
MODELL STELLWERK 10
VORBILDORIENTIERTE STEUERUNG
FÜR DIGITALE MODELLBAHNEN
Manual part 3
Network, control centers and hardware

Model switchboard

Version 10

Manual model control unit part 3

control panels, network and hardware

Edition from 1.1.2021

Manual model control unit part 3

Table of Contents

1 introduction

In the first part of the manual, the settings of the program as well as the configuration, i.e. the planning of your own system, were described. The second part of the manual describes the manual operation of the model railway system and the possibilities that ModellStellwerk offers to automate operational processes.

This part describes the network operation, the special properties of the various control panels and hardware and their settings.

2 Network operations

2.1 Client - server

The model railway layout can be controlled with several computers in a PC network. The PC to which the digital center is connected acts as a server. The computers communicate with each other via the TCP / IP protocol with text-based messages.

The same program ModellStw.exe serves as client as well as server. The server is the computer that is connected to the system. The same system is loaded on all computers. Communication takes place on the basis of the internal numbers (turnout number, block number, etc.), so these must be the same on all computers.

On the client, "- PC network -" is then selected as the control center.

When the connection is established, the clients will automatically find the server in the same network. In the event that this mechanism does not work, you can enter the IP address of the server computer under server name. The number of the TCP port must then be entered under Port. This is any number that is not yet used in your computer network and must be the same on all model interlocking computers. If the number 0 is entered here, the network capability is switched off.

2.2 Web interface

By ticking the box, the model switchboard's web interface is switched on, which offers the option of controlling the system via a web browser. A standard value for this port is 80, but must be adjusted if other web servers are already integrated in the network.

The web pages that are shown are saved in the WebIf folder and can be changed as desired.

3 Central

This chapter describes the special properties of the various control panels.

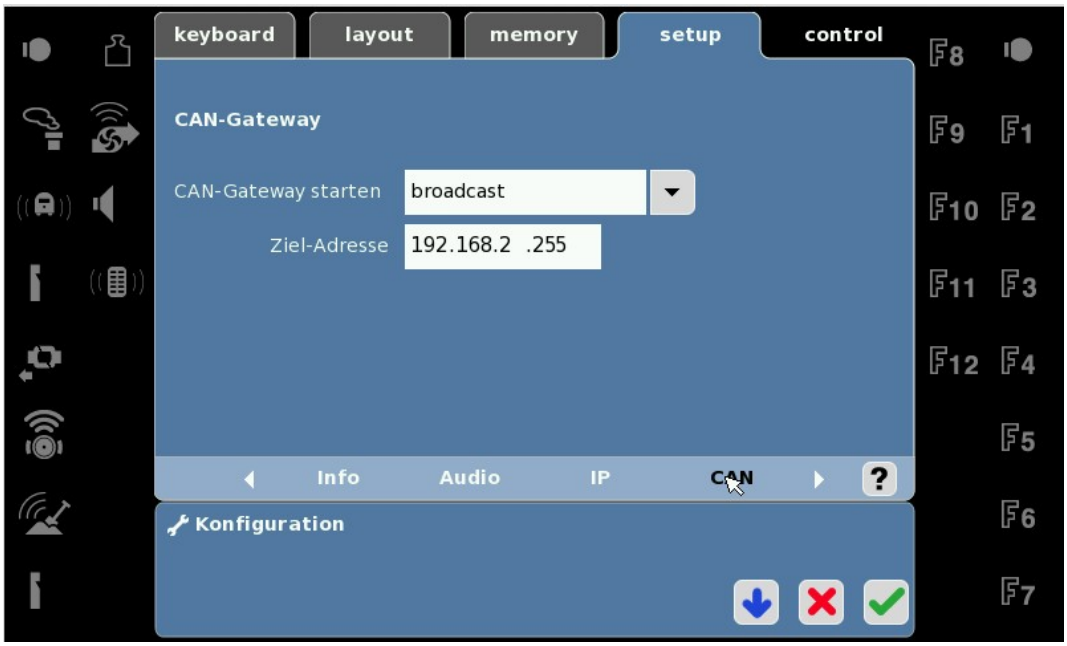
3.1 Central Station 2/3

Communication with the Central Station 2 and 3 takes place via the computer network.

The model interlocking needs the IP address of the CS2 for this. With the key 

both Settings will try to determine the IP automatically. The CS2 must be switched on for this.

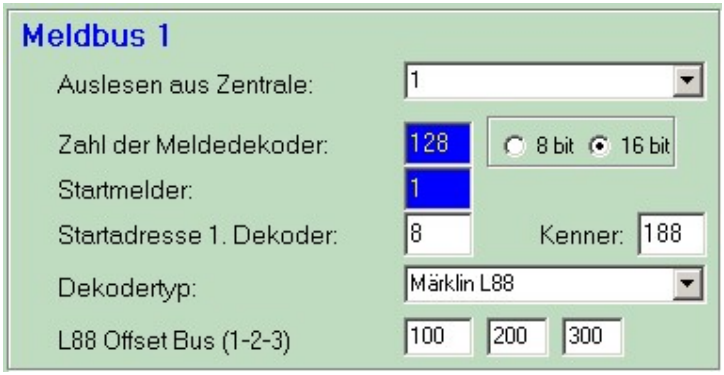
An IP address, the so-called broadcast address, must also be entered in the CS2 itself. If this address is not entered, the CS2 does not send any data to ModellStellwerk, not even confirmations to commands. Communication will then not work. The broadcast address is entered in the Setup CAN window, the first 3 groups of numbers must match the home network, the last number should be 255.



If you have an active firewall on the PC, communication with the CS2 must probably also be activated separately here. The CS2 needs 2 IP ports, which have to be activated in the firewall for the IP address of the CS2, these are ports 15730 and
15731.

3.1.1 Feedback decoder

ModellStellwerk supports 2 connection methods for feedback decoders on the CS2. However, these two methods cannot be used at the same time.



1. S88 feedback connected to the CS2 itself

This method is used for S88 feedback decoders that are connected to the underside of the CS2. "Standard" is then selected as the decoder type. With this method, the number of S88 message decoders must be entered in the model control unit. You do this in the field "S88 decoder on S88 bus"

2. Feedback connected to the L88.

Märklin L88 is selected as the decoder type. The L88 has a built-in S88 decoder and 3 bus connections. These 4 decoder lines each report in their own address range. You can set the number of the first contact for each bus in the "L88 Offset Bus" fields. If, for example, 100 is specified for the first bus, then the first contact on this bus has the number 100, this number is then used in ModellStellwerk.

The 16 internal detectors report to ModellStellwerk from the contact number entered under "Start detector".

Every L88 decoder has an "identifier". This identifier is set with the CS2 itself and can be read in the CS2 menu under "Devices". The identifier is a kind of address of the L88. This identifier is also entered in the ModellStellwerk, in the window shown under "Identifier".

Both methods 1 and 2 can be combined with the feedback decoders from CAN Digital Bahn. The decoders from CdB always report with the set address,

3.2 Ecos and Central Station 1

The IP address of the Ecos is entered in the configuration. This address can be read in the Ecos options under Network. It should be noted that this address can change when a DHCP server is used.

The connection is established by pressing the [Connect] button; the system can be controlled by pressing "Go" or selecting the ECOS menu.

The Ecos does not know any feedback of short circuits to the model control unit, in the event of a short circuit the control center switches to stop.

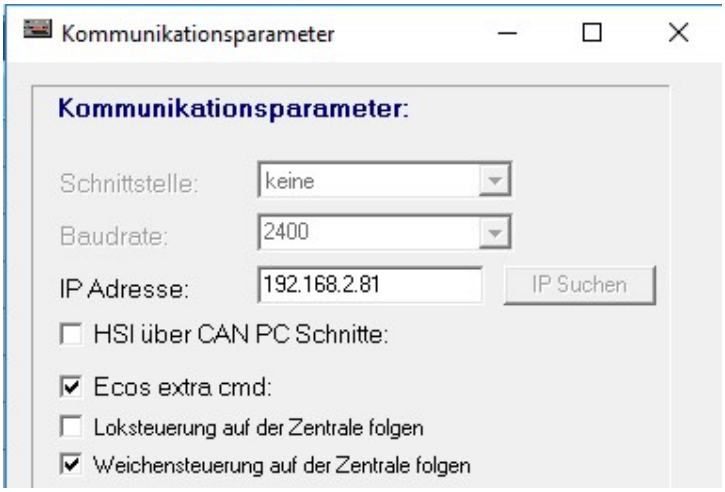
3.2.1 Magnetic items

There are 2 options for controlling multi-aspect signals or other solenoid items with the Ecos.

1)

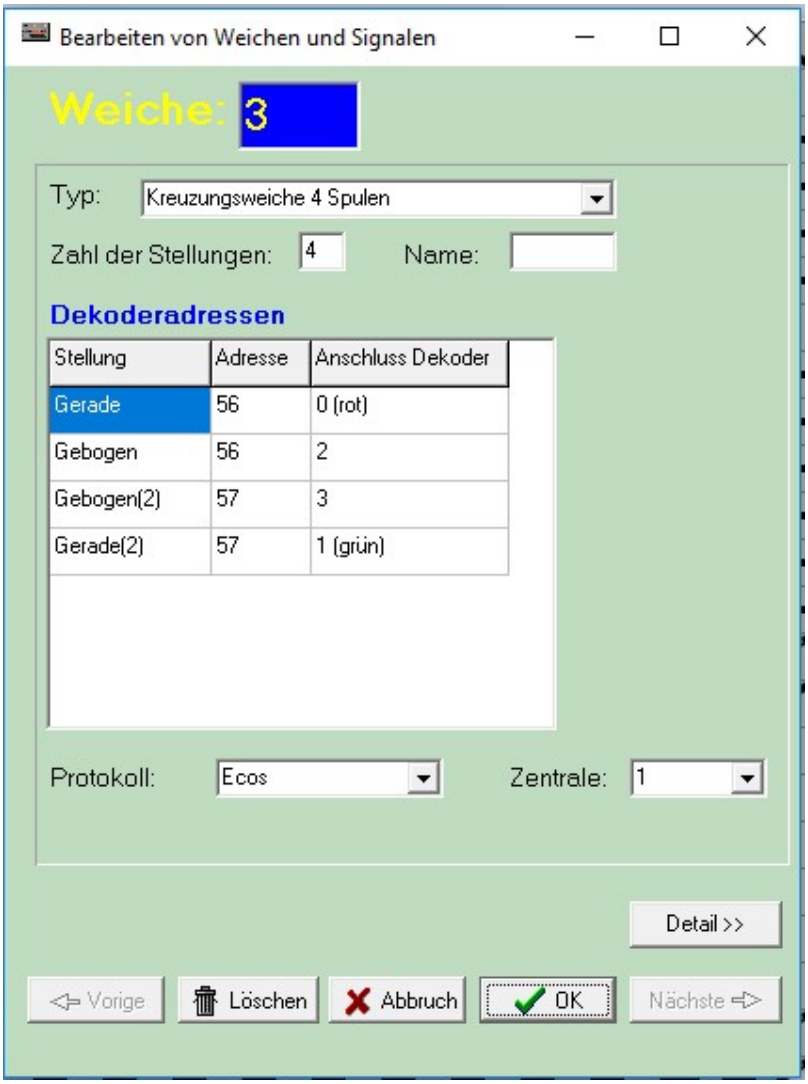
You use the Ecos Protocol. This enables feedback from the control center: if a turnout is set on the control center, it is also switched in the model switchboard.

The protocol is selected when defining the turnout. The turnout or the signal must then also be created in the Ecos. The Ecos works internally for turnouts and locomotives with IDs, not with addresses. When switching to GO mode, ModellStellwerk will synchronize the solenoid accessories in the software with those in the Ecos using the digital address. (NB locomotives are synchronized based on their name). The setting "Ecos Extra Cmd" must switched on be.



A signal can then have up to 4 positions, e.g., HP2 = position 3 A double

crossing switch with 4 coils is then entered as follows:



You must also use this setting if you have an Esu Switchpilot turnout decoder and want to use the feedback of the turnout setting.

2)

You use the DCC or Motorola protocol. The switch then does not have to be defined in the Ecos. With a signal with 3 positions (HP0 / 1/2) then use 2 decoder addresses, the signal is probably already created in the Ecos in this way. The positions for solenoid items in model interlocking can then only have the values 0 or 1.

With the Ecos, the locomotives are always controlled with 128 speed steps, the speed sent by the PC is always in the range of 0-128. For this purpose, speeds are converted into model interlocking. In practice this means that the control of the locomotives is independent of the locomotive protocol that is set in the model control panel. The locomotive protocol then only determines the number of speed steps in the software.

The actual protocol of the locomotives is set in the Ecos itself. The setting here determines which protocol is output on the track.

3.2.2 Control locomotives with the Ecos

In contrast to conventional digital systems, the locomotives in the Ecos are not addressed by their address, but by an ID number determined by the Ecos. Model signal box must know these numbers before it can control the locomotives. When the control is started, the locomotive data is automatically queried from the Ecos. The model signal box then compares this locomotive data with the data in the internal locomotive database. The model switchboard compares the locomotive data on the basis of the NAMES of the locomotives, so these must be identical in the model switchboard and in the Ecos. This locomotive can only be controlled from the computer if a name is the same in the Ecos and in the model switchboard.

In the Central / Ecos menu there is a tool with which it is possible to synchronize the locomotive lists in the model switchboard and the Ecos. However, this tool cannot accept all the data, for example the symbols for the functions must be selected afterwards. However, all data that the systems need to be able to control the locomotives are taken over.

3.2.3 Ecos detector

The Ecos detector with RailCom can read the locomotive address on 4 inputs via RailCom. ModellStellwerk can display this address or, if there is a locomotive with this address, the locomotive. The link to a block is automatic. If you enter the corresponding detector number in a block, then the number is not only used for the occupancy message, but if a locomotive is recognized on this input, it is also copied into this block.

3.3 Loconet

Uhlenbrock Loconet switching decoders can be controlled directly via Loconet, i.e. not with the track signal, the following settings are required for this:

IB BASIC to 'direct mode interface' baud

rate to 19200 (can also be higher)

Model signal box control center 1 on IB II / IB-COM -> COM 4 also on 19200 Bd

The decoder used for the test was: Uhlenbrock 20-channel decoder 63410

3.4 RailCom

RailCom is a technology that enables (certain) DCC systems to read data from the locomotive decoders. RailCom can be used in the model interlocking to read out the locomotive positions for train number display and train tracking. Modellstellwerk works together with the RC detectors and the RC-Link from Tams http://www.tams-online.de/.

There is a similar technology for Selectrix. The feedback decoder 8i from Müt can read out a Selectrix locomotive address and pass it on to the model signal box. See section 7.3.5.

From version 8.02, RailCom data can also be read out from the Ecos detector.

3.4.1 Tam's RC link

The RC-Link is connected to the computer via the USB interface or the COM port. The interface is selected in the configuration / connection under RailCom: Tams RC-Link.

RC detector

An RC detector can read out the address (and other CV's) of a locomotive decoder in a block. An RC detector is therefore assigned to a block in the model signal box. The address of the RC detector is entered in the block data under train report. The detectors have an address from 1-25.

For Selectrix, the Selectrix address of the Müt8i decoder is given here.

If you only drive with RailCom-capable locomotives, the RC detector can also be used as a track vacancy detection device. However, it is recommended to use an additional S88 decoder for track vacancy detection. These decoders react faster and also detect non-RailCom-capable locomotives and wagons without a decoder.

Programming an RC detector

The RC detectors have their own address. Model interlocking can program the addresses of the detectors. With the menu item Edit RailCom the editing window for RailCom detectors opens. The addresses entered for the block data are located here again and individual RC detectors can be programmed with the [Programming] key.

This key opens a window in which the address to be programmed is entered. After switching on the system, the detector is set to programming mode, then the OK button must be pressed.

Locomotive recognition

If a (RailCom-capable locomotive) drives the detector section, the decoder address of the locomotive is sent to the model signal box. The model signal box compares this address with the addresses of the defined locomotives. If a locomotive with the same address is found, this locomotive is assigned to the block and the locomotive name is displayed in the block if the block is reported as occupied.

If no locomotive with the same address is found, the locomotive is assigned to the block as an unknown locomotive. This locomotive is then only displayed with its address

If in the configuration RailCom: add new locomotive automatically is checked, this locomotive will be added to the locomotive data. The change window of the locomotive opens with the data of this locomotive. The locomotive is added with the [OK] button, the new locomotive is not added by pressing [Cancel].

Read out CV

RailCom not only has the option of reading out locomotive addresses, other CV's (the locomotive address is CV 1 or CV17 / 18 for long addresses) can also be read out. The locomotive address is automatically adopted, but all other CVs must be queried from the central unit. Model signal box can instruct a Tams EasyControl center to query a specific CV of a specific locomotive. To do this, open the locomotive programmer window under program extra locomotives. This window can only be opened in GO mode. When the window is open, other windows are blocked.

It makes sense to read out when all locomotives are at a standstill. The locomotive to be read out must be (as the only locomotive) in any (any) detector section.

Enter the model interlocking number or address of the locomotive under address. Whether a locomotive or an address is entered is indicated with the locomotive / address selection. The CV to be queried is entered under CV. If the read CV button is pressed, the CV is read out and displayed under value. If no response is received within 30 seconds, the process is aborted and an error code is displayed. If the locomotive is not a DCC locomotive, the address is not in refresh or the MasterControl is in STOP mode, an error message is output.

CV programming

In the locomotive programmer window (see above) it is possible to program CV values on the main track. However, this only works with the central Tams and Intellibox. The data must be entered as described above, the value to be programmed is entered in the second field under CV, then the programming key must be pressed.

3.5 Selectrix

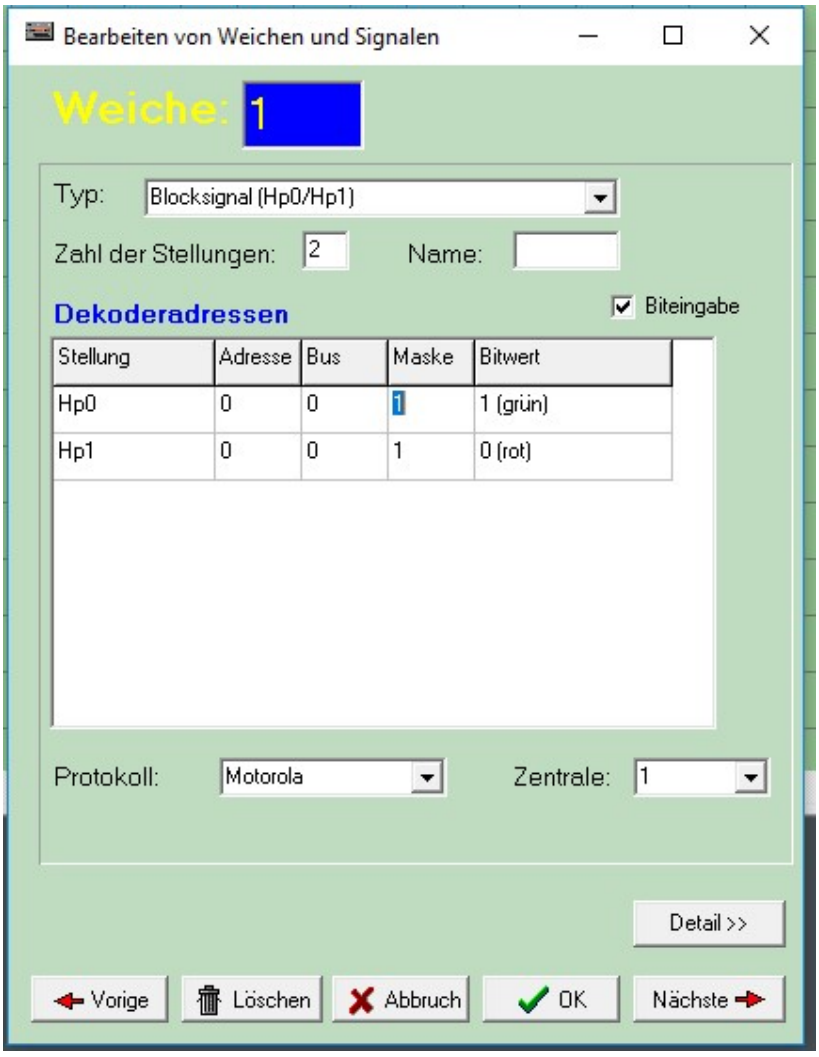
3.5.1 Locomotive recognition for Selectrix

As RailCom can take care of locomotive recognition in DCC systems, this can be done under Selectrix with the feedback decoder 8i from MÜT. This decoder functions as a track vacancy detection and simultaneously reads the locomotive decoder address for up to 8 track sections.

The MÜT occupancy detector 8i requires 3 Selectrix addresses and can be read out for train reports (locomotive addresses). A block is assigned to the feedback device by entering the Sx address in the field detector address MÜT 8i of the block in the "Train number" tab. An entry of 0 means that the detector is not used. The detector connection is then the same as that used for the busy report. If the 8i is used, the two addresses that follow the address of the 8i cannot be used for other detectors or decoders. The MÜT occupancy detector 8i works in "operating mode 1", DIP 7 should be switched off.

3.5.2 Bite entry for solenoid items

With Selectrix solenoid article decoders in particular, the outputs can be controlled individually or in groups. This is of particular interest when connecting signals. For each position it can be specified which outputs have to change. A mask is used to indicate which outputs are affected by the command. This functionality is activated when the "Bit input" field is checked. The mask and the output itself are counted bit by bit.

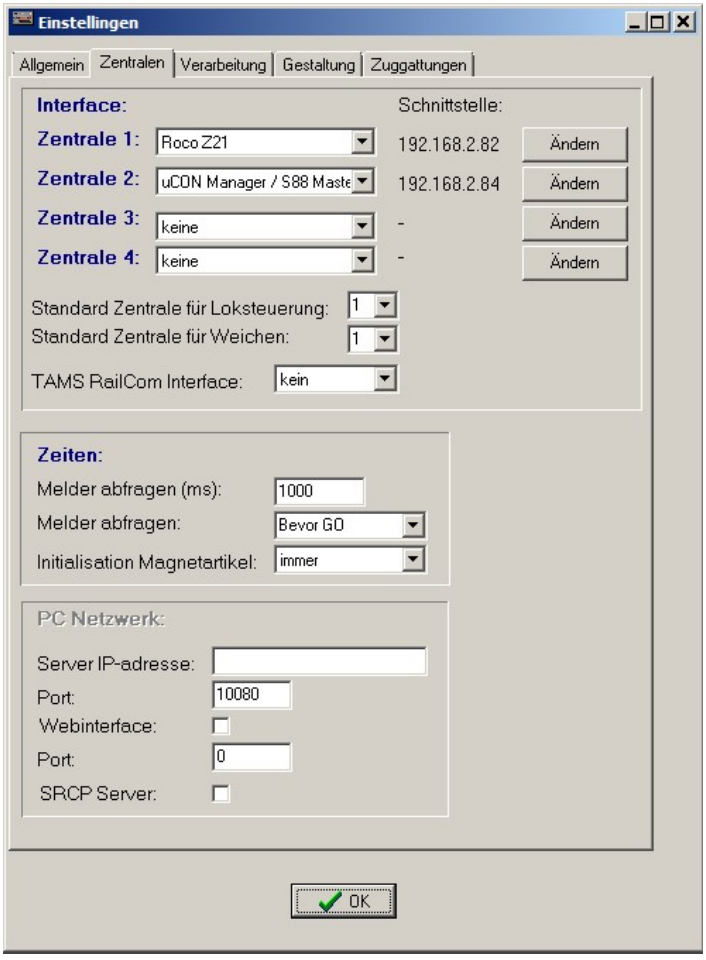


3.6 Z21

<no entry yet>

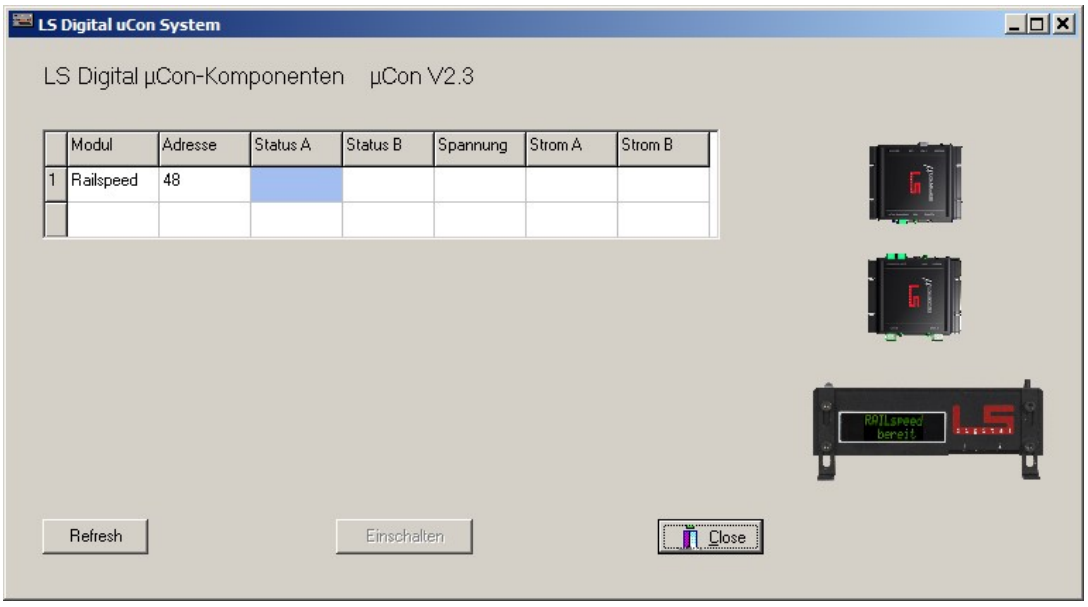
3.7 LS Digital

The µCon master is entered as one of the 4 central units, in the example here as central unit 2. You can also enter 2 central units for µCon, one for the S88 master and the second for the µCon master.



3.7.1 µCon booster

After a GO you can then call up the overview of the µCon modules in the [Central] menu. The modules and the data of the connected boosters are shown in the table. (The test unfortunately showed that not all connected boosters report. This seems to be a problem on the µCon bus and is not a problem in the model control room).

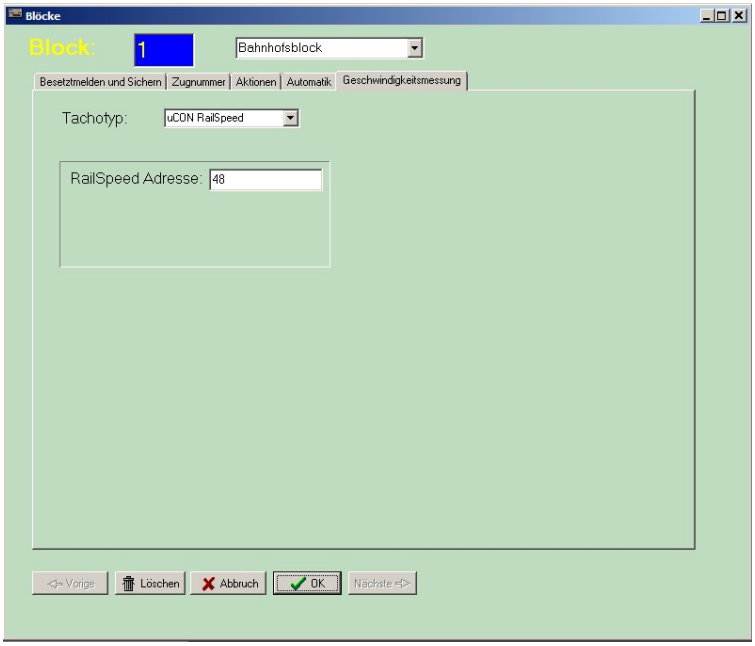


In the table, the booster outputs can be switched on and off with the "Switch on" button. To do this, first select the output in the table and then press the button.

3.7.2 µCon RailSpeed

RailSpeed is integrated in 2 places in the model control unit. The speed can be displayed in a block; this can also be used here for calibration during operation. Then every time a locomotive drives past the measuring point, the speed is saved in the speed step table, but the locomotive is not consciously controlled.

The address of the Railspeed is entered in the block data (here as an example in the Annex _Z21.pcw in block 1):

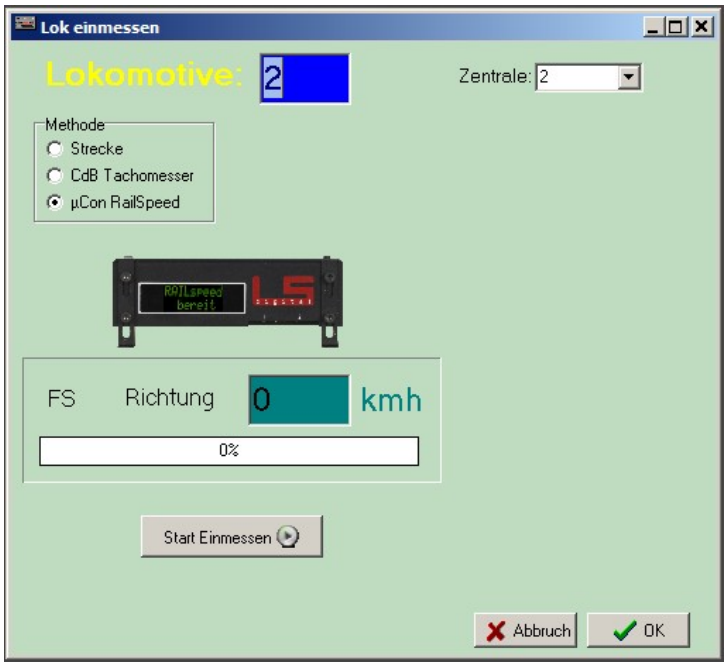


A symbol (red square) for displaying the speed is added to the track plan:

NB The speed is only shown if the block is occupied:

The other use of the Railspeed is the active calibration of a locomotive. In the GO Mode is then opened with a double click on a locomotive window he with the locomotive data open. The calibration window is opened with the key 

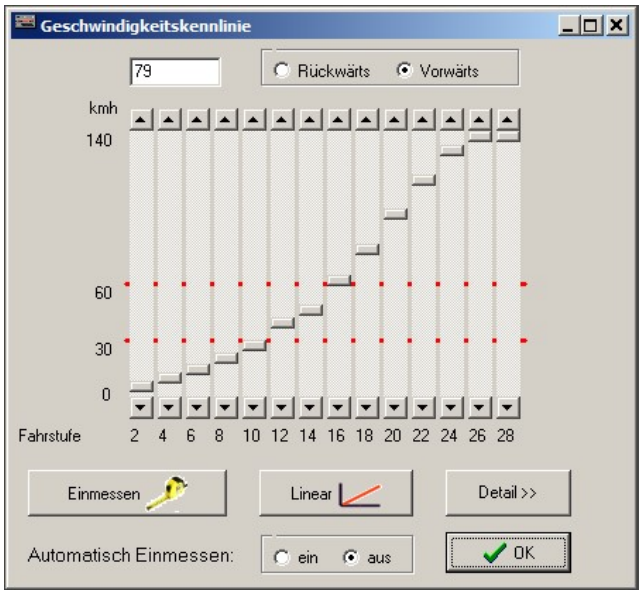
open:



First the µCon central unit is selected here, here central unit 2. Then the method is selected in the window. It is not necessary to enter the address of the Railspeed. The locomotive is positioned so that it first passes the RailSpeed forwards. After pressing the [Start calibration] button, the locomotive will pass the RailSpeed in both directions with all even speed steps (with 28 FS). The speeds for the uneven speed steps are automatically calculated (interpolated). Make sure there is enough space for the locomotive to run out on both sides of the railspeed. When the calibration is finished,

can in the Lokfenset with the 

Button the result will be shown and the values may still be changed:



Here you can switch off the automatic calibration (in a block, first possibility) even after successful calibration.

3.7.3 µCon S88 master

The S88 master is used to read feedback contacts on up to 3 S88 buses. The master is connected to the network and is entered as the control center in the model control room. Here you also enter the IP address of the S88 master.

3.8 BiDiB / OpenDCC system

The center is specified as one of the centers. For the time being, only control via USB is possible, just as the GBM Boost from Fichtelbahn is connected.

3.8.1 Supported functions

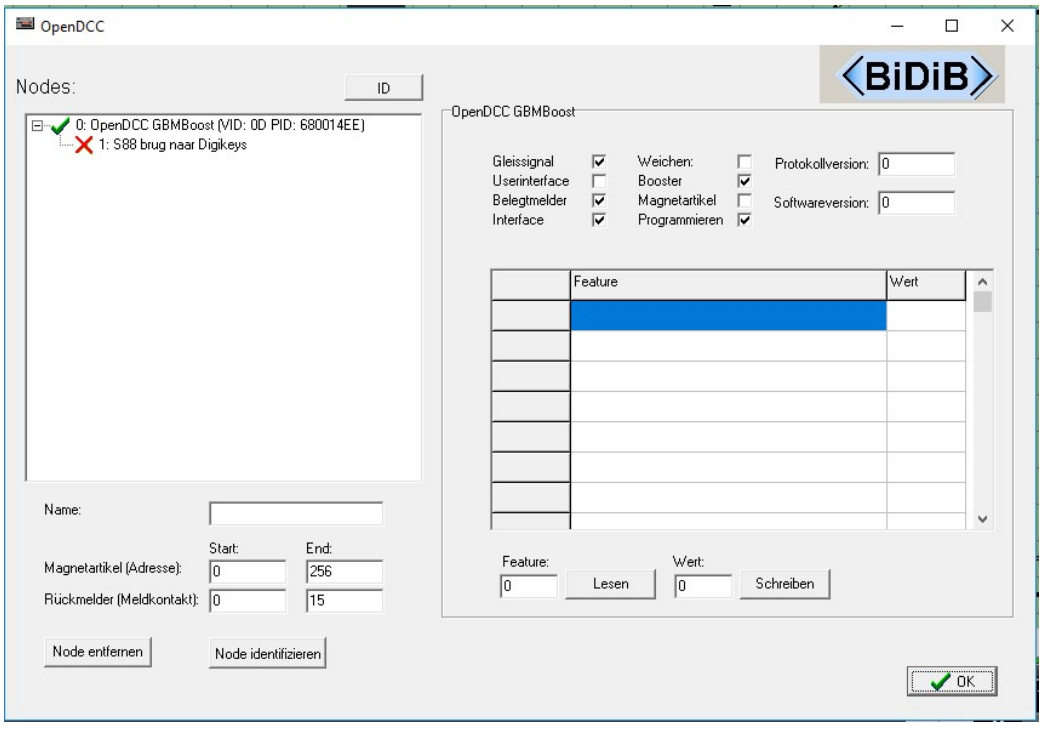
In version 9.5 of the model control system, these OpenDCC functions are implemented:

DCC track signal for locomotives and solenoid items,
Accessories / Switching / Macros for decoders on the BiDiB bus,
Feedback from the decoder on the BiDiB bus,
Reading out 1 locomotive decoder address on the BiDiB bus,
Detection of further nodes, only on 1 level,
Forwarding of clock data from the model switchboard.

Most of the settings are made in ModellStellwerk in the "Central / OpenDCC" window. The OpenDCC settings are saved in a separate file:
<plant> .bidib.

3.8.2 BiDiB bus

When establishing the connection  with the OpenDCC system the list of nodes read in. Even if nodes are added or recognized later, they are added to the list.



This list is shown in the "Central / OpenDCC" window. This list is also saved in the bidib file so that it is available again with the properties the next time it is started. The registered nodes are then marked in the list. Not

(more) existing nodes can possibly be deleted. The properties of the nodes, such as the addresses per node, are saved in the list

OpenDCC issues the node numbers automatically when you log on. It can therefore happen that the order of the nodes in the list changes, but this does not change anything about the control in the model control unit.

Each node has certain OpenDCC features. The features are shown in the window for the selected node, the values of the features can be changed in the window.

The user can enter a name for the node, this name will then be shown in the list. Model control unit properties can be entered for each node. For each node that has switching functions, the first and last decoder address used in the ModellStellwerk is entered. The first and last feedback number used in ModellStellwerk is entered for each node that is capable of feedback.

With the key 

the selected node can be identified, ie on
One LED will flash on the decoder.

The key 

the display changes between name and BiDiB name and ID.

ModellStellwerk 9.5 only supports nodes in the first level.

3.8.3 Track signal

The track signal (DCC) is output at the first decoder in the list of nodes that can generate a track signal. Further settings are not necessary. The track signal can control locomotives and DCC turnout decoders. A DCC signal for turnout decoders is output at all addresses that are not reserved for other nodes.

3.8.4 Switches

Switching information for turnouts and other solenoid accessories can be generated as a DCC track signal or sent to certain nodes. The destination of a switching command is determined based on the decoder address entered in the data of the turnout. For each node a start and end address is given in the list of nodes. If the address given for the turnout lies between these values, the switching command is sent to this node. If the address is not in the specified range for any node, the command is output as a DCC track signal.

OpenDCC knows 3 different switching commands: Accessory (turnouts and signals), accessories and macro. The decoder can recognize and execute 1 or more of these switching commands. The Lightcontrol, for example, knows all switching commands. In the properties of the solenoid accessory, it is specified in the "Protocol" field whether a switching command is output as an accessory, accessory or macro.

In the case of the “Accessories” decoder type, the “BiDiB Type” field also specifies which accessories are involved.

If the turnout decoder supports this, the turnout position can be monitored. For this purpose, "from control center" is selected for the turnout data under "Position monitoring". In the settings of the control center itself, “Follow switch control on the control center” is checked. If a feedback-capable turnout is manually adjusted on the drive, the turnout is marked as 'opened'. The turnout can only be operated again after the turnout has been reported free again with the WAT button.

3.8.5 Feedback

ModellStellwerk can read feedback contacts from different nodes. As with the turnouts, a range of feedback contacts is specified for each node. If a change in a feedback contact is reported to a certain node, then this is reported to ModellStellwerk as feedback contact "feedback contact start" + "contact number on decoder".

If the feedback decoder (node) is RailCom capable, then the locomotive address is also passed on to the ModellStellwerk in the same way. This message is linked to the feedback contact, ie the locomotive address is forwarded to the block where the feedback contact for the occupancy message is also entered. OpenDCC decoders can recognize up to 4 locomotive addresses in one section. ModellStellwerk only processes one address; the last reported address is saved in the block and displayed.

The direction information is not evaluated in version 9.5.

3.8.6 Clock

OpenDCC has a central clock as its function. The model position clock is activated in this way forwarded the BiDiB bus.