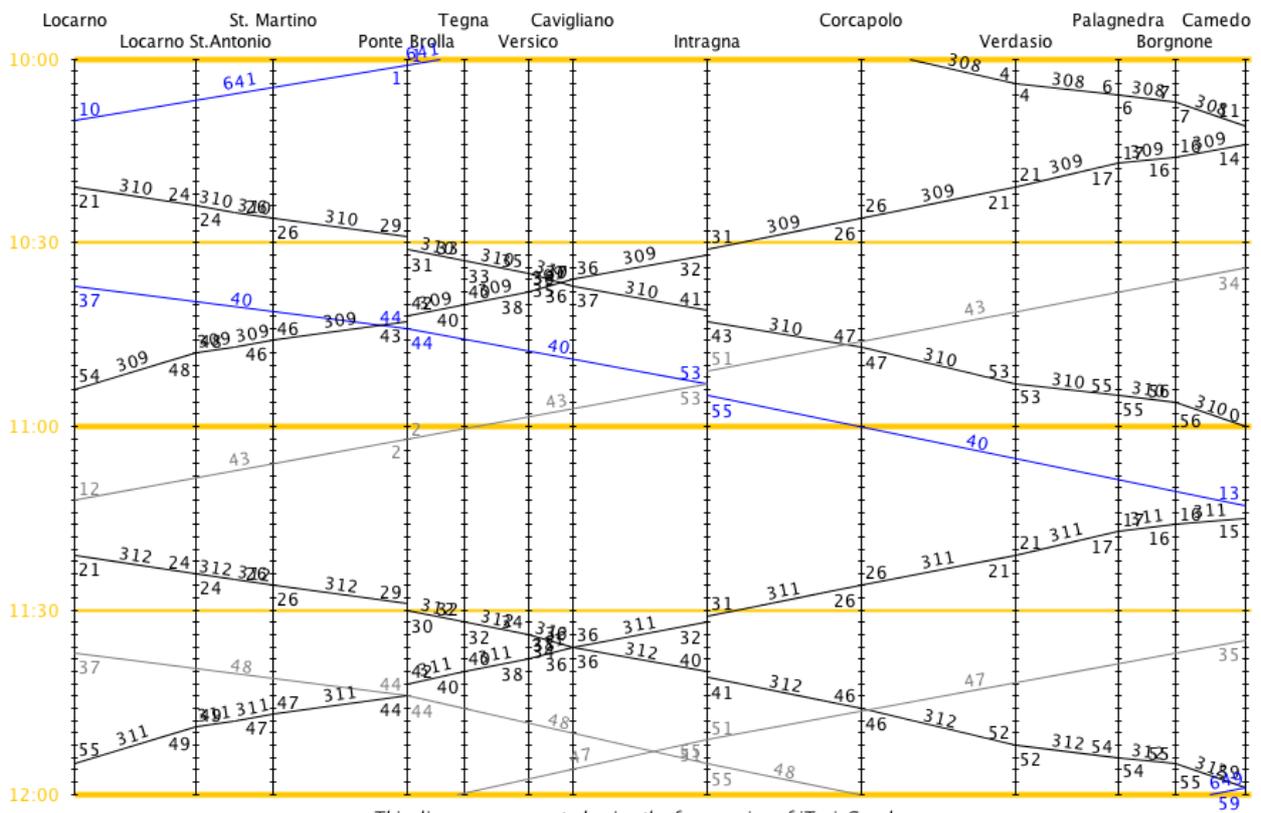


jTrainGraph Manual

This diagram was created using the free version of jTrainGraph.



This diagram was created using the free version of jTrainGraph.

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Current version

3.4.1

Last update

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1 Terms and conditions

The application jTrainGraph was developed by Moritz Scherzinger, all right are reserved. For possible damages caused by using the application, there is no liability of the author.

By using jTrainGraph, these terms and conditions are accepted by the user.

jTrainGraph must only be used for non-commercial purposes, if there is no separate permission. This is valid not only for the user interface of jTrainGraph, but also for all files that are created. That means, that the train graphs (e.g. pdf or png), timetable files, Excel/csv files and others must not be used for commercial applications.

Users have to contact the author before using the application for commercial uses and before embedding the application, it's parts or it's concepts (like user interfaces) into other applications.

jTrainGraph in it's free version must only be handed over to other users for free and on non-public platforms. The rules for passing the application to other users might be more restricted by the author.

The non-free version jTrainGraph Pro must not be handed over to other users in general.

2 System prerequisites and installation

jTrainGraph is a platform-independent Java application, therefore it runs on all operating systems, where a Java runtime environment exists. The Java runtime environment has to be downloaded and locally installed. Most common runtime environment is the one of Oracle:

<http://www.java.com/download/>

Other Java environments are available e.g. as OpenJDK. jTrainGraph should work with all of them.

If you use the executable exe-file on a windows computer, the application automatically checks if Java is installed. Otherwise, your browser will be opened to download Java.

On any other operating systems, use the jar-file to open the application. Ensure, that .jar-files are correctly linked to the Java runtime environment (search online for „open jar file on [operating system]“).

JTrainGraph is compatible from Java 8 Update 101 onwards (in earlier versions, the SSL certificate for the update functionality won't work).

3 Current version

3.1 Change log

3.1.1 New in version 3.4.1

Bugfixes

3.1.2 New in version 3.4

- Performance improvement for plan validation
- New features for live train graph (see 5.5.1.7)
- Provide Stellwerksim configuration to others (see 6.3.6)

3.1.3 New in version 3.3.1 – 3.3.2

Bugfixes

3.1.4 New in version 3.3

- Possibility for timetables with precision of seconds
- Feature to have train graphs with time on x-axis on top of the existing feature to have train graphs with time on y-axis.
- Bugfixes

3.1.5 New in version 3.2.1

Bugfixes and improvements of sortation function (5.4.1)

3.1.6 New in version 3.2

- Enhanced train transitions:
Split and join trains, restrict train transitions to special operation days
Details in chapter 5.7
- Create daily and weekly tours (jTrainGraph Pro): Details in chapter 5.8
 - Show tours per day, based on train transitions
 - Define vehicles / locomotives with first train per day per vehicle, change to next vehicle after operation day
 - By using this function, also weekly tours can be displayed – for one or more vehicles
- Additional checks (chapter 7.2)
- Improved navigation in *Edit*-menu: Create trains, search trains
- Create multiple trains by separating the names with semicolon (5.3)
- Change train link to copy (5.4.2)

- New export template for table including tracks (7.1.3)
- Bugfixes

3.1.7 New in version 3.1.1

- Several bugfixes, e.g.:
 - Delete shunting movements and stations when editor is open
 - Delete last track of station
 - Enter trains before stations: Fixed bug in checks
 - Delete trains with several train connections
 - Display stopping trains with several columns and trains over midnight
 - Edit linked trains in train graph

Thanks to all, that reported errors in version 3.1!

3.1.8 New in version 3.1

- Timetables with multiple tracks
 - Define tracks per station (with default track per direction) - 5.2
 - Enter tracks for each train stop (if it's not on the default track) - 5.6.2
 - Show tracks in train graph (optionally) - 5.5.1.1
 - Enter shunting movements (jTrainGraph Pro) - 5.6.3
- Checks: Chapter 7.2
 - Checks for consistency
 - Check occupation of parts of the route (beta-version in jTrainGraph Pro)
 - Check occupation of tracks in stations (beta-version in jTrainGraph Pro)
- Extended possibilities to define rules for train styles (regular expressions in 7.3)
- Better error messages during Excel-import of timetables
- Enter hostname in Stellwerksim-mode in case the instance runs on another machine (see 7.5.1)
- Manual is now also available in English

3.1.9 New in version 3.01 - 3.03

Several bugfixes.

3.1.10 New in version 3.0

- Redesign of application with completely new concept for using it more comfortable
 - New: Unlimited number of opened windows

- New: Undo/Redo functionality
- New: Select trains by clicking on the train graph
- New: Change times directly in train graph
- Introduction of jTrainGraph Pro with this extended functionality:
 - No message stating the train graph was created with the free version of jTrainGraph in the header / footer of the train graph
 - Link trains (instead of copying) to automatically apply timetable changes later on to all linked trains
 - Import and export of timetables to Excel and to csv file format
 - Connect trains to their successors at the final stop.
 - Some comfort functions, like copy times, modify multiple train times at once
- Live mode:
 - Show live train graph jumping to the current time
 - Enter and visualize delays
 - Manually set delays or define delays based on rules (e.g. when a train has to wait on another one)

3.2 Version log

Version	Status	Release date
3.4.1	Full version	20.02.21
3.4	Full version	29.12.20
3.3.2	Full version	13.12.20
3.3.1	Full version	29.11.20
3.3	Full version	27.11.20
3.2.1	Full version	12.07.20
3.2	Full version	11.06.20
3.1.1	Full version	27.12.19
3.1	Full version	04.03.19
3.03	Full version	01.11.18
3.02	Full version	11.05.18
3.01	Full version	02.04.18
3.00	Full version	29.03.18
2.03	Full version	26.02.17
2.02	Full version	22.01.17
2.01	Full version	20.09.16
2.0	Full version	11.01.14
1.25	Full version	29.08.13
1.21	Full version	28.04.13
1.2	Full version	13.04.13
1.1	Full version	13.07.12
1.0	Full version	01.06.12
0.5	Beta	16.05.12
0.41	Beta	20.04.12
0.4	Beta	07.04.12
0.3	Beta	28.02.12
0.21	Beta	26.07.11
0.2	Beta	22.07.11
0.11	Beta	28.04.11
0.1	Alpha	25.04.11
0.02	Alpha	24.04.11

Version	Status	Release date
0.01	Alpha	20.04.11

4 General usage

The application starts in the mode of creating own timetables by default. In order to show timetables live (own timetables or timetables of interfaces, e.g. Stellwerksim), change the mode in the menu on *File* → *Live view*.

When you open the application, there is the main window that consists of a toolbar and a text area, that shows different messages during the usage of jTrainGraph.

At startup time, there are these tabs beside the log:

- Stations
- Trains and days of operation
- Timetable
- Train graph
- Checks

You can shift the tabs to another position using the arrows beside the titles. Using the +-sign on the right, you can show these tabs additionally:

- Styles of stations
- Styles of trains
- Display rules
- Settings

Other windows can be shown using the menus *Views* and *Windows* or using the symbols in the upper part of the main view. Changes can be applied in every windows and every tab, all others will automatically be updated. Using the items *Undo* and *Redo* in *Edit* menu, changes can be withdrawn.

Trains are shown according to their individual style (defined in *Styles of trains* view). On top, rules can be defined, e.g. to show all trains of the train type *IC* in red.

The timetables and all relevant settings are stored in timetable files (.fpl). These files are compatible with other applications like FPLEdit.

There are some settings to customize jTrainGraph. These settings are stored in the file *preferences.xml*, that will be created in the folder where jTrainGraph is started. If you delete this file, jTrainGraph will start with default settings.

To get an overview of the jTrainGraph functionality, you might want to use the quick guides in chapters 5.1 or 6.3.2.

A general notice on this manual: The screenshots were created on the operating system Mac OS X. Depending on the platform where jTrainGraph is started, other Java designs are available so jTrainGraph will look slightly different – but this does not impact the number and position of the user interface components.

5 Create own timetables and train graphs

To create a train graph, most importantly stations and trains have to be entered. Stations are entered in the view *Stations* (see 5.2), trains can be created using these means:

- *View Trains and days of operation*
- *View Timetable*
- *View Train graph* when the timetable is entered directly into the train graph
- using the menu *Edit* → *Add train*

After that, many different settings exists to fine-tune the train graph (see chapter 7). Tracks can be entered optionally (see 5.2 and 5.6.2).

The train graph can be shown directly (see 5.5), can be exported as an image file (see 5.5.5) or be printed (see 5.5.6).

Based on the timetable that was defined, a tour can be displayed and shown in a separate window (see chapter 5.8). Tours do not have impact on the train graph.

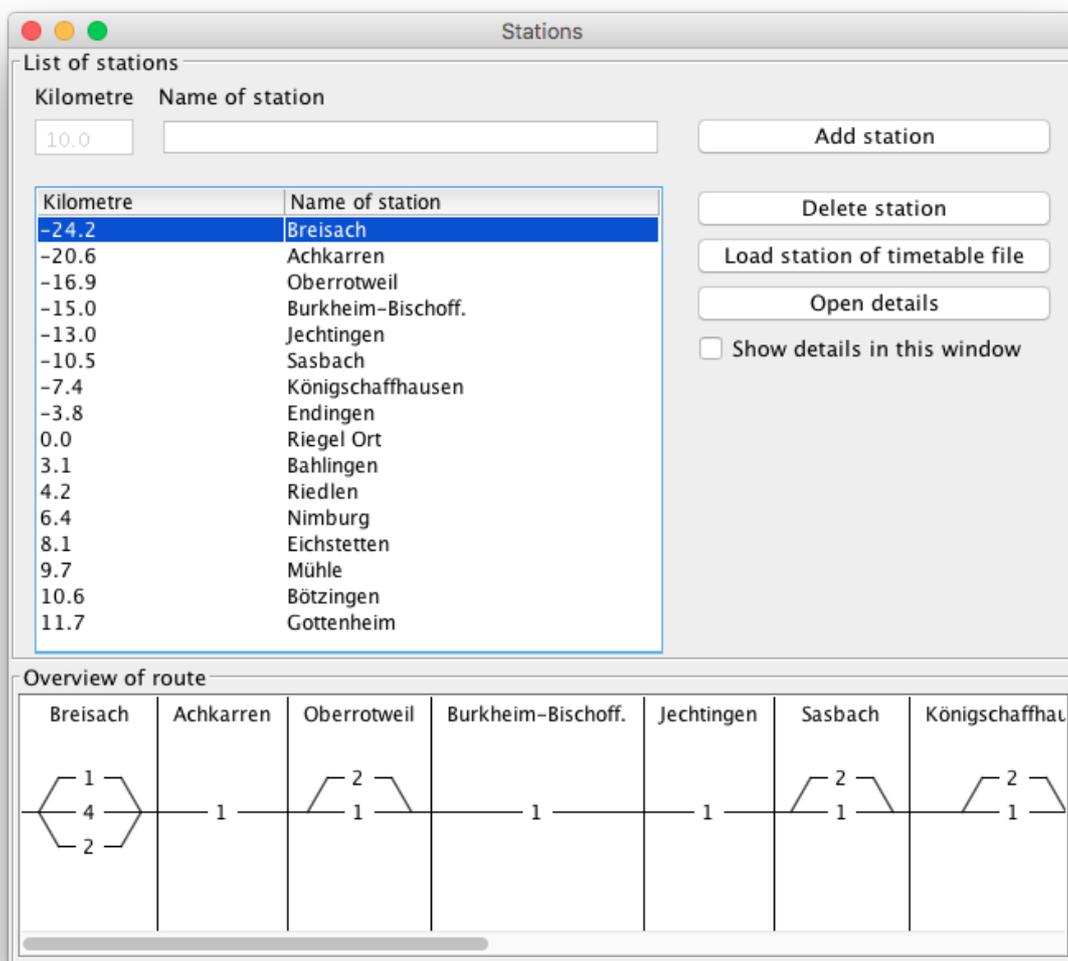
5.1 Quick start

To get a first impression on jTrainGraph, you can stick to the toolbar (pictures on top) of the main window, or to the different tabs of the main window.

You might want to open example timetables (see downloaded folder) and view the different tabs / windows. The windows should be mostly self-explaining and are already filled with information, if you opened a timetable.

5.2 Enter stations

The view *Stations* looks like that:



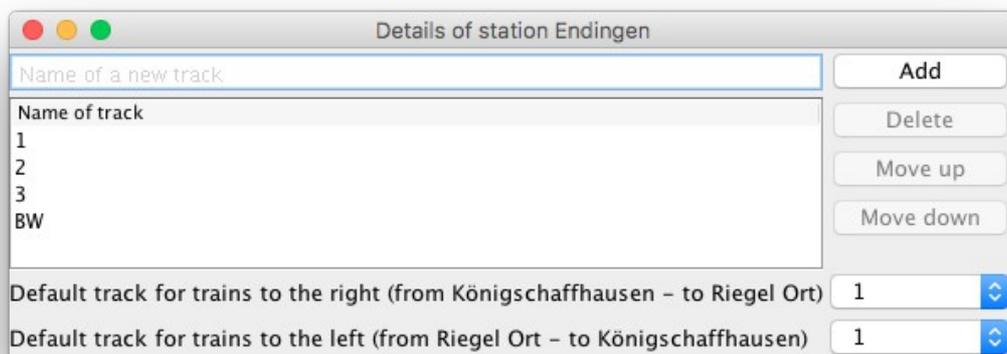
You can create new stations by entering the position of the station (in kilometres) and the name and a push on the enter key (or choose *Add station* button). You can double click on the cells in the table of stations in order to change positions or names. If you click on *Delete station*, all selected stations will be deleted. Currently there has to be a continuous mileage (that means “jumps” are not supported), negative values are permitted.

You can automatically create stations using the stations of another timetable file. Just click on *Load stations of timetable file*. Stations and their styles will be loaded, but no trains will be loaded.

In the lower part of the window, all stations are shown. You can click on a station to select it. The lower part also shows the tracks that are defined for stations. The position depends on the default tracks that are chosen.

To enter tracks, select a station in the table or the route overview and click on *Open details*. You can also enter the tracks in the same window, if you select the checkbox *Show details in this window* that causes the last selected station to be shown in details.

Details for stations consist of these information (note that all details are optional – you only have to enter tracks, if you want to show them in train graph or use checks for station tracks):



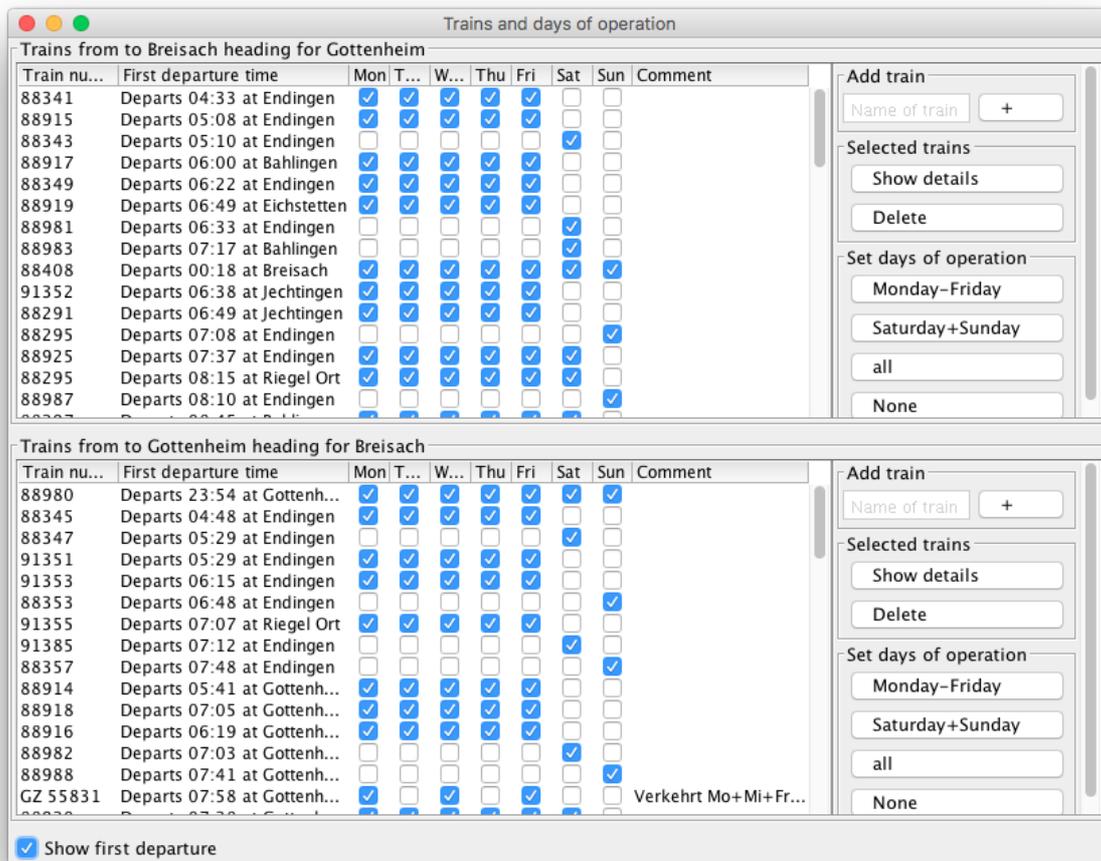
Here you can enter a track name and push on the enter key. You can delete tracks, edit the names by double clicking on them or change the sortation with *Move up* and *Move down* buttons. The order of the tracks is relevant if you want to show them in train graph. The most upper track of the list is the leftmost track in train graph.

Default tracks define, where trains stop by default – if no specific track is chosen for a train. See also chapter 5.6.2.

Track names have to be distinct and must not start with “-”.

5.3 Enter train numbers (names) and days of operation

The following image shows the view *trains and days of operation*:



For each direction there is a table with trains and the days of operation of each train. Using the checkboxes you can define the days, the train departs (arrives) at it's first station.

New trains can be added by entering the name/number in the field right to the table of the desired direction. Several trains can be added at once, when the names are separated with semicolons (;). Keep in mind, that also other means exists (see e.g. chapter 5.4.2 Copy and link trains).

The buttons for setting days of operation, the buttons for opening details and deleting trains have an impact on all selected trains of the particular table.

Using the checkbox on the lower part of the window, another column is shown stating the first departure station and time of each train. You can edit the train name and comment by double clicking on the value in the table. The comments for trains can be shown on the train graph (optionally) and will be used as mouse-over in timetable view (when mouse is on title of table).

5.4 Enter the timetable

The timetable can be entered e.g. in the view *Timetable*:

The screenshot shows a window titled "Timetable" with two main sections. The top section is titled "Trains from to Breisach heading for Gottenheim" and contains a table with columns for train numbers (GZ 55830, 91356, 91378, 91358, 88945) and departure/arrival times. The bottom section is titled "Trains from to Gottenheim heading for Breisach" and contains a table with columns for train numbers (88916, 88982, 88988, GZ 55831, 88920) and departure/arrival times. To the right of each table is a control panel with buttons for "Edit plan", "Add train", "Sort trains", "Selected trains", "Show details", "Copy", "Fill timetable", "Delete", "Selected times", and "Move times".

Trains from to Breisach heading for Gottenheim					
	GZ 55830	91356	91378	91358	88945
Breisach dep	11:20		12:23	12:36	
Achkarren arr			12:28	12:41	
Achkarren dep			12:28	12:41	
Oberrotweil arr			12:33	12:45	
Oberrotweil dep			12:33	12:45	
Burkheim-Bischoff. arr			12:36	12:48	
Burkheim-Bischoff. dep			12:36	12:48	
Jechtingen arr			12:39	12:50	
Jechtingen dep			12:39	12:51	
Sasbach arr			12:43	12:54	
Sasbach dep			12:43	12:54	
Königschaffhausen arr			12:48	12:57	
Königschaffhausen dep			12:48	12:57	
Endingen arr	11:50		12:52	12:01	

Trains from to Gottenheim heading for Breisach					
	88916	88982	88988	GZ 55831	88920
Gottenheim dep	06:19	07:03	07:41	07:58	07:38
Bötzingen arr	06:22	07:06	07:44	08:01	07:41
Bötzingen dep	06:22	07:06	07:44	08:02	07:41
Mühle arr	06:24	07:07	07:46		07:43
Mühle dep	06:24	07:07	07:46		07:43
Eichstetten arr	06:28	07:09	07:49		07:46
Eichstetten dep		07:10	07:52		07:54
Nimburg arr		07:12	07:54		07:56
Nimburg dep		07:12	07:54		07:56
Riedlen arr			07:56		07:58
Riedlen dep			07:56		07:58
Bahlingen arr		07:15	07:58		07:59
Bahlingen dep			07:58		07:59
Riedel Ott arr			08:02	08:12	08:02

There is one table containing timetables for each direction. For each table there are buttons to edit times in the specific table. New trains can be added and the trains can be sorted (see 5.4.1 Sort trains). For all selected trains details can be shown, trains can be copied (see 5.4.2 Copy and link trains), the timetable can be filled or shifted automatically (see 5.4.3 Automatically calculate a timetable) and the selected trains can be deleted.

If you enter a time when a cell is selected, you can overwrite the old value with a new one. If you double click on a cell, you can modify the existing value.

The following time formats are supported (the separation sign is arbitrary, as long as it is no

number – in the examples it is a colon):

hhmm	e.g.	0900 oder 900		(leading 0 can be omitted)
hh:mm	e.g.	09:00		
h:mm	e.g.	9:00		
hh:mm:ss	e.g.	09:00:30		(seconds entered exactly)
hhmm:ss	e.g.	900:30		
hh:mm,ss	e.g.	09:00,5		(seconds entered decimally)
hhmm,ss	e.g.	900,5		
m	e.g.	3	=>	00:03 (also possible with leading colon)
mm	e.g.	33	=>	00:33 (also possible with leading colon)
hh:	e.g.	3:	=>	03:00 (leading 0 can be omitted)
hh:m	e.g.	12:3	=>	12:03 (leading 0 can be omitted)

Seconds can be entered either exactly (e.g. 30 seconds) or decimally (e.g. ,5 or ,75). If there are no seconds, none need to be entered. Seconds will be shown in the train graph in the way they were entered.

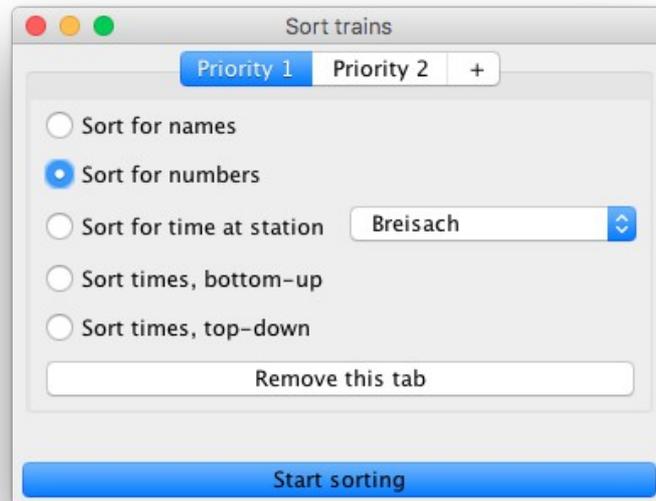
You don't have to enter times for all stations. Stations without times will be leaped and a line to the next station with an arrival time will be drawn.

If there is only a departure time at a station (no arrival time) and it is not the first station of a train, the departure time is interpreted as a drive through time and no arrival time will be displayed in the train graph.

If a departure time is defined at the last stop of a train or a arrival time is defined at the first stop of a train, this is interpreted as exit of the train graph and a train line is drawn on half of the distance to the next station. You can use this feature e.g. if the train has to use “your” tracks to get out of the last station. Note that this arrival/departure time is not taken into account when route occupation is calculated and checked.

5.4.1 Sort trains

You can open the sort train view in the *Timetable* window for one of the two directions. One or more criterions can be defined to sort the trains. You can see them here:



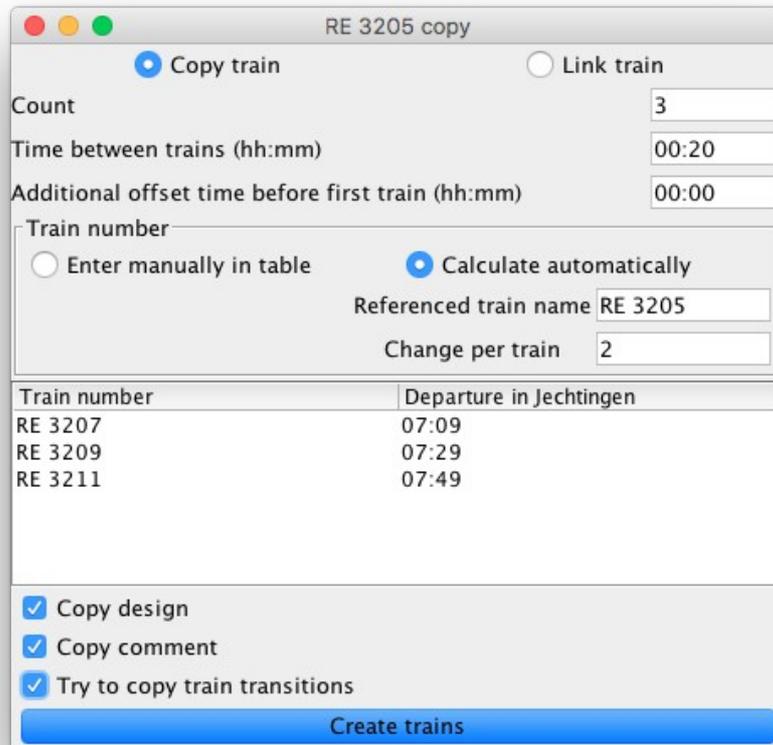
The selection in tab *Priority 1* is the most influential. More tabs can be added using the +-Button on the right and can be removed using the button *Remove this tab*. Sort for name is based on an alphabetical compare, *Sort for numbers* extracts all digits in a train name and does a mathematical comparison. Below that, the times at a specific stop can be taken into account or the times of all stations. The top-most priority has the time

- at the first station of the direction in case of *bottom-up*
- at the last station of this direction in case of *top-down*.

Trains without times added to their timetables are sorted to the very right / bottom, when *bottom-up* or *top-down* is chosen.

5.4.2 Copy and link trains

Using the Button *Copy* e.g. in the timetable view, a train can be carried forward with a specific pulse. The copy window opens like this:



The explanation of the window is from top of the window to the bottom part. On top the selection is made, whether the train has to be copied or linked. When a train is copied, all current values are deep-copied (e.g. timetable) and later changes to one of the trains do not impact the others. When a train is linked, there is a reference to the basic train and all later changes are applied to all linked trains. This link functionality is only available in jTrainGraph Pro.

For live mode of own timetables, the links are released and all trains can be edited individually (as not all will have the same delay e.g.).

Starting in version 3.2, links can be changed later to copies. In this case all trains are created as individual trains. Existing train transitions are changed.

In this example, the train *RE 3205* is copied, its train number is increased by 2 for each copied train and 20 minutes are added to the timetable. For all three copied trains the style, the comments and the train transitions at the last station are copied (train transitions only in jTrainGraph Pro). The impact on the timetable is as follows:

	RE 3205	RE 3207	RE 3209	RE 3211
Jechtingen dep	06:49	07:09	07:29	07:49
Sasbach arr	06:53	07:13	07:33	07:53
Sasbach dep	06:53	07:13	07:33	07:53
Königschaffhausen arr	06:56	07:16	07:36	07:56
Königschaffhausen dep	06:56	07:16	07:36	07:56
Endingen arr	07:00	07:20	07:40	08:00
Endingen dep	07:02	07:22	07:42	08:02
Riegel Ort arr	07:06	07:26	07:46	08:06
Riegel Ort dep	07:07	07:27	07:47	08:07
Bahlingen arr	07:12	07:32	07:52	08:12
Bahlingen dep	07:12	07:32	07:52	08:12

5.4.3 Automatically calculate a timetable

In the view *Timetable* for a selected train this view can be opened using the button *Fill timetable*:

The screenshot shows a dialog box titled "Fill timetable". At the top, there are three colored window control buttons (red, yellow, green). Below them, the title "Fill timetable" is centered. The "Reference time" section contains a text field with "Departure Endingen", a dropdown arrow, and "at 09:00" followed by "O'clock". The "Timetable profile" section has four radio buttons: "According to reference train" (selected), "According to profile of train type", "According to mean value of all trains", and "Using mean velocity of". The "Using mean velocity of" option is set to "40.0 km/h, stopovers of 00:00:30 h and precision of minutes". At the bottom, there is a blue button labeled "Fill timetable".

The reference time fields are pre-filled with the currently selected row of the timetable. Using the reference time, the timetable is calculated based on the timetable of another train, of the trains of a specific type (e.g. all trains containing *GZ* in their name), the mean value of all trains or based on a mean velocity and a specific time for each stopover.

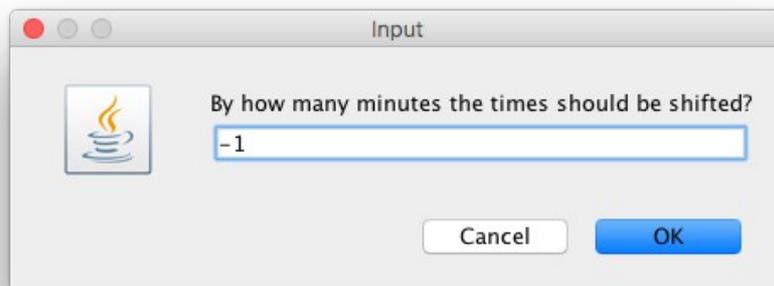
If the mean velocity option is selected, the precision of the times can be chosen. E.g. when minutes are used (see screenshot), each time is rounded mathematically to the closest minute value after the calculation of all times.

5.4.4 Shift times

When one or more rectangular areas in the table of the *Timetable* view are selected, the affected times can be shifted:

Trains from to Breisach heading for Gottenheim			
	RE 3205	RE 3207	RE 3209
Jechtingen dep	06:49	07:09	07:29
Sasbach arr	06:53	07:13	07:33
Sasbach dep	06:53	07:13	07:33
Königschaffhausen arr	06:56	07:16	07:36
Königschaffhausen dep	06:56	07:16	07:36
Endingen arr	07:00	07:20	07:40
Endingen dep	07:02	07:22	07:42

After clicking on the button *Move times* there is this dialog, where a number of minutes (negative or positive) can be entered to shift all selected times:

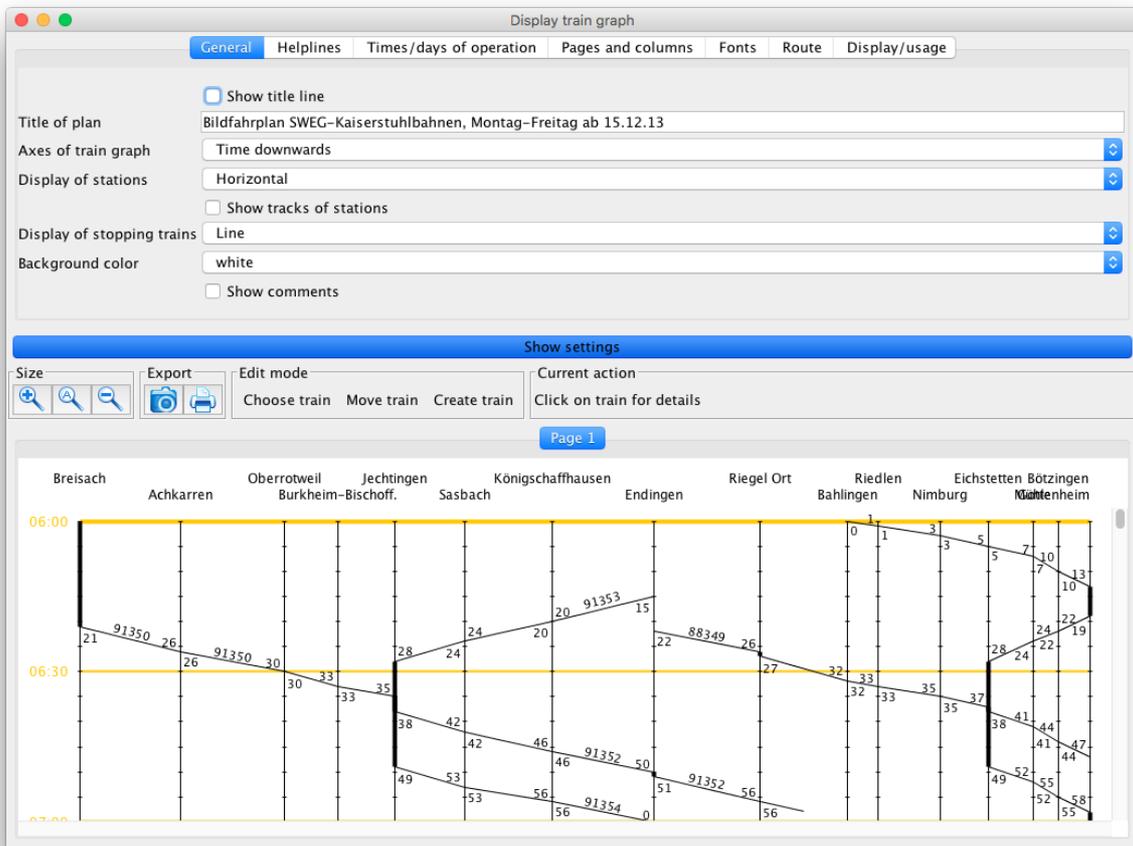


Only those times are impacted, that are already set (non-empty cells).

5.5 Show the train graph

This view *Train graph* is split in three areas: On the upper part, there is an area with settings of the train graph. This panel either can be shown or can be made invisible. Below there is a toolbar for a fast access to functions impacting the train graph. In the lower part of the view the train graph itself is shown. By default, the edit mode is automatically selected that opens details for a train when clicking on it.

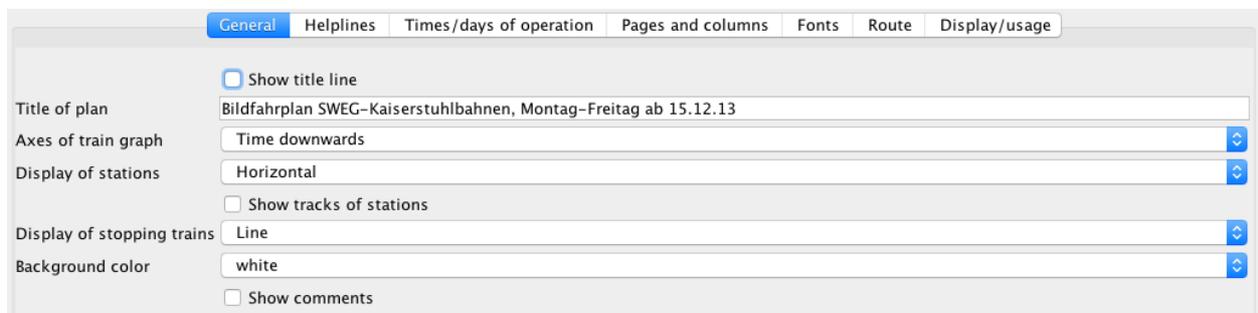
5.5.1 Settings for the train graph



The area of settings is divided in some tabs, where train graph can be customized. Most of the settings are saved to the timetable file (.fpl), a few of it are saved in the settings of the application instance (*preferences.xml*).

In the following chapters, each tab is explained shortly.

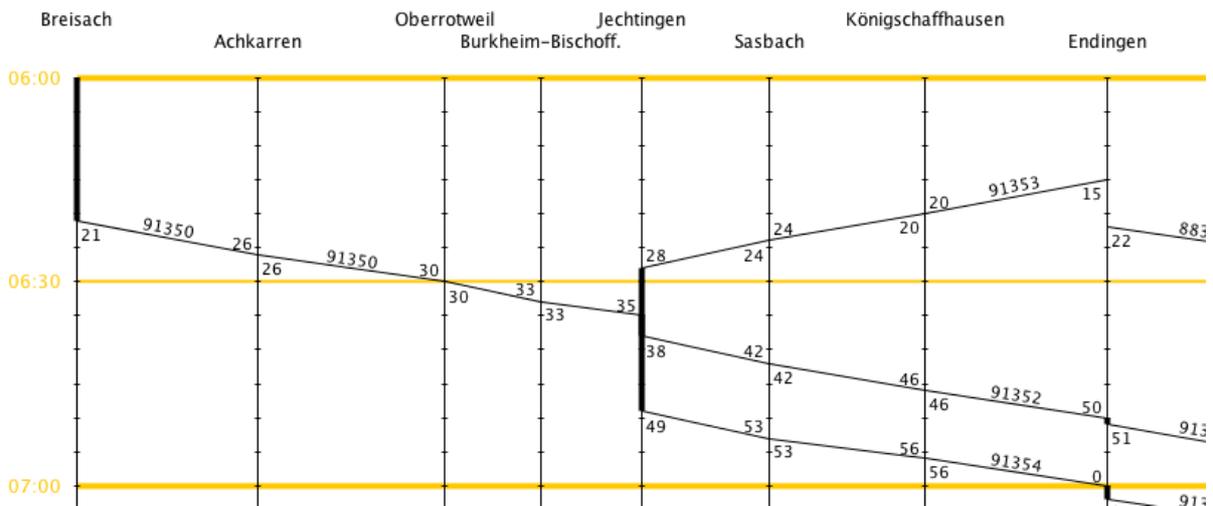
5.5.1.1 General settings



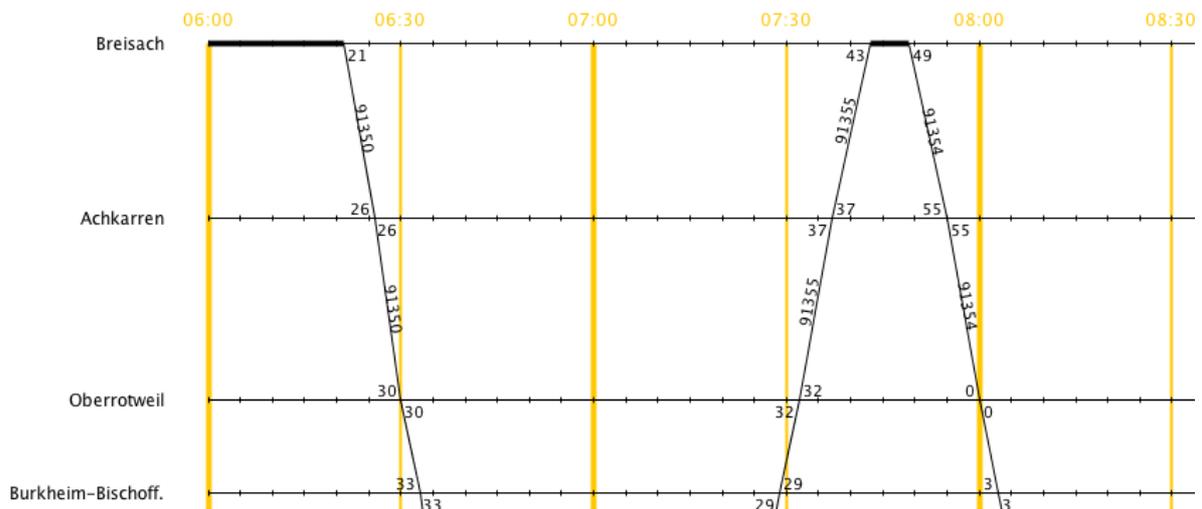
In the tab *General* the title line can be configured. It is shown above the train graph. Changes to the title are applied as soon as the enter key is pressed (or the textfield loses focus).

One of two train graph visualizations can be chosen:

- Line and stations on the x-axis, time on the y-axis
This visualization is most common e.g. in Germany and is therefore available since the first jTrainGraph version:

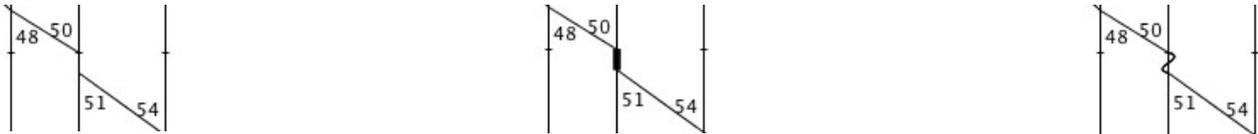


- Time on the x-axis, line with stations on the y-axis
This is the most common visualization outside of Germany:



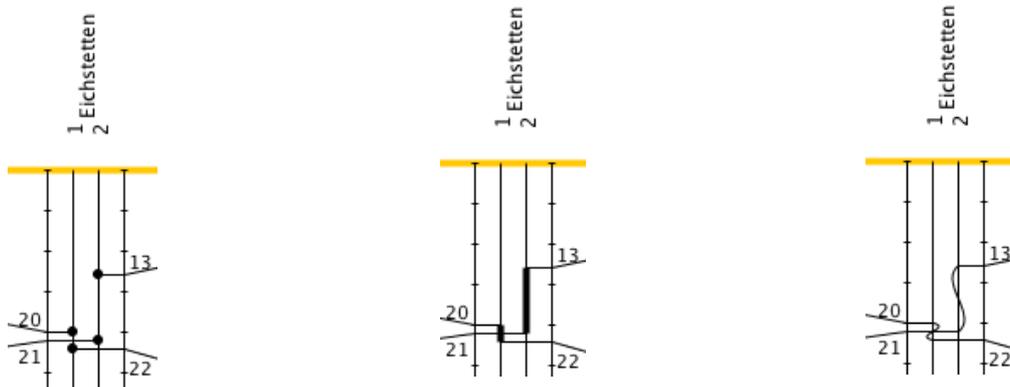
The station names left to or above the train graph can be shown vertically or horizontally, so they need more or less space.

For stopping trains, either no (see left), linear (see middle) or cubical lines (see right) can be shown:



Show tracks of stations leads to all tracks getting displayed for station with at least one track defined. Note that this requires much more space than a train graph without tracks – therefore choose the width accordingly. Also refer to chapter 5.6.2 for multi-track information.

Depending on the line style that is chosen for lines shown for stopping trains (see above), the stops at stations with tracks looks different:



With no lines shown for stopping trains, there is a small circle for every arrival or departure or drive through of a train.

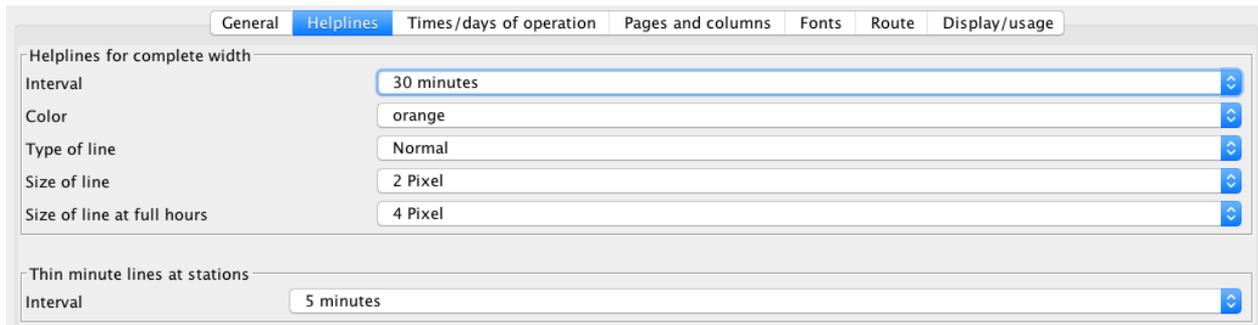
With linear or cubic lines, they are shown at the right track from arrival till departure.

The background color can be chosen out of all preconfigured colors (see also 7.5.2 Manage additional colors).

Show comments leads to comments being shown below the train graph for all trains, that are displayed in the relevant plan / column.

5.5.1.2 Helpline settings

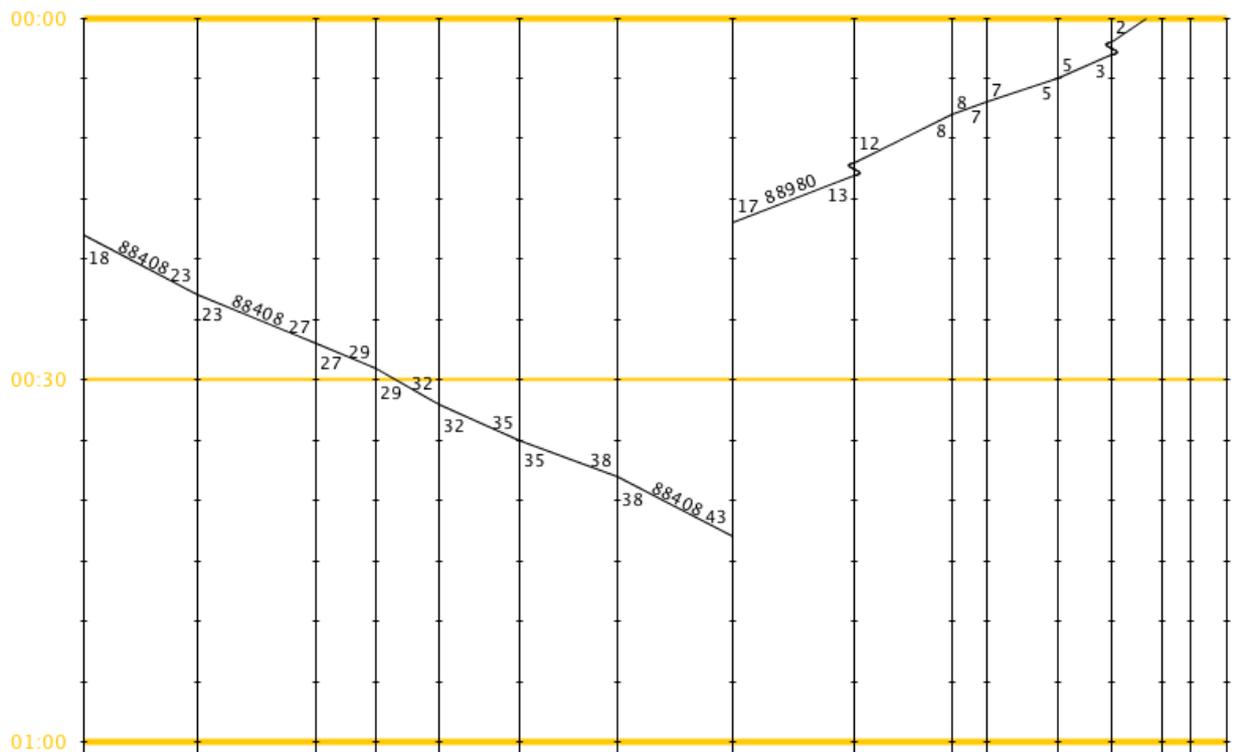
In the tab *Helplines* two types of helplines are configured:



The upper part of the view is about helplines that span across the whole width of the train graph. They are shown in an user-defined interval, a specific color and with a specific line style (see also 5.5.7). There are two line sizes for these kind of helplines – for lines at full hours another line size can be defined.

In the lower part of the view an interval for smaller “minute lines” can be defined. They are shown as short lines at each station and track.

The example below shows those helplines that are defined in the example of this chapter:



5.5.1.3 Times / days of operation

The start and end times shown by default are automatically calculated based on the trains that are shown. If there is a train that drives across midnight, the whole time between midnight and next midnight is shown. If the checkbox *Calculate times automatically* is deselected, the times can be entered manually. They are taken into account as soon as the field loses focus or the enter key is pressed. Also times after midnight can be entered in the field *End time*, e.g. start time 06:00 o'clock and end time 03:00 o'clock.

Caution: The times might be rounded up or down if *Times are rounded to helpline intervals* is selected in tab 5.5.1.4 Pages and columns.

Below the days of operation of the trains that have to be shown in the train graph can be selected. They define the days for the start of the train graph (in case of train graphs across midnight). If a train drives at least at one of the selected days (in a specific part of the route), it is shown.

5.5.1.4 Pages and columns

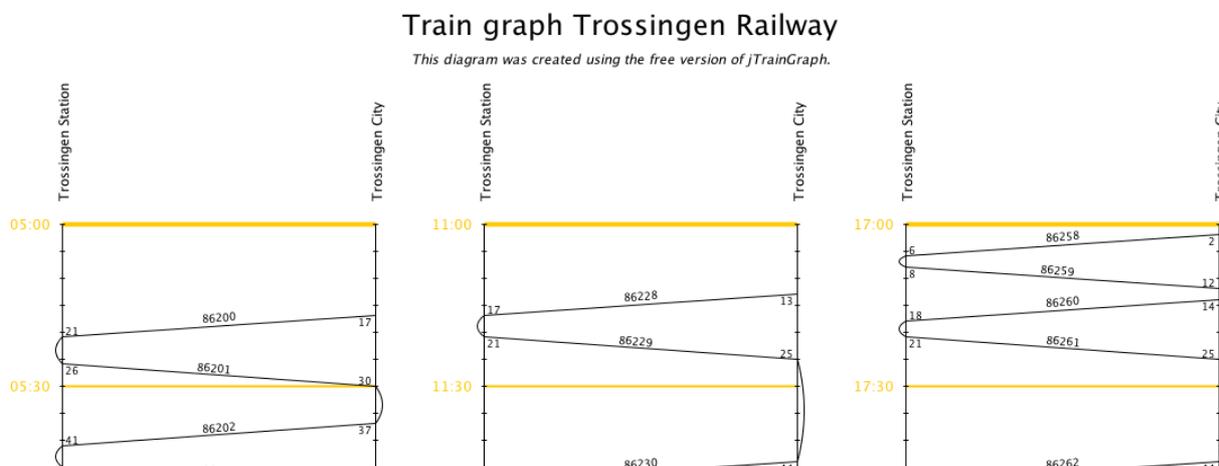
The train graph can be spread on more than one column, what is desirable especially for export and printing of train graphs. Show more than one column per page is appropriate for short routes with few stations.

The number of pages can be entered directly (first combobox), or the number of hours per page can be entered (second combobox).

The title line is shown only on the first page by default. By selecting *Title line on every page* it is also shown on all other pages. Also comments are shown below each column by default, but there can also be one big comment block below the whole train graph.

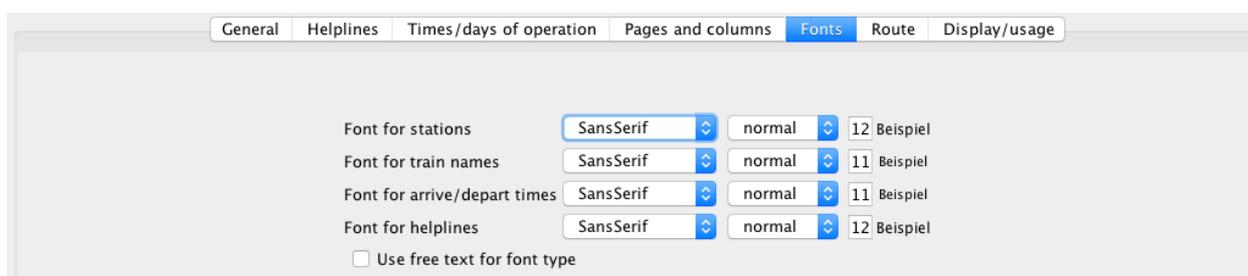
Times are rounded when *Times are rounded to helpline intervals* is chosen.

Below, a train graph with more three columns is shown:



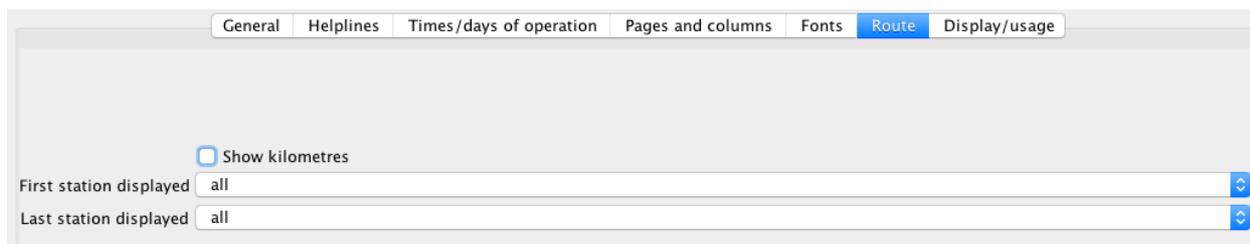
5.5.1.5 Fonts

Fonts for stations, trains, times and helpline-descriptions can be chosen out of five platform-independent fonts. If you select *Use free text for font type*, you can choose any other font that is available on your system – but the font might not be available on other systems. On the right, an example for each font is shown.



5.5.1.6 Route

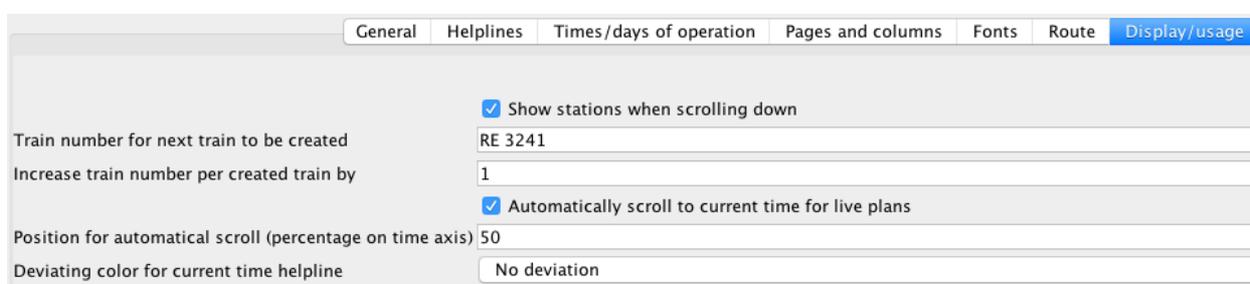
The part of the route that is shown in the train graph can be restricted in this tab. By default, the whole route is shown:



When *show kilometres* is selected, the station names are shown together with the position values, e.g. [14,3] Sasbach.

5.5.1.7 Display/usage

These settings are not stored to the timetable file, but they only impact the way the train graph is shown in an application instance and how the interface of jTrainGraph behaves.



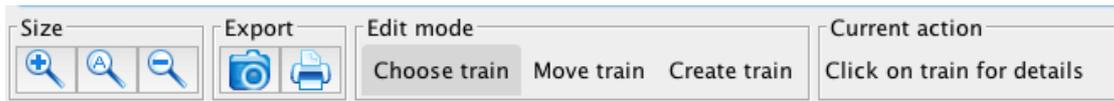
Show stations when scrolling down has the impact, that the bar with all station names (and track names) is always shown, even if the user scrolls down the train graph. Using this function, the times and lines can be better assigned to the station names, but this requires some height of the view, so less train graph area can be shown.

The next fields define the next train number for trains created on click in the train graph (see 5.5.4) and the increasing number for each train.

Automatically scroll to current time for live plans leads to the train graph aligning to the current time for live plans, as soon as the time changes (each minute). *Position for automatical scroll* defines, where the current time is positioned on the time axis. 0 leads to current time being at the top / left of the train graph, 50 leads to the current time being in the middle of the train graph.

Deviating color for current time helpline can be used to have a different color for the current time, compared to other helplines.

5.5.2 Toolbar



On the left of the toolbar, the size of the train graph is changed. If you click on the left button (+) or the right button (-), the size is increased or decreased in both dimensions. If you press the alt-key, only the height of the train graph is changed (increased/decreased), if you press the ctrl-key (Mac: cmd-key), only the width of the train graph is changed.

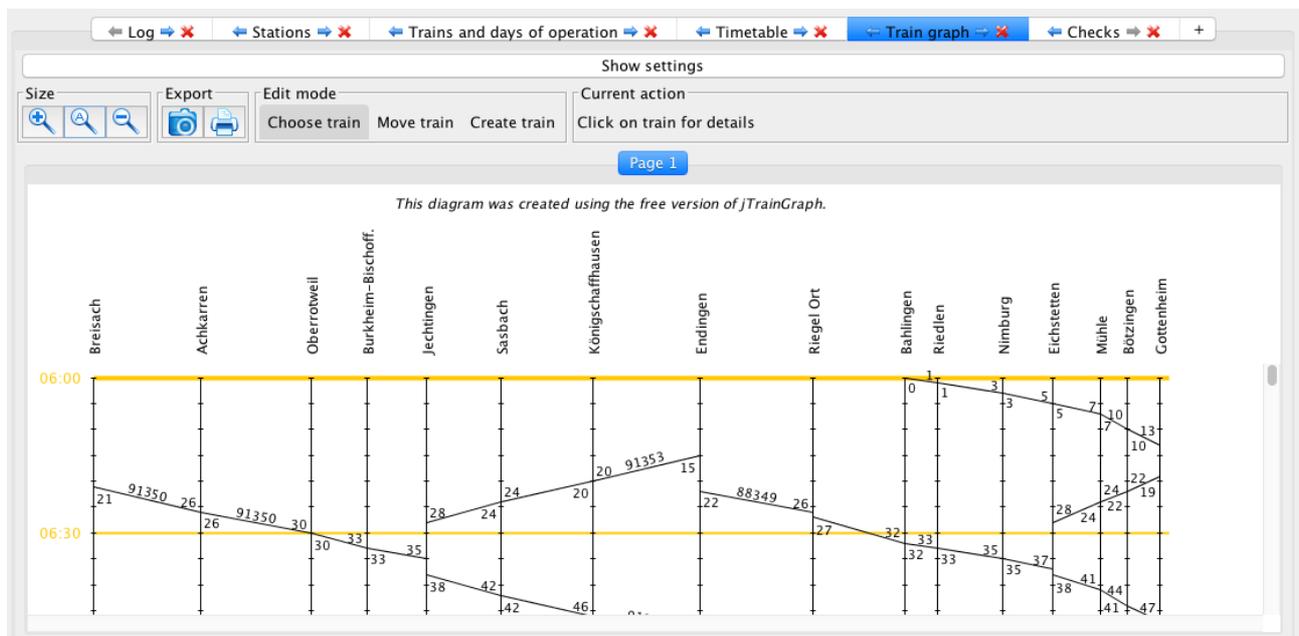
Using the button in the middle of this two keys (A), the pixel-size of the train graph can be entered precisely.

There are two buttons in the *Export*-panel, that start the export of the train graph to an image file or start printing the train graph.

On the left, there are three buttons to choose the edit mode of the train graph view, see 5.5.4 Create and move trains directly in the train graph. On the right, the next action is shown. This action will be executed as soon as there is a click in the train graph.

5.5.3 Train graph

The train graph is shown according to the settings that were entered. By clicking to the train graph, the actions described in 5.5.4 are executed.



5.5.4 Create and move trains directly in the train graph

There are three modi to process clicks to the train graph. They are selected in the toolbar.

5.5.4.1 Choose train

Right above the train graph it is shown, which trains are near the current mouse cursor position. When clicking on the train graph, the train detail view of the chosen train is opened. If more than one train is next to the mouse cursor, the train has to be chosen in a list view. You can navigate with the cursor keys or your mouse in this view and open the details for the selected train by pressing on the enter-key.

5.5.4.2 Move train

If you click on *move train* in the toolbar, the mode is changed. By clicking on a train, it is selected. Afterwards, all the times of the train can be shifted by moving the mouse cursor up or down, till the number of minutes (shown right above the train graph) has the desired value. When another click to the train graph is made, the timetable shift is performed. Now, the next train can be selected.

If the ctrl-key is pressed, only specific times of the train are shifted. Which time is again shown right above the train graph, there is also the number of minutes for the shift.

The train is selected in the same way, afterwards an unlimited number of specific time changes can be performed. To change the times of another train, click again on the mode *Move train*.

5.5.4.3 Create train

Choose the mode *Create train*. Click on one timetable point after another. You are free to define arrival or departure (drive through) times. Note that the train might not be shown (correctly) when the first time is defined, as in most cases two times are necessary to find out the direction of the train. Just keep selecting one time after another.

To create the next train, click on *Create train* again.

5.5.5 Export the train graph to an image file

Exporting the train graph can be started directly in an train graph view by clicking this symbol in the toolbar:

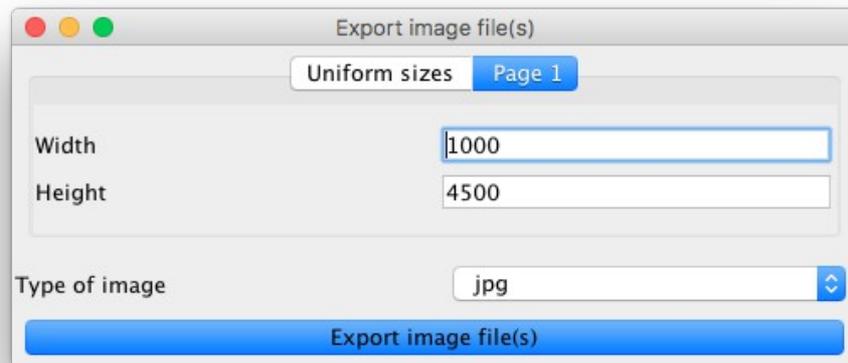


There is the alternative to use the menu of the main frame: File → *Export* → *Image*

In this case, a new view is opened. The export can be started by clicking on *Export image file(s)*

on the bottom of the view.

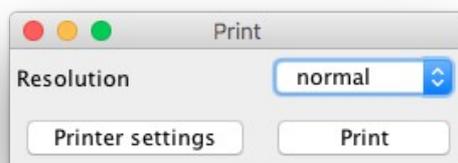
In both cases, a small window opens afterwards. There, the pixel-sizes of the images are shown (and might be adjusted). The image file format has to be chosen amongst *jpg*, *gif* and *png*.



After a click on *Export image file(s)* the target file can be entered. If the train graph is split across multiple pages, one file per page will be created. In this case, the page number is appended to the file name (e.g. *_1* for page 1).

5.5.6 Print the train graph

Printing the train graph is started in the same way, exporting an image file is started (see 5.5.5). For printing, this windows is opened:



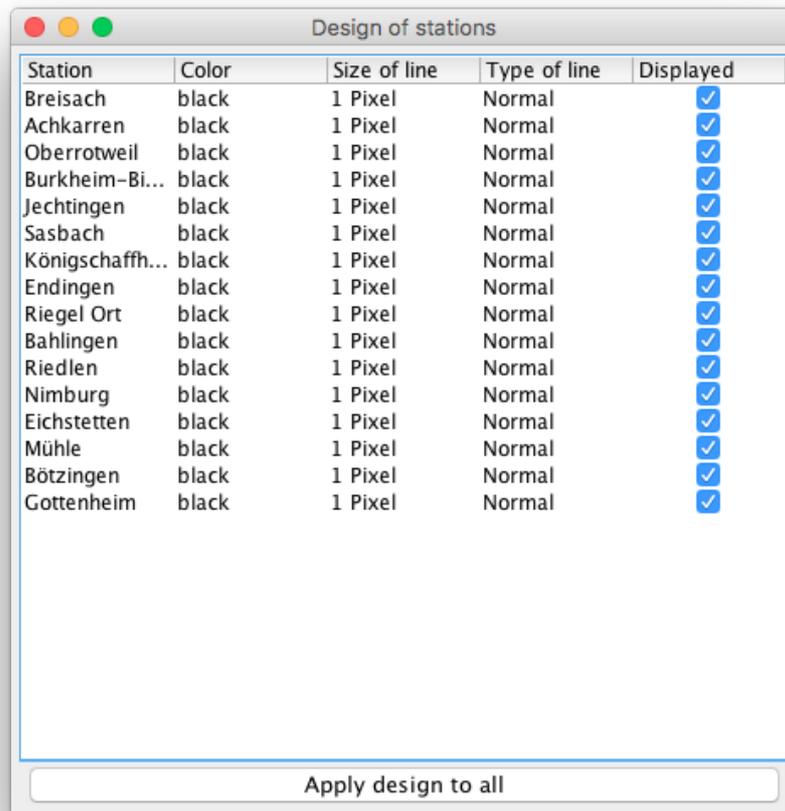
When the resolution of a printout or printed pdf-file is too high or too low, in this window the resolution can be adjusted. When you click on *Printer settings*, the default system dialog to change printout settings is shown. In this window there is the setting for portrait or landscape format.

When *Print* is clicked, the printer has to be chosen. This can either be a real printer, or a so-

called PDF printer to create a pdf file.

5.5.7 Design of stations

In the view *Design of stations* the style of each station can be defined separately. The view is opened using the menu of the main frame: *View* → *Change station design*

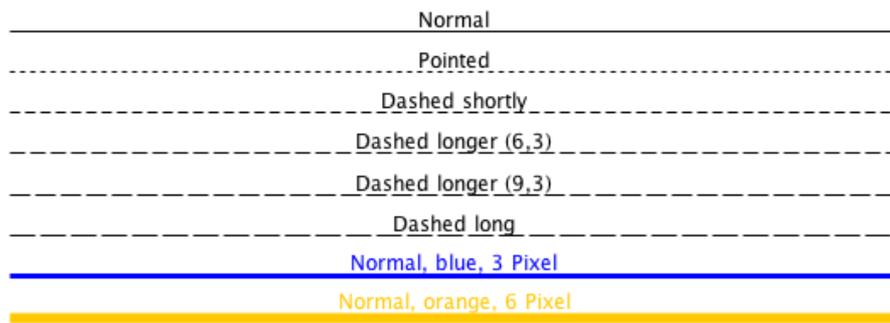


The line style of each station can be adjusted (see Different line styles). When *Apply design to all* is executed, the style of the currently selected station is applied to all stations.

For stations that are not printed, no train times are shown in the train graph.

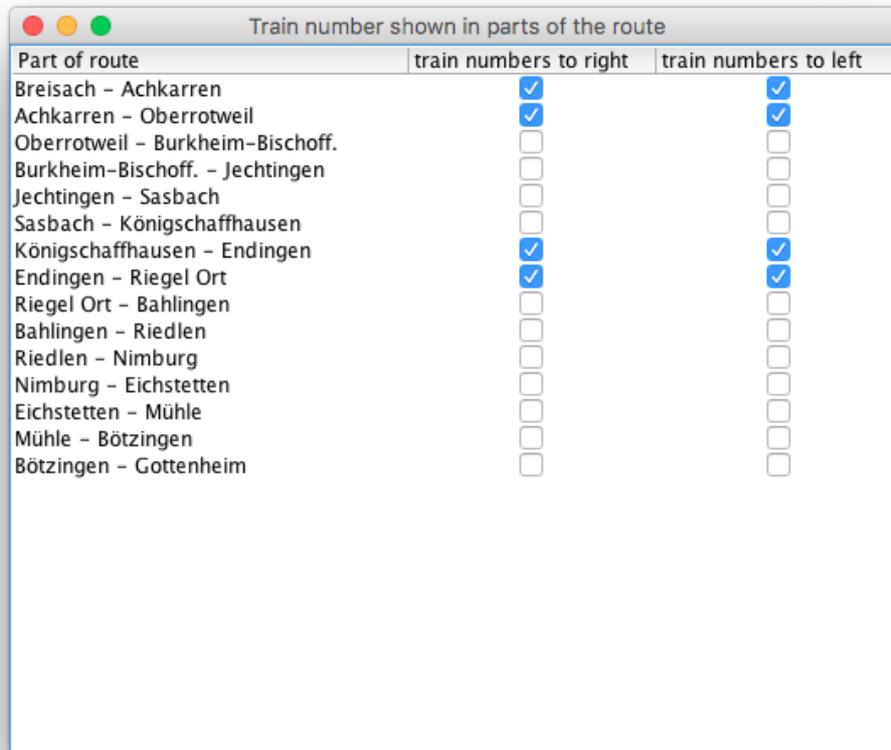
5.5.8 Different line styles

For lines (e.g. stations in 5.5.7 and trains in 5.5.10), the color, the size and the style can be defined. This picture shows the six different line styles and two examples for colored lines with sizes of 3 and 6 pixels:



5.5.9 Show and hide train names (numbers)

In order to hide the train names (numbers) in the train graph on specific parts of the route, you can open the view *View* → *Change route design*. For each part of the route, the user can choose for which train direction(s) the train names should be displayed.



For a train that drives through a station without having a departure time there, the train number is shown, if it should be shown in at least one part of the route.

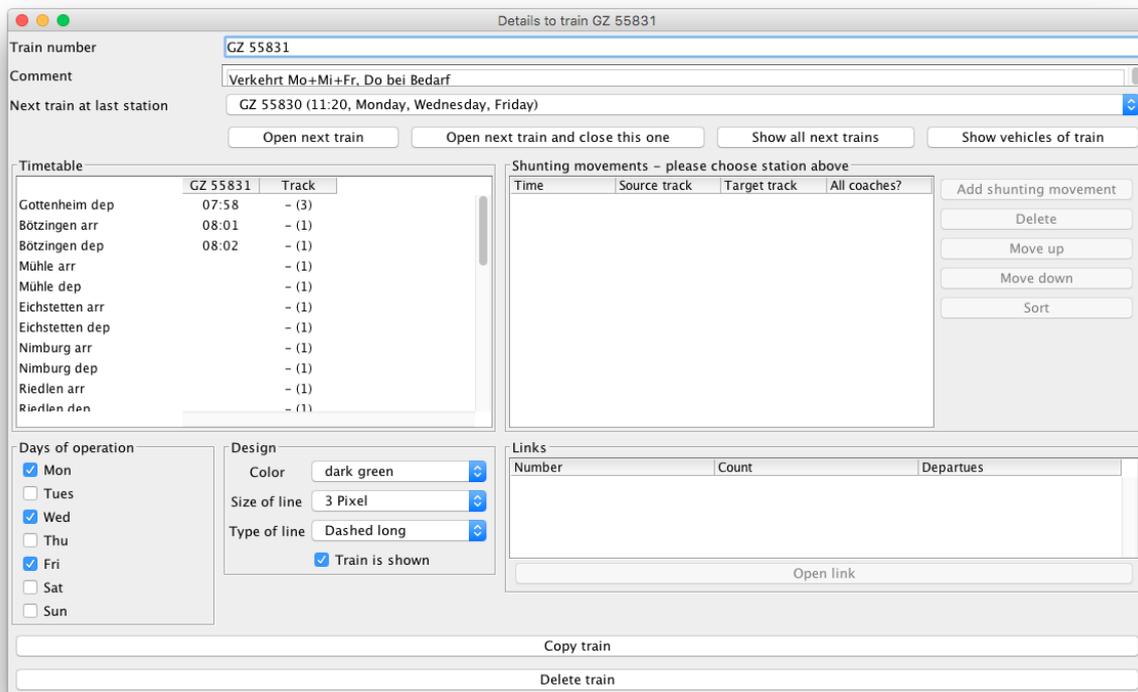
5.5.10 Individual design of trains

For the individual train design there is a view similar to the design view of stations (see Design of stations). The view can be opened using the menu *View* → *Change individual train design*.

If you want to define the train design according to rules (e.g. all trains of the train type ICE are red), please refer to chapter 7.3 Show trains using rules. When you activate the rule-based design for trains, then the settings of the individual train design view are only applied, if no rule matches a train (including the default rule).

5.6 Change trains

When you click on a train in the train graph (see 5.5.4.1) a window pops up, where the most important settings for the train can be adjusted:



Parts of the window are only activated in jTrainGraph Pro, e.g. the functions *Next train* (see 5.7.1), shunting (see 5.6.3) or train links (see 5.4.2).

5.6.1 Connect trains

The function *next train* is explained in chapter 5.7.1.

Using the buttons below *next train*, jTrainGraph can open automatically the view for the next train, for a detailed list of train transitions (see 5.7.2) or for the vehicles that run on this train.

5.6.2 Choose tracks

Right beneath the timetable, the individual tracks for a train can be chosen. When no tracks are chosen, in brackets the tracks automatically calculated by jTrainGraph are shown. They are calculated like this:

- When neither for arrival, nor for departure a track is chosen, the default track is used (like it is defined in 5.2 Enter stations).

In general: When the train arrives at a station and has a train transition (see 5.7), then the departure of the next train is taken into account. When the next train also has other train transitions (split, join), also for them it is checked whether they have tracks explicitly set. When no track is selected for both, then the default track for arrival is relevant.

When the other trains have different tracks set, then fallback goes again to the default

track.

- When an arrival or a departure track is chosen, it is used for both arrival and departure.
- When both arrival and departure track are chosen, both are valid. The train has to change the track in this case automatically or manually (see 5.6.3).

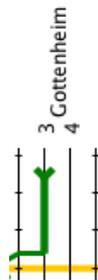
Timetable		
	91353	Track
Krieger Ort dep		- (1)
Endingen arr		- (1)
Endingen dep	06:15	- (1)
Königschaffhausen arr	06:20	2
Königschaffhausen dep	06:20	- (2)
Sasbach arr	06:24	1
Sasbach dep	06:28	2
Jechtingen arr	06:32	- (1)

5.6.3 Shunting

On the right part of the window, shunting movements are defined. Each shunting movement is entered with four information: time, source track, target track and a flag, if the track is empty afterwards.

To define shunting movements, first the right station has to be selected in the table on the left of the frame.

For source and target track, also *None* can be selected. In this case, the train enters (source=None) or leaves (target=None) the plan. Two small lines are shown like this (example of a train that arrives it's departure track 10 minutes before departure):



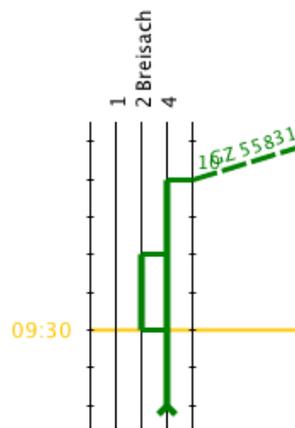
This is the example of the train, that does a shunting movement to the departure track 10 minutes before departure:

Shunting movements at station Gottenheim			
Time	Source tra...	Target track	All coaches?
07:48	(None)	3	<input checked="" type="checkbox"/>

The second example is a combined example, first the locomotive of the train shunts on the other side of the train (leaving the train at track 4 and shunting on the other side using track 2), then the whole train leaves the plan:

Shunting movements at station Breisach			
Time	Source track	Target track	All coaches?
09:20	4	2	<input type="checkbox"/>
09:30	2	4	<input checked="" type="checkbox"/>
09:40	4	(None)	<input checked="" type="checkbox"/>

In a train graph with tracks shown for all stations, this will look like this:



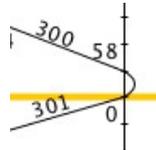
There are three types of shunting movements that are automatically calculated:

1. When no arrival shunting is defined at the first station and no connection from another train is defined, the train automatically shunts to the departure track by default 10 minutes before departure. This time can be changed using *Edit* → *Change default time for track occupancies* (also in the free version of jTrainGraph).
2. Same situation, if no time for leaving the final track at the final station is defined and there is no connection to another train.
3. When arrival and departure track are different, and no shunting movement is defined manually, there will be a automatic shunting from arrival to departure track after half of the time.

For departures at a station it is calculated automatically, whether or not the track is cleared by the departure (based on the fact, if afterwards shunting movements start in this track).

5.7 Connect trains / create train transitions

Trains can be connected with the following trains. In this manual, they are called *train transitions*. The transitions are shown like this in the train graph, if *Display of stopping trains* is activated:



Train transitions are also used to show tours (chapter 5.8).

Connections are copied if possible, when linked trains (see lower right part of the view) are defined. Using this feature, for a route with only one commuting train composition in only two clicks all connections are defined for the whole day.

5.7.1 Simple train transitions

Using the view for a train (chapter 5.6) the *next train* can be chosen. The train transition that is created using this function is valid for

- the last station of the first train
- all operational days, where both first train and next train are running
- for all vehicles running on first train

If one or more of these attributes should be restricted, or if you want to add more than one train transition (e.g. one transition on work days, another one on Sundays), you can do this using the detailed list view (chapter 5.7.2).

5.7.2 Complex train transitions

Using Windows → Edit train transitions a detailed list of train transitions is shown:

From train	to train	at	(last)	(calc.)	Days of operation	Vehicles	Tour
88291	88920	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88295	88924	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88297	88926	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88301	88930	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88305	88934	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88313	88942	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88914	88917	Bahlingen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88915	88914	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88916	88919	Eichstetten	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88917	88916	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88918	88925	Endingen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88919	88918	Gottenheim	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Friday	All	
88920	88295	Riegel Ort	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	
88922	88297	Bahlingen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Monday-Saturday	All	

The train transitions can be sorted (on the top of the window) and can be filtered. As soon as text is entered in the textfield next to *Filter*, only these rows are shown, that contain this text. Also,

specific columns can be filtered using e.g. *From train=<Name of train>*

In the first three columns of the table, the affected trains and the affected station are shown. Trains can have a transition to another train before the last station, if the train splits up. To define, which part of the splitted train continues with which other train, there is the column *Vehicles*. If <all> vehicles are chosen, then all vehicles of the first train use the train transition – in case there is no other train transition that explicitly lists them.

In the column *Tour*, based on the tours that are defined (chapter 5.8), for a specific operational day it is shown, which tour uses a specific train transition. The operational day is chosen above next to *Tour reference day*.

There are three more columns:

- (last)
Defines if the station is automatically set to the last station of the first train. This leads to the behaviour, that even after timetable changes the transition will still work the same way.
- (calc.)
Shows, if this transition is calculated for linked trains. If it is modified, all calculated train transitions of this train link (see 5.4.2) are released and will no longer be calculated – but also no longer linked to the train link.
- Days of operation
Shows on which days (related to the arrival of the first train) this transition is valid. These are the *Actual arrive days* – see next picture.

Per row a detailed view can be opened. New train transitions can be added using the button *Add* – in both cases this view opens:

The screenshot shows a dialog box titled "Create train transition". It has the following fields and options:

- First train:** 88291
- Station:** Last station (Gottenheim)
- Next train:** 88920 (07:38, Monday-Saturday)
- Possible arrival days:** Mon Tues Wed Thu Fri Sat Sun
- Possible departure days:** Mon Tues Wed Thu Fri Sat Sun
- Actual arrive days:** Mon Tues Wed Thu Fri Sat Sun
- Actual depart days:** Mon Tues Wed Thu Fri Sat Sun
- Vehicles:** All (selected)
- Available vehicles unknown**
- Button:** Create train transition

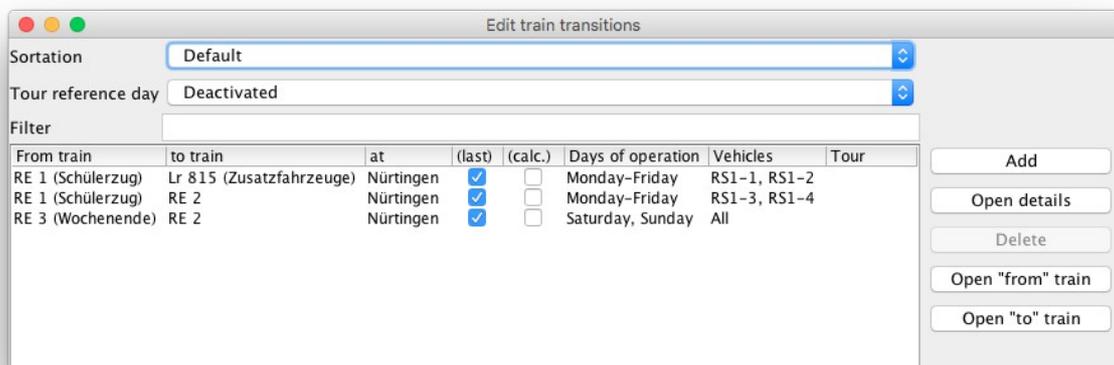
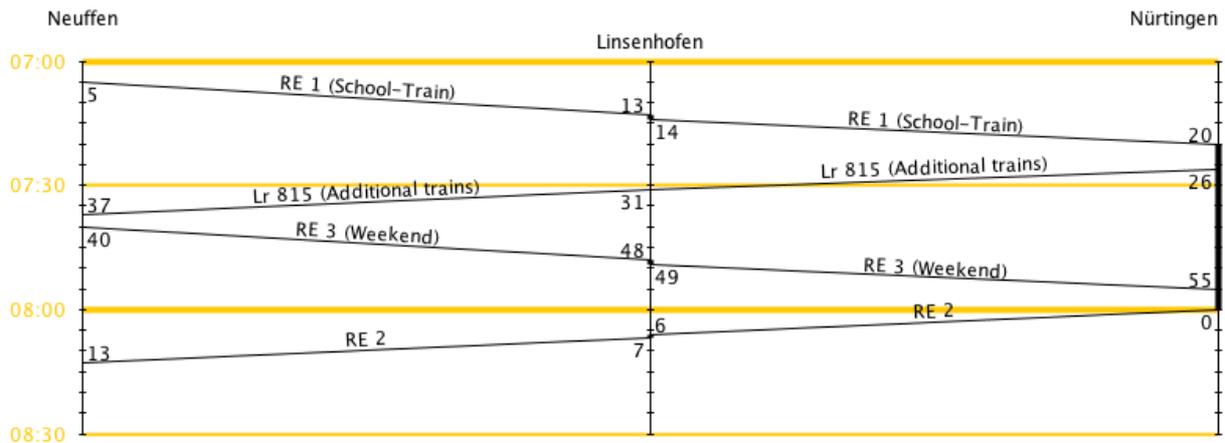
First train, station and next train can be chosen. It is shown, at which days the first train arrives at this station and at which days the second train departs here. These are the *possible days*. The actual days can be restricted, e.g. to have transition for trains that both drive daily to be valid only on Sundays – if there are trains in between on work days.

Actual arrive and depart days are always modified both ways. They differ by one day, if the arrival is before midnight and the departure is after midnight.

5.7.3 Example

One example for the application of the new train transitions functionalities (since 3.2): Below you find the train graph of a branch line. Monday to Friday there is the train RE 1 running with four motor coaches from Neuffen to Nürtingen. The train then splits up: Two motor coaches are running back to Nürtingen right away (with Lr 815). The other two ones are running back with RE 2.

But on Saturday and Sunday, RE 1 and Lr 815 are not running. Therefore, train transition is from RE 3 to RE 2 – with all vehicles:



5.8 Create tours and vehicles

Since version 3.2 it is possible to show daily tours of trains. This is based on the train transitions that were entered (chapter 5.7). This is always possible – as far as jTrainGraph Pro is used.

Optionally, also vehicles can be defined. The advantages are:

- For daily tours: Split of trains is supported, that means trains that are split so some vehicles continue their tour with one day and other vehicles continue with other trains.
- Weekly tours can be built

5.8.1 Daily tours

With *Windows* → *Show daily tours* a window will all tours per day can be shown. On the top of the window, the border of the operational day is shown. While for all trains and transitions always the actual day of the week is entered (trains before midnight are e.g. marked with

Monday, trains after midnight with Tuesday), this is about the operational day that is also 24h long, but does not always change at midnight (default time: 03:00 am).

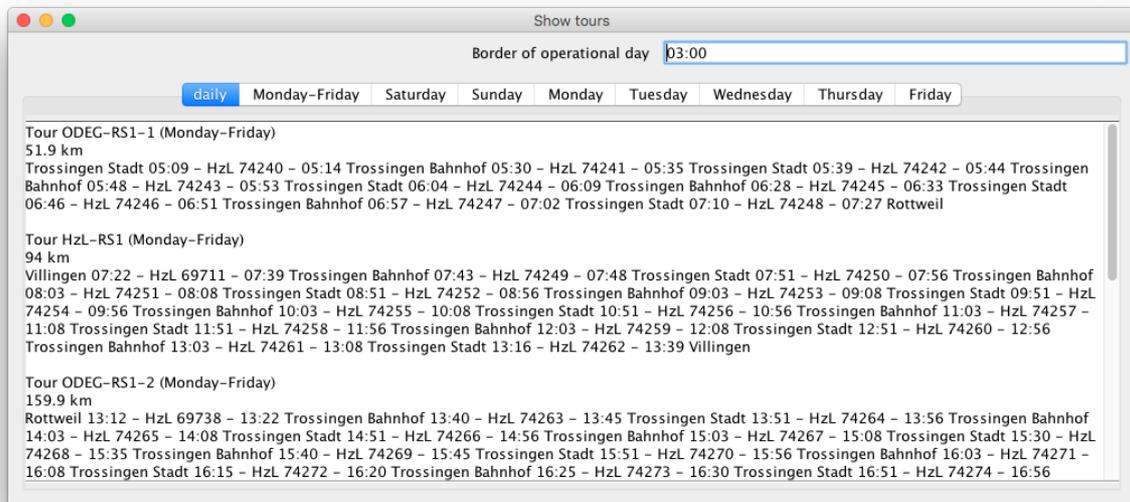
That means, tours are calculated till the border of the operational day. Trains that start before this border are covered by the tour of the last operational day. All train transitions that start with these cross-border trains are not evaluated for the last operational day, but they are valid for the next day (even if the cross-border train is not listed again at the next train).

It is best to choose a border time, where no train is running (or the last trains of the operational day are running, but do no longer have train transitions).

There are several tabs, to show all (*daily*) or only the tours for specific sets of days. Tours are numbered as far as no vehicles are booked on the tour. Otherwise, the vehicles per day are shown (chapter 5.8.2).

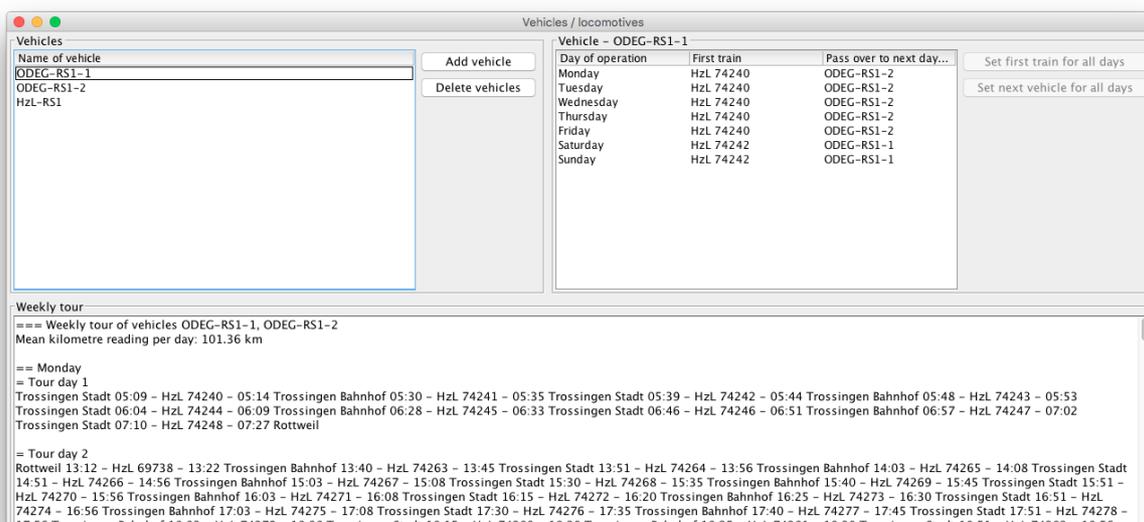
Format for tours that are shown is:

<Start station> <Departure time> - <Train number> - <Arrival time> <End station>



5.8.2 Vehicles and weekly tours

Using *Windows* → *Show vehicles / locomotives and weekly tours* this window is opened:



Vehicles are created, deleted and renamed (by double clicking on the name) in the upper left part of the window. There is no limitation what a vehicle is: It can be locomotives, motor coaches, train sets or even single coaches.

On the upper right part the selected vehicle is shown. In a table you can choose, per operational day:

- With which train the vehicles starts on that operational day (further trains are calculated with train transitions)
- Which vehicle this one becomes **after** this operational day

This *pass over* function can be used for a better comfort: In the example above there are e.g. two vehicles ODEG-RS1-1 and ODEG-RS1-2. They take each others turns: One of them stays overnight in Rottweil, the other one in Trossingen. Now you could choose the first train alternating for them – so every second day in Trossingen or Rottweil. Instead, the first train is always the same for both and the *pass over* is adjusted respectively: ODEG-RS1-1 passes over to ODEG-RS1-2 and vice versa. This matches, as ODEG-RS1-1 starts in Trossingen and ODEG-RS1-2 ends in Rottweil – and vice versa.

Only one vehicle per day is allowed to pass over to the same other vehicle – if there are two vehicles on the same day that pass over to the same other vehicle on the next day, there is a error message (chapter 7.2).

On the lower part of the window, the multi-day tours are shown. Vehicles pass over from tour

day n on operational day m to tour day $n+1$ on operational day $m+1$. From Sunday to Monday, other changeovers can apply (as $n+1$ might not match).

More information about reading tours are available here (unfortunately, only in German):

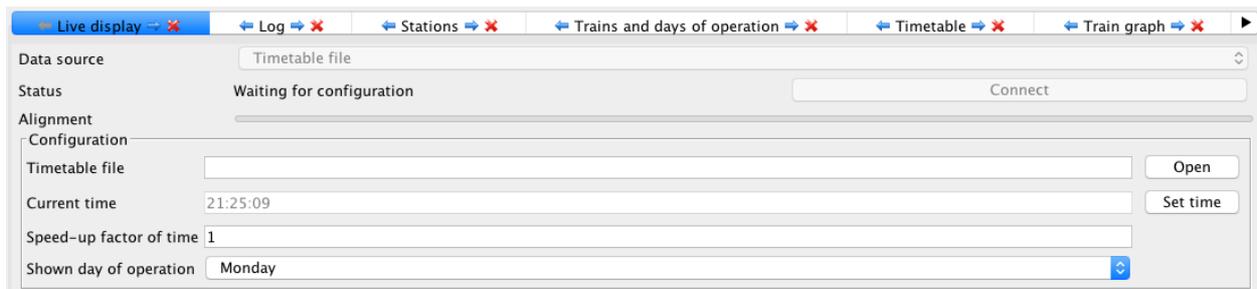
https://www.drehscheibe-online.de/ds_cms/show.php?page=ULP&ret=Fragen

On top, the mean distance that is traveled by the affected vehicles is shown: This is the sum of all distances divided by the number of vehicles.

6 Live timetables

6.1 Display own timetables live

In order to show an own timetable live, choose *File* → *Live view* → *Timetable file*. A new tab within the main frame is opened:



To start the live display of a timetable, first choose the timetable file using the button *Open*. By default, the current system time is used as current time in the train graph. You can choose another time when you click on *Set time*. There is also a field for the *Speed-up factor of time* to move the time forward more quick. Changes are applied, as soon as the enter key is pressed or the field loses focus. If you e.g. choose factor 30, every 2 seconds the minute is increased. In the lower part of the timetable, the day of operation for the timetable is chosen.

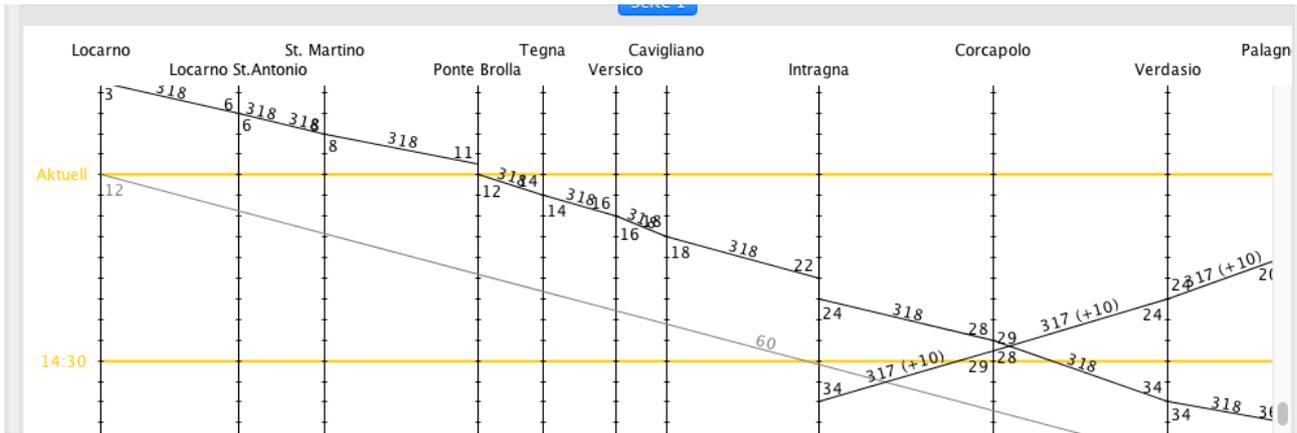
The live display is started, when the button *Connect* in the upper part of the view is pressed. The train graph is automatically selected.

6.2 Train graph in live mode

6.2.1 Display

There are these differences for a live train graph compared to the normal version:

- Delays are shown per part of the route behind the train name
- The current time is shown, if help lines are activated
- When you click on a train, a frame to change it's delay is shown instead of the detail view.



6.2.2 Delays

Delays are changed in the live mode, when the train is selected in the train graph (click on the train). There is this window:

Live data for train 317

Station	Arrival: actual (nominal)	Delay	man.	Departure: actual (nomi...	Delay	man.
Camedo			0	14:17 (14:07)	10	<input type="checkbox"/>
Borgnone	14:19 (14:09)		10	14:19 (14:09)	10	<input type="checkbox"/>
Palagnedra	14:20 (14:10)		10	14:20 (14:10)	10	<input type="checkbox"/>
Verdasio	14:24 (14:14)		10	14:24 (14:14)	10	<input type="checkbox"/>
Corcapolo	14:29 (14:19)		10	14:29 (14:19)	10	<input type="checkbox"/>
Intragna	14:34 (14:24)		10	14:38 (14:28)	10	<input type="checkbox"/>
Cavigliano	14:42 (14:32)		10	14:42 (14:32)	10	<input type="checkbox"/>
Versico	14:44 (14:34)		10	14:44 (14:34)	10	<input type="checkbox"/>
Tegna	14:46 (14:36)		10	14:46 (14:36)	10	<input type="checkbox"/>
Ponte Brolla	14:48 (14:38)		10	14:49 (14:39)	10	<input type="checkbox"/>
St. Martino	14:52 (14:42)		10	14:52 (14:42)	10	<input type="checkbox"/>
Salduno	14:53 (14:43)		10	14:53 (14:43)	10	<input type="checkbox"/>
Locarno St. Antonio	14:54 (14:44)		10	14:54 (14:44)	10	<input type="checkbox"/>

system delay 0 minutes

Delay rules

Train has exact 10 minutes delay as from Departure Camedo

Train has -Please choose- 10 minutes delay as from Departure Camedo

Train has -Please choose- 10 minutes delay as from Departure Camedo

Train 317 -Please choose- in Camedo with Please choose, depart after 0 minutes

Train 317 -Please choose- in Camedo with Please choose, depart after 0 minutes

Train 317 -Please choose- in Camedo with Please choose, depart after 0 minutes

Delete all delay rules

Comment

Design

Color black

Size of line 1 Pixel

Type of line Normal

Train is shown

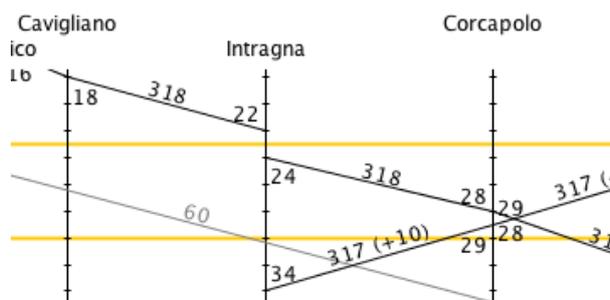
In the upper part the timetable is shown with the actual delays. If the check box *Man. Is* selected, the delay for the arrival or departure time can be set completely manual, when the values in the columns *Delay* are changed.

All non-manually entered delays are automatically calculated according to the system delay (if applicable – only if timetable is read over an online interface) and the rules that are entered in the lower part of the view.

The delay rules in the upper part are impacting the delays at specific points of the plan, either arrivals or departures. The delay can be impacted in these ways:

- exact; the delay has exactly this value
- more; this value will be added to the delay
- less; this value will be subtracted from the delay
- at least; if the delay is smaller, then this value will be set as the new delay
- at most; if the delay is greater, then this value will be set as the new delay

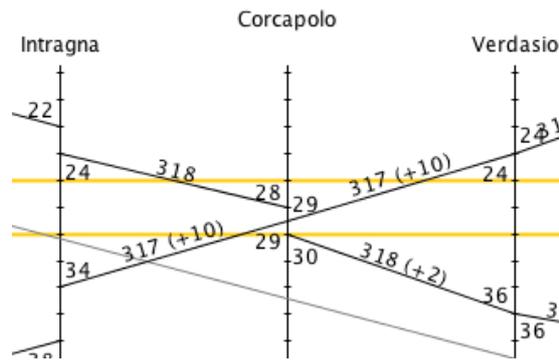
On top, delay rules can be set based on other trains in the timetable. Therefore there is another area in the lower part to enter crossings or take-overs. Example: Train 317 has a delay rule, that it has 10 minutes delay from it's start station onwards. Therefore, the crossing with train 318 is moved from Intragna to Corcapolo. Train 318 has to wait there, till train 317 has passed:



To reach this, a delay rule is defined for train 318. A crossing with train 317 in Corcapolo is entered and train 318 can leave one minute after train 317 has arrived (so there is time to e.g. release the train route):

Train 318 crosses in Corcapolo with 317 (14:29), depart after 1 minutes

Due to that, train 318 gets a delay of one minute:



6.2.3 Save the live timetable

Using *File* → *Save live state* the current timetable is saved to a timetable file. It can be modified manually afterwards.

The delay values are lost during this save action, so the current times are took-over as normal times. E.g. in the example of chapter 6.2.2 train 318 would get the departure 14:30 o'clock at Corcapolo.

6.3 Display Stellwerksim-timetables

6.3.1 Prerequisites

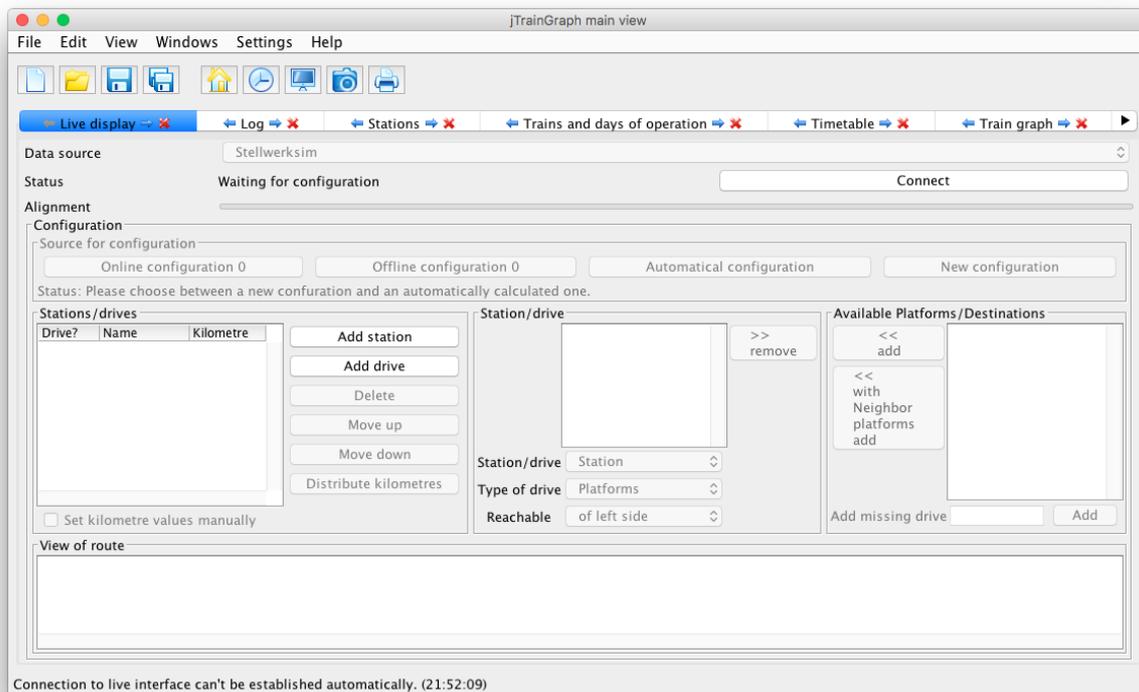
To use jTrainGraph, the plugin interface of the Stellwerksim simulation has to be activated: <http://doku.stellwerksim.de/doku.php?id=stellwerksim:plugins>

6.3.2 Quick start

To start quickly, when Stellwerksim is already running you click on *File* → *Live view* → *Stellwerksim* in the main frame. jTrainGraph tries to connect to the Stellwerksim instance and checks, if there is already a file with the definition, which stations are lined up in the train graph. If yes, the train graph is directly opened. If not, jTrainGraph asks the user for a model train that defines, which stations are shown in the train graph. In this case, it's best to choose a train with many stops to show as much points of the timetable as possible.

6.3.3 Connect

By default (you can disable this in the settings), jTrainGraph tries to reach the Stellwerksim instance automatically, if jTrainGraph was closed in Stellwerksim live mode last time. In every case the tab in the main frame is opened:



To connect manually, click on the *Connect* button in the upper part of the view.

When the connection is established, a configuration is needed. From Stellwerksim, all stations are obtained, but the sequence of the stations is unknown to the Stellwerksim interface. The configurations can be calculated half-automated and later be modified manually. The configuration can be saved in a file with the file-ending *.stsconfig*, so it does not need to be entered each time.

The configuration contains a list of drives (drive ins/drive outs) and platforms, to assign a train stop to a station in the train graph. All trains are shown, that touch at least two stations (thats the only way to determine the direction).

jTrainGraph automatically searches for configurations in this order:

1. Offline: In subfolders of the folder, where jTrainGraph is currently executed, it searches for configuration files, that match the currently chosen Stellwerksim interlocking (according to the Stellwerksim-ID).
If exactly one configuration file is found, it is directly loaded. If more than one file is found, the user has to choose the right file.
2. Online: jTrainGraph searches online for a configuration. The internet address is defined

in the settings (default: jTrainGraph-website). Same as in step 1 – if one file is found, it is directly loaded, otherwise the user chooses one of the files.

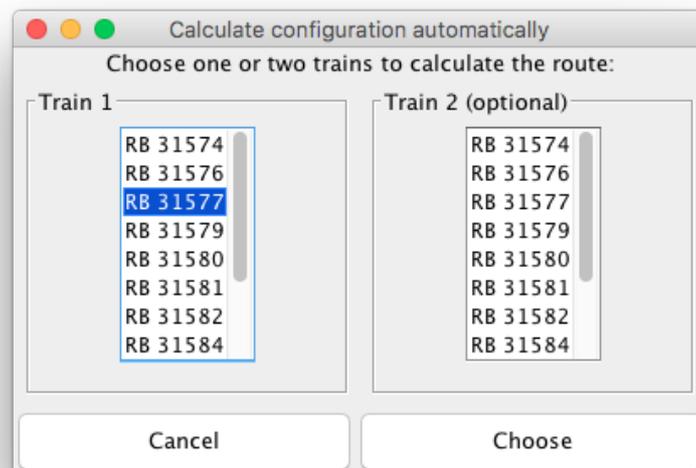
3. When neither online nor offline a configuration is available, it can be calculated half-automated based on one or two trains. The procedure is like that:

1. The train graph will start on the left with the drive in, where the first train comes from.
2. For each timetable stop, a new station is created with the platform, where the train stops and all neighbor platforms plus platforms, that have a similar name (e.g. will RSEE 6 be added, when the train stops at RSEE 1, even when they are not neighbors).
3. The train graph will end at the drive out, where the last train leaves the interlocking.

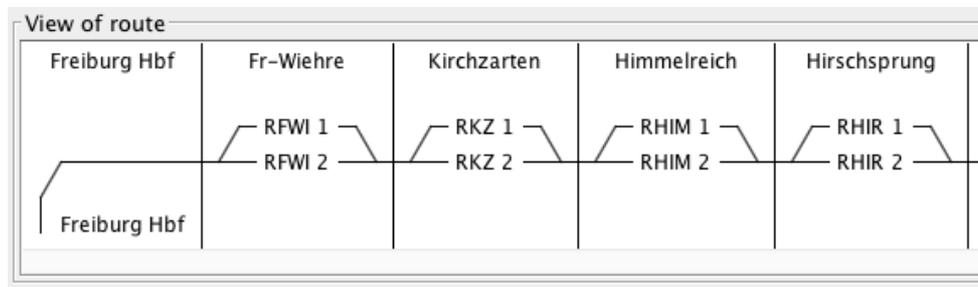
To obtain as much timetable data as possible, select trains that have a long ride through the interlocking and serve as much platforms as possible.

If a train ends early in the interlocking, another train can be chosen to continue the half-automated calculation. This is appropriate, where two lines of e.g. local trains meet at a common station in the middle of the interlocking.

The frame to choose the trains looks like this:

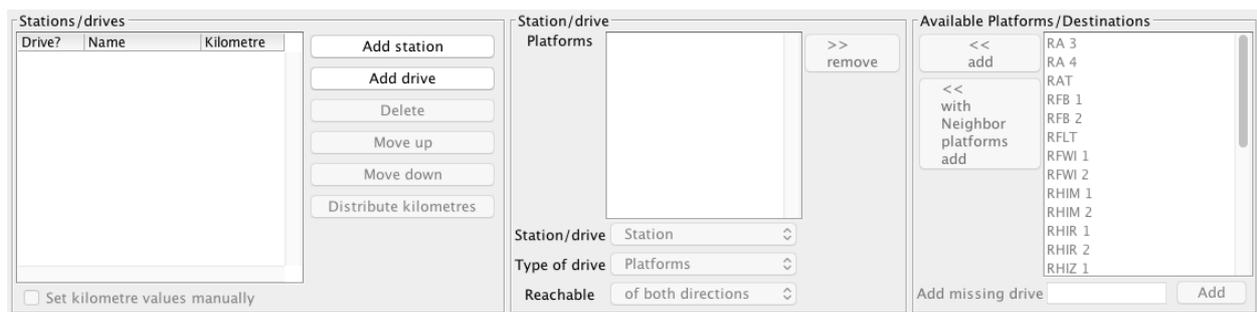


You can modify the loaded configuration manually in any case. The procedure is explained in the following chapter. In the lower part of the window, a schematic view of the route is shown:



6.3.4 Define or extend the configuration manually

Entering the configuration can be performed fully manual, or an existing configuration can be manually optimized. The input is splitted in three columns:



In the left column the configuration itself is shown: There are all stations and stops, that are shown in the train graph. On the one hand, there are stations defined by the platforms they contain. On the other hand there are drives, that relate to Stellwerksim-Drives or junctions, where the train reaches a platform after using the junction (but not the arrival at the station is relevant, but the time the train leaves the train graph).

Stations and drives are added with the buttons *Add station* and *Add drive* and they are deleted with the button *Delete*. The order can be changed with *Move up* and *Move down*, positions can be entered manually (e.g. using the Wikipedia-article to a route) or they are calculated automatically, when the checkbox *Set kilometre values automatically* is deselected (click on *Distribute kilometres* to force this). The column in the middle shows the platforms or Stellwerksim-drives that are configured for the station that is currently selected in the left column. Also, the type of the station can be changed to a drive and vice versa. For drives, it can be set, if the drive is defined by a Stellwerksim-drive or by platforms (see example below). For drives, also the direction is provided, from where the drive can be reached (from left, from right or both directions).

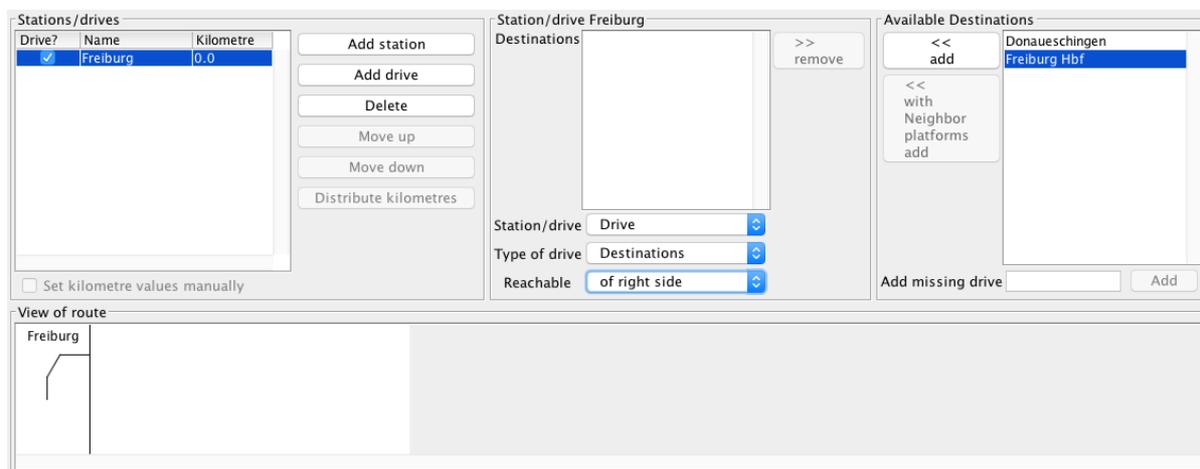
In the right column the available Stellwerksim-platforms and drives are listed. When you click on << *add* all selected platforms/Stellwerksim-drives are added. If you click on << *add with neighbor platforms*, also all neighbor platforms are added (based on the neighbors that are defined in Stellwerksim).

Not all Stellwerksim-drives are transmitted on the interface to jTrainGraph, therefore Stellwerksim-drives can be entered manually by the user, when the text field on the right (behind *Add missing drive*) is used. Please enter the name and click on *Add*.

As this explanation was theoretically, here is an example. The example is about the interlocking *Höllentalbahn*. The route from Freiburg to Donaueschingen has to be shown with the junction to Seebrugg. Here is overview on the route: http://www.stellwerksim.de/shot/see_864.jpeg

First the drive in Freiburg is entered:

- Click on *Add drive*
- Enter the name Freiburg the the second column of the table on the left
- Optionally, you can enter that the drive is reachable from the right (as the train graph continues on the right)



- Choose *Freiburg Hbf* in the right column and click in << *add*.

After that, all stations are entered by doing this:

- Click on *Add station*

- Enter the name in the second column of the new row in the table on the left
- Select all platforms in the right column and click on << *add with neighbor platforms*

Afterwards, the view looks like this:

The drive on the right – *Donaueschingen* - was created in the same way as *Freiburg Hbf*. Only difference is, that it can be reached from the left side.

In Titisee there is the junction to Seebrugg. The whole route is modeled in the interlocking. Therefore, the trains do not leave the interlocking using a *Stellwerksim-drive* (like *Freiburg Hbf*). Therefore, the type of the drive is *platforms* and the platform names of the next station *Feldberg-Bärental* are added.

All trains that run on the line configured in the train graph and come from or leave to the platforms of *Feldberg-Bärental* will be displayed from/till the junction Seebrugg.

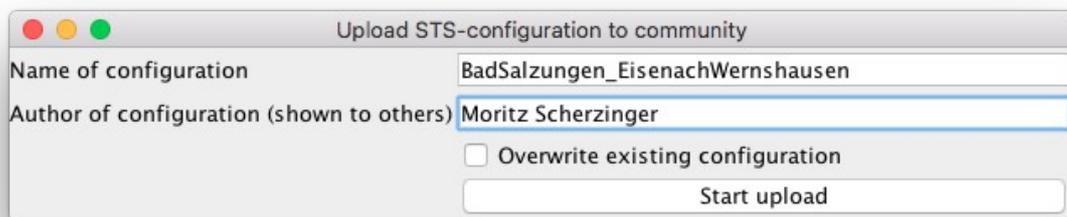
The configuration of *Seebrugg-drive* looks like this:

6.3.6 Upload configuration for others

For Stellwerksim-Interlockings that do not yet have an online configuration and where the user defined a configuration, the user is automatically asked after 2 minutes, if the configuration can be uploaded to the community.

This step can also be triggered manually using File → *Upload configuration*.

In both cases, this windows is opened:



In this window, the name of a configuration can be entered. A standard name using this schema is proposed:

Interlockingname_SourceTarget_comment.stsconfig

The example in chapter 6.3.4 would be named

Hoellentalbahn_FreiburgDonaueschingen_WithSeebruggJunction.stsconfig

You can use camel case to provide a distinction of words, e.g. for *BadSalzungen*.

When the name of the author is entered, the name is stored in the file and will be shown to other users that use this file. The field can be either left empty, filled with a real name or filled with the Stellwerksim user name.

If a configuration for the same interlocking with the same configuration name already exists, the new configuration will be renamed by appending underscores. If you want to overwrite an existing configuration instead, e.g. as it is no longer up to date, use the option *Overwrite existing configuration*.

6.3.7 Close the connection

In most of the times, jTrainGraph will detect if the connection to Stellwerksim was lost. The

connection will be cleanly closed in this case and can be manually restarted.

If a lost of connection wasn't detected automatically, you can click on *Close* in the live tab of the main frame.

7 Additional functions

7.1 Import and export to Excel / csv

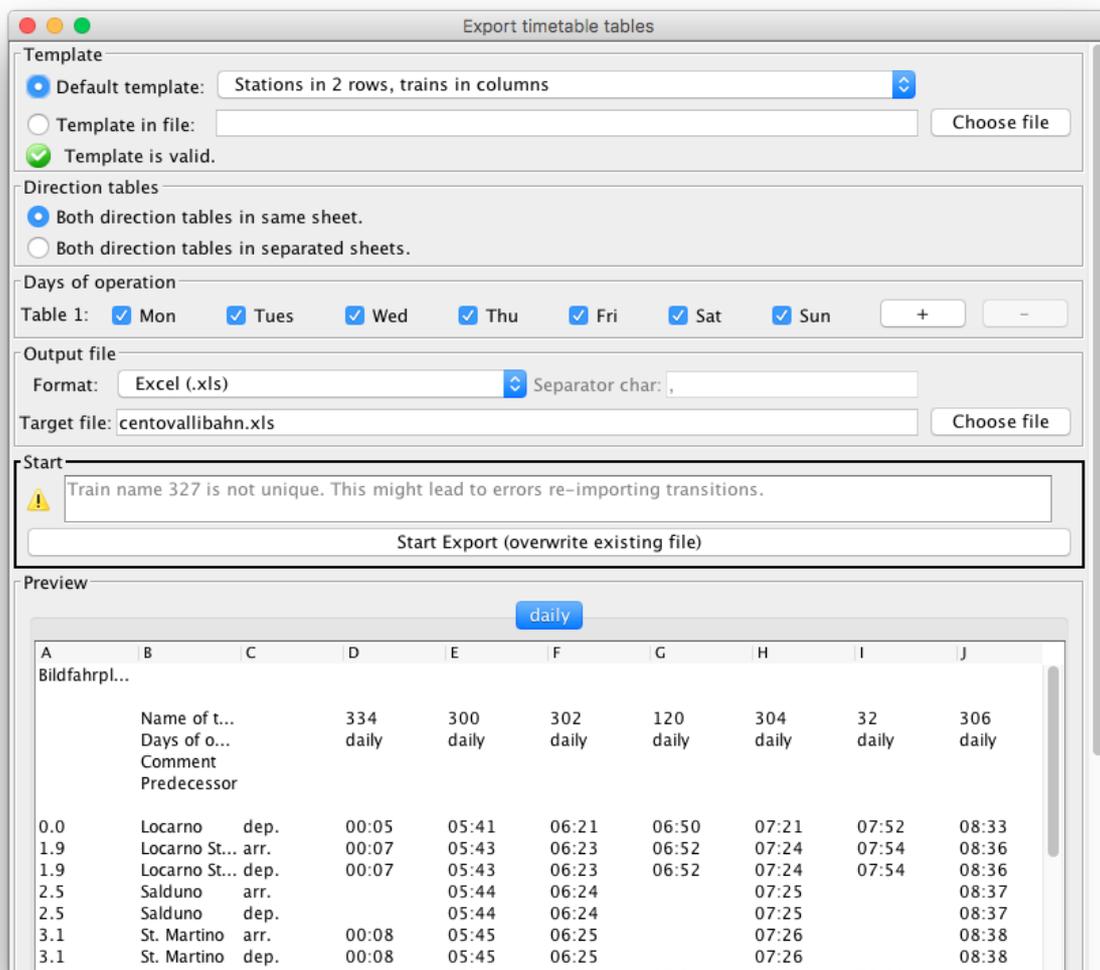
In jTrainGraph Pro timetables can be exported to and imported from Excel files. Templates define, how the timetable has to look when it is exported and how jTrainGraph tries to interpret imported tables. Look to chapter 7.1.3 for further details.

Timetables can be distributed on several table sheets (csv: several files).

To ensure an optimal re-import of exported table files, the name of the table sheets or files should keep untouched.

7.1.1 Export

Export is started in the menu of the main frame using *File* → *Export* → *Tabular timetable (Excel/csv)*. This window is opened:



In the upper part the template is selected (7.1.3). Below, the user can define, if both directions should be contained in the same sheet of the table, or if there has to be one separate sheet for each direction.

In the next section states the days of operation, that should be taken into account for the specific tablesheets (or tablesheet-pairs). A train is contained in a sheet, when it drives at least at one of the specified days.

By clicking on the +-button, additional tablesheets with other days of operation can be added.

Below, the output file is defined. If an export to csv is performed, per tablesheet one file is created with the name of the sheet appended to the filename. The target file format can be changed here, if necessary. For csv-files, the separation sign can be defined (default: comma).

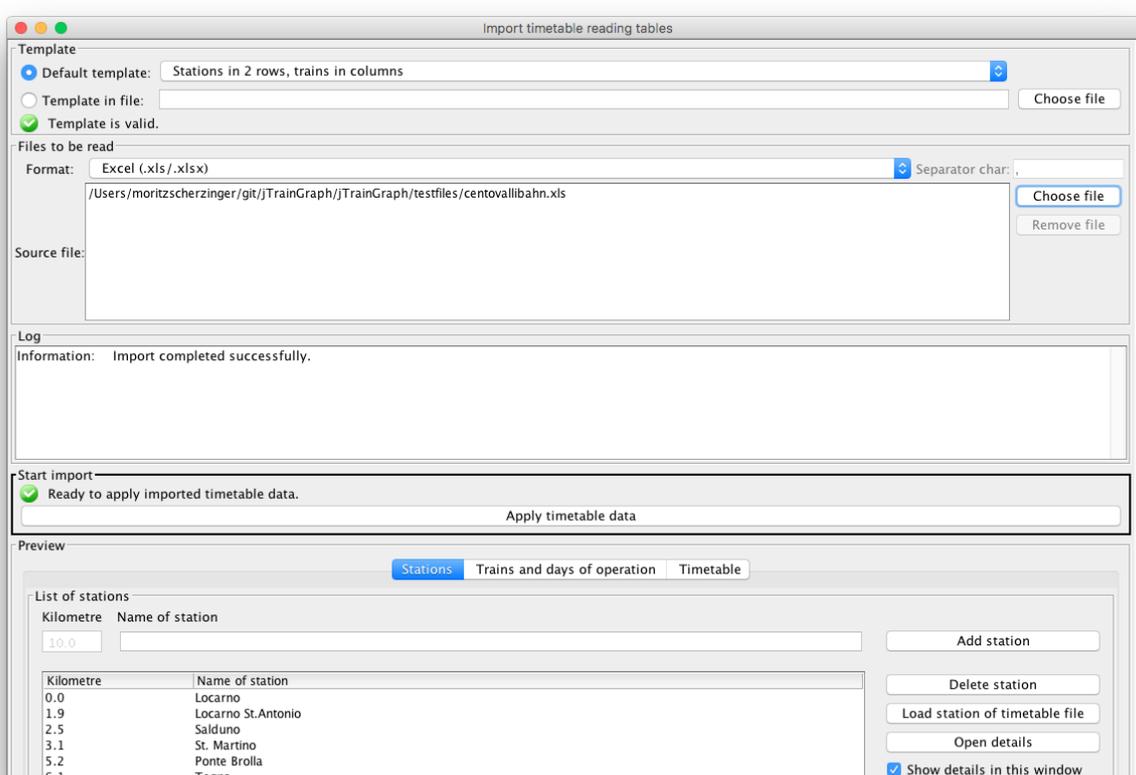
In the panel *Start* that is bordered in black, warnings and error messages are shown. In the

example screenshot there is a warning, as two trains with the name 327 are contained in the timetable. For trains with the same name, the connection to former or next trains can't be restored when the timetable is imported again. The export might be started even when there are warnings, as soon as *Start Export* is pressed.

In the lower part, a preview of the exported tables are shown.

7.1.2 Import

You can open the view for import at File → *Import* → *Excel/csv-timetable file*:



Also in this view the template (7.1.3) and the input files are shown. For Excel imports, one file is possible, for csv-imports one or more files are possible. As soon as the file is chosen (using the button *Choose file*) it is imported in the background and the log shows potential errors during import. In the bottom part of the view, a preview of the imported timetable is shown (stations, trains, timetable).

The timetable data are used in all views and frames of jTrainGraph, as soon as *Apply timetable data* is clicked.

7.1.3 Templates

There are four default templates for import and export. Also own templates can be defined in Excel or csv (with user-defined formatting).

These are the default templates:

- Stations in 2 rows, trains in columns

Stations are written top down and the departure and arrival times are shown in separate rows. Per train there is one column, where the name (number) of the train, the days of operation, comments, predecessor and times are shown. Times are listed just like in the timetable view.

A	B	C	D	E
Centovallibahn timetable				
	Name of train		334	300
	Days of operation		daily	daily
	Comment			
	Predecessor			
0.0	Locarno	dep.	00:05	05:41
1.9	Locarno St. Antonio	arr.	00:07	05:43
1.9	Locarno St. Antonio	dep.	00:07	05:43
2.5	Salduno	arr.		05:44
2.5	Salduno	dep.		05:44
3.1	St. Martino	arr.	00:08	05:45
3.1	St. Martino	dep.	00:08	05:45
5.2	Ponte Brolla	arr.	00:11	05:48
5.2	Ponte Brolla	dep.	00:11	05:48

- 1 row per station, trains in columns

Just like template 1, with the difference, that for each station only one row is filled.

Arrival and departure times are shown side by side, that means, a train ranges over two columns:

A	B	C	D	E	F
Centovallibahn timetable					
	Name of train	334		300	
	Days of operation	daily		daily	
	Comment				
	Predecessor				
0.0	Locarno		00:05		05:41
1.9	Locarno St. Antonio	00:07	00:07	05:43	05:43
2.5	Salduno			05:44	05:44
3.1	St. Martino	00:08	00:08	05:45	05:45
5.2	Ponte Brolla	00:11	00:12	05:48	05:48
6.1	Tegna	00:14	00:14	05:50	05:50
7.1	Versico	00:16	00:16	05:52	05:52
7.8	Cavigliano	00:18	00:18	05:54	05:54
9.9	Intragna	00:23		05:58	

- Stations in columns, trains in rows

Vice versa to template 1: Per station there are two columns with arrival and departure times. Each train is shown in a row and the timetable has to be read from the left to the right:

A	B	C	D	E	F
Centovallibahn timetable					
	Locarno	Locarno St. Antonio	Locarno St. Antonio	Salduno	Salduno
	dep.	arr.	dep.	arr.	dep.
334	00:05	00:07	00:07		
300	05:41	05:43	05:43	05:44	05:44
302	06:21	06:23	06:23	06:24	06:24
120	06:50	06:52	06:52		
304	07:21	07:24	07:24	07:25	07:25
32	07:52	07:54	07:54		
306	08:33	08:36	08:36	08:37	08:37
308	09:33	09:36	09:36	09:37	09:37
310	10:21	10:24	10:24	10:25	10:25
40	10:37				
312	11:21	11:24	11:24	11:25	11:25

- Stations in 2 rows, trains in columns, with tracks

Just like template 1, but with arrival and departure tracks.

You can create own templates by writing some parameters in an Excel or a csv file. jTrainGraph parses the parameters and fills them with information (for export) respectively reads information at this position (for import).

Therefore in tables, where the stations are shown in rows (see templates 1 and 2), all columns with information about trains are copied to the right so all trains are contained. All information that is on the right of these columns is shifted respectively. Stations are expanded top down.

For timetables with trains in rows (see template 3) the same applies vice versa.

The function for own templates is recommended for advanced users. Only in special cases, support can be provided.

There are these parameters:

Parameter	Meaning	Restrictions
%CONSTANT_STATIONS_RIGHT%	Removed when applied	Insert this at a random place in the table to show, that stations have to be expanded to the right (stations in columns) Not needed, when STA_NAME_RIGHT is used
%CONSTANT_TRAINNAME%	Is replaced by the static text <i>Name of train</i>	
%CONSTANT_DAYS%	Is replaced by the static text <i>Days of operation</i>	
%CONSTANT_COMMENT%	Is replaced by the static text <i>Comment</i>	
%CONSTANT_PREDECESSOR%	Is replaced by the static text <i>Predecessor</i>	
%CONSTANT_SUCCESSOR%	Is replaced by the static text <i>Successor</i>	
%TITLE%	Replaced by the title of the plan	
%STA_POS%	For a station: Position	
%STA_NAME%	For a station: Name	
%STA_NAME_RIGHT%	For a station: Name	Automatically shows, that stations have to be expanded to the right (see template 3)
%STA_COLUMN%	Is replaced by the static text <i>Arrival</i> resp. <i>Departure</i>	Automatically shows, that per station two rows/columns have to be written
%STA_COL%	Is replaced by the static text <i>arr.</i> resp. <i>dep.</i>	
%TRAIN_NAME%	For a train: name	
%TRAIN_DAYS%	For a train: days of operation (e.g. daily, Mo-Fr; Mo, Sa-Sun)	
%TRAIN_COMMENT%	For a train: comment	

%TRAIN_PREDECESSOR%	For a train: predecessor train (according to connected train, 5.6.1)	
%TRAIN_SUCCESOR%	For a train: successor train (according to connected train, 5.6.1)	
%TRAIN_TIME%	For a train at a station: time	Automatically shows, that there are two rows resp. columns per train
%TRAIN_TIME_ARRIVE%	For a train at a station: arrival time	Used when there is only one row/column per train
%TRAIN_TIME_DEPART%	For a train at a station: departure time	Used when there is only one row/column per train
%TRAIN_TIME_DTLINE%	For a train at a station: arrival time, when train drives through	Used when there is only one row/column per train
%TRAIN_TRACK%	For a train at a station: track	Only works in combination with %TRAIN_TIME%, not the other parameters

For predecessor trains and successor trains, only trains at the first station respectively last station are taken into account. If there is a split or merge event during the run, this is currently not evaluated.

For example, the Excel template for the default template 1 looks like this:

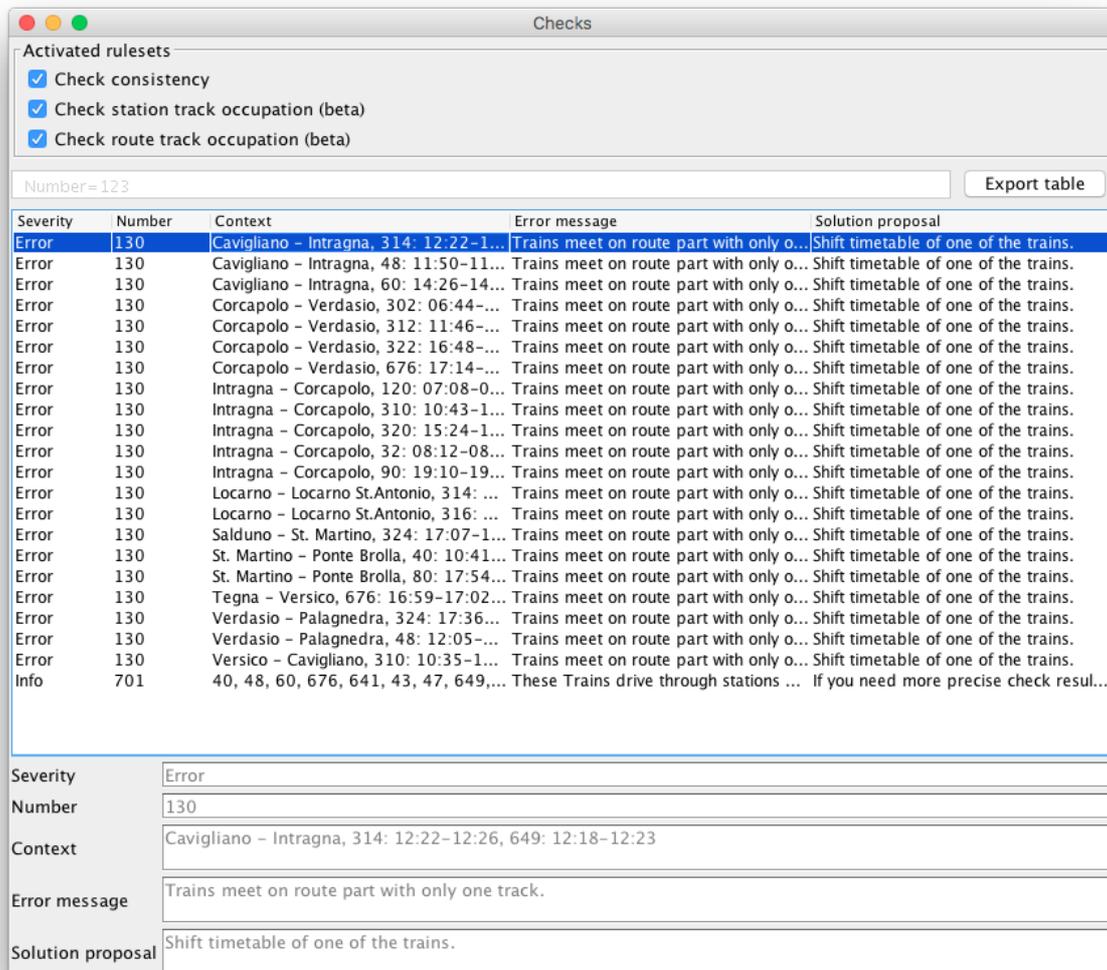
	A	B	C	D	E
1	%TITLE%				
2					
3		%CONSTANT_TRAINNAME%		%TRAIN_NAME%	
4		%CONSTANT_DAYS%		%TRAIN_DAYS%	
5		%CONSTANT_COMMENT%		%TRAIN_COMMENT%	
6		%CONSTANT_PREDECESSOR%		%TRAIN_PREDECESSOR%	
7					
8	%STA_POS%	%STA_NAME%	%STA_COL%	%TRAIN_TIME%	
9					
10		%CONSTANT_SUCCESOR%		%TRAIN_SUCCESOR%	
11					
12					

7.2 Checks

Since version 3.1 some checks can be applied to the timetable. In version 3.2, additional checks were added.

Keep in mind that the checks (as the whole program) have no safety relevance: Too many or too less validation errors can be displayed.

There is tab in the main window, the checks can be also shown in an own window using *Windows* → *Show checks*:



In the upper part of the view the rulesets to be applied to the timetable can be chosen. By default, all are selected. In the free version of jTrainGraph only consistency checks can be applied.

The rules are rechecked whenever a change occurs in the timetable. The results are shown in the table. When a row is selected, its details are shown in the text fields on the bottom.

Above the table there is a textfield to filter the table entries. When a text is entered, all rows are shown that contain this text at any position in any column. The filter can be applied more precise

by using the name of the column, e.g. “Number=130”. More than one column can be assigned, so e.g. “Number=130;Context=Intragna” will find all messages with number 130, where the context contains Intragna.

On the right of this textfield there is a button to export the current content of the table to an Excel- or csv-file (in jTrainGraph Pro).

These are the possible error messages:

Number	Rule set	Description
101	Consistency	Two stations are at the same position. This will cause errors in train graph.
102	Consistency	Default track is not in station.
103	Consistency	Track name is invalid, as it starts with -.
104	Consistency	Two tracks in this station have the same name. This will cause errors.
110	Consistency	Train transition invalid, as train(s) are no longer contained in plan.
111	Consistency	Train has times after last arrival.
112	Consistency	Train transition is invalid (Details are listed in the context section)
120	Station track occupation	Train arrives in occupied track.
130	Route track occupation	Trains meet on route part with only one track.
131	Route track occupation	Train passes by on route part with only one track.
132	Route track occupation	Train passes by on route part with two tracks. No free track found.
140	Vehicles and tours	Vehicles are not set for train transitions and therefore can't be assigned distinctively to tours.
141	Vehicles and tours	The same vehicle passes over to multiple trains on the same day after this base train.
142	Vehicles and tours	Train transition is located before first station of one of the affected trains.
143	Vehicles and tours	Train transition is located after last station of one of the affected trains.
144	Vehicles and tours	Train transition is located at station, where one of the affected trains does only drive through.
145	Vehicles and tours	Tour not consistent, as there is no train connection between the stations of two consecutive train transitions.

Number	Rule set	Description
146	Vehicles and tours	Location of standstill can't be calculated: Ends at station before standstill, but starts next operation after standstill at another station.
147	Vehicles and tours	Weekly tour not consistent, as vehicle ends at a station but starts next operation on day after at another station.
148	Vehicles and tours	Operation days are overlapping: Last train on operation day ends after first train of next operation day should have started.
149	Vehicles and tours	More than one vehicle transforms to same vehicle on next day of operation.
150	Vehicles and tours	The train that is set as first train on operation day is not running on this day.

These are possible warnings:

Number	Rule set	Description
401	Station track occupation	Multiple shunting movements from different trains are in this track at the same time.
410	Vehicles and tours	On the named operation day, the following tours are not equipped with vehicles.
411	Vehicles and tours	Train transition can't be used by all assigned vehicles.
412	Vehicles and tours	There are several train transitions from source to target train, that affect all vehicles and are valid on the same days.

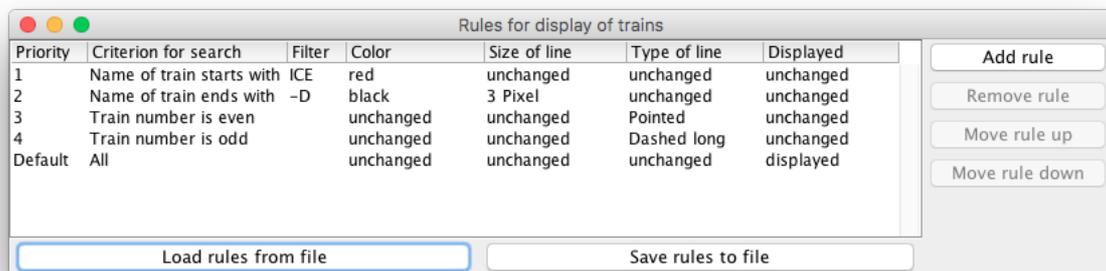
These are possible information messages:

Number	Rule set	Description
701	Route track occupation	These trains drive through stations without departure times. Times are automatically calculated. <i>Note that this will be done on the safe side – arrival is rounded up, departure time is rounded down. Therefore the safe arrival time can be one minute later than the safe departure time.</i>
702	Station track occupation	These trains drive through stations without departure times. No tracks are blocked for drive through at these stations.
703	Station track occupation	Shunting is automatically calculated.
704	Station track occupation	Track change is calculated automatically (different arrival, than departure track).

Number	Rule set	Description
705	Route track occupation	For a route part with more than 3 tracks, no check of track occupation is performed.
710	Route track occupation	Train passes by another train in route part with 2 tracks. No conflicting trains found.
720	Vehicles and tours	Split of train was found. As no vehicles are created, the resulting tours might be wrong or redundant.
721	Vehicles and tours	The listed train transitions are not evaluated for tours, as they reach over break time between operational days.
722	Vehicles and tours	Train runs for more than 24 hours. This is not yet supported by tour / weekly tour calculation.

7.3 Show trains using rules

In order to show the trains in the train graph using rules, first this functionality has to be activated in the main view: *View* → *Display trains according to rules*. Afterwards the rules are configured: *View* → *Configure train display rules* and this view is opened:



Every row represents a rule. There is a default rule that applies to all trains (column 1 says *Default*). Rules are added, removed and reordered using the buttons on the right. Rules that are displayed on top have a higher priority than the ones on the bottom of the view. When more than one rule applies for a train, the rule with the higher priority defines the train style in case of conflicts.

The second column defines the criterion to apply to the train name / train number:

1. Name of train contains
2. Name of train is

3. Name of train starts with / ends with
4. Train number is smaller / greater than
5. Train number is even / odd
6. Train name matches [regular expression](#)

In column 3, for criterions 1-4 and 6 the search text / the number is defined, that has to be compared to the train name or number. For criterions 4 and 5 all digits in the train name are taken into account (e.g. S1 3845 will be evaluated to number 13845).

The columns 4 to 7 define the style of all trains the rule applies to. Four different aspects of the style can remain untouched or be defined explicitly.

Example based on the image above:

- All trains are shown, as this is the default rule. This means, that also trains that are individually defined as *not shown* are still shown in the train graph (see 5.5.10 Individual design of trains).
- All trains with even train numbers are shown with pointed lines, all trains with odd numbers are shown with longly dashed lines.
- All trains with names that start with *ICE*, are shown in red.
- All trains whose names end with *-D* are shown in black with 3 pixels line size.
Exception: All trains with names starting with *ICE* and ending with *-D* are shown in red (as the *ICE*-rule has a higher priority) with 3 pixels line size.

Rule sets can be saved using *Save rules to file* and reloaded using *Load rules from file*. They are saved to plain xml files with ending *.xml*.

7.4 Update functionality

The update function of jTrainGraph is started explicitly using *Help* → *Search for update* in the main window. It searches for new versions of the application and, if the user wants, starts downloading this new version (or opens jTrainGraph-website so the user can).

By default, the update function is executed every time the application is started. This behaviour

can be deselected in the preferences. If a new version is available, a dialog is shown to the user, otherwise there is a message in the log of the main window.

For statistical purposes and to get the best possible proposal for a new version, the following information is transmitted to the update server:

- Currently used jTrainGraph-version

Zu Statistikzwecken sowie zur Ermittlung des benötigten Updates werden folgende Angaben verwendet und an den Updateserver übermittelt:

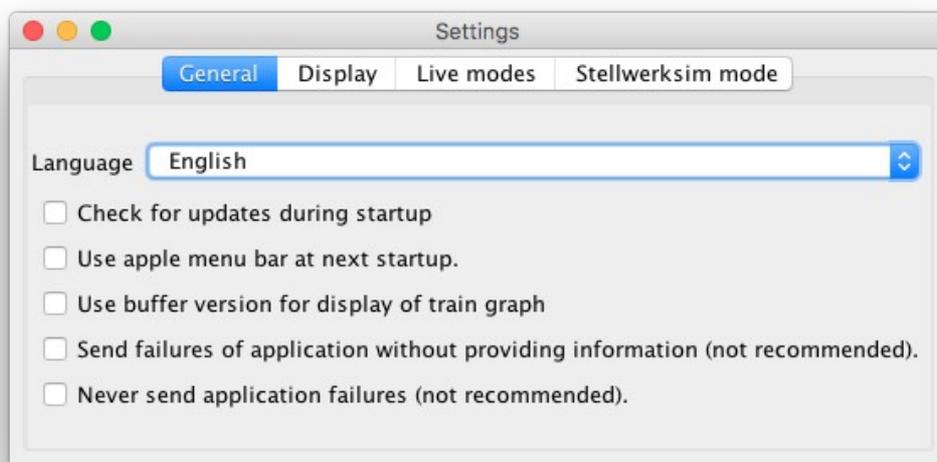
- Currently used jTrainGraph-version
- Operating system
- Selected language
- User name and serial number / activation code, when the Pro-functionality is used
- Flag which mode is currently executed (Stellwerksim-mode or not)
- Flag if the update function is executed automatically at application start

7.5 Settings

7.5.1 Change settings

Using *Settings* → *Settings* some parameters can be modified in order to better align the application to the user needs.

Some special parameters are described here briefly:



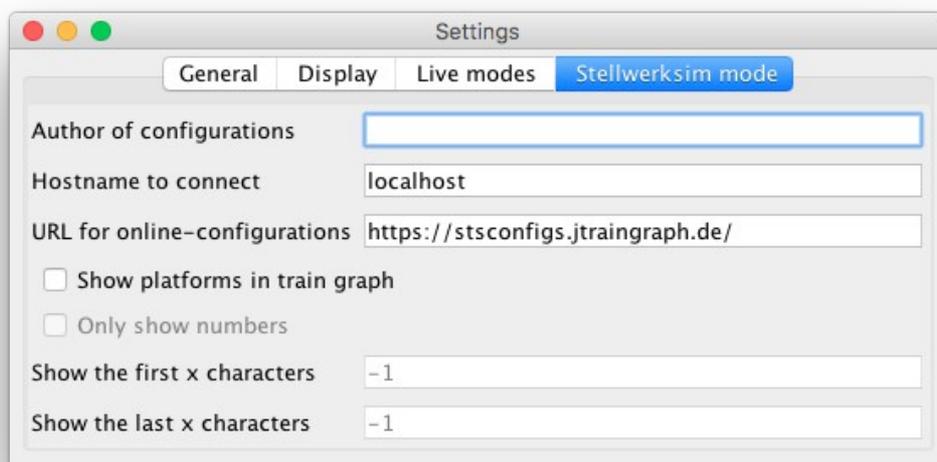
Language:

Changes to this parameter will be applied at next start of the application.

Send failures of application without providing information / Never send application failures:

If an unexpected failure occurs in jTrainGraph, a window is opened where the error can be reported. In this window, a description of the actions leading to this error can be entered. If this windows does not have to be shown, but the error should be automatically reported, the upper checkbox has to be selected. If errors should never be reported, the lower checkbox has to be selected. It is not recommended to change the default settings, as errors can't be fixed in this case (or it's more difficult to do so).

When the error is reported, no user settings are transmitted. Only the description, an optionally to be entered e-mail address and the crash message of the application (strack trace) is sent.



Author of configurations: For newly created or automatically created configurations the user name entered here will be filled into the configuration file. When the file is provided to other users, they will see the name entered here in their application log.

Hostname to connect: Applies when Stellwerksim runs on another machine within the same network. This hostname will be directly used for startup of Stellwerksim interface the next time a connection is established.

URL for online-configurations:

To this web-address the question for online-configurations is transmitted. For the moment, only

the address that is entered by default is possible, but there might be other providers later.

Show platforms in train graph: Below every train name / train number, the Stellwerksim platforms will be shown.

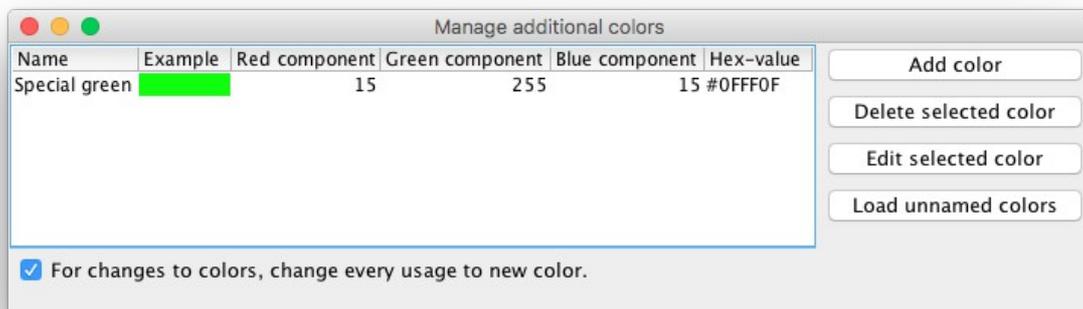
Only show numbers: Only the numbers of Stellwerksim platforms are shown (e.g. for Stellwerksim-platform RHIZ 1 only “1” will be shown)

Show the first/last x characters: Only the first/last x characters of the Stellwerksim-platforms will be shown. Any number can be entered. For value -1, the whole name is shown. For values greater than 0, this number of characters will be shown in the way, that e.g. for *first x characters* = 2 and *last x characters* = 1 the Stellwerksim-platform will be shown as *RHI*. When 0 is entered, only the other parameter applies, so e.g. *first x characters* = 2 and *last x characters* = 0 resolves to *RH* for Stellwerksim-platform *RHIZ 1*.

The settings chosen in this frame will be stored in the file *preferences.xml* in the folder, where the jTrainGraph jar- or exe-file is. In this file also some additional, invisible settings are stored, e.g. if jTrainGraph was in Stellwerksim mode when it was executed last time (in this case it will be started in this mode also the next time).

7.5.2 Manage additional colors

The existing colors can be extended by additional colors. To do this, in the main window *Settings* → *Manage additional colors* has to be selected in order to show this window:



Using *Add color* a new color can be entered. In the first column (from the left), the name of the color is shown. In the second column, the color is shown. The color can be entered in three ways:

1. Enter decimal values for red, green and blue component of the color (0 - 255)
2. Enter the hexadecimal value for RGB-value in the rightmost column
3. Select the color and click on *Edit selected* color on the right in order to define the color using the default frame of the operating system.

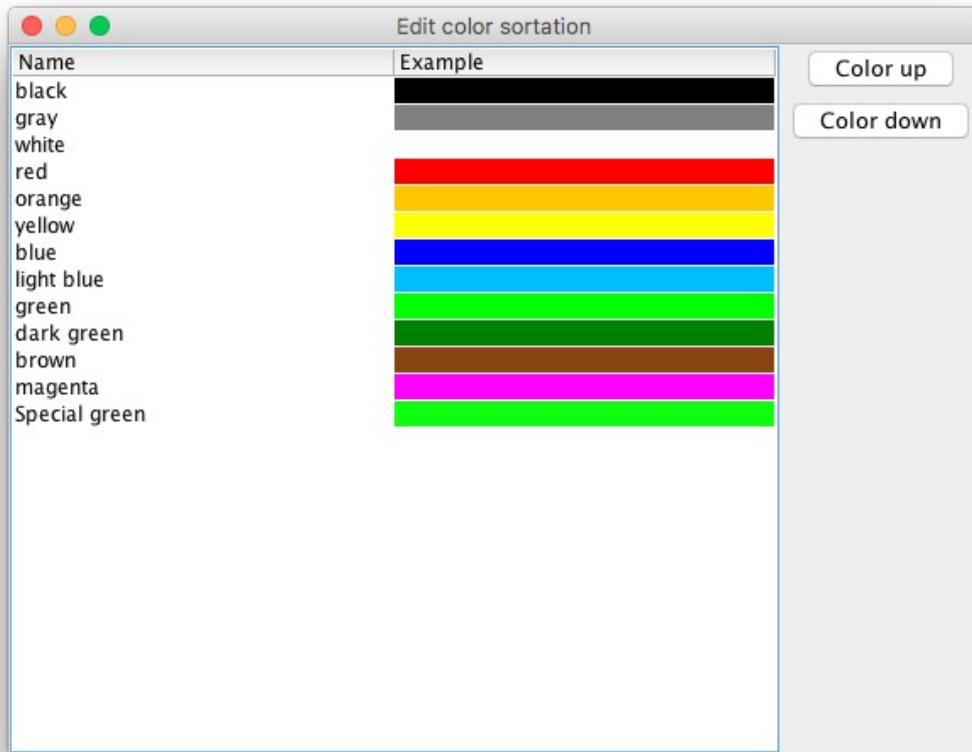
Using *Load unnamed colors* all colors are loaded, that are used for trains, stations and helplines, but are not listed in the *additional colors* table and are also no default color. This can be caused when timetable files of other users are loaded without applying their color settings.

When the checkbox *For changes to colors, change every usage to new color* is selected, changes are directly applied to all existing trains, stations and helplines.

The colors are also stored in *preferences.xml* file.

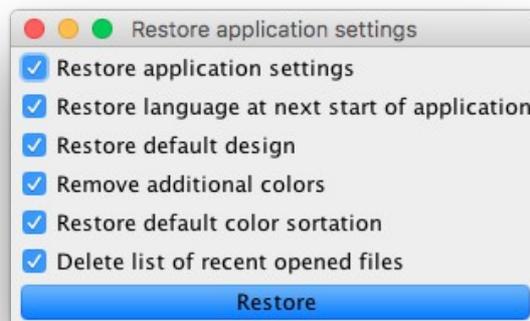
7.5.3 Change color sortation

For a quicker selection of colors, the order of default and additional colors can be modified. This is started using *Settings* → *Change sequence of colors* in the main window. There is a table with all colors and the sortation can be changed by selecting a color and using the buttons on the right:



Colors no longer present will be removed at next startup of jTrainGraph, newly created additional colors are appended at the end of the list.

7.5.4 Restore default settings



In order to load default settings after changes by the user, *Settings* → *Restore default settings* has to be chosen. In this window, several options define which parts of the settings are reset and which are not.

8 Shortcuts

Windows are closed using Ctrl/Cmd + W or Ctrl/Cmd + S. In the main windows, these additional shortcuts apply:

Shortcut	Action
Ctrl + N	Create new file
Ctrl + O	Open file
Ctrl + S	Save file
Ctrl + Shift + S	Save file to
Ctrl + Z	Undo
Ctrl + Shift + Z	Redo
Ctrl + Q	Close application (not on Mac OS)
Ctrl + E	Export train graph to image file
Ctrl + P	Print train graph
Ctrl + T	Switch between mode to create own timetables and mode to show Stellwerksim-live data
Ctrl + B	Open new windows to edit stations
Ctrl + K	Open new window to edit trains and days of operation
Ctrl + Z	Open new window to edit timetable
Ctrl + R	Open new windows to show train graph
Ctrl + ,	Open new window with application settings

On Mac OS, the cmd-key is used instead of the ctrl-key.

9 FAQ

9.1 General

9.1.1 How to report errors?

Errors can't be completely avoided during development, therefore it is important to localize and fix bugs. To be able to do this, I need a description of the failure and all steps that are necessary to reproduce it – and if possible and applicable the files needed to reproduce it.

When the problem only occurs on a specific operation system / platform, I also need the version of the operation system and the version of the installed Java version(s).

9.2 Stellwerksim mode

9.2.1 Why are not all trains shown in the train graph?

Trains are only shown, when they stop at least at one platform that is added to a jTrainGraph station and

- have their source or destination at a drive defined in jTrainGraph
- stop at a second platform defined in a jTrainGraph station

Therefore the first platforms right beneath the start of the interlocking area should be contained in the configuration (see 6.3.4).

In order to use meaningful slopes for trains, at least two platforms for each train should be defined in jTrainGraph.

9.3 jTrainGraph Pro

9.3.1 I purchased jTrainGraph Pro. Why am I not able to download it?

After ordering jTrainGraph Pro you first get an unlock code. This code can be entered in the free version of jTrainGraph using *Help* → *Unlock pro functionality*. It is valid for 2 weeks.

After paying the bill, a serial number is sent to you. With this serial number you will be able to download jTrainGraph Pro online – for permanent offline use.