![Uhlenbrock logo] **Uhlenbrock**

Universal Control
For DCC Systems with DCC Brake Generator

68 720

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1. General

This Manual deals with the simple control of block sections and stations. Additional possibilities of the Universal Control are described in the Technical Manual for the Universal Control, which is available for download from the Internet site www.uhlenbrock.de in pdf format. Among these additional options are, for example, the integration of LISSY or MARCo data into the control, as well as the programming of mixed use of a module. Further details can be found in the technical manual. In the event that an Internet connection is not available, please contact us.

1.1 Description

The digital Universal Control can be employed for many automatic control sequences on a model railway layout and is connected to the digital center via the LocoNet. The control can monitor 4 track sections and brake and stop one train per track section depending on the signal. Every track section is controlled via 3 terminals. One terminal is used per driving section, one for the braking section, and one for the stop section. All sections must be isolated from the rest of the layout.

The Universal Control 68720 operates only in pure DCC Data format and can be expanded with other Universal Controls 68720 as wished. With the expansion it is possible to control 12 track stations with additional passing loop, or control Block section with as many Blocks as desired. In a Universal Control there are 4 occupancy detectors, 4 feedback units, a DCC Brake generator for the 4 track sections, and also an integrated route buffer for up to 13 routes with 20 switching instructions. All routes needed for the station control are saved in the module as switching sequences of solenoids and are activated by the module. No additional devices are required for activating the routes.

1.2 Technical Data

Permissible data formats on the track: DCC data format
Maximum total driving current: 3 A
Maximum current load on the Brake generator on all outputs: 1.6 A
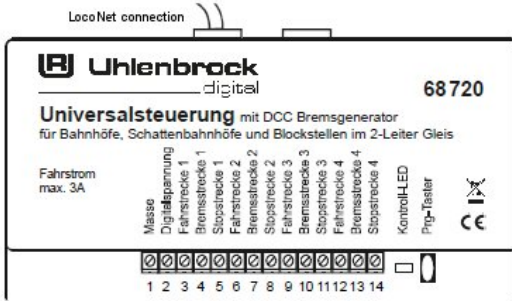Dimensions: 104 x 58 x 33 mm

2. Putting into Operation

2.1 The Connections

The front of the module has a 14-pole screw terminal strip for the Digital power and the track connections. On the back are two LocoNet sockets which are used to connect the module to the digital center.
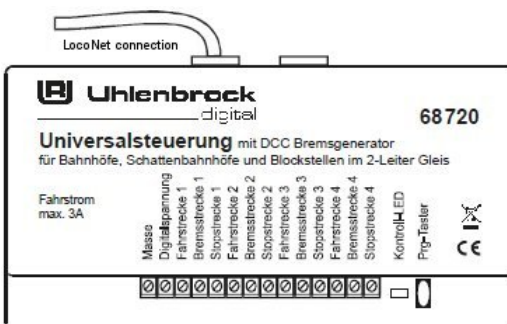
2.2 Connection assignment

Screw terminal list

1 Chassis (brown) track power
2 Digital power (red) track power
3 Running section track1
4 Brake section track1
5 Stop section track1
6 Running section track2
7 Brake section track2

8 Stop section track2
9 Running section track3
10 Brake section track3
11 Stop section track3
12 Running section track4
13 Brake section track4
14 Stop section track4

Connection socket Rear side
2x LocoNet

2.3 Connecting digital power and a track section

In the example the track section is connected to terminals 3 - 5 of the terminal strip. The track power from the digital center or booster is connected to terminals 1 and 2.
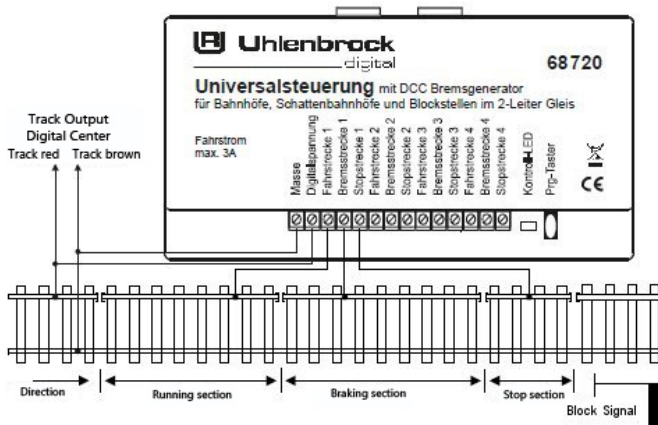
The running section must be long enough so that it can accommodate the longest train. The braking section must be long enough for the train with the longest braking distance. The optional stop section is without power when the brake generator (Signal Halt), so that trains which may slip through are always safely stopped.

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2.4 Connecting to the Center via the LocoNet

The Universal Control can be connected to all Intelliboxes or other LocoNet centers with enclosed LocoNet cable.
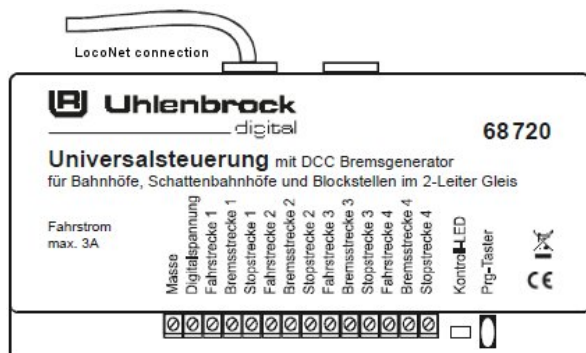
The two LocoNet sockets on the Universal Control are identical and can be used for connecting the center or further LocoNet devices.

Important: Set your Digital center to DCC for both your locomotive and turnout data format.

2.5 Setting the Intellibox to pure DCC mode

1. Start the Intellibox
2. Basic Settings – Reset Configuration
3. Basic Settings – Special option 25 = 1 and Special option 907 = 4
4. Basic Settings – Locomotive data format = DCC
5. Basic Settings – Turnout data format - overall Data format = DCC
6. Basic Settings – Reset Turnout data format
7. Basic Settings – Reset locomotive data format
8. Disconnect the Intellibox from the transform and wait 10 min
9. Start the Intellibox – Now in pure DCC operation

3. The Operating Modes and their Programming

3.1 Configuring Operating Modes LocoNet-CV Programming

In order to utilise the various possibilities the Universal Control offers, LocoNet-CVs must be programmed. These possibilities and their programming are outlined in the Technical Operating Manual for the Universal Control, which can be found on the Internet site www.uhlenbrock.de in pdf format to download.

3.2 Configuring via key Programming

The module offers the following control options for simple key programming:
- Station with automatic entry with or without passing loop
- Station with automatic exit with or without passing loop
- Track extension for a station
- Block section control

Note: The automatic entry and automatic exit can not be used in the same module. For the control of a station with automatic entry and exit two Universal Controls are usually required.

Commencing Programming

After the module that is to be programmed is connected to the LocoNet it is placed into programming mode by pressing the programming key on the module. The Control-LED blinks repetitively 1x short with a long pause. After each of the following programming steps the LED blinks 1x more. At the end of the programming the LED turns off.

When using key programming each programming step is entered as a solenoid address by activating that address <u>1 time</u> from the digital center or other entry device that can switch solenoid addresses (IB-Control, IB-Switch, DAISY hand controller). The specific switching direction (red or green) is not relevant in this case. The module evaluates these solenoid address as programming values.

The following programming steps are entered solenoid address:

1. Solenoid address = Operation Mode
2. Solenoid address = Module address
3. Solenoid address = Number of tracks
4. Solenoid address = Feedback address
5. Solenoid address = Signal address
6. Solenoid address = Solenoid address (only operating mode of station control)

Step 1 to 5 must always be entered. Step 6 only for operating modes for station control because routes can only be switched in these modes.

Note: Operate the relevant solenoid address only <u>once</u>, because after each entry the module jumps directly to the next programming step. After a possible incorrect entry, programming can be aborted by pressing the programming key on the module. The module exits programming (LED turns off). Now you can start again.

The meaning of the above terms for programming steps 1-6:

Operating Mode: Solenoid addresses 1-6 determine in which operating mode the module is to work.

Module address: Each module must be able to be individually addressed for eventual LocoNet programming. For this it assigned a module address which must be unique in the system (1-65534).

Number of Tracks: The number of tracks that are to be controlled by this module is entered here. For example, operating modes, block control and station expansion 1-4 track,. in the operating modus, station control 1-12 tracks.

Feedback address: A feedback address is required, for example, to automatically have a "red indication" on a track plan, or other automatic operations in devices that react accordingly (e.g. switching routes in an Intellibox II or IB-Switch). The address entered here is the feedback address for track 1 of the module. The additional track connections are automatically assigned consecutive feedback addresses according to the number of tracks entered.

Signal address: The signal address is the one that switches the exit signal of the first track section. The address must be entered even if no signal is installed at the actual location on the layout (e.g. shadow station). The address entered here is that for track 1 of the module. The other tracks are automatically assigned the subsequent addresses according to the number of tracks entered.

Turnout address (only in station control mode)**:** In station control with automatic entry mode the turnout address for entering track 1 is entered here. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered.

In station control with automatic departure control the turnout for exiting track 1 is entered here. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered.

Note: The switching position for the turnout is programmed into the route in order to access this track for entry or departure, it must be switched to branch (red). This applies to the entry as well as the exit turnout. The remaining turnouts in the route are switched to straight (green). If the station control has a passing loop then all relevant turnouts are switched to straight (green).

TIP: If the actual position of a turnout is not switched in the correct direction then swap the wiring for the relevant turnout.

3.2.1 Operating Mode 1: Station Control with automatic entry
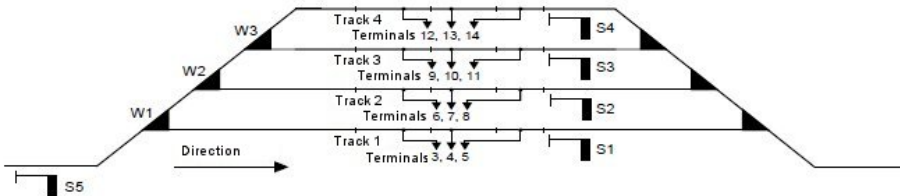
Press the programming key. The control LED gives repeated short blinks.
Now 6 solenoid addresses must be entered.
In Step 1 (Operation Mode) 2 is entered.
The control LED gives repeated 2x short blinks.
In Step 2 (Module address) a random value between 1 and 65534 is entered.
The control LED gives repeated 3x short blinks.
In Step 3 (Number of tracks) the number of all the station tracks is entered. The first 4 tracks of the station are connected to this module's terminal strip.
The control LED gives repeated 4x short blinks.
In Step 4 (Feedback addresses) the address to be used for station track 1 is entered. The additional addresses are automatically assigned the subsequent turnout according to the number of tracks entered.
The control LED gives repeated 5x short blinks.
In Step 5 (Signal address) the address or the exit signal for track 1 of the station is entered here. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered. The station's entry signal is assigned the address for track 1 plus the number of tracks (e.g. 4 track station signal address Track 1 is 1, signal address of the entry signal is 1 + 4 = 5).
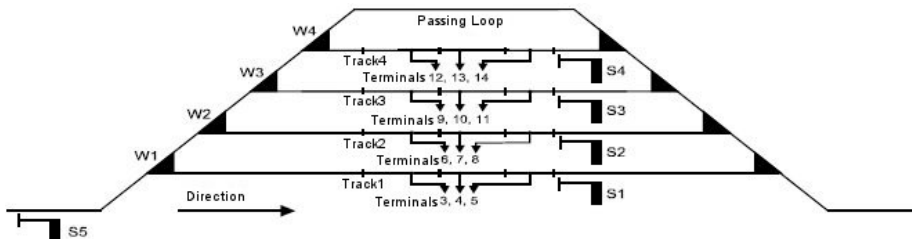The control LED gives repeated 6x short blinks.
In Step 6 (Turnout address) the address which corresponds to the entry turnout for track 1 is entered. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered.
The control LED turns off.

The entry order always starts with track 1 and then increments.
If all station tracks are occupied the entry signal is switched to stop (red).

3.2.2 Operating Mode 2: Station Control with automatic entry and passing loop

Press the programming key. The control LED gives repeated short blinks.
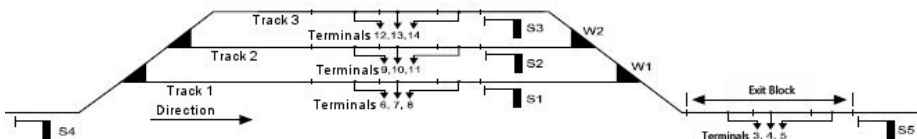Now 6 solenoid addresses must be entered.
In Step 1 (Operation Mode) 1 is entered.
The control LED gives repeated 2x short blinks.
All further entries as for operating mode 1.

The entry route to the passing loop switches all the entry turnouts to straight (green).
The entry route is automatically set when all the station tracks are occupied.
If the station exit is not switched "manually" the exit turnouts will be switched by a second Universal Control which controls the station's departures.

3.2.3 Operation Mode 3: Station Control with automatic exit

Press the programming key. The control LED gives repeated short blinks.
Now 6 solenoid addresses must be entered.
In Step 1 (Operation Mode) 3 is entered.
The control LED gives repeated 2x short blinks.
In Step 2 (Module address) a random value between 1 and 65534 is entered.
The control LED gives repeated 3x short blinks.
In Step 3 (Number of tracks) the number of all the station tracks is entered. The section for the exit block must be connected to terminals 3 - 5. The remaining 3 usable tracks can be used as station tracks and are then used as station tracks 5 - 7, if the station has more than 4 tracks.
The control LED gives repeated 4x short blinks.
In Step 4 (Feedback addresses) the address to be used for station track 1 is entered. The additional addresses are automatically assigned the subsequent turnout according to the number of tracks entered. The feedback address for the exit block is given the feedback address of track 1 plus the number tracks in the station, plus 1 (e.g. 6 track station feedback address for track 1 is 1, feedback address for the exit block is $1 + 6 + 1 = 8$).
The control LED gives repeated 5x short blinks.
In Step 5 (Signal address) the address or the exit signal for track 1 of the station is entered here. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered. The station's entry signal is assigned the address for track 1 plus the number of tracks (e.g. 7 track station signal address Track 1 is 1, signal address of the entry signal is $1 + 7 = 8$). The exit signal for the exit block is assigned the signal address of track 1 plus the number of station tracks plus 1 (e.g. 7 track station, track 1 signal address is 1, Signal address for the exit signal of the exit block is $1 + 7 + 1 = 9$).
The control LED gives repeated 6x short blinks.
In Step 6 (Turnout address) the address which corresponds to the entry turnout for track 1 is entered. The additional turnouts are automatically assigned the subsequent turnout according to the number of tracks entered.
The control LED turns off.

The exit order is random, so that varied train traffic will occur.

3.2.4 Operating Mode 4: Station Control with automatic exit and passing loop
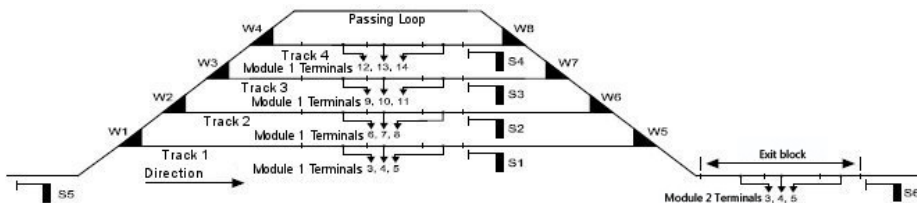
For an automatic station control two modules are installed. As long as the station entry is not switched manually the entry turnouts to the passing loop are controlled by a second Universal Control which controls the station entry and first 4 tracks.

Press the programming key. The control LED gives repeated short blinks.
Now 6 solenoid addresses must be entered.
In Step 1 (Operation Mode) 4 is entered.
The control LED gives repeated 2x short blinks.
All further entries as for operating mode 3.
The exit route from the passing loop switches all exit turnouts to straight (green).

3.2.5 Operating Mode 5: Station Expansion

If a station with automatic entry has more than 4 tracks the control can be extended with additional modules.

Example 1

Track x	Feedback addr x	Module x Terminals x, y, z	Sx
Track 7	Feedback addr 7	Module 2 Terminals 9,10,11	S7
Track 6	Feedback addr 6	Module 2 Terminals 6, 7, 8	S6
Track 5	Feedback addr 5	Module 2 Terminals 3, 4, 5	S5
Track 4	Feedback addr 4	Module 1 Terminals 12, 13, 14	S4
Track 3	Feedback addr 3	Module 1 Terminals 9, 10, 11	S3
Track 2	Feedback addr 2	Module 2 Terminals 6, 7, 8	S2
Track 1	Feedback addr 1	Module 1 Terminals 3, 4, 5	S1

Direction

Example 2

etc.

Trk 9	Feedback add 9	Module 3 Terminals 6, 7, 8	S9
Trk 8	Feedback add 8	Module 3 Terminals 3, 4, 5	S8
Trk 7	Feedback add 7	Module 2 Terminals 12, 13, 14	S7
Trk 6	Feedback add 6	Module 2 Terminals 9,10,11	S6
Trk 5	Feedback add 5	Module 2 Terminals 6, 7, 8	S5
Trk 4	Feedback add 4	Module 1 Terminals 12, 13, 14	S4
Trk 3	Feedback add 3	Module 1 Terminals 9, 10, 11	S3
Trk 2	Feedback add 2	Module 1 Terminals 6, 7, 8	S2
Trk 1	Feedback add 1	Module 1 Terminals 3, 4, 5	S1

Feedback add. x
Exit Block
Module 2 Terminals 3, 4, 5

Direction

If a station with an automatic Entry and Departure has (Example 2) more then 6 tracks then additional modules for more tracks can be installed.

Press the programming key. The control LED gives repeated short blinks.
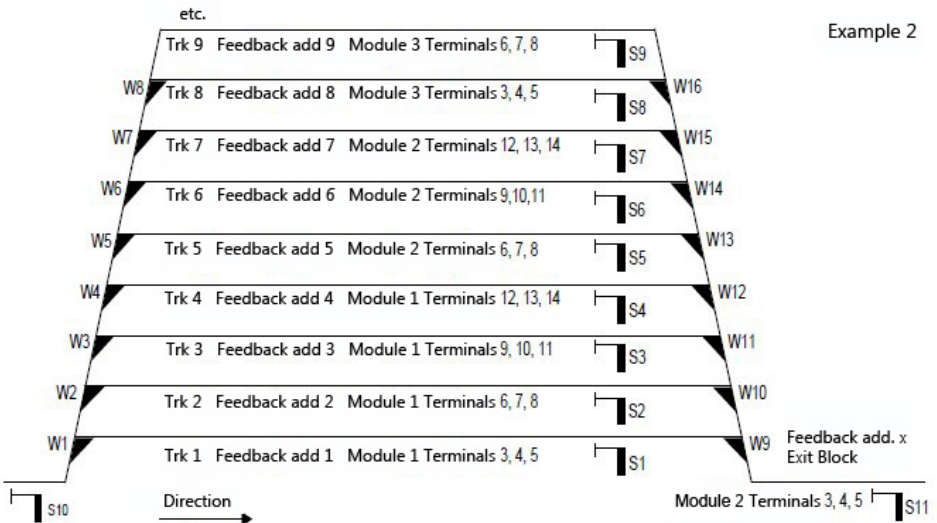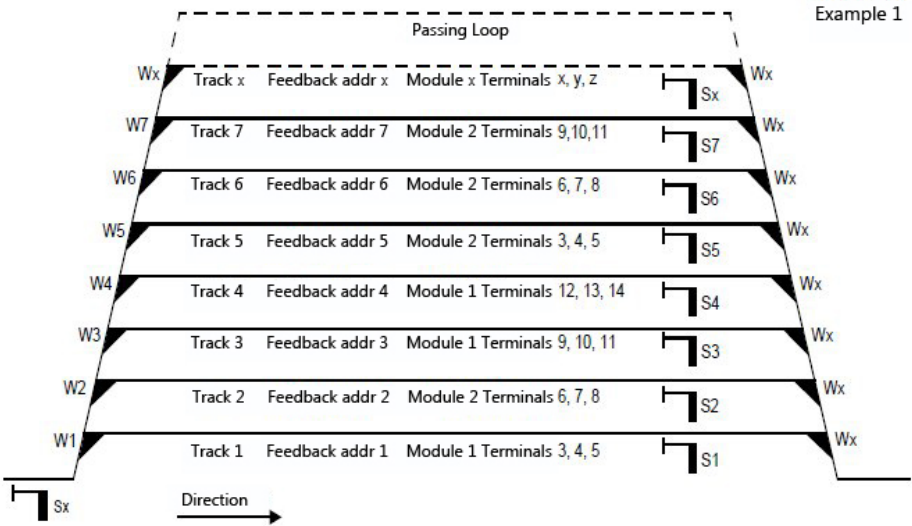Now 5 solenoid addresses must be entered.
In Step 1 (Operation Mode) 5 is entered.
The control LED gives repeated 2x short blinks.
In Step 2 (Module address) a random value between 1 and 65534 is entered.
The control LED gives repeated 3x short blinks.
In Step 3 (Number of tracks) the number of all the station tracks is entered.
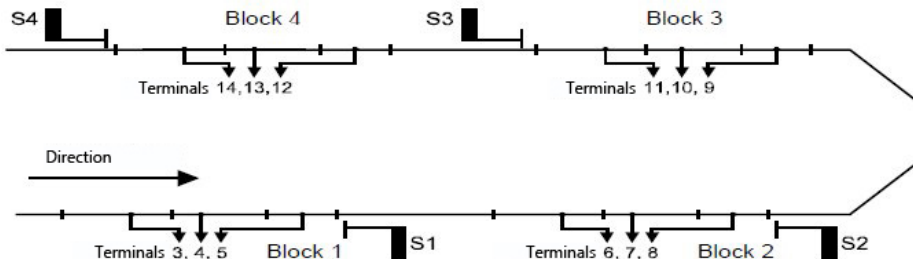The control LED gives repeated 4x short blinks.
In Step 4 (Feedback address) the address is entered for the track connected to terminals 3 - 5 of this module. All additional tracks connected to this module are automatically assigned the subsequent feedback up to the number of tracks.
The control LED gives repeated 5x short blinks.
In Step 5 (Signal address) the address is entered for the exit signal for the track connected to terminals 3 - 5 of this module. . All additional tracks connected to this module are automatically assigned the subsequent signals up to the number of tracks.
The control LED turns off.

TIP: Always make a sketch as in example 2 in which all module addresses, feedback addresses, signal and turnout addresses as well as the terminal connections are indicated.

Press the programming key. The control LED gives repeated short blinks.
Now 5 solenoid addresses must be entered.
In Step 1 (Operation Mode) 6 is entered.
The control LED gives repeated 2x short blinks.
In Step 2 (Module address) a random value between 1 and 65534 is entered.
The control LED gives repeated 3x short blinks.
In Step 3 (Number of tracks) the number of all the station tracks is entered.
The control LED gives repeated 4x short blinks.
In Step 4 (Feedback address) the address is entered for the track connected to terminals 3 - 5 of this module. All additional tracks connected to this module are automatically assigned the subsequent feedback up to the number of tracks.
The control LED gives repeated 5x short blinks.
In Step 5 (Signal address) the address is entered for the exit signal for the track connected to terminals 3 - 5 of this module. All additional tracks connected to this module are automatically assigned the subsequent signals up to the number of tracks.
The control LED turns off.

So that the automatic block traffic can take place the following applies for every block:
As soon as a train arrives in a block the exit signal of the previous (signal address of this block minus 1) is switched to stop (red) and the entry signal of the previous block (signal address of this block minus 2) is set to go (green).

3.3 Combination of Operating Modes
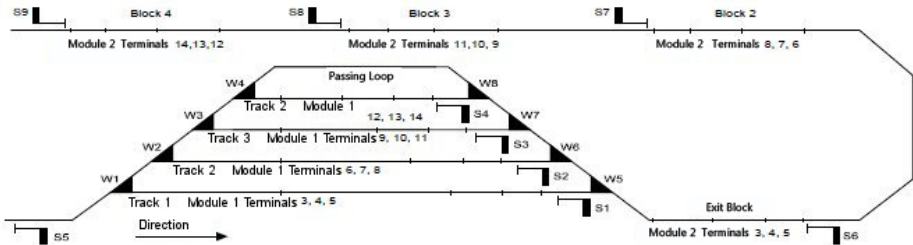
So that none, or a minimum number of track connections are unused, different operating modes can be combined in a module under certain circumstances. This cannot be achieved when using the simple key programming and must be done by using LocoNet programming (see Chap. 1 "General").

4. First time use

If the Universal Control is connected and programmed the railway traffic can start. For this you first switch all signals to red. Now the occupancy detectors of the brake sections are active and the first can drive into first track section, or enter the first station track. When the train arrives in the brake section it is automatically stopped.

Station operation with entry and exit: In the following the station can be completely filled. If all tracks in the station are occupied the first train can depart. When this train reaches the exit block all station exit signals are switched to stop (red). That way the track from which the first train departed is reported as "vacant" and its entry route is automatically activated. When the first train leaves the exit block and subsequently switches this block's exit signal to stop (red) the exit signal of a randomly selected station track is switched to go (green).

Block section operation: When a train arrives in the first block then its exit signal can be switched to go (green) and the train drives into the second block section. When the train arrives there it also stops automatically and the exit signal of the first block is switched to stop (red). So the second train can enter the first block and stop. If the exit signal of the second block is switched to go (green) the train drives into the third block section. When it arrives there it automatically stops. The exit signal of the second block is switched to stop (red) and the exit signal of the first block is switched to go (green). So the second train leaves the first block and drives into the second block etc.

5. Factory Configuration

In factory configuration track sections 1-4 react to signal addresses 1-4 and report states (occupied /vacant) via feedback addresses 1-4. Solenoid address 5 can switch the occupancy detectors off and it applies the digital power to the track. The first key programming automatically deletes these settings.

020458583-27 If you have any questions call us. Hotline times are:
Mon - Tue - Thu - Fri, 14:00-16:00 and Wednesdays 16:00-18:00

Should it be urgent. The Premium Hotline: 0900-1858327
Mon-Fri 10:00-16:00 Fee applies (98cent/min landline high with mobile)

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