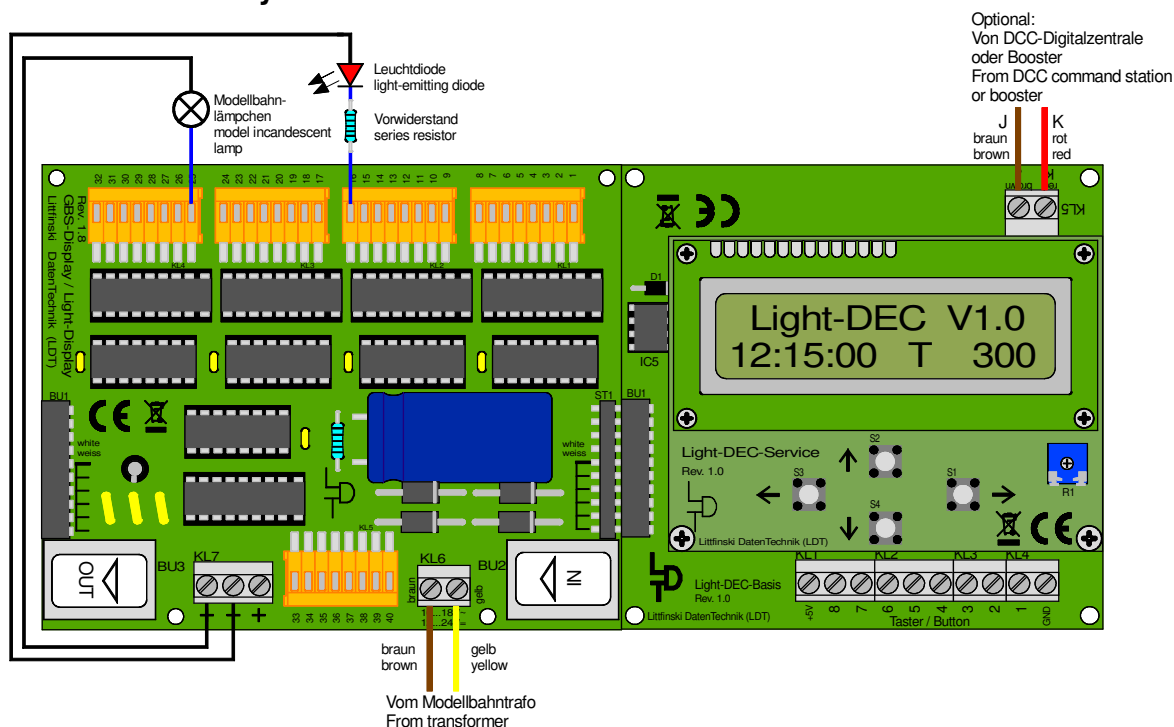
page 1611

The Light-DEC Basic-Module (right) in connection to one Light-Display- (middle) and one Light-Power-Module (left).

Layout-Light-Control Light-DEC – Manual

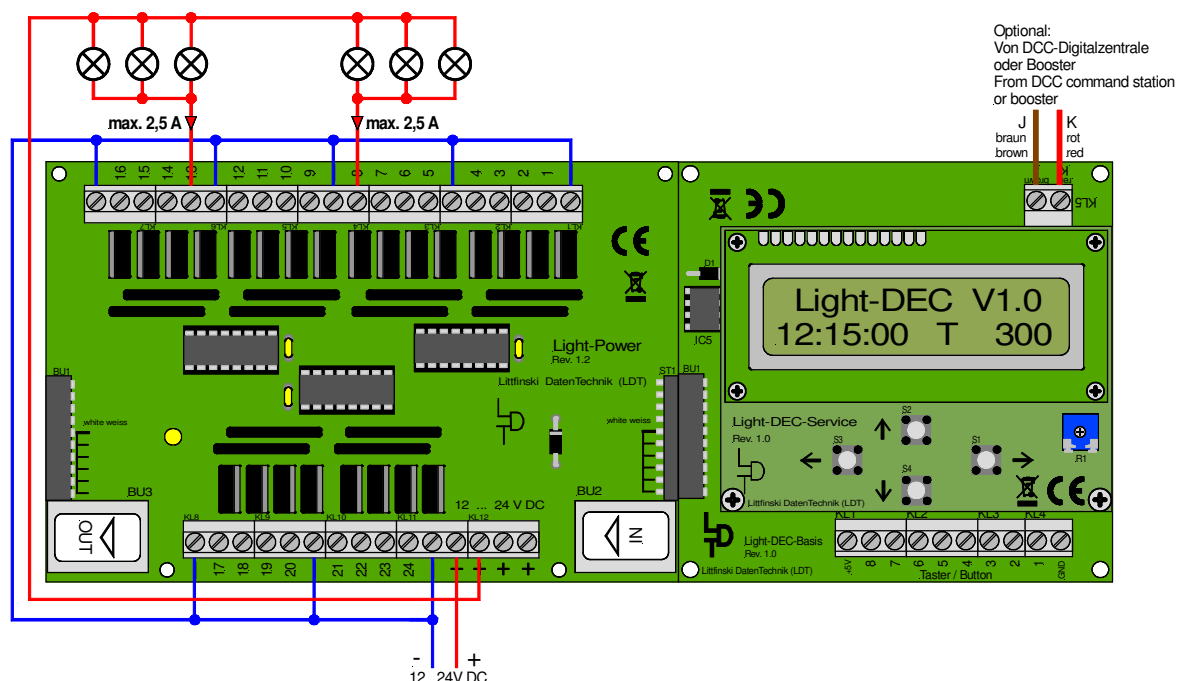
2. Connect the Basic-Module with the first Light-Module

Connect the **Basic-Module** via the 10-poles socket bar BU1 either with a **Light-Display-** or a **Light-Power-Module**. It is essential to attend careful to the position of the **pin bar** of the **Light-Display-** and the **Light-Power-Module** and that there is **no offset** to the **socket bar** of the **Basic-Module**. If the **printed circuit boards** of the **Basic-** and **Light-Module** are inserted into a position that they are **flush on top and bottom** both modules are **correctly connected**.



page_1601

The Light-DEC Basic-Module with the first directly connected Light-Display-Module.



page_1608

The Light-DEC Basic-Module with the first directly connected Light-Power-Module.

Layout-Light-Control Light-DEC – Manual

The first Light-Module has to be always directly connected onto the Basic-Module for voltage supply.

Attend as well to the separate Operation Instruction of the Light-Display- or Light-Power-Module.

At the Operation Instruction you can find as well basic instruction for the connection of the power supply and the connection of model incandescent lamps or light emitting diodes (LED) within the section "Connection of Illumination".

2.1. Using further Light-Modules

Via the Basic-Module is it possible to control with max. 7 Light-Modules up to 160 light-outputs. A variable combination of Light-Display- and Light-Power-Modules is possible.

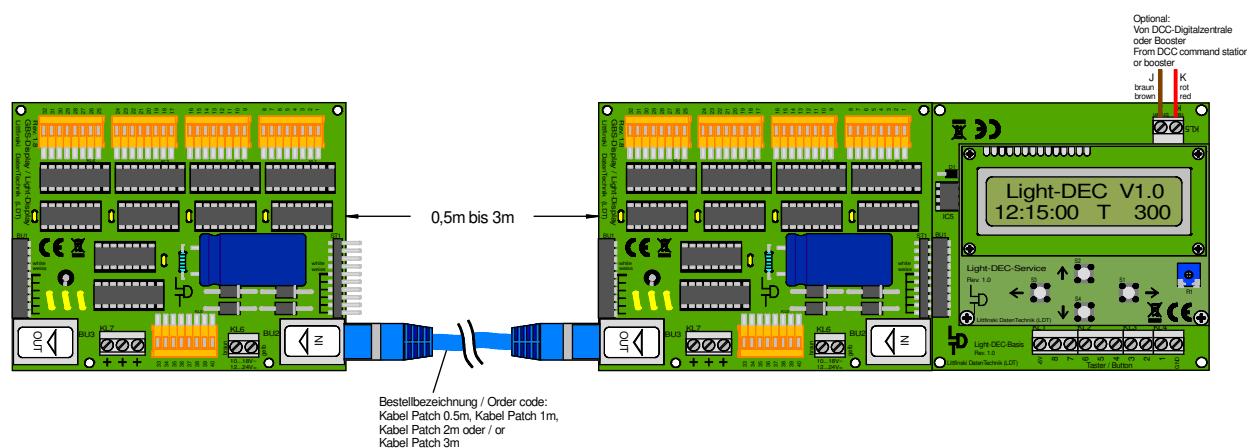
A Light-Display-Module contains 40 and a Light-Power-Module 24 outputs. If there are only Light-Power-Modules connected can be with 7 of those Modules (7 x 24 = 168 light-outputs) used. The last 8 outputs of the seventh Light-Power-Module cannot be used for control connection because the maximum quantity of 160 light outputs will be exceeded by 8.

If there are only Light-Display-Modules used with 40 outputs each there can be 4 of those modules (4 x 40 = 160 light-outputs) used at the Basic-Module.

Combined used can be 5 to 7 Light-Modules used on one Basic-Module. If the summary will be more than 160 light outputs will be the surplus outputs not controlled.

The Light-Modules shall be connected directly next to each other as shown at the illustration on page 2 with one Light-Display- and one Light-Power-Module each.

If the Light-Modules shall be installed at an extended situation to be closer to the light sources there shall be shielded interference-protected patch-cables (computer network cable) used for the connection.



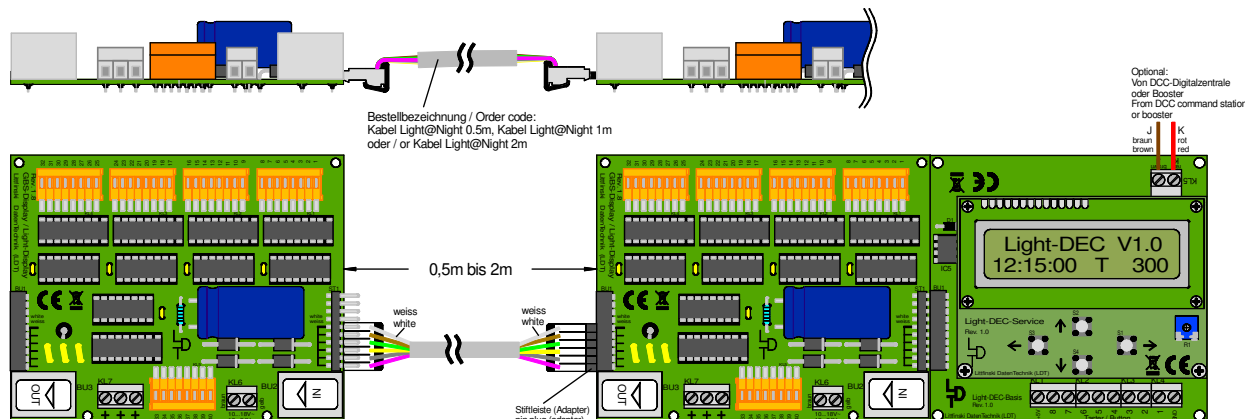
page_1607

The second Light-Display-Module has been connected to the first Module via a Patch-Cable.

Layout-Light-Control Light-DEC – Manual

It is as well possible to connect the **Light-Modules** to each other via the “**Kabel Light@Night**” at a distance of 0.5m, 1m or 2m.

On this way can be as well **older Light-Modules without RJ-45 sockets** for a **patch-cable connection** connected to each other on a **longer distance** of up to 2m.



page_1606

The second Light-Display-Module has been connected to the first Module via a Kabel Light@Night.

2.2. Connect light sources to the Light-Modules

Some light-functions require only **one light source** (model railway incandescent lamps or light emitting diodes – LED). Maximum is 10 light sources for the light-function traffic-light cross-road.

If one **light-function** requires **more** than one **light-source** those have to be connected to the **clamps** of the **Light-Modules** in **series** and **ascending sequence**.

For the **light-function** of **Running Light 4** and **5**, **Fun-Fair** and **Construction Work 5** and **8** shall be the **light-sources** in **series** connected to the **clamps** at the **sequence** of the actual **installed situation**.

The **light-function Control-Center** requires **3 light-sources**, which have to be **implemented** into the **control center** to **simulate the light of a switch panel**. The **first clamp** shall be connected to the **red**, the **second** to the **green** and the **third** to the **yellow light-source**.

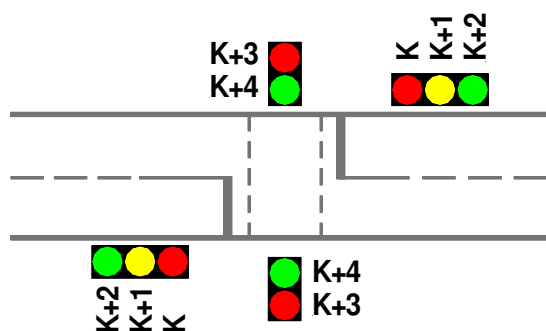
3 light-sources are required for the **light-function TV-Set** which have to be **installed** into the **TV-room** for **simulation of a running TV-Set**. The **first clamp** shall be connected to the **red**, the **second** to the **green** and the **third** to the **blue light-source**.

The **light-function Traffic-Light Pedestrian** occupies **5 clamps** but **provides** via those clamps **voltage** to **10 light-sources**. There shall be **2 light-sources** connected to **one clamp**. Both **Pedestrian-** and **both Traffic-road lights** will be electrical **parallel switched** on this way because they will show always **the same light phases**.

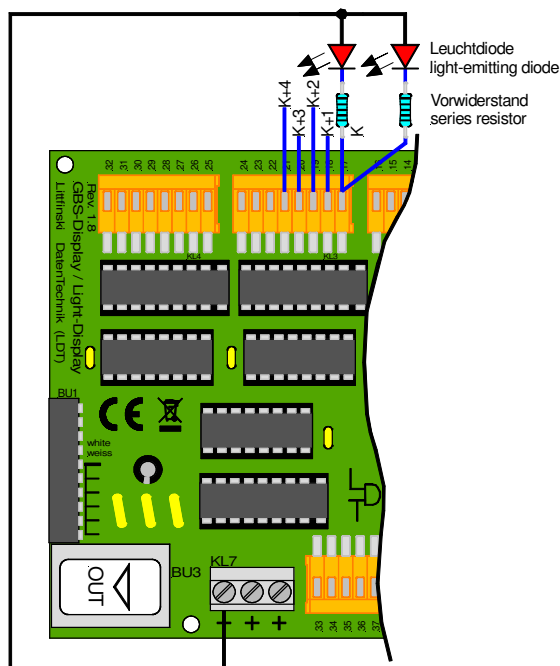
For the **correct function** is it required that the **traffic-light-sources** have to be connected to the **correct clamps**.

The **following illustration** shows, which **light-source** has to be **wired** to **which clamp** of the **Light-Module**.

Layout-Light-Control Light-DEC – Manual



Ausgang / Output	Bezeichnung / Function	Farbe / Color
K	Straße Rot / road red	Rot / red
K+1	Straße Gelb / road yellow	Gelb / yellow
K+2	Straße Grün / road green	Grün / green
K+3	Fußgänger Rot / pedestrian red	Rot / red
K+4	Fußgänger Grün / pedestrian green	Grün / green



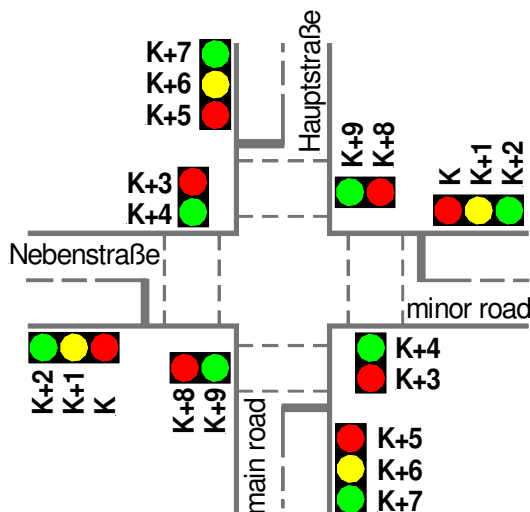
page_1678

Connection of Pedestrian Traffic-Light (Light –function Traffic-Light Pedestrian) with light emitting diodes to a Light-Display-Module (LDM).

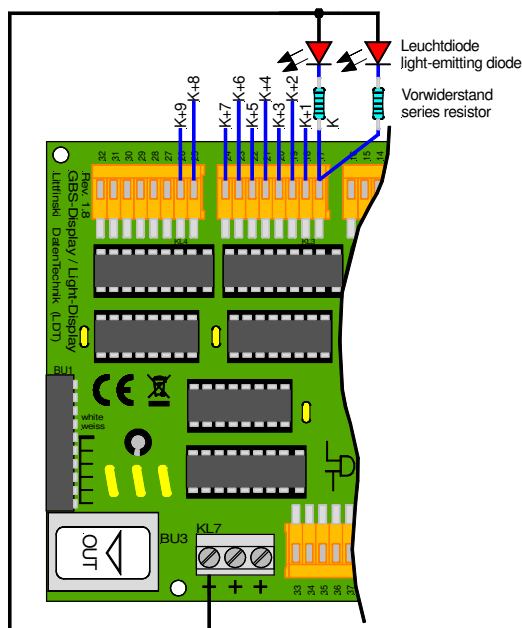
The **light-function Traffic-Light Cross-Road** creates all required **traffic-light sequences** for **cross-roads** and **road-intersections**.

Up to **20 light-sources** will be **supplied** via **10 clamps** from one **Light-Module**. **Two light-sources** each shall be connected to **one clamp**.

Which **light-source** has to be wired to **which clamp** shows the following illustration.



Ausgang / Output	Bezeichnung / Function	Farbe / Color
K	Nebenstraße Rot / minor road red	Rot / red
K+1	Nebenstraße Gelb / minor road yellow	Gelb / yellow
K+2	Nebenstraße Grün / minor road green	Grün / green
K+3	Fußgänger Nebenstr. Rot / pedestrian minor road red	Rot / red
K+4	Fußgänger Nebenstr. Grün / pedestrian minor road green	Grün / green
K+5	Hauptstraße Rot / main road red	Rot / red
K+6	Hauptstraße Gelb / main road yellow	Gelb / yellow
K+7	Hauptstraße Grün / main road green	Grün / green
K+8	Fußgänger Hauptstr. Rot / pedestrian main road red	Rot / red
K+9	Fußgänger Hauptstr. Grün / pedestrian main road green	Grün / green



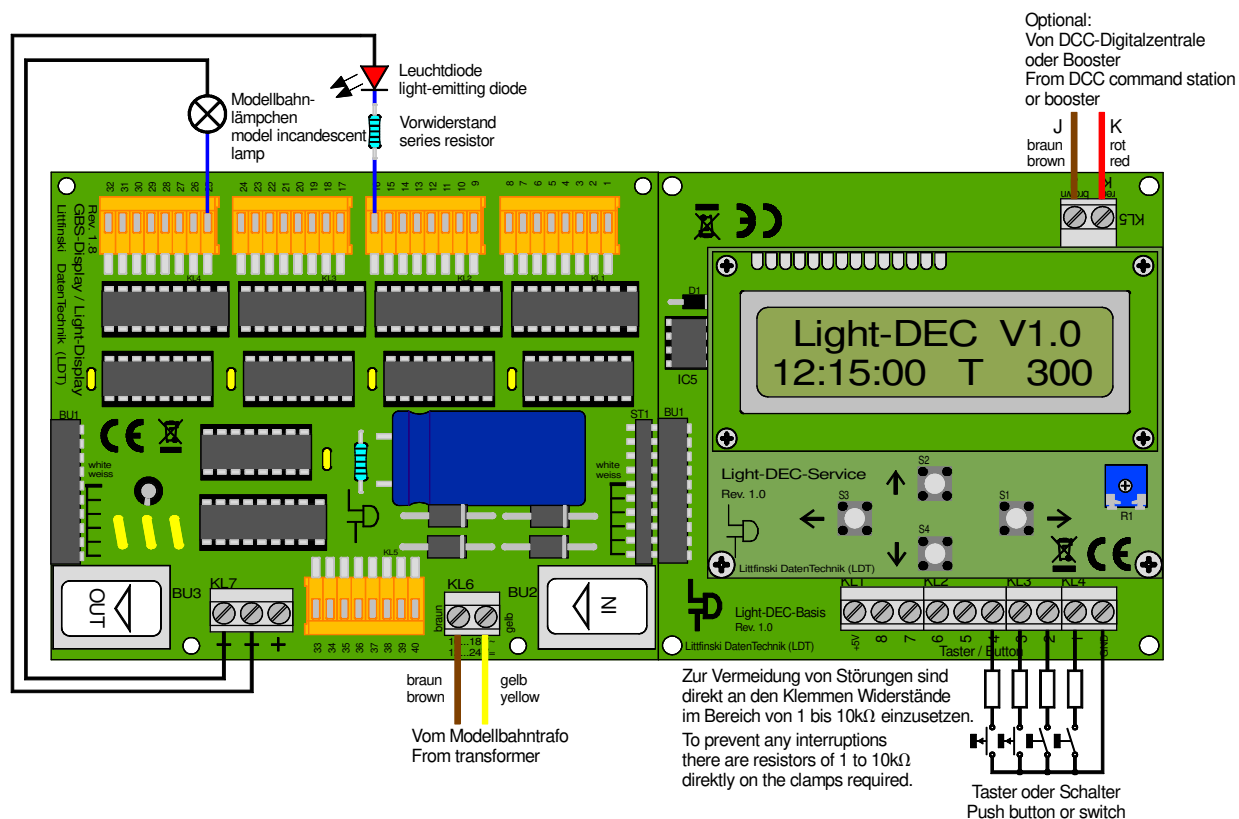
page_1679

Connection of a traffic-light system of a cross-road (Light-function traffic-light cross-road) with light emitting diodes to a Light-Display-Module.

Layout-Light-Control Light-DEC – Manual

3. Connect push-buttons or switches to the Basic-Module

The **Basic-Module** contains a **10-poles clamp bar** for the connection of up to **8 Push-Buttons or Switches**. Via those **external push-buttons or switches** is it possible to **start or stop** manually the **Light-Control Light-Dec** or **single light-functions**.



page_1612

Up to 8 push-buttons or switches can be connected to the 10 poles clamp bar of the Basic-Module.

One pole of the **push buttons or switches** has to be always **connected** to the **earth terminal**, which is marked with **"GND"**. The **second pole** shall be **connected** to one of the **clamp 1 to 8**. The **clamp "+5V"** will **not be required** by use of **push-buttons or switches**.

If a **light-function** is **assigned** to a **push-button** will the function be **started** with the **first keystroke** and **stopped** with the **second keystroke**. If a **switch** will be **used** will be the **function active** as long as the **switch** will be in **"ON"** position.

If there are **push buttons or switches** **connected** can be **individually transmitted** to the **basic module** for each of the **8 inputs** (as described at **section 5.1**).

The **factory setting** for all **8 inputs** is **adjusted** to **push buttons**.

4. Connect the Basic-Module with the digital layout

If you want to **start and stop** the **Light-Control Light-DEC** or **single output-functions** **digital** via **DCC-addresses** the **Basic Module** requires **digital informations**.

Those receive it via the **connection clamp KL5** as shown at the **sample-connections** on **page 1 to 5**. **Supply** the **basic module** with **digital voltage** directly from the **digital central unit** with **integrated booster** or from an **external booster** or from the **digital ring-conductor "Switching"** because then will be **interference-protected data** available.

Layout-Light-Control Light-DEC – Manual

Do not supply the **digital voltage** for the **Basic-Module** directly from the rails. **DCC-Digital systems** are using **different cable colors** or **designations** for both digital cables. **Mostly used markings** are printed next to **clamp 5** but do not necessarily to be used because the **Basic-Module** will automatically evaluate the correct DCC-digital signal.

5. First starting-up / selecting language

As soon as the **first Light-Module** which has been **directly** plugged onto the **Basic-Module** receives **power supply** the **operation status** will be **indicated** at the **display** with a short delay:

Light-DEC VX.X
22:30:00 A 300

If the **Display** does **not correct indicate** during **first starting-up** you should turn with help of a **small screwdriver** carefully the **potentiometer P1**. This **Potentiometer** is located at the **right side below** the **display** has to be turned **halfway left or right** until the information on the **display** can be **optimal read**.

For the **first 40 light-outputs** are **output-functions set ex-factory**, which will be **started at random within the first 15 seconds** after switching-on the unit. If you have **installed** some **light sources** onto the **first 40 light outputs** those will now **lighten** and **flash** on **different intervals**.

The **starting** of the **light-functions at random after switching-on** provides an **optimal optical impression** because **multiple installed light functions** shall **not be running synchronized**.

Within the **Technical Manual** you can find at the **section “Output-Functions / Factory setting”** a **table** which indicates the **assignment** of **output functions** to the **related clamps set ex-factory**.

VX.X at the **Display** of the **Operation Display** indicates the **firmware version** of the **Basic-Module**. **More information** about the **lower line** of the **display** can be found at the **following pages** of this **manual**.

Below the Display you can find **4 push-buttons** indicated with **arrows** for the directions **LEFT, RIGHT, ABOVE** and **BELOW**. Within the further description those **keys** will be indicated as **LEFT, RIGHT, ABOVE** and **BELOW**.

The **Technical Manual** includes a **graphical Menu Navigation** to **illustrate the steps** through the **menus parallel** to the **following descriptions**.

Depress now the **key RIGHT** longer as **three seconds**. The **display changes** into the **Main Menu** and all **light sources** will be **switched off**:

---Main Menu---
Language

Ex-factory has been the **language “Deutsch”** **reselected**. If you **don’t want to change the language** just **skip** the **following lines** and carry on **reading** with **chapter 5.1**.


If you want to select the **language “Deutsch”** just **activate** the **key RIGHT**. The **display** will indicate the **actual selected language**:

Language
>English<

Layout-Light-Control Light-DEC – Manual


With the **keys ABOVE** or **BELOW** you can **switch-over between** **>Deutsch<** and **>English<**.  

Language
>Deutsch<


Leave the **language selection** with the key **LEFT** for using now the **selected language**.
If you would have **selected >Deutsch<** the **display** would show now: 

---Hauptmenü---
Sprache



5.1. Register external push-buttons or switches

Depress within the **main menu** several times shortly the **key BELOW** until the **display** shows: 

---Main Menu---
Buttons/Switches

To **register** the **used external push buttons or switches** **depress** again the **key RIGHT**. The **Display** shows the **actual setting** for the **input 1**: 

Button / Switch
>1< = Button

With the **keys ABOVE** or **BELOW** you can **select** one of the **8 inputs**. The **actual setting** (**switch or push button**) will be indicated **matched to the input** (e.g. **input 7**):  


Button / Switch
>7< = Switch

Ex factory are **all 8 inputs** set for **push buttons**.



General: values between a **bigger- and smaller sign (> <)** can be **edited** with the **keys ABOVE** or **BELOW** **step-wise** with **single keystrokes**.

Is the **value range** for the selection of a **very large value** (e.g. for a **time selection**) will be the editing value indicated with **curly braces { }**. If the **keys ABOVE** or **BELOW** will be **activated** for a **longer duration as 2 seconds** the **adjustable values** at the **display** will **keep running** until the **key** will be **released**.


If you want to **change** the **setting** of an **input** you have at first to select via **ABOVE** or **BELOW** the **number of the input** (e.g. **position 3**).

Activate now the **key RIGHT** for **editing** the setting. The **previous setting** of **push button** will now be shown between a **bigger- and smaller sign**. 

Button / Switch
3 = > Button <

Now you can select with the **keys ABOVE** or **BELOW** either **>push button<** or **>switch<**.  

Button / Switch
3 = > Switch <

Leave now the **selection** with the key **LEFT** for the **use of the indicated setting**. If you have selected for the **input 3** a **switch** the **display** will show now: 

Button / Switch
>3< = Switch

Layout-Light-Control Light-DEC – Manual

Now **select as well** the **set-up** for the **other-inputs** or **return** with the key **LEFT** into the **Main Menu**:



---Main Menu---
Buttons/Switches

Activate again the key **LEFT** to **store** the **selected adjustments** at the **Basic-Module**. After a short delay the **display** of the **Basic-Module** will indicate the **operation status**:



Light-DEC VX.X
22:30:00 A 300

5.2. Register used Light-Modules at the Basic-Module

Depress at the **Main Menu** the key **BELOW** several times **shortly** until the **display** shows:



---Main Menu---
Light-Modules

To **register** the **employed Light-Module** depress the key **RIGHT**.



Module position
No.: >1< = LDM

The **display** indicates which **Light-Module** has been **registered** on **position 1** and is therefore directly **connected** to the **Basis-Module**. **LDM** is the **shortcut** for the **Light-Display-Module** with **40 light-outputs**.

With the keys **ABOVE** or **BELOW** can be the module **position changed**. On this way will be **indicated** which modules are **registered** onto **other positions** (e.g. position 4):



Module position
No.: >4< = LDM

Ex-factory is **four Light-Display-Modules (LDM)** **registered**.

If you want to register one **Light-Power-Module** with **24 outputs** on a position select at first the module-position with the keys **ABOVE** or **BELOW** (e.g. position 2).

For **editing** the **Light-Module** activate the key **RIGHT**. The **previous registered Light-Display-Module (LDM)** will be now indicated **inside** a **greater- and smaller sign**.



Module position
No.: 2 = >LDM<

With the keys **ABOVE** or **BELOW** you can **select** **between >LDM< and >LPM<**. **LPM** is the **shortcut** for **Light-Power-Module**.



Module position
No.: 2 = >LPM<

Leave the **selection** with the key **LEFT** for **using** the **indicated Light-Module**. If you have selected a **Light-Power-Module >LPM<** the **Display** shows now:



Module position
No.: >2< = LPM

For **other module positions** **select** either further **Light-Modules** or proceed with the key **LEFT** back into the **Main Menu**:



---Main Menu---
Light-Modules

Activate now again the key **LEFT** for **storing** the **selected Light-Module** at the **Basic-Module**. After a short delay the **display** of the **Basic-Module** shows the **operation mode**:



Light-DEC VX.X
22:30:00 A 300

Layout-Light-Control Light-DEC – Manual

5.3. Light source test

With the **light source test** can be the **light sources** of all **single Light-Module outputs tested**.

Depress at first the **key RIGHT** longer than three seconds. The **display** changes into the **Main Menu** and all **light sources** will be **switched off**.

Depress now within **Main Menu** several times shortly the **key BELOW** until the **display** shows:



---Main Menu---
Lightsource test

Open the **light source test** with the **key RIGHT**:



Lightsource test
Light-Module: >1<

With the **keys ABOVE** or **BELOW** can be the **Light-Module selected** for the **light source test** of the **relative outputs** (e.g. **Light-Module 2**):



Lightsource test
Light-Module: >2<

With the **key RIGHT** will be the **light source test** for the **selected Light-Module started**. At the upper line will be the **number** of the **selected Light-Module** and the **module type** indicated.



Module: 2 = LDM
Output : > 1<

LDM indicates a **Light-Display-Module**. If a **light source** has been **connected to output 1** this **light source** will **glow constantly**. All **other light sources** also those connected to **further Light-Modules** will remain **switched off**.

With the **keys ABOVE** or **BELOW** can be the **output** with the **connected light source** selected.



Module: 2 = LDM
Output: >22<

After **testing all light sources** of a **Light-Module** you have to **activate** the **key LEFT** for eventually selecting one **further Light-Module** for the **light source test**.



Lightsource test
Light-Modul: >2<

If you want to **leave** the **light source test** you have to activate again the **key LEFT**. The **display** shows now the **Main Menu**.



---Main Menu---
Lightsource test

From here you can proceed with the **key LEFT** to the **operation mode** which will be indicated after a short delay at the **display** of the **Basic-Module**:



Light-DEC VX.X
22:30:00 A 300

6. Adjusting start time for day-sequence of the light control

At the **bottom left** of the **operation display** will be the **actual daytime** of the **light control** indicated. The **starting time** has been **set ex-factory** for the **running day** to **22:30 hours** (10:30pm). Via the **menu-step start options** can be the **starting time** **changed** for the **running day** of the **Light control Light DEC**.

At first **depress** the **key RIGHT** longer than three seconds. The **display** changes into the **Main Menu** and all **light sources** will be **switched off**.

Layout-Light-Control Light-DEC – Manual

Depress at the **Main Menu** the key **BELOW** several times **shortly** until the menu step **start options** will be indicated:



---Main Menu---
Start options

Open the menu **start time** with the key **RIGHT**.



Start time
}22{ : 30

Adjust the required **hour** for the **start time** with the keys **ABOVE** or **BELOW**:



Start time
}13{ : 30

After **adjusting** the required **hour** depress the key **RIGHT** for the **adjustment** of the **minute**:



Start time
13 : }30{

Adjust now with the keys **ABOVE** or **BELOW** the minute for the **start time**:



Start time
13 : }45{

After **adjusting** the required **minute** depress the key **LEFT** several times until after a warm start the operation display indicates the **new start time**:



Light-DEC VX.X
13:45:00 T 300

6.1. Selecting start options of the light control

Ex-factory the **start properties** have been set to “**Always active**”. This adjustment will start the **Light control Light-DEC** at the **adjusted time** and as soon as power will be supplied.

For the **Start options** are two further possibilities available: The **Light control** can be **manually** started or stopped with a **push button or switch** or digital with a **DCC-Address**.

Via the menu step **Start options** will be the **Start properties** for the running day of the **Light-control Light-DEC** selected.

Depress at first the key **RIGHT** longer than three seconds. The display will change into the **Main Menu** and all **light sources** will be **switched off**.

Depress within the **Main Menu** the key **BELOW** shortly several times until the menu step **Start properties** will be indicated:



---Main Menu---
Start options

Open now the menu **Start options** with the key **RIGHT**:



Start time
}22{ : 30

If required change the **Start time** as described at section 6 or depress the key **RIGHT** two times until the menu step **Start properties** will be indicated.



Start property
>Always active<

Layout-Light-Control Light-DEC – Manual

By calling the menu **Start properties** there will be always at first the **property** indicated which is **presently active**. Ex-factory this will be “**Always active**”.

With the **keys ABOVE** or **BELOW** is it possible to select the **Start property** between **>DCC-Address<**, **>Button/Switch<** and **>Always active<**:



Start property
>Button/Switch<

6.1.1. Start/stop of Light-DEC via external push buttons/switches

If you want to **start or stop** the **Light-control Light-DEC** manually via one of the **8 push buttons or switches** which can be **connected** to the **Basic-Module** you can **assign** the **external push button** by depressing the **key RIGHT** when the display indicates **>Ext. Button:<**.

If there was **previously no external push button assigned** e.g. after first putting into operation the display will **indicate** this with the sign “-”.



Start property
Ext. Button: -

If there was **already a push button assigned** this will be **indicated** at the display. **Switch** now the **push button** or **switch** for the **start** and **stop** of the **Light-control Light-DEC on and off**. At the **display** will be the **number** of the **push button** or **switch** indicated.

The **previous defined push buttons** or **switch numbers** will be indicated.



Waiting for
Ext. Button: 2

Activating this button will start the **Light-control** with the **adjusted start time** and will **stop** when **activating the button again**.

If you want to use this function for a **switch** the **Light-control** will **start** by **switching-on** the **switch**. If the **switch** will be **switched-off** the **Light-control** will **stop**.

6.1.2. Start/stop of Light-DEC via DCC-Addresses

If you want to **start and stop** the **Light-control Light-DEC digital** via a **DCC-address** you can **program** the **DCC-address** by depressing the **key RIGHT** when the display indicates **>DCC-Address<**.

If there was **previously no DCC-address programmed** e.g. after the first putting into operation the display will **indicate** this with the sign “----”.



Start property
DCC-Address:----

If there was **already a DCC-address programmed** this will be **indicated** at the display. **Send** now the **DCC-address** from your **digital central unit** or your **model railway control software**, which are assigned for the **start** and **stop** of the **Light-control Light-DEC**. It has to be an **accessory address**, which will be e.g. used as well for the **switching of turnouts**. **DCC-Addresses** from **1 to 2044** can be used.

If the **Basic-Module** recognizes the **DCC-address** this will be **indicated** at the display.

Layout-Light-Control Light-DEC – Manual

Depress now the **key LEFT** several times until the **start-display** will be shown after a warm start. The **previous programmed DCC address** will be indicated.



**Waiting for
DCC-Address: 13**

If the **basic-module** receives the **programmed DCC-address** with the **additional information** of **turnout straight** the **Light-Control** will **start** with the **adjusted starting time**. If the **programmed DCC-address** with the **additional information** **turnout round** will be received the **Light-control** will **stop**.

7. Day-phases: select start timing and time-factors for daybreak, day, dusk and night

The **operation display** shows at the **second line** right next to the **actual Light-DEC daytime** a letter for the **actual phase of the day**.

**Light-DEC VX.X
22:30:00 A 300**

“**M**” indicates for **daybreak**, “**T**” for **day**, “**A**” for **dusk** and “**N**” for **night**.

At the **very right** will be the **time factor** indicated. The **time factor** indicates the **acceleration** of **time** of the **indicated day phases**. The **sense** of this **factor** is that a **model-railway-day** does **not** need to have real **24 hours**. **Model railway days** have often a **duration** of **15 to 60 minutes**. On **model railway exhibition layouts** has a **model railway day** mostly a duration of **15 minutes** i.e. **10 minutes bright** and **5 minutes dark**. The **model railway night** is **optical impressive** but the many **interesting structural layout details** can be only **captured** during the longer **bright phases**.

For **each** of the **four day-phases** can be the **time factor individually** at the range from **1** to **600** and at the steps of **1, 3, 6, 20, 40, 60, 100, 200, 300, 400, 500** and **600** adjusted. The **time factor 1** stays for one **model railway day** of **24 hours** i.e. **1440 minutes**. One **model railway hour** is therefore **actually 60 minutes** long. By a **selected time factor** of **40** will be one **model railway hour** = **60 minutes / 40 = 1.5 minutes** long.

Via the menu option **Day phases** can be the **start time** and the **time factors** of the **four day-phases** **individually adjusted**.

At the **Technical Manual** you can see the **table “Start-times and Time-factors at the Menus Start-adjustments and Day-phases”** with the **ex-factory predefined values**.

You will have as well the **possibility** to **document your own values** at the **table**.

If you want to **change** the **start times** and the **time factors** of the **day phases** depress at first the **key RIGHT** longer than **three seconds**. The **display** will **change** into the **Main Menu** and all **light sources** will be **switched off**.

Depress within the **Main Menu** the **key BELOW** shortly **several times** until the menu-step **Day phases** will be shown:



**---Main Menu---
Day phases**

Open the menu **Day phases** with the **key RIGHT**:



**Day phases
>Daybreak<**

Layout-Light-Control Light-DEC – Manual

Select the **day phases** with the keys **ABOVE** or **BELOW** for your relevant adjustments.

With the key **RIGHT** you will go to the **adjustments** of the **selected day phases**:



Daybreak
}06{ : 30 F: 300

With the keys **LEFT** and **RIGHT** you can select as usual the adjustments between **}hour{**, **}minute{** and **}factor{**. Values between the curly brackets (} {) can be edited with the keys **ABOVE** or **BELOW**.

After completing the **day phases** you have to depress the key **LEFT** several times until after a warm start the **operation display** will be indicated:



Light-DEC VX.X
23:30:00 A 300

8. Setup of switch groups and switch times

Via **switch groups** with **defined switch times** will be the **output functions** of the **day phases** with reference to the **adjusted switch times switched on and off**. If required will be a suitable **switch-group** assigned to an **output-function**. Several **output-functions** can be assigned to **each switch-group**. If you have a **switch-group** with e.g. a timewise **on- and off-activated welding light** you can arrange the **working time** and **exclusively the time breaks**. The **welding light** will be in this case **active** only during the **working hours** of the **day phase**.

At the **technical manual** you will find within the table “**Switch groups with example: Working hours at the factory**” the **switch group 1** established.

Here are the **working hours** at the **production** of a **factory determined**. Via this **switch-group** can be the **output-function welding light activated and deactivated** during the **day phase**.

At his **switch-group 1** are within the **first switch-time** the **working hours** from **7:00 (a.m.) till 8:40 (a.m.)** defined. Then comes the **breakfast time**.

At the **second switch-time** is the **working time** defined from **9:00 (a.m.) till 12:00 (a.m.)** **lunchtime**.

The **working time** from **end of lunch time** to **end of work** **12:40 (12:40 p.m.) till 16:00 (4:00 p.m.)** will be defined within the **third switch-time**.

At the **table** are e.g. the **switch-times** of **further switch-groups** around the **factory** registered. With this **switch groups** can be e.g. the **illumination** at **different rooms** of the **factory activated and deactivated during the day phase**.

There are **maximal 24 switch groups** available for the adjustments of **5 switch times** with **on- and off-switch times** each for the **day phase**.

The “**Switching group table for own adjustments**” at the **Technical Manual** can be **used** for the **documentation** of **times** of your **switch-groups**. Additionally you can **download** this **table** from our **Web-Site** at a **DIN-A4 format**.

Layout-Light-Control Light-DEC – Manual

Via the menu step **Switching group** can be the **on- and off-switch times** for the **switch-groups individually adjusted**.

At first **depress** the **key RIGHT** longer than three seconds. The **display** will change into the **Main Menu** and all **light sources** will be **switched off**.

Activate within the **Main Menu** several times shortly the **key BELOW** until the menu step **Switching group** will be indicated:



---Main Menu---
Switching group

Open the menu **Switching group** with the **key RIGHT**:



Switching group
No.: >1<

Select with the **keys ABOVE** or **BELOW** the **Switching group** for the **adjustment** or **change** of the **on- and off switching times**.



Switching group
No.: >4<

With the **key RIGHT** you can go to the selection of **switching times**. For **each switching group** can be **5 switching times adjusted** and selected via the **keys ABOVE** or **BELOW**.



Switching group 4
Switch time: >1<

With the **key RIGHT** you can now go to the option for editing the **times** of the **selected switch time**.
(The time setting shall be on the 24 hours base)



ON: }hh{ : mm
OFF: hh : mm xx

The **required on- and off switch time** can now be adjusted via the **keys ABOVE** or **BELOW**. With the **keys RIGHT** you can go to the **entry fields** or go back with **LEFT**.

Via the **last entry field** will be the **switching time released** or **disabled** with the **keys ABOVE** or **BELOW**. **>*<** is indicating the **release** and **>--<** the **disabling** of the time.



ON: 07 : 00
OFF: 08 : 40 >*<

There is **no release or disabling** possible if **>==<** will be indicated because the adjusted **switch-on time** will **correspond** to the **switch-off time**.

With the **key LEFT** you can go back to the selection of the **switching time** for these **Switching group**. Go now back with the **key LEFT** to the selection of the **switch time** for this **Switching group**. Select with the **keys ABOVE** or **BELOW** the **next switch time** for the **adjustment** or **change** of **switching-on- and switching-off time**.



Switching group 4
Switch time: >1<

After **completing** all **adjustments** for the **Switching group** you have to depress the **key LEFT** until the **Switching group selection** will be indicated. With the **keys ABOVE** or **BELOW** you can now select the **next Switching group** for the **adjustment** or **change** of **ON- or OFF-switching times**.



Switching group
No.: >4<

Layout-Light-Control Light-DEC – Manual

After **completing** all **adjustments** at the **switch groups** you have to depress several times the key **LEFT** until after a warm start the **operation mode** will be displayed after a short time:



Light-DEC VX.X
23:30:00 A 300

9. Available light functions

The **Light-DEC** provides **44 light functions**, which can be as well assigned several times to the **outputs** of the **Light-Module**.

A “**Description of the available light functions**” can be found within the **technical Manual** at the **relevant chapter**.

At the above chapter you can **find** the **description** about **how many outputs** of a **Light-Module** will be **required** by each **light function**.

The **description** indicates as well which **parameter** of a **light-function** can be **individually adapted**. The **possibilities** of the **adaption** will be **described** within the **next chapter**.

10. Light adjustment: individually matching of parameters of light functions

At the chapter “**Description of the available light functions**” at the **Technical Manual** is described if **parameters** can be **individually adapted** to a particular **light function**. The **Technical Manual** describes as well with the table “**Light options: Parameter of Light functions, which can be individually matched**”. **Changed parameters** for a light function are listed at the column “**Adjustment**”.

The column “**Factory setting**” indicates the **predefined values** and at the column “**Own setting**” you can **enter** your **individual values**.

The **possible range** of **values** and the **possible steps** for **changing** the **parameters** are listed at the column “**Setting range**”.

Via the menu step **Light options** can be the **defined parameters** of the **light-function** **individually changed**.

At first **depress** the key **RIGHT** longer than three seconds. The **display** will **change** into the **Main Menu** and all **light sources** will be **switched off**.

Depress at the **Main Menu** the key **BELOW** shortly several times until the menu-step **Light options** will be indicated:



---Main Menu---
Light options

Open now the menu **Light options** with the key **RIGHT**. As **first Light option** will be always **Neon light** indicated:



Light options
>Neon light<

Layout-Light-Control Light-DEC – Manual

With the **keys ABOVE** or **BELOW** you can now select the **light-function** whose **parameter** shall be **changed**.



Light options
>Run light<

For changing e.g. the **speed** of the **light function** **Run light** you have to activate the **key RIGHT**. **Indicated** will be the **actual value**:



Speed
} 200 { ms

With the **keys ABOVE** and **BELOW** you can select now the **value** for the **Run light speed suitable for your application**. In accordance to the table “**Light options: Parameter of Light functions which can be individually matched**” can be a value **between 50 and 5000ms** within **50ms steps** adjusted.

If the **suitable value** will be **indicated** you can **leave** as usual the **adjustment options** with the **key LEFT**.

To **match individually** the **parameters** of **other light functions** you should **follow** the **menu navigation** at the **Technical Manual**.

10.1. Light adjustments: traffic light pedestrian, traffic light cross road, traffic light circuit

Light-DEC offers two **light-functions** for **traffic-light circuits**. With the **light-function** **traffic-light pedestrian** (at the display indicated as shortcut: **>Traffic l. ped<**) will be **traffic-lights pedestrian** realized. The options **traffic-light cross-road** (display: **>Traffic l. c<**) offers the phases of **road- and pedestrian traffic lights** for **cross-roads and intersections**.

Some phase times can be separately individual matched for both **light functions** at the menu **Light adjustments** under **>Traffic l. ped<** and **>Traffic l. c<**.

Two **country specific features** can be adjusted via the **Light adjustment >Traffic. l. opt.<** as described at the **graphical menu navigation** at the **Technical Manual**.

With the first setting can be defined if the **traffic light** shall switch from **RED to GREEN** via **YELLOW** (**>Via RED+YELLOW<**) or **directly** from **RED to GREEN** (**>Directly<**).

At the second country specific setting can be via the option **GREEN flashing** selected if **GREEN shall flash before the traffic light switches to RED** or if the **switching** will be **without flashing directly from GREEN to RED**.

The **selected adjustments** will be **active** for **both light functions** of the **traffic light circuits**.

At **night** will be the **traffic-light circuits** generally **switched off**. For this time can be the **night-function** **individually activated** for “**YELLOW flashing**”. The **road light** of the **traffic-light pedestrian** or the **road-light** of the **side street** will flash then **at night**. **Particulars** can be **found out** at the **chapter output function**.

Layout-Light-Control Light-DEC – Manual

11. Output function: assign light functions to the output of light modules

Via the menu **Output functions** will be the **outputs** of the **Light-Modules** **light-functions** and their **properties assigned, deleted** or **changed**.

Depress at first the **key RIGHT** longer than three seconds. The **display** will **change** into the **Main Menu** and all **light sources** will be **switched off**.

Depress at the **Main Menu** the **key BELOW** several times **shortly** until the Menu step **Output functions** will be indicated:



---Main Menu---
Output functions

Open now the menu **Output functions** with the **key RIGHT**. The **display** indicates which **Light-Module** has been **registered** at the **position 1**:



Module pos.: >1<
LDM

If you want to **assign light functions** to the **outputs of another Light-Module** those **deleting** or **changing** the **start options** you can **select** the relative module with the **keys ABOVE** or **BELOW**.

References for the **register** of **Light-Modules** can be found at **chapter 5.2.** of this Manual. **Ex-factory** are **four Light-Display-Modules (LDM)** **registered**.

With the **key RIGHT** you can go to the **processing** of the **output functions** of the **selected Light-Module**.

After **first setting into operation** are the **samples** for the **factory settings** of the **Light-Module 1** active. The **display** shows the occupancies of the **first 8 clamps** with the **random light functions** **Funfair**.



1 = LDM-KL:01-08
Random Funfair

With the **keys ABOVE** and **BELOW** can be all **established output functions** for this **Light-Module** indicated.

At the **lower line** will be the **used light-function** indicated. At the **upper line** left side you will find the **position of the Light-Module**. Indicated will be as well if it is a **Light-Display-** or a **Light-Power-Module (LDM or LPM)**. At the very right you can read the **number of the clamps** (outputs), which are **occupied** by the **light-function**.

A **listing** of the **output functions** for the **factory settings** can be found at the **Technical Manual** at the section "**Output function: Factory settings**". Return now with the **keys ABOVE** or **BELOW** to the **initial function Random Funfair**.

Depress again the **key RIGHT** for **changing** the **adjustments** for this **initial function**. At first there is the **possibility** to **delete** the **initial function**:



Output funktion
Delete: >NO<

We will use this option. With the **keys ABOVE** or **BELOW** you can switch between **>NO<** and **>YES<**. Select **>YES<**.



Output funktion
Delete: >YES<

Layout-Light-Control Light-DEC – Manual

Depress the **key LEFT** for **deleting** the preinstalled **initial functions**. Now it will be indicated that the **clamps 1 to 8** will be **vacant**.

With the **key RIGHT** you can change to the possibility to **set-up a new light function** as **initial function** at this clamp section. As a **first possible light function** will be always the **Railway crossing** initiated:

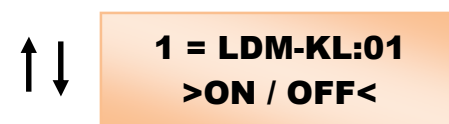


With the **key BELOW** can be the **available light-functions** indicated at the **sequence** as they are listed at the **Technical Manual** under the headline “**Description of the available light functions**”.

With the **key ABOVE** will be the **reversal sequence** indicated.

If the **indicated light-function** need more **clamps** as actual **vacant** there will come an Info at the **lower line** with **changing** to the name of the **light-function** the letters “**Not possible**”.

Select with the **keys ABOVE** or **BELOW** the **light-function ON/OFF**. With this **light-function** will be the **output 1** initiated as **switch output** e.g. for a **lightsource** or a **motor**.



11.1. Output function: properties always active

Depress now the **key RIGHT** for **selecting** the **output function** for a **property**. There are **4 properties** available. The display will indicate the **first property**:



“**Always active**” signifies das the **output function** will be **activated as soon** as the **day phase function** of the **Light-control Light-DEC** will be **started**. The **output function** will be **deactivated** if the **day phase function** will **stop**.

11.2. Output function: properties switch group

If you want to **activate** or **deactivate** timely an **output-function** during the **day phase** via a **Switchgroup** you have to depress the **key ABOVE** or **BELOW** until **>Switchgroup<** will be indicated at the display. Now depress the **key RIGHT**.

If there **was no Switchgroup** determined for the **output-function** before, this will be **indicated** at the display with “—”.



If there was **already a switch-group** determined, this will be indicated at the display.

Select with the **keys ABOVE** or **BELOW** the **suitable Switchgroup**. There will be **only Switchgroups** for selection indicated for those **switchtimes** are released.



During the **day phase** will be the **output-function** **activated** with relation to the **switch times** which are **selected** and **released** for the relevant **Switchgroup** as described within chapter 8 of this manual.

Layout-Light-Control Light-DEC – Manual

11.3. Output function: properties push button/switch

If you want to **activate** or **deactivate** manually the **output functions**, which are **connected** via one of the **8 push buttons or switches** to a **Basic-Module** you have to **depress** the **key ABOVE** or **BELOW** until the display indicates **>Button/Switch<**. Depress now the **key RIGHT**.

If there **was no external key determinates** for the **output function** will be the display indicate “-“.



Property
Ext. Button: -

If there was **already a key determinates** this **will be indicated** at the **display**. **Activate** now the **button** or **switch-on** and **-off the switch** which shall **activate** and **deactivate** the **output function**. The **display** shows now the **number** of the **button** or **switch**.

If you **activate this button** later **during the day phase** the **output-function** will be **activated** respectively **deactivated** by **activating** the **button** again.

If you use a **switch** for this function there will be the **output-function** **activated** as soon as you **switch-on** the **switch**. If you **switch-off** the **output-function** will be **deactivated**.

11.4. Output function: properties DCC-address

If you want to **activate** and **deactivate** the **output function digital** via a **DCC-Address** you have to depress the **key ABOVE** or **BELOW** until the display indicates **>DCC-Address<**. Depress now the **key RIGHT**.

If there was so far **no DCC-Address programmed** for the **output function** this will be indicated at the display with “----“.



Property
DCC-Address:----

If there was **already a DCC-Address programmed** this **will be indicated** at the **display**. Send now a **DCC-Address** from your **digital central unit** or your **model railway control software**, which shall **activate** or **deactivate** the **output-function**.

It has to be an **accessory-address** such as used for the **switching of turnouts**. If the **Light-DEC** will **recognize the DCC-Address** this address will be **indicated** at the **display**. **DCC-Addresses** from **1 to 2044** can be used.

If the **Light-DEC** receives later during the **day-phase** the **programmed DCC-Address** with the **additional information** of **turnout straight** the **output-function** will be **activated**.

If the **programmed DCC-Address** with **additional information** of **turnout round** will be received the **Light-DEC** will **deactivate** the **output-function**.

Generally applies: If **output-functions** will be **deactivated** via the switching time of a **switch-group** or **button/switch** the **actual running cycle** of a **light function** will be at first **processed**. Only then will be the **light function** **actually switched off**. This follows that with reference to the **complexity** of the **light function** the **deactivation** will be **timely delayed** by several seconds. By **deactivation** via a **DCC-Address** will be the **output function** **immediately switched off** without waiting for the **end** of the **actual processed light-cycle**.

Layout-Light-Control Light-DEC – Manual

11.5. Output function: night function for traffic light pedestrian and traffic light cross road

If one of the two **light-functions traffic-light pedestrian** or **traffic-light cross-road** has been set as **output-function** there can be “**yellow**” **flashing individually activated** for a **night-function**. At **night** the **road light** of the **traffic light pedestrian** or the **road light** of the **side street** will **flash yellow**.

Via the **key ABOVE** or **BELOW** you can **switch-on** or **off** the **night function** “**Yellow flashing**”.



Night function
>ON<

After **completion** of all **adjustments** within the menu **output-function** you have to depress the **key LEFT** several times after a warm start until the **operation mode** will be **indicated** at the display:



Light-DEC VX.X
23:30:00 A 300

12. Adjusting the connected Digital Command Station

Roco Digital Command Stations are using contrary to **all other Digital Command Stations** a **DCC-Address Section** which has been shifted by **4 addresses**. To assure the **correct indication** of addresses by using the **Roco Command Station** the used **Digital Command Station “Roco”** can be **adjusted**.

Depress shortly several times the **key BELOW** within the **main menu** until you will come to the menu option **Command station**:



---Main Menu---
Command station

Open now with the **key RIGHT** the menu **Command station** and select with the **key ABOVE** or **BELOW** either “**Roco**” or “**All other**”. The **factory setting** is “**All other**”. With the **key LEFT** you will **come back as usual**.

13. Factory setting

Ex factory are the following **values adjusted**:

- **Start times** and **Time factors** for **start adjustment** und **day phase**
- **Parameter** of the **Light-functions** which can be changed

The **presented values** for **both issues** can be found at **tables** within the **Technical Manual**.

Additionally are **output-functions** for the **first Light-Display-Module (LDM)** **preinstalled**. Those are listed at the table “**Output functions: Factory setting**” at the **Technical Manual**.

Ex-factory are **no switch-times** for **switch-groups** registered. If the **factory-setting** will be **performed** the **installed switch times** will be **deleted**.

You can **restore** the **factory-setting**. Additionally is there the possibility to waive the **preinstallation** of **output-functions** for the **first Light-Display-Module (LDM)**.

Layout-Light-Control Light-DEC – Manual

In this case is it not required to **delete** the **single output functions** for **setting of own functions**.

Depress at first the **key RIGHT** longer than three seconds. The **display** will **change** into the **Main Menu** and all **light sources** will be **switched off**.

Depress at the **Main Menu** the **key BELOW** shortly several times until the menu **Factory setting** will be indicated:



---Main Menu---
Factory setting

Open now the menu **Factory setting** with the **key RIGHT**.



Factory setting
>Examples<

With the **key ABOVE** or **BELOW** you can select between **Examples** and **Blank**.



Factory setting
>Blank<

>Examples< is for the possibility that **output-functions** will be **preinstalled** for the **first Light-Display-Module (LDM)**. If you select **>Blank<** there will be no **output-functions** as **factory-setting** preinstalled.

If you selected one of the two possibilities you can proceed with the **key RIGHT** to the **security request**.



Factory setting
>NO<

With the **key ABOVE** or **BELOW** you can select **No** or **Yes**.



Factory setting
>YES<

If you **leave** now the **request** with the **key LEFT** by **No** there will be **no factory setting** performed.

If you **leave** the **request** with the **key LEFT** by **Yes** there will be the **factory setting** performed. The installation can last up to 15 seconds.



Install
Factory setting

Then will be the usual **operation mode** indicated and **Light-DEC** will start with **day phase**:



Light-DEC VX.X
23:30:00 A 300

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