

Universal Control

For DCC Systems with DCC Brake Generator



68720

Technical Operating Manual

The basis of this technical operations manual is the description of simple control operations which the device affords. This technical operations manual describes the extended possibilities of the Universal Control in its functions, programming and applications, starting from software version 1.00.

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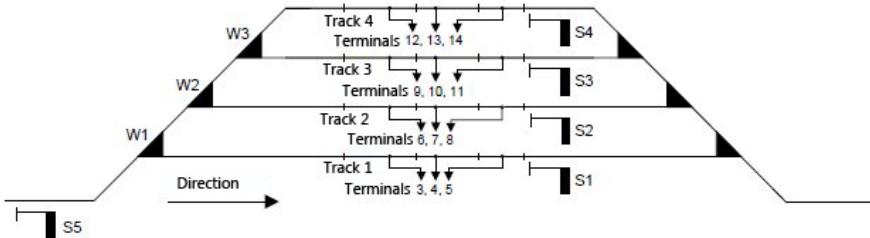
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1. Extended Possibilities for the Universal Control

1.1 Basic Settings

The Universal Control can be configured by LocoNet Programming. Among these configurations are start-up time, deleting of module programming, sending of special LocoNet commands during a short circuit, the setting of a solenoid address which can be used to delete all states of a station, as well as the switching time of solenoid commands.

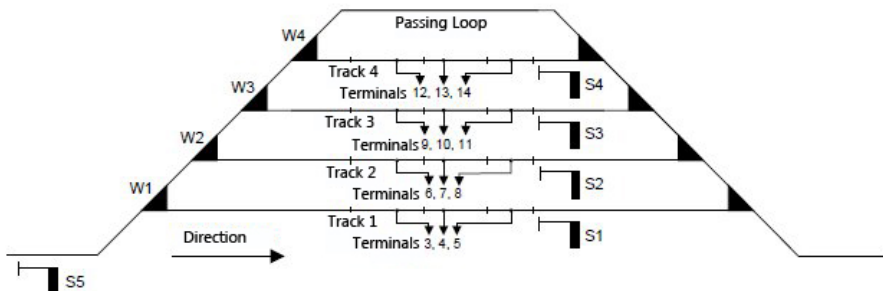
1.2 Station control with automatic Entry



By programming individual LocoNet CVs (LNCVs) the following configurations can be made in a station control with automatic Entry.

- Assignment of random signal addresses
- Assignment of random feedback addresses
- Assignment of random turnout addresses and turnout states for station entry
- Configuring and inserting an entry block in which the trains can be handled according to station status
- Free definition of track connections 1-4
- Switching block automation on and off with a random solenoid address
- Fix delay period before the train departs when the exit signal changes to proceed (green)
- Entry of specific trains into preset destination tracks by installation of a LISSY or MARCo receiver before the station
- Sending of locomotive addresses in the station tracks for example for displaying locomotive addresses by installing a LISSY or MARCo receiver before the station

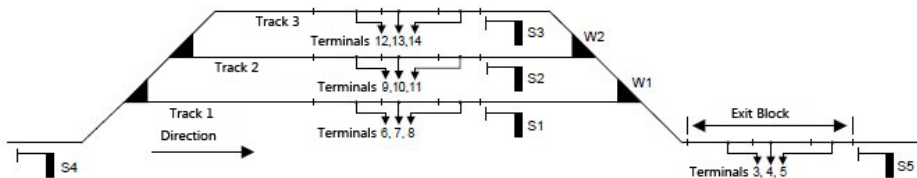
1.3 Station control with automatic Entry and Passing Loop



By programming individual LocoNet CVs (LNCVs) the following settings can be made for the station control with automatic Entry and passing loop.

- Assignment of random signal addresses
- Assignment of random feedback addresses
- Assignment of random turnout addresses and turnout states for station entry
- Assignment of a random solenoid address for directing all trains via the passing loop
- Configuring and inserting an entry block in which the trains can be handled according to station status
- Free definition of track connections 1-4
- Switching block automation on and off with a random solenoid address
- Fix delay period before the train departs when the exit signal changes to proceed (green)
- Entry of specific trains into preset destination tracks by installation of a LISSY or MARCo receiver before the station
- Sending of locomotive addresses in the station tracks, for example, for displaying locomotive addresses by installing a LISSY or MARCo receiver before the station

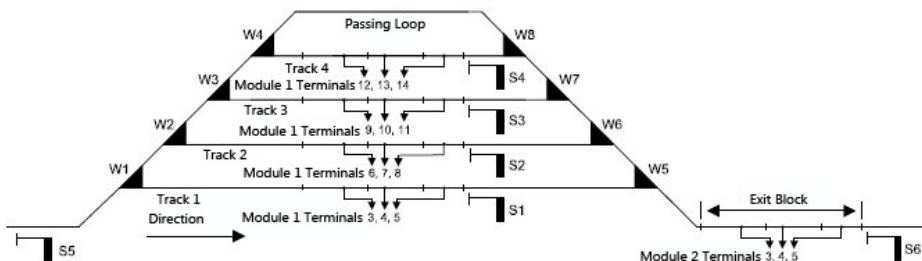
1.4 Station control with automatic Departure



By programming individual LocoNet CVs (LNCVs) the following settings can be made in the station control with automatic exit.

- Assignment of random signal addresses
- Assignment of random feedback addresses
- Assignment of random turnout addresses and turnout states for the station exit
- Switching the block automation off and on for individual blocks with random solenoid addresses
- Configuring a delay before a train departs when the exit signal changes to green
- free definition of track connections 1-4 for the exit block
- Definition of the departure sequence, if this is to random or cyclical (track-by-track)

1.5 Station control with automatic Departure and Passing Loop

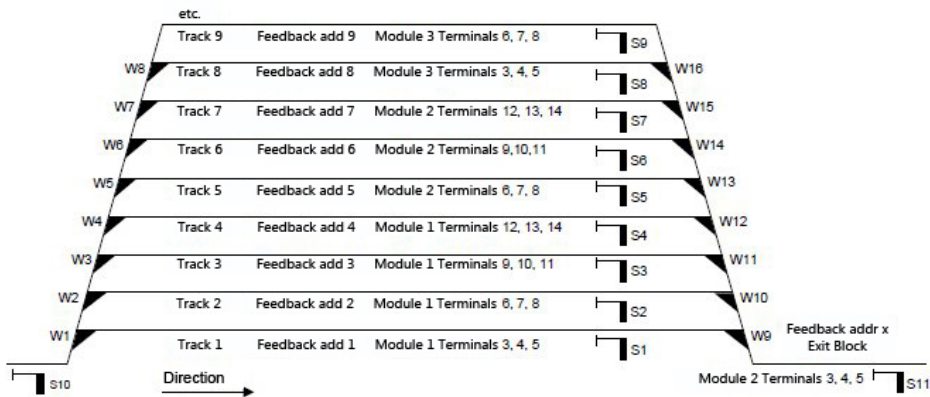


By programming individual LocoNet CVs (LNCVs) the following settings can be made for the station control with automatic Exit and passing loop.

- Assignment of random signal addresses
- Assignment of random feedback addresses
- Assignment of random turnout addresses and turnout states for the station exit
- Switching the block automation off and on for individual block with random solenoid addresses
- Configuring a delay before a train departs when the exit signal changes to green

- free definition of track connections 1-4 for the exit block
- Definition of the departure sequence, if this is to random or cyclical (track by track)
- Starting the first station departure with a random solenoid address
- Entry of two Signal addresses which must be switched when a train that travelled via the passing loop arrives at the exit block. These are the exit signals of the last two blocks before the station entry.

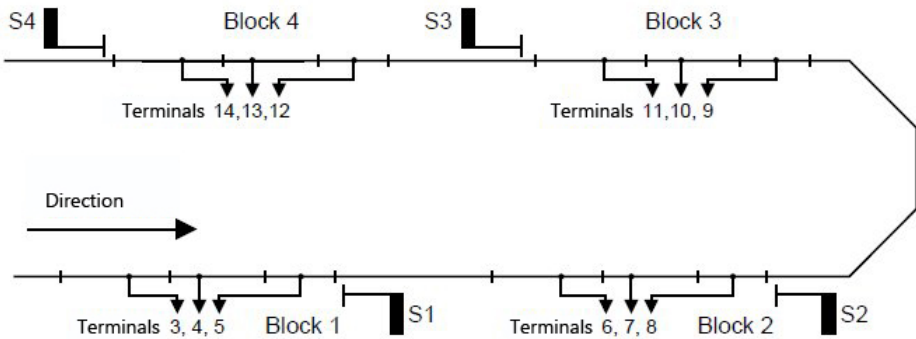
1.6 Station Control



By programming individual LocoNet CVs (LNCVs) the following settings can be made for the station control.

- Assignment of signal addresses which are placed in routes for the station exit (module with exit block)
- Assignment of random feedback addresses
- Switching the block automation off and on for individual blocks with random solenoid addresses
- Configuring a delay before a train departs when the exit signal changes to green
- free definition of the track connections 1-4

1.7 Block Section Operation



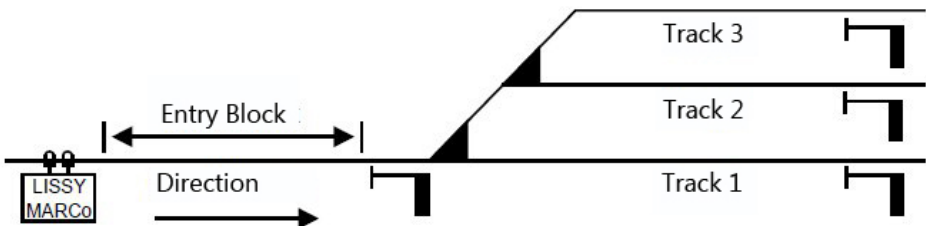
By programming individual LocoNet CVs (LNCVs) the following settings can be made for the block section control.

- Assignment of random signal addresses
- Assignment of random feedback addresses
- Switching the block automation off and on for individual block with random solenoid addresses
- Configuring a delay before a train departs when the exit signal changes to green
- free definition of the track connections 1-4

1.8 Operation with LISSY or MARCo

For operations with LISSY or MARCo address reporting, the following guidelines apply:

Only one receiver must be installed before the station for example. The reported addresses of the detected locomotives are passed from here from block to block.



To allow particular trains only into specific station tracks, there is the distinction between locomotive addresses from 1 to 9999.

Up to 15 train categories can also be used to group a number of trains in the same category. As a typical application, all freight trains can be directed via the passing loop without stopping at the station. The use of all 15 categories presupposes the use of an Intellibox II and MARCo (all

Versions) or LISSY receiver 68610 (from Software 2.05). With other LocoNet Centers, categories can only be used in combination with the LISSY System (all Versions) and train categories 1 to 4.

A mixed operation of locomotives with transmitter (LISSY or MARCo) and locomotives without transmitters is also possible, whereby the locomotives without transmitter cannot be controlled in a targeted manner. In a mixed operation a time can be set, which determines if the address notification from the detector in the previous block is processed or not. That is, if a locomotive is reported by a LISSY or MARCo receiver to LocoNet, then it must arrive at the next block before the time has expired in order to be processed. If it arrives later it is processed like a locomotive without a transmitter, therefore with a stop signal (red), it stops by DCC brake generator.

If a locomotive without a transmitter arrives in block section with its exit signal on stop (red) the locomotive is stopped using the DCC brake generator. This means that the locomotive in the brake section can no longer be addressed. If a locomotive with a transmitter enters the block section whose exit signal indicates stop (red), it is stopped by setting the speed step to zero and can therefore be controlled. Locomotive special functions can therefore still be switched.

Every locomotive which has entered the Stop section can no longer be controlled, since the track power is switched off. If the signal changes to go again (green) the section will get power again.

If LISSY or MARCo address notification is to be done in only particular blocks, this function can be switched on or off in each block. If the function is switched off, the particular block only reports via the feedback address occupied and the locomotives are stopped by the DCC brake generator.

1.9 Swith off Behaviour with Short Circuit

The Universal Control ex-factory is configured so that, in the event of a short circuit in one of its track sections, a "Power off" message is reported via the LocoNet. This notification switches off the booster to the entire layout. The Universal Control can also be configured so that if a random solenoid address between 1 and 2048 sends "red", a short circuit occurs in one of its sections. After removal of the short circuit it can be switched back on by either the center's "go"-key or the afore-mentioned solenoid address "green".

2. LNCV Programming

2.1 Configuring the Universal Control via the LocoNet

LocoNet Devices, like the Universal Control, configured with so called LocoNet Configuration Variables (LNCVs). These LNCVs can be programmed with the help of all Intelliboxes (Intellibox 1 from Software Version 1.3), the IB-Control 1 (from Version 1.55), the SystemControl 7 or the TwinCenter (from Version 1.1).

In principle the programming process of the LocoNet CVs (LNCVs) is the same as in the named devices. The module is placed into programming mode, by entering the part number in the center LocoNet Programming menu (here 68720), followed by the particular Module address (ex-factory the 1).

Now the device is in programming mode and all LNCVs from the list of LocoNet-CVs can be programmed as desired. The specifics for LNCV-Programming can be found the programming device's manual.

Important: Every module uses a module address for programming so that the digital center knows which module is being referred to. The factory setting for a Universal Control is address 1. If further Universal Controls are to be used by the center they must be given a different module address. The allowable address range is 1 to 65534. To verify that your Universal Control is correctly addressed the red LED on module lights up when it is in programming mode. Since mostly numerous modules are installed, or eventually retro-fitted, it makes sense to program module addresses higher than 1 right from the outset.

2.2 The Universal Address

With the universal address 65535, as the name suggests, you can call up all Universal Controls.

Since the universal address is not an address with which individual Universal Controls can be identified, it can only be used to call up a Universal Control whose address is unknown. For this, only that particular device can be connected to the LocoNet. If it is then called up it is possible to read the programmed address from LNCV 0.

2.3 Description of LocoNet CVs for the Basic Configuration

LNCV 0: Module address

Here the module address for this module is entered.

LNCV 1: Software Version

After reading LNCV 1 the module's software version is displayed. LNCV 1 can also be used to delete the module's programming. For this, LNCV 1 is programmed with a value greater than 0. Most LNCVs are deleted.

The LNCVs

0 = Module address

2 = StartUp Time

5 = LocoNet notification with a short circuit

6 and 7 = Parameters for short circuit measuring

9 = Switching time for solenoid commands are not deleted.

LNCV 2: StartUp Time

If locomotives that are fitted with a LISSY or MARCo transmitter is standing in one of the blocks when the layout is switched off, the Universal Control saves these locomotives. When the layout is restarted, that is, as soon as the Universal Control gets its power back, they will notify the center of the locomotives. So that this process happens in an orderly way it is sensible to program the module with a StartUp time. This StartUp Time delays the notification process for the entered time. This time can be entered in 0.5 Second increments. It is sensible for the first module to have a value of 30 (15 seconds) and for subsequent modules to increase the value by 4. Then it is certain that the LocoNet of all LocoNet Centers is operational.

LNCV 5: LocoNet notification with a short circuit

Here you can enter the solenoid address, which the module notifies as “red” in the event of a short circuit, and can be switched ON/OFF via the module's track power. The value range of solenoid addresses is 1 to 2048. If a value of 5000 is entered here (factory setting), then in the event of a short circuit, the module sends a “Power off” notification via the LocoNet, which then sets the layout to “stop”. See chapter 1.9 “Switch off Behaviour with Short Circuit”.

LNCV 8: Delete a Station's Saved Block Status

This holds the solenoid address with which the block states that apply to the entry and exit of the station. If the station is to go back into operation this address is switched back to “green”.

LNCV 9: Switching time for solenoid commands

This contains the switching time in 10ms intervals, which the module uses for switching turnouts and signals. This switching time should not be shorter than is used for the base switching time for solenoids. This ensures that for very comprehensive routes the Universal control does not “overflow” the digital center's buffer. The factory setting is a value of 30, that is 300ms.

2.4 LocoNet CVs for configuring a Block

The following LNCVs deal with the configuration of the four connected blocks. The indicated LNCV number is for the first Block (LNCVs 10 - 18). The configuration for Blocks 2 - 4 are identical in meaning, to program LNCVs 20 - 28 for Block 2, 30 - 38 for Block 3 and 40 - 48 for Block 4.

LNCV 10: Time for previous block Address notification

Here a time can be entered, in 0.5 Second intervals, in which a locomotive with LISSY or MARCo transmitter must get from the notifying LISSY or MARCo receiver to the brake section of this block, to take on the locomotive information and stop the locomotive with speed step 0. If this time is overrun, the locomotive is stopped by the DCC brake generator. This is sensible in mixed operation with notifying locomotives with transmitter and locomotives without transmitter. If no notifying locomotives are used the value of this LNCV can be set to 0 (factory setting). All the braking will be done with the DCC Brake generator and no address notification is taken on from the previous block. If locomotives with LISSY or MARCo transmitters are exclusively used, a value of 255 can be entered. The the address notification from the previous block is always taken on.

LNCV 11: Address of the Block Exit signal

The Signal address for Block exit signals is entered here.

LNCV 12: Adresse and State of the previous block exit signal

Enter here the Signal address and status of the previous block's block exit signal. In station tracks this is the entry signal to the station. If a train arrives in the block the exit signal of the previous block is set to stop (red – block safety). The value to be programmed into the LNCV is a combination of two components: For one the address of the signal, and the other is the state (red or green) of the signal.

Setting "red" = Value 0

Setting "green" = Value 1

Value of the LNCV = Signal address x 10 + Signal state

Example 1: The exit signal of the previous block has the Signal address 1 and should switch to stop (red) upon arrival of the train.

Signal address 1 x 10 + status "red" Value 0 => 10 + 0 = 10

Example 2: The exit signal of the previous block has the Signal address 150 and should switch to stop (red) upon arrival of the train.

Signal address 150 x 10 + state "red" Value 0 => 1500 + 0 = 1500

The value for the state can therefore be considered as the last digit which is simply appended to the address.

Signal 150 and end digit 0 appended, therefore equals a value of 1500.

It is also possible to handle addresses other than signal addresses of the previous block on the arrival of a train. Solenoids can therefore also be switched to "green", or feedback "vacant" or "occupied", which activate routes saved in other devices.

In principle valid values:

Value of LNCV = Address x 10 + C

C = 0 for solenoid address “red“

C = 1 for solenoid address “green“

C = 2 for feedback address “vacant“

C = 3 for feedback address “occupied“

Example: Upon arrival of the train a feedback address 10 “occupied” is to be reported.

Feedback address 10 x 10 + Status “occupied“ value 3 => 100 + 3 = 103
or

Feedback address 10 and end digit 3 appended, gives the value 103.

LNCV 13: Address and State of the previous block’s Entry signal

Here the Signal address and the state of the block entry signal of the previous block is entered. When a train arrives in the block, the entry signal of the previous block is to be set to a go state (green), so that the waiting train can then move into the vacated block (Block section operation).

Value of the LNCV = Signal address x 10 + Signal state

Example: The entry signal of the previous block has the signal address 2 and should be set to go (green) upon arrival of the train.

Signal address 2 x 10 + state “green“ value 1 => 20 + 1 = 21

It is also possible to handle further addresses like those in LNCV 12 on the arrival of a train. The same rules apply here for calculating the value as those described in the LNCV 12 section.

LNCV 14: Feedback and LISSY/MARCo address for the Block

Here you enter the feedback address which the module reports as “occupied” when a train enters the brake section of this block. If LISSY/MARCo Information is processed (LNCV 16 = 1), the module also sends the necessary “block occupied” message with this address.

LNCV 15: Feedback and LISSY/MARCo address for the previous Block

Here you enter the feedback address which the module reports as “vacant” when a train enters the brake section of this block. If LISSY/MARCo Information is processed (LNCV 16 = 1), the module also sends the necessary block vacant message with this address.

This address should be the feedback address of the previous block.

LNCV 16: Block mode

If a value 0 is entered into LNCV 16 the module does not send any LISSY/MARCo Information. If a value 1 entered the module sends LISSY/MARCo-Information.

LNCV 17: Delay at “green” turning exit signal

A delay, in 0.5 second interval for which the train waits before departing, when the exit signal changes from stop (red) to go (green), is entered here.

LNCV 18: Switch off this block’s Block automation

The solenoid address by which the block automation can be turned off when set to “red”, is entered here. In this case the track is permanently on for the track sections in this block, even when a train arrives in the brakig section when the signal is set to stop (red). By switching this solenoid address to “green” the block automation is active again and the next train will be handled according to the signal state.

2.5 LocoNet CVs for configuring automatic Station entry

LNCV 50: Configuration of the Entry control

This determines if a station entry control is to be used in this module. If a value 0 is entered then no station entry is controlled by this module.

If a value 255 is entered the tracks are monitored and the relevant entry route is switched to the vacant tracks as soon as they become vacant. The selection always begins with track 1. If this module is connected to an entry block, that is, a block before the station entrance, the block number (1-4) of the terminals to which the entry block is connected, is entered in this LNCV.

LNCV 51: The station Entry signal

If with entry control no entry block is connected (LNCV 50 = 255), the address of the signal, which is located at the station entrance, is entered here. The signal address is switched to stop (red) as soon as a vacant station track becomes available for the next station entry.

If the Universal Control is installed for shadow station control without automatically controlling, then this signal address can be read to check if there is still room in the shadow station (Signal address shows “green”), or if all tracks of the shadow station are occupied (Signal address shows “red”).

LNCV 52: Directing all trains via the station passing loop

If a station is furnished with a passing loop, a solenoid address can be entered here when set to “green”, directed via the passing loop. If this solenoid address is switched to “green”, the route to the passing loop is set (see Chap. 1.3). If automatic entry and exit controls are set, then the routes that direct traffic via the passing loop right through to the exit are activated (see Chap. 1.5).

If this solenoid address is “red” the arriving trains are processed according to various station data.

LNCV 53: Control of the station's entry with fully occupied tracks

If a station equipped with a passing loop and all station tracks are occupied, this LNCV can be used to determine if the trains arriving now will wait (value 0), or if they go through the passing loop (value 1).

2.6 LocoNet CVs for configuring automatic Station Departure

LNCV 55: Exit block's Block number

If an exit block is connected to this module, that is a block directly after the station, then this LNCV must have the block number (1-4), to which terminals the exit block is connected.

***Note:** If both LNCV 50 (automatic Entry) and LNCV 55 are programmed with values larger than 0 the automatic entry is performed. LNCVs 55 - 59 for automatic exit are then not considered.*

LNCV 56: Sequence of station departures

The exit sequence of the station departure is configured here. If the departures from the station are always cyclical, that is one track after the other then this LNCV must have a value 0. If a random sequence of departures is to be selected the value must be 1.

***Note:** If a train arrives at the entry and is allowed to use the passing loop, the exit block will interrupt the track selection and set the passing loop next.*

LNCV 57: Switching the station entry signal after driving through the passing loop

When a train arrives at the exit block via the passing loop the entry signal to the station must be switched to stop (red). For this, the signal address and state "red" of the entry signal for the the station, are entered here. This signal switching is used instead of that from LNCVs 12, 22, 32 or 42. The value to be entered is calculated in the same way as that for LNCV 12 (see Chap. 2.4, LNCV 12).

LNCV 58: Switching the station entry signal after driving through the passing loop

When a train arrives the exit block via the passing loop, the entry signal to the station's previous block must be switched to go (green), (block section control before the station). The signal address and state "green" for the pre-entry block are entered here. The signal switching is then used instead of that from LNCVs 13, 23, 33 or 43. The value to be entered is calculated in the same way as that for LNCV 13 (see Chap. 2.4, LNCV 13).

LNCV 59: Activating the station departure

Here you can enter a random solenoid address with which the green state automatically switches the station exit. If a newly installed station is used for the first time, or if an automatic exit is to occur directly, then the solenoid address entered here is set to "green". The "red" state has no effect.

2.7 LocoNet CVs for configuring Station data

The following LNCVs serve to configure the station data. Here the information needed for the entry and exit of a station, that is, the station tracks, is entered. They are only programmed into the modules that control the automatic entry and automatic exit. The indicated LNCV numbers are for Track 1 (LNCVs 60 - 69). The setting for tracks 2 - 12 and the passing loop are then identical in meaning. For track 2 -12 and the passing loop the following LNCVs are used:

Track 2: 70 - 79	Track 3: 80 - 89	Track 4: 90 - 99
Track 5: 100 - 109	Track 6: 110 - 119	Track 7: 120 - 129
Track 8: 130 - 139	Track 9: 140 - 149	Track 10: 150 - 159
Track 11: 160 - 169	Track 12: 170 - 179	Passing Loop: 180 - 189

LNCV 60: Address of track notification of station track 1

The address entered reports the track section as “occupied” as soon as a train enters the braking section of the station track and reports it as “vacant” as soon as the train leaves the braking section of the station track. Immediately after departure of the train, the exit signal of the track switches back to stop (red). In response to these occupied and vacant messages the modules can perform the automation of the entry and exit for the station tracks.

LNCV 61 - 69: Address list of locomotive addresses and categories for track 1

The value entered here determines which trains should travel these tracks.

Value	Description
0	LNCV not used, no automatic arrival or departure
1 - 9999	Locomotive address (only LISSY/MARCo locomotives)
19999	Locomotive address 0, Loco without LISSY/MARCo transmitter
20000	All locomotive addresses
20001 - 20015	Train category (only LISSY/MARCo locomotives)

2.8 LocoNet CVs for configuring the Route

The following LNCVs serve to configure the routes. Here the switching sequences are entered that are used for entering and leaving the station. They are therefore only programmed in the modules that control the automatic entry and automatic departure. These routes can each have up to 20 switching instructions. If these sequences are used for station entry these should first switch the turnout addresses with their desired state up to the destination track and the last instruction should switch the entry signal to go (green). If the sequences for departing the station are entered they should have as the last instruction that is the twentieth instruction, to switch

the track exit signal to go (green). Therefore it is a given that, upon arrival of a train in the exit block, an automatic sequence is triggered which switches the exit signals of all station tracks to stop (red).

The entered numbers represent the route to and from track 1 (LNCVs 200 - 219).

The setting for tracks 2 - 12 and the passing loop are then identical in meaning. For track 2 -12 and the passing loop the following LNCVs are used:

Track 2: 220 - 239	Track 3: 240 - 259	Track 4: 260 – 279
Track 5: 280 - 299	Track 6: 300 - 319	Track 7: 320 – 339
Track 8: 340 - 359	Track 9: 360 - 379	Track 10: 380 – 399
Track 11: 400 - 419	Track 12: 420 - 439	Passing Loop: 440 - 459

The individual entries for the switching sequence are calculated in the same way as the value for LNCV 12 (see Chap. 2.4, LNCV 12).

LNCVs 200-219: Route switching sequence to/from station track 1

Example 1: To set a route for entering station track 1 the following turnouts and signals must be switched.

Turnout 1 Branch (red)

Turnout 2 Straight (green)

Turnout 3 Straight (green)

Turnout 4 Straight (green)

Turnout 5 Branch (red)

Signal 21 Go (green)

For this program the following LNCVs:

LNCV 200 = 10	Solenoid address 1, end digit 0 (red)
LNCV 201 = 21	Solenoid address 2, end digit 1 (green)
LNCV 202 = 31	Solenoid address 3, end digit 1 (green)
LNCV 203 = 41	Solenoid address 4, end digit 1 (green)
LNCV 204 = 50	Solenoid address 5, end digit 0 (red)
LNCV 205 = 211	Solenoid address 21, end digit 1 (green)

Example 2: To set a route for exiting station track 1 the following turnouts and signals must be switched.

Turnout 8 Branch (red)

Turnout 9 Straight (green)

Turnout 10 Straight (green)

Turnout 11 Straight (green)

Turnout 12 Branch (red)

Turnout 13 Straight (green)

Turnout 14 Branch (red)

Signal 30 Go (green)

For this program the following LNCVs:

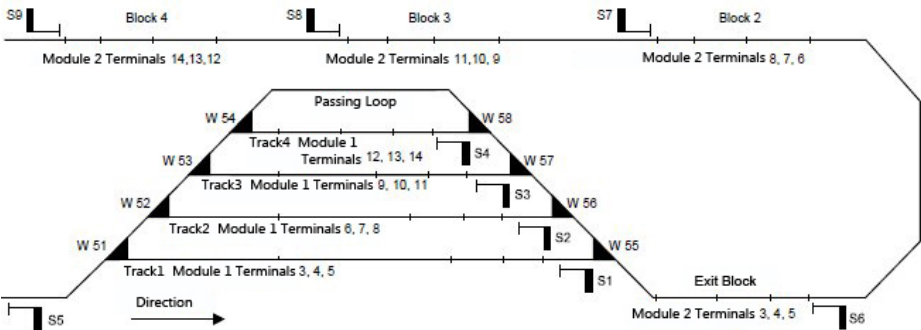
LNCV 200 = 80	Solenoid address 8, end digit 0 (red)
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LNCV 201 = 91	Solenoid address 9, end digit 1 (green)
LNCV 202 = 101	Solenoid address 10, end digit 1 (green)
LNCV 203 = 111	Solenoid address 11, end digit 1 (green)
LNCV 204 = 120	Solenoid address 12, end digit 0 (red)
LNCV 205 = 131	Solenoid address 13, end digit 1 (green)
LNCV 206 = 140	Solenoid address 14, end digit 0 (red)
LNCVs 207 - 218 = 0	These LNCVs are not used
LNCV 219 = 301	Solenoid address 30, end digit 1 (green)

2.9 Combination of Operating Modes

To leave no or at least very few track connections unused, the track module's outputs can, under certain circumstances, be used for operating modes of other modules.

Example:



In this example module 1 is programmed for 4 station tracks with automatic entry. In module 2 track terminals 6 - 14 are used for a block section even though the exit block that controls the station's exit is connected to terminals 3 - 5 of the same module. It is only braked with the DCC brake generator.

The LNCVs of the second module must be programmed as follows:

LNCV	Value	Description
0	2	Module address 2
8	arbitrary	Solenoid address for deleting station track status
10	0	Always DCC brake generator
11	6	Address of the exit block exit signal
12	0	No Previous block exit signal
13	0	No Previous block entry signal
14	6	Exit block feedback address
15	0	No Previous block feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block

LNCV	Value	Description
20	0	Always DCC brake generator
21	7	Address of the exit block 2 exit signal
22	60	Exit signal blocking to Stop (red)
23	0	No Previous block entry signal
24	7	Block 2 feedback address
25	6	Previous block Feedback address
26	0	Do not send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of exit block
30	0	Always DCC brake generator
31	8	Address of the exit block 3 exit signal
32	70	Previous block Exit signal to Stop (red)
33	61	Previous block Entry signal when green
34	8	Block 3 feedback address
35	7	Previous block Feedback address
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of exit block
40	0	Always DCC brake generator
41	9	Address of the exit block 4 exit signal
42	80	Previous block Exit signal to Stop (red)
43	71	Previous block Entry signal when green
44	9	Block 4 feedback address
45	8	Previous block Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of exit block
55	1	Station exit block connected to terminal 3-5
56	1	Random order for departing station
57	50	After departure from passing loop, Entry signal 5 to red
58	0	No Previous block of station entry, so no signal green
59	Arbitrary	Solenoid address green, immediate station exit
60	1	Occupied report Track 1
61	20000	All locomotives can use Track 1
70	2	Occupied report Track 2
71	20000	All locomotives can use Track 2
80	3	Occupied report Track 3
81	20000	All locomotives can use Track 3
90	4	Occupied report Track 4

LNCV	Value	Description
91	20000	All locomotives can use Track 4
180	10	Occupied report passing loop
181	20000	All locomotives can use the passing loop
200	550	Exit turnout to round (red)
201-218	0	Not used
219	11	Track 1 exit signal to go (green)
220	551	Exit turnout 55 to straight (green)
221	560	Exit turnout 56 to round (red)
239	21	Track 2 exit signal to go (green)
240	551	Exit turnout 55 to straight (green)
241	561	Exit turnout 56 to straight (green)
242	570	Exit turnout 57 to round (red)
259	31	Track 3 exit signal to go (green)
260	551	Exit turnout 55 to straight (green)
261	561	Exit turnout 56 to straight (green)
262	571	Exit turnout 57 to straight (green)
263	580	Exit turnout 58 to straight (green)
279	41	Track 4 exit signal to go (green)
440	551	Exit turnout 55 to straight (green)
441	561	Exit turnout 56 to straight (green)
442	571	Exit turnout 57 to straight (green)
443	581	Exit turnout 58 to straight (green)

3. Update

The Universal Control is updatable. Should a new software version (LNCV 1) be developed, then this will be made available for download from our Internet site www.uhlenbrock.de. To perform the update you will require a computer, a digital center with LocoNet interface, an interface for the computer (mostly integrated into the center) and the Universal Control. These do not have to be sent away for updating like previous modules. The connection between the computer and digital center is made as outlined in the relevant manual for the digital center. Then connect a Universal Control to the LocoNet and start the Update Program. Follow the instructions on the screen. Each module will take approximately 1 minute. When the progress bar shows 100% the Update is complete. The previous LNCV Programming is not deleted during the update, they remain intact.

4. List of LNCVs

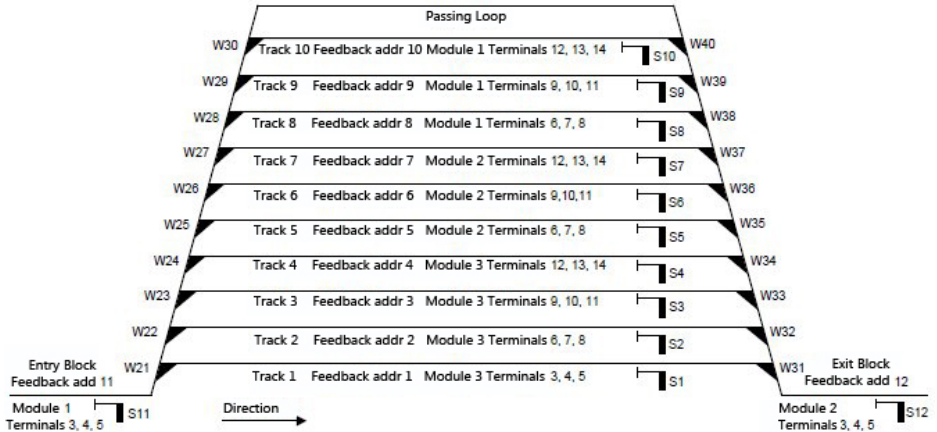
CV	Description	Value range	Default value
0	Module address	1-65534	1
1	Software version	-	varies
2	StartUp time in 0.5 second steps	0-255	1
5	LocoNet transmission with Booster short circuit	1-2048 5000	5000
8	Solenoid address for deleting station track status	1-2048	5
9	Switching time for solenoid commands in 10ms steps	1-255	30
LNCVs 10 – 18 Block Data for block 1 (Track connection for terminals 3 – 5)			
10	Time for reporting the address of the previous block in 0.5 sec intervals 0 = always DCC 255 = always LISSY/MARCo addresses	0-255	0
11	Address of block 1 exit signal	1-2048	1
12	Address and state of previous block exit signal Value = address x 10 + C C = 0 -> Solenoid address set to red C = 1 -> Solenoid address set to green C = 2 -> feedback address status vacant C = 3 -> feedback address status occupied	10-20483	0
13	Address and status of the entry signal's previous block (calculation as for LNCV 12)	10-20483	0
14	Feedback and LISSY/MARCo address for Block 1	0-4095	1
15	Feedback and LISSY/MARCo address for the previous block	0-4095	0
16	0 = send no LISSY/MARCo information 1 = send LISSY/MARCo information	0, 1	0
17	Delay in 0.5 sec. Interval when exit signal turns green	0-255	0
18	Solenoid address for switching block automation for Block 1	1-2048	0
20 - 28	Block Data for block 2 (Track connection for terminals 6 – 8)	see above	see above
30 - 38	Block Data for block 3 (Track connection for terminals 9 – 11)	see above	see above
40 - 48	Block Data for block 4 (Track connection for terminals 12 – 14)	see above	see above
50	Configuration for station entry 0 = no control of the station entry 1 - 4 = Block number to which the entry block is connected 255 = Automatic station entry without entry block	0, 1-4, 255	0
51	Address of station entry signal when LNCV 50 = 255	1-2048	0
52	Solenoid address for function "all trains use passing loop"	1-2048	0
53	Station control when all station tracks are occupied 0 = when all tracks are occupied, wait before the station 1 = when all tracks are occupied, use passing loop	0, 1	0
55	Block number of this module's exit block	1-4	0

CV	Description	Value range	Default value
56	Sequence for station departure 0 = Cyclic order track after track 1 = Random order	0, 1	0
57	Solenoid address and status (red) of the station entry signal after traffic on passing loop (calculation as for LNCV 12)	10-20483	0
58	Solenoid address and status (green) of the exit signal of the block before the entry block after traffic via the passing loop (calculation as for LNCV 12)	10-20483	0
59	Solenoid address for immediate station departure	1-2048	0
LNCVs 60 – 69 Station data for station track 1			
60	Address for reporting occupied report station track 1	0-4095	0
61 - 69	Address list for driving track 1 0 = LNCV not used, no automatic arrival and departure 1-9999 = locomotive address (only LISSY/MARCo locos) 19999 = locomotives without LISSY/MARCo transmitter 20000 = all locomotives 20001 – 20015 = train categories (only LISSY/MARCo locos)	0-9999, 19999- 20015	0
70 - 79	Station data for station track 2	see above	0
80 - 89	Station data for station track 3	see above	0
90 - 99	Station data for station track 4	see above	0
100 - 109	Station data for station track 5	see above	0
110 - 119	Station data for station track 6	see above	0
120 - 129	Station data for station track 7	see above	0
130 - 139	Station data for station track 8	see above	0
140 - 149	Station data for station track 9	see above	0
150 - 159	Station data for station track 10	see above	0
160 - 169	Station data for station track 11	see above	0
170 - 179	Station data for station track 12	see above	0
180 - 189	Station data for passing loop	see above	0
LNCVs 200 – 219 Route for station track 1			
200	1. Switching address and route status to/from track 1 Address x 10 + 0 = switching address red Address x 10 + 1 = switching address green (calculation see also LNCV 12)	10-20483	0
201	2. Switching address and route status to/from track 1	10-20483	0
202	3. Switching address and route status to/from track 1	10-20483	0
203	4. Switching address and route status to/from track 1	10-20483	0
204	5. Switching address and route status to/from track 1	10-20483	0
205	6. Switching address and route status to/from track 1	10-20483	0
206	7. Switching address and route status to/from track 1	10-20483	0

CV	Description	Value range	Default value
207	8. Switching address and route status to/from track 1	10-20483	0
208	9. Switching address and route status to/from track 1	10-20483	0
209	10. Switching address and route status to/from track 1	10-20483	0
210	11. Switching address and route status to/from track 1	10-20483	0
211	12. Switching address and route status to/from track 1	10-20483	0
212	13. Switching address and route status to/from track 1	10-20483	0
213	14. Switching address and route status to/from track 1	10-20483	0
214	15. Switching address and route status to/from track 1	10-20483	0
215	16. Switching address and route status to/from track 1	10-20483	0
216	17. Switching address and route status to/from track 1	10-20483	0
217	18. Switching address and route status to/from track 1	10-20483	0
218	19. Switching address and route status to/from track 1	10-20483	0
219	20. Switching address and route status to/from track 1	10-20483	0
220 - 239	Route for station track 2	see above	0
240 - 259	Route for station track 3	see above	0
260 - 279	Route for station track 4	see above	0
280 - 299	Route for station track 5	see above	0
300 - 319	Route for station track 6	see above	0
320 - 339	Route for station track 7	see above	0
340 - 359	Route for station track 8	see above	0
360 - 379	Route for station track 9	see above	0
380 - 399	Route for station track 10	see above	0
400 - 419	Route for station track 11	see above	0
420 - 439	Route for station track 12	see above	0
440 - 459	Route for passing loop	see above	0

5. Examples

5.1 10-track Station with Passing Loop, also Entry and Exit Block



In the example, the braking sections always operate with the DCC brake generator. LISSY/MARCo Information is not processed.

Programming:

Module 1: Station entry and Tracks 8 – 10

LNCV	Value	Description
0	1	Module address 1
8	arbitrary	Solenoid address for deleting station track status
10	0	Always DCC brake generator
11	11	Address of the exit block exit signal
12	0	No Previous block exit signal
13	0	No Previous block entry signal
14	11	Exit block feedback address
15	0	No Previous block feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	0	Always DCC brake generator
21	8	Address of the exit block 8 exit signal
22	110	Exit signal blocking to Stop (red)
23	0	No Previous block entry signal
24	8	Block 8 feedback address
25	11	Previous block Feedback address
26	0	Do not send LISSY/MARCo information

LNCV	Value	Description
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation for track 8
30	0	Always DCC brake generator
31	9	Address of the exit block 9 exit signal
32	110	Previous block Exit signal to Stop (red)
33	0	Previous block Entry signal when green
34	9	Block 9 feedback address
35	11	Previous block Feedback address
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation for track 9
40	0	Always DCC brake generator
41	10	Address of the exit block 10 exit signal
42	110	Previous block Exit signal to Stop (red)
43	0	Previous block Entry signal when green
44	10	Block 10 feedback address
45	11	Previous block Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation for track 10
50	1	Entry Block connected to terminals 3-5 (Block No. 1)
51	0	Value 0 because entry block is present
52	arbitrary	Solenoid address for function "all trains use Passing Loop"
53	1	Station control when all station tracks are occupied 0 = when all tracks are occupied, wait before the station 1 = when all tracks are occupied, use passing loop
60	1	Occupied report Track 1
61	20000	All locomotives can use Track 1
70	2	Occupied report Track 2
71	20000	All locomotives can use Track 2
80	3	Occupied report Track 3
81	20000	All locomotives can use Track 3
90	4	Occupied report Track 4
91	20000	All locomotives can use Track 4
100	5	Occupied report Track 5
101	20000	All locomotives can use Track 5
110	6	Occupied report Track 6
111	20000	All locomotives can use Track 6
120	7	Occupied report Track 7

LNCV	Value	Description
121	20000	All locomotives can use Track 7
130	8	Occupied report Track 8
131	20000	All locomotives can use Track 8
140	9	Occupied report Track 9
141	20000	All locomotives can use Track 9
150	10	Occupied report Track 10
151	20000	All locomotives can use Track 10
180	13	Occupied report passing loop
181	20000	All locomotives can use the passing loop
200	210	Entry turnout to round (red)
201	111	Station entry signal green
220	211	Entry turnout 21 to straight (green)
221	220	Entry turnout 22 to round (red)
222	111	Station entry signal green
240	211	Entry turnout 21 to straight (green)
241	221	Entry turnout 22 to straight (green)
242	230	Entry turnout 23 to round (red)
243	111	Station entry signal green
260	211	Entry turnout 21 to straight (green)
261	221	Entry turnout 22 to straight (green)
262	231	Entry turnout 23 to straight (green)
263	240	Entry turnout 23 to round (red)
264	111	Station entry signal green
280	211	Entry turnout 21 to straight (green)
281	221	Entry turnout 22 to straight (green)
282	231	Entry turnout 23 to straight (green)
283	241	Entry turnout 24 to straight (green)
284	250	Entry turnout 25 to round (red)
285	111	Station entry signal green
300	211	Entry turnout 21 to straight (green)
301	221	Entry turnout 22 to straight (green)
302	231	Entry turnout 23 to straight (green)
303	241	Entry turnout 24 to straight (green)
304	251	Entry turnout 25 to straight (green)
305	260	Entry turnout 26 to round (red)
306	111	Station entry signal green
320	211	Entry turnout 21 to straight (green)
321	221	Entry turnout 22 to straight (green)

LNCV	Value	Description
322	231	Entry turnout 23 to straight (green)
323	241	Entry turnout 24 to straight (green)
324	251	Entry turnout 25 to straight (green)
325	261	Entry turnout 26 to straight (green)
326	270	Entry turnout 27 to round (red)
327	111	Station entry signal green
340	211	Entry turnout 21 to straight (green)
341	221	Entry turnout 22 to straight (green)
342	231	Entry turnout 23 to straight (green)
343	241	Entry turnout 24 to straight (green)
344	251	Entry turnout 25 to straight (green)
345	261	Entry turnout 26 to straight (green)
346	271	Entry turnout 27 to straight (green)
347	280	Entry turnout 28 to round (red)
368	111	Station entry signal green
360	211	Entry turnout 21 to straight (green)
361	221	Entry turnout 22 to straight (green)
362	231	Entry turnout 23 to straight (green)
363	241	Entry turnout 24 to straight (green)
364	251	Entry turnout 25 to straight (green)
365	261	Entry turnout 26 to straight (green)
366	271	Entry turnout 27 to straight (green)
367	281	Entry turnout 28 to straight (green)
368	290	Entry turnout 29 to round (red)
369	111	Station entry signal green
380	211	Entry turnout 21 to straight (green)
381	221	Entry turnout 22 to straight (green)
382	231	Entry turnout 23 to straight (green)
383	241	Entry turnout 24 to straight (green)
384	251	Entry turnout 25 to straight (green)
385	261	Entry turnout 26 to straight (green)
386	271	Entry turnout 27 to straight (green)
387	281	Entry turnout 28 to straight (green)
388	291	Entry turnout 29 to straight (green)
389	300	Entry turnout 30 to round (red)
390	111	Station entry signal green
440	211	Entry turnout 21 to straight (green)
441	221	Entry turnout 22 to straight (green)

LNCV	Value	Description
442	231	Entry turnout 23 to straight (green)
443	241	Entry turnout 24 to straight (green)
444	251	Entry turnout 25 to straight (green)
445	261	Entry turnout 26 to straight (green)
446	271	Entry turnout 27 to straight (green)
447	281	Entry turnout 28 to straight (green)
448	291	Entry turnout 29 to straight (green)
449	300	Entry turnout 30 to round (red)
450	111	Station entry signal green

Module 2: Station departure and Tracks 5 – 7

LNCV	Value	Description
0	2	Module address 2
8	arbitrary	Solenoid address for deleting station track status
10	0	Always DCC brake generator
11	12	Address of the exit block exit signal
12	0	No Previous block exit signal
13	0	No Previous block entry signal
14	12	Exit block feedback address
15	0	No Previous block feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit track
20	0	Always DCC brake generator
21	5	Address of the exit block 5 exit signal
22	110	Exit signal blocking to Stop (red)
23	0	No Previous block entry signal
24	10	Block 5 feedback address
25	11	Previous block Feedback address
26	0	Do not send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of exit track
30	0	Always DCC brake generator
31	6	Address of the exit block 6 exit signal
32	110	Previous block Exit signal to Stop (red)
33	0	Previous block Entry signal when green
34	6	Block 6 feedback address
35	11	Previous block Feedback address

LNCV	Value	Description
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of exit block
40	0	Always DCC brake generator
41	7	Address of the exit block 7 exit signal
42	110	Previous block Exit signal to Stop (red)
43	0	Previous block Entry signal when green
44	7	Block 7 feedback address
45	11	Previous block Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of exit block
55	1	Station exit block connected to terminal 3-5
56	1	Random order for departing station
57	110	After departure from passing loop, Entry signal to red
58	0	No Previous block of station entry, so no signal green
59	Arbitrary	Solenoid address green, immediate station exit
60	1	Occupied report Track 1
61	20000	All locomotives can use Track 1
70	2	Occupied report Track 2
71	20000	All locomotives can use Track 2
80	3	Occupied report Track 3
81	20000	All locomotives can use Track 3
90	4	Occupied report Track 4
91	20000	All locomotives can use Track 4
100	5	Occupied report Track 5
101	20000	All locomotives can use Track 5
110	6	Occupied report Track 6
111	20000	All locomotives can use Track 6
120	7	Occupied report Track 7
121	20000	All locomotives can use Track 7
130	8	Occupied report Track 8
131	20000	All locomotives can use Track 8
140	9	Occupied report Track 9
141	20000	All locomotives can use Track 9
150	10	Occupied report Track 10
151	20000	All locomotives can use Track 10
180	13	Occupied report passing loop

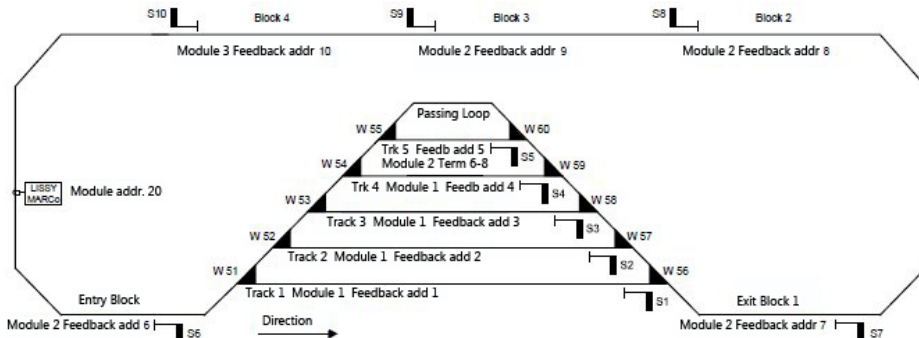
LNCV	Value	Description
181	20000	All locomotives can use the passing loop
200	310	Exit turnout 31 to round (red)
201	11	Track 1 exit signal to go (green)
220	311	Exit turnout 31 to straight (green)
221	320	Exit turnout 32 to round (red)
239	21	Track 2 exit signal to go (green)
240	311	Exit turnout 31 to straight (green)
241	321	Exit turnout 32 to straight (green)
242	330	Exit turnout 33 to round (red)
259	31	Track 3 exit signal to go (green)
260	311	Exit turnout 31 to straight (green)
261	321	Exit turnout 32 to straight (green)
262	331	Exit turnout 33 to straight (green)
263	340	Exit turnout 34 to round (red)
279	41	Track 4 exit signal to go (green)
280	311	Exit turnout 31 to straight (green)
281	321	Exit turnout 32 to straight (green)
282	331	Exit turnout 33 to straight (green)
283	341	Exit turnout 34 to straight (green)
284	350	Exit turnout 35 to round (red)
299	51	Track 5 exit signal to go (green)
300	311	Exit turnout 31 to straight (green)
301	321	Exit turnout 32 to straight (green)
302	331	Exit turnout 33 to straight (green)
303	341	Exit turnout 34 to straight (green)
304	351	Exit turnout 35 to straight (green)
305	360	Exit turnout 36 to round (red)
319	61	Track 6 exit signal to go (green)
320	311	Exit turnout 31 to straight (green)
321	321	Exit turnout 32 to straight (green)
322	331	Exit turnout 33 to straight (green)
323	341	Exit turnout 34 to straight (green)
324	351	Exit turnout 35 to straight (green)
325	361	Exit turnout 36 to straight (green)
326	370	Exit turnout 37 to round (red)
339	71	Track 7 exit signal to go (green)
340	311	Exit turnout 31 to straight (green)
341	321	Exit turnout 32 to straight (green)

LNCV	Value	Description
342	331	Exit turnout 33 to straight (green)
343	341	Exit turnout 34 to straight (green)
344	351	Exit turnout 35 to straight (green)
345	361	Exit turnout 36 to straight (green)
346	371	Exit turnout 37 to straight (green)
347	380	Exit turnout 38 to round (red)
359	81	Track 8 exit signal to go (green)
360	311	Exit turnout 31 to straight (green)
361	321	Exit turnout 32 to straight (green)
362	331	Exit turnout 33 to straight (green)
363	341	Exit turnout 34 to straight (green)
364	351	Exit turnout 35 to straight (green)
365	361	Exit turnout 36 to straight (green)
366	371	Exit turnout 37 to straight (green)
367	381	Exit turnout 38 to straight (green)
368	390	Exit turnout 39 to round (red)
379	91	Track 9 exit signal to go (green)
380	311	Exit turnout 31 to straight (green)
381	321	Exit turnout 32 to straight (green)
382	331	Exit turnout 33 to straight (green)
383	341	Exit turnout 34 to straight (green)
384	351	Exit turnout 35 to straight (green)
385	361	Exit turnout 36 to straight (green)
386	371	Exit turnout 37 to straight (green)
387	381	Exit turnout 38 to straight (green)
388	391	Exit turnout 39 to straight (green)
389	400	Exit turnout 40 to round (red)
399	101	Track 9 exit signal to go (green)
440	311	Exit turnout 31 to straight (green)
441	321	Exit turnout 32 to straight (green)
442	331	Exit turnout 33 to straight (green)
443	341	Exit turnout 34 to straight (green)
444	351	Exit turnout 35 to straight (green)
445	361	Exit turnout 36 to straight (green)
446	371	Exit turnout 37 to straight (green)
447	381	Exit turnout 38 to straight (green)
448	391	Exit turnout 39 to straight (green)
449	401	Exit turnout 40 to straight (green)

Module 3: Station departure for Tracks 1 – 4

LNCV	Value	Description
0	3	Module address 3
10	0	Always DCC brake generator
11	1	Address of the exit block 1 exit signal
12	110	Exit signal Previous block to Stop (red)
13	0	No Previous block entry signal
14	1	Block 1 feedback address
15	11	Previous block Feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	0	Always DCC brake generator
21	2	Address of the exit block 2 exit signal
22	110	Exit signal blocking to Stop (red)
23	0	No Previous block entry signal
24	2	Block 2 feedback address
25	11	Previous block Feedback address
26	0	Do not send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of exit block
30	0	Always DCC brake generator
31	3	Address of the exit block 3 exit signal
32	110	Previous block Exit signal to Stop (red)
33	0	Previous block Entry signal when green
34	3	Block 3 feedback address
35	11	Previous block Feedback address
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of exit block
40	0	Always DCC brake generator
41	4	Address of the exit block 4 exit signal
42	110	Previous block Exit signal to Stop (red)
43	0	Previous block Entry signal when green
44	4	Block 4 feedback address
45	11	Previous block Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of exit block

5.2 5-track Station with additional Block sections, also Entry and Exit Block with LISSY/MARCo Information



In the example, the brake sections work in mixed mode with the DCC brake generator or for Locomotives with LISSY/MARCo transmitters with the speed steps. The trains of category 2 are to use only tracks 1 and 2. Locomotives without LISSY/MARCo transmitter are to use the passing loop.

Programming:

Module 1: Station Tracks 1 – 4

LNCV	Value	Description
0	1	Module address 1
10	255	Always LISSY/MARCo addresses
11	1	Address of the exit block 1 exit signal
12	60	Previous block Exit signal to Stop (red)
13	101	Previous block entry signal to green
14	1	Block 1 feedback address
15	6	Previous block Feedback address
16	1	Send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of track 1
20	255	Always LISSY/MARCo addresses
21	2	Address of the exit block 2 exit signal
22	60	Previous block Exit signal to Stop (red)
23	101	No Previous block entry signal
24	2	Block 2 feedback address
25	6	Previous block Feedback address
26	1	Send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of track 2

LNCV	Value	Description
30	255	Always LISSY/MARCo addresses
31	3	Address of the exit block 3 exit signal
32	60	Previous block Exit signal to Stop (red)
33	101	Previous block Entry signal when green
34	3	Block 3 feedback address
35	6	Previous block Feedback address
36	1	Send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of track 3
40	255	Always LISSY/MARCo addresses
41	4	Address of the exit block 4 exit signal
42	60	Previous block Exit signal to Stop (red)
43	101	Previous block Entry signal when green
44	4	Block 4 feedback address
45	6	Previous block Feedback address
46	1	Send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of track 4

Module 2: Station track 5 and Blocks 1 - 3 autom. Exit block on terminals 3-5, Track 5 on terminals 6-8, Blocks 2 and 3 on remaining terminals 9-14

LNCV	Value	Description
0	2	Module address 2
8	arbitrary	Solenoid address for deleting station track status
10	255	Always LISSY/MARCo addresses
11	7	Address of the exit block 1 exit signal
12	0	No Previous block Exit signal
13	0	No Previous block entry signal
14	7	Exit block feedback and LISSY address
15	0	Previous block Feedback and LISSY address
16	1	Send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	255	Always LISSY/MARCo addresses
21	5	Address of the exit block 5 exit signal
22	60	Previous block Exit signal to Stop (red)
23	101	No Previous block entry signal
24	5	Block 5 feedback address

LNCV	Value	Description
25	6	Previous block Feedback address
26	1	Send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of exit block
30	255	Always LISSY/MARCo addresses
31	8	Address of the exit block 2 exit signal
32	70	Previous block Exit signal to Stop (red)
33	0	No Previous block Entry signal
34	8	Block 2 feedback address
35	0	Previous block Feedback address
36	1	Send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of exit block
40	255	Always LISSY/MARCo addresses
41	9	Address of the exit block 3 exit signal
42	80	Previous block Exit signal to Stop (red)
43	71	Previous block Entry signal when green
44	9	Block 3 feedback address
45	8	Previous block Feedback address
46	1	Send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of exit block
55	1	Station exit block connected to terminal 3-5 (Block No. 1)
56	1	Random order for departing station
57	60	After running via passing loop, Entry signal to red
58	101	After running via passing loop entry, so no signal green
59	Arbitrary	Solenoid address green, immediate station departure
60	1	Occupied report Track 1
61	20000	All locomotives can use Track 1
70	2	Occupied report Track 2
71	20000	All locomotives can use Track 2
80	3	Occupied report Track 3
81	20000	All locomotives can use Track 3
90	4	Occupied report Track 4
91	20000	All locomotives can use Track 4
100	5	Occupied report Track 5
101	20000	All locomotives can use Track 5
180	11	Occupied report passing loop

LNCV	Value	Description
181	19999	All locomotives can use the passing loop
200	560	Exit turnout 56 to round (red)
201	11	Track 1 exit signal to go (green)
220	561	Exit turnout 56 to straight (green)
221	570	Exit turnout 57 to round (red)
239	21	Track 2 exit signal to go (green)
240	561	Exit turnout 56 to straight (green)
241	571	Exit turnout 57 to straight (green)
242	580	Exit turnout 58 to round (red)
259	31	Track 3 exit signal to go (green)
260	561	Exit turnout 56 to straight (green)
261	571	Exit turnout 57 to straight (green)
262	581	Exit turnout 58 to straight (green)
263	590	Exit turnout 59 to round (red)
279	41	Track 4 exit signal to go (green)
280	561	Exit turnout 56 to straight (green)
281	571	Exit turnout 57 to straight (green)
282	581	Exit turnout 58 to straight (green)
283	591	Exit turnout 59 to straight (green)
284	600	Exit turnout 60 to round (red)
299	51	Track 5 exit signal to go (green)
440	561	Exit turnout 31 to straight (green)
441	571	Exit turnout 32 to straight (green)
442	581	Exit turnout 33 to straight (green)
443	591	Exit turnout 34 to straight (green)
444	601	Exit turnout 35 to straight (green)
445	61	Entry block exit signal to go (green)

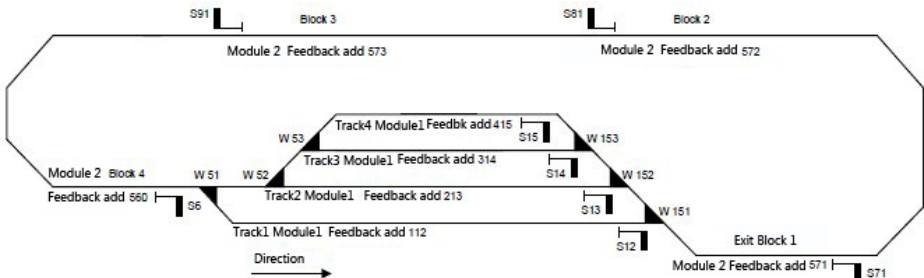
Module 3: Station entry block with automatic Entry, and Block 4 entry block on terminals 3-5, Block 4 on terminals 6-8

LNCV	Value	Description
0	3	Module address 3
8	arbitrary	Solenoid address for deleting station track status
10	30	Time for reporting the LISSY/MARCo address feedback to arriving in the entry block in 0.5 sec intervals (Value 30 = 15 Sec)
11	6	Address of the exit block 1 exit signal
12	100	Previous block Exit signal to Stop (red)
13	91	Previous block entry signal to green
14	6	Block 1 feedback address

LNCV	Value	Description
15	20	Previous block Feedback address
16	1	Send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	255	Always LISSY/MARCo addresses
21	10	Address of the exit block 4 exit signal
22	90	Block 3 Exit signal to green (previous block)
23	81	Entry signal block 3 green (previous block)
24	10	Block 4 feedback and LISSY/MARCo address
25	9	Previous block Feedback and LISSY/MARCo address
26	1	Send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of track 2
50	1	Entry block on terminals 3-5 (block No. 1)
51	0	Value 0 because an entry block is present
52	arbitrary	If green then all trains use the passing loop
53	0	When all tracks are occupied wait in the entry block till a track is free
60	1	Track occupied message for station track 1
61	20000	All locomotives can use track 1
62	20002	Locomotives with category 2 on track 1
70	2	Track occupied message for station track 2
71	20000	All locomotives can use track 2
72	20002	Locomotives with category 2 on track 2
80	3	Track occupied message for station track 3
81	20000	All locomotives can use track 3
90	4	Track occupied message for station track 4
91	20000	All locomotives can use track 4
100	5	Track occupied message for station track 5
101	20000	All locomotives can use track 5
180	11	Track occupied message for passing loop
181	19999	Locomotives without LISSY/MARCo transmitter always use passing loop
200	510	Exit turnout 51 to round (red)
201	61	Exit signal for entry block to go (green)
220	511	Exit turnout 51 to straight (green)
221	520	Exit turnout 52 to round (red)
239	61	Exit signal for entry block to go (green)
240	511	Exit turnout 51 to straight (green)
241	521	Exit turnout 52 to straight (green)

LNCV	Value	Description
242	530	Exit turnout 53 to round (red)
259	61	Exit signal for entry block to go (green)
260	511	Exit turnout 51 to straight (green)
261	521	Exit turnout 52 to straight (green)
262	531	Exit turnout 53 to straight (green)
263	540	Exit turnout 54 to round (red)
279	61	Exit signal for entry block to go (green)
280	511	Exit turnout 51 to straight (green)
281	521	Exit turnout 52 to straight (green)
282	531	Exit turnout 53 to straight (green)
283	541	Exit turnout 54 to straight (green)
284	550	Exit turnout 55 to round (red)
299	61	Exit signal for entry block to go (green)
440	511	Exit turnout 51 to straight (green)
441	521	Exit turnout 52 to straight (green)
442	531	Exit turnout 53 to straight (green)
443	541	Exit turnout 54 to straight (green)
444	551	Exit turnout 55 to straight (green)

5.3 4-track Station with additional Block sections with vacant indication of turnouts, signals and feedback addresses



Programming:

Module 1: Station tracks 1 - 4 with automatic entry only, DCC Brake generator.

LNCV	Value	Description
0	1	Module address 1
8	arbitrary	Solenoid address for deleting station track status
10	0	Always DCC brake generator
11	12	Address of the track 1 exit signal
12	60	Block 4 Exit signal to Stop (red)

LNCV	Value	Description
13	911	Block 4 entry signal to green
14	112	Track 1 feedback address
15	560	Block 4 Feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	0	Always DCC brake generator
21	13	Address of the exit block 2 exit signal
22	60	Block 4 Exit signal to red
23	911	Block 4 entry signal to green
24	213	Track 2 feedback address
25	560	Block 4 Feedback address
26	0	Do not send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of exit block
30	0	Always DCC brake generator
31	14	Address of the exit block 3 exit signal
32	60	Block 4 Exit signal to red
33	911	Block 4 feedback address
34	314	Block 3 feedback address
35	560	Block 4 Feedback address
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of exit block
40	0	Always DCC brake generator
41	15	Address of the exit block 4 exit signal
42	60	Block 4 Exit signal to red
43	911	Block 4 Entry signal green (previous block)
44	415	Track 4 feedback address
45	560	Block 4 Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of exit block
50	255	Automatic station entry without entry block
51	6	Address of the entry signal to the station
60	1	Track occupied message for station track 1
61	20000	All locomotives can use track 1
70	2	Track occupied message for station track 2

LNCV	Value	Description
71	20000	All locomotives can use track 2
80	3	Track occupied message for station track 3
81	20000	All locomotives can use track 3
90	4	Track occupied message for station track 4
91	20000	All locomotives can use track 4
200	510	Exit turnout 51 to round (red)
201	61	Exit signal for block 4 to green
220	511	Exit turnout 51 to straight (green)
221	521	Exit turnout 52 to straight (green)
222	61	Exit signal for block 4 to green
240	511	Exit turnout 51 to straight (green)
241	520	Exit turnout 52 to round (red)
242	530	Exit turnout 53 to round (red)
243	61	Exit signal for block 4 to green
260	511	Exit turnout 51 to straight (green)
261	520	Exit turnout 52 to round (red)
262	531	Exit turnout 53 to straight (green)
263	62	Exit signal for block 4 to green

Module 2: Blocks 1 - 4 with automatic station exit block on terminals 3-5

LNCV	Value	Description
0	2	Module address 2
8	arbitrary	Solenoid address for deleting station track status
10	0	Always DCC brake generator
11	71	Address of the exit block 1 exit signal
12	0	No previous block Exit signal
13	0	No previous block entry signal
14	571	Exit block feedback address
15	0	Previous block Feedback address
16	0	Do not send LISSY/MARCo information
17	6	3 second delay at green exit signal
18	arbitrary	Solenoid address to switch off automation of exit block
20	0	Always DCC brake generator
21	81	Address of the exit block 2 exit signal
22	710	Block 1 Exit signal to green
23	0	No previous block entry signal
24	572	Block 2 feedback and LISSY/MARCo address
25	571	Previous block Feedback address

LNCV	Value	Description
26	0	Do not send LISSY/MARCo information
27	6	3 second delay at green exit signal
28	arbitrary	Solenoid address to switch off automation of track 2
30	0	Always DCC brake generator
31	91	Address of the exit block 3 exit signal
32	810	Block 2 Exit signal to red
33	711	Entry block 2 entry signal to green
34	573	Block 3 feedback address
35	572	Block 2 Feedback address
36	0	Do not send LISSY/MARCo information
37	6	3 second delay at green exit signal
38	arbitrary	Solenoid address to switch off automation of track 3
40	0	Always DCC brake generator
41	6	Address of the exit block 4 exit signal
42	910	Block 4 Exit signal to red
43	811	Block 3 entry signal to green
44	560	Block 4 feedback and LISSY/MARCo address
45	573	Block 3 Feedback address
46	0	Do not send LISSY/MARCo information
47	6	3 second delay at green exit signal
48	arbitrary	Solenoid address to switch off automation of track 4
55	1	Entry block on terminals 3-5 (block No. 1)
56	0	Value 0 because an entry block is present
59	arbitrary	Solenoid address green for immediate departure
60	1	Track occupied message for station track 1
61	20000	All locomotives can use track 1
70	2	Track occupied message for station track 2
71	20000	All locomotives can use track 2
80	3	Track occupied message for station track 3
81	20000	All locomotives can use track 3
90	4	Track occupied message for station track 4
91	20000	All locomotives can use track 4
200	1510	Exit turnout 151 to round (red)
219	121	Exit signal for block 1 to go (green)
220	1511	Exit turnout 151 to straight (green)
221	1520	Exit turnout 152 to round (red)
239	131	Exit signal for block 2 to go (green)
240	1511	Exit turnout 151 to straight (green)

LNCV	Value	Description
241	1521	Exit turnout 152 to straight (green)
242	1530	Exit turnout 153 to round (red)
259	141	Exit signal for block 3 to go (green)
260	1511	Exit turnout 151 to straight (green)
261	1521	Exit turnout 152 to straight (green)
262	1531	Exit turnout 153 to straight (green)
263	1540	Exit turnout 154 to round (red)
279	151	Exit signal for block 4 to go (green)

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