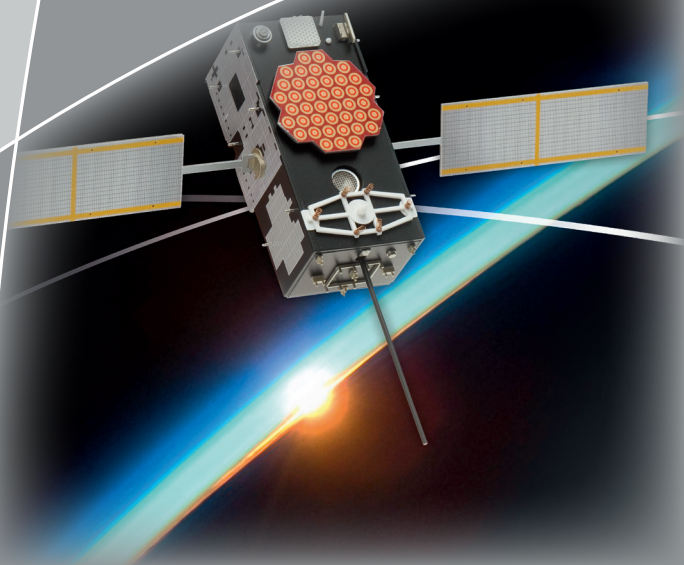


 CAR SYSTEM DIGITAL



161356
Car System Digital
Software Instruction Manual

DE



Instruction Manual



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1. Welcome to FALLER's World!



Congratulations – You have found the right thing!

The »Car System Digital« software you have acquired represents the most efficient and most versatile vehicle and traffic control system ever offered by FALLER.

Car System Digital drastically reduces the expenditure of time and effort required for the construction and connection of your circuits, while offering realistic driving pleasure you have never experienced before:

- Accurate locating of your digital vehicles down to the millimeter
- Automatic distance monitoring during operation via satellites
- Control of all the vehicle's functions in real time
- Realistic starting and braking behaviour
- Integrated setting and control of all light signals and control components on the track with one extension module
- Realistic representation of traffic on your monitor

The Car System Digital Beginner's Set offers, aside from the vehicle, all elements that are required for an appropriate initiation into the fully automatic operation of Car System Digital. These are three satellites, the Car System Digital Master and the software required for controlling the driving on the circuit.

It's play fun guarantee.

Gebr. FALLER GmbH wishes you a lot of creative ideas and plenty of delight with your new acquisition!

2. Safety and responsibility



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Proper use

Car System Digital is exclusively designed for use on a model installation. You will be able to adjust the functions of Car System Digital units and control components to your specific requirements.

To ensure the reliable operation of Car System Digital it is imperative that the operating instructions and recommendations given on road building in FALLER brochures be followed.

The guarantee offered will not apply to any damage or defect resulting from the non observance of the directions given in the present instruction manual.

For your safety

- ▶ Carefully read through the present instruction manual before using the products.
- ▶ Pay attention to the safety recommendations and warnings given in the instruction manual or provided on the product.
- ▶ Inform children of the contents of the instruction manual, if necessary, and of the potential hazards related to the use of the product.
- ▶ Use the product only when it is in perfect technical condition.
- ▶ Always retain the instruction manual available near to the product itself.
- ▶ Hand over the product to any third person only together with the present instruction manual.

CAUTION

CAUTION identifies hazards that may result in property damage.

EN

Explosion hazard

Using the product in explosive environments may trigger explosions and cause severe injuries and property damage.

- ▶ Do not use the product in explosive environments!
- ▶ To load rechargeable batteries, refer to the instruction manual supplied with digital vehicles.

Fire hazard

Operating the product after wrongly connecting it or bridging certain terminals may trigger a fire or generate smoke.

- ▶ Do not use the product without monitoring the process.
- ▶ Immediately disconnect the product from the mains supply if smoke is generated!
- ▶ To load rechargeable batteries, refer to the instruction manual supplied with digital vehicles.

Corrosion hazard

Using the product in moist rooms or any contact of the product with water may cause property damage.

- ▶ Use only in dry rooms!
- ▶ Avoid any contact with water!

Overload hazard

Operating the product with the wrong power pack may result in property damage.

- ▶ Only operate the product with FALLER 50 VA, 56 to 60 Hz transformer, Art. 180641!

Risk of physical injury and property damage

Improper use of the product may cause physical injury and property damage.

- ▶ Do not open enclosures!
- ▶ If the product does not operate correctly or does not operate at all: Consult FALLER's Customer Service Department!

Malfunction hazard

Devices without tested electromagnetic compatibility may cause failures and malfunctions.

- ▶ Do not operate any device that was not tested in the nearest vicinity of the installation.

Environmentally friendly disposal

- ▶ Comply with the local regulations applying to waste disposal.
- ▶ Dispose of rechargeable batteries via the qualified collecting points authorized by your government.

3. General view of product



Articles supplied (Car System Digital Beginner's Set)



Fig. 1: Articles supplied in Car System Digital Beginners Set, Art. 161355

- Car System Digital Master, Art. 161354
- 3 x Car System Digital Single satellite, Art. 161353
- Car System Digital Software, Art. 161356 (on USB 2.0 Memory Stick)
- USB Cable (USB-A to USB-B)
- Instructions manuals (Satellites, Quick Installation Guide)

Operating elements (Hardware)

Car System Digital Master

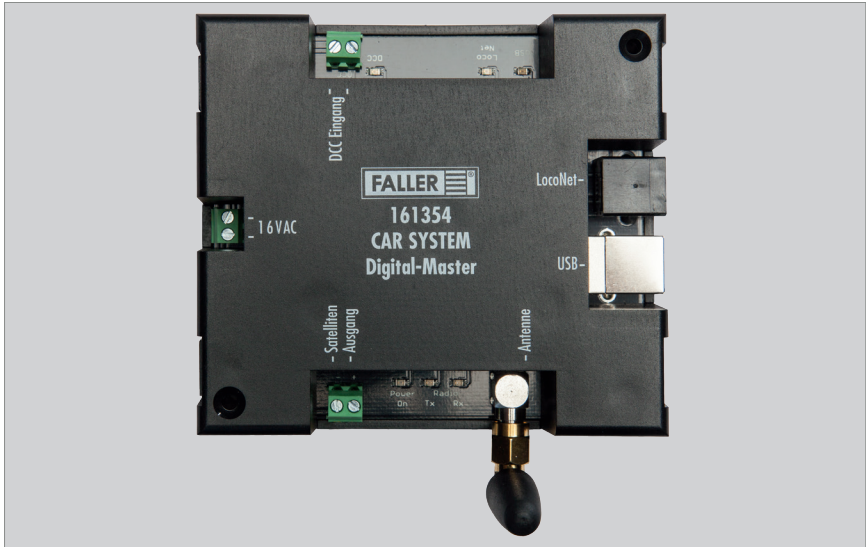


Fig. 2: Operating elements on Car System Digital Master, Art. 161354

Ports	Description
16 V AC	Port for the supply voltage (16 V alternating voltage)
DCC Eingang	Port for a digital control unit
LocoNet	Port for a LocoNet connection
USB	USB Port of a personal computer
Satelliten Ausgang	Supply voltage for satellites
Antenne	Radio link between vehicle and satellite
LED	Description
Power On	Indicator LED (flashes at heart rate)
Radio Tx	Incoming radio signal, e.g. from a satellite
Radio Rx	Outgoing radio signal, e.g. from a digital vehicle

Tab. 1: Operating elements on Car System Digital Master, Art. 161354

Car System Digital Satellite

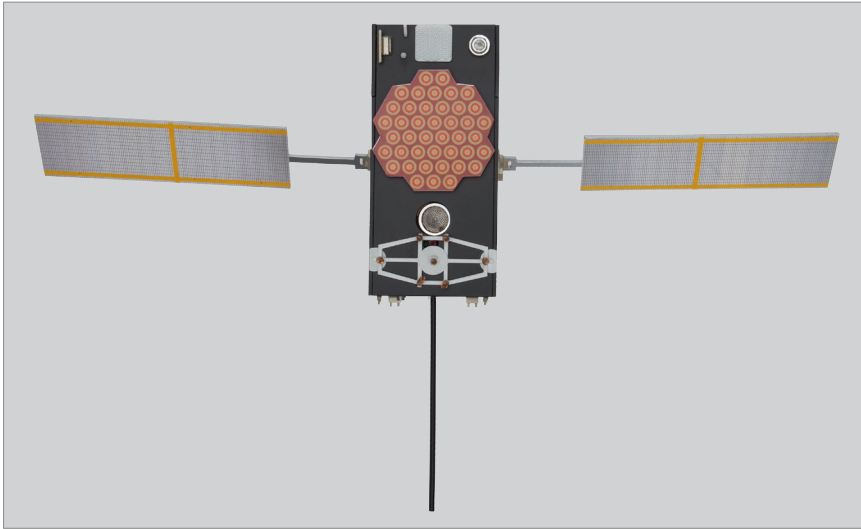


Fig. 3: Operating elements of Car System Digital Satellite, Art. 161353

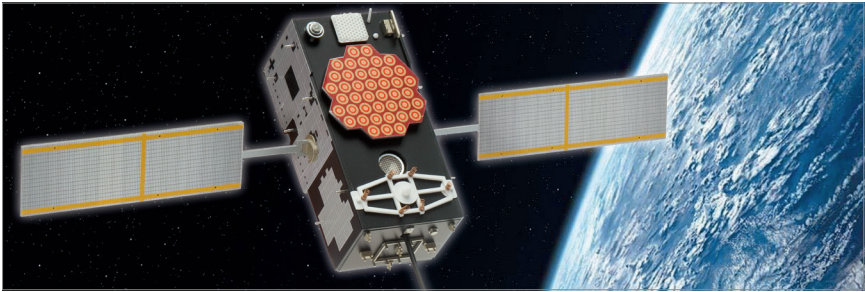
Ports	Description
16 V AC	Port for the supply voltage (coming from the Master). The integrated rectifier protects the ports against reversed polarity.

LED	Description
LED	Indicator LED (flashes if connection is correct)

Tab. 2: Operating elements of Car System Digital Satellite, Art. 161353

NOTE: Please note that, after any software update, you may be in possession of an updated version of the present instruction manual, too. It can be called up at any time using functional key 'F1'.

4. Car System Digital – Summary



The ideal combination of vehicles and technical components of Car System Digital depends on your own goals and requirements. Along with fully automatic operation of digital vehicles allowed by »Car System Digital Master« (in the following: Master), »Car System Digital Satellites« (in the following: Satellites) and the »Car System Digital« software, you can also specifically set and combine the desired scope of functions – from the mere modification of the vehicles' properties during operation (arbitrary change of light and sound functions or speed and many others more) up to software-based control of complex road traffic situations via satellites.

NOTE: For the construction of your model roads and for traffic operation, only use articles from FALLER's range of products such as the Special guide wire (Art. 161670), Sensors (Art. 161773) or Branch-off junctions/Turnouts (Art. 161677). Similar components of other systems are not explicitly supported by the complete »FALLER Car System Digital« technology.

Option 1 – Car System Digital 2.0

Minimum version. All digital vehicles are provided with a built-in magnetic field sensor that also allows operation on conventional analog Car System installations.

Basic equipment:

- Car System Digital 3.0 Vehicle
- Processor-controlled charging unit, Art. 161349

Optional equipment:

- Traffic Control unit, Art. 161651 or PC Basic module (Art. 161351) with Extension module (Art. 161352)
- Car System light signals and control components (Stop sections, Turnouts, Parking spaces, sensors)

All vehicle functions (F0 to F4) are set using the Processor-controlled charging unit (Art. 161349). Further functions are available by connecting the Processor-controlled charging unit to a digital control unit. Modifying the functions while driving is not possible, any modifications being possible only during the connection of a digital vehicle to the Processor-controlled charging unit. Stop sections featuring a south magnetic field will change any digital vehicle to slow speed. Stop sections featuring a north magnetic field will stop the vehicles. Realistic starting and braking are included.

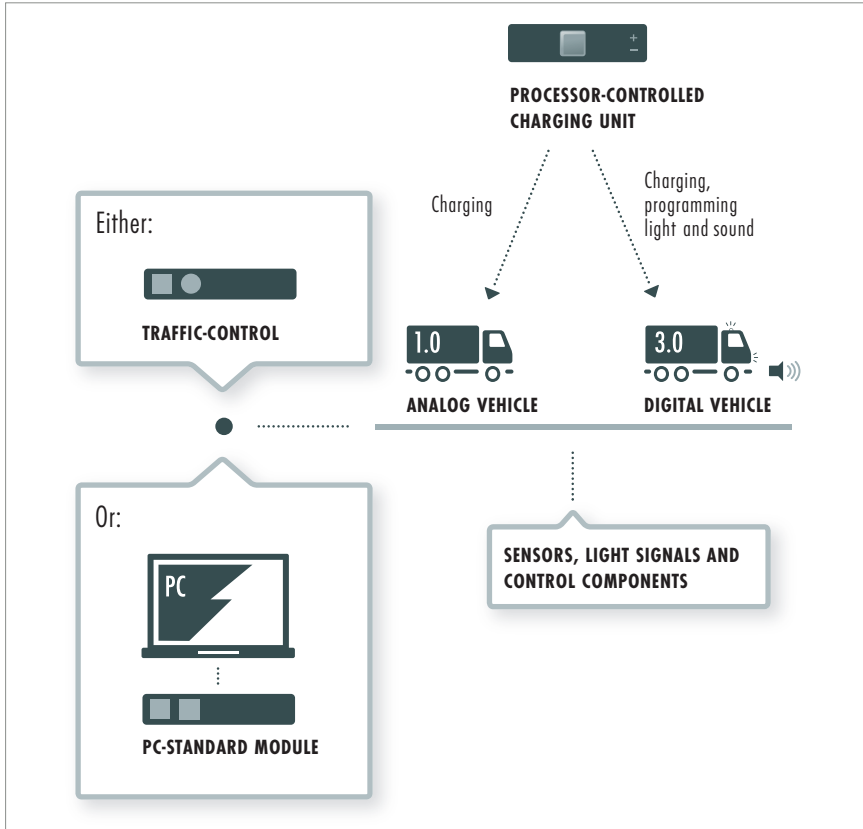


Fig. 4: Option 1

Option 2 – Primary extension using a digital control unit

Fascinating easy entry. If you are in possession of a digital control unit already, it will offer you the simplest entry into the fascinating driving experience ensured by Car System Digital. Playing without automatic operation gives in fact no checkback signal of the position of the vehicle, in combination with the Car System Digital Master however, the digital control unit will allow you permanent access to the speed as well as to the light and sound functions of a vehicle. And 28 driving speeds are then available.

Basic equipment:

- Car System Digital 3.0 vehicle
- Processor-controlled charging unit, Art. 161349
- Car System Digital Master, Art. 161354
- Digital control unit (Advice on compatibility: comprehensive field tests were performed with the Intellibox II of Uhlenbrock.)

Optional equipment:

- Extension module, Art. 161352
- Car System light signals and control components (Stop sections, Turnouts, Parking spaces, sensors)

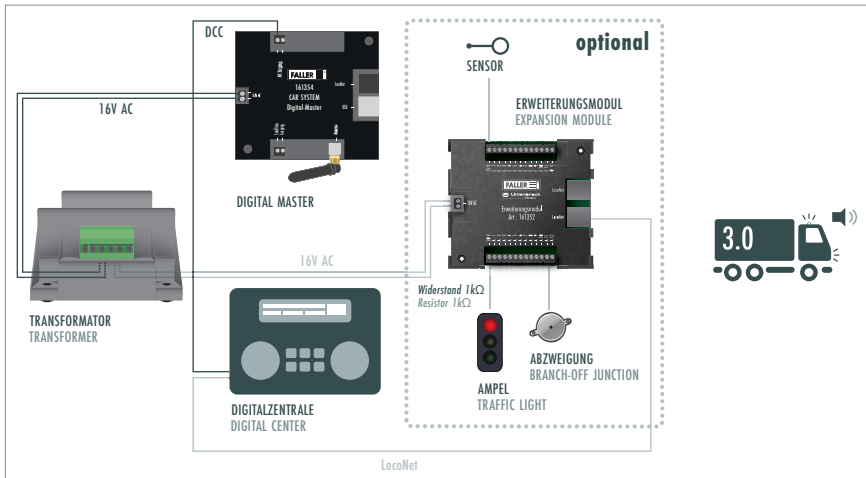


Fig. 5: Option 2

NOTE: Digital control unit and extension modules have to be operated each with their own supply voltage.

Option 3 – Full extension using software and satellites

Maximum comfort, flexibility and traffic safety. The full extension of Car System Digital will allow you to locate your vehicles by means of ultrasonic satellites and will permit fully automatic traffic on your model installation, including distance control. To do this the Car System digital software will help you generate the circuit layout, ensure the recognition of all light signals and control components, and permit fully automatic or voice-aided traffic control as well as all changes in the vehicles' functions in real time.

All features of the new generation. Braking, flashing, turning off, stopping, flashing and speeding up again. Activating a flashlight turn signal when approaching a turnout and switching it off again after turning off. Stopping in front of signals, observance of the right of way, all other active traffic rules, and the most realistic distance control available in the market. Possible 'take-over' of a vehicle by speech control to drive an own itinerary. And many others more.

Basic equipment:

- Car System Digital 3.0 vehicle
- Processor-controlled charging unit, Art. 161349
- Car System Digital Beginner's Set, Art. 161355

Optional equipment:

- Extension module, Art. 161352
- Car System light signals and control components (Turnouts, Parking spaces)
- Sensors, Art. 161773, for shadow areas such as tunnels

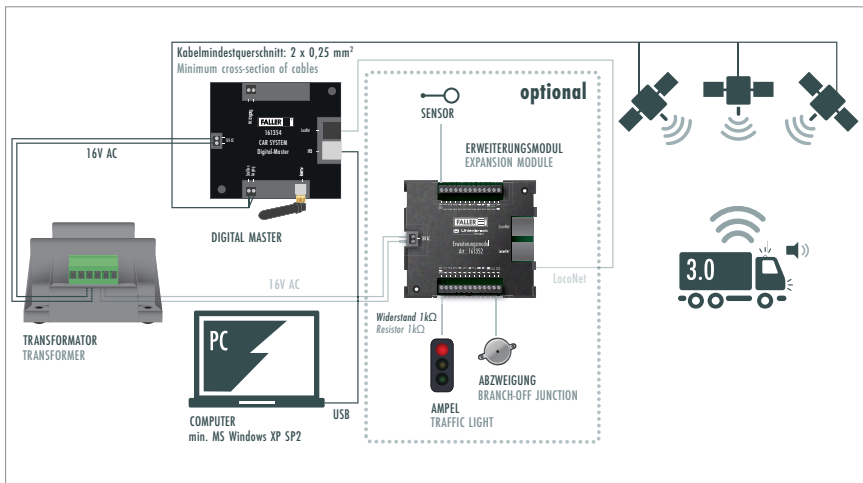


Fig. 6: Option 3

Comparing Car System generations

Functions	CS 1.0	CS 2.0	CS 3.0
Wire-guided	✓	✓	✓
Reed sensor	✓	–	–
Magnetic field sensor	–	✓	✓
Revolving signal lights not switchable	✓	–	–
Revolving signal lights switchable via cable, when the vehicle is stationary	–	✓	✓
Revolving signal lights switchable via remote control while driving	–	–	✓
Light and sound functions (L+S) switchable via cable, when the vehicle is stationary	–	✓	✓
L+S switchable via remote control while driving	–	–	✓
Permanent access to the vehicle while driving	–	–	✓
Permanent feedback from the vehicle while driving	–	–	✓
Millimetre precision determination of vehicle's position while driving	–	–	✓
Vehicles can drive on conventional Car System layouts with stop points and parking spaces	✓	✓	✓
Slow braking and accelerating	–	✓	✓
2 driving speeds on conventional Car System layouts	–	✓	✓
Stageless change in speed	–	–	✓
Direction indicator	–	–	✓
Distance control	–	–	✓
Feedback rechargeable battery state	–	–	✓
Quickly chargeable	–	✓	✓
Modification of the vehicle parameters (speeds, start-up/braking curves...) with a DCC capable digital controller via cable	–	✓	✓
Modification of the car parameters (speed, start-up/braking curves...) with a DCC capable digital controller via remote control	–	–	✓
Control of the vehicle with a DCC capable digital controller	–	–	✓
Load-sensing motor control	–	✓	✓

Fig. 7: Comparing Car System generations

Components

Components are the analog standard control elements that will allow you to regulate Car System traffic on model installations.

Branch-off junction, electrical, Art. 161677

When activated the magnetism of the Turnout steers a vehicle onto a second turning-off guide wire. This occurs via the magnet fastened to the steering slider built into the vehicles.

Stop section, Art. 161675

When activated the Stop section generates a magnetic field. That magnetic field opens the dry reed sensor built into the vehicle and cuts the current supply to the motor. The vehicle thus stops. When driving over a Stop section, a digital vehicle can also change to a second driving speed. For this purpose, the south pole of the Stop section must show upwards.

In digital operation, installing virtual or physical signals replaces to a very large extent the use of Stop sections.

Parking space, electrical, Art. 161674

The Parking space features a permanent magnet that is readily able to maintain analog Car System vehicles currentless over a lengthy period of time. Whenever the Parking space is activated that field of force is briefly overlaid with that of a built-in current-operated coil. This closes the dry-reed sensor located in the analog vehicle, and the motor is supplied with current again. This sets the vehicle in motion.

In digital operation the Parking space puts a digital vehicle in rest mode and switches the radio link off. However, the magnetic field sensor built into the digital vehicle continuously checks whether the Parking space is switched off. As soon as the Parking space is switched on, radio transmission is resumed immediately.

Sensors, Art. 161773

Sensors built into the roadway are activated by magnets installed on the vehicles and timely send a checkback signal to an extension module or to the traffic control unit whenever the vehicle drives over them. In digital operation their use is particularly meaningful whenever checkback signals are required from spots that are not covered by satellites, but nevertheless should be detected, for instance in underground garages or shadow stations. Other possible uses consist in monitoring traffic at level crossings or controlling intersections when simultaneously operating Car System Digital and Car System Analog vehicles.

TIP

You will find detailed wiring diagrams for all Car System components in the instructions for use supplied with our respective products.

5. Assembly and putting into operation



Connecting satellites

Positioning satellites

NOTE:

- The distance between satellites should be at least one meter and two meters at the most.
- Position the satellites above the circuit in such a way that they will form a triangle. To ensure precise calibration, none of the angles of such triangle may be less than 20°.
- Measuring points all over the circuit must be within a five meter radius from each satellite, i.e. no satellite may be more than five meters away from any measuring point.
- Make sure that fastening is reliable and stable.
- Take into consideration the fact that the satellites should be arranged and directed towards the circuit in such a way that, when operating the installation, you never stand between the vehicles and the satellites.
- If vehicles cannot be detected by more than two satellites in certain areas of the installation (apart from tunnels), think about the mounting of an additional fourth satellite.
- We basically would advise against the use of two satellites only, because of the bad resolution and the two-dimensional representation. Should you want to use a 2D scenario nevertheless, the satellites must then be mounted approx. 50 cm behind or in front of the installation, otherwise the measuring circles will overlap and some measuring points will be detected twice.

TIP

The Master will allow you to supply up to six satellites with voltage and to position them in such a way that your vehicles can reliably be located even on large installations that feature areas of difficult monitoring. For the rest, if you want to operate the installation with more than six satellites, these additional satellites will have to be connected to a separate supply voltage.

Prerequisite: Position at least two satellites (minimum prerequisite for digital operation with software and satellites).

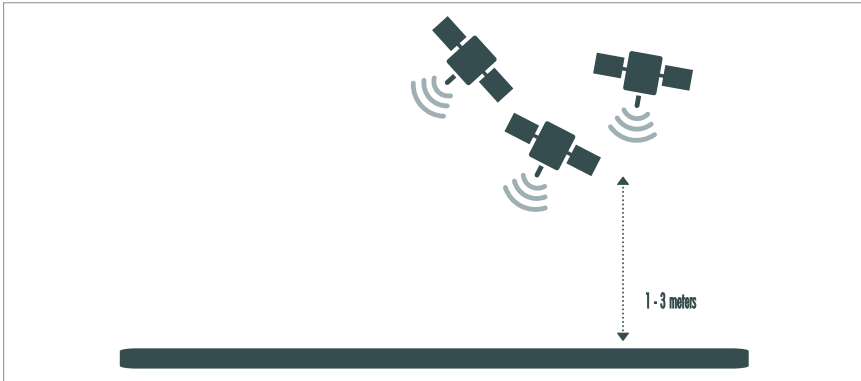


Fig. 8: Positioning satellites

- ▶ Position the satellites one to three meters above the circuit.
 - ▶ Position the satellites at a distance of one to two meters to one another.
- The satellites are now positioned and can be connected to the Master.*

Positioning the satellites on larger installations

NOTE: Three satellites will allow you to operate an installation with a length of up to ten meters.

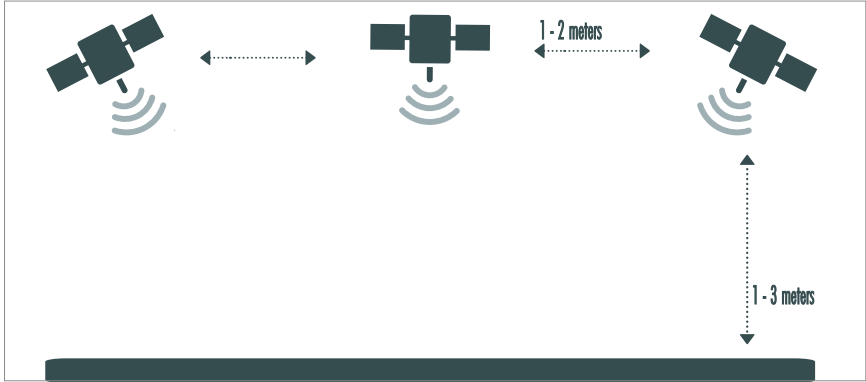


Fig. 9: Positioning satellites

- ▶ Position the satellites.
- ▶ Direct the satellites towards the extremities of the installation.
The rear part of the installation will be covered.

Connecting the satellites to the Master



Fig. 10: Connecting the satellites to the Master

NOTE: It is not possible to reverse the polarity of the satellites' connection lines.

Prerequisite:

- You will require a cable featuring at least 2 x 0.25 mm².
- At least two satellites are required to operate the system. We expressly recommend to use three satellites.
- ▶ Connect the satellites to the Master.

Connecting the Master

Caution

Overload of the Master through wrong supply voltage! Maximum 16 V AC!

Failure of the Master.

- ▶ Operation only with FALLER 50 VA, 56 to 60 Hz transformer, Art. 180641!

Building up the power supply

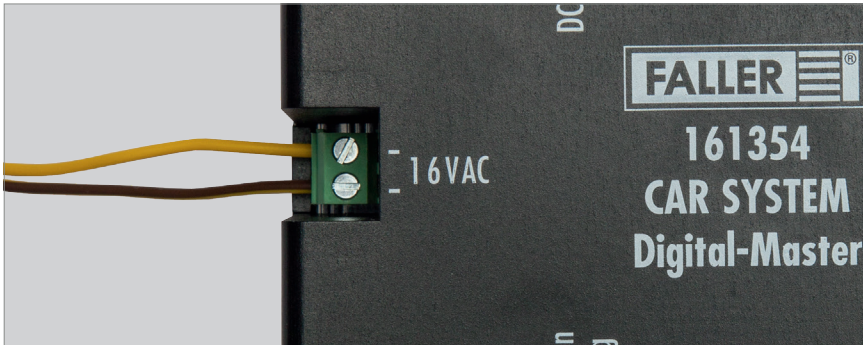


Fig. 11: Building up the power supply (Master)

- ▶ Connect the Master to 16 V alternating voltage.
The Master is now connected to the power supply.

Connecting the Master to a personal computer

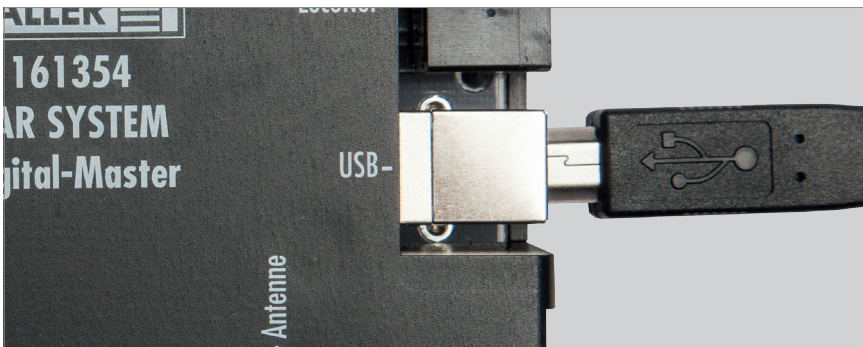


Fig. 12: Connecting the Master to a PC

NOTE: A prerequisite to a proper connection between PC and Master is the previous installation of the necessary drivers on your PC. After completing the installation of the »Car System Digital« software, a driver installation wizard will automatically open.

- ▶ Connect the Master to your PC using the USB cable (USB-A to USB-B).

If the Master is connected to both, the supply voltage and your PC, and the »Car System Digital« software has been installed on your PC, the 'Power On' diode flashes at heart rate and radio transmission is activated. The Master will search for devices, transmitters and satellites.

NOTE: If the Master picks up radio signals, various diodes will flash:

- when receiving signals diode 'Radio Tx' flashes..
- when transmitting signals diode 'Radio Rx' flashes.

When transmitting data via PC/USB, LocoNet or DCC the corresponding diodes will flash: USB, LocoNet or DCC diodes.

Connecting the Master to an extension module

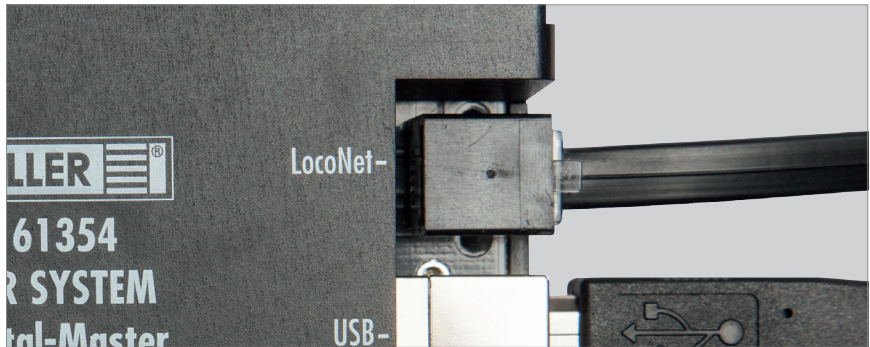


Fig. 13: Connecting the Master to an extension module

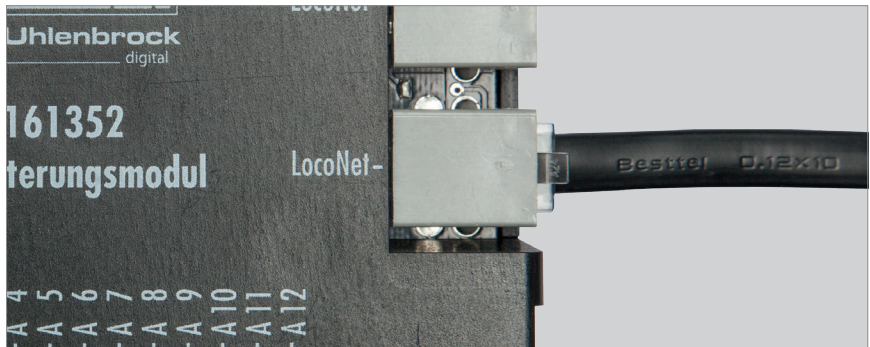


Fig. 14: Connecting the Master to an extension module

- ▶ Connect the Master to your extension module via a LocoNet cable.
The Master is now connected to your extension module.

TIP

You will find LocoNet cables in specialized dealers' shops for modellers.

Connecting an extension module

Connecting the power supply

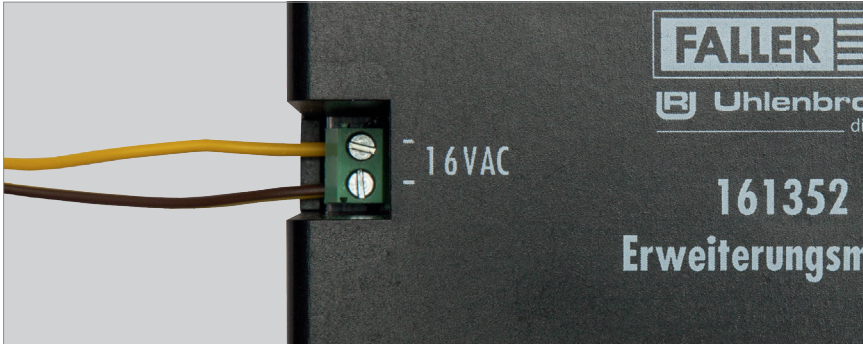


Fig. 15: Connecting the power supply (Extension module)

NOTE: As far as possible you should use for your extension modules a supply voltage that is different from that of the Master (separate transformer).

- ▶ Connect the extension module to 16 V alternating voltage.
The extension module is now connected to the power supply.

Connecting checkback contacts

The inputs of the modules may not be connected to any voltage.

CAUTION

Short-circuit hazard!

Failure of the extension module.

- ▶ Never connect live components, e.g. the outputs of a points decoder, to the inputs of modules.

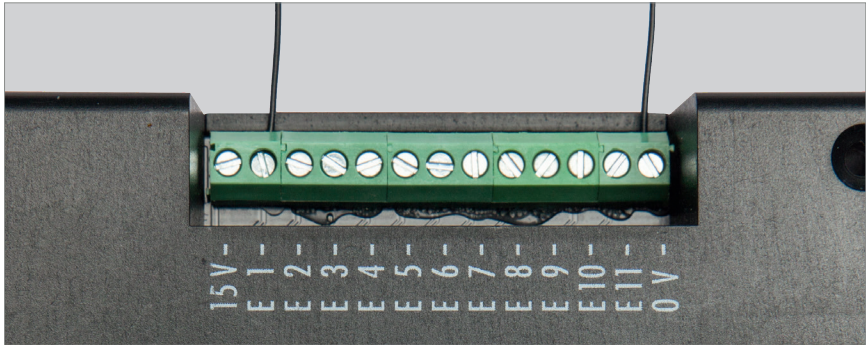


Fig. 16: Checkback contacts

- ▶ Connect an end of the sensor to 0 V and the other end to the desired input (E1 to E11).

TIP

Here you may connect, at choice, push buttons, sensors, switching tracks or the potential-free outputs of switching decoders. For checkback signals coming from the road, use FALLER sensors, Art. 161773.

Connecting components

Outputs of modules allow to control various consuming devices. Such devices may be on the one hand Car System control components (Turnout, Parking space, Stop section) or any other consuming devices such as LEDs (along with a suitable protective resistor) or lamps.

CAUTION

Overload of light signal through excessive electric voltage!

Failure of the light signal.

- ▶ Use a 1 k Ω protective resistor (available from electronics retailer's shops).

NOTE:

- Components such as 'Parking space' and 'Stop section' have to be connected to 20 V. On the other hand components such as 'Turnout' and lighting elements have to be connected to 15 V.

- When connecting a Stop section, make sure you observe the polarity. If a vehicle should stop in such a place, the north pole of the coil must show upwards. To test that it is so, hold the steering slider of a vehicle above the middle of the Stop section when it is switched on. If the steering slider is repelled, the north pole shows upwards and the polarity is correct. On the contrary, if a vehicle of FALLER digital series should switch over to its second driving speed in that place, it's the south pole that has to show upwards.

TIP

For further information regarding the connection of components and consuming devices, please refer to the instruction manual of the relevant device.

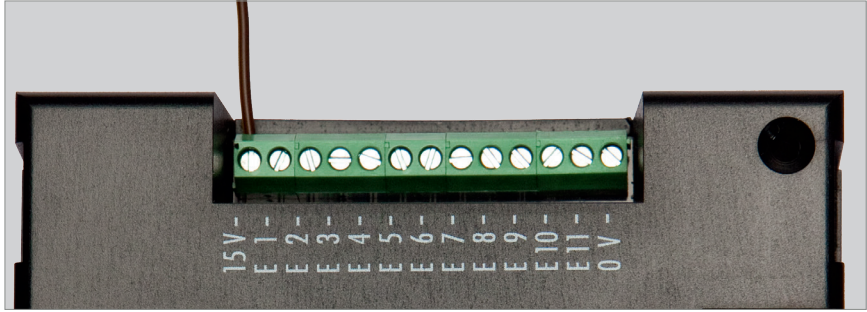


Fig. 17: Clamping screw 15 V

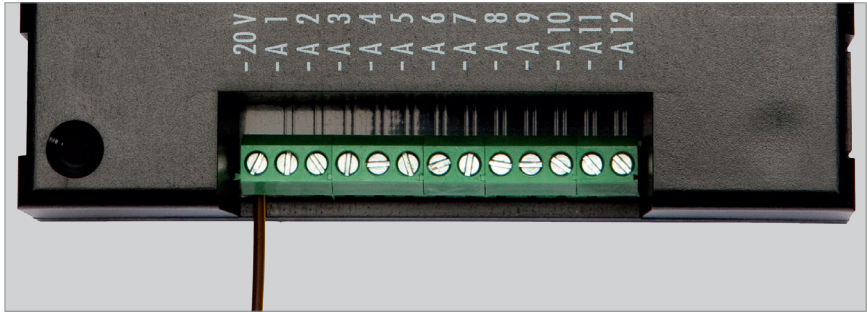


Fig. 18: Clamping screw 20 V

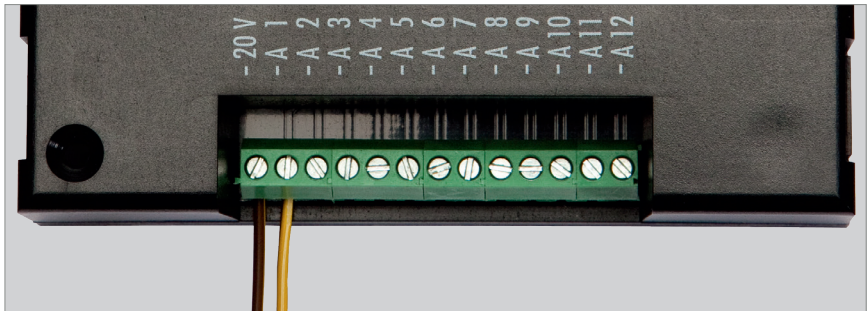


Fig. 19: Clamping screw 20 V, Output

- ▶ Connect one of the cables of the consuming device to the voltage provided for that purpose (15 V / 20 V).
- ▶ Connect the other end of the consuming device to the desired output (A1 to A12).

6. Installing the software



EN

The present »Car System Digital« software is of easy and intuitive operation and fully automatically identifies any hardware components of Car System Digital that are added to the system (digital vehicles, Car System Digital satellites, extension modules). The circuit layout is drawn up through automatic recording of the track.

NOTE: In the course of the installation you will be prompted to enter not only the license code (Software-SN), but also the registration code (Reg.-Nr.) of your product.

You will find the license code for the software on both, the rear side of the Master and on the product card supplied with the Master.

To be given your registration code, you are kindly requested to contact FALLER's Customer Service Department. Please note that we shall require for that procedure your license code (Software-SN) and the serial number of your Master (Serien-Nr.).

TIP

Your direct line to FALLER's Customer Service Department:

Phone: + 49 (0) 7723 651-106

E-Mail: kundendienst@faller.de

Installing »Car System Digital«

NOTE:

- Take into account the system requirements of your operating system and carry out the installation completely. This will include .NET framework V 4.0 of Microsoft and drivers by Silabs (Silicon Labs).
- Do not connect the Master until you have installed the software and the required drivers on your PC.
- ▶ Plug the USB memory stick into one of the relevant inputs of your PC.
- ▶ In window 'Automatic Retrieval' open the file directory or search for the interchangeable data medium in Windows Explorer.

- ▶ Open file directory 'Software'.
- ▶ Let file 'Setup.exe' run by clicking twice on its name.
Please wait for the installation on your computer to be prepared. This may take several minutes. Acknowledge, if necessary, the safety warnings emitted by the user account control process by pressing the buttons 'Run' or 'Yes'.
- ▶ Follow the instructions given by the setup wizard regarding the desired language, license agreement, destination directory for the installation, etc.
- ▶ Acknowledge the respective steps to be taken for the installation of the required drivers and stated in driver installation wizard 'CP210x USB to UART Bridge Driver Installer' with 'Next', and accept the required license agreement by ticking the box 'I accept this agreement'.
- ▶ Exit the driver installation with 'Finish'.
The software is going to be installed on your computer.

Licensing

You have the possibility of choosing different types of license, which differ from one another by the scope of services offered.

NOTE: All available licenses can be ordered later, at any time, from FALLER's Customer Service Department.

Available licenses

License type	Scope	Contained in
Basic version	2 digital vehicles	Car System Digital Master, Art. 161354
Standard	10 digital vehicles	Car System Digital Beginner's set, Art. 161355
Premium	Unlimited number of digital vehicles	Car System Digital Software, Art. 161356

Tab. 3: Available licenses

TIPP

Only the Premium software license additionally allows pure virtual operation of Car System Digital without having to connect any Digital Master.

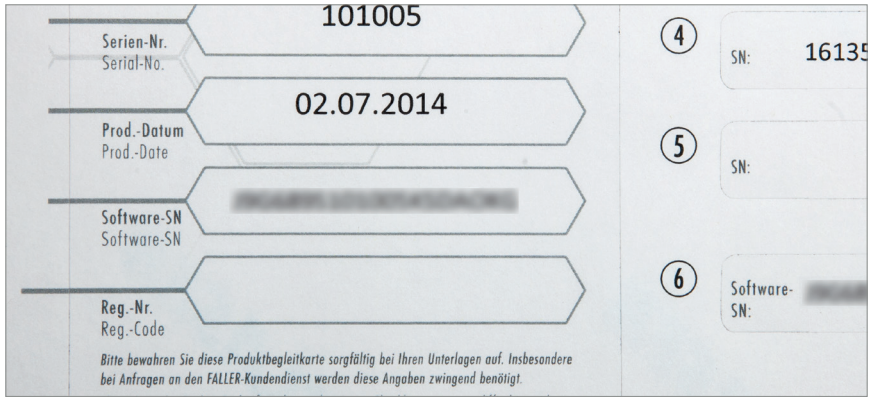


Fig. 20: License code

After finishing the software installation, the program starts and requests you to enter your license code. Make sure that the Master is connected to your PC.

NOTE:

- You will find the license code (Software-SN) on both, the rear side of the Master and on the product card supplied with the Master.
- When entering the code, you need not pay any attention to capitals or small letters.

Prerequisite: The Master is connected to the PC.

- ▶ Enter the license code.
The check field is highlighted in 'green' and your license type is displayed.
- ▶ Click on 'Accept'.
An information window appears on the display.
- ▶ Click on 'Ok'.
Your software and the Master are now activated.

Upgrading your license will be possible at any time. Your license code is stored on both, your PC and our server. Whenever you purchase a new license code, you will be able to simply delete the former code and to enter the new one and, as described just now, to accept. If you lose your license code, FALLER's Customer Service Department will be of assistance in such a situation.

Registration

Before making use of your Master and »Car System Digital« software, it is necessary to have these products registered. After entering your license code, the license type is displayed with a 'green' background and you have the opportunity to enter your registration code.

- ▶ To be given your registration code (Reg.-Nr.), you are kindly requested to contact FALLER's Customer Service Department. Please note that we shall require for that procedure your license code (Software-SN) and the serial number (Serien-Nr.) of your Master.

TIP

Your direct line to FALLER's Customer Service Department:

Phone: + 49 (0) 7723 651-106

E-Mail kundendienst@faller.de

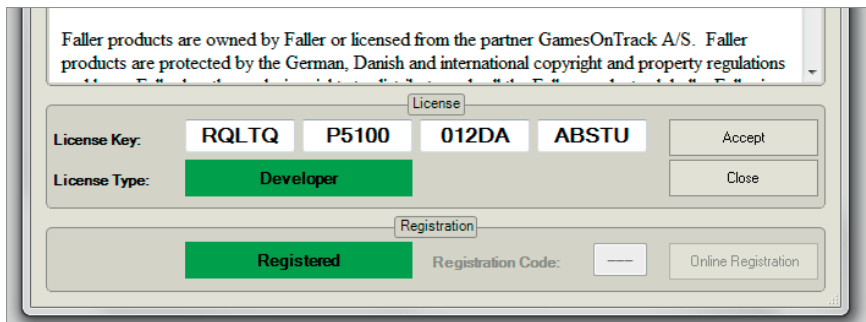


Fig. 21: Software registration

- ▶ After being given the registration code (Reg.-Nr.), write it down with a ballpoint in the field provided for that purpose on the product card.
- ▶ Enter the three-digit registration code in the installation window.
- ▶ Click on 'Accept'.

Your Master and the software are now registered.

NOTE: The software license is directly tied up with the serial number of the Master and thus cannot be used in association with another Master.

TIP

At the beginning of chapter 7 'User interface of the software' you will find information on an illustrative model installation included in the software and containing all the essential functions of »Car System Digital«.

Updating

Software updates will automatically be offered to you whenever you start the software, as far as you are online. You might also want to start the search for an updated version yourself in menu 'Help'.

- ▶ Store the exe-file in a directory of your own choice.
- ▶ Start the exe-file you have downloaded by clicking twice on its name.
- ▶ Acknowledge, if necessary, the safety warnings emitted by the user account control process by pressing the buttons 'Run' or 'Yes'.
- ▶ Select in the window 'Selection of setup language' the language that is to be used during the installation.
- ▶ Acknowledge the steps in the setup wizard with 'Next'.
- ▶ Exit the setup wizard with 'Finish'.
- ▶ Acknowledge, if necessary, the respective steps to be taken for the installation of the required drivers with 'Next', and accept the required license agreement by ticking the box 'I accept this agreement'.
- ▶ Exit the driver installation wizard with 'Finish'.

The updated version of the software will be installed on your computer.

TIPP

Please note that after any software update you may be in possession of an updated version of the present instruction manual, too. It can be called up at any time using functional key 'F1'.

Note: After installing the software you can immediately start designing your model installation, see Chapter 9 'How to design a new system'.

7. User interface of software



NOTE: Your interchangeable data medium contains the illustrative file of a preconfigured model installation with all the essential functions of »Car System Digital«. That recorded track is only meant to serve as an illustrative circuit and to introduce you to the operation of the software.

- ▶ In the menu bar click on 'File' and then on 'Load System'.

A Windows Explorer window appears on the display.

- ▶ Using the menus in that Windows Explorer window, search for directory 'Beispiel' (Example) on your interchangeable data medium.
- ▶ Select the file you find there and click on 'Open'.

The illustrative installation is displayed.

Presentation of user interface

The user interface shows all information and presets you can perform with the »Car System Digital« software. The whole functionality of the program can be handled through a conventional Windows menu system.

NOTE: There are different reasons for a given area in the menus or for a button to appear greyed out and therefore disabled:

- They are not relevant for the action in question.
- They are not available within the license you have purchased.
- They will be of significance as part of a future update.

In the following we shall present and explain all pictures, buttons and elements of the user interface.

The user interface consists of the menu bar, the view window and the information bar.



Synopsis picture

Purpose

The synopsis picture is the start picture of the software. It is divided into three major areas.

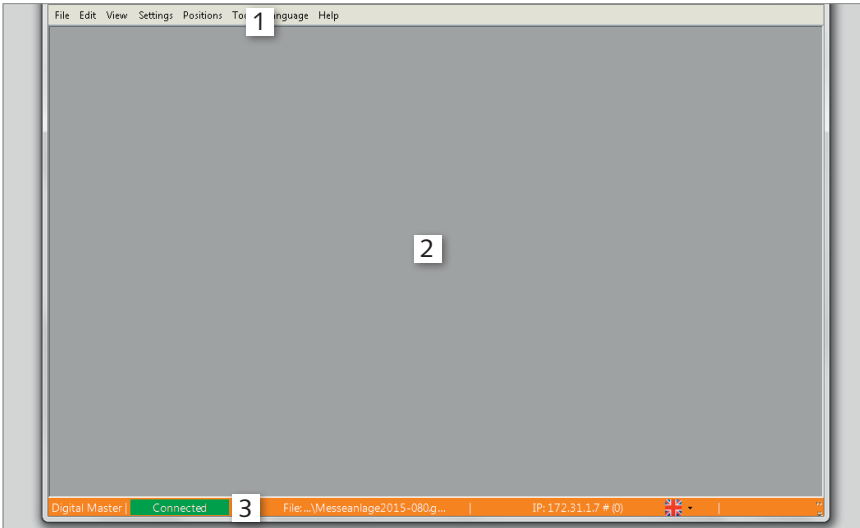


Fig. 22: Synopsis picture

Element	Description
1 Area 'Menu bar'	Shows all functions of the user interface, these functions being gathered under key words
2 Area 'View window'	Displays the different windows of the user interface
3 Area 'Information bar'	Shows at a glance the essential data when working on the display

Tab. 4: Synopsis picture

Menu bar

In the Menu bar all functions and elements of the user interface are gathered under key words.

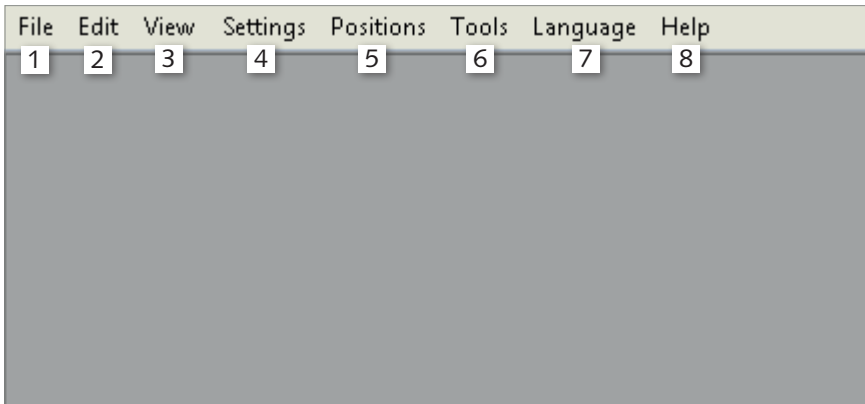


Fig. 23: Menu bar

Element	Description
1 File	Opens the File menu
2 Edit	Opens the Edit menu
3 View	Opens the View menu
4 Settings	Opens the Settings menu
5 Positions	Opens the Positions menu
6 Tools	Opens the Tools menu
7 Language	Lists the languages available
8 Help	Opens the Help menu

Tab. 5: Menu bar



Information bar

The information bar shows the Master's current state as well as further information on the system.

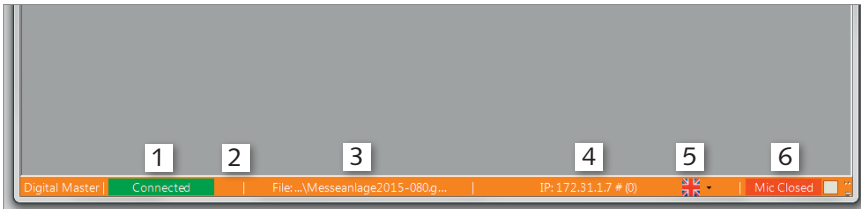


Fig. 24: Information bar

Element	Description
1 Digital Master	Shows the state of the connection to the Master
2 Log	Shows the recording state of a Log file: 'red': Recording Log file. 'green': Log file created
3 File	Shows the system file currently open
4 IP	Shows your IP address
5 Language	Shows the selected language
6 Microphone	Shows the state of the microphone.

Tab. 6: Information bar

Circuit window and View window

Circuit window

The circuit window is subdivided into three views: 'Driving', 'Edit' and 'Track'.

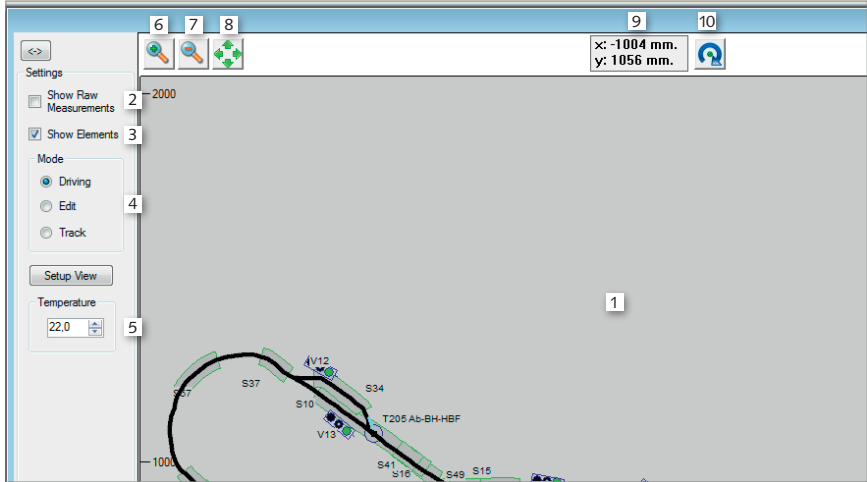


Fig. 25: Circuit window

	Element	Description
1	View	Shows the recorded track scenario
2	Show Raw Measurements	Shows the positions of the vehicles measured in real time
3	Show Elements	Shows all elements of the track
4	Mode 'Driving'	Changeover to mode 'Driving'
	Mode 'Edit'	Changeover to mode 'Edit'
	Mode 'Track'	Changeover to mode 'Track'
5	Temperature	Setting of the ambient temperature
6	Zoom in	Enlarges the picture displayed
7	Zoom out	Reduces the picture displayed
8	Zoom all	Resets the circuit window to the standard view
9	Coordinates	Shows the coordinates of the mouse cursor
10	Rotation	Rotates the picture displayed by 90°

Tab. 7: Circuit window

View 'Driving' within the circuit window

Purpose

- Shows the circuit when playing.
- Controlling turnouts and signals.

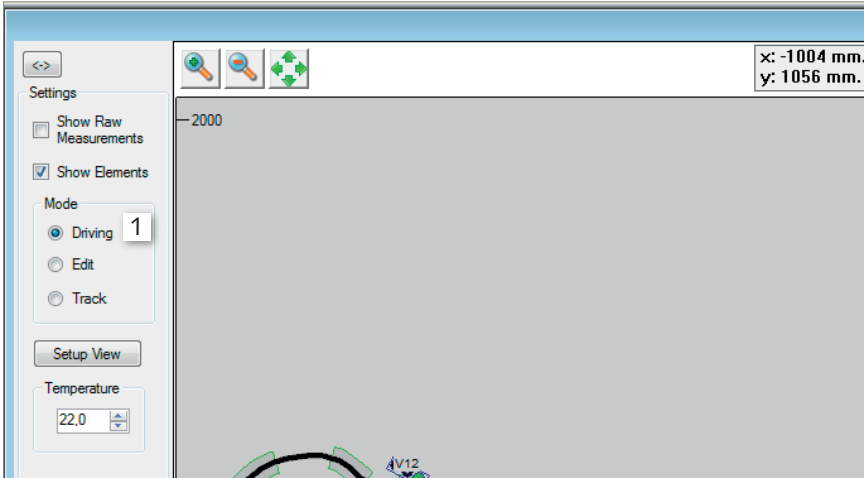


Fig. 26: View 'Driving' within the circuit window

Element	Description
1 View 'Driving'	Shows the track and the elements in the circuit window Allows controlling turnouts and signals

Tab. 8: View 'Driving' within the circuit window

NOTE: A vehicle that flashes in the 'Driving' view points at the fact that its battery is nearly discharged.

View window 'Edit' within the circuit window

Purpose

- Shows the circuit in the Edit view.
- Adding and modifying all elements on the circuit.

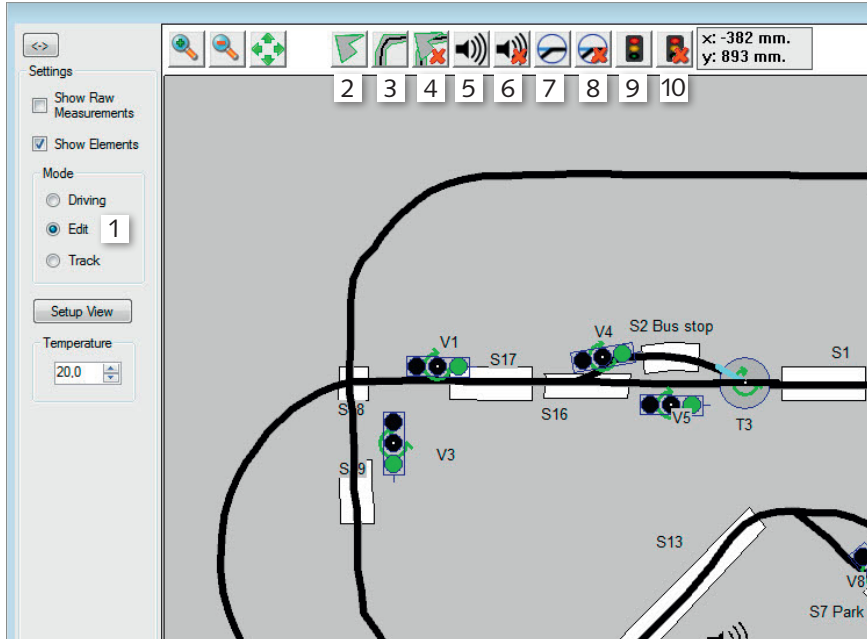


Fig. 27: View 'Edit' within the circuit window

Element	Description	
1	View 'Edit'	Shows the track and the elements in the circuit window Allows adding and modifying all elements on the circuit
2	Draw a section	A section can be drawn freehand. To draw a polygon of any kind, click with the mouse key on the type of corners you want to have
3	Section Circuit	A section can be drawn along the track. Directly click on the track. The first click indicates the beginning of the section. The second click indicates the end of the section
4	Remove section	The selected section is removed
5	Add Sound	A sound is added

Element	Description
6	Remove Sound The selected sound is removed
7	Add Turnout A turnout is added
8	Remove Turnout The selected turnout is removed
9	Add Signal A Signal is added
10	Remove Signal The selected Signal is removed

Tab. 9: View 'Edit' within the circuit window

NOTE:

- Turnouts and signals without any relation to a track feature a red frame.
- Pressing key 'Strg' + clicking left mouse key reduces the view of the turnout.

View 'Track' within the circuit window

Purpose

- Shows all measuring points of a track
- Adding, modifying or deleting of measuring points

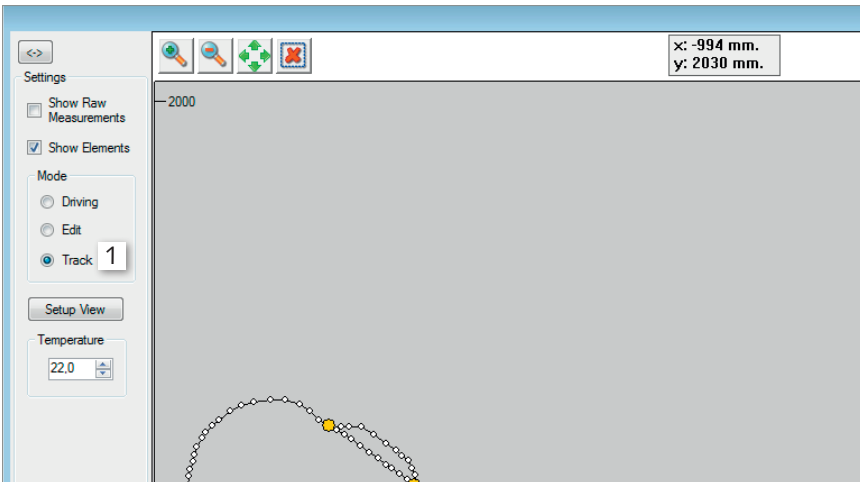


Fig. 28: View 'Track' within the circuit window

Element	Description
1	View 'Track' Shows all measuring points of a track Allows adding, modifying or deleting measuring points

Tab. 10: View 'Track' within the circuit window

View windows

The different view windows allow to display all vehicles, functions and their status, and to control functions.

View window 'Synopsis of vehicles'

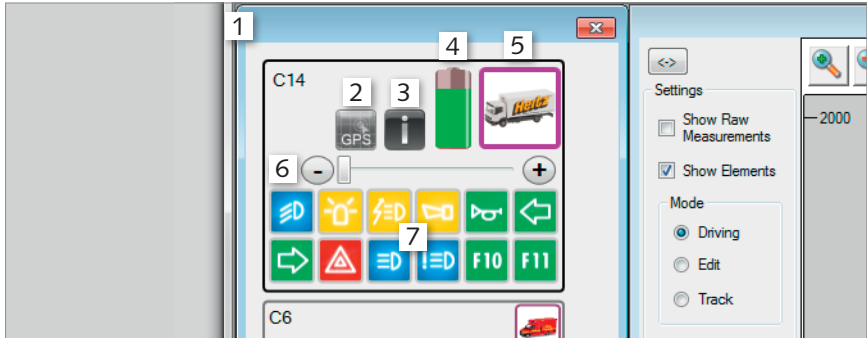


Fig. 29: View window 'Synopsis of vehicles'

The order of listing within the synopsis of vehicles results from the following criteria: last vehicle switched on, vehicle with discharged or nearly discharged battery (red battery symbol).

Element	Description
1 Vehicle	Shows the vehicles added Shows the vehicle's name
2 GPS	Shows the GPS link Starts the individual vehicle calibration
3 Info	Shows information on the vehicle
4 Battery display	Shows the charge of a battery
5 Vehicle picture	Shows the vehicle type
6 Speed slider control	Regulates the speed
7 Vehicle functions	Controls the vehicle's functions and shows their status

Tab. 11: View window 'Synopsis of vehicles'

NOTE: The battery display distinguishes between three colors: 'green': charge full to sufficient, 'red': charge empty or nearly empty, 'blue': simulated vehicle.

View window 'Turnouts'

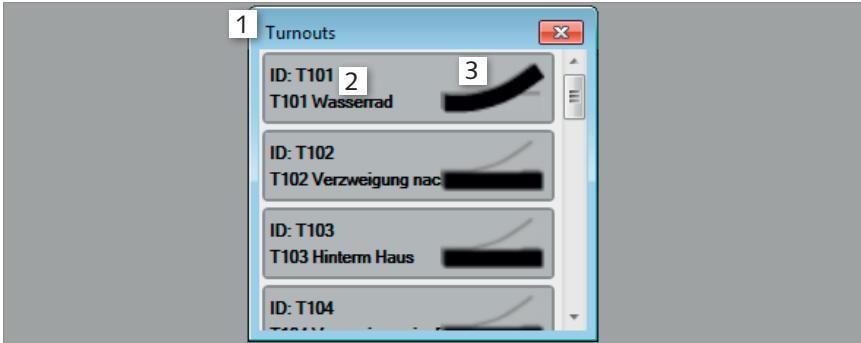


Fig. 30: View window 'Turnouts'

Element	Description
1 Window 'Turnouts'	Shows the turnouts
2 ID, Name	Shows the identification number of the turnout Shows the name of the turnout
3 Turnout symbol	Shows the current position of the turnout Clicking switches the turnout

Tab. 12: View window 'Turnouts'

View window 'Signals'

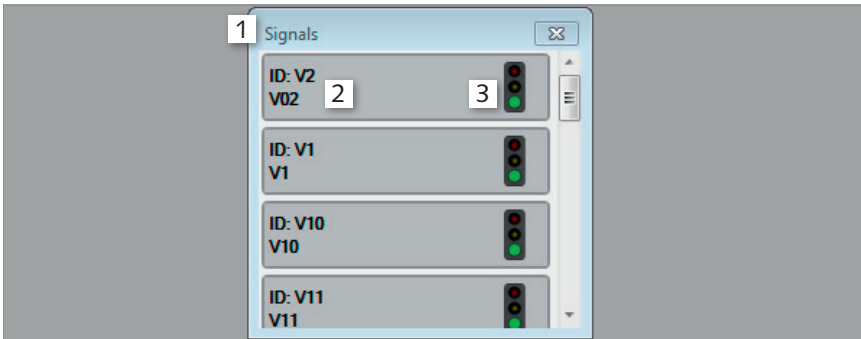


Fig. 31: View window 'Signals'

Element	Description
1 Window 'Signals'	Shows the signals

Element	Description
2 ID, Name	Shows the identification number of the signal Shows the name of the signal
3 Signal symbol	Shows the current color of the signal Clicking switches over the signal

Tab. 13: View window 'Signals'

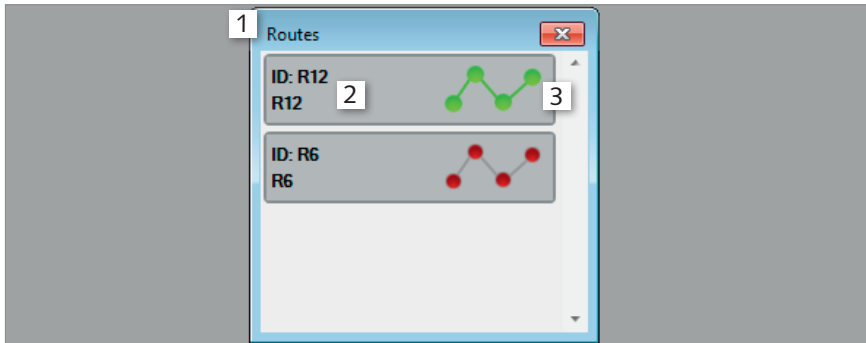
View window 'Routes'

Fig. 32: View window 'Routes'

Element	Description
1 Window 'Routes'	Shows the routes
2 ID, Name	Shows the identification number of the route Shows the name of the route
3 Route symbol	Shows the state of the route Clicking on the route activates/deactivates it

Tab. 14: View window 'Routes'

View window 'Sounds'



Fig. 33: View window 'Sounds'

Element	Description
1 Window 'Sounds'	Shows the sounds
2 ID, Name	Shows the identification number of a sound Shows the name of a sound
3 Sound symbol	Shows the state of the sound Through clicking the play of the sound is activated/deactivated

Tab. 15: View window 'Sounds'

View window 'Automation Control'

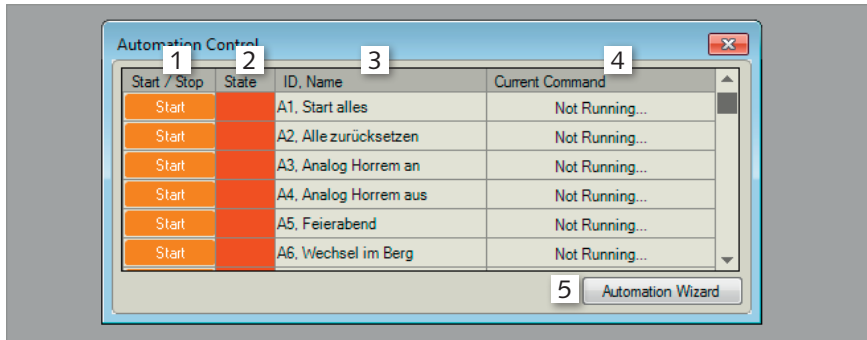


Fig. 34: View window 'Automation Control'

Element	Description
1 Start/Stop	Starts or stops the automation
2 State	Shows the current state of the automation (Green: Automation is activated. Red: Automation is deactivated. Violet: Automation makes a pause)
3 ID, Name	Shows the identification number and the name of the automation
4 Current Command	Shows the command being executed
5 Automation wizard	Changeover to Automation wizard

Tab. 16: View window 'Automation Control'

NOTE: With functional key 'F12' it is possible for you to stop the operation on your installation at any time. This will also stop all automatic processes (State color: violet). Actuating functional key 'F12' again will cause all vehicles to resume their drive and all automatic processes to continue in the same place where they have been stopped.

TIP

Clicking on the line under 'ID, Name' will cause the Automation Editor to open.

Menu 'Files'

Menu 'Files' allows you to manage circuit files and exit the software. This will include e.g. loading and saving your track, your settings, your vehicle data, etc. All these data are stored in a so-called system file. It will be possible for you to save new circuits, to modify existing system files or to save under a new name any circuit you have drawn already.

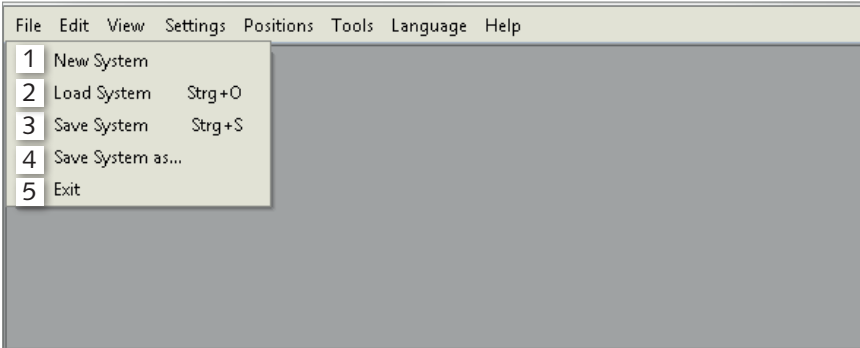


Fig. 35: Menu 'Files'

Element	Description	
1	New System	A new circuit will be designed
2	Load System	An existing circuit will be loaded
3	Save System	Saves a track that is being generated
4	Save System as	Save under another file name a circuit that is generated
5	Close	Exit the software

Tab. 17: Menu 'Files'

NOTE: At the end of every day make a backup file of your circuit and save that file on the USB memory stick ('File' >> 'Save System as').

TIP

We also recommend you to save your working procedures frequently, after every modification for instance. To this end, use in the file menu either 'Save System' or the shortcut 'Strg' + 'S', at your option.

Menu 'Edit'

In menu 'Edit' you will find a list of all the elements that can be installed and edited such as e.g. vehicles, turnouts, signals, and the like.

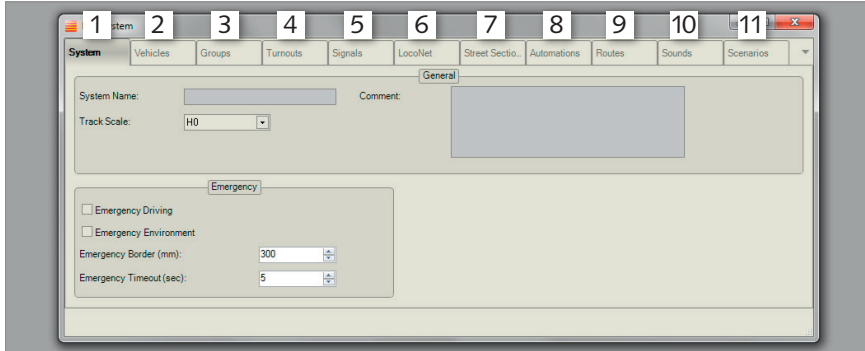


Fig. 36: Menu 'Edit'

Element	Description
1 System	Shows information and possible presetsings regarding the selected circuit
2 Vehicles	Shows information and possible presetsings regarding vehicles
3 Groups	Shows information and possible presetsings regarding groups
4 Turnouts	Shows information and possible presetsings regarding turnouts
5 Signals	Shows information and possible presetsings regarding signals
6 LocoNet	Shows information and possible presetsings regarding LocoNet modules
7 Street Sections	Shows information and possible presetsings regarding sections
8 Automations	Shows information and possible presetsings regarding automations
9 Routes	Shows information and possible presetsings regarding routes
10 Sounds	Shows information and possible presetsings regarding sounds
11 Scenarios	Shows information and possible presetsings regarding scenarios

Tab. 18: Menu 'Edit'

TIP

Use the comment fields provided to describe your system, especially when you have made some changes.

Menu 'View'

Menu 'View' allows you to have the various view windows displayed as well as to reset the entire view and thus to restore the standard view. Use that menu to adjust the display to see on the monitor exactly what you want to see.

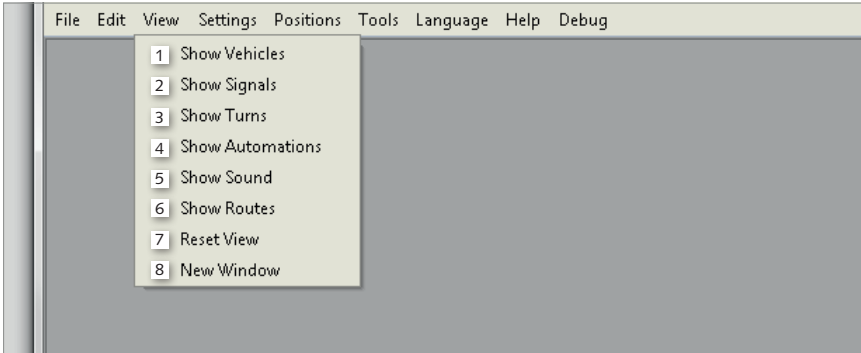


Fig. 37: Menu 'View'

Element	Description
1 Vehicles	Shows view window 'Synopsis of vehicles'
2 Signals	Shows view window 'Signals'
3 Turnouts	Shows view window 'Turnouts'
4 Automations	Shows view window 'Automation Control'
5 Sound	Shows view window 'Sounds'
6 Routes	Shows view window 'Routes'
7 Reset View	Restore the standard view
8 New Window	Generates a new system window (e.g. for a partition of the view on several monitors)

Tab. 19: Menu 'View'

Menu 'Settings'

Menu 'Settings' gives access to the basic settings of the Master. The adjustable areas there are on the one hand 'Radio' and on the other hand, under 'General', the control of LocoNet modules and the ambient temperature.

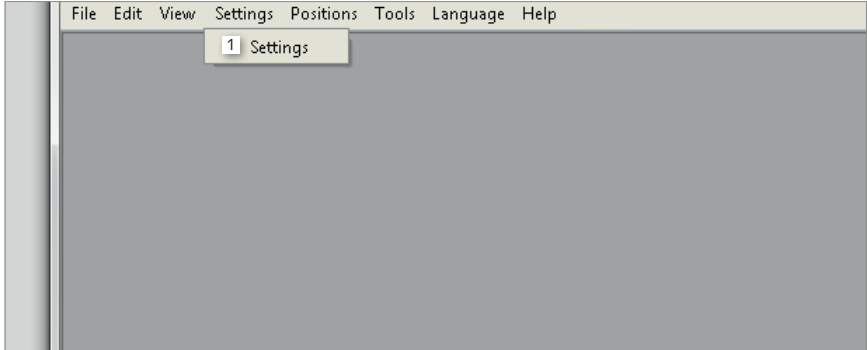


Fig. 38: Menu 'Settings'

Element	Description
1	Settings
	Opens the settings: Radio
	Opens the settings: General

Tab. 20: Menu 'Settings'

Radio

Purpose

- Modifies the radio settings of the Master.

NOTE: Please do not change these settings unless you have sufficient technical knowledge.

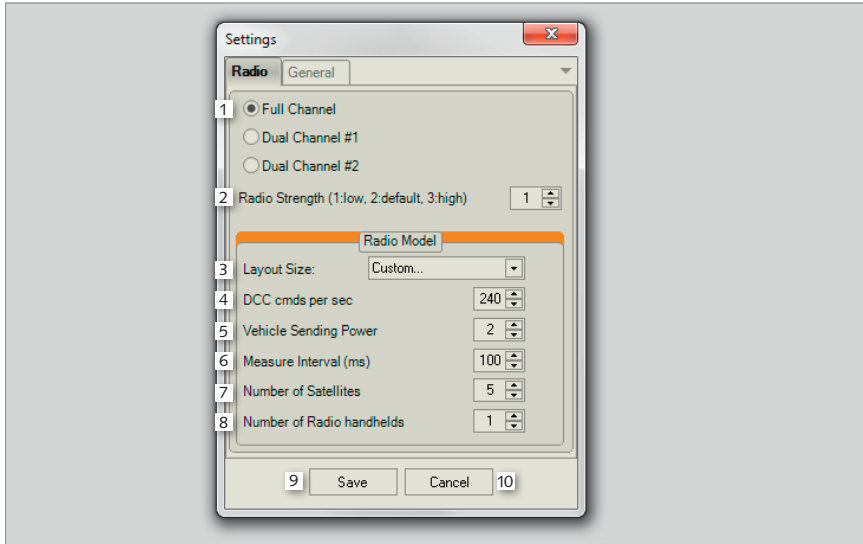


Fig. 39: Radio

Element	Description	
1	Full Channel	The entire band width of the channel is used
	Dual Channel #1	The available band width of the channel is split up (when operating two circuits, there is no signal overlap)
	Dual Channel #2	The available band width of the channel is split up (when operating two circuits, there is no signal overlap)
2	Radio Strength	Setting of the radio working range
3	Layout Size	Selection of the circuit size (depending on the size, the maximum number of satellites varies)
4	DCC cmds per sec	Number of commands to be transmitted by a Digital Control Unit
5	Vehicle Sending Power	Setting of the ultrasonic transmission power of vehicles
6	Measure Interval (ms)	Time interval between two position measurements

Element	Description
7	Number of Satellites
8	Number of Radio handhelds
9	Save
10	Cancel

Tab. 21: Radio

General

Purpose

- Modification of the Master's settings

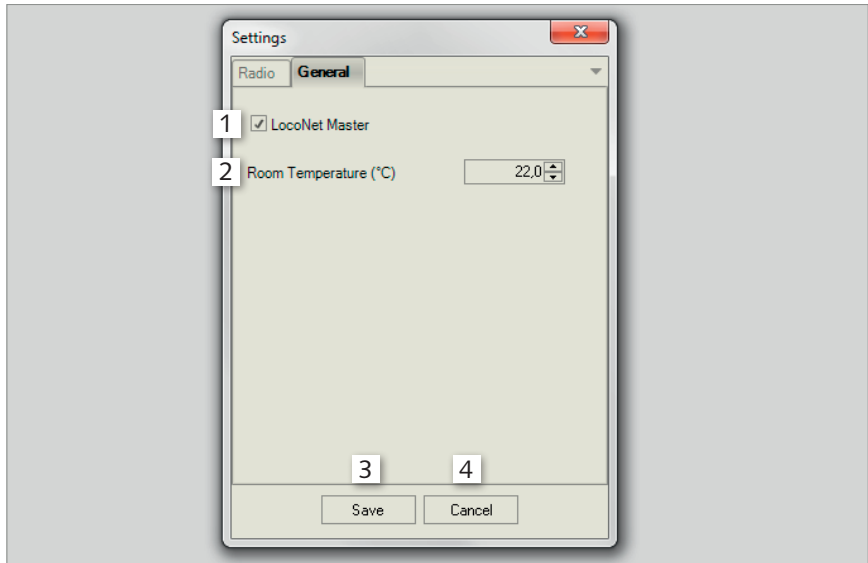


Fig. 40: General

Element	Description
1	LocoNet-Master
2	Room temperature (°C)
3	Save
4	Cancel

Tab. 22: General

Menu 'Positions'

Menu 'Positions' allows recording and editing the positions of the circuit.

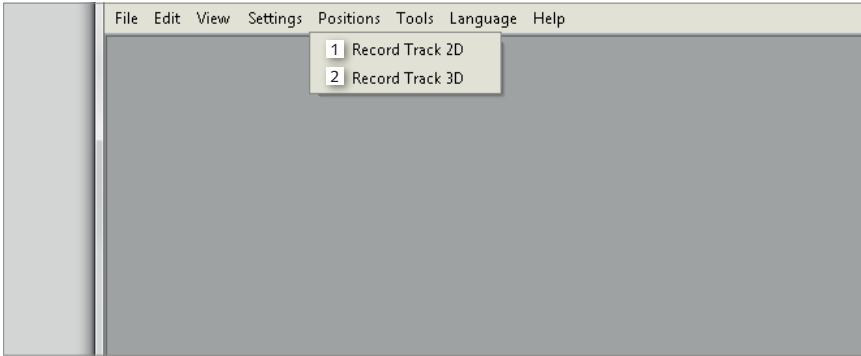


Fig. 41: Menu 'Positions'

Element	Description
1	Record Track 2D The track of an installation is virtually recorded (2 positions)
2	Record Track 3D The track of an installation is virtually recorded (3 positions)

Tab. 23: Menu 'Positions'

Record Track 2D

Purpose

- Virtually records the track covered.

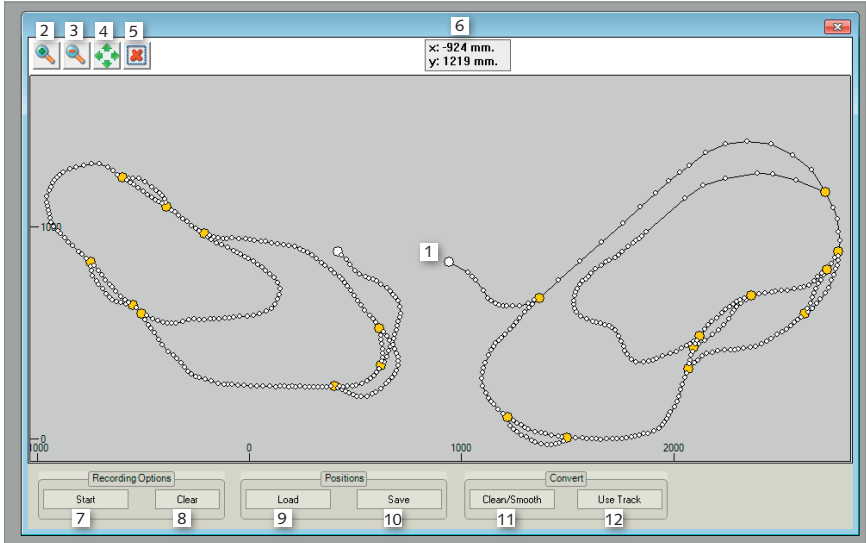


Fig. 42: Record Track 2D

Element	Description
1 View	Shows the recorded track
2 Zoom in	Enlarges the view in the window
3 Zoom out	Reduces the view in the window
4 Zoom all	Resets the system window to the standard view
5 X key	Deletes points in the track recording (multiple selection of points possible through pulling of a rectangle with pressed mouse key.)
6 Coordinates	Shows the current coordinates
7 Recording Options Start	Starts the recording of the track
8 Recording Options Clear	Deletes the entire recording
9 Positions Load	Loads the positions already existing
10 Positions Save	Saves the positions

Element	Description
11 Convert Clean/Smooth	Clears the track from measuring points that are not required
12 Convert Use Track	Adopts points from track recording

Tab. 24: Record Track 2D

Record Track 3D

Purpose

- Virtually records the track covered.

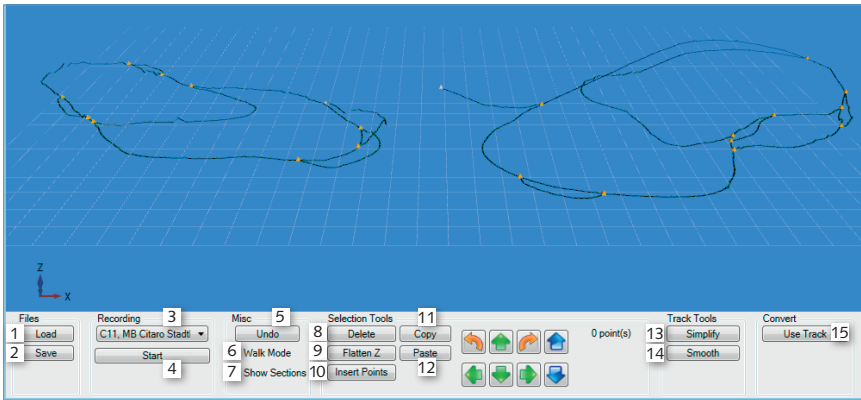


Fig. 43: Record Track 3D

Element	Description
1 Files Load	Loads a track that was previously recorded
2 Files Save	Saves the recorded track or the modifications made
3 Recording Pull-down menu	Selection of vehicle
4 Recording Start	Starts recording the track
5 Misc Undo	Cancels the last entry
6 Misc Walk Mode	Other behavior for Zoom and PAN
7 Misc Show Sections	Shows three-dimensional sections
8 Selection Tools Delete	Deletes points that have been selected
9 Selection Tools Flatten Z	Smooths the Z-values of a selected group of points (all measuring points are preserved)
10 Selection Tools Insert Points	Inserts further points within the area that has been selected

	Element	Description
11	Selection Tools Copy	Copies a group of selected points
12	Selection Tools Paste	Inserts a group of selected points
13	Track Tools Simplify	Clears the track from measuring points that are not required
14	Track Tools Smooth	Smooths the Z-values of a selected group of points by removing measuring points (track extrapolated)
15	Convert Use Track	Adopts points from track recording

Tab. 25: Record Track 3D

Menu 'Tools'

Menu 'Tools' allows updating the firmware of your Master, restarting the Master, performing settings on vehicle types as well as examining and saving Log files.

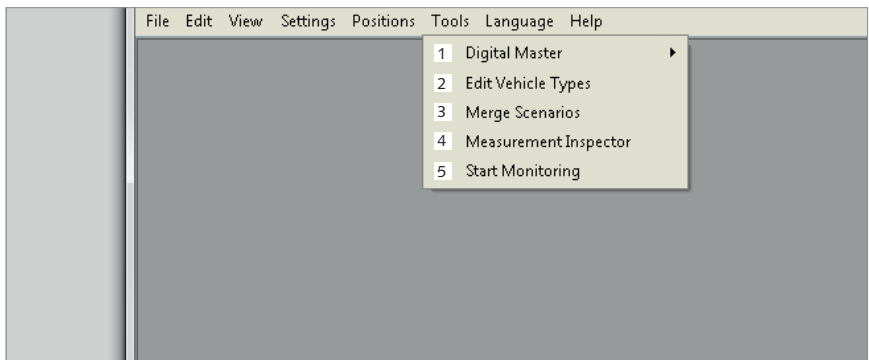


Fig. 44: Menu 'Tools'

	Element	Description
1	Digital Master	Firmware update Restart of Master
2	Edit Vehicle Types	Opens the settings of the vehicle types
3	Merge Scenarios	Joins two scenarios together in one system of coordinates

Element	Description
4 Start Monitoring	Stores the Log data of the track on a predefined memory site. In the window's left part a red box appears under the file name and turns 'green' after 1000 lines. Clicking on that box completes the recording procedure for the Log file
5 Show Debug	The current satellites, vehicles, quality of the radio/ultrasonic connection as well as the subject matter of the transmission are displayed

EN

Tab. 26: Menu 'Tools'

NOTE:

- Merely perform a firmware update when the system prompts you to do so. On every restart of the Master all radio-based components as well as your track data are read in and stored again.
- By adding further satellites it is possible for you to join the coordinate data of two tracks together to form one coherent scenario. On doing so the different measuring triangles are first geometrically joined together, and in a second stage the groups of measuring points are first linked with one another.
- Log files that are generated make and keep a record of the behavior of the software, and may help the technical service department at FALLER analyze and eliminate any problems or errors. After contacting FALLER, you may be requested to activate the generation of such a Log file.
- Window 'Edit Vehicle Types' makes it possible for you, for example, to modify some vehicle values and a picture that is stored in the synopsis of vehicles, or to set the safety distance that has to be observed by following vehicles.

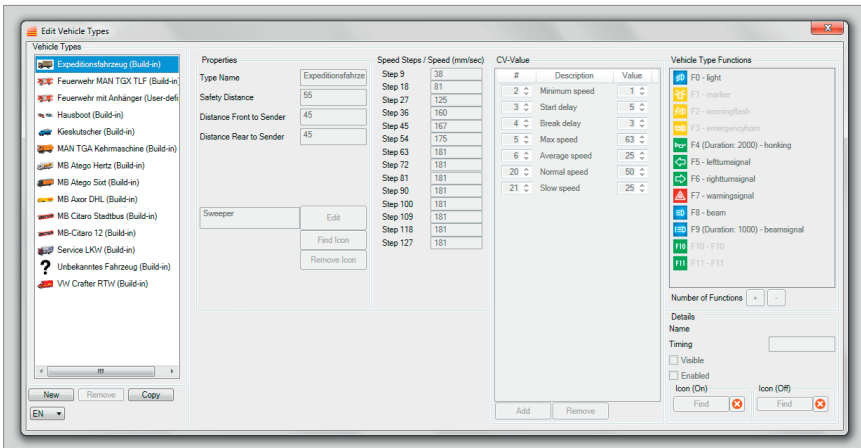


Fig. 45: Tool 'Edit Vehicle Types'

Menu 'Language'

Menu 'Language' allows you to change the display language of the user interface.



Fig. 46: Menu 'Language'

Element	Description
1 English	Changeover to English for the entire user interface
2 German	Changeover to German for the entire user interface
3 Danish	Changeover to Danish for the entire user interface

Tab. 27: Menu 'Language'

TIP

The easiest way to change the language of the user interface is to click on the flag symbol in the information bar.



Menu 'Help'

Menu 'Help' allows you to open and consult the texts intended to help you, to search for software updates that may be available, and to have some information on your present license displayed on your monitor.

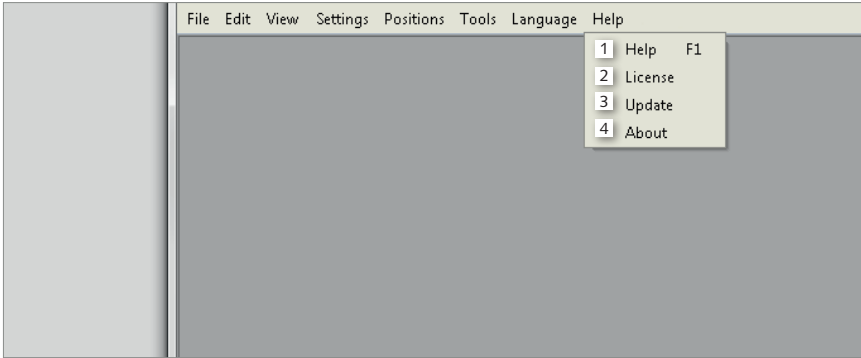


Fig. 47: Menu 'Help'

Element	Description
1 Help 'F1'	Help texts are displayed
2 License	Shows the license agreement and registration
3 Update	Checks the availability of software updates
4 About	Shows information on the software installed

Tab. 28: Menu 'Help'

8. Basic settings on the Master



EN

Setting the layout size

In the radio settings of the Master you will find predefined options that you may specify depending on the size of your model installation. Adjust these settings to the size of your installation. Do not change these preset values unless you have sufficient technical knowledge.

- ▶ In menu 'Settings' click on 'Settings'.
- ▶ Go to register card 'Radio'.
- ▶ Under 'Radio settings' select the size of your installation.
- ▶ Click on 'Save'.

The layout size is stored. The radio values preset now correspond to the size of your installation.

NOTE: The option for Dual Channels allows the operation of two installations that are near each other.

Setting the temperature

The temperature plays an important part when measuring the distance existing between vehicles and satellites – the higher the ambient temperature is, the higher the speed of an ultrasonic signal will be. You thus should always enter the room temperature the thermometer reads.

- ▶ In menu 'Settings' click on 'Settings'.
- ▶ Go to register card 'General'.
- ▶ Enter the temperature.

That temperature is adopted by the system.

NOTE: You will also find a field allowing to enter the temperature in the system window.

Please take into account that, only if you maintain the presetting Master as 'LocoNet Master', the LocoNet modules can be switched via the software.

9. How to design a new system



In the present chapter you are going to read how to set up an entire system with all control elements that are available. You will be able to familiarize yourself step by step with the system and its components.

If you want to operate your installation fully automatically, you first have to add and preset an extension module as well as to install and preconfigure some turnouts so that the circuit can virtually be recorded.

- ▶ In menu 'Files' click on register card 'New System'.

Begin building up a new system.

Adding an extension module

The Master allows you to preconfigure some more LocoNet modules you might want to use. For turnouts, signals and stops, the procedure thus assigns standard digital addresses. Numbering will use as first digit the module's number (starting from Module 1), then use the numbering of the module's ports (e.g. 11). The digital address for Module 2, port 11 is thus 211.

Sensors are connected to LocoNet modules in the same way, starting with 101, so that Module 2, Sensor 8 is read with the ID E208. IDs are also used in automations. If Sensor 8 in Module 2 has to be scanned, the notation is 'NLW E208'.

NOTE:

- You may connect several extension modules.
- Always connect the extension modules one by one, configure each one, and wait until the end to join all extension modules together to form a chain.

Prerequisite:

- The extension module is connected to a supply voltage.
- The extension module is connected to the Master (LocoNet cable required).

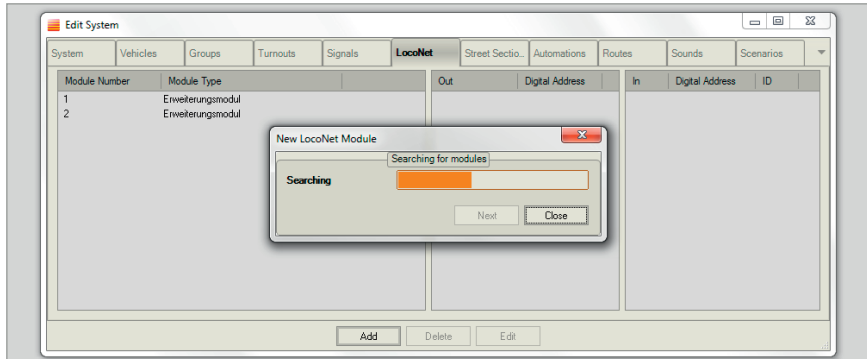


Fig. 48: Adding an Extension module

- ▶ In menu 'Edit' click on register card 'LocoNet'.
- ▶ Click on 'Add'.

The Master searches for new LocoNet modules. The extension module is displayed. If it is the first module found, it will be assigned Number 1, while modules that are added later on are given the corresponding sequential numbers.

- ▶ Click on 'Next'.

The extension module's settings are displayed. All digital addresses are preconfigured. In drop down menus you have the option to choose between single issues (e.g. for simple turnouts) and consecutive issues (e.g. for multicolor light signals or light signals with a stop).

- ▶ Give the extension module the required settings.
- ▶ Click on 'Save'.

The settings are now saved.

Basic settings on the extension module

CAUTION

Overload of components through excessive electric voltage!

Failure of the components.

- ▶ Connect Stop sections (Art. 161675) to 20 V.
- ▶ Connect Parking spaces (Art. 161674) to 20 V.
- ▶ Connect Turnouts (Art. 161677) to 15 V.
- ▶ Connect light signals to 15 V using a protective resistor.

TIP

Component 'Parking space, electric' (Art. 161674) puts a digital vehicle in rest mode and switches the radio link off. However, the magnetic field sensor built into the digital vehicle continuously checks whether the parking space is switched off. As soon as the parking space is switched on, radio transmission is resumed immediately.

Setting for signals without Stop section

NOTE:

- The module's number is also the first digit of the digital address.
- Use the digital address entered to install the signal.

Prerequisite: Three consecutive outputs (e.g. A1 to A3 or A4 to A6) are not occupied.

- ▶ Change the output to triple assignment.
The outputs that are additionally required appear in grey.
- ▶ Assign the outputs a digital address.
- ▶ Connect the signal.
The signal is now connected.

Setting for signals with Stop section

NOTE:

- The module's number is also the first digit of the digital address.
- Use the digital address entered to install the signal.

Prerequisite: Four consecutive outputs (e.g. A1 to A4 or A5 to A8) are not occupied.

- ▶ Change the output to quadruple assignment.
The outputs that are additionally required appear in grey.
- ▶ Connect the signal to the first three outputs.
The signal is now connected.
- ▶ Connect the Stop section to the fourth output.
The Stop section is now connected.

Adding a turnout

Turnouts are put to use wherever a circuit divides into two different circuits. Turnouts can be actuated either under register card 'Turnout' or in the system window (turnout symbol), voice actuation being also possible. Moreover, it is also possible for turnouts to form part of automations.

IDs of turnouts begin with the letter 'T'.

Prerequisite: An extension module is connected and has been set.

- ▶ In menu 'Edit' click on register card 'Turnout'.
- ▶ Click on 'Add'.

A window opens. The system suggests an ID for the turnout, but that ID can also be modified.

- ▶ Assign the turnout a name.
- ▶ Enter the digital address stored in the extension module.
- ▶ Click on 'Save'.

The turnout is now added.

TIP

To be able to allocate the turnout on the track more easily, also enter its ID after the name of that turnout.

Setting up a 3D scenario

The word scenario stands for the area of the track (or the partial area of a track) that is measured by satellites and shown on the monitor. 3D means that, in the system of coordinates, along with the x-axis and the y-axis, elevations are also detected using the z-axis. Hills or bridges are correctly represented in a 3D scenario.

NOTE:

- FALLER expressly recommends to operate the system in a 3D scenario, i.e. using at least three satellites.

Prerequisite:

- At least three satellites are positioned and connected.
- To set up the circuit you need a yard-stick or a measuring tape or a similar object.
- At least one vehicle is switched on.

- ▶ Measure the room temperature.
- ▶ Before recording the track enter the room temperature in the settings of the Master (Menu 'Settings' >> Register card 'General').

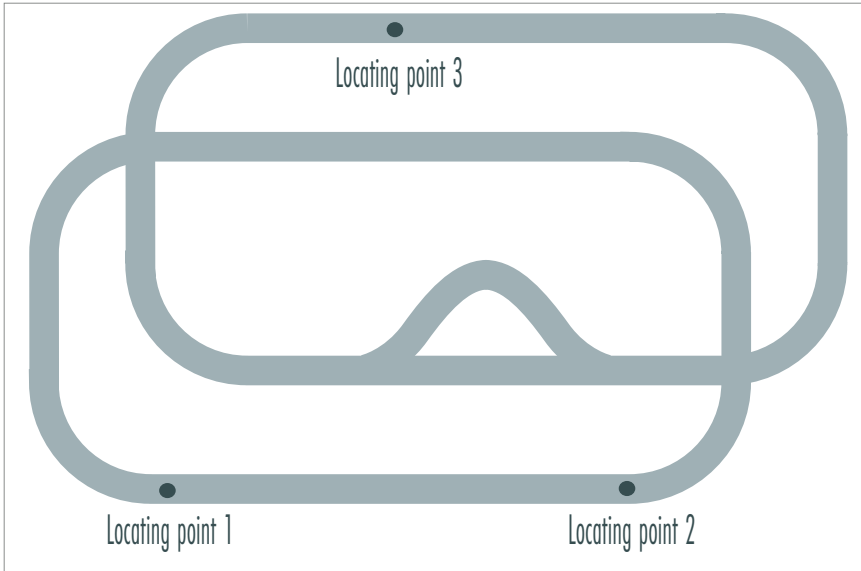


Fig. 49: Position of the locating points

- ▶ Select three arbitrary points on your track.
Make sure that all three locating points are at the same height on your track. It is not necessary for the locating points to be on the circuit.

Try to form an isosceles triangle, as far as possible, with sides that are 1 to 1.5 m long. The first selected point is $0,0,0$, the next point is $x,0,0$ and the third is $x,y,0$. The line linking $0,0,0$ and $x,0,0$ represents the x-axis. We recommend to take that axis for the longest side of the installation, the side facing the point where you will be standing most of the time.
- ▶ In menu 'Edit' click on register card 'Scenarios'.
Window 'Edit System' is displayed.
- ▶ Click on 'Add'.
The window 'Scenario Setup' is displayed.

EN

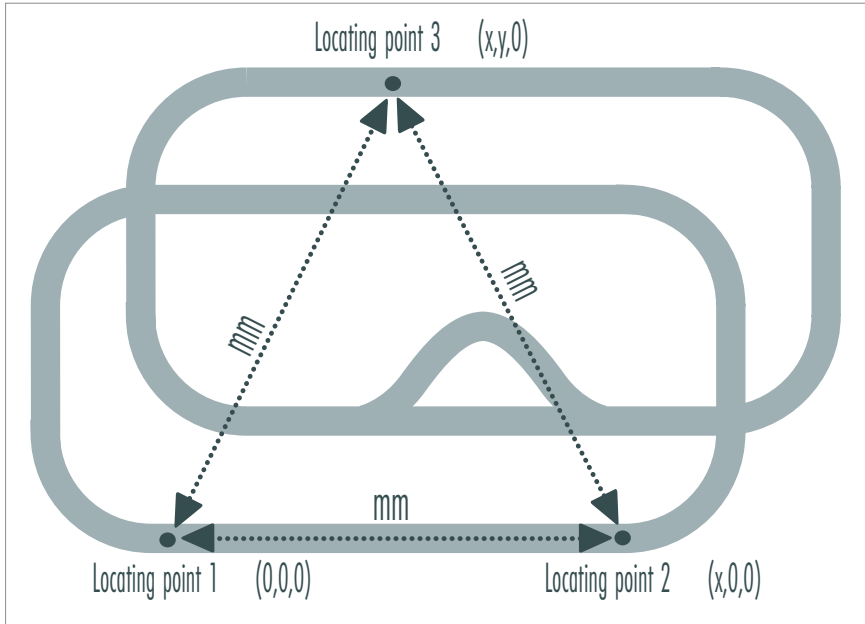


Fig. 50: Determining the dimensions

- ▶ Measure the distance existing between the different locating points (actual values in mm).
- ▶ Enter the dimensions in the fields ('Distance').

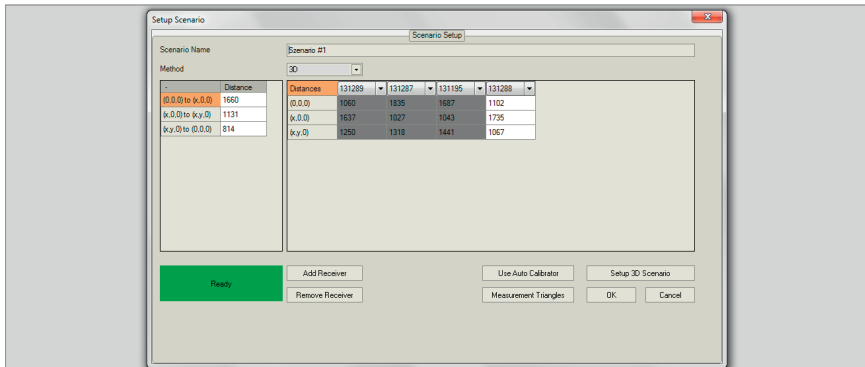


Fig. 51: Building the system up

- ▶ Enter a name for the system.
- ▶ Select the method '3D' in the pull-down menu.
- ▶ Click on 'Setup 3D Scenario'.

A selection window appears.

- ▶ Choose a vehicle with which the system is to be recorded.
- ▶ Click on 'Next'.
A window is displayed.
- ▶ Place the middle of the vehicle with the ultrasonic receiver above locating point 1 (0,0,0).
Wait a short moment until the system is ready for the measurement.
- ▶ Click on 'Next'.
The system records the first locating point.
- ▶ Place the middle of the vehicle with the ultrasonic receiver above locating point 2 (x,0,0).
- ▶ Click on 'Next'.
The system records the second locating point.
- ▶ Place the middle of the vehicle with the ultrasonic receiver above locating point 3 (x,y,0).
The system records the third locating point.
- ▶ Click on 'Finish' and close that window.
- ▶ Open the window again and make sure that the field 'Ready' is green.
The scenario is now set up.

Setting up a 2D scenario

The word scenario stands for the area of the track (or the partial area of a track) that is measured by satellites and shown on the monitor. You need a minimum of two satellites, which will provide a 2D scenario. 2D means that, in the system of coordinates, only the x-axis and the y-axis are detected, but elevations won't.

NOTE:

- FALLER does not recommend to operate the system in 2D scenario:
 - The accuracy of position is limited.
 - The use of wizards is limited.
 - Hidden areas of the system cannot be detected.
- To operate a 2D scenario the satellites must be mounted approx. 50 cm behind or in front of the installation and at a distance of 1 to 3 meters to each other, i.e. these satellites may not be mounted above the track. Also make sure that both satellites are at the same height.
- ▶ In menu 'Edit' click on register card 'Scenarios'.
Window 'Edit System' is displayed.
- ▶ Click on 'Add'.
Window 'Scenario Setup' is displayed.

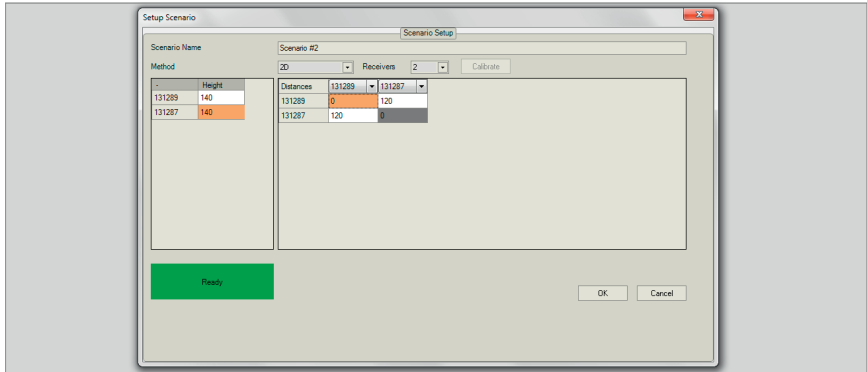


Fig. 52: 2D System

- ▶ Enter a name for the system.
- ▶ Select the method '2D' in the pull-down menu.
- ▶ Enter '2' for the number of satellites used.
- ▶ Select both satellites in the ID drop-down menu.

Left satellite takes the coordinates 0,0. Make sure that it is the left one of both satellites when you are standing in front of the system, and that both satellites are on the same side of the system as you, or are above you.

- ▶ Enter the height (in mm) of the satellites with regard to the model installation.
- ▶ Enter the distance (in mm) between the satellites.

'Ready' is displayed.

- ▶ Click on 'Ok' and close that window.
- ▶ Open the window again and make sure that the field 'Ready' appears in 'green'.

The scenario is now set up.

Additional satellites

On larger systems there may be some areas that are not covered by the existing satellites, for instance because they lie behind elevations. In such cases it is necessary to install and set up an additional satellite to ensure continuous locating of the vehicles.

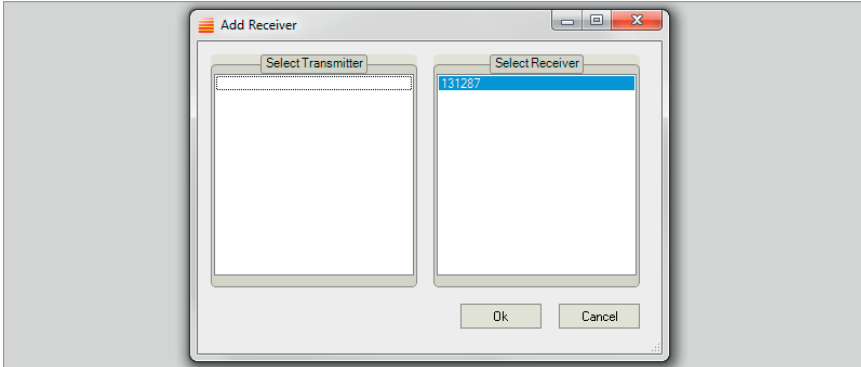


Fig. 53: Additional satellite

- ▶ In menu 'Edit' click on register card 'Scenarios'.
- ▶ Select the relevant system and click on 'Edit'.
- ▶ In window 'Scenario Setup' click on 'Add Receiver'. The system lists the vehicles and satellites it has registered.
- ▶ Choose a vehicle you would like to use in order to set up the new satellite. If necessary, select those satellites you think they can be of help during the setup procedure for the additional satellite.
- ▶ Select four arbitrary points on your track that are in the range of vision of all other satellites. It is not necessary for these points to be located on the circuit, but they merely should cover together as large an area on your system as possible.
- ▶ Place the vehicle, which is switched on, above one of the four selected points.
Wait a short moment until the calibration is completed. The vehicle honks its horn as soon as it is so.
- ▶ Place the vehicle above the next point.
Wait a short moment until the calibration is completed. The vehicle honks its horn as soon as it is so.
- ▶ Repeat that procedure for the last two points.
In the window 'Scenario Setup' the new satellite will appear.
- ▶ Click on 'OK'.
The additional satellite is now set up.

Recording and Editing Track (2D)

TIPP

We recommend to record a track in the 2D view, and after that to check and edit that track in the more convenient 3D view.

NOTE:

- You may interrupt the recording at any time. Click on 'Stop' to this end.
- The recorded track itself should not feature any break.
- Breaks in the track are identified by the system and marked with a large white circle. Bifurcations of the track are marked with a large yellow circle.

NOTE: The curves in track recording might depend on the speed of the recording vehicle. Please test the procedure first with an average speed, then modify the speed until you have found the best result for your purpose. 'Delete' key allows you to restore the initial view without measuring points.

Prerequisite:

- An extension module has been added.
- Turnouts have been added.

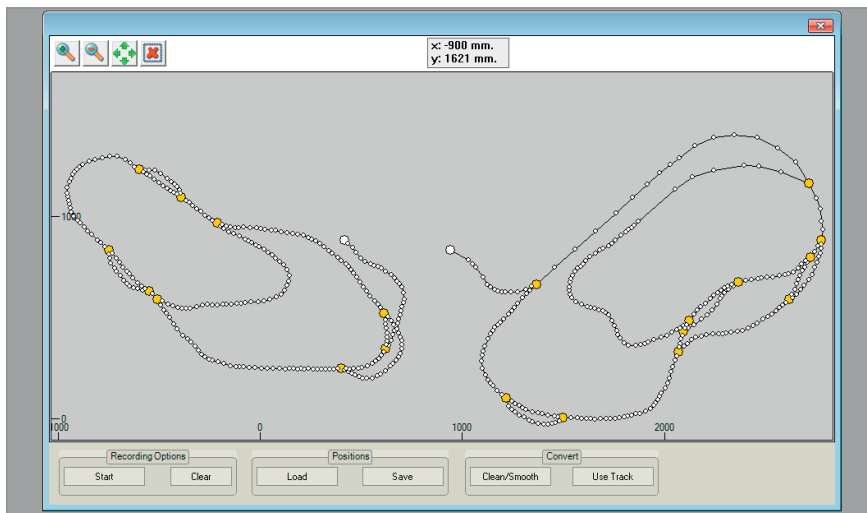


Fig. 54: Starting track record (2D)

- ▶ In menu 'Positions' click on 'Record Track 2D'.
A selection window is displayed.

- ▶ Click on 'Start'.
An additional window is displayed.
- ▶ Choose a vehicle with which you want to record the system.
- ▶ Click on 'Next'.
The track is being recorded.
- ▶ Click on 'Stop'.
The recording will stop.

NOTE:

- After recording the track, its course has to be corrected manually.
- After the recording use the function 'Track Tools Smooth' to clear the track from measuring points that are not required. Such corrections aim at representing the track with a low number of required measuring points, as each pair of measuring points forms a vector allowing to precalculate a position. The circuit should be recorded with a single drive, as far as possible. In any case try to keep the number of drives as low as possible.
- Only delete those yellow markings, with the aid of the red cross in the upper part of the program window, which are no true turnouts.
- Bridge the gaps thus produced by connecting points with each other.

Correcting Sections

All measuring points have to be linked with each other. Fill any gaps to allow the system to precalculate accurately the distance existing between vehicles, or for instance the distance to signals.

- ▶ With the right mouse key click on a measuring point.
A cross appears.
- ▶ Move the cursor to the next connecting point.
The connecting line appears in 'green'.
- ▶ Clicking again on the second measuring point with the right mouse key connects both measuring points.
The system gives that line a straight shape.
- ▶ Repeat the procedure to connect all other measuring points.

NOTE: To remove a line, click on that line with the scroll wheel of the mouse. It is also possible to delete lines by clicking once on the red cross in the upper part of the program window.

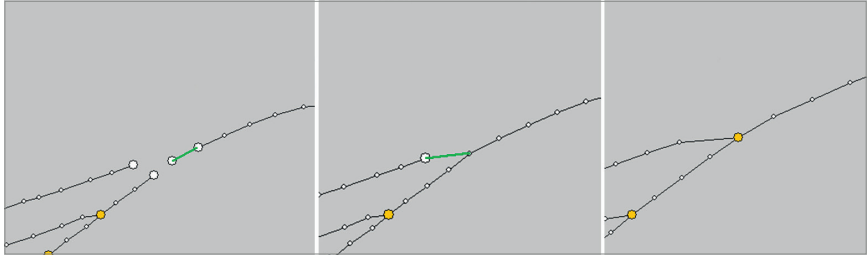


Fig. 55: Linking points

NOTE on Figure 55: If the left point in the picture is linked with the central point, a yellow circle will appear (turnout). For the precalculation of the drive it is particularly important to have that yellow circle located as near to the actual intersecting point of both routes as possible.

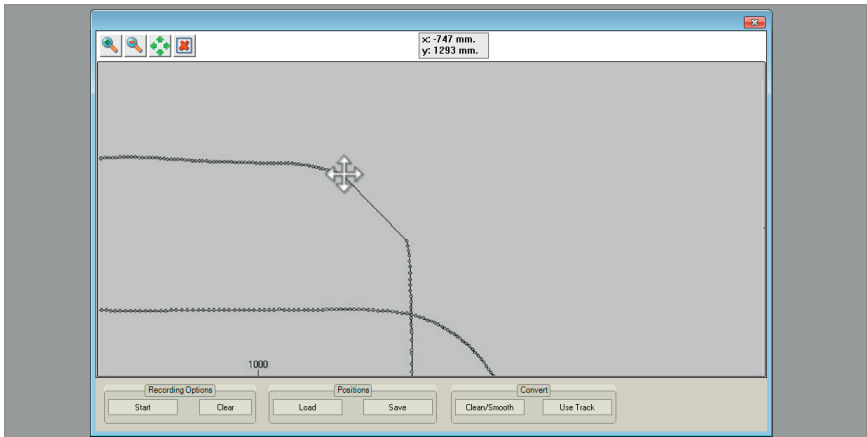


Fig. 56: Gaps in the track

Such procedure aims at eliminating all gaps existing in the preview of the track, so as to enable the system to precalculate the position of a vehicle as accurately as possible. You will have to correct tunnel sections precisely in case you have switched off the measuring procedure within a tunnel.

- ▶ Go onto a point with the mouse cursor.
- ▶ Maintain left mouse key pressed.
The cursor will change into a cross of arrows.
- ▶ Move the point to an arbitrary position.

Adding points

- ▶ Go onto the circuit with the cursor.
A '+' sign is displayed
- ▶ Click on the left mouse key.
Another point is being added.

NOTE: Tunnels and shadow areas represent a particularity. After recording the track for the first time the measuring points usually are not on a straight line. Delete most of the points, and link with a click on the right mouse key only a small number of points that will approximately reproduce the actual course of the track. To complete the correcting work, define sections for both, the tunnel entry and the tunnel exit, so as to enable the system to precalculate the movement within the tunnel by means of the speed of the vehicle.

Automatically removing points that are not needed

To maintain the quantity of data as low as possible, you should remove any points that are not required after you have recorded the track.

- ▶ Click on 'Positions Save'.
Points that are not needed are removed.
- ▶ Click on 'Positions Save'.
A window 'Save System as' is displayed.

The system is saved and can now be provided with all functions and automations.

Loading positions

It is possible for you to edit and complement any track that has been recorded.

- ▶ In menu 'Positions' click on 'Record Track 2D'.
A selection window is displayed.
- ▶ Click on 'Load'.
- ▶ Select a file that has to be loaded.
- ▶ Click on 'Open'.
The selected track is displayed.

Recording and Editing Track (3D)

NOTE:

- You may interrupt the recording at any time. Click on 'Stop' to this end.
- The recorded track itself should not feature any break.
- Breaks in the track are identified by the system and marked with a large white circle. Bifurcations of the track are marked with a large yellow circle.

ADVICE: The curves in track recording might depend on the speed of the recording vehicle. Please test the procedure first with an average speed, then modify the speed until you have found the best result for your purpose. 'Delete' key allows you to restore the initial view without measuring points.

Prerequisite:

- An extension module has been added.
- Turnouts have been added.

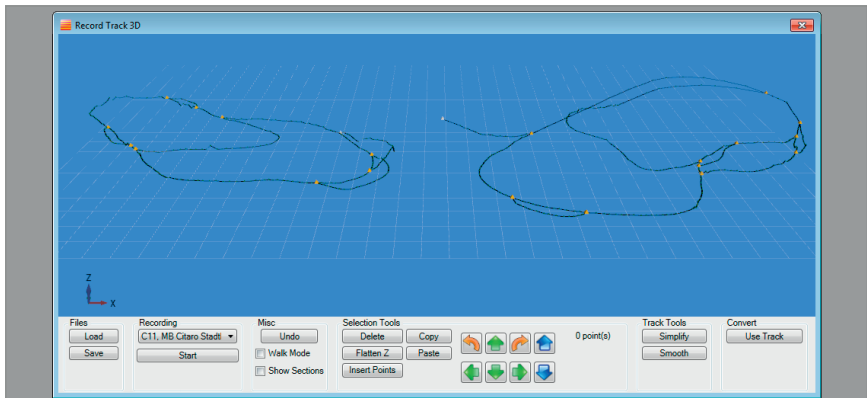


Fig. 57: Starting track record

- ▶ In menu 'Positions' click on 'Record Track 3D'.
A selection window is displayed.
- ▶ Click on 'Start'.
An additional window is displayed.
- ▶ Choose a vehicle with which you want to record the system.
- ▶ Click on 'Next'.
The track is being recorded.
- ▶ Click on 'Stop'.
The recording will stop.

NOTE:

- After the recording use the function 'Track Tools Smooth' to clear the track from measuring points that are not required. Such corrections aim at representing the track with a low number of required measuring points, as each pair of measuring points forms a vector allowing to precalculate a position. The circuit should be recorded with a single drive, as far as possible. In any case try to keep the number of drives as low as possible.
- After recording the track, its course has to be corrected manually.
- Actuating the key 'Track Tools Simplify' will trigger the appearance of yellow markings where turnouts have been recorded. If several drives have been performed, you might see a multitude of such markings (white markings are final points, yellow markings are simple turnouts, red markings mean the linking of four points together).
- Delete the red and yellow markings with the aid of button 'Delete' in the lower part of the program window.
- Bridge the gaps thus produced by connecting points with each other.

Correcting Sections

All measuring points have to be linked with each other. Fill any gaps to allow the system to precalculate accurately the distance existing between vehicles, or for instance the distance to signals.

- ▶ With the right mouse key click on a measuring point.
A cross appears.
- ▶ Move the cursor to the next connecting point.
The connecting line appears in 'green'.
- ▶ Clicking again on the second measuring point with the right mouse key connects both measuring points.
The system gives that line a straight shape.
- ▶ Repeat the procedure to connect all other measuring points.

NOTE: To remove a line, click on that line with the scroll wheel of the mouse. It is also possible to delete lines by clicking once on the red cross in the upper part of the program window.



Fig. 58: Linking points

NOTE: If the left point in the picture is linked with the central point, a yellow circle will appear (turnout). For the precalculation of the drive it is particularly important to have that yellow circle located as near to the actual intersecting point of both routes as possible.

Such procedure aims at eliminating all gaps existing in the preview of the track, so as to enable the system to precalculate the position of a vehicle as accurately as possible. You will have to correct tunnel sections precisely in case you have switched off the measuring procedure within a tunnel.

- ▶ Go onto a point with the mouse cursor.
- ▶ Maintain left mouse key pressed.
The cursor will change into a cross of arrows.
- ▶ Move the point to an arbitrary position.

Adding points

- ▶ Go onto the circuit with the cursor.
A '+' sign is displayed.
- ▶ Click on the left mouse key.
Another point is being added.

NOTE: Tunnels and shadow areas represent a particularity. After recording the track for the first time the measuring points usually are not on a straight line. Delete most of the points, and link only a small number of points (click on the right mouse key) that will approximately reproduce the actual course of the track. To complete the correcting work, define sections for both, the tunnel entry and the tunnel exit, so as to enable the system to precalculate the movement within the tunnel by means of the speed of the vehicle.

Automatically removing points that are not needed

To maintain the quantity of data as low as possible, you should remove any points that are not required after you have recorded the track.

- ▶ Click on 'Track Tools Smooth'.
Points that are not needed are removed.
- ▶ Click on 'Positions Save'.
A window 'Save System as' is displayed.

The system is saved and can now be provided with all functions and automations.

Loading positions

It is possible for you to edit and complement any track that has been recorded.

- ▶ In menu 'Positions' click on 'Record Track 3D'.

A selection window is displayed.

- ▶ Click on 'Load'.
- ▶ Select a file that has to be loaded.
- ▶ Click on 'Open'.

The selected track is displayed.

10. Editing and operating the system



In menu 'Edit' you will find a list of all the elements that can be installed and edited such as e.g. vehicles, turnouts, signals, and the like.

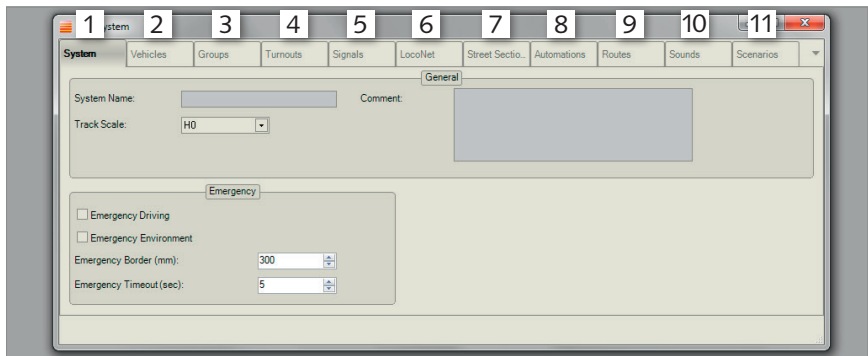


Fig. 59: Menu 'Edit'

Element	Description
1 System	Shows information and possible presetsings regarding the selected circuit
2 Vehicles	Shows information and possible presetsings regarding vehicles
3 Groups	Shows information and possible presetsings regarding groups
4 Turnouts	Shows information and possible presetsings regarding turnouts
5 Signals	Shows information and possible presetsings regarding signals
6 LocoNet	Shows information and possible presetsings regarding LocoNet modules
7 Street Sections	Shows information and possible presetsings regarding sections
8 Automations	Shows information and possible presetsings regarding automations
9 Routes	Shows information and possible presetsings regarding routes
10 Sounds	Shows information and possible presetsings regarding sounds

Element	Description
11 Scenarios	Shows information and possible presets regarding scenarios

Tab. 29: Menu 'Edit'

Register card 'System'

Purpose

- Shows information regarding the system.

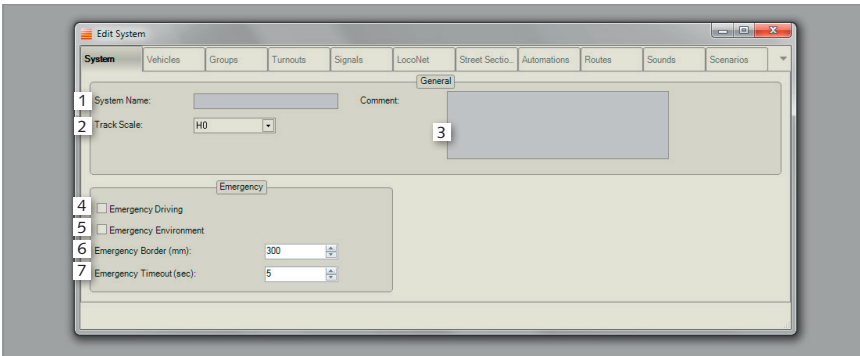


Fig. 60: Register card 'System'

Element	Description
1 System Name	Shows the name of the installation
2 Track Scale	Indicates the scale of the track
3 Comment	Entry field for your own comments
4 Emergency Driving	Activates the emergency stop. (Whenever a vehicle comes to a stop because of a breakdown or an accident, all vehicles are stopped and switch their warning signal flashers on. After the obstacle has been removed, all vehicles resume their drive.)
5 Emergency Environment	Activates the emergency stop outside the system. (A vehicle stops and switches its warning signal flashers on whenever it is outside the system. Values preset: 300 mm / 3 sec.)
6 Emergency Border	Stops the vehicles whenever they leave the track. The distance to the track is set in mm.
7 Emergency Timeout	Stops the vehicles whenever the link is interrupted. Reaction time is adjustable in seconds.

Tab. 30: Register card 'System'

NOTE: Your system contains various functionalities that ensure safe operation:

- The distance to the border is defined through x mm beyond the outermost ring. That setting may not have been selected when recording a system.
- The Emergency Timeout is the maximum duration in seconds for which a vehicle may be beyond the outermost ring before being stopped. That setting may not have been selected when recording a system.
- When starting or exiting the Master, and in the event of a software crash, all vehicles are stopped and all automations are terminated. This can also be produced by clicking functional key 'F10' ('F10' = Stop).
- With functional key 'F12' it is possible for you to stop the operation on your installation at any time. This will also stop all automatic processes (State color: violet). Actuating functional key 'F12' again will cause all vehicles to resume their drive and all automatic processes to continue in the same place where they have been stopped ('F12' = pause).
- When loading a system, the program performs a new start with a view to removing all previous vehicle settings and thus avoiding inconsistencies.

Register card 'Vehicles'

Purpose

- Shows the existing vehicles.
- Modifying the settings of vehicles.

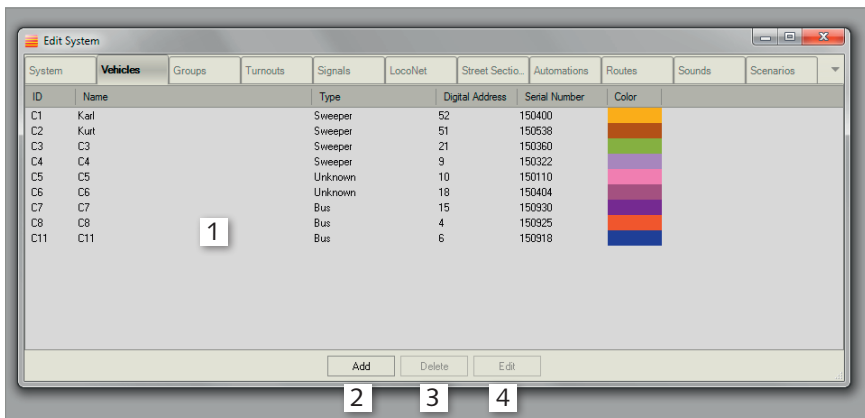


Fig. 61: Register card 'Vehicles'

Element	Description
1 View	Shows the vehicles already added Shows vehicle-specific information
2 Add	Adds a vehicle
3 Delete	Deletes the selected vehicle
4 Edit	Edits the selected vehicle

Tab. 31: Register card 'Vehicles'

'Add'/'Edit' Vehicles

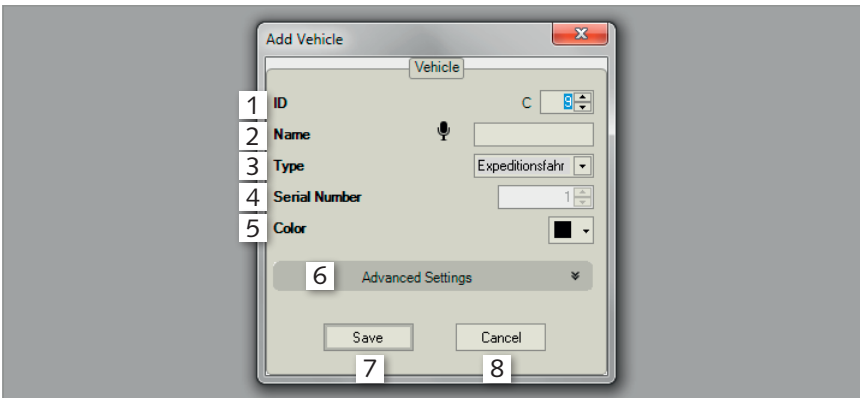


Fig. 62: 'Add'/'Edit' Vehicles

Element	Description
1 ID	Identification number for automations and voice actuation
2 Name	Shows the vehicle's name Name for voice actuation
3 Type	Selection of the vehicle type Loads the vehicle-specific settings
4 Serial Number	Shows the vehicle's serial number
5 Farbe	Changes the vehicle's view color
6 Advanced Settings	Shows advanced settings
7 Save	Stores the settings
8 Cancel	Interrupts the procedure

Tab. 32: 'Add'/'Edit' Vehicles

NOTE: If you also want to use voice actuation: When you enter a name a microphone symbol appears to the left of the entry field as soon as the voice actuation module identifies that name as valid. It might be necessary for you to switch over to another name if the microphone symbol does not appear. If you do not intend to use voice actuation, the microphone symbol is not relevant.

Vehicles 'Advanced Settings'



Fig. 63: Vehicles 'Advanced Settings'

Element	Description	
1	Digital Address	The vehicle's digital address
2	Minimum Speed	The vehicle's lowest driving speed
3	Start Delay	Accelerating distance
4	Brake Delay	Stopping distance (Small number means short stopping distance. Large number means long stopping distance.)
5	Max. Speed	Determines the vehicle's highest speed at driving speed level 28
6	Average Speed	Determines the vehicle's average speed
7	Normal Speed	Determines the start speed of all vehicles after switching on or after a stop

Element	Description
8	Slow Speed Determines the vehicle's speed whenever it drives over a south magnetic field
9	Reset to Default Resets all settings to factory settings
10	Save Stores the settings
11	Cancel Interrupts the procedure

Tab. 33: Vehicles 'Advanced Settings'

TIPP

You will find further information on ranges of values, magnetic-field sensors as well as interesting facts all around Vehicles in the Car System Digital Vehicle Instruction Manual.

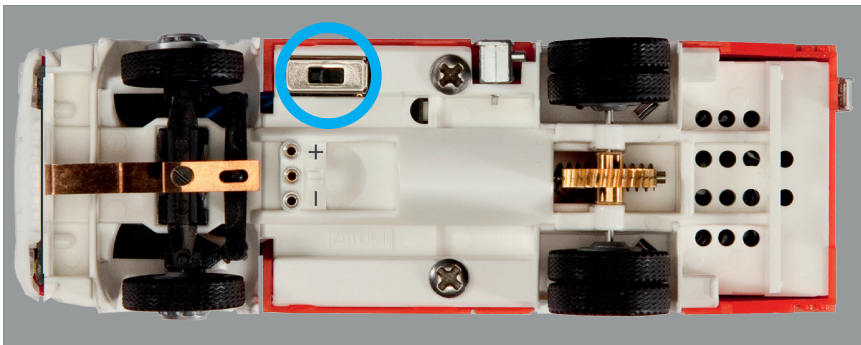


Fig. 64: Vehicle switch

Switching on a digital vehicle

As supplied a digital vehicle is always ready for immediate operation. After switching the vehicle on, the system automatically assigns an ID to that vehicle.

- ▶ Push the on/off switch towards the front, when looking in the direction of drive.
The vehicle is automatically identified and displayed by the software.
- ▶ Move the speed slider control displayed in the software to the desired value.
The vehicle drives off.
- ▶ In the window 'Synopsis of vehicles' click on the desired vehicle function to activate or deactivate that function.

Loading the vehicle card

As supplied a digital vehicle is always ready for immediate operation, however it has been provided with CVs (Configuration Variables) that are uniform for all vehicle types. To assign a vehicle specific functions these CVs have to be overwritten just once by determining the vehicle type.

Prerequisite:

- You are in possession of a valid license.
- The vehicle is switched on.
- ▶ In menu 'Edit' click on register card 'Vehicles'.
- ▶ Select one of the vehicles available.
- ▶ Click on 'Edit'.

A selection window opens.

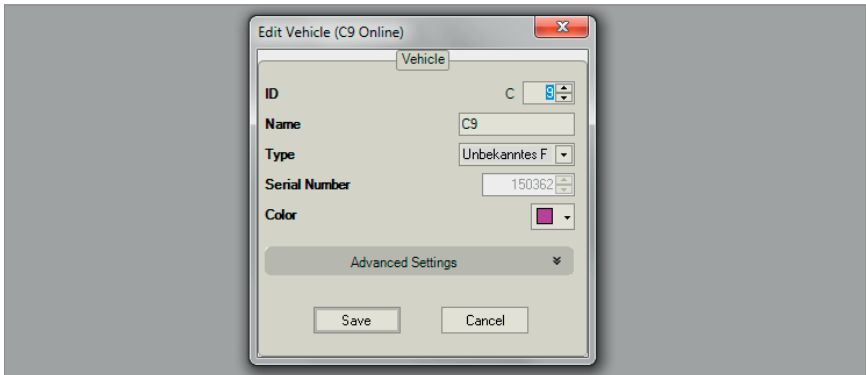


Fig. 65: Vehicle type

- ▶ Select under 'Type' the kind of vehicle you have.
In the drop-down menu you will find a list of all Car System digital vehicles available.
- ▶ Click on 'Save'.
A picture of the vehicle is displayed. The vehicle-specific data are downloaded.

Vehicle calibration

Vehicle calibration will also optionally allow you to decide which speed levels are to be calibrated. It is also possible to enter the speed values manually.

- ▶ In the synopsis of vehicles displayed in the system window click on the GPS symbol of a vehicle.
- ▶ Tick the box of the relevant driving speeds that are to be calibrated.
- ▶ Click on 'Start'.
- ▶ Enter any modification manually.
- ▶ Click on 'Ok'.

NOTE: Your system contains various functionalities that ensure safe operation:

- If a vehicle displays a driving speed although it is immobilized, that vehicle may have collided with some object or with another vehicle, or it is stuck in a tunnel. After nine consecutive measurements without any progression, the vehicle will be stopped and a warning will be displayed.
- If a vehicle stops because its battery is empty, its turn signal lamps will alternately flash left/right.
- If a vehicle stops because its battery is empty and then even stops emitting radio signals, a flashing circle will appear in the system window as a warning sign. As long as such warning sign is activated following vehicles will take into account the position of the immobilized vehicle and will stop, if necessary. The warning sign will continue to flash for approx. 30 seconds after you have removed the vehicle by clicking on the vehicle symbol.

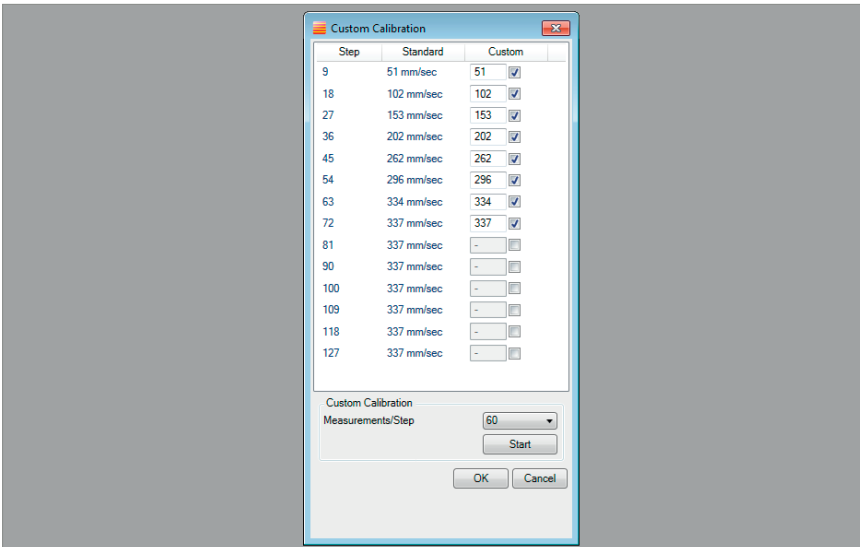


Fig. 66: Custom Calibration

Register card 'Groups'

Register card 'Groups' allows to collect several vehicles easily in a group per drag and drop and thus to control them uniformly. You may generate an arbitrary number of groups. It is possible for a single vehicle to form part of an arbitrary number of groups, to be easily assigned to a group or to be removed again from that group. Group names may also be used as part of automations.

- ▶ Click on 'New' and assign a name for a new group.
- ▶ With the cursor select a vehicle in the left field and drag it with the mouse to the right to the new group you have created

Make sure that the 'Add' symbol appears before you place the vehicle.

Purpose

- Shows the existing groups and vehicles.
- Generating and modifying groups.

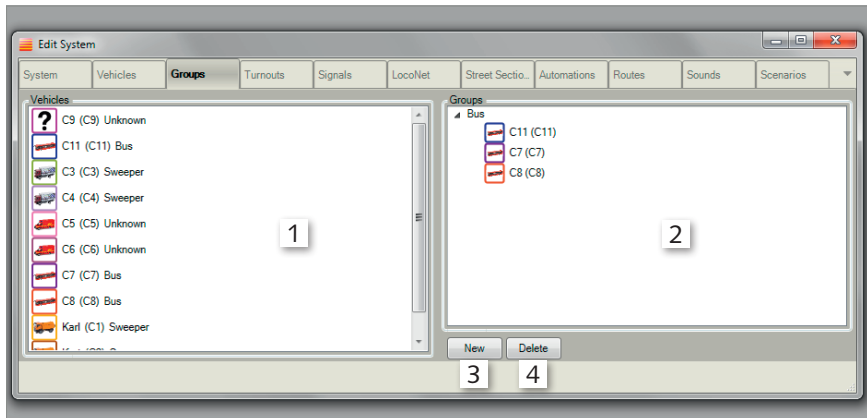


Fig. 67: Register card 'Groups'

Element	Description
1	View 'Vehicles'
2	View 'Groups'
3	New
4	Delete
	Removes single selected vehicles from a group

Tab. 34: Register card 'Groups'

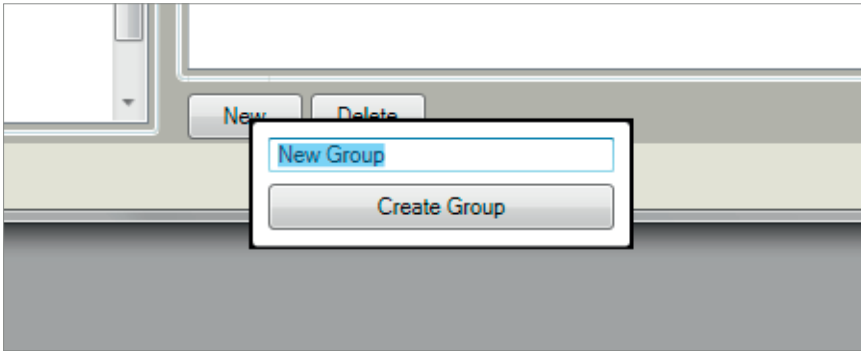
'Add'/'Delete' Groups

Fig. 68: 'Add'/'Delete' Groups

Creating groups

- ▶ In menu 'Edit' click on register card 'Groups'.
- ▶ Click on 'New'.
An entry field opens.
- ▶ Assign the group a name.
- ▶ Click on 'Create Group'.
The group is created.

Register card 'Turnouts'

Purpose

- Shows the existing turnouts.
- Modifying the settings of turnouts.

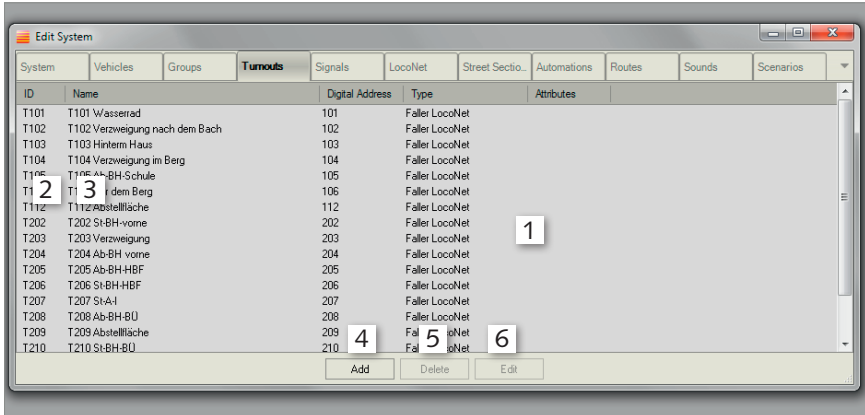


Fig. 69: Register card 'Turnouts'

	Element	Description
1	View	Shows the turnouts already added
2	ID	Identification number for automations and voice actuation
3	Name	Shows the name of the turnouts
4	Add	Adds a turnout
5	Delete	Deletes the selected turnout
6	Edit	Edits the selected turnout

Tab. 35: Register card 'Turnouts'

'Add'/'Edit' Turnouts

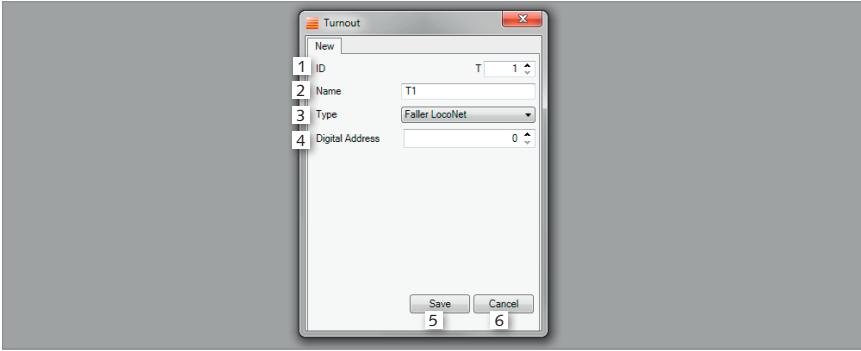


Fig. 70: 'Add'/'Edit' Turnouts

Element	Description
1	ID Identification number for automations and voice actuation
2	Name Name of the turnout (View name in the street representation)
3	Type FALLER LocoNet
4	Digital Address Digital address of the turnout
5	Save Stores the settings
6	Cancel Interrupts the procedure

Tab. 36: 'Add'/'Edit' Turnouts

Creating a turnout

- ▶ In menu 'Edit' click on register card 'Turnouts'.
- ▶ Click on 'Add'.
A selection window opens.
- ▶ Give the turnout a name.
- ▶ Enter the digital address stored in the extension module.
- ▶ Click on 'Save'.
The turnout is now added.

Drawing in an existing turnout

- ▶ In the system window click on mode 'Edit'.
- ▶ Click on symbol 'Turnout'.
- ▶ Click on the place where the turnout has to be inserted.
A selection window appears.

- ▶ Select in the drop-down menu the turnout already created.
- ▶ Click on 'Save'.

The turnout is now inserted.

Drawing in a new turnout

- ▶ In the system window click on mode 'Edit'.
Mode Edit is displayed.
- ▶ Click on symbol 'Turnout'.
- ▶ Click on the place where the turnout has to be inserted.
A selection window appears.
- ▶ Click on 'New Turnout'.
- ▶ Give the turnout a name.
- ▶ Enter the digital address stored in the extension module.
- ▶ Click on 'Save'.

The turnout is now added and inserted.

Positioning and adjusting a turnout

- ▶ In the system window click on mode 'Edit'.
Mode Edit is displayed.
- ▶ Press and hold down the left mouse key in the middle of the turnout, and move the turnout to the desired position.
- ▶ Click on the spin arrows to rotate the turnout.
- ▶ Click on the turnout to define the direction of turn.
- ▶ Holding down 'Strg' key + clicking on left mouse key will reduce the view of the turnout.

The turnout is now positioned and adjusted.

Removing turnouts

- ▶ In the system window at the very left click on 'Edit'.
- ▶ Click on 'Remove Turnout'.
- ▶ With the left mouse key click on the turnout you want to remove.

The turnout is removed.

TIP

Turnouts with red frame lack any reference to the circuit. Move the turnout symbol nearer to the course of the circuit until the frame turns black.

Register card 'Signals'

Purpose

- Shows the existing signals.
- Modifying the settings of signals.

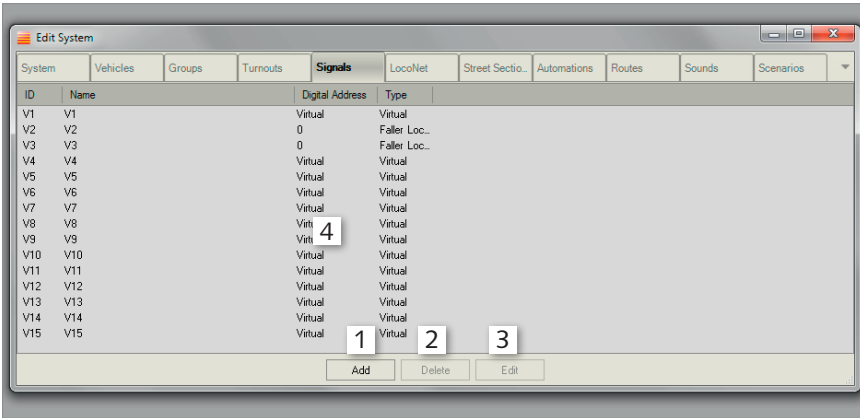


Fig. 71: Register card 'Signals'

Element	Description
1 Add	Adds a signal
2 Delete	Deletes the selected signal
3 Edit	Edits the selected signal
4 Digital address	Digital address of the signal

Tab. 37: Register card 'Signals'

'Add'/'Edit' Signals

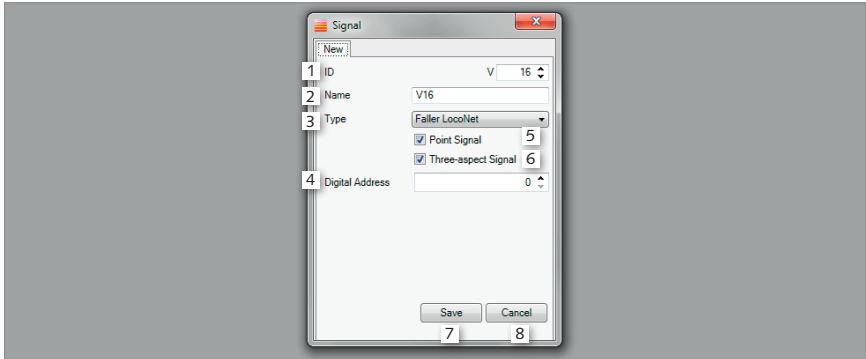


Fig. 72: 'Add'/'Edit' Signals

Element	Description
1 ID	Identification number for automations and voice actuation
2 Name	Name of the signal (View name in the street representation)
3 Type	FALLER LocoNet Virtual
4 Digital address	Digital address of the signal
5 Point Signal	Stops the vehicle exactly in the position of the signal (standard setting)
6 Three-aspect Signal	Signal with three colors (without that tick: Signal with two colors, e.g. for access to multistory parking lots or the like)
7 Save	Stores the settings
8 Cancel	Interrupts the procedure

Tab. 38: 'Add'/'Edit' Signals

You may choose between virtual signals (e.g. to simulate the right of way) and physical signals for real light signals (FALLER LocoNet).

Virtual signals do not possess any digital address and may be used wherever point signals are intended to be on the circuit. In the 'Add'/'Edit' window 'Point Signal' is the standard setting: a vehicle reduces its speed before reaching a point signal and comes to a stop on that point signal in a natural way. If the setting 'Point Signal' was not selected, a vehicle stops whenever it enters a section that was defined as Signal. Virtual signals with the setting 'Point Signal' may, even after they have been installed, also be moved to another position on the circuit. On doing so, make sure to position the symbol to the right of the circuit in driving direction.

Physical signals on the contrary must be connected to an extension module and are visible in the system window with a digital address. Enter in the 'Add'/'Edit' window the digital address previously stored in the extension module while replacing the preset digit '0'.

NOTE: Please take into account that the software does not distinguish between both types 'Virtual' and 'FALLER LocoNet'.

It is possible to actuate signals not only under register card 'Signals', but also in the system window (Signal symbol) or through voice actuation. Moreover, signals can be provided as part of automations.

IDs of signals begin with the letter 'V'.

Signals can not only be installed alone, but also as part of a section.

CAUTION

Overload of light signal through excessive electric voltage!

Failure of the light signal.

- ▶ Use a 1 kΩ protective resistor (available from electronics retailer's shops).

Prerequisite: The extension module has been set.

Point Signal

At all signals it is possible to activate a stop, to this end just tick the box 'Point Signal'. In the present case it does not matter whether it is a virtual or a physical signal. The vehicles will automatically be braked before reaching the signal and will stop exactly at the signal position.

- ▶ Connect the colored wires of the signal to the outputs.
- ▶ Connect the signal's black wire to '15 V'.

The signal is now connected.

Creating a signal

- ▶ In menu 'Edit' click on register card 'Signals'.
- ▶ Click on 'Add'.

A selection window opens.

- ▶ Give the signal a name.
- ▶ In the case of a physical signal enter the digital address stored in the extension module (1st address of the packet).
- ▶ In the drop-down menu choose between 'FALLER LocoNet' and 'Virtual Signal'.
- ▶ Click on 'Save'.

The signal is added.

Drawing in an existing signal

- ▶ In the system window click on mode 'Edit'.
Mode Edit is displayed.
- ▶ Click on symbol 'Signal'.
- ▶ Click on the place where the signal has to be inserted.
A selection window appears.
- ▶ In the drop-down menu select the signal already created.
- ▶ Click on 'Save'.
The signal is now added.

Drawing in a new signal

- ▶ In the system window click on mode 'Edit'.
Mode Edit is displayed.
- ▶ Click on symbol 'Signal'.
- ▶ Click on the place where the signal has to be inserted.
A selection window appears.
- ▶ Click on 'New Signal'.
- ▶ Give the signal a name.
- ▶ Enter the digital address stored in the extension module.
- ▶ Click on 'Save'.
The signal is now added and inserted.

Positioning and adjusting a signal

- ▶ Klicken Sie im Anlagenfenster auf den Zustand 'Bearbeiten'.
Mode Edit is displayed.
- ▶ Hold left mouse key down and move the signal to the desired position.
- ▶ Click on the spin arrows to rotate the signal.

TIP

Signals with red frame lack any reference to the circuit. Move the signal symbol nearer to the course of the circuit until the frame turns black.

Register card 'LocoNet'

Purpose

- Shows the existing LocoNet modules.
- Modifying the settings of LocoNet modules.

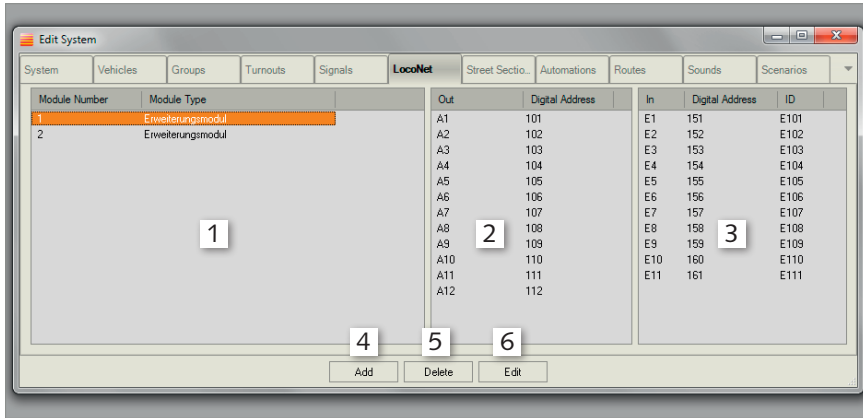


Fig. 73: Register card 'LocoNet'

Element	Description
1	View LocoNet Shows the modules already added
2	View Out Shows the outputs and their digital addresses
3	View In Shows the inputs as well as their digital addresses and IDs
4	Add Adds a LocoNet module
5	Delete Deletes the selected LocoNet module
6	Edit Edits the selected LocoNet module

Tab. 39: Register card 'LocoNet'

'Add'/'Edit' LocoNet

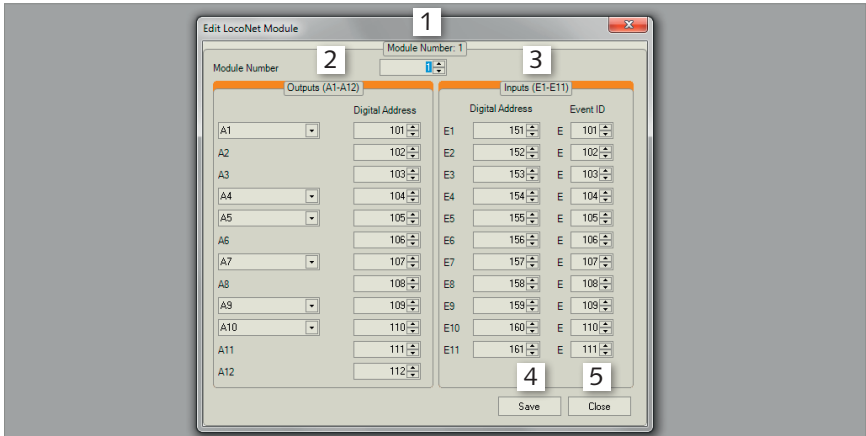


Fig. 74: 'Add'/'Edit' LocoNet

Element	Description	
1	Module Number	Shows the number of the module
2	Outputs (A1 – A12)	Setting of the outputs and digital addresses
3	Inputs (E1 – E11)	Setting of the inputs and digital addresses
4	Save	Stores the settings
5	Close	Closes the window 'Edit LocoNet Module'

Tab. 40: 'Add'/'Edit' LocoNet

NOTE: The pull-down menus for the outputs allows to combine some outputs to a signal (light signal) or to combine some outputs to a signal (light signal) with stop section. In such a case the system merely assigns one digital address. The light sequence is ensured by the extension module.

Register card 'Street Sections'

Purpose

- Shows the existing sections.
- Modifying the settings of sections.

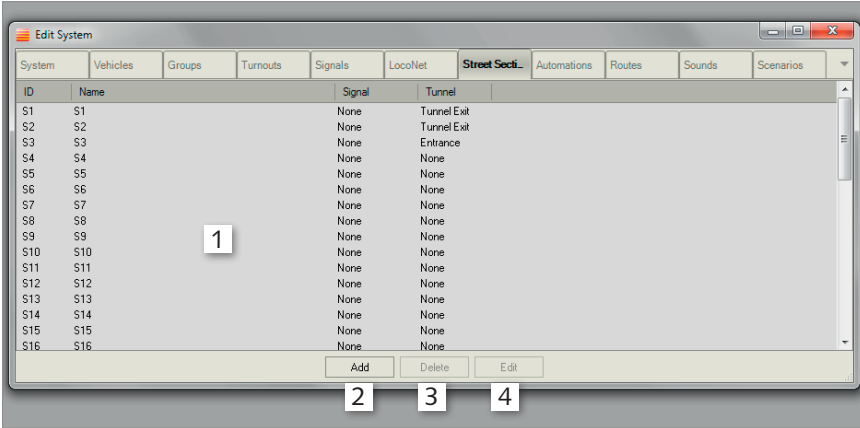


Fig. 75: Register card 'Street Sections'

Element	Description
1	View
2	Add
3	Delete
4	Edit

Tab. 41: Register card 'Street Sections'

'Add'/'Edit' Sections

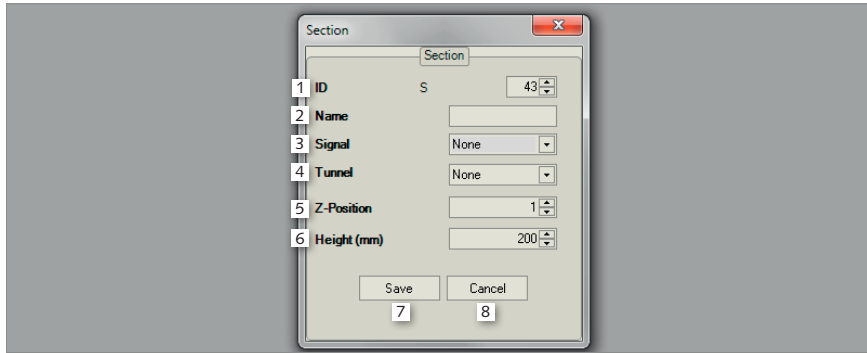


Fig. 76: 'Add'/'Edit' Sections

Element	Description
1 ID	Identification number for automations and voice actuation
2 Name	Name of the section (View name in the street representation)
3 Signal	Allocation of a signal to a section
4 Tunnel	Defines a section as tunnel entry or tunnel exit
5 Z-Position	Begin of the section in height
6 Height (mm)	Height of the section
7 Save	Stores the settings
8 Cancel	Interrupts the procedure

Tab. 42: 'Add'/'Edit' Sections

NOTE: Sections monitor areas on the track and allow to trigger some programmed reactions in automations. Sections allow to distinguish different vehicles from one another and thus to trigger purposefully some desired functions.

'Z-Position' and 'Height' (standard: 40 mm) both relate to the height area of a section. This is relevant for instance when two roads cross each other on different levels (bridges). Both parameters will ensure that a given section is activated only by the vehicle that drives on the corresponding section.

A special feature allows to define sections as tunnel entry or tunnel exit. Whenever a vehicle drives along that section, it will move within the tunnel without providing any measurements. Its position is then merely precalculated on ground of its speed and the scenario in question. If that vehicle, in the further course of the track, drives along the section that was defined as tunnel exit the measurements will be resumed.

Another special feature also allows to link a section and a signal together. In that case such a section takes on the function of a stop point just in front of a signal. Install a signal first, then link a section to that signal. Vehicles will stop as soon as they drive over such a red section.

It is possible to modify the state of a section (red/green) not only in the system window or through voice actuation, but also using the corresponding signals. Moreover, it is possible for sections to form part of automations.

IDs of sections begin with the letter 'S'.

TIPP

Adjust the length of street sections to the speed of vehicles. High vehicle speed requires longer street sections.

Creating a section

- ▶ In menu 'Edit' click on register card 'Street Sections'.
- ▶ Click on 'Add'.

A selection window opens.

- ▶ Give the section a name.
- ▶ Click on 'Save'.

The section is now added.

NOTE: Among sections a distinction is made using four colors:

- Green frame/Grey interior surface: there is no application for that section yet, and there is no vehicle in that section.
- Green frame/White interior surface: there is a vehicle in that section. The vehicle will not be stopped.
- Red frame/Grey interior surface: that section will stop every vehicle that drives over it.
- Red frame/White interior surface: there is a vehicle stopped in that section.

TIP

When writing the name put the corresponding ID in brackets after the name (e.g. Old town gate (S20)). This will make the allocation easier when programming automations. After all automations have been drawn up, you can delete again the ID that formed part of a name.

Drawing in an existing section

- ▶ In the system window click on mode 'Edit'.

Mode Edit is displayed.

- ▶ Click on symbol 'Section'.
- ▶ Draw the section.

A section can be drawn either freehand (to this end, draw a polygon of any kind by clicking with the mouse key on the type of corners you want to have) or using two clicks directly on the circuit.

- ▶ In the drop-down menu select the section already created.
- ▶ Click on 'Save'.

The section is now added.

Drawing in a new section

- ▶ In the system window click on mode 'Edit'.

Mode Edit is displayed.

- ▶ Click on symbol 'Section'.
- ▶ Draw the section.

A section can be drawn either freehand (to this end, draw a polygon of any kind by clicking with the mouse key on the type of corners you want to have) or using two clicks directly on the circuit.

- ▶ Click on 'Add'.
- ▶ Give the section a name.
- ▶ Click on 'Save'.

The section is now added.

TIP

Make use of the 3D view of your installation to have the height of your sections displayed and, if necessary, to have them edited: Positions >> Record Track 3D >> Misc Show Sections.

Register card 'Automations'

Purpose

- Shows existing automations.
- Editing of automations.



Fig. 77: Register card 'Automations'

Element	Description
1	View Shows the automations already added
2	Sequence Shows the sequence of the automation
3	Add Opens the automation editor
4	Delete Deletes a selected automation
5	Edit Opens the automation editor

Tab. 43: Register card 'Automations'

'Add'/'Edit' Automations

Purpose

- Opens the automation editor.
- Generation and editing of automations.

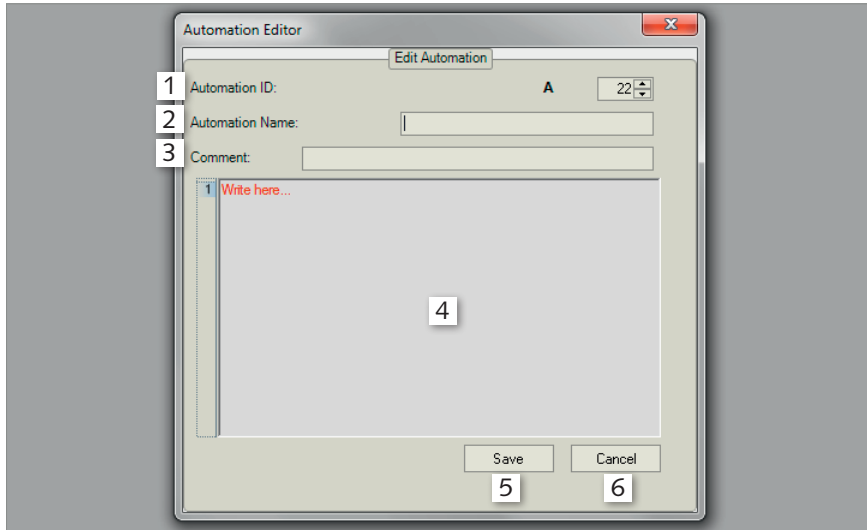


Fig. 78: 'Add'/'Edit' Automations

Element	Description
1	Automation ID Identification number for automations and voice actuation
2	Automation Name Name of the automation (View name of the automation)
3	Comment Entry field for your own comments
4	Entry field Entry of the different commands
5	Save Stores the automation
6	Cancel Interrupts the procedure

Tab. 44: 'Add'/'Edit' Automations

NOTE: The criteria to be chosen for the sequential processing of the commands of an automation are either the chronological order or the query of the sections or sensors.

The automations generated are processed simultaneously and without any priority. In case of conflicting instructions field 'Start/Stop' in window 'Automation Control' may appear in grey.

Automation editor

The automation editor allows you to generate your own automations to your personal liking. The automation editor features a simple structure. In each line you always have to answer the questions 'WHO' and 'WHAT'. As soon as a line is correct and complete, it appears in black characters. Faulty lines appear in red characters, but can be stored, e.g. whenever another automation is started within an already existing automation, but has still to be compiled.

You will find functional commands allowing the generation of an automation in chapter 'Functional commands in automations'.

- ▶ In menu 'Edit' click on register card 'Automations'.
- ▶ Click on 'Add'.

The automation editor is displayed. The automation editor assigns the automation an ID.

- ▶ Enter a name and, if necessary, a comment for the automation.
- ▶ Enter the desired command lines.
- ▶ Click on 'Save'.

The automation is now created.

TIPP

To start all automations simultaneously, simply generate a Start Automation (for instance Name: 'Start all' >> (ID x) A2 on, A3 on, ...). With functional key 'F10' all automations can simultaneously be stopped at any time.

Functional commands in automations

Variables

Command	Meaning
C	Vehicle
F	Vehicle function
T	Turnout
V	Signal
S	Section
A	Automation
R	Route
P	Sound

Tab. 45: Variables

Driving functions

Command (Example)	Meaning
C1 forward 20	The vehicle with the ID C1 drives forward at speed 20
Sixt forward 20	The vehicle with the name Sixt drives forward at speed 20
C1 stop	The vehicle with the ID C1 stops
Sixt stop	The vehicle with the name Sixt stops
Stop all	All vehicles on the track will stop 'F10' on the keyboard

Tab. 46: Driving functions

Vehicle functions

Command (Example)	Meaning
C1 F0 on	The vehicle with the ID C1 switches on function F0 of the vehicle card
Sixt F0 off	The vehicle with the name Sixt switches off function F0 of the vehicle card
C1 light on	The vehicle with the ID C1 switches on the light function of the vehicle card
Sixt light off	The vehicle with the name Sixt switches off the light function of the vehicle card

Tab. 47: Vehicle functions

Turnouts

Command (Example)	Meaning
T2	The turnout with the ID T2 is switched (other position)
T2 straight	The turnout with the ID T2 is set to the straight position
T2 turn	The turnout with the ID T2 is swiveled (turn-off position)

Tab. 48: Turnouts

Sections

Command (Example)	Meaning
S3 green	The section with the ID S3 is switched over to green (Drive)
S3 red	The section with the ID S3 is switched over to red (Stop)

Tab. 49: Sections

Signals

Command (Example)	Meaning
V5 green	The signal with the ID V5 switches to green (Drive)
V5 red	The signal with the ID V5 switches to red (Stop)

Tab. 50: Signals

Routes

Command (Example)	Meaning
R 66	Set all turnouts and signals to the defined position

Tab. 51: Routes

Pause

Command (Example)	Meaning
Pause 3	The automation waits for 3 seconds and runs again
Pause 3,5	The automation waits for 3.5 seconds and runs again

Tab. 52: Pause

Repeated Automation

Command (Example)	Meaning
Repeat	The automation is repeated endlessly
Repeat 4	The automation is repeated four times

Tab. 53: Repeated Automation

Section-dependent conditions

Command (Example)	Meaning
NLW S1 occupied	The automation only continues if Section S1 is occupied (a vehicle is driving over it)
NLW S1 free	The automation only continues if Section S1 is free (no vehicle is driving over it)
NLW T1 straight	The automation only continues if Turnout T1 is straight
NLW V12 green	The automation only continues if Signal V12 is green
NLW C3 stop	The automation only continues if the vehicle with the ID C3 has stopped

Tab. 54: Section-dependent conditions

Automations

Command (Example)	Meaning
A5 on	The automation with the ID A5 is switched on (started)
A5 off	The automation with the ID A5 is switched off (stopped)
Bus stop on	The automation with the name Bus stop is switched on (started)
Bus stop off	The automation with the name Bus stop is switched off (stopped)

Tab. 55: Automations

Individual Sections

Command (Example)	Meaning
NLW C3 S5	The automation only continues if the vehicle with the ID C3 occupies section S5
NLW Sixt S5	The automation only continues if the vehicle with the name Sixt occupies section S5
NLW CS5 F2 on	If a vehicle (C) occupies section S5, it switches on function F2 of the vehicle card
NLW CS5 light on	If a vehicle (C) occupies section S5, it switches on the light function of the vehicle card
NLW CS5 light off	If a vehicle (C) occupies section S5, it switches off the light function of the vehicle card
NLW S5 occupied CS5 stop	If a vehicle (C) occupies section S5, it stops
NLW S5 occupied CS5 forward 20	If a vehicle (C) occupies section S5, its speed is changed to 20
NLW Emons S10	The automation only continues if vehicles with group name Emons occupy section S10

Tab. 56: Individual Sections



Voice commands

Prerequisite: A microphone is connected and activated.

Note: To check the state of the microphone, look at the information bar: 'red': deactivated. 'yellow': standby. 'green': on. If that state is 'yellow' or 'green' the microphone can be switched on or off using voice commands 'Microphone on' or 'Microphone off'.

Voice commands feature the same structure as the functional commands of automations. They must always comply with the same pattern. A command must contain:

- Who
- What
- How

NOTE: In window 'Add/Edit Vehicles' a microphone symbol must appear left of the entry field when entering a name. This is the case as soon as the voice actuation module identifies that name as valid. It might be necessary for you to switch over to another name if the microphone symbol does not appear.

Examples:

Vehicles

Command (Example)	Meaning
Sixt forward 20	The vehicle with the name Sixt drives forward at speed 20
Sixt light on	The vehicle with the name Sixt switches its light on

Tab. 57: Voice commands Vehicles

Turnouts

Command (Example)	Meaning
Tango 2	The turnout with the ID T2 is switched on
Tango 2 straight	The turnout with the ID T2 is set to the straight position
Tango 2 turn	The turnout with the ID T2 is set to the turn position

Tab. 58: Voice commands Turnouts

Sections

Command (Example)	Meaning
Sierra 11 red	The section with the ID S11 is switched to red (Stop)

Tab. 59: Voice commands Sections

Signals

Command (Example)	Meaning
Victor 3 green	The signal with the ID V3 is switched to green (Drive)

Tab. 60: Voice commands Signals

Automations

Command (Example)	Meaning
Alpha 9 on	The automation with the ID A9 is switched on (started)

Tab. 61: Voice commands Automations

Sounds

Command (Example)	Meaning
Papa 9 on	The sound with the ID P9 is activated (played)

Tab. 62: Voice commands Sounds

Routes

Command (Example)	Meaning
Romeo 1 on	The route with the ID R1 is made available

Tab. 63: Voice commands Routes

Automation Wizard

Purpose

- Creating standard automations.

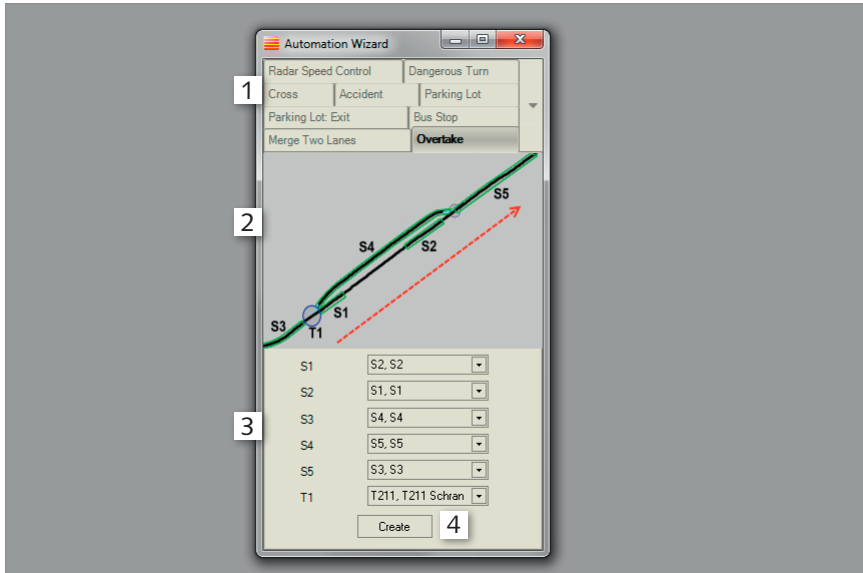


Fig. 79: Automation Wizard

Element	Description	
1	Automations	Choice of preconfigured automations
2	Representation of the structure	Shows the structure of the automation in question
3	Definition window	List of the elements required for the automation
4	Create	Generates the automation

Tab. 64: Automation Wizard

TIPP

To call up the Automation Wizard, please click on 'View' >> 'Automation' >> 'Automation Wizard'.

The automation wizard and the automation editor are two powerful tools allowing you to exhaust all the possibilities offered by Car System Digital. They will help you generate sequences of commands and functions that will be performed fully automatically.

Automation Wizard

First look in the automation wizard what elements (Sections, Signals and the like) are required for a representative traffic situation and create these elements at a preliminary stage by stipulating the IDs, drawing the elements, and naming them. After that, in the automation wizard, you will be able to select these elements using their ID.

- ▶ In menu 'View' click on 'Automations'.
View window 'Automation Control' is displayed.

- ▶ Click on 'Automation Wizard'.
The wizard is displayed.

- ▶ Select an automation.
- ▶ Create sections according to the figure.
- ▶ Select the sections thus created.
- ▶ Click on 'Create'.

The automation is now created by the software. The automation appears in the Automation Control.

Synopsis of automations

Bus Stop

The automation 'Bus stop' steers a vehicle onto an additional lane via a turnout, and keeps it immobilized there for a set period of time. After that, before driving the vehicle onto the main road again, the automation checks whether the main road is free at that moment. If this is not the case the vehicle will wait until the main road is free, before resuming its drive.

Cross

The automation 'Cross' is used to control the traffic at one-lane or two-lane (signal) crosses with two relations. Both directions are alternately switched to green/red and the oncoming traffic is stopped accordingly.

Merge Two Lanes

The automation 'Merge Two Lanes' is used to grant the right of way. To this end the automation makes use of two sections. Any vehicle that is located in the first section checks whether there is a vehicle in the second section. If this is the case, it stops by itself and grants the right of way.

Accident

The automation 'Accident' controls the driving round a stationary obstacle or an overtaking maneuver by means of a turnout placed in the course of the track. To this end the automation makes use of five sections.

Overtake

Departing from the automation 'Accident' the automation 'Overtake' allows driving round a moving obstacle. For this purpose, the automation uses five sections. The vehicle overtaken is slowed down or, if necessary, stopped.

Dangerous Turn

The automation 'Dangerous Turn' is an area provided with two sections that can be used for instance within or before a drive along a curve. In the first section a vehicle is braked and in the second section it is accelerated up to the speed it had previously.

Radar speed control

The automation 'Radar speed control' is used together with product 'Radar speed check', Art. no. 161666. It allows to adjust a maximum speed within a section. If that speed is exceeded by a vehicle, the flash is triggered and the speed of the vehicle reduced from this moment. Whenever a vehicle drives in the section at a lower speed than the maximum speed set, nothing will happen.

Parking Lot

The automation 'Parking Lot' checks whether any sections are free on provided parking bays and distributes the vehicles in these parking bays accordingly.

Parking Lot, Exit

The automation 'Parking Lot, Exit' uses three sections to regulate the driving out off two parking spaces that both run into a common circuit. If the first vehicle to drive out is on a section following the parking bays, the second vehicle will be stopped until that section is free again.

TIPP

It is possible for you to individualize subsequently, using the automation editor, an automation that has been generated already by means of the automation wizard.

Register card 'Routes'

Purpose

- Shows the existing routes.
- Modifying the settings of routes.



Fig. 80: Register card 'Routes'

Element	Description
1	View Routes
2	View Commands
3	Add
4	Delete
5	Edit

Tab. 65: Register card 'Routes'

'Add'/'Edit' Routes

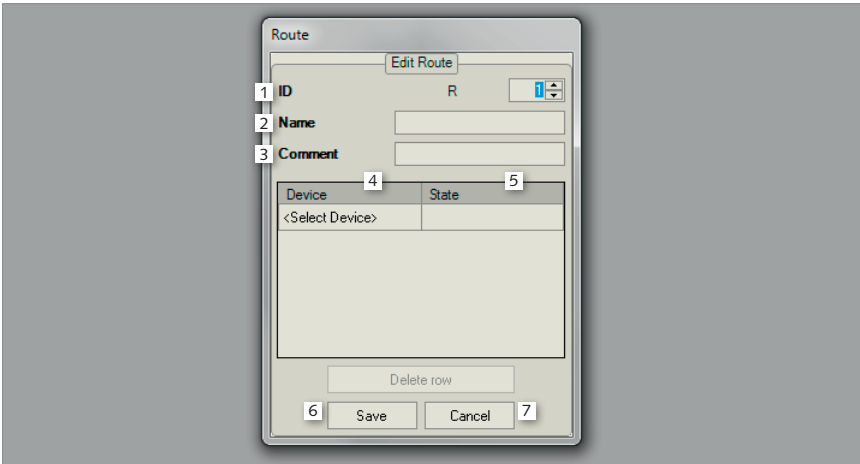


Fig. 81: 'Add'/'Edit' Routes

Element	Description
1	ID Identification number for automation and voice actuation
2	Name Name of the route (View name in the street representation)
3	Comment Entry field for your own comments
4	Device Choice of the route commands
5	State State of the element
6	Delete row Deletes the selected row
7	Save Stores the settings
8	Cancel Interrupts the procedure

Tab. 66: 'Add'/'Edit' Routes

Routes are the arrangement in groups of turnouts, signals, light signals and the like, which are preconfigured in such a way that this will result in a defined behavior on a specific route.

It is possible to set and reset routes not only in the system window (route symbol), but also through voice actuation (set: the symbol appears 'green', not set: the symbol appears 'red'). Moreover, routes may be made to form part of automations.

IDs of routes begin with the letter 'R'.

Routes are displayed and controlled in a separate route window.

Creating routes

- ▶ In menu 'Edit' click on register card 'Routes'.
- ▶ Click on 'Add'.

A selection window is displayed.

- ▶ Enter a name and, if necessary, a comment for the route.
- ▶ Click twice on 'Select Device'.

A choice of available elements is displayed.

- ▶ Select an element.
- ▶ Click twice on 'State'.
- ▶ Select the state of the element.
- ▶ Click on 'Save'.

The route is now created.

Editing a route

- ▶ In menu 'Edit' click on register card 'Routes'
- ▶ Click on 'Edit'.

Window 'Route' is displayed.

- ▶ Modify the route.
- ▶ Click on 'Save'.

The route is now modified.

Delete row

- ▶ In menu 'Edit' click on register card 'Routes'.
- ▶ Click on 'Edit'.

Window 'Route' is displayed.

- ▶ Select a row.
- ▶ Click on 'Delete row'.
- ▶ Click on 'Save'.

The modified route is stored.

NOTE: Click on the route symbol to stipulate a given route. If the symbol appears 'red', one or several elements on that route are not suitably preconfigured. If the symbol appears 'green', all elements of that route are correctly preconfigured. Every time you click on the symbol, it will appear 'green' unless the route is being modified in the moment through an automation.

Register card 'Sounds'

Purpose

- Shows the existing sounds.
- Modifying the settings of sounds.

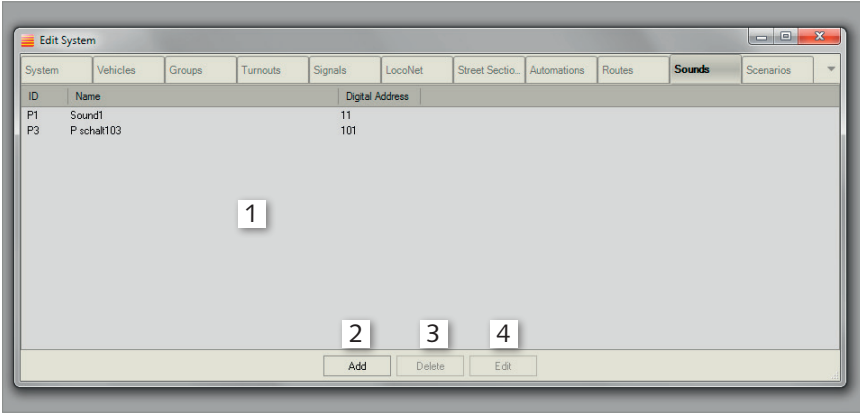


Fig. 82: Register card 'Sounds'

Element	Description
1	View Shows the sounds already added
2	Add Adds a sound
3	Delete Deletes the selected sound
4	Edit Edits the selected sound

Tab. 67: Register card 'Sounds'

'Add'/'Edit' Sounds'

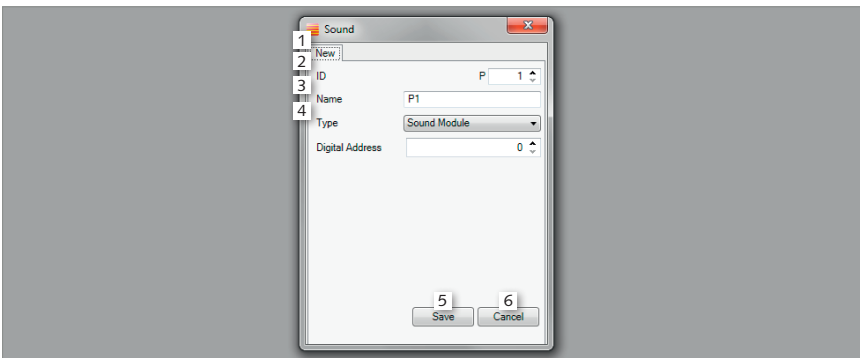


Fig. 83: 'Add'/'Edit' Sounds

	Element	Description
1	ID	Identification number for automations and voice actuation
2	Name	Name of the sound (View name in the street representation)
3	Type	Sound module
4	Digital address	Digital address of the sound
5	Save	Stores the settings
6	Cancel	Interrupts the procedure

Tab. 68: 'Add'/'Edit' Sounds

'Sounds' allows you to define the matching ambient noises for your model installation. They will then be played depending on the respective drives of your vehicles, or through voice actuation, or using a tablet computer and the like.

It is possible to activate sounds not only in the system window (sound symbol), but also through voice actuation. Moreover, sounds can be provided to form part of automations.

IDs of sounds begin with the letter 'P'.

FALLER's Sound module (Art. 180730) is connected in the same way as an extension module. Every noise is assigned a LocoNet address in the range 0 to 9999. Such address has to be defined at a preliminary stage using the software of the sound module. If, for instance, you assign a noise the same LocoNet address as that that has been assigned already to a turnout, that noise will be played every time that turnout is activated.

Creating a sound

- ▶ In menu 'Edit' click on register card 'Sounds'.
- ▶ Click on 'Add'.

A selection window is displayed.

- ▶ Enter an ID and a name for that sound.
- ▶ Assign the sound a LocoNet address that has been assigned already.

The sound is now assigned.

NOTE: After sounds have been installed, they can also be moved to another position on the route.

Register card 'Scenarios'

Purpose

- Shows the existing scenarios.
- Modifying the settings of scenarios

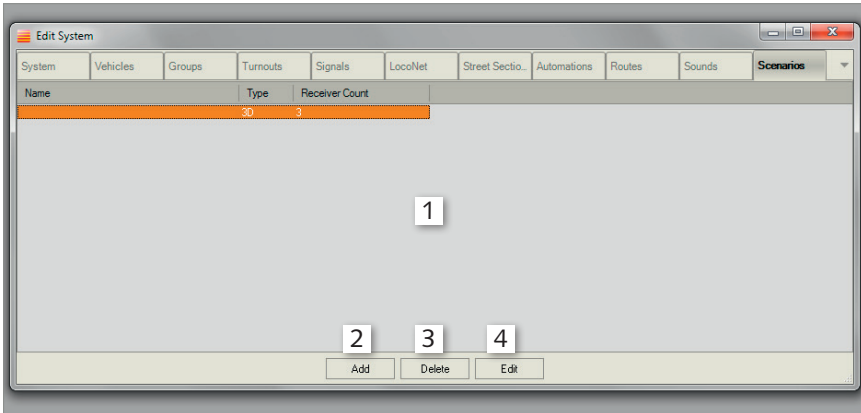


Fig. 84: Register card 'Scenarios'

Element	Description
1	View Shows all scenarios
2	Add Adds a scenario
3	Delete Deletes a selected scenario
4	Edit Edits a selected scenario

Tab. 69: Register card 'Scenarios'

'Add'/'Edit' Scenarios

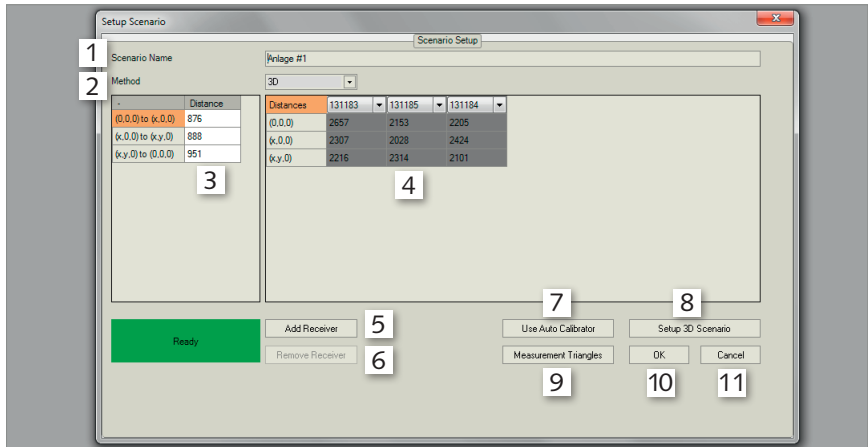


Fig. 85: 'Add'/'Edit' Scenarios

Element	Description
1 Scenario Name	Name of the scenario
2 Method	Selection between 2D or 3D recording of the scenario
3 Entry field Distance	Entry of the distances measured between measuring points 1 to 3
4 Entry field Distances	Entry of the distances measured for the satellites (only 2D)
5 Add Receiver	Adds an additional satellite
6 Remove Receiver	Removes a satellite
7 Use Auto Calibrator	Uses the optional calibrator (relevant for large systems)
8 Setup 3D Scenario	Switches over to window 'Setup 3D Scenario'
9 Measurement Triangles	Shows, in the case of more than three satellites, which triangles are suitable for the measurement
10 Ok	Stores the settings
11 Cancel	Interrupts the procedure

Tab. 70: 'Add'/'Edit' Scenarios

11. How to deal with problems



Error messages

Error pattern	Error source	Remedy
Master does not react any more	Connection to the Master interrupted	▶ Check the USB cable. Replace the cable if necessary
	System error	▶ Start the Master again
Turnout does not switch	Wrong connection	▶ Check the connected wires
	Wrong digital address	▶ Check the digital addresses in the extension module and in the turnout
Vehicle stops unintentionally	Rechargeable battery is empty	▶ Recharge the vehicle
	Hardware malfunction	▶ Switch the vehicle off and on again
Vehicle stops with alternating turn signals	Rechargeable battery is empty	▶ Recharge the vehicle
Vehicle stops with flashing headlights	Radio link interrupted	▶ Put the vehicle within radio working range
	Master was switched off	▶ Switch the Master on again
Vehicle stops with working warning signal flashers	Vehicle is outside the intended system layout	▶ Check the safety area
		▶ Manually place the vehicle within the intended system layout

Error pattern	Error source	Remedy
Components not operating	Wrong connection	▶ Check the right connection of the components
	Component damaged	▶ Replace the component
No satellite signal	Power supply	▶ Check the power supply of the satellites
	Satellite not set up	▶ Check the system scenario
Software does not react	Software error	▶ Start the software again

Tab. 71: How to deal with problems

TIP

Direct line to FALLER's Customer Service Department:

Phone + 49 (0) 7723 651-106

E-Mail kundendienst@faller.de

12. Technical data




Power supply

Designation	Value
Supply voltage	16 V AC

Tab. 72: Power supply



NOTE: All devices are radio-based two-way short-range transmission systems regulated under European standard sheet EN 300-220-1 (2). Published under: ETSI EN 300 220-2 V2.1.1. Frequency spectrum includes bands 868 to 870 MHz.

Symbols

Symbol	Meaning
	Product is subject to the 2002/96/EC European Directive
	CE conformity label
	1:87/H0/16.5 mm track gauge

Tab. 73: Symbols

Signs

Sign	Meaning
	Prompting
	Enumeration

Tab. 74: Signs



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