2x Semaphores Decoder RB 3122

Content

Introduction

The RB 3122 2x Semaphores decoder is used to control two 5-aspect semaphores or five 2-aspect semaphores and display signals that are used on the real railroads. The decoder works with DCC Command stations. The decoder has built-in schemes of Polish signals system. The RB 3122 works in digital DCC mode (connects to the DCC bus directly from the tracks or from the command station) or in analogue mode for 5-aspect semaphores (requires an external power supply and rotary switches with a ladder of resistors). The decoder has a brightness adjustment of the semaphore lamps.

Basic functions:

- **Supports 2 5-aspect semaphores or 5 2-aspect shunting semaphores (or more with parallel connection)**
- **Decoder works in DCC and analogue mode (ver. D and above: change mode via a switch on the PCB)**

- **Outputs for connecting two 11-position switches (analogue mode)**
- **Easy configuration via mobile app RailBOX: Railroad Control ⚙(ver. D and above, see more here)**
- **Supports Railcom® protocol (ver. D and above)**
- **Possibility of the manual decoder configuration using button on the PCB**
- **Possibility to change the lamp brightness of each signal independently**

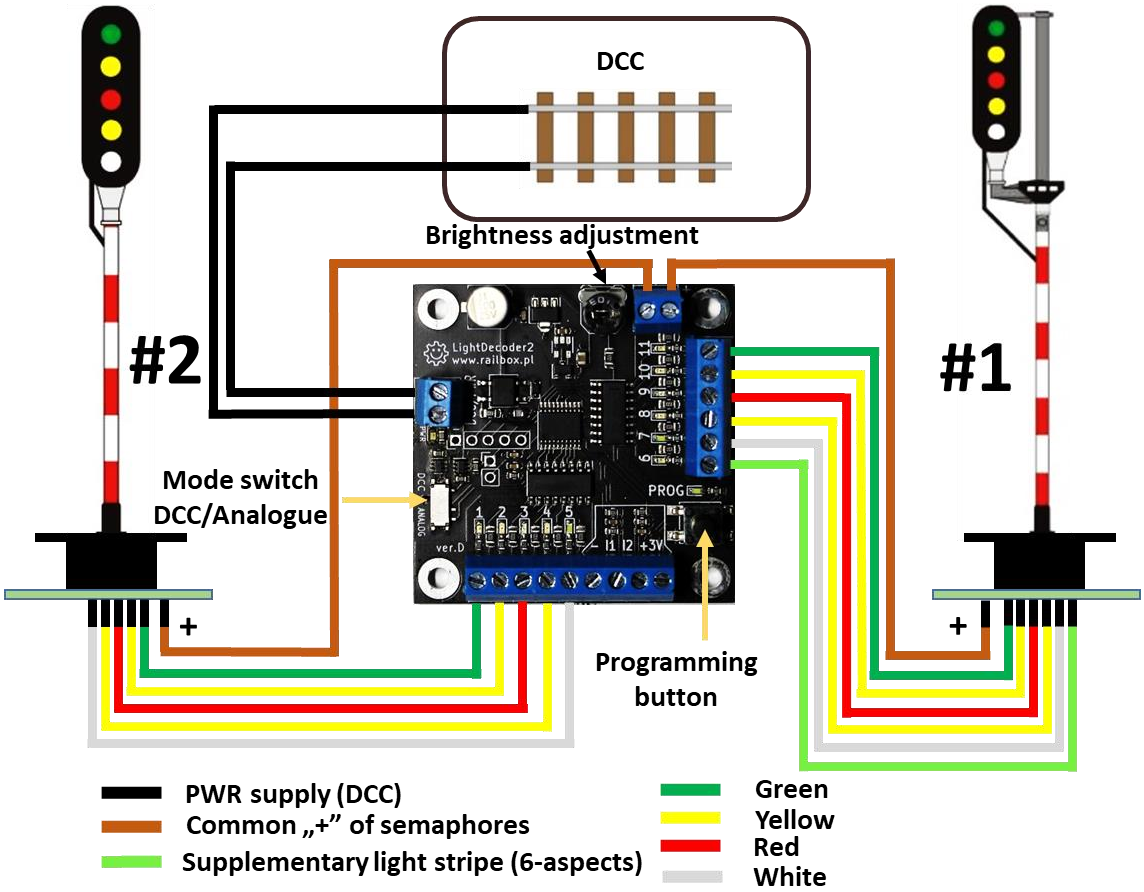
Technical parameters:

- **Decoder PCB dimensions - 50 x 50 mm.**
- **PWR supply - 7 - 20 V AC/DC or DCC.**
- **Current consumption - 25 mA.**

Description of the decoder outputs and connecting semaphores to it

Note: Semaphores on the pictures is just for an illustration and can be any semaphores with 1-6 aspects for #1 and 1-5 aspects for #2 The decoder has built-in resistors on all outputs intended for connecting LEDs directly but some semaphores may have their own board with resistors.

Connection in DCC mode (PWR supply directly from the track)



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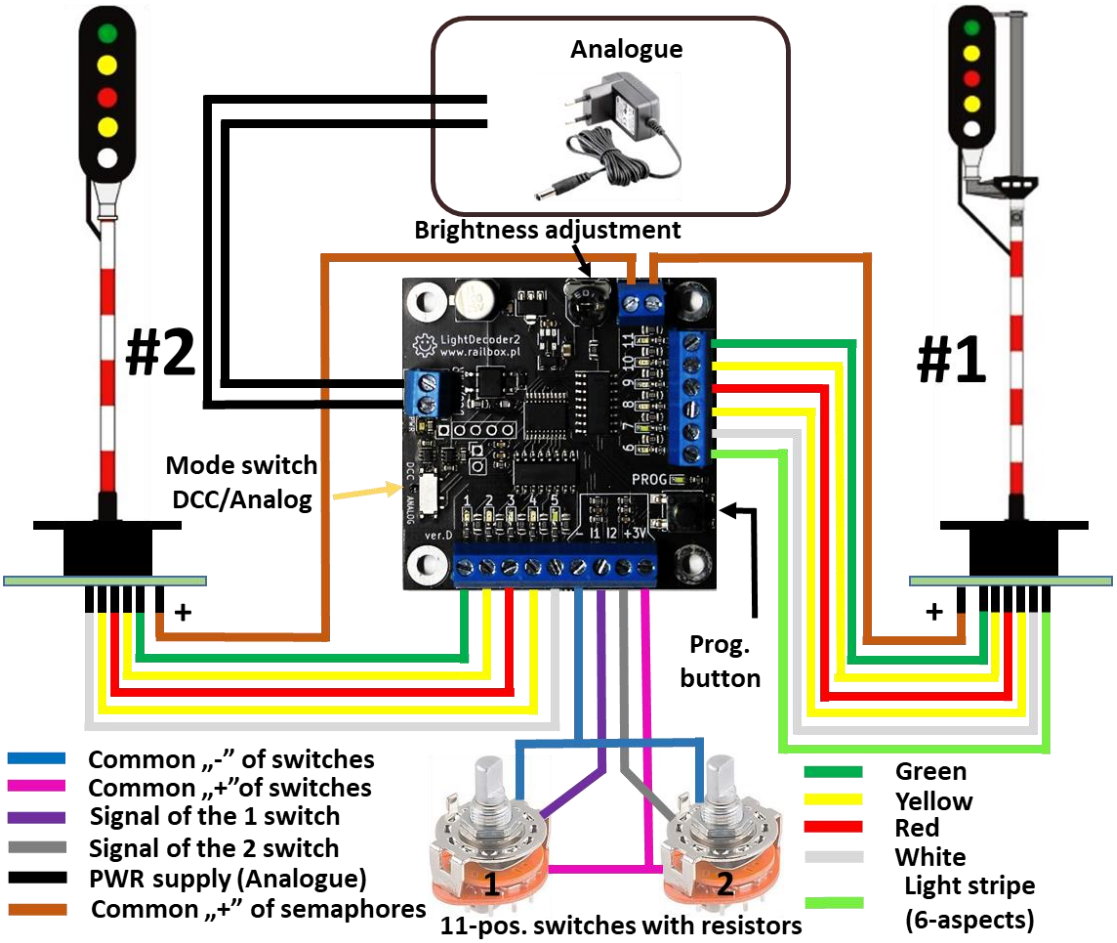
Connection in analogue mode (requires external PWR supply)

Note: Connection in analogue mode can be done using a power supply up to 20V as shown below. Switching the semaphore signals in analogue mode is done by 11-position switches connected to the corresponding outputs of the decoder and having a common "+" and a common "-". The switches must have 10 single 10kOhm resistors between the" positions " of the switches.



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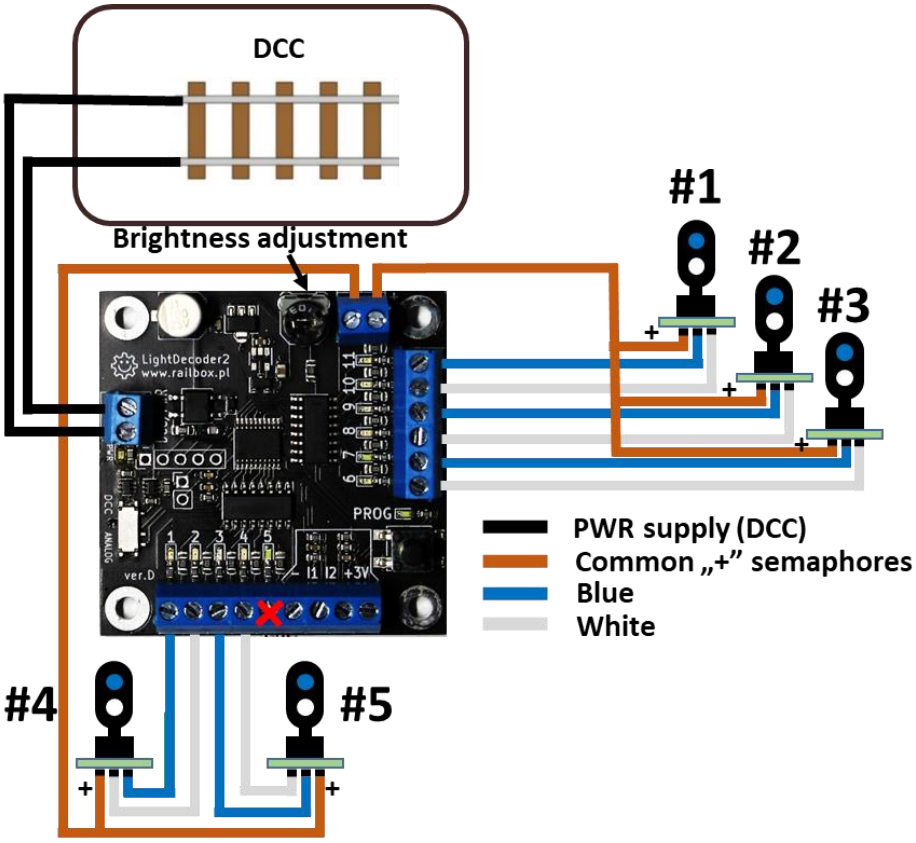
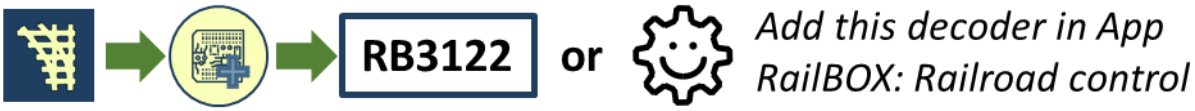
Connection of shunting semaphores



Note: **The connection of the shunting semaphores can be done as shown above, output 5 cannot be used for this purpose. The connection in analogue mode is not possible.**

Programming the decoder

Connecting to RailBOX: Railroad Control App



This symbol means "Easy configuration". All RailBOX products with this symbol on the board or sticker on the case allows two-way communication (Railcom ® protocol) with command stations with a Railcom ® receiver:

- **Automatic detection of new decoders connected to the tracks and the ability to automatically assign the address to the decoder (only with Command station, e.g., WiFi Command Station RB 1110)**
- **Ability to read and write configuration variables (CV) at any time on the main track (PoM)**

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Owners of RailBOX decoders with the symbol ⚙ and the RB 1110 Command station no longer have to worry about manual address programming for RailBOX accessory, wagons and loco decoders, just connect a new device to the tracks and the system itself will automatically find the next free address and assign it to the decoder. After that, in the mobile app RailBOX: Railroad Control will automatically appear a new loco, or accessory already with the specified address. In the case of semaphore will only need to move them to the appropriate place on the map in the mobile app RailBOX: Railroad Control. More information about this system **see here**

Note: If you do not have the RB 1110 Command station and/or there is no ⚙ symbol on the decoder, you can also quickly add the decoder to the map in RailBOX: Railroad control mobile app. Connect your own command station with attached decoder to it to our mobile app and follow the instructions as on above image and further instructions in the app.

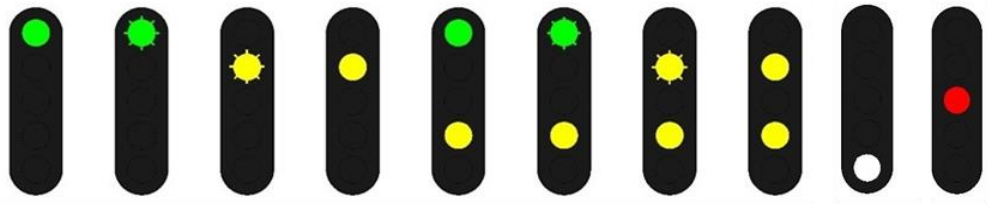
Manual decoder programming

To configure RB 3122 decoder DCC address manually, User should repeat the following steps:

- Press and hold the decoder programming button for 2 seconds (5 seconds for shunting semaphores mode) the device will go into programming mode and the first 5 LEDs (first 2 LEDs for shunting semaphores mode) will start flashing, also the white LED next to the button will be turned ON showing that the programming mode is active. Further programming can be done in 2 ways:

1st way – simple configuration:

- While in the programming mode that corresponds to the connected semaphores, send the accessory command with the selected address from any Command station using a manipulator, e.g., Multimaus in turnout mode (or use smartphone/tablet). Subsequent signals will be automatically assigned to subsequent addresses.
- **Note: You do not need to push button again after entering required programming mode, after successful reception of the DCC command the programing will be finished automatically.**
- After successful programming the signals will have offsets from base address (BA) as follow:



1# Sem.	BA(Off)	BA(On)	+1(Off)	+1(On)	+2(Off)	+2(On)	+3(Off)	+3(On)	+4(Off)	+4(On)
2# Sem.	+5(Off)	+5(On)	+6(Off)	+6(On)	+7(Off)	+7(On)	+8(Off)	+8(On)	+9(Off)	+9(On)

- **Note: Programming address for supplementary light stripe could be done by changing CV 121 and 122**

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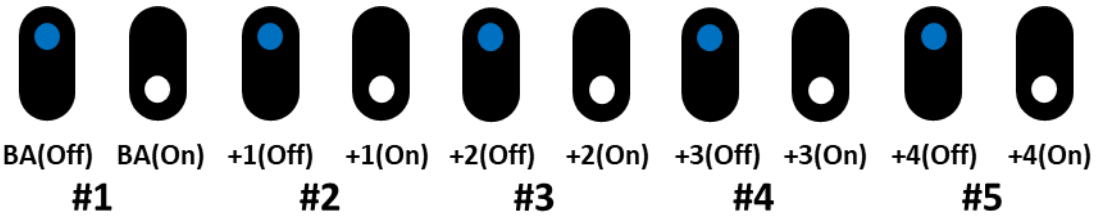

2nd way – manual configuration:

- While in the programming mode that corresponds to the connected semaphores first shortly press the programming button again. The first signal will be shown. To assign the address for this signal send the accessory command with the selected address from any Command station using a manipulator, e.g., Multimaus in turnout mode (or use smartphone/tablet).
- **Note: You can skip current signal by pressing the button again.**
- Continue programming the signals until the white LED near the button goes OFF. You can exit programming mode at any time by long pressing the decoder programming button. In this case, all current configuration will be lost.

  This way gives you possibility to use any addresses.

CV address settings table for the decoder

CV	Value	Default value	Description
1	1..255	0	Address (low byte): Decoder address (CV1 and CV9)
7	0..255		Decoder software version
8	0..255	13	Manufacturer code / decoder Reset: Manufacturer code / writing any value resets the decoder to factory settings
9		0	Address (high byte): Decoder address (CV1 and CV9)
28	bit		Railcom configuration
	1	1	Enabling the second channel CH2: 0-off, 1-on
	7	1	Automatic recognition system enabling: 0-off, 1-on
29	bit		Decoder configuration 1
	3	1	RailCom : 0-off, 1-on
	6	1	Address type: 0-uknown, 1-output address
	7	1	Accessory Decoder: 0-unkonwn, 1-Yes
44	0..255	255	Maximum brightness, output 11

CV	Value	Default value	Description
45	0..255	255	Maximum brightness, output 10
46	0..255	255	Maximum brightness, output 9
47	0..255	255	Maximum brightness, output 8
48	0..255	255	Maximum brightness, output 7
49	0..255	255	Maximum brightness, output 6
50	0..255	255	Maximum brightness, output 1
51	0..255	255	Maximum brightness, output 2
52	0..255	255	Maximum brightness, output 3
53	0..255	255	Maximum brightness, output 4
54	0..255	255	Maximum brightness, output 5
68	0..255	10	Flowability of the signal change: Flowing change of the signal is 1s (* 10ms)
113	0..11	10	Setting a common signal #1 (Sem #1): Setting a common signal #1 for multiple semaphores: 0 – S2, 1 – S3, 2 – S4, 3 – S5, 4 – S10, 5 – S11, 6 – S12, 7 – S13, 8 – Sz, 9 – MS2, 10 – S1, 11 – OFF
114	0..255	0	Setting a common signal address #1 (Sem #1): Setting a common signal enabling #1 for multiple semaphores. Set here DCC address, for which will be set the signal from CV 98. Note: Some DCC Command stations may send accessory addresses that are greater by 4. So if you don't see any action in your trial setup, enter a value of 4 less.
115	0..11	10	Setting a common signal #2 (Sem #1): Setting a common signal #2 for multiple semaphores: 0 – S2, 1 – S3, 2 – S4, 3 – S5, 4 – S10, 5 – S11, 6 – S12, 7 – S13, 8 – Sz, 9 – MS2, 10 – S1, 11 – OFF
116	0..255	0	Setting a common signal address #2 (Sem #1): Setting a common signal enabling #2 for multiple semaphores. Set here DCC address, for which will be set the signal from CV 98. Note: Some DCC Command stations may send accessory addresses that are greater by 4. So if you don't see any action in your trial setup, enter a value of 4 less.
117	0..11	10	Setting a common signal address #1 (Sem #2): Setting a common signal enabling #1 for multiple semaphores: 0 – S2, 1 – S3, 2 – S4, 3 – S5, 4 – S10, 5 – S11, 6 – S12, 7 – S13, 8 – Sz, 9 – MS2, 10 – S1, 11 – OFF
118	0..255	0	Setting a common signal address #1 (Sem #2): Setting a common signal enabling #1 for multiple semaphores. Set here DCC address, for which will be set the signal from CV 102. Note: Some DCC Command stations may send accessory addresses that are greater by 4. So, if you don't see any action in your trial setup, enter a value of 4 less.
119	0..11	10	Setting a common signal address #2 (Sem #2): Setting a common signal enabling #2 for multiple semaphores: 0 – S2, 1 – S3, 2 – S4, 3 – S5, 4 – S10, 5 – S11, 6 – S12, 7 – S13, 8 – Sz, 9 – MS2, 10 – S1, 11 – OFF

CV	Value	Default value	Description
120	0..255	0	Setting a common signal address #2 (Sem #2): Setting a common signal enabling #2 for multiple semaphores. Set here DCC address, for which will be set the signal from CV 104. Note: Some DCC Command stations may send accessory addresses that are greater by 4. So, if you don't see any action in your trial setup, enter a value of 4 less.
121	0..255	0	[SM] Supplementary light stripe address (low byte)
122	0..255	0	[SM] Supplementary light stripe address (high byte)
112	0..1	0	[SM] Simple configuration type: [SM] Simple configuration type: 1 – 2-aspect mode. 0 – 5-aspect mode