

Switch Control 63 400

DIGITAL 2

For connecting Track diagram panel

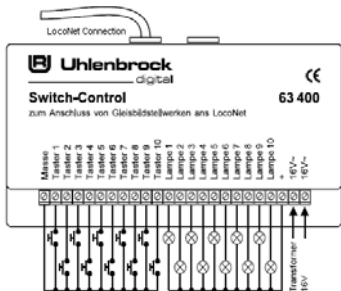
Description

For connecting a track diagram panel to an Uhlenbrock digital system. Suitable for all digital controllers with a LocoNet connector (e.g. Intellibox, TwinCenter, Daisy ...)

The Switch Control 63 400 has 10 inputs for connecting keys and 10 outputs for connecting lamps or LEDs with current limiting resistor. The keys or lamps can be connected individually or as part of a track diagram pane (e.g. from Heki and others).

Connecting

Connect the Switch control to the LocoNet T or LocoNet B socket of the Intellibox, TwinCenter or the LocoNet socket of the Daisy system using the provided LocoNet cable.



Connect a transformer (12V-16V) to both "16 V~" connectors. For example our 45VA transformer 20 040.

The transformer use to power the Switch control can power several Switch controls or other devices on the layout that are not electrically connected to the track

system or digital controller in anyway. (e.g. house or street lighting).

Important: The transformer must not be used to power the Intellibox, TwinCenter or a Booster (Power 2, Power 3, Power 6, TwinBooster).

The keys for the track diagram panel are connected to the module inputs 1 to 10 and with the other pole to the device chassis ("Masse").

The lamps are connected to the lamp outputs with 1 to 10 with one pole and with the other pole to the modules "+" terminal. The voltage rating of the lamps should match that of the output of the transformer being used.

If LEDs are used a 1.5KOhm series resistor must be added. You must also ensure that the LED's cathode is connected to the lamp output.



Operation

When a key is pressed a command is sent out. This can switch turnouts or signals or even entire routes which are stored in the Intellibox, TwinCenter or IB-Switch. The Switch control can also send a command when two keys are pressed in sequence. Thus the track diagram can be equipped with start/finish keys like the prototypes.

The module monitors all switching commands on the digital system and when particular commands are sent can turn the connected lamps on and off. The lamp can be influenced by commands for switching solenoids or by feedback modules. This makes it possible for the connected lamps to show turnout status, track occupation and to indicate entire routes.

The functions of the connected keys and lamps are set by programming the module. This can be done via the programming menu in the Intellibox.

Single keys and Start/Finish Combinations

The Switch control can activate the following commands with a single key press:

1. Switch a specific solenoid to “red”.
2. Switch a specific solenoid to “green”.
3. A feedback signal of “vacant” for a specific feedback address. The feedback is used by the IB-Switch to switch routes.
4. A feedback signal of “occupied” for a specific feedback address.
5. Toggle the status of a specific solenoid = single key activation.

Commands 1 to 5 can be activated with a single key to switch turnouts and signals or entire routes.

Often track diagram control panels use start/finish keys to switch routes. A start/finish combination is activated by first pressing the start key and holding it down while pressing the finish key. Once both keys are pressed the module can send out the command 1 to 4 from the above list as it was programmed.

Operation of the Lamps

The Switch control switch lamps on or off with the following commands from the digital system:

1. A specific solenoid switches to a “red” state.
2. A specific solenoid switches to a “green” state.
3. A specific feedback module reports a “vacant” state.
4. A specific feedback module reports a “occupied” state.
5. A specific key or key combination is pressed on the Switch control.

Factory default settings

Key inputs 1 and 2 switch solenoids with address 1 and 2. Key 1 switches the solenoid to “red” or “round”. Key 2 switches the solenoid to “green” or “straight”. Lamp output 1 and 2 show the state of the solenoid. Lamp on output 1 shows the “red” state. Lamp on output 2 shows the “green” state.

The following key inputs and lamp outputs are assigned to solenoids 2 to 5 so that input/output 3 and 4 are

associated with solenoid 2, input/output 5 and 6 with solenoid 3, input/output 7 and 8 with solenoid 4 and input/output 9 and 10 with solenoid 5.

Programming

So that a key press will send the desired command the module must first of all be configured.

For this there are two possibilities:

In simple programming a solenoid address is assigned to key pair 1/2 for switching and the lamp outputs 1/2 for monitoring. The subsequent key pairs automatically receive the subsequent solenoid addresses. Further changes can not be made.

With the Intellibox from Software version 1.3, all of the module's LocoNet CV's can be programmed. All of the previously mentioned operation can be setup as desired in this way.

Tip: Please look at the examples at the end of this description. There you will find a number of examples for common operation situations.

Simple Programming

You can configure the module so that two keys and two lamps are used to switch and monitor a solenoid. A total of 5 solenoids can be monitored by a Switch control in this mode.

Programming sequence:

- Connect the Switch control to the LocoNet.
- Disconnect the modules transformer.
- Hold down the key which is connected to input 1.
- Connect the transformer.
- The lamp connected to output 1 will blink and the key can be released.
- Assign a solenoid to the key pair for input 1 and 2 by switching the relevant solenoid with another device connected to the LocoNet (Intellibox, IB-Control TwinCenter, TwinControl, Daisy hand controller or IB-Switch). Should for example the solenoid with address 10 be switched by key pair 1 and 2, then solenoid 10 must be switched from your controller.

- The lamp on output 1 turns off and programming is done.

If solenoid with address X (10 in the example) was switched during the programming phase, the module is programmed as follows:

Solenoid Address		Selected with	
General	Example	Key	Lamp
x	10	1 & 2	1 & 2
x+1	11	3 & 4	3 & 4
x+2	12	5 & 6	5 & 6
x+3	13	7 & 8	7 & 8
x+4	14	9 & 10	9 & 10

Programming using the Intellibox Programming menu

Programming is possible using the Intellibox from Software version 1.3. All module settings are done by programming LocoNet configuration variables (LNCV). The meaning of the LNCV's is outlined in the section "Description of LocoNet configuration Variables".

First time call up of a Switch control to Program the Module address

Every Switch control requires a unique module address by which the module will be contacted. A new module has a module address 0. This must first be changed so there is no conflict or erroneous programming when more Switch controls are used on a layout.

To change the module address set LNCV 0 to a value between 1 and 2047.

Programming of LocoNet Configuration Variables (LNCV)

- Connect the module to the LocoNet and transformer.
- On the Intellibox press the [menu]-key and then the [mode]-key to enter the Basic programming mode.
- Scroll through the menus using the [↓]-key to the "LocoNet Prog." menu.

LocoNet Prog.:
Art.-Nr.:

- Enter the part number (in this case 63400) and press the [↵]-Key.

```
LN Prog.: 63400
Modul Adr.:.....
```

- Enter address of the module (new Module = 0) and press the [↵]-Key:

```
LNPr 63400-00000
LNCV:....0=....0
```

The top row displays the module's part number and lower row the valid module address. On lower line is the number of the LNCV (here "0" for the module address) and its current value (here 0).

- At the cursor position enter the ID number of the LNCV you wish to program.
- Press the [↵]-Key.
- The Intellibox reads the CV. The value is shown on the right of the lower line of the display.
- Move the cursor to the right with the [→]-Key and enter the new value for the LNCV with the number keys.
- By Pressing the [↵]-Key the new value will be programmed.

Description of LocoNet Configuration Variables (LNCV's)

The module is programmed using LocoNet Configuration Variables (LNCV). These LNCV's are addressed by an ID number and then be set to particular values.

```
LNP# 63400-00000
LNCV: . . . . 0 = . . . . 0
```

LNCV ↑ ↑ LNCV
ID number value

LNCV's 1 to 6 are helpers or used for clearing LNCV's. The actual operation of the module is determined by LNCV's 10 to 29 and 100 to 199.

LNCV	Function
0	Module address
1-5	Programming aid for "Switching of solenoids" application
6	Setting and erasing of LNCV's
10-19	Lamp outputs On
20-29	Lamp outputs Off
100-199	Programming of single keys and key combinations

The Module address - LNCV 0

For programming every module needs a module address so the controller knows which module is meant. The address range is 0 - 2047.

Switching of solenoids - LNCV 1-5

These LNCV's configure the module to switch solenoids. The programming means the key/lamps pairs switch and monitor solenoids. This means:

LNCV	Key inputs	Lamp outputs
1	1 = red, 2 = green	1 = red, 2 = green
2	3 = red, 4 = green	3 = red, 4 = green
3	5 = red, 6 = green	5 = red, 6 = green
4	7 = red, 8 = green	7 = red, 8 = green
5	9 = red, 10 = green	9 = red, 10 = green

The value of the LNCV is the solenoid address (1-2048) which is to be switched and monitored.

NOTE: LNCV's 1-5 are programming aids. If before or after programming of LNCV's 1-5, other LNCV's higher than 9 are changed, the programming can be then be changed again.

The following will be changed:

LNCV	Change in LNCV
1	111, 122, 11, 21, 12, 22
2	133, 144, 13, 23, 14, 24
3	155, 166, 15, 25, 16, 26
4	177, 188, 17, 27, 18, 28
5	199, 100, 19, 29, 20, 30

Tip: Erase the programming of the module from its entire memory by programming LNCV to a value of 11.

Erasing Module Memory and configuring - LNCV 6

This LNCV is used to erase the module memory or configure for special application. The meaning of various values is:

Value	Meaning of LNCV 6
1-10	Erases all programming function for the Key number and all key combinations using this key.
11	Erases the entire memory except the module address.
1AAAA*)	Configures the module so that two keys and two lamps are used for switching and/or supervising a solenoid. A total of 5 solenoids can be switched/monitored by a Switch Control. Holds the address, which the key/lamp ½ will switch/monitor e.g. 10010 for address 10 the key/Lamp pair 3/4 to 9/10 automatically receive the subsequent addresses.
2AAAA*)	Configures the module so that in each a single key can change a solenoid and a lamp used to monitor the solenoid. A total 10 solenoids can be switched/monitored with the Switch control in this mode. Holds the address which is to switch/monitor key/lamp 1. The addresses for key/lamps 2 to 10 automatically receive the following solenoid addresses.

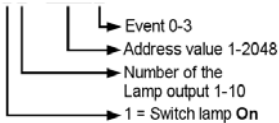
*) Valid values for AAAA are the solenoid addresses 1-2048.

Switching Lamp Outputs On

LNCV's 10 to 19 contain the numeric codes of the events for which lamp outputs 1 to 10 are switched on. The module can react to five different events.

For events E = 0-3 the programming appears as follows:

LNCV 1 L = AAAA E



Note: "0" must be used as the number for lamp 10. Leading zeros for addresses are not shown.

Description of Events

E = 0 Lamp output is switched on when the solenoid is switched to "red" status.

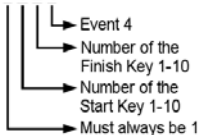
E = 1 Lamp output is switched on when the solenoid is switched to "green" status.

E = 2 Lamp output is switched on when the feedback module reports "vacant".

E = 3 Lamp output is switched on when the feedback module reports "occupied".

If the Lamp is to switch on when a key or key combination is operated, event code **E = 4** is used and the programming appears as follows:

LNCV 1 L = 1 S Z 4



Note: "0" must be used as the number for key 10.

Example

Lamp number 2 is to be switched on when the feedback module with address 1055 reports "occupied".

LNCV 12 = 10553

Lamp number 9 is to be switched on when key 7 is pressed.

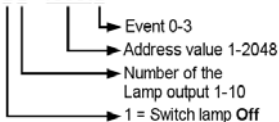
LNCV 19 = 1774

Switching Lamp Outputs Off

LNCV's 10 to 19 contain the numeric codes of the events for which lamp outputs 1 to 10 are switched off. The module can react to five different events.

For events E = 0-3 the programming appears as follows:

LNCV 2 L = AAAA E



Note: "0" must be used as the number for lamp 10. Leading zeros for addresses are not displayed.

Description of Events

E = 0 Lamp output is switched off when the solenoid is switched to "red" status.

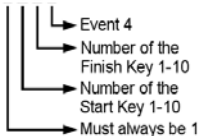
E = 1 Lamp output is switched off when the solenoid is switched to "green" status.

E = 2 Lamp output is switched off when the feedback module reports "vacant".

E = 3 Lamp output is switched off when the feedback module reports "occupied".

If the Lamp is to switch on when a key or key combination is operated, event code **E = 4** is used and the programming appears as follows:

LNCV 2 L = 1 S Z 4



Note: "0" must be used as the number for key 10

Example

Lamp number 2 is to be switched on when the feedback module with address 1055 reports "vacant".

LNCV 22 = 10552

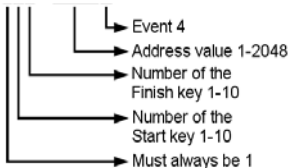
Lamp number 9 is to be switched on when key 7 is pressed.

LNCV 29 = 1774

Key functions - LNCV 100 to 199

LNCVs 100 to 199 contain the commands that will be transmitted by activating a key or a start/finish combination.

LNCV 1SZ = AAAAC



The number and value of the LNCV have following format:

The desired Key combination is in ID number of the LNCV (1SZ). The 'tens' position is the start key (from 1 for key 1 to 0 for key 10) and 'units' position is the finish key (from 1 for key 1 to 0 for key 10). If the 'tens' and 'units' are the same the LNCV has the command for a single key press.

Note: "0" must be used as the number for key 10

The address of the solenoid which to be switched by the key or key combination is entered as the value for the LNCV (AAAAC).

AAAA = address value 1-2048

Note: lead zeros are not displayed.

Command C determines which action will be carried out.

0 = solenoid with address AAAA is set to "red".

1 = solenoid with address AAAA is set to "green".

2 = feedback module with address AAAA reports "vacant".

3 = feedback module with address AAAA reports "occupied".

4 = solenoid with address AAAA is toggled.

Example

LNCV 100 contains the command for single key 10.

LNCV 144 contains the command for single key 4.

LNCV 137 contains the command for key combination start key 3 and finish key 7.

Sample Applications

1.) Switch turnouts with a key pair

The most common application is that a key pair is to switch a solenoid and the corresponding lamp outputs monitor the solenoid's state. A Switch control has 5 such inputs and outputs available.

1. Possible using "Simple Programming" described above
2. Possible using Intellibox programming menu

In this case only LNCV 6 needs to be programmed with a value of 1AAAA. AAAA represents the desired solenoid address which is to be assigned to key pair of keys 1 and 2 and lamp outputs 1 and 2.

Example

LNCV 6 = 1 0010



Key 1 and 2 switch solenoid 10

Key 3 and 4 switch solenoid 11
etc. to

Key 9 and 10 switch solenoid 14

Tip: Next erase the memory by setting LNCV 6 = 11.

2.) Switch turnouts with one key

In this configuration up to 10 solenoids can be switched with one Switch control. The lamp which is assigned to the solenoid glows when the solenoid is in the "red" state.

For this configuration LNCV 6 must be programmed to a value of 2AAAA. AAAA represents the solenoid address that is to be assigned to key 1.

Example

LNCV 6 = 2 0037



Key 1 switches solenoid 37

Key 2 switches solenoid 38

etc. to

Key 10 switches solenoid 46

Tip: Next erase the memory by setting LNCV 6 = 11.

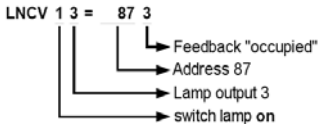
3.) Showing Track occupation status (Feedback)

Lamp 3 is to be used for the track section being monitored by feedback module 87 to show its occupation status.

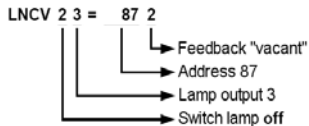
LNCV's 13 and 23 must be programmed.

Example

Feedback address 87 switches lamp 3 on.



Feedback address 87 vacant lamp 3 switches off.

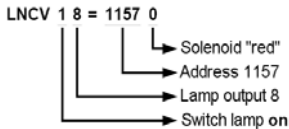


4.) Monitor a Solenoid with two Lamps

Two of the module's lamp outputs are to be used to monitor one solenoid, e.g solenoid address 1157. The indicator lamps are connected to lamp outputs 8 and 9. The lamp on 8 is indicate the "red" state and the lamp on 9 the "green" state.

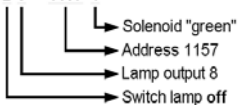
Monitoring is achieved with the following programming:

Solenoid address 1157 red switches lamp 8 on.



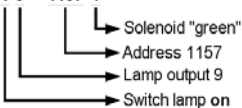
Solenoid address 1157 green switches lamp 8 off.

LNCV 2 8 = 1157 1



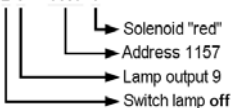
Solenoid address 1157 green switches lamp 9 on.

LNCV 1 9 = 1157 1



Solenoid address 1157 red switches lamp 9 off.

LNCV 2 9 = 1157 0



5.) A single Key is to switch a Route from the Intellibox

Routes stored in the Intellibox can be activated using solenoid commands from all devices connected to the LocoNet. The following applies:

Solenoid address 2001 - red switches Route 1 Group 1

Solenoid address 2001 - green switches Route 2 Group 1

Solenoid address 2002 - red switches Route 3 Group 1

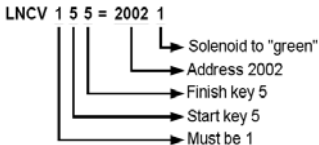
Solenoid address 2002 - green switches Route 4 Group 1, etc. to

Solenoid address 2024 - green switches Route 16 Group 3

A key connected to a Switch control is to activate a Route in the Intellibox or in a TwinCenter. The key on the Track diagram panel e.g. connected to input 5 of the module is to activate Route 4 from Group 1.

For this the following must be programmed:

Key 5 switches solenoid address 2002 to green.



The desired switching commands for the route must be programmed in Group 1, Route 4.

6.) Start/Finish key Combination is to activate an Intellibox Route

Several keys in various combinations of Start/Finish keys are to activate various routes.



The above diagram shows a simple station setup with 2 tracks. The turnouts and signals for the station are to be controlled via a route. The switching commands to switch the solenoids must

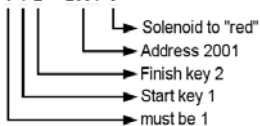
be entered into routes 1 to 4 of group 1 of the Intellibox. The routes are to be activated with a Start/Finish key combination. Key T1 to T4 are connected to inputs 1 to 4 of the module. The following applies:

- First press Key 1 as Start Key and then Key 2 as Finish Key, to switch Route 1 from Group 1 of the Intellibox to enable entry from A to track 1.
- Next press Key 1 as Start Key and then Key 3 as Finish Key, to switch Route 2 from Group 1 of the Intellibox to enable entry from A to track 2.
- Next press Key 2 as Start Key and then Key 1 as Finish Key, to switch Route 3 from Group 1 of the Intellibox to enable exit from track 1 to A.
- Next press Key 3 as Start Key and then Key 1 as Finish Key, to switch Route 4 from Group 1 of the Intellibox to enable exit from track 2 to A.

Appropriate module programming:

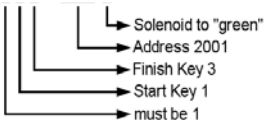
Start Key 1 and Finish Key 2 switches solenoid address 2001 red and thereby Route 1 from Group 1 in the Intellibox.

LNCV 1 1 2 = 2001 0



Start Key 1 und Finish Key 3 switches solenoid address 2001 green and thus Route 2 from Group 1 in the Intellibox.

LNCV 1 1 3 = 2001 1



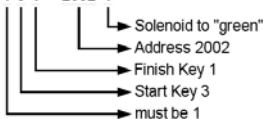
Start Key 2 and Finish Key 1 switches solenoid address 2002 red and thus Route 3 from Group 1 in the Intellibox.

LNCV 1 2 1 = 2002 0



Start Key 3 and Finish Key 1 switches solenoid address 2002 green and thus Route 4 from Group 1 in the Intellibox.

LNCV 1 3 1 = 2002 1



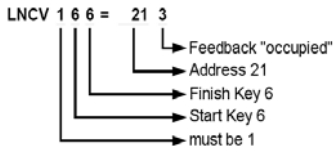
7.) A single Key is to activates a Route from an IB-Switch

The switching commands for the route are programmed into one of the routes in the IB-Switch. The red Key of this route is programmed to a feedback address in the IB-Switch e.g. address 21 and the "occupied" status. (For programming routes refer to the IB-Switch Manual.)

The Key on the track diagram panel is connected to input 6 of module for example.

To use this Key to activate the route in the IB-Switch, the following programming must be done:

Key 6 reports "occupied" for feedback address 21.



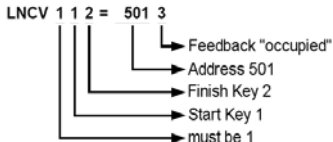
8.) Start/Finish Key Combination to activate a Route from the IB-Switch

The example in 6.) is to be used together with an IB-Switch.

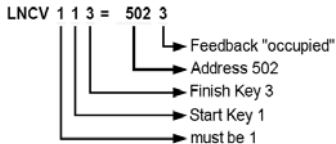
The switching commands of the 4 desired routes are assigned to 4 IB-Switch key pairs. The red Key from these Key pairs (Route activation) are assigned 4 feedback addresses for the activation. In our example feedback addresses 501 to 504 are to be used for "occupied" state. (For a description on programming routes refer to the IB-Switch manual.)

To use routes like in 6.), for entering and exiting a station the Switch control is programmed as follows:

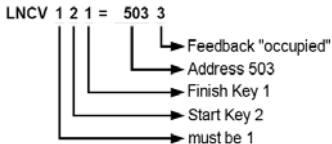
Start Key 1 and Finish Key 2 sends feedback address 501 occupied and thus activates route 1.



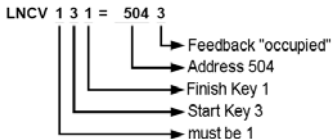
Start Key 1 and Finish Key 3 sends feedback address 502 occupied and thus activates route 2.



Start Key 2 and Finish Key 1 sends feedback address 503 occupied and activates route 3.



Start Key 3 and Finish Key 1 sends feedback address 504 occupied and thus activates route 4.



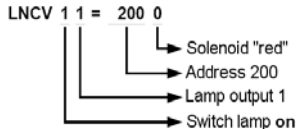
9.) Display an Active Route

To show an active route on the track diagram panel a solenoid command which will not switch any installed solenoid installed on the layout, but activate a lamp output on the Switch control e.g.:

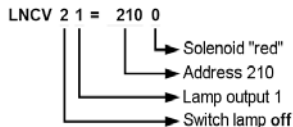


As the diagram above shows routes 1-3 are to be indicated by lamps 1 to 3 on the track diagram panel. The Lamps are connected to outputs 1 to 3 of the Switch control. Also when a route is activated the lamps for the other routes are be switched off. To achieve this the Switch control must be programmed as follows:

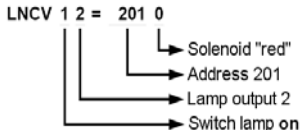
Solenoid address 200 red turns Lamp 1 on.



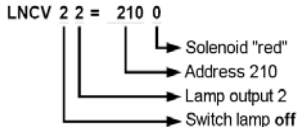
Solenoid address 210 red turns Lamp 1 off.



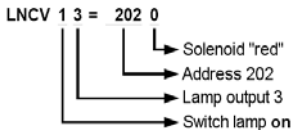
Solenoid address 201 red turns Lamp 2 on.



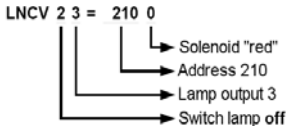
Solenoid address 210 red turns Lamp 2 off.



Solenoid address 202 red turns Lamp 3 on.



Solenoid address 210 red turns Lamp 3 off.



Routes 1 to 3 execute the following switch commands:

Route 1

Solenoid 210 - red and 200 - red

Route 2

Solenoid 210 - red and 201 - red

Route 3

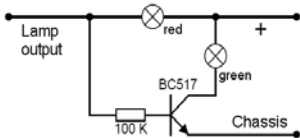
Solenoid 210 - red and 202 - red

The command "Solenoid 210 - red" in every route switches all lamps L1 to L3 off before the following command turns the lamp belonging to the active route on.

Tips and Tricks

1.) An additional lamp to indicate "green" Status

If as in example 2 a solenoid is switched by a single Key and monitored by a single Lamp output the lamp output is only active when the solenoid is in its "red" state. The following circuit can be used to switch a second Lamp on when the Lamp output is in active.

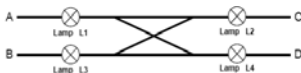


2.) One Lamp to indicate several Routes

If several routes are to be indicated on a track diagram and outline the actual path it can happen that some components are part of more than one route.

If a route activates a lamp output then certain lamps will have to be turned on by more than one output.

Example track plan



In the above example the following routes are to shown:

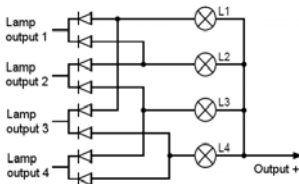
Route 1 (from A to C) activates Lamp output 1

Route 2 (from B to C) activates Lamp output 2

Route 3 (from A to D) activates Lamp output 3

Route 4 (from B to D) activates Lamp output 4

For panel lighting the following diode matrix can be used:



The diodes used can be 1N4001 (Part No. 40 111).



**0 20 45
85 83 27**

If you have any questions call us.

Hotline times are: Mon - Tue - Thu - Fri., 14:00-16:00 and
Wednesdays 16:00-18:00

This product has two year warrantee. If it is defective send decoder along with the receipt of purchase to the following address:

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