

**Digital  
Systems**



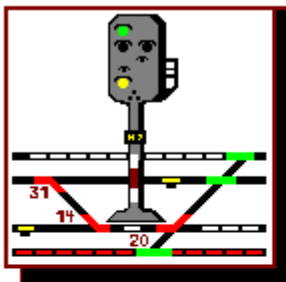
# STELLWERK 2001

**Track layout and control  
of a model railroad**

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Version 10.5

Switch Tower, program to control and display track layout of model railroads using a PC with WINDOWS® 98/ME/XP, Windows® 2000 and DIGITAL Systems of Märklin, Arnold, Uhlenbrock-Intellibox, Fleischmann-TwinCenter or Lenz.





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# 1 Introduction

Program STELLWERK 2001 (STW2001) is a graphic-oriented operation program for model railroads based on a DIGITAL system of the companies Märklin, Arnold, Uhlenbrock-intellibox, Fleischmann-TwinCenter or Lenz in connection with an their interface. It is developed as a 32bit application for **WindowsXP®**. It's running also at **Windows® 98**, **Windows® ME** or **Windows® 2000**. Execution with PC's using **Windows® 95** cannot be guarantied of cause of memory size and possible old DLL's /OCX's. The use of Windows® 3.1 or WfW 3.11 is not possible.

The program was developed to use the main functions of model railroad operations like:

- Use of the technical possibilities provided of several digital interfaces.
- Construction and modification of track layout of various sizes.
- Display of the current status on screen.
- Switching of magnet articles (like e.g. turnouts, signals) by the PC as well as loco control - including doubleheading (double traction) and control of function module use.
- Large number of switch routes with simple definition details and display of reserved route elements.
- Simple simultaneous control of several locomotives.
- Automatic train control using contacts, with setting of switch routes, switching accessories (switches, signals, etc.) and locomotive control or using several schedules with event processing as well as time control.
- Simultaneous use of automatic activities (by contact control or schedules) as well as manual controls.
- Possibilities for software-controlled locomotive tracking.
- Inclusion of sounds (WAV files) if sound board is installed.
- Display and printout of the used resources and system settings.
- Easy restart with all last data and settings.
- Standardized easily understandable graphic surface under Windows® 98/ME/XP and 2000 with simple change of defined data.
- Help system.
- Possibilities for later expansion.

In addition, no reductions should be defined -if possible- in size of possible model railroad equipment. Data and schedules used by the last program STWWIN (version 9.0) should be converted or loaded directly.

The supported DIGITAL Systems Märklin, Arnold, Uhlenbrock, Fleischmann and Lenz are different in their component parts, features and transmitting data. Partial functions therefore are allowed only under definite systems, others are only simulated by software routines. To receive a uniform program, all above systems were integrated; you find a number of parameters to customize the configuration.

Because the standard version is programmed in German, several definitions (like names of tracks symbols and schedule commands) keep their original German name. But in the manual, you'll find the explanation or translation.

**This program must be licensed, copies are allowed only for own safeguarding purposes. Details explain the license determination (see page VII of the description or enclosure at the original CDROM).**

IBM is the trademark International Business Machines Corp.  
IBM PC and IBM PS/2 are products of International Business Machines Corp.

Microsoft, MS, MS DOS, MS-Windows are registered trademarks of the Microsoft Corp.

DIGITAL plus is a brand name of the company Lenz Elektronik GmbH Germany.

LGB, EPL are brand names of the company a Ernst Paul Lehmann

Further brand names are registered trademarks of her manufacturers.



## 2 Requirements

### 2.1 Hardware

#### 2.1.1 Personal computer

The following requirements apply to execute the 32bit application STELLWERK 2001 under Windows®98/ME/XP/2000:

- IBM compatible PC with fixed disk as type 486 or Pentium, for all given conditions to process Windows®98/ME/XP/2000. Execution using Windows®95 cannot be guaranteed of cause of memory size and possible old DLL's /OCX's. Processing under Windows® 3.1 or Windows® for Workgroups 3.11 is not possible.
- At least 32 MB (recommended 64 MB or more) RAM working memory.
- Free fixed disk space approx. 40 MB for files,
- VGA graphic board and VGA color graphic display or higher, resolution at least 800x600 pixel.
- Mouse with 2 buttons (**recommended mouse with 3 buttons**).
- In addition to the mouse operation one COM port for the DIGITAL Interface.  
Using Lenz Digital plus System together with LI-USB Interface you must a PC with USB port and installed Windows®XP or Windows®2000 software with Lenz USB driver.
- One CDROM disk drive to program/data-setup.
- Optionally sound board to use WAV files and
- optionally printer for listings and graphic printouts.

#### 2.1.2 DIGITAL System

The following conditions apply to the model railroad DIGITAL System:

Next to track and engine parts for a DIGITAL System (Märklin, Arnold, Uhlenbrock-Intellibox, Fleischmann-TwinCenter or Lenz) at least respectively one:

**Table:** Necessary DIGITAL parts

Component	Type Märklin	Type Arnold	Type Uhlenbrock or Fleischmann	Type Digital plus Lenz
Central Processing Unit	Control Unit <b>6021</b> or Central Control <b>6030</b> or Central Unit <b>6020/6027</b> and Control 80/80f <b>6035/6036</b>	Central Control <b>86029</b> or Central Unit <b>86028</b> and Control <b>80/80f</b> <b>86035/86036</b>	<b>Intellibox</b> or <b>TwinCenter</b> each at <b>Märklin mode</b>	<b>LZ 100</b> with <b>LV100</b> , <b>LV101</b> or <b>LV200</b> also <b>LZV100</b>
Interface with PC cable	<b>6050 / 6051</b>	as Märklin	<b>included</b>	<b>LI 100 / LI100F / LI 101F / LI-USB</b>
Magnetic article decoder	<b>6083</b> k83, <b>6084</b> k84 or <b>6073</b> k73 (switch decoder)	<b>86078</b> k87N	as Märklin	e.g. <b>LS100/110/120</b> or <b>86078</b> k87N
Optionally feed-back modules	<b>6088</b> S88	as Märklin	as Märklin	<b>LR100, LR101</b>

#### Remarks:

Maybe newer types of the original manufacture or compatible components are usable also. Lenz LI-USB Interface is usable only in connection with Lenz driver, USB port and using Windows®XP or Windows®2000.

If using a **Märklin Interface** the **functions F1..F4** are only responsive with the central processing units 6020 or 6021. For Märklin types 6027, 6030 and Arnold System this isn't possible.

For true processing with program STW2001 the corr. interface must be connected with the right hardware settings via a conductor-wire to one COM/RS232 interface of the computer.

The settings of DIP-switches for Märklin-Interface are described under chapter 20.5. The necessary cable for the Märklin-Interface is described also with his definitions in the appendix under 20.6.

In hardware descriptions of Uhlenbrock-Intellibox, Fleischmann-TwinCenter and DIGITAL plus System of company Lenz you will find their details for settings.

The upper limits for digital parts are defined by respective DIGITAL System particularly:

<u>Component</u>	<u>Märklin</u>	<u>Arnold</u>	<u>Uhlenbrock Fleischmann</u>	<u>Lenz</u>
Max Loco address *)	80 (99)	80 (99)	wie Märklin	9999**)
Max. real magnetic article number	256	256	as Märklin	1024***)
Max. real contact number	496	496	as Märklin	1024***)

The STELLWERK 2001 program determines the upper limits for furthermore:

Max. number of simple track symbols, special signs	= 999
Largest loco number (also if not really usable by system)	= 9999
Max. number of switch routes with each 99 (switch) elements	= 512
Max. number of loco tracking entries	= 9 * number of contacts
Max. number of symbols to the WAV data triggering	= 99
Max. number of parallel running schedules	= 9
Max. number of schedule instructions altogether	= 9999
Max. number of jump destinations per schedule	= 999
Max. length of schedule names	= 12

\*) Using Märklin-Interface only locomotive numbers up to loco-no. 80 can be transferred (hardware condition!).

**Remarks for Lenz DIGITAL plus System:**

\*\*) For special Lenz software versions. Locomotive addresses >99 are usable at software version 3.0 and the special loco decoders only.

\*\*\*) Sum of the contacts and magnet articles mustn't exceed 1024 (unique Lenz address) and contact numbers and magnet article must have dissimilar hardware addresses (see chapter to 20.1 to 20.3).

## 2.2 Software

STELLWERK 2001 was designed as 32bit application for Windows®XP therefore installation and execution is possible under Windows®98/ME/2000 only. The system is developed with help of Visual Basic (professional) and additional (Assembler)-tools. So you have to use some DLL- and OCX-files, which are included during installation SETUP.

STW2001 was tested for Lenz Digital plus System with software version 2.3 and version 3.5 (hard-/software). Lenz LI-USB Interface is usable only in connection with installed Lenz USB driver, USB port and using Windows®XP or Windows®2000.

Using a 3 buttons mouse the correct product obtained driver must be installed. The mouse settings must not have added features on the right as well as the middle button (such as double-clicks).

Because many various components and settings are possible under Windows®98/ME/XP/2000, you should particularly use only standard settings at systems with low performance. E.g. special

driver and parallel loaded components can expand the needed working memory strongly and delay processing also.

***Processing under Windows® 3.1 or Windows® for Workgroups 3.11 is not possible.***

Data (but not schedules) of the older STWWin version 9.0 can be converted automatically by an enclosed conversion program to the new STELLWERK 2001 (Version 10.5) data structure (see "Conversion remarks" chapter 17.11).



## 3 Installation

### 3.1 Program and data setup

The software is delivered on CDROM disk. Only for safeguarding purposes copies may be created. The installation is only possible via the SETUP program of the CDROM.

The installation program will be executed automatically after reading the self starting CDROM. Under Windows® 98, Windows® ME, Windows® XP or Windows® 2000 installation program can be started also via the task bar at "Execute":

dev:**StwSTART.exe** dev: = is the usually device name of the CDROM device.

During the menu-driven setup you are asked for:

"Output device" and

"Application folder" (standard: **C:\Program Files\STW2001**).

The installation is executed in several steps in which only newer or not available components get unpacked and registered.

1. Storing of installation routines.
2. System checking, query of the installation folder. The standard folder, which can be changed however, is: **C:\Program Files\STW2001**.
3. Expanding STELLWERK 2001 parts, examples and the necessary system- and tool components. The transferred system parts (DLL, OCX and others), are listed below.
4. Structure of the program group and software registration. A Windows group (STW2001) is created; in which you'll find several icons:

Main program, help files, conversion program V.9.0 -> V.10,

Schedule editor with help file and

Documentation (STW2001) as PDF files (for Acrobat Reader).

5. Furthermore the README file can be displayed at setup end with newest notes. This file is also to read by a Windows® 98/ME/XP/2000 editor (e.g. notebook/notepad).

At first start of STELLWERK 2001 you are asked for information to the license file (first name, name, ZIP code, home address, license number and CD key).

Please, take license number and CD key from your documents and put these important information aside for later questions and updates. The inputs in the license window are absolute necessary or STW2001 processing is not possible.

Before you start STELLWERK 2001, you should read the essential points of this manual to let the program run with right parameters.

### 3.2 Files transferred from the CDROM

The following parts of the CDROM be installed after expanding into the given **installation folder**:

#### Real application:

STW2001.exe	= Under Windows® 98/ME/XP/2000 executable main program
STW2001e.hlp	= English STW2001 Help file (Windows® Help-System)
STW2001d.hlp	= German STW2001 Help file (Windows® Help-System)
STW2001.liz	= License file for STW2001
STW2001.pdf	= Documentation of STW2001 (English, on one side) as PDF-file
STW2001.ico	= Icon for STELLWERK 2001
STWHLP.ico	= Icon of help files
STWEdite.hlp	= English Schedule Editor Help file (Windows® Help System)

STWEditd.hlp = German Schedule Editor Help file (Windows® Help System)  
 STWEditd.pdf = Documentation of Schedule Editor as PDF-file  
 STWEditd.ico = Icon for Schedule Editor  
 STW\_CONV.exe = Conversion program files v.9.0 -> v.10  
 AR40ENG.exe = Program to install the Acrobat Reader for reading PDF-files  
 README.txt = Last current notes

#### STW2001 - Examples:

##### Simple demo example:

STW\_001.stw = Track layout (simple oval)  
                   with switch routes,  
                   loco tracking.  
 STW\_001.sfp = schedule

##### Test programs magnetic articles:

All\_Magnetics\_001\_256.stw  
 All\_Magnetics\_257\_512.stw

##### Shaded railroad station examples:

STW\_005C.stw = shaded railroad station  
                   For contact control with  
                   explanations  
 STW\_005C.txt  
 STW\_005S.stw = shaded railroad station  
                   for schedule control with  
                   explanations and  
 STW\_005S.txt  
 STW\_005S.sfp = schedule

##### Further track layout examples:

STW\_002.stw = large track layout  
 STW\_003.stw = all symbols in different  
                   representations  
 STW\_004.stw = inverse and coupled  
                   magnetic articles

##### Test programs contacts:

All\_Contacts\_001\_256.stw  
 All\_Contacts\_257\_512.stw  
 All\_Contacts\_513\_768.stw

##### Block distances examples:

STW\_006C.stw = block distance track layout  
                   for contact control with  
                   explanations  
 STW\_006C.txt  
 STW\_006S.stw = block distance track layout  
                   for schedule control with  
                   explanations and  
 STW\_006S.txt  
 STW\_006S.sfp = schedule

Next parts being (also unpacked) transferred into the **WINDOWS/SYSTEM** folder:

##### Additional control elements for:

ANIBTN32.OCX	= Animation control elements	COMDLG32.OCX	= Common dialog
COMCTL32.OCX	= Windows Common Controls 5.0	GAUGE32.OCX	= Gauge measuring
GRID32.OCX	= Microsoft Grid Control	MCI32.OCX	= Multimedia controls
MSCOMCTL.OCX	= Common controls	MSCOMM32.OCX	= Communication
MSFLXGRD.OCX	= Flex grid controls	MSMASK32.OCX	= Formatted input/output
THREED32.OCX	= 3D-symbols		

##### TOOL LIBRARY:

QPRO32.DLL = QuikPak-prof. tool library (company: Crescent)

VB6 (Visual Basic version 6) applications need the following Microsoft components (WIN+VB6), if you have not newer updates in your **Windows® version**. They will be unpacked into the WINDOWS\SYSTEM folder also:

##### Additional file elements for:

ASYCFILT.DLL	= Necessary VB6 DLL	CMDLGDE.DLL	= Common controls (German)
CMCTLDE.DLL	= Windows Common Controls 5.0	FLEXGDDE.DLL	= Flex grid controls (German)
COMCAT.DLL	= Installshield part	MSCMCDE.DLL	= Common Controls (German)
MCIDE.DLL	= Multimedia controls (German)	MSCOMDE.DLL	= Common controls (German)
MSMSKDE.DLL	= Formatted input/output (German)	MSVBVM60.DLL	= Visual Basic Runtime
OLEAUT32.DLL	= OLE2 library	OLE2PRO32.DLL	= OLE2 library
VB6DE.DLL	= Intern. resources (German)	STDOLE.TLB	= Standard type library

The following parts being transferred (unpacked) into the **installation folder\WAV**  
 (standard is: C:\Program Files\STW2001\WAV)

20 different sounds -train passing, whistle, bell, announcement, gate closing- e.g.

STW\_01.WAV sound example "Eisteigen bitte"

STW\_02.WAV sound example "train steaming"

.....

STW\_20.WAV sound example crash

Some components of the install software for uninstalling are stored in the installation folder also, don't erase these.

Example files are first impressions of this program for you. You can use them to build up your own files. Details see chapter 18 "**File Examples**".

## 4 Quick Start

### 4.1 Preparation

If you have installed the software via the SETUP program, you probably want to start immediately and run your model railroad from your computer without reading long descriptions. Ok, so fast it's running!

1. Load the program STELLWERK 2001 via the icon created by the installation program or search for the program STELLWERK 2001 under "Start symbol" of Windows®98/ME/XP/2000 and "Programs".
2. At first start insert the needed information into the license window. You'll find the license number and the CD-Key at your documents. After right and complete input program STW2001 will be started. Please wait, until the remarks on the starting screen disappears. Input of license data are done only once, they are stored in the same folder as the program.
3. After short loading time you see an almost empty display with a menu bar



as well as a number of icons and underlaid gray background.

4. Now, the PC must know:

Which DIGITAL System do you have and how is your Interface connected?

The settings are done by a special menu item. Search for "Options" as main item in the menu and there you'll find the sub-item "**Initialization parameter**". By calling this item a window is opened and at "**Digital System / Interface type**" you can select your system and at "**PC-Interface (RS232/COM)**" you can use the right connection. At first it would be the best you leave all other parameters. Details are described at chapter 6 "Initialization- and Color-Parameter". By "OK" the window will be closed.

5. Now you have two options:
  - try one of the sample layouts first or
  - start building your layout as a track plan.

If you use examples, you can start switching turnouts or control locomotives, if your switches have the same numbers as examples.

However, we want to start with a track layout of our own. First we will give you an overview over this reference manual. Perhaps you read the description some time anyway?

### 4.2 Where are things described?

In the next chapter 5 "**General operating and menu description**" you'll find the overview, the "**Initialization and Color parameters**" are described at chapter 6.

The possibilities of defining track layouts with all track layout symbols and their structure are then explained in detail in the chapter 7 "**Track layout**". "**Switch routes**" are explained in chapter 9.

In chapter 11 you find all about "**Locomotive Details**". "**Locomotive tracking**" is described at chapter 12. Details of the later listed Contact control are explained at chapter 10. You find the possibilities to create schedules with all schedule commands in details mentioned later in chapter 14.


The active operations are explained in chapter 15 "**Control and drive**", especially "**Drive and control locomotives**" in chapter 15.2, "**Function modules**" in chapter 15.3, "**Sound triggering**" in chapter 15.6.

"**Special topics and options**" are explained in the chapter 17. Also part of this are: "**Checkpoint restart**" (chapter 17.3), the "**Locomotive bar**" (chapter 17.4), "**Inverse display of turnouts**" (chapter 17.6), "**Coupling of magnet articles**" (chapter 17.7), "**Doubleheading**" i.e. coupling locomotives (chapter 17.1), and if using DIGITAL plus System of Lenz company "**Locomotive decoder programming**" (chapter 17.2).

There are explanations of some examples in chapter 18 as well as a the help file, with suitable information by calling via the <F1>- key. If you don't find the right item, there is the search possibility in the help file via menu item "Index".

### 4.3 How do I create a track layout?

At first you start STW2001 with a double click at the STELLWERK 2001 icon in the STW2001 group (or also by selection at Start / Programs).

Click the construction icon  in the menu bar or choose "**File**" and then "**Define/modify track layout**".

**Graphics:** Menu bar



We will create now as example only a track and a turnout as track layout.

1. Now you find under the "menu bar" a "construction bar" with tool symbols during construction time and a "symbol bar" with all available symbols.


**Graphics:** Construction bar










**Graphics:** Symbol bar








Third row of symbols will be drawn right behind 1. / 2. row if using higher graphic solution.

Click and pull by "Drag/drop" (push left mouse button and pull symbol to wanted destination in the track layout) e.g. the track symbol  (horizontal track to right) to one point of the track layout range. A piece of track appears on the display. You change the length of the track by further clicks (at track layout range): extending with the right and reducing up to the standard length with the left mouse button. For most of the symbol types there are 4 directions to select (clockwise direction 0, 3, 6 and 9).


2. By the icons  and  you can move the track horizontally, by the icons  and  it's moving vertically and with the help of the  icon you can turn the track through 90 degrees by every click respectively.
3. If the position is right, you click on  icon of the construction bar. Now you choose a new or the same symbol.
4. Click on the turnout/switch symbol e.g. a left hand switch  (in direction to right) and pull the symbol into the track layout. After let off the mouse button in the track com-



plex, a black switch symbol will be drawn. You can move it like described before. If the position isn't right or you have made something wrong, you can move it as described before or erase it with the delete icon  also.

5. Give the switch your number (e.g. 1 = as by decoder defined). A switch decoder is constructed for 4 magnetic article numbers normally; so decoder address is using magnetic article no. 1 up to 4. STELLWERK 2001 is using magnetic article numbers only, the needed decoder address must be encoded/programmed as described in the manual of your special decoder type. Choose a initial position (e.g. green). The standard switching speed and the coupling possibility is not necessary to change at this time. Termination by clicking on the OK-icon.
6. In this way you can create all parts of your track layout. Please start first by creating only some symbols.
7. For signals, accessories, track contacts and switch routes, further definitions are requested in separate window. For information on switch routes track contacts, see the corresponding chapters.
8. With grid  icon you can still more easily define the position of single symbols, and by "New drawing" in the menu "Options" or  icon all symbols already defined ready are drawn once more, e.g. if you "destroyed" symbols by moving or turning other. You can e.g. move a whole area with help of "mark"  icon.
9. If you are finished with defining, you can move to control/running mode by the menu item "Processing/First start" or by  icon directly.


## 4.4 Saving / reading files

Now you should save the two defined symbols (or more) using the  icon or the menu item "File" / "Save as..." and then the sub-item "**STELLWERK Data (stw)**". A standard window will open for file savings. The name is free to choose within the rules of Windows® 98/ME/XP/2000. Device and folder can be changed also within the standard window. The standard window is described in chapter 5.8. As so called "extension" STW2001 files get ".stw". Later or after a restart, you can find and load this track figure by "Open/STELLWERK Data (stw)" in the menu item. Also the last 4 used names are displayed in the lower lines at menu part "File" and they can be invoked directly.

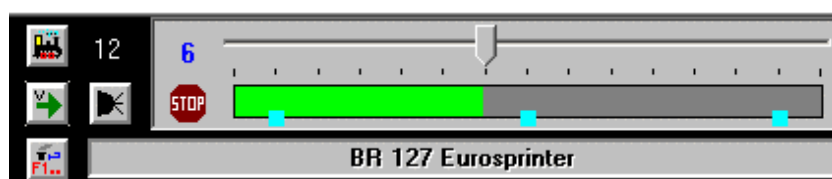
It should be taken into account that all values of "Initialization" are saved into stw-file and these are valid restoring this file.

## 4.5 Manual control

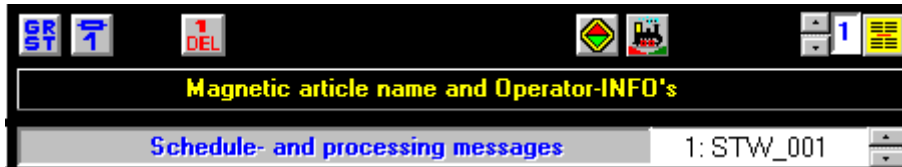
Now you probably want to switch the one (or more) track switches or, control one of your locomotives from your computer. It is simple! –

1. Select  icon or "Processing" and then "First start". Instead of construction bar and symbol bar you'll see a loco bar under the menu bar. At the lower part of the screen you'll find left the


**Graphics:** Locomotive control




and right the parts for switching, settings and schedule running.


**Graphics:** Switching and messages






2. Switch your turnout no. 1 by click on the symbol (approximately middle):  
left mouse button changes to RED/DIVERGING and  
right mouse button changes to GREEN/STRAIGHT.

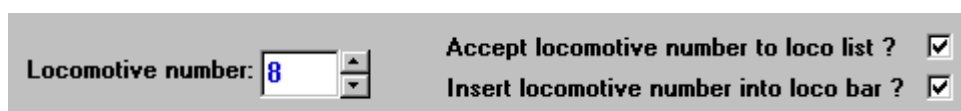
The  icon (general reset status) moves all magnet articles to the starting/initial position defined by you.

3. Enter one of your engine numbers at the keyboard (if less 4 digits confirm by <Enter> button).


By "mouse dragging" on the  lever a green speed information display appears and your engine must drive. You also can use the arrow keys (← or →) for changing the engine speed.




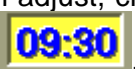
Also engines can gradually select (on the right forwards, on the left backwards) by the  icon with the mouse. You can fix your engine numbers for a special engine list later.


4. By  icon you can switch the engine direction. With Lenz system the left button switches "backwards" and right button "forwards". There (unfortunately still) isn't the specific switchover at Märklin and Arnold. You can as well use the key combination < Ctrl > and arrow keys for changing the engine direction.
5. By  icon or with key <Pos1> the engine stops immediately. With <End> button the "stop" is not quite so abrupt, the locomotive brakes slowly. Later you can adjust the decelerating parameters for your locomotives if necessary.
6. Light (function F0) will be switched on or off by   icon as toggle mode.
7. By clicking on icon  down right you can change all settings of a locomotive and move a loco icon to the loco bar. Click on this icon. In the invoked window activate the item "Insert locomotive number into loco bar?" for your engine number and close the window. (more at chapter 11 "Locomotive Details").



Now your locomotive number is in the loco bar. The short name of the engine appears by "Mouse-Moving" over these locomotive icons as so-called "ToolTip". By click with right mouse button on one of these upper icons the chosen engine drives one step faster, by click with left mouse button one step more slowly.

The function window is invoked by  icon, there your defined engine functions are simply to trigger, more is to found at chapter 11 "Locomotive Details" and in chapter 15.3 "Function modules".

8. By the red icon  an "Emergency brake" (all off) is executed, the  icon is used for "Emergency stop" of all locomotives and  icon is calling a "Reset" after e.g. a short circuit.
9. You can adjust, change clock speed and start the model time by double click on digital clock symbol .



10. Select "Operational data / Display" or click on  icon to display the current values of all loaded or used components.


## 4.6 Fundamentals of automatic train control

I think, you don't want to control your equipment only manually with your PC, but also a automatic processing should be possible. Signals shall be switched and in dependence of special situations engines shall more slowly and faster drive, stop or look for stands free switch routes. There are two alternatives to solve these problems. You can use the **new and easy contact control** or the older and **more complex part with schedules**.

### 4.6.1 Automatic running by contact control

Automatic train control can be achieved by creating switch routes and by using contacts to control switches and locos.

Switch routes are defined by two symbols, a starting point ("from ...", e.g. symbol ) and a destination/target point ("to ...", e.g. symbol ). The components of a switch are selected in a switch route definition window (see chapter 15.7) by clicking with the right mouse button on the "from ..." symbol. Several switch routes can be defined from every starting point.

Contacts have their own symbols (e.g. ). What a contact triggers is defined in a separate window (see chapter 10), which is opened by clicking with the right mouse button at the contact symbol. You can define for every contact::

- triggering one sound,
- switch one switch, signal or other magnetic article
- set (reserve) or release up to two switch routes,
- define or erase one so called marker,
- set/release a third switch route by a marker number and/or
- control one locomotive (speed, direction, light and/or function).

Contacts can be triggered by every locomotive, or only by selected locos. In the latter case, loco tracking is especially helpful.

Additional possibilities are described in detail in the following chapters.

### 4.6.2 Principle of schedule construction

Using the alternative schedule control you have to build one or more schedules with commands of STELLWERK 2001. A command is one line and has several parameters. At running time all schedules are executed very fast step by step. Users construct two types of schedules mostly:

- **Endless schedules**  
In an endless loop the status of e.g. all contacts is asked for (by command: F = If...) and the wanted command (activity) is included into the YES/TRUE part.
- **Straight line schedules**  
Between two waiting points (by command: K = Wait until contact status) the wanted activities are included.

As a rule, you work with an "endless loop" and the "If" commands for questioning contact positions, signals, switch routes, model time and other. Then jumps to small routines shall be included where the new activities are defined. At the end of the last query you jump to the beginning of the schedule.


For "straight" created schedules you have to use waiting commands usually such as "till contact is free/occupied (K) ", " till a switch route is free/occupied (X, W) " or normal time (Z) commands. Here you should know for the beginning that an additional parallel running schedule is running on if another waits for one of the above-mentioned conditions.

You can build very simple or very complex schedules. Here one small (unreal) example:

L, 1, B, +7	The engine no. 1 accelerates by 7 steps,
Z, 50	then drives 5 seconds
L, 1, B, -14	and finally brakes on zero.

But it has to be cleared: Did it also have the speed zero at the beginning?- Shouldn't it notice the available signals either? Why is it the locomotive no. 1? - What is at use of other locomotive numbers? Where do I get the locomotive number from? How do I use contacts?

There are a number of schedule commands. You can assemble e.g. with Schedule Editor Program "STWEdit" one or several schedules by these commands. Schedule commands are described in the chapter 14 in a table and also in detailed singles items. Schedule Editor "STWEdit" is part of installation of STELLWERK 2001, described at chapter 14.3 and can be

started by  icon. Because everyone has other equipment and other driving ideas, practically isn't it possibly to deliver a standard package. However, some delivered examples can represent a help.

Start with a simple schedule to know the single schedule commands and to check the performance of your railroad equipment. Try to test and to change the examples e.g. of block distance and shaded railroad station on your interests. Remember even if several schedules are running parallel; perhaps you must manage dependence's (crossing points, resources used together). Of course it is possible that e.g. one schedule supervises the block distances a second one the shaded railroad station etc. You have many possibilities and ... you can make many errors. For testing schedules the TRACE possibility with several variants is available.

## 4.7 More complex topics

To get to know all possibilities of STELLWERK 2001, you should read in this manual the next chapter anyway now. You then will recognize the possibilities, how getting a locomotive number at contacts, how simplifying the program start, how maximizing and changing your track figure -also with special symbols-, how defining switch routes and integrating sounds and some more.

If you want to end now, then:

Stop the driving operation and the program via menu item "File" /  
"Program end" (normal termination).

A safety query is done if a track layout was created or data changed. You should know, all data (without schedules) -so all initialization data, track layout, locomotive details, switch routes, contact definitions, locomotive tracking- are stored with their actual status in one STELLWERK file all together. If you want to save all data and the schedules, you have to use the menu item "Checkpoint writing" of the menu. Later you can start as first activity with "Checkpoint reading".

## 5 General Operating and Menu Description

### 5.1 General operation

STELLWERK 2001 (STW2001) is an object-oriented, fully conceived on the Windows® 98/ME/XP/2000 surface program. It uses the possibilities of this standard like separate window, scrollbars, command switches, icons etc. Almost all windows are variable in their size and position. Furthermore it is possible to run parallel activities. However, do not assign features to the right and/or the middle mouse button (such as double-clicks etc.).

**To run the program, you should be familiar with your Windows® 98/ME/XP/2000 surface.**

Windows® allows the simultaneous processing of various programs (by event orientation), however this is not recommended when running real time systems. No other programs should be used actively during STW2001 processing operations

After loading Windows® with active mouse control, STW2001 can be loaded by "clicking" on the icon or by using the task list/programs of Windows® 98/ME/XP/2000. A small help window is displayed during the loading phase (it lasts for some time!). After searching the **necessary license file**, standard parameters for the current processing are fixed.

**The following parameters must be set right within the initialization window for true processing with an interface:**

<b>Digital-System / Interface type</b>	<b>and</b>
<b>PC-Interface (RS232/COM)</b>	(USB only for Lenz and Windows® XP/2000)

(See chapter 6 "Initialization and Color Parameter").

After loading and showing LOGO display of STELLWERK 2001 program informs about the simply possibilities by a pulldown menu. The complete operation corresponds to possibilities of Windows® 98/ME/XP/2000 like mouse support, button use, window technique etc. The corr. MS-Windows® manual gives intensively information about this.

Using mouse for program STELLWERK 2001 remind following general possibilities:

#### **Left mouse button:**

- General: Activating (clicking) of icons
- Drag/Drop (pull and set symbols)
- Shorting of tracks during construction
- Selecting of symbols for switch route at definition time
- Switch to RED / DIVERGING / STOP by clicking symbol at the track layout part

#### **Right mouse button:**

- Changing of definitions during construction mode by clicking symbol at it's defined position
- Extending of tracks during construction
- Switching to GREEN / STRAIGHT / PROCEED by clicking symbol at the track layout

#### **Middle mouse button:**

- Switching to ORANGE. DIVERGING/SLOW DOWN by clicking symbol at the track layout.

Function keys and special keys are also used; in the corr. sections are referred to this. Windows are changed and/or new windows are visible at call of the single menu items such as "File / New track layout", "Read files". Furthermore there is a number of icons which are represented in bars of upper screen part usually. A description is found at following menu items.

## 5.2 Menu: General

The **STELLWERK 2001 program** is subdivided into 5 main parts:

File, Processing, Data, Options and Help

**Menu:** Main menu














A choice is executed via a "pulldown menu" similar to other Windows® 98/ME/XP/2000 applications; the menu can be accessed using the mouse or the <Arrow> and <Enter> keys. If a choice isn't available yet, it appears "underlaid gray" and isn't usable.

In addition you'll find a menu bar for fast and easy starting of procedures.

**Menü:** Menu bar



Here you see:

-  = New
-  = Open STELLWERK 2001 file
-  = Save (Fast saving of STW 2001 file)
-  = Save as .... STELLWERK 2001 file
-  = Build/Modify track layout
-  = Processing First start or Continue (depending on last status)
-  = Data information
-  = Data printouts
-  = Help
-  = Create/Modify locomotive tracking
-  = Controlling by timer

Instead of the last two icons you see during processing mode:

-  = Doubleheading
-  = Locomotive decoder programming (for Digital System Lenz)

Creating, changing or saving of schedules is not possible by STW2001 directly. Schedules can be created or changed parallel by delivered Schedule Editor "STWEdit", described at chapter 14.3. Windows® editors e.g. EDITOR / NOTEPAD are usable also, but you have check right file extension "sfp".

### 5.3 Menu item: File

When selecting the menu item **File** the following submenu is available.

**Menü:** Datei

<b>File</b>	Processing	Data	Options	Help
-------------	------------	------	---------	------

New	Ctrl+N	
Define/Modify track layout	F2	
Define/Modify locomotives	Ctrl+L	
Open		STELLWERK Data (stw)
		Schedule Data (sfp)
		Graphic folio (bmp)
Save		
Save as ...		STELLWERK Data (stw) Ctrl+S
		Graphic picture output (bmp)
Checkpoint		Checkpoint reading
		Checkpoint writing
Program End	Ctrl+E	
Up to four last called STW2001 file names (stw)		
Up to four last called Schedule file names (sfp)		

#### 5.3.1 New

The first choice allows a **new structure** of the track layout. Existing data and graphic will be erased after a safety query.

#### 5.3.2 Define/Modify track layout

At the second choice "**Define/Modify track layout**" an existing one (built or read in) can be completed and/or changed on graphic surface. Changes must be saved with the "Save" or "Save as ..." command before program ends.

#### 5.3.3 Define/Modify locomotives

Using "**Define/Modify locomotives**" select locomotive details. An own window is called. See chapter 11 "Locomotive Details".


#### 5.3.4 Open

All necessary files can be loaded by this menu item "**Open**" from an external device.

These are:

**STELLWERK Data** (stw),  
**Schedule Data** (sfp) *(only visible for schedule control)* and  
**Graphic folio** (bmp)

STELLWERK Data including all initialization parameters, the whole track layout, switch routes, locomotive details, contact control and loco tracking definitions.

Schedules are external (by an editor) created command lines as a text file. Open with reading schedules displays a window, in which you can define the  schedule running number.

Files of the older STWWIN version 9.0 cannot read in directly. At first these must be converted by the conversion program (STW\_CONV.EXE) to the new format.

A graphic folio must be loaded at first before a track layout is created or loaded. No track layout definitions or other parameters are set by such a graphic folio.

A standard window is shown to select filename, folder and device. More see chapter 5.8 "Standard Window".

### 5.3.5 Save and Save as ...

At **Save** the "stw" file is stored without security question and with actual name/folder/device directly (fast saving). It's possible only after read in a "stw" file and/or after saving with "Save as".

At **Save as...** there are two sub items:

**STELLWERK Data (stw)**      and  
**Graphic picture output (bmp)**

At **STELLWERK Data (stw)** all records of a track layout are stored in a "stw" file with all defined accessories, initialization parameter, switch routes, locomotive details, contact control and loco tracking. Afterwards a fast saving is possible for this file by "Save".

At **"Graphic picture output (bmp)"** user can store the actual track layout part as a BMP-file for e.g. a later printout or working with a painting program (e.g. PAINT). This type of file can be read in only as a graphic folio, but this can't take the place of reading or defining a STELLWERK (stw) file with its symbols.

For "Save as ..." a standard window is used to fix filename, folder and device. More see chapter 5.8 "Standard Window".

### 5.3.6 Checkpoint

You find at **Checkpoint** two sub items:

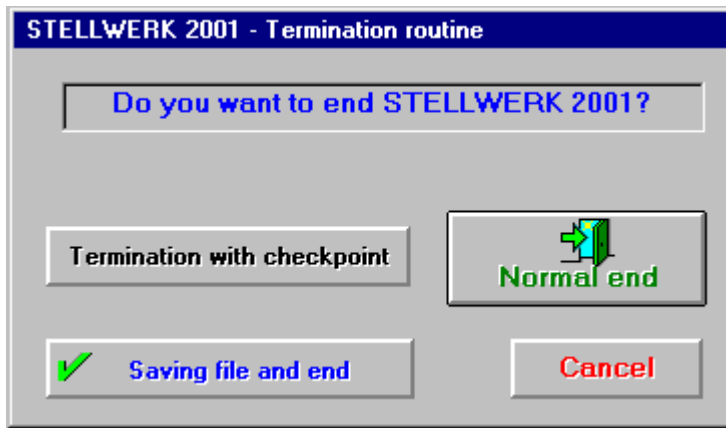
**Checkpoint reading**      and  
**Checkpoint writing**

By checkpoint function it's possible to make a checkpoint restart of your model railroad equipment at a special time, so you hold the status of one situation in place and produce this after switching off the complete system at a later time again. A checkpoint can be written at any time, but the last one will be overwritten every time (filename: STW2001.CHK). Reading a checkpoint is possible only at first starting the program. A restart description has to be found in the chapter 17.3.

### 5.3.7 Program End

Normal program termination is executed by last entry **Program End**. If you terminate using the Windows®98/ME/XP/2000 icon **x** or via button combination <Alt> <F4>, termination window will be shown as well. After you build or modify a track layout, first -before termination- a question appears for saving STELLWERK data, afterwards termination window is shown:



**Window: Program termination**

At **Termination with checkpoint** a checkpoint is written for later starting with all used data. (Details see chapter 17.4.

By **Saving file and end** the standard window will be invoked to save all STELLWERK data (stw) before termination.

By **Normal end** the program terminates after closing all files.

By **Cancel** you can return to normal running.

### 5.3.8 File names

Up to 4 file names each with device/folders are displayed in order of last call or saving:

File names of track data (stw-files)

File names of schedule data (sfp-files)

You can read in by clicking these files directly. Schedule files are visible only if "Schedule Control" was fixed.

## 5.4 Menu item: Processing

At choosing the menu item **Processing**, you can access following submenu.

### Menu: Processing

File	<b>Processing</b>	Data	Options	Help
------	-------------------	------	---------	------

First start	F6
Continue	F7
Stop	

Driving is started here or will be continued after a stop.

#### 5.4.1 First start

**First start** can be used at each time after a construction or opening of a track layout, also by <F6> key.

#### 5.4.2 Continue

**Continue** is used after an interim "Stop". Icons of processing and loco bar are usable again and clicks at track layout are possible, also by <F7> key.

#### 5.4.3 Stop

If started by "First start" or again by "Continue", processing can be interrupted by "**Stop**".

COM interface is not closed, but automatic running, all possibilities of switching or control the track layout are interrupted at **Stop**, simultaneous schedules and model time clock are stopped.

Only by "Continue" icons in processing and loco bar are usable and clicks at the track layout are possible.

At "Stop" in the menu the schedules are stopped at the command just executed and later starts with the next command at the choice of "Continue" in the menu (after last stop) .

## 5.5 Menu item: Data

At choice of menu item **Data** the following submenu is available:

**Menu:** Data

File	Processing	<b>Data</b>	Options	Help
------	------------	-------------	---------	------

Display	Ctrl+D
Print	Ctrl+P
Lenz system items	

The actual status of used data/files at this moment can be displayed or printed by this item.













*Last sub item only for Digital plus System of company Lenz and only display.*

### 5.5.1 Display and Print

Choosing these items own window parts appear. Details of **Data** you will find at chapter 16.2.



There are following display or print possibilities:

	<b>= Magnetic articles</b>	Displaying status and definitions of all magnetic articles or:
	<b>= only turnouts</b>	
	<b>= only signals</b>	
	<b>= Contact tracks</b>	Displaying status and definitions of all contact tracks
	<b>= Tracks general</b>	Information of "normal" track symbols, special signs, text etc.
	<b>= Switch routes</b>	Display switch route definitions with parts to be switched
	<b>= Sounds</b>	Display of defined values for sound symbols
	<b>= Locomotives</b>	Displaying actual status of all locomotive data
	<b>= Loco tracking</b>	Displaying the defined dependencies
	<b>= Marker</b>	Displaying status and definition of markers
	<b>= Initialization</b>	Information of currently used Initialization/color parameters
	<b>= Schedules</b>	Display of all loaded schedules as plain text and definition

You'll find same possibilities and representations under **Print** as under "Display". Details of "Print" are explained in the chapter 16.3.

### 5.5.2 Lenz System data

Entry "**Lenz System data**" is usable only if using the DIGITAL plus System of company Lenz (as defined at initialization window). If using during execution time an own window is opened, which is described more precisely in chapter 16.3.

## 5.6 Menu item: Options

By choosing menu item **Options**, the following submenu is available.

**Menu:** Options

File	Processing	Data	<b>Options</b>	Help
------	------------	------	----------------	------

Language German
New drawing
Display ToolTip <span style="float: right;">Ctrl+T</span>
Initialization Parameter
Color Parameter
Controlling by Timer
Locomotive tracking
Doubleheading
Programming loco decoder

At this menu item you find a number of supplements. However, some of these are available only during the construction or during the processing phase.

### 5.6.1 Language German / Sprache englisch

You can change to German menu items by selecting the first sub-item **Language German**. If you see “Sprache englisch”, so you can switch here back to English language. All text of menus and new defined text are displayed in used language. Help file changes to actual language (Stw2001e=English, Stw2001d=German).

### 5.6.2 New drawing

A new drawing will be forced for the complete layout with all defined or read data by selecting the option **New drawing** during construction time.

### 5.6.3 Display ToolTip

This item “**Display ToolTip**” is used as help during construction and processing mode. The function is switched off or on by this selection (displayed as check sign). More details you’ll find in chapter 17.5.

### 5.6.4 Initialization and Color parameter

All necessary settings for processing can be changed during program running by these two menu items. For everyone a special window is opened. The windows and parameters are described in chapter 6.

### 5.6.5 Controlling by timer

In the sub-item “**Controlling by timer**” you define which contacts will be triggered at a certain clock time on the built-in clock, or which contacts will be triggered at certain intervals. It’s not possible to make or modify these definitions during active processing. In chapter 13 details are explained.

### 5.6.6 Locomotive tracking

All data of a software-supported way of tracking loco numbers are selected or modified under item **Locomotive tracking**, details see chapter 12.

### 5.6.7 Doubleheading

Doubleheading with two engines is possible by selecting the menu item **Doubleheading** during processing mode. This function is described in detail in chapter 17.1.

### 5.6.8 Programming loco decoder

The possibilities for **programming loco decoder** by PC with interface can be looked up in the chapter 17.2. This last point is usable only during processing mode (or if COM=0) and under the DIGITAL plus System of company Lenz.

## 5.7 Help

By selecting menu item **Help** the following submenu is available

**Menu: Help**

File	Processing	Data	Options	<b>Help</b>
				Help Index F1 Info...

A context obtained on-line help is offered by a help file (STW2001e.HLP) on base of the Windows® 98/ME/XP/2000 help system in this part.

By selecting **Index**, you'll see the first page of the STW2001 help file.

Under **Info...** you'll find special license information and author details.

The capabilities of the help file are explained briefly in the appendix (chapter 20.7).

## 5.8 Standard window

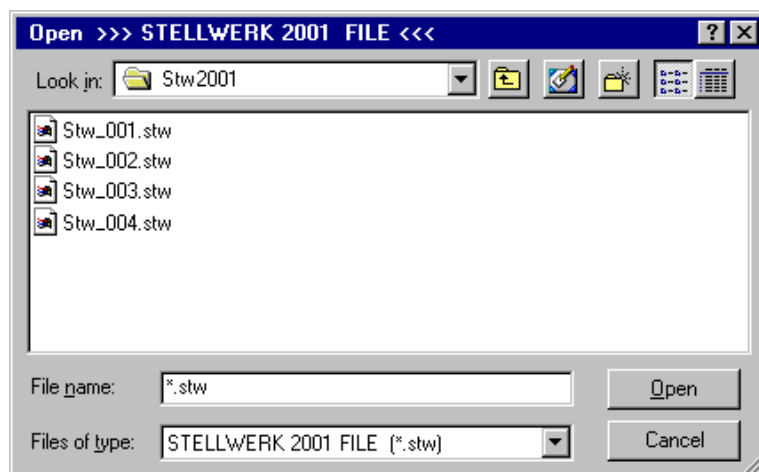
This is a Windows® 98/ME/XP/2000 standard window for use of all input/output procedures.

This window is used by following STELLWERK 2001 activities for:

- Select and read STELLWERK data (\*.stw)
- Select and read Graphic folio (\*.bmp)
- Select and read schedules (\*.sfp)
- Select and read sound files (\*.wav)
- Select and write STELLWERK 2001 data (\*.stw)
- Select and write graphic picture (\*.bmp)

As example you see a standard window to **Open** a STELLWERK 2001 file.

**Window:** Standard window



At "**Look in:**" the actual folder is displayed, this one and device is changeable by the special icons.

At "**File name**" the actual type of selection or selected file is displayed.

At "**Files of type**" the needed file type for STELLWERK 2001 is shown.

By "**Open**" the wanted activity is executed, by "**Cancel**" it's closed without activity.

A similar window is used for changing print font within the printout window.

The actual 4 folders of different file types are stored during program running and saved as part of the STELLWERK 2001 file.

Furthermore it's possible to change at "Look in:" instead of the standard extension (this is the file ending definition of 3 digits after point) to e.g. \*.\* or other, specially reading schedules. This is important for self created schedules by editors because txt or doc as extension is often used by Windows® 98/ME/XP/2000 automatically. But later you should rename such file names.

STELLWERK 2001 files are stored as text files, but these files shouldn't change by user with an editor. Exceptions are possible by calling the author, either links could be damaged or abort program execution.

The following files of older STWWIN version 9.0:

<b>INI file</b>	<b>(STWWIN.INI)</b>
<b>Track layout data</b>	<b>(*.SGB)</b>
<b>Locomotive lists</b>	<b>(*.SLK)</b>
<b>Switch routes</b>	<b>(*.SST)</b>
<b>Loco tracking</b>	<b>(*.SNV)</b>

can't read in directly, but you should convert and bring together these to the new file type (\*.stw) by the conversion program STW\_CONV. exe. Details see chapter 17.11.



## 6 Initialization and Color Parameters

### 6.1 General

Initialization parameters are used for structuring tables at execution time and to customize hardware conditions. Track layouts can be fit in color to personal request by the “Color Parameters”

Initialization and Color parameters are set to a standard at program start and can be changed during program is running (construction mode) in own windows. The values are stored together with other parts in the STELLWERK 2001 file (\*.stw).

**Window:** General Settings

The parameters are divided into 5 groups within this window:

- Track layout
- Interface
- Control (manual and by ...)
- Contacts
- Test

These are described now in details.

Initialization parameters take place of STWWIN INI-parameters version 9.0. Some are definable in other windows or absolute values are standard now. Details see chapter 17.11 (Conversion notes)

## 6.2 Initialization: Track layout

Here you see 6 parameters which can be defined/changed.

- Track layout width
- Max. no. of magnetic articles
- Display magnetic article numbers ?
- Track layout height
- Pause between switching (msec)
- Display contact numbers ?

Track layout

Track layout width (100 up to 500): 110 (in % of screen width)	Max. no. of magnetic articles: 256
Track layout height (100 up to 500): 110 (in % of screen height)	Pause between switching (msec): 111
	Display magnetic numbers ? <input checked="" type="checkbox"/>
	Display contact numbers ? <input checked="" type="checkbox"/>

### 6.2.1 Track layout width

Values: 100 up to 500  
Default: 110

Track layout width is defined as percentage screen width. It can be defined 5 times greater than the screen width as "virtual" figure. A horizontal "scroll bar" always appears at the lower margin. Please, note as a remark, that at higher resolutions more information is represented on same width generally (smaller graphic). The instruction always refers to the real screen width with the resolution used under Windows®98/ME/XP/2000. Therefore considerable graphic sizes can arise, which have large influence on processing speed and processing ability at small RAM memory sizes. The item therefore shouldn't be chosen more greatly than unconditional required.

### 6.2.2 Track layout height

Values: 100 up to 500  
Default: 110

Track layout height is defined as percentage screen height. It can be defined 5 times higher than the screen height as "virtual" figure. A vertical "scroll bar" always appears at the right margin. The explanations listed under chapter 6.2.1 are valid also.

### 6.2.3 Max. no. of magnetic articles

Value: 1 up to 1024  
Default: 256

All switchable elements like turnouts, signals, double slip switches and general magnetics (e.g. all-purpose counter, uncoupler, turntable) fell to this. Because the maximum number of the connected magnet articles can be very various and depend on DIGITAL System and its software, therefore the necessary tables can be adapted to the program individually. Numbers are not usable if higher than defined here.

### 6.2.4 Pause between switching

Value: 55 up to 1000 (in msec)  
Default: 111

Pauses between switching magnetic articles are necessary. The default pause is a sufficient value normally and need not to be changed. But in special cases it may be necessary to extend in steps of 1/18 sec., eg. if some magnetic articles are false switched during "Init status" although switching times of these magnetic articles are long enough.

### 6.2.5 Display magnetic article numbers ?

Checkbox: checked or not checked



Default: checked (YES)

With this parameter the display of magnetic article numbers can be removed. Numbers of magnetic articles are only important at construction time, later displaying of magnetics without numbers is not necessary in most cases. The defined numbers remain internal also and can be switched e.g. by contact control, schedule commands or clicking symbols.

### 6.2.6 Display contact numbers ?

Checkbox: checked or not checked

Default: checked (YES)

With this parameter the display of contact numbers can be removed. Numbers of contacts are only important at construction time, later displaying of contact tracks with numbers is not necessary in most cases. The defined numbers remain internal also and will be checked/set during processing mode e.g. by contact control or schedule commands or set by a special (slow) twice click at contact symbols. If "Loco tracking" is used, this parameter shouldn't check to YES.

## 6.3 Initialization: Interface

Here you see 3 parameters which can be defined and most also changed..

- Digital System / Interface type
- Data rate
- PC-Schnittstelle (RS232/COM)
- Interrupt time

Interface

Digital System / Interface type: MÄRKLIN with 6050/6051

PC Interface (RS232/COM): COM1 Data Rate 2.400

Interrupt time (after): 5 second(s)

### 6.3.1 Digital System / Interface type

You select by this parameter the used Interface of the Digital Systems.

Text values: At the moment 9 different can be selected by scroll bar:

- “MÄRKLIN (6050/6051)” only 2.400 Baud,
- “ARNOLD with Märklin (6050/6051)” only 2.400 Baud,
- “ARNOLD with DIGITAL plus (86062)” with 9.600 Baud
- “FLEISCHMANN TwinCenter” with 2.400, 4.800, 9.600 or 19.200 Baud,
- “UHLENBROCK Intellibox” with 2.400, 4.800, 9.600 or 19.200 Baud,
- “LENZ DIGITAL plus LI100” with 9.600 Baud,
- “LENZ DIGITAL plus LI100F” with 9.600 or 19.200 Baud,
- “LENZ DIGITAL plus LI101F” with 19.200, 38.400, 57.600 or 115.200 Baud,
- “LENZ DIGITAL plus LI101F” with 19.200, 38.400, 57.600 or 115.200 Baud,
- “LENZ DIGITAL plus LI-USB” with 57.600 Baud.

Default: “MÄRKLIN (6050/6051)”

The possible DIGITAL Systems are different in performance and function. The “DIGITAL plus System” of the company Lenz is using other transmitting codes as well as parameter and has other possibilities and function characteristics as Märklin. Partial differences must be made also between the systems Märklin and Arnold, e.g. added feature modules are only possible for Märklin and in connection with the central units 6020 or 6021.

Changing to Lenz LI-USB Interface display of definition window is shown as e.g.:

USB-Interface simulated as: COM3 Data Rate 57.600

Data Rate cannot be changed for LI-USB Interface. Number of COM Port must be inserted as explained in chapter 6.3.2.

**Essential note:** You can get unexpected, abnormal reactions and false processing if not using the right DIGITAL System!

### 6.3.2 PC-Schnittstellstelle (RS232/COM)

You define the input/output of your PC by this parameter.

Text values: "none" or "COM1" up to "COM8" selecting by scroll bar.

Default: "none"

Because the Interface is connected by serial line (COM/RS232), this must be made known to the program. As default "none" (=no Interface connected) is defined to make a test operation possible without connection. As a rule, COM1 or COM2 probably will be used for real processing (value according to 1 or 2).

#### LENZ USB Interface

If you will connect a Lenz, Interface **LI-USB**, a USB port can be used for Windows®XP or Windows®2000, but first time before program start delivered driver of company Lenz must be installed. A "virtual" COM port is activated by this driver. The used COM number can be seen at Windows Device Manager. You get to Windows Device Manager by:

- Start Icon
- Call System Control / Control Panel
- Call System
  - Select Hardware
  - Select Device Manager
  - Select Ports (COM and LPT)

Changes are not necessary there! - Remember your displayed COM number!

Other also delivered programs from company Lenz like LI-USB Server, LI-USB Fahrpult, LI-USB CV-Editor or LI-USB Configuration must not be loaded/activ!

### 6.3.3 Data rate (Baud)

Adjustable data rate depends of:

- **Interface type** and
- **selected hardware setting of Interface**

Only 2400 Baud are usable for Märklin/Arnold.

Using Uhlenbrock Intellibox or Fleischmann TwinCenter you can select same value as set before in hardware.

Different data rates are usable for several Lenz Interfaces, but here also hardware must be set before as described within Interface documentation of company Lenz.

**Fehler! Textmarke nicht definiert.**

### 6.3.4 Interrupt time

The program can react after processing of "Interrupt time" if technical problems or transmitting errors occur with the interface.

Values: 1 up to 10 setting by scroll bar.

Default: 5

The value is indicated in seconds (sec), the default was defined with 5 seconds. You should not define less than 2 seconds.

## 6.4 Initialization: Control

Here is a difference between **Contact control** and **Schedule control**.

Control (manual and by ....)

Contact controlling ? ☐      Highest used locomotive number.:

Schedule controlling ? ☒      Max. no. of parallel schedules:

Display all schedule commands ? ☐      Max. addresses per schedule:

Max. no. of all schedule lines:       Loading schedule by F11 ? ☐

Max. addresses per schedule:       Loading schedule by F12 ? ☐

Selecting **Contact controlling** only 1 additional parameter is shown and changeable.

**Highest used locomotive number**

Selecting **Schedule controlling** 7 parameters are shown and changeable.

**Highest used locomotive number**  
**Display all schedule commands ?**  
**Max. no. of parallel schedules**  
**Max. no. of all schedule lines**  
**Max. addresses per schedule**  
**Loading schedule by F11 ?**  
**Loading schedule by F12 ?**

#### 6.4.1 Highest used locomotive number

Because hardly all theoretically possible locomotive numbers are used, you can limit the highest number by this parameter.

Values:            1 up to 99  
 Default:           99

Die locomotive number 0 is for a conventional (analogue) engine, it's independent used with the special Digital System.

The highest number depends on the used Digital System, Interface type, software version of the Digital System and locomotive decoder types.

As note remember:

*Arnold and Märklin with Märklin Interface (6050/6051) and Intellibox/TWIN-Center **max. 80!***  
*Lenz with SW version <3.0 max. 99 and since version 3.0 up to 9999.*

#### 6.4.2 Contact controlling

If "**Contact controlling**" is selected as alternative option, only the parameter "Highest used locomotive number" is changeable as described at item 6.4.1.

#### 6.4.3 Schedule controlling

If "**Schedule controlling**" is selected as alternative option, additionally to the parameter "Highest used locomotive number" (described at item 6.4.1) the following parameters are to select and change.

**Display all schedule commands ?**

Checkbox:            checked or not checked  
 Default:             not checked (NO)

Since, schedule commands are shown very fast usually, information display is not necessary in most cases. Commands waiting on an event (e.g. time, contact) will always, independently of the parameter value, reported; but these will be typed over by a parallel ongoing schedule since the latest information is always shown.

**Max. no. of parallel schedules**

Values: 1 up to 9  
Default: 3

By this parameter you can define how many schedules can be loaded and run parallel. Every schedule gets an own, free eligible schedule. So every schedule has an own address area of branch instructions and an own timer. Please note that the number of the max. schedule lines (see next) applies to all schedules together; the schedules share these equally ("all" divide by "number").

**Max. no. of all schedule lines**

Values: 1 up to 9999  
Default: 3000

An instruction is every schedule line in which loops, skips and subroutines are defined. "Max no. of schedule lines" has influence on the program size. Please note that the number of the schedule lines applies to all schedules together; the schedules share these equally ("all" divide by "number"). If schedules get too large, then they should divided and the singles programs are reloaded by the schedule command "N".

**Max. addresses per schedule**

Values: 1 to 999  
Default: 300

Names in schedules are used for subroutines and skips (GOTO's). Every schedule has its own table; other schedules don't have any access to another table. "Max. addresses per schedule" indicates the maximum number of the different names and has influence on the program size of STW2001 at execution time. The number applies to every schedule with same value.

**Loading schedule by F11 / F12 ?**

Checkbox: checked or not checked  
Display field: empty or schedule file name  
Default: not checked (NO), display field: = empty

With these two parameters "Schedules:F11/F12 key" up to two schedule file, which shall be loaded and started fast by the F11- or F12-button, can be indicated.

If one of the checkboxes is selected, the standard window (see 5.8) is opened and a schedule file name can be selected. This one is displayed at the lower field.

*You can't input the name directly!*

Loading up is always done on the schedule counter no. 1 under the condition, that no schedule is active there.

## 6.5 Initialization: Contacts

Here you see 4 parameters which can be defined/changed.

- **Standard contact type**
- **Highest contact number**
- **Contact free automatically ?**
- **Triggering feedback modules**

The screenshot shows a window titled "Contacts" with the following settings:

- Standard contact type:** A dropdown menu showing "Reed contact".
- Highest contact number:** A text input field containing "64".
- Contact free automatically?:** A checkbox that is checked.
- Triggering feedback modules:** A dropdown menu showing "every 150 msec.".

### 6.5.1 Standard contact type

Here you can select between 4 types of contacts.

Text field: 4 different names selected by scroll bar

"Reed contact"  
 "Switch track (Märklin)"  
 "Contact track"  
 "Track occupation sensor"

Default: "Reed contact"

This parameter influences the contact display. The two first items are moment contacts and the two last are using "permanent" display. A single, special type can be defined or changed at contact definition time also.

### 6.5.2 Highest contact number

Every contact needs an own number to get feedback of status information. The hardware numbers are fixed by address defining (coding) or installation order of feedback modules.

Values: 1 up to 1024

Default: 64

The maximum number depends on Digital System and its software status.

"Only" 31 feedback modules (S88) everyone with 16 contacts are allowed for **Märklin/Arnold, Uhlenbrock-Intellibox, Fleischmann-TWINCenter**, so together  $31 * 16 = 496$  maximum contacts. Entry of higher number than 496 is possible to use as virtual contacts (up to 1024).

The maximum contact number for **Lenz** is 1024, but feedback modules and switching decoders must not have any same addresses, therefore feedback modules are defined often as address 65 or higher (=contact numbers from 513 up).

Contact queries are possible only by feedback modules (FB-modules) with up to 16 contacts. **Queries and settings are executed via contact controlling or by schedule commands during schedule controlling.**

If "max. contact number" is higher then real FB-modules are installed, virtual contacts are assumed. No feedback will be received, but these contacts can be used by contact controlling (coupled contact).

### 6.5.3 Contact free automatically ?

Using the default value a contact is displayed as "free" after the query of schedule commands.

Checkbox:: checked or not checked

Standard: checked (YES)

Using Reed contacts a occupation is only reported once to the PC usually, but some users want to see the condition "occupied" after a contact query by schedule commands too, so you can surround the display/occupation with this parameter on one purely manual reset-

ting. So e.g. the status "free" will be reset by the schedule command "B" (occupy contact .. as free).

#### 6.5.4 Triggering feedback module

With this parameter the time can be defined between two queries for feedback modules/components.

Text values: "0 =automatically" or "every 100 msec." up to "every 1000 msecs"  
changeable in steps of 50 via scroll bar.

Default: "every 150 msecs."

The value is indicated in milliseconds, i.e. if using the default value 150 so every 0.15 seconds the state of the feedback modules will be updated.

The special value 0 (= no automatic query) is valid for the Lenz software at the version 2.0 or higher, because all contact positions, there are sent automatically unlike Märklin or Arnold to the PC.

The default can be reduced if necessary to 100 at very fast PCs (Pentium III or higher with highest clock frequencies). The default must be maximized at very slow PCs (older 486) under circumstances, since otherwise the PC only is occupied with return information evaluations.

**The parameter "0 = automatically" must be used for Lenz Systems with Lenz software versions 2.x or 3.x.**

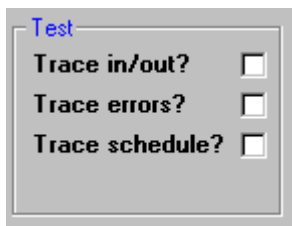
#### Remarks:

Contact status is sent to Lenz Interface automatically only with Lenz software from version 2.x up. For Lenz software version 1.5 or Märklin/Arnold systems feedback modules must be queried by the PC continuously. Using great numbers of feedback modules and often queries there is a big overhead by time control.

## 6.6 Initialization: Test

Here you see 3 parameters which can be defined/changed.

- Trace in/out ?
- Trace errors ?
- Trace schedules ? (for schedule controlling only)



You sign in checkbox, if one or more functions shall be executed.

#### Trace in/out ?

Checkbox: checked or not checked

Default: not checked (NO)

It is possible to create a trace of all data as option with this parameter. All data sent to or received from Interface, are stored in a file (fixed file name is STWTRACE.DAT in the current folder). An already available STWTRACE.DAT file is typed over without warning. . This parameter is created for solving program errors and should be used for these cases only or after consulting the author. The created file can be displayed with a Windows® 98/ME/XP/2000 editor (e.g. notebook/NOTEPAD), read by a text program or printed if necessary on a standard printer.

**Trace errors ?**

Checkbox: checked or not checked  
 Default: not checked (NO)

It is possible to create a trace of all error data as option with this parameter (in connection with Interface). The data are stored in a file (fixed file name is STWERROR.DAT in the current folder). An already available STWERROR.DAT file is typed over without warning. This parameter is created for solving program errors and should use for these cases only or after consulting the author. The created file can displayed with a Windows® editor (e.g. notebook/NOTEPAD), read by a text program or printed if necessary on a standard printer.

**Trace schedules ?** (for schedule controlling only)

Checkbox: checked or nor checked  
 Default: No  
 Display fields: A or digit 1 up to 9  
 Default: A

It is possible to create a trace of all running schedule commands as option with this parameter. Data are stored in a file (fixed file name is STWTRACE.DAT in the current folder). An already available trace file is typed over without warning. If the checkbox is checked a display field with scrolls bar appears. The values **A** or **1** up to **9** (depending on max. schedule number) can be changed. Is it a number, only the corr. schedule number will be monitored, at **A** = **All** every schedule is monitored.

A trace can lead to "slowed down" processing at time-critical schedules and lead to very large files at loops, CAUTION therefore! With a special schedule command a trace still can switched off and on again. The created file can displayed with a Windows® editor (e.g. notebook/NOTEPAD), read by a text program or printed if necessary on a standard printer.

## 6.7 Color Parameter

An own window is opened using this menu item "**Color Parameter**" in which the actual values of all main colors used by STELLWERK 2001 are displayed and can be changed. As a rule, no changes of the standard entries are here necessary since the "standard colors" intended for Windows® are used.

**Window: Color Parameter**

**Color Definitions STELLWERK 2001**

**General colors**

Background	gray
Messages	blue
Digits contact numbers	black
Digits magnetic article no's	blue
Error text	red

**Tracks general**

Tracks / Crossings	black
--------------------	-------

**Contact tracks**

Free status	yellow
Occupied status	red
Blocked status	dark red

**Switches, 3-Way-, Double-slip-**

Straight	green
1. Diverging	red
2. Diverging (spec. pos)	yellow
False position	black

**General magnetic articles**

On / Green	cyan
Off / Red	violet

**Signals general**

Proceed / Hp1	green
Stop / Hp0	red
Slow down / Hp2	yellow

**Track inhibit signals (append)**

Free for shunting / Sh1	white
-------------------------	-------

**Distant signals (append)**

Stop expecting / Vr0	yellow
----------------------	--------

**Switch routes**

Free (Start-/Dest.-Point)	yellow
Free (Track part)	white
Reserved (Point/Track)	red

OK Standard Cancel

For 9 different types:

- General colors
- Tracks general
- Contact tracks
- Switches, 3-Way-, Double-slip-
- General magnetic articles
- Signals general
- Track inhibit signals (append)
- Distant signals (append) and
- Switch routes

For every part a display field with scrollbar  is shown by which the wanted color can be selected. The color name is displayed right of the scroll bar.

The following colors are possible:

- black, dark blue, dark green, dark cyan, dark red, dark violet, dark yellow, dark gray,
- gray, blue, green, aquamarin (cyan), red, violet, yellow and white.

The default colors are defined by . The colors are stored by "OK" or processing is continued without changes by "Cancel".

In details the following colors can be set:

#### **General colors**

Background of track layout (default: gray)  
 Messages during processing (default: blue)  
 Digits of contact numbers (default: black)  
 Digits of magnetic article no's. (default: blue)  
 Error text during processing (default: red)

#### **Tracks general**

Tracks / Crossings etc. (default: black)

#### **Contact tracks**

Free status (default: yellow)  
 Occupied status (default: red)  
 Blocked status (default: dark red)  
 The blocked status color is a type of display for the period time as defined and the contact is blocked.

#### **Switches, 3Way, Double-slip**

Straight (default: green)  
 1. Diverging (default: red)  
 2. Diverging (default: orange)  
 False position (default: black)  
 The "false position" is the not switched part of a turnout.

#### **General magnetic articles**

On / Green (default: cyan)  
 Off / Red (default: violet)

#### **Signals general**

Proceed / Hp1 (default: green)  
 Stop / Hp0 (default: red)  
 Slow down / Hp2 (default: yellow)

#### **Track inhibit signals (append)**

Free for shunting / Sh1 (default: white)



**Distant signals (append)**

Stop expecting / Vr0 (default: yellow)

**Switch routes**

Free (Start-/Dest.-Point) status display inner part (default: yellow)

Free (Track part) status display inner part (default: white)

Reserved (Point/Track) status display inner part (default: red).

## 6.8 Notes for editing files

A Schedule Editor Program "STWEdit" is delivered together with STELLWERK 2001 for creating/changing schedules (sfp files). Furthermore you can use an **EDITOR** e.g. **NOTEPAD** or word processing programs in text mode. If you want to store a file as normal "text file" these programs normally will add to your typed extension **SFP** an own one at the end of the file name (I think, it's bad!); so instead of your wanted name e.g. **STW\_EXAMPLE.sfp** it's stored as **STW\_EXAMPLE.sfp.txt** or **STW\_EXAMPLE.sfp.doc**. Later STW2001 will not find this schedule file. Please, change in "file selection" **\*.sfp to \*.txt or \*.doc** at loading time or change the name using Windows "Explorer". The extension is allway **\*.sfp** if you are using STWEdit and above problems are not existing.



## 7 Track layout

### 7.1 General

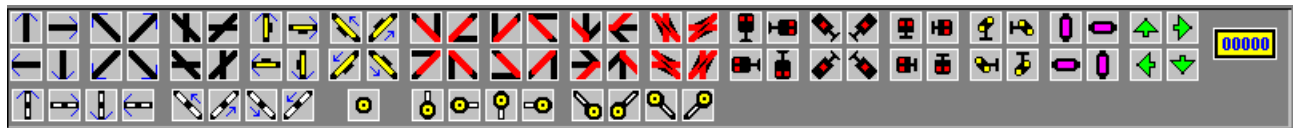
A track layout is always built up in the graphic mode with the resolution defined by Windows®98/ME/XP/2000. Track- and switches-components are drawn and managed in one part of the display (track layout). This part is virtual and thus variable; the size is defined by two initialization parameters (width and height). By horizontal and vertical scroll bars all parts can be made visible. An "update" of e.g. one turnout display also is executed if the switch isn't visible at the moment.

Rows and columns only have a meaning for internal track layout definition and general orientation, the smallest gap space between two rows is 4 pixels respectively. Several bars are displayed beyond the menu in the upper part of the screen, in which general menu icons and icons to define track layout at construction mode or locomotive control at processing mode are available. A processing bar is represented in the lower display area, in which icons for loco control and switching function are integrated. The complete window can be moved and changed in its size (Windows®98/ME/XP/2000 function).

### 7.2 Track layout symbols

Construction of a track layout is done by choosing predefined symbols; most are available in four directions. Furthermore there are diagonal types (45 degrees). The available symbols are displayed in a symbol bar and can be selected and moved by Drag/Drop to the wanted track layout position.

**Graphics:** Symbol bar



Third row can be displayed at end of 1 / 2 row directly for higher screen resolutions. The following symbols –from left to right- are available, in details:



#### **Straight tracks with variable length**

(Blue arrows are used to sign direction only; they are not drawn in track layout)  
internal symbol numbers 0 up to 3  
internal names GL0, GL3, GL6, GL9



#### **Diagonal tracks with variable length**

(Blue arrows are used to sign direction only; they are not drawn in the track layout)  
internal symbol numbers 8 up to 11,  
internal names DLO, DRO, DRU, DLU



#### **Crossings**

internal symbol numbers 16 up to 19,  
internal names KR0, KR3, KR6, KR9



#### **Straight contact tracks with fixed and variable length**

(Blue arrows are used to sign direction only; they are not drawn in track layout, contact- or loco-number is displayed opposite of the „bulge“.)  
internal symbol numbers 20 up to 23,  
internal names KG0, KG3, KG6, KG9 or KL0, KL3, KL6, KL9



#### **Diagonal contact tracks with variable length**

(the blue arrows are used to sign direction only; they are not drawn in the track layout)  
internal symbol numbers 28 up to 31,  
internal names KLO, KRO, KRU, KLU

**Left switches (turnouts)**

internal symbol numbers 40 up to 43  
internal names WL0, WL3, WL6, WL9

**Right switches (turnouts)**

internal symbol numbers 44 up to 47,  
internal names WR0, WR3, WR6, WR9

**Three way switches**

interne symbol numbers 48 up to 51,  
internal names WD0, WD3, WD6, WD9

**Double slip switches**

internal symbol numbers 52 up to 55,  
internal names KW0, KW3, KW6, KW9

**Straight signals (home, two arm, light) several types**

internal symbol numbers 56 up to 71,  
internal names SH0...SH9, S30...S39, S40...S49, SL0...SL9

**Diagonal signals (home, two arm, light) several types**

internal symbol numbers 72 up to 87,  
internal names SLO, SRO, SRU, SLU, 3LO, 3RO, 3RU, 3LU, 4LO, 4RO, 4RU, 4LU, LLO, LRO, LRU, LLU

**Track inhibit signals**

internal symbol numbers 100 up to 103,  
internal names SG0, SG3, SG6, SG9

**Distant signals (one, two arm, light) several types**

internal symbol numbers 104 up to 119,  
internal names VS0...VS9, V30...V39, V40...V49, VL0...VL9)

**General magnetic articles, single magnetics**

internal symbol numbers 32 up to 35,  
internal names MG0, MG3, MG6, MG9 or ME0, ME3, ME6, ME9

**Special magnetic articles direction arrows**

internal symbol numbers 120 bis 123,  
internal names MR0, MR3, MR6 or MR9

**All-purpose Counter**

internal symbol number 153,  
internal name ZAE

**Straight route elements variable length**

internal symbol numbers 142 up to 145,  
internal names TH0, TH3, TH6, TH9

**Diagonal route elements variable length**

internal symbol numbers 146 up to 149,  
internal names TLO, TRO, TRU, TLU

**Switch route symbol without track**

internal symbol number 141  
internal name RT

**Switch route symbol with straight track variable length**

internal symbol numbers 132 up to 135,  
internal names RT0, RT3, RT6, RT9

**Switch route symbol with diagonal track variable length**

internal symbol numbers 136 up to 139,  
internal names RLO, RRO, RRU, RLU

Furthermore there are three icons in the construction bar for creating track symbols:

**Special signs and text definitions**

internal symbol number 152  
internal names Z00=Line,  
Z01=Points,  
Z02, Z03=Arrow without or with line,  
Z04, Z05=Double arrow without or with line,

Z06, Z07=Square, rectangle unfilled,  
 Z08=Square filled,  
 Z09, Z10=Circle unfilled / filled,  
 Z11=Free definable text

see chapter 8.6.



#### Digital turntable definition


internal symbol number 151  
 internal name DDS  
 see chapter 8.4



#### Sound definitions

internal symbol number 150  
 internal name P  
 see chapter 8.5

## 7.3 New construction / changing track layout

For first construction or later changing of a graphic track layout there is the  icon in the menu bar and the sub-menu item "Define/Modify track layout" which can be chosen by main menu item "File", also by <F2> key.

A construction bar is displayed beyond the menu bar with icons for easy help creating track layout and some special graphic symbols. They are described in chapter 7.3.9.








#### Graphics: Construction bar









A symbol bar is displayed beyond the construction bar with all available symbols. The several symbols are listed in chapter 7.2.

The track layout is created or changed in the middle part of the display; it's framed by scroll bars.

The fundamental mode of operation is the following:

1. One of the track symbols is chosen from the symbol bar by pushing/hold the left mouse button and moving "Drag/Drop" to put down at the right position of the track layout (let off mouse button). The special symbols (sound, switch route without track, turntable) as well as the special signs/text are explained later.
2. The track symbol still can afterwards be moved by the horizontal   and/or vertical "arrow icon"  . There are 4 icons (to left, to right, up and down).
3. Revolving a track symbol with mouse button by the "turn icon"  is possible, in which 90 degrees are executed with every mouse click.
4. If a wrong symbol is selected, this can be deleted again by the "erase icon" .
5. Tracks, contact tracks, switch route symbols with track and route elements can be changed in their length by clicking in the track layout. The right mouse button extends and the left mouse button shortens (up to the minimal length) in defined direction. An additional revolving turns the full track length
6. If position, direction and length are right, then this must be confirmed by selecting the "OK" icon.  in the construction bar. For contact tracks, magnet articles, and sounds now further details are asked by a special window.
7. There are various window types:
  - 1.) for magnet articles (such as turnouts, signals, direction arrows, All-purpose counters) definitions (see chapter 8);
  - 2.) for all types of contact definitions (see chapter 10);

- 3.) for sound definitions (see chapter 8.5);
- and furthermore there are windows:
- 4.) for digital turntable (see chapter 8.4);
  - 5.) for special signs a definition window (see chapter 8.6), which displayed at first, though;
  - 6.) for switch route definitions a special definition window (see chapter 9), but it is invoked by click with right mouse button at the start symbol of a switch route.
8. A whole source area can be defined by "Mark"- icon and erased, moved or copied to a target area.
  9. If you want, a grid can be created by the "Grid"- icon for a better placing during the construction time. This is cut out again by a new click on the icon or by the menu item "new drawing". The grid isn't stored.
  10. The points 1 to 6 are repeated so long till you have finished with the track layout structure and then you can e.g. change for saving the track layout by  /  icons or start processing mode by the  icon.
  11. An own window in which definitions of special signs/text can be defined is immediately shown at selection the  special sign icon (see chapter 8.6). After window closing the special sign (special text) is represented on the track layout and can be still moved (or also deleted).

Symbols/icons of the **Construction bar** are described at chapter 7.3.4 in detail (from left to right).


### 7.3.1 Changing track length

Straight, diagonal tracks, contact tracks, switch route symbols with track and route elements are always placed in front of in their basic length. By clicks in the area of the track layout window the definite length can be defined. It is used:


- \*\*\* **Extending by right mouse button**
- \*\*\* **Shortening by left mouse button.**

The respective direction of extending is defined by previous definition or by revolving of the symbol.

### 7.3.2 New drawing

All till now created symbols will be new drawn by the symbol . This is useful if parts of track layout are destroyed / not visible by e.g. shifting or revolving symbols.

### 7.3.3 Help grid


A help grid can be represented by the  icon for placing in the area of the track layout exactly during construction time. The grid can be removed by a new click on the icon or by the sub-menu item "Options / New drawing" again. The grid is not stored and not displayed in the processing mode either.

### 7.3.4 Positioning symbols

The following icons serve for placing track layout symbols, meaning from left to right:




- Shifting horizontally to left
- Shifting horizontally to right
- Shifting vertically up
- Shifting vertically down

A symbol already placed can be moved to left/right by horizontal shift icons and moved up/down by vertical shift icons. With every keystroke the symbol wanders to the corr. direction. If an already created symbol is painted over by moving a new one in its position, then the complete track layout graphic can be drawn again by  icon or by sub-menu item "Options / New drawing".

The symbol is always moved in its whole length.


### 7.3.5 Revolving symbol

The placed symbol is revolved 90 degrees by every click in its present position with the "Revolve" icon .


**\*\*\* Left mouse button shifts clockwise \*\*\***

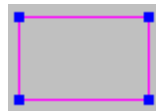
An alternate shifting and revolving is possible.


### 7.3.6 Erase symbol


A symbol yet not ready defined by the "OK" icon can be erased from track layout by "Erase" icon  or you delete an already defined one, which was selected with help of "Search" icon (see chapter 7.3.8).

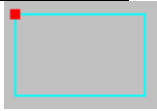
### 7.3.7 Marking symbol


A source area can be defined by "mark"  icon via Drag/Drop and data of this area can be moved or copied to a new target area. You can also erase data within the source area.



Source area is displayed by a violet rectangle with four blue corners. Size and also the position can be altered by these corners. Data of the source area can be erased by clicking the "erase"  icon.

A target area is marked by another click at "mark"  icon as an aquamarine colored rectangle



with one red corner. It can be moved to another position by this red corner. If the new position is ok, you can execute the real move or copy of data by another click at "mark"  icon and choosing the activity in a small displayed window: Copy, Move, Cancel or None Activity. It's not reversible.




Using erasing data of source area or copy to target area you have to know, not every defined symbol can be changed always, e.g. data chained to other definitions (e.g. magnetics within switch routes) can't be erased. Magnetic articles and contacts can't be copied, because numbers would be defined twice to different symbols.

Furthermore you must know, always the start point of Stellwerk 2001 symbols is decisive.

Therefore following points must be taken into account for e.g. tracks/contacts/text and other:

1. Symbols are erased/copied/moved in full length, although defined area is smaller than defined symbol.
2. If the start point of a symbol is not within defined area, it's not erased/copied/moved, although parts are within the defined area.

### 7.3.8 Search symbol

With "Search"  icon the start position of a symbol already defined can be searched by "drag/drop". If a symbol is found a text and ToolTip are displayed, and "Erase"  icon can be used or you can move the symbol to another position by letting off and new moving. During moving process a changed icon  appears.

### 7.3.9 Other special icons

There are different helps for three special definitions:



These are from left to right:

- **Sound icon**  
Positioning and definition of a symbol for later triggering of a WAV file. This symbol has a special status, since it's usable on one hand like a track layout symbol but on the other hand it's available only for one direction. See chapter 8.5.
- **Digital (Märklin) turntable icon**  
A figure of a digital Märklin turntable .with all necessary magnet articles can be defined. Details see chapter 8.4.
- **Special sign icon**  
Several special signs and also text can be created by this icon, selected and predefined in an own window. There are lines, points, arrows, squares, rectangles, circles and free text changeable in size, direction and color. The special signs are explained in details at chapter 8.6.

### 7.3.10 OK icon



This turns up only after placing a symbol in the track layout and serves for informing, that position and representation of the track layout symbol can be accepted; it must be selected for any placed symbol. Further definitions are requested in own window if necessary.

For tracks, crossings, switch route symbols and route elements this indicates the end of the symbol definition.

For contact tracks, magnetic articles, all-purpose counter, turntable and sounds still additional definitions must be made in a respectively special window. Special signs get their right position, size and color by this icon.

## 7.4 Tips

You should begin definitions with the outer tracks and diagonals at the top left. A sorting (to internal symbol number, row, column) is done when saving the track layout, so it is possible to put e.g. a long track into a turnout (or reverse) without this turnout is drawn false later. The locations of numbers for magnetic articles or contact tracks are not variable by users. It was chosen that no other symbols if possible are destroyed. No representations of numbers get required for processing either and can be removed with the corr. initialization parameter.

If your complete track layout shall always be visible without scrolling, then you should take into account the following:

Approx. 6 rows less of the grid can be seen in the lower part of the track layout, if you change from "Construction mode" to "Processing mode"; and therefore the layout must be scrolled if it's larger.

Changing should be done in graphic mode only. Switch routes and route elements of switch routes can be erased only if the whole switch route is erased within switch route definition window.



## 8 Magnetic articles, Sound, Special signs, Text

### 8.1 Definition of Magnetic articles

If a magnetic article (e.g. turnout, signal) is at the right position (confirmed by "OK" icon), all necessary definitions follow in an own window. If you want to change parts of a magnetic article, so click with right mouse button on the symbol to open the definition window; but then magnetic article number is not changeable (gray underlaid).

**Window:** Magnetic article definition (example signal)

By "**Cancel**" magnetic article definition is terminated with deleting of the symbol and window will be closed.

By "**OK**" definition is stored in the working storage (RAM) and the window is closed.

#### 8.1.1 Number and Switching time

The desired **number** will be entered for later switching. The number appears if necessary, later at magnet article symbols.

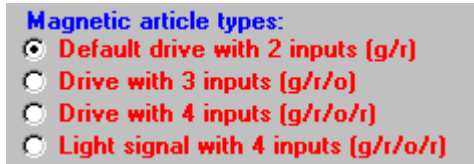
You can provide for this magnet article a specific **switching time** here, settings in milliseconds between 55 and 5500. The initial setting is 110 milliseconds and will be fit for most magnetic articles.

*Remark: Steps are only meaningful in approx. 55 milliseconds intervals since the system timer works with the precision of 1/18 sec (= 55,555 milliseconds) as standard.*

#### 8.1.2 Type and Init status

Two further inputs **Type** and **Init status** are absolute necessary:

Using **Home signals** you can choose between four types as options:



At signals four types are available:

"**Default drive with 2 inputs**". One address with real switching to **GREEN** and **RED**; **ORANGE** is only used internal for PC and display.

"**Drive with 3 inputs**". One and a half address with real switching to **GREEN**, **RED** and **ORANGE** are used.

"**Drive with 4 inputs**". Two addresses with real switching to **GREEN**, **RED** and **ORANGE**.

"**Light signal with 4 inputs**". Two addresses with real switching to **GREEN**, **RED** and **ORANGE**.

For **Distant signals** also the option "**Coupled with home signal**" is displayed (the distant signal is used only as display at the track layout).

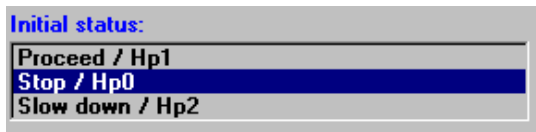
At "**General magnetic articles**" you can select between:

"**Default drive with 2 inputs**" green and red are used for one magnetic article symbol.

"**Single magnetics with 1 input**". **RED** and **GREEN** are used for two different single magnetics (e.g. uncoupler).

Exact switching differences of magnetic articles see chapter 8.7 "Tips"

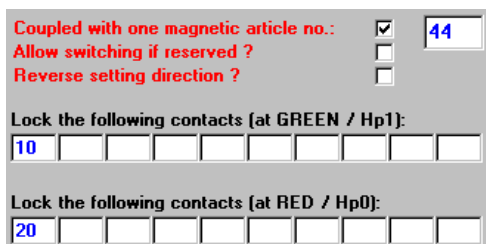
The **Initial status** of the **magnetic article** can be chosen by a list as plain text.



Later, **switches, signals etc.** can always be "adjusted" on this setting at processing time. For "Single magnetics" it's the later trigger condition.

### 8.1.3 Optional settings

All other statements are optional:



#### **Coupled with one magnetic article no.**

If you want to couple, a field is opened for input the 2<sup>nd</sup> number (here 44). If you define "Changed switching" for 2<sup>nd</sup> number, so 2<sup>nd</sup> number is switched with changed status of the 1<sup>st</sup> number; so switching first number to "GREEN" then second number is switched to "RED" (opposite also). It's not possible for "ORANGE".

#### **Allow switching if reserved ?**

"Switching if reserved" means, this magnetic article can be switched manually or automatically although it's reserved by a switch route triggering.

#### **Reverse setting direction ?**

For this one decoder address you can change green/red output of the decoder.

### Lock contacts

Up to 10 different contacts can be locked at green and/or red position; it means these contacts don't trigger activities at occupation. If a contact is locked by different magnetic articles, this one is free only after unlocking the last magnetic article.

### Contact numbers for triggering

An automatic triggering of contacts is possible when a magnetic article is changing its status, in fact:

- |                                 |  |
|---------------------------------|--|
| 1. <b>any</b> position          | 2. <b>green</b> or Proceed/Straight            |
| 3. <b>red</b> or Stop/Diverging | 4. <b>orange</b> or Slow down/Special position |

Triggering contact no(s) by changing magnetic article status to:





any:	<input type="text"/>	green:	<input type="text" value="111"/>	red:	<input type="text" value="112"/>	orange:	<input type="text" value="113"/>
------	----------------------	--------	----------------------------------	------	----------------------------------	---------	----------------------------------

To come to no conflict with real control triggering only virtual contacts should be used generally for these contacts.

**Attention:** Also take care for endless switchings by chaining.

Furthermore **Remarks** can be defined optionally. If none is available at first definition a default text is created.

## 8.2 Definition of direction arrows (special magnetics)

If one of direction arrow , , ,  is at right position (confirmed by "OK" icon), all necessary definitions follow in an own window. If you want to change parts of a direction arrow, so click with the right mouse button on symbol to open definition window; but then the direction arrow number is not changeable (gray underlaid).

Direction arrows have an additional feature apart of normal, real or virtual magnetic articles. They can be switched automatically in dependency on direction changing one driving locomotive number as following:

**Locomotive changes direction to forward = Direction arrow switches to GREEN**

**Locomotive changes direction to backward = Direction arrow switches to RED**

Color of direction arrow and also its sight is changing for 180 degrees if switched.

**Window: Direction arrow definition**

**Magnetic article definitions for Direction arrow**

➔ **Number:**  1 up to max. 256 **Switch time:**  msec. 55 up to max. 5500

**Peculiarity of direction arrow:**  
 Switching at direction changing of a definite loco no.:   
 (to GREEN if it's forward or to RED if it's backwards)

**Init status:**

**Coupled with one magnetic article no.:** ☐  
**Allow switching if reserved ?** ☐  
**Reverse setting direction ?** ☐

**Lock the following contacts (at GREEN / ON):**  
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**Lock the following contacts (at RED / OFF):**  
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**Triggering contact no(s) by changing magnetic article status to:**  
 any:  green:  red:


**Remarks:**

Same properties as magnetic articles are valid and described at chapter 8.1 for definition of number, switch time, init status, options (coupling..., allow switching..., reverse setting...), contacts... and remarks as well as Cancel and OK.

A locomotive number can be defined at **Peculiarity for direction arrows** for switching arrow if loco direction is changing as described above. This is done for locomotive number 3 in above example. Several direction arrows can be defined with same and/or different locomotive numbers, but you have to know:

1. There is no feedback of external locomotive controller activities for Märklin/Arnold/Uhlenbrock/Fleischmann, a used number is locked for PC; therefore automatic status changing of direction arrows is possible only for locomotives controlled by PC with STELLWERK 2001.
2. System Lenz has an automatic feedback to PC if a remote control takes over a locomotive from PC, but that's all. Only if locomotive is going back to PC new values of speed, light, direction are transferred. STELLWERK 2001 is trying to ask for external locomotives, which are named within direction arrow definition to get always their data. Displaying and switching is not possible directly, because a query is not done every some milliseconds.

### 8.3 Definition of a All-Purpose Counter

If symbol  for All-purpose Counter was selected and placed in the track layout, the further definitions are selected menu-driven in a little bit different magnetic article window. All-purpose Counter is a magnetic article in principle. Real and virtual magnetic article numbers are possible for all-

purpose counters. Same conditions as for magnetic articles are also valid for later switching/triggering of all-purpose counters.

### Window: All-purpose Counter

**Magnetic article definitions for All-purpose Counter**

**1** **Number:** 200 **Switch time:** 110 msec.  
 1 up to max. 256 55 up to max. 5500

**Starting value:** 1  
**Maximum value:** 99999  
**Minimum value:** 1

☐ **Coupled with one magnetic article no.:**  
☐ **Allow switching if reserved ?**  
☐ **Reverse setting direction ?**

**Init status:**  
 Count forward  
 Count backward

**Lock the following contacts at GREEN:**  
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**Lock the following contacts at RED:**  
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**Alternative triggering of contact no(s) by counter value:**  
 between minimum and maximum: 40  
 greater or equal maximum value: 51  
 lower or equal minimum value: 62

**Cancel**

**Remarks:**  
 No. 200: All-purpose Counter

**OK**

As difference to normal magnetic article definition window following entries are displayed:

#### Starting value:

This value is set at initial time, values between -99999 and 99999 are possible, preset is 0.

#### Maximum value:

If this value is reached, so a defined contact number at "greater or equal maximum value" will be triggered. Values between -99999 and 99999 are possible, preset is 99999.

#### Minimum value:

If this value is reached, so a defined contact number at "lower or equal minimum value" will be triggered. Values between -99999 and 99999 are possible, preset is 0.

Starting value (here 1) is displayed within rectangle symbol during construction mode.

Same properties as magnetic articles are valid and described at chapter 8.1 for definition of number, switch time, init status, options (coupling..., allow switching..., reverse setting...), contacts... and remarks as well as Cancel and OK.

You can define several all-purpose counters (with different numbers and same or different functions). Switching/triggering of all-purpose counters is same as magnetic articles, GREEN is always forward counting and RED backward counting.

**left mouse button = RED backward counting**

**right mouse button = GREEN forward counting**

So GREEN-switching adds value 1 to actual value and RED-switching subtracts value 1 from actual value. Rectangle gets a border of switching color (green/red). Actual counter value is displayed within rectangle with blue digits (on yellow), but if all-purpose counter is reserved actual counter value is displayed within rectangle with red digits (on yellow).

**Initial status:**

You can select "Count forward" or "Count backward", "Count forward" is (initial)switching to GREEN and "Count backward" (initial)switching to RED.

**Note:** As difference to other magnetic articles this all-purpose counter is not set to initial status by releasing a switch route, in which all-purpose counter is included; the actual value will remain, so only symbol will be released.

**Alternative triggering of contact no(s) by counter value:**

Only one of following contacts will be triggered, if it's defined.

**between minimum and maximum**

If e.g. minimum is defined with 0 and maximum with 10, so triggering is done each time for 1 up to 9.


**greater or equal maximum value**

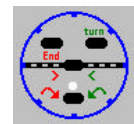
If e.g. minimum is defined with 0 and maximum with 10, so triggering is done for value 10 or higher. At same time actual value is set to starting value.

**lower or equal minimum value**

If e.g. minimum is defined with 0 and maximum with 10, so triggering is done for value -1 or lower. At same time actual value is set to starting value.

## 8.4 Definition of a digital turntable

If turntable symbol  was selected by "Drag/Drop", then a figure is shown of the turntable with the pre-definition in the track complex. This still can be moved in a new position. After clicking the "OK" icon a definition window is shown.

**Window: Details of a digital turntable**

The keyboard number (as 15 or 14) is firmly scheduled at the Märklin turntable. Four magnet article definitions can be executed automatically by click of "OK" icon, e.g at keyboard no. 15 (for alternate no. 14 in brackets).

No. 225 (209) = button "end"	End of turning, magnetic type = Single magnetics
No. 226 (210) = button "turn"	180° degrees turning, magnetic type = Single magnetics
No. 227 (211) = button "step"	Turning gradually, magnetic type = General magnetics middle symbol (at > <)
No. 228 (212) = button "•"	Defining the direction of turning, magnetic type = General magnetics, lower symbol (at white circle)
No's. 227 + 228 are working:	"RED" to the right ⇒ (in clock hand meaning) and "GREEN" to the left ⇐ (against clock hand meaning).


If the definitions will not match (e.g. for other digital turntables), you may delete and replace the magnet article definitions with other. An own turntable could be drawn with the help of the **"Special signs"** too.

**Remarks:**

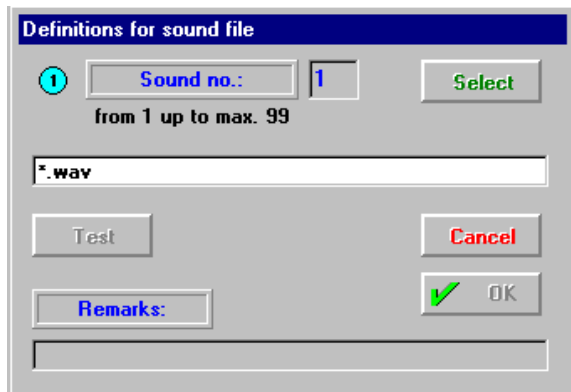
The numbers put into brackets hold for choice of the alternative keyboard number 14. The figure of the turntable is coordinated with a gray background.

It isn't possible to draw up to 24 switching possibilities and their connection tracks exactly, so it's left to the user for his situation. Tracks can get straight and diagonal or with "curve" added. If you want, that the turntable runs up to the numbered tracks by magnet articles also, then they should be defined as type "Single magnetics" at the special tracks.

## 8.5 Definition of sounds

By  icon position and number is defined for the later triggering of a WAV file. Drag/Drop to the desired position, same as using track layout symbols. A (cyan filled) circle is created. The following definition window is invoked by "OK" icon. This window can be invoked for changing (without no.) also by the clicking on symbol with right mouse button if the symbol is already defined.

**Window:** Sound definition



After input of a sound number, you can select WAV file name. By "Select" and using the Windows standard window with \*.wav as key you can search for WAV files or you can define full name of the sound file.

As a standard WAV files should be stored in the folder:


C:\Program Files\STW2001\WAV  
or  
C:\WINDOWS.

If the wanted file and a sound board are available, you can trigger file as a test by "Test" button. Max. 99 definitions are possible to define by number. Many WAV files can be triggered by schedule instructions with direct naming WAV-files.




It is possible at every time to undo the definition by the button "Cancel"; symbol is deleted and window is closed.

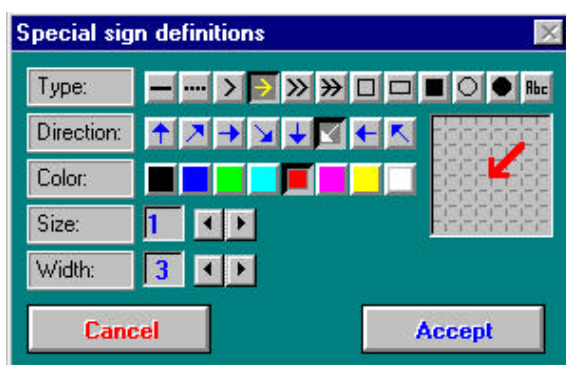
By "OK" the definition is stored in the working storage (RAM) and window is closed.

The real triggering of these symbols (e.g. ) is executed later during processing mode (see chapter 15.6) manually, by contact control or alternatively by a schedule command (P).

## 8.6 Definition of special signs

If special sign symbol  was selected by "Drag/Drop", then a window opens for the special sign definition.

**Window:** Definition of special signs and text




You have the possibility to define 11 different symbols and user-definable text in different direction, color, size and (line) width. The alternatives are then described.





The following 12 symbol types are offered to select:


 = Line (Z00)


 = Points (Z01)

 = Arrow without line (Z02)


 = Arrow with line (Z03)


 = Double arrow without line (Z04)


 = Double arrow with line (Z05)

 = Square empty (Z06)

 = Rectangle empty (Z07)

 = Square filled (Z08)

 = Circle empty (Z09)

 = Circle filled (Z10)

 = Text (Z11)

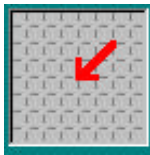
At this 8 directions are available, the desired one can be selected by the arrows.

Arrows  display the direction in 45° degrees of steps.

The following 8 (bright) colors exist:

black, blue, green, cyan, red, violet, yellow and gray.

On one hand you can select the size between 1 and 16, and on the other hand the (line) width between 1 and 5 by scroll bars. Text is provided only horizontally, square and rectangle don't have to be created in diagonal direction.



In a pre-window the select sign (or last character) is represented in direction, color, size and width.

The "underlaid" squares correspond to the grid size at the track layout.

The special sign/text will take to the position selected by "Accept". It still can be moved or deleted, before "OK" icon terminates definition. No character is created at "Cancel".

## 8.7 Tips

### Notes for general magnet articles:

The same symbol of "general magnetic articles" and "single magnetics" was developed for e.g. gates or uncoupler. "General magnetic articles" make possible a switching of **RED** and **GREEN**.

With singles magnetics it is possible to connect two single magnetics to one address (1<sup>st</sup> magnetics to **GREEN** (-) , 2<sup>nd</sup> magnetics to **RED** (+) decoder output); the only one possibility **GREEN** or **RED** is switched (identical whether with left or right mouse button).

Single magnetics may use the unused second part of the decoder output address, even if the first part is occupied by e.g. a signal with 3 inputs (SD., VD.. etc.) by "orange" (however not turned around!). Longer switching is possible with both sub-types, on the one hand with automatic driving operations over loops and on the other hand with manual operations. A multiple switching (one after another of the same decoder output) is possible by this symbol only.

### Notes for signals:

For signals with option "Default drive with 2 inputs" following switchings are executed:

**Green:** Number (only one address) is switched to **GREEN**.

**Red:** Number (only one address) is switched to **RED**.

**Orange:** Number (only one address) is switched to **GREEN**, display is **"ORANGE"**.

For signals with option "Drive with 3 inputs" following switchings are executed:



- Green:** 1. address is switched to **RED** and afterwards the 1. address to **GREEN**.  
**Red:** 1. address is switched to **RED**. If the 2. Number is not defined as a ME-type, so this one will be switched to **RED** also.  
**Orange:** 2. address is switched to **RED** and afterwards the 2. address to **GREEN**.

For signals with option "Drive with 4 inputs" following switchings are executed:

- Green:** 1. address is switched to **GREEN**.  
**Red:** 1. and 2. addresses are switched to **RED**.  
**Orange:** 2. address is switched to **GREEN** (no setting of 1. number to **RED**!).

Signals with option "Light signal with 4 inputs" are designed for (Lenz) decoder with permanent light definition. Because the switching sequence must be changed for these signals, following switchings are executed:

- Green:** 2. address is switched to **RED** and afterwards the 1. address to **GREEN**.  
**Red:** 2. address is switched to **RED** and afterwards the 1. address to **RED**.  
**Orange:** 1. address is switched to **GREEN** and then the 2. address to **GREEN**.

#### **Notes for three-way switches:**

Two numbers are occupied by three-way switches also. Only the first is defined, however. By definition as "inverse" type you can change branch-lines "left" and "right" of three-way switches.






#### **Notes for turntable:**

The digital (Märklin) turntable uses 4 magnetic articles numbers; in chapter 8.4 you find a detailed description, but single numbers are changeable.



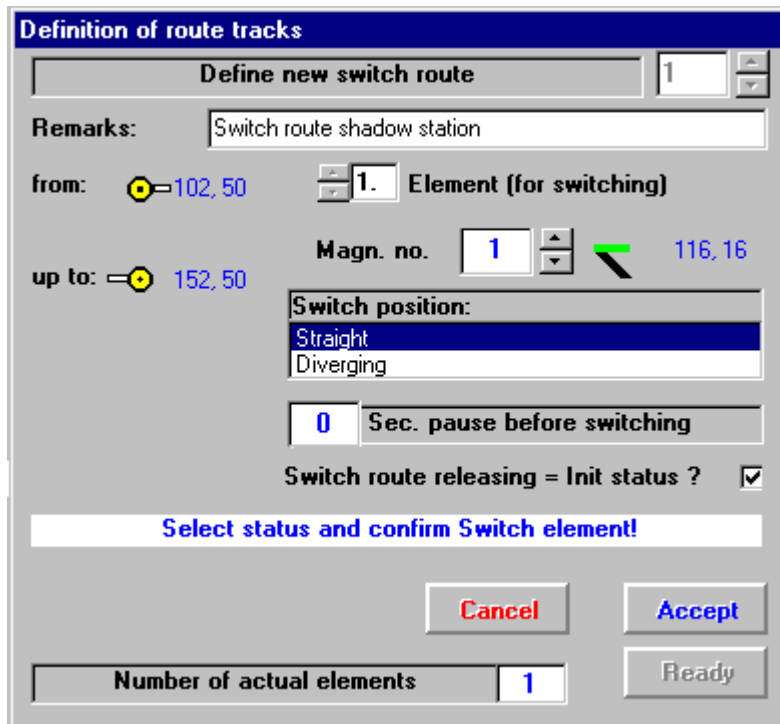
## 9 Switch routes

### 9.1 Switch route definition: General

If two switch route symbols e.g.  and  are positioned in the track layout and also switching elements of the line e.g. turnouts , signals  and/or special route elements , so **by clicking with right mouse button on a switch route symbol (starting point)** the switch route definition begins.

Up to 512 switch routes, every one with up to 99 (switching) elements can be defined in one track layout.

**Window:** Switch route definition



Defining follows with several steps in an own window:

1. **Select switch route number,**
2. **Naming of the switch route,**
3. **Accept starting point,**
4. **Select destination point and accept,**
5. **Select several switch elements and accept,**
6. **Ready or Cancel.**

By "**Accept**" the special input (starting point, end point, switch position etc.. will be accepted. The number of selected switching elements is displayed at the last line.

Is a switch route defined completely, so definition can be closed by "**Ready**". All done definitions are saved in the working storage area (RAM).

It's possible to erase all done definitions of this switch route at any time by "**Cancel**".

### 9.2 Track layout definition: Starting point

To start definition of a switch route click at a switch route symbol (starting point) with the mouse button.

At switch route number either the first available switch route from the chosen starting point



or the next free number will be displayed automatically.



If a switch route already exists from chosen starting point, then you'll see on left to the "Cancel" icon

e.g.  to delete the chosen switch route.

Several different switch route definitions can be defined from a starting point e.g. at branch-lines etc. Numbers between 1 and 512 are possible.

### 9.3 Switch route definition: Naming


A switch **route name** should be entered for better overview, e.g.

**Remarks:**

at the field below the switch routes no.

### 9.4 Switch route definition: Confirming starting point

The starting point of a switch route is defined by its selection. The symbol, its coordinates

**from:**  102, 50 are displayed. If there is already a switch route from this starting point available, then name and number are displayed.

You choose "**Accept**" button to confirm the starting point. An existing switch route can also be deleted or the complete definition process can be canceled.

After confirming starting point then the destination point must be selected (by clicking with left mouse button) in the track layout. To do this the definition window can be moved; perhaps it disappears also until selection of destination point.

### 9.5 Switch route definition: Selecting and confirming destination point

After confirming starting point then target point (destination) must be selected (with click by left mouse button) in the track layout. At this the definition window can be moved, perhaps it disappears also until selection of the destination point. Switch route definition window is displayed in turn with the previous information as well as the details of the destination point (symbol and coordinates)

**up to:**  152, 50 .

You have to confirm the destination point with "**Accept**" button or you end definition by "**Cancel**" button.

After confirming destination point, single (switching) elements can be selected (by clicking the left mouse button) in the track layout. To do this, then definition window can be moved, perhaps it disappears also until selection of the next element.

### 9.6 Switch route definition: selecting elements and confirming

After confirming destination point then individual (switch)elements can be selected (with click by left mouse button) in the track layout. At this the definition window can be moved, perhaps it disappears also until selection of destination point.

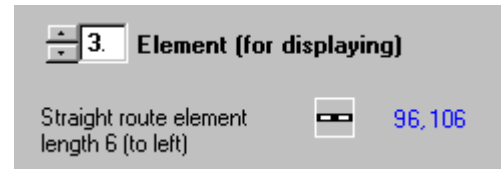
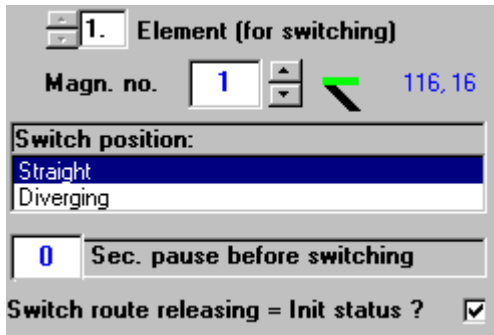
Only the following elements are allowed:

1. All magnetic articles as e.g. switches, signals, all-purpose counters.
2. Horizontal, vertical , diagonal route elements for displaying.

Normal track symbols, contacts and other graphic parts are not allowed.

The selected symbol now is displayed with its coordinates.

Left picture for switching elements and right picture for elements only for displaying:



At least two possibilities are displayed for switching symbols (e.g. here turnout no. 1), one of these must be selected and confirmed. As an option a **pause before switching** (in sec.) can be selected. You can define at **"Switch route releasing = Init status ?"** if shown magnetic article should be switched back to initial status when switch routewill be released. If option is not filled, no switching will be done when releasing switch route.

For track elements (only displaying) you have to confirm only.

You confirm here also with **"Accept"** button.

Elements can be selected in any order; however, this is the order in which they are switched later, when switch route is activated.

## 9.7 Switch route definition: Termination

Once definition of switch route has been completed, the definition will be terminated by clicking on **"Ready"** button. Definitions can and should saved later via menu item **"Save as"** to a Stellwerk 2001 user file.

By pressing **"Cancel"**, you can delete all defined settings for this switch route.

## 9.8 Switch route definition changing

If a switch route is defined and later changes are necessary, so observe following conditions.

1. During definition a false symbol (magnetics, elements for displaying) was confirmed:  
You go back one number at "element", select new element at screen, change switch position and confirm by "Accept".
2. Only switch position of one switch route element must be changed:  
You click with right mouse button on start symbol of defined switch route. If several switch routes have this start point, select wanted number and confirm. Next free element number is shown. Go to wanted element number and change switch position of shown element.
3. One element of a defined switched route must be changed to another one:  
First proceed like item 2 and if element to change is displayed, click with left mouse button on new symbol within track layout. It will be displayed in switch route definition window and switch position can be selected. Confirm at end.

4. A single element of a defined switch route must be deleted:  
This is a critical case, because no gaps are allowed. But you can select the symbol as described at item 3 at first and then exchange by another symbol which is defined in this switch route also, e.g. a magnetic article second time with same switch position or better a route element.

## 10 Contacts

If a track contact symbol was right defined in the track layout and confirmed by “OK” icon, a special window is opened. If you are modifying definitions for an existing contact, click on the contact symbol with right mouse button to open the definition window. However, you cannot change the contact number (gray underlaid).

**Window:** Contact definition (example Reed contact)

**Contact definitions for Contact track straight**

Contact no.: 10 (1 up to max. 64)

Init status: **Free** / Occupied

Contact type: **Reed contact** / Switch track (Märklin) / Contact track / Track occupation sensor

☒ Waiting for another contact event?

Occupied contact no.: 11 by loco number: ?

☒ for special loco numbers? 3 7 11

generates triggering / activities of:

☒ 1.) Sound file: C:\Program Files\STW2001\WAV\Stw\_01.wav WAV-TEST

☒ 2.) Magnetic article no.: 1

☒ 3.) First Switch route no.: 4

☒ 4.) Second Switch route no.: 5

5.) Marker

Marker no. 8 fill with value: 19 = Switch route no.

☒ Switch route via marker no. 7

Marker no. 6 erased value

Afterward contact will be blocked for: 5 second(s)

Contact free automatically? ☒

Coupled with another contact no.: 0 **A coupled contact is not to couple!**

Contact remark: No. 10: Reed contact length 1 (straight to right)

6.) Loco no.: ? Loco no. from contact: 10

Loco speed: 50%

Loco direction?

no change ☐ absolute ☐

reverse <-> ☐ % from max. ☒

forward -> ☐

backwards <- ☐

Light?

☐ == ☒ off ☐ on ☐ change

Function by icon picture: ☐ ? ☐ ON ☐ OFF

No activities

☒ OK ☐ Cancel

### 10.1 Contact definition: General settings

The following three items must be defined for every contact:

**Contact no. , Init status and Contact type.**

#### Contact no.:

Input your wanted number for later triggering. The number may appear later at contact symbol, always at start point (opposite the “bulge”). The highest contact number is fixed by definition of initialization parameter.

#### Init status:

You can select “Free” or “Occupied”, The item “Free” will be the normal one.

#### Contact type:

The several contact types have different display time. Reed contacts and (Märklin) switch tracks get only short impulses for triggering, but contact tracks and track occupation sensors get their status for a longer time.

Furthermore you can define following items in the lower part of the definition window:

**Blocking time of contact, Contact free automatically ? ,  
Coupled with another contact no. and Contact remark.**

Afterward contact will be blocked for:  second(s).

Contact free automatically? ☒

Coupled with another contact no.:  ▲ coupled contact is not to couple!

Contact remark:

#### Blocking time:

Default is 5 seconds, during this time a second activity (at contact controlling) is prevented.

#### Contact free automatically ?

This entry is significant for schedule controlling in connection of Reed contacts and/or switch tracks (Märklin) only. You can decide to display the status "Free" automatically for schedules after queries or manually by the B(Occupy) command.

#### Coupled with another contact no.:

By this item it's possible to define a second triggering group, e.g. with help of a virtual contact. For this case the second contact number has display mode only and shouldn't exist in reality (it must be addressable theoretically - use "Highest contact number" in init parameters).

#### Contact remark:

If nothing is inserted at contact remark, so a default text is generated for this contact type.

## 10.2 Contact definition: Triggering/Limitations

All following triggering parts and activities are valid only for "Contact control" and not for "Schedule control".

☒ **Waiting for another contact event?**

Occupied contact no.:  by loco number:

☒ **for special loco numbers?**

You can define by "**Waiting for another contact event?**", that triggering is started only after another contact is occupied. Inserting at "by loco number:"

- no locomotive number, every occupation is valid,
- a single locomotive number, so it's waiting for this special number via locomotive tracking,
- any locomotive number (as ?), so it's waiting for any number via locomotive tracking.

It's waiting for any locomotive number at contact number 11 in this example.

All selected functions can either be triggered by all locomotives or only by up to 5 **specified loco numbers** (here 3, 7 and 11). If the latter is selected, the contact can be triggered only by one of the selected locos (e.g. in connection with loco tracking)..

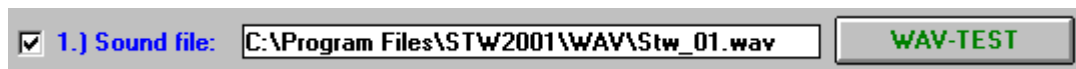


If the option "**for special loco numbers ?**" isn't selected, this contact is triggered by all locomotives.

If option "**for special loco numbers ?**" is selected, up to 5 locomotive numbers can be entered in the provided fields. When the contact is triggered, program checks first whether the contact actually is occupied by one of the selected locomotive numbers. If this isn't the case, then triggering of the contact is ignored, and no functions are executed.

### 10.3 Contact definition: Triggering of a sound file

As part of the **definition of contact triggering** window, there is the possibility to trigger a sound file (WAV-file).



If option button "**Sound file**" is selected, then a standard window is shown to select a WAV file. Here you can change device and folder and select a file. You can test the sound via the "**WAV- TEST**" icon.

Device, folder and file name must be unchanged at execution time to guarantee a triggering.

### 10.4 Contact definition setting of one magnetic article

As 2<sup>nd</sup> part of the **definition of contact triggering** window you can specify one magnetic article number. Switching is started after point 1 (Sound) directly.

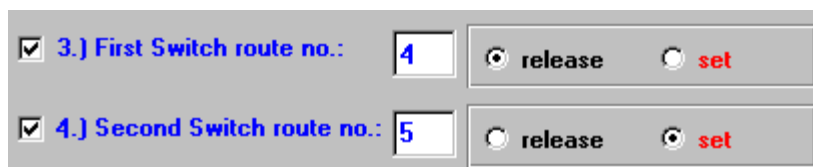


If you click check box "**Magnet article no.**" an accessory number (1 up to max. magnetic article no.) can be entered. Choose between "**Green/Straight**", "**Red/Diverging**" or in special cases "**Orange/Special status**".

At this point the individual accessory need not yet be defined.

### 10.5 Contact definition: Switch route setting via contacts

As 3<sup>rd</sup> and 4<sup>th</sup> parts of the **definition of contact triggering** window you can specify by option fields "**First switch route no.**" and "**Second switch route no.**" up to two switch route to release or set. Triggering of first route is started after point 2 (magnetic article), the second one is started after end of first one.



If one of check boxes "switch route no." is selected, a switch route number (1 to 512) can be entered and "**release**" and "**set**" can be selected.

As example here no 4 is released and then no. 5 is set.

At this point, the actual switch route need not yet be defined.

## 10.6 Contact definition: Marker

### 10.6.1 General explanations of term marker

Positions within a track layout can be fixed by markers. Later this marker number is usable for switching control. 99 different marker numbers are possible. Positive values between 0 and 9999 are allowed for every marker number. (Values higher 512 are valid only if schedule control is used). Special schedule commands support marker handling.

### 10.6.2 Marker definitions

As 5<sup>th</sup> part of the **definition of contact triggering** window, there is the possibility to define marker up to three entries:

- Filling one marker number with switch route number,
- Set/release one switch route via content of a single marker number,
- Erase content of a marker number.

5.) Marker

Marker no. 8 fill with value: 19 = Switch route no.

☒ Switch route via marker no. 7 ☒ release ☐ set

Marker no. 6 erase value

#### Example:

Sometimes there is the necessity to release one switch route of a shadow station (with 3 or more tracks), but at that time it is not easy to determine reserve track or exit area. Up to now e.g. one or several virtual magnetic articles could be defined as "marker". Last situation could be recognized by their switch positions. Now a marker (e.g. no. 8) is fixed as "Exit shadow station". You save switch route number of special exit track at set time (e.g. 19, 20 or 21 ...). Later you don't declare a definite switch route number, but order "Release a switch route which is stored by marker number xx". Three activities for markers should be executed e.g. in above picture (at contact no. 10):

- Fill marker no. 8 with value 19 (switch route no.),
- Release switch route via saved value of marker no. 7,
- Delete value of marker no. 6.

**A Marker can be used also for set or release up to a third switch route by one contact.**

Marker technology for setting third switch route (e.g. no 24) is usable as following:

- Fill marker no. 99 with switch route no. 24,
- Set switch route no. via value of marker no. 99 (*value is now 24*),
- Erase value of marker no. 99.

## 10.7 Contact definition: Locomotive control

As 6<sup>th</sup> part of the **definition of contact triggering** window you can specify locomotive number.

After clicking checkbox "**Locomotive no.**", a locomotive number (0 up to max. locomotive no.) can be entered, the features of which will be controlled when the contact is triggered.

Entering "?" the actual locomotive will be assumed at triggering time. Loco no. can be accepted from the triggered or another contact number. This function only works when "locomotive tracking" is integrated.

The "**Loco speed**" can be defined between 1 and 14, 28 or 126 (depending on your Digital System) alternatively as an absolute value or in % of the maximum allowed speed of this engine (e.g. here 50%), and also with + or - as stepwise alteration.

It also can remain unchanged by selecting "===". If the direction is changed simultaneously, the loco brakes slowly to zero and then accelerates up to the old (or indicated) speed. There are also four entries for selecting (before entry "===")

**OLD** = old speed before braking to zero and three standards for every defined locomotive **L**=low; **M**=middle; **H**=high speed. See also at "Locomotive Details" at chapter 11.4.

At the choice of "**Loco direction ?**", there are four alternatives:

1. **no change** = same actual direction after contact triggering as before.
2. **reverse (<->)** = the actual direction will be reversed at triggering time.
3. **forward (->)** = if engine drives forward, it keeps the direction, if it drives backward, then it changes to forward.
4. **backward (<-)** = if engine drives backward, it keeps the direction; if it drives forward, then it changes to backward.

Light function can be selected by "**Light**" options:

1. **===** = Light status is remaining for this locomotive (on or off)
2. **off** = Locomotive lights get off.
3. **on** = Locomotive lights get on.
4. **change** = Locomotive lights are changing from on → off or from off → on.

With "**Function**", a function (F)1 to (F)12 can be entered, which will be triggered by the contact. The entered function (F1..F12) must be available for type of loco decoder. If a function picture has been selected for this function, you see the icon, otherwise the number-icon of the function. When selecting "Emergency stop" or "without function" additional text appears.

#### Notes:

Locomotive control is started after end of route triggering. Contact types "Reed contact" and "Switch track" keep their status at schedule control till the next request to this contact number. Contact types "Contact track" and "Track occupation sensor" keep their status at schedule control till another status of this contact is sent.

Coupled contacts at schedule control are used for display only (virt. contact).

The block time prevents multiple switching for the defined time.

At Contact control a contact is displayed as blocked (red) at least during its block time, a coupled contact is blocking the source contact during blocking time of the coupled contact.

Nevertheless a not reserved coupled contact can be triggered, although source contact is reserved.




## 11 Locomotive Details

### 11.1 General

A locomotive list serves to be able to define only the own, available locomotive numbers with their parameters from the variety of theoretical possibilities. Furthermore a later driving process can be influenced positively with additional details.

The definition of individual locos in a locomotive list can be initialized either via:

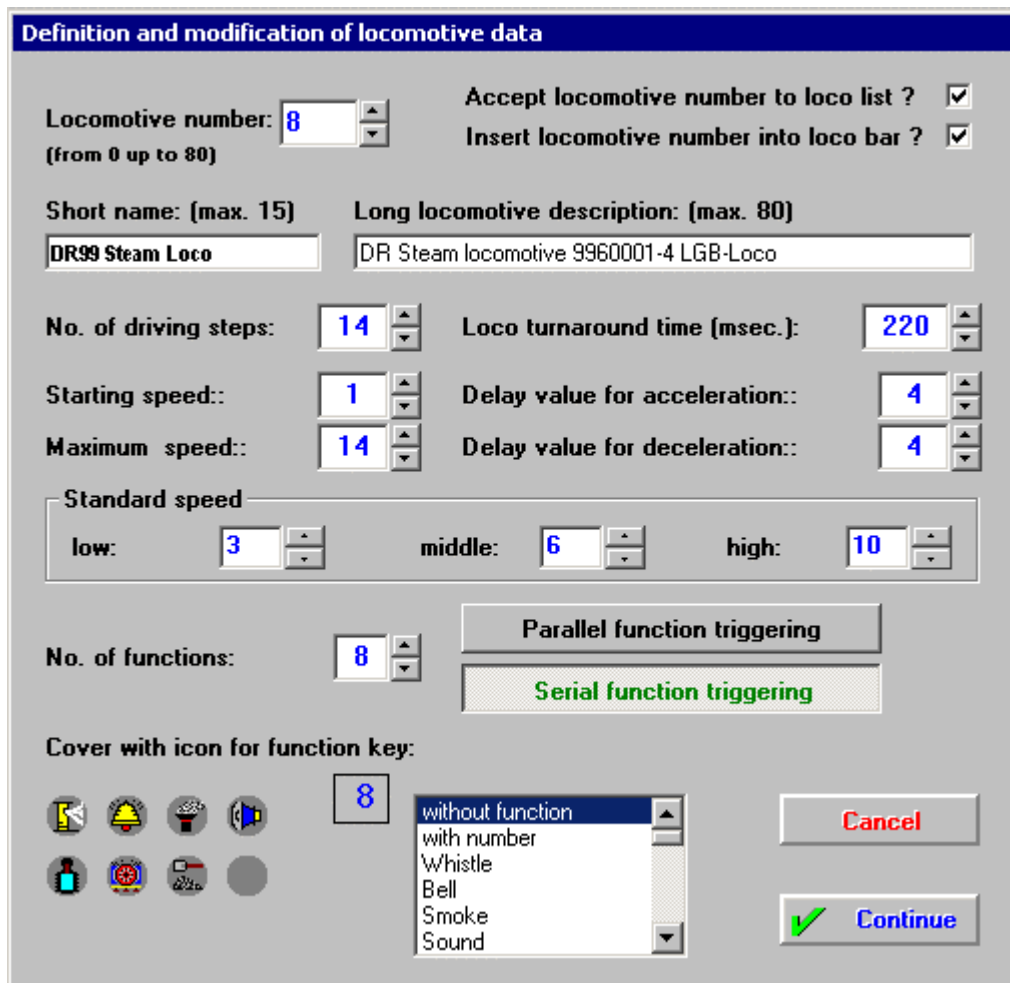
The menu item "**Define/Modify locomotives**" under "**File**" during construction mode and also

for the one special locomotive during processing mode by clicking  icon.

An separate window is shown in which following activities can be defined:

1. **Locomotive number**
2. **Locomotive names**
3. **Control steps**
4. **Deceleration and acceleration values** and
5. **Graphic icons for function buttons**

**Window:** Definition locomotive data



**Definition and modification of locomotive data**

Locomotive number:  (from 0 up to 80) Accept locomotive number to loco list ? ☒ Insert locomotive number into loco bar ? ☒

Short name: (max. 15)  Long locomotive description: (max. 80)

No. of driving steps:  Loco turnaround time (msec.):

Starting speed:  Delay value for acceleration:


Maximum speed:  Delay value for deceleration:

Standard speed

low:  middle:  high:

No. of functions:  **Parallel function triggering** **Serial function triggering**

Cover with icon for function key:



without function with number Whistle Bell Smoke Sound

**Cancel** **Continue**

By clicking "**Continue**" new values are stored in the working area (RAM). They must be saved (with the other information) in a STW file by selecting "File / Save.as".

Clicking "**Cancel**" the old definitions remain.

## 11.2 Locomotive definition: Selection of loco number

At 1<sup>st</sup> part of **locomotive definition window** you'll find first the field for selection/specification of locomotive number.

Locomotive number:

Accept locomotive number to loco list ? ☒

Insert locomotive number into loco bar ? ☒

Using the scroll bar a locomotive number (0 to 9999 depending on the Digital System) can be selected. Now all defined values for this loco are displayed. To transfer the loco definition (into the loco list) the special check field must be signed. To transfer the locomotive number into the locomotive bar the second check field must be signed.

## 11.3 Locomotive definition: Loco names

In 2<sup>nd</sup> part of **locomotive definition window** you can enter a **loco short name** (no more than 15 digits) and a **long locomotive name**.

Short name: (max. 15)

Long locomotive description: (max. 80)

The short name will be displayed later as ToolTip of the locomotive bar for the special locomotive number.

The long locomotive name is displayed down left in the processing bar and serves for documentation.

## 11.4 Locomotive definition: Selecting control steps

In 3<sup>rd</sup> part of **locomotive definition window** you can select minimum and maximum control steps for the selected locomotive.

No. of driving steps:

Starting speed:

Maximum speed:

Defaults are: Starting speed = 1  
Maximum speed = 14 or 27,27,126

If starting speed value is greater than 1, the loco speed is going from this value to zero directly when slowing down, and the loco speed is going from zero to this value directly when accelerating.

If maximum speed value is lower than the number of driving steps, then accelerating is possible only up to this value.

Three standard speed entries can be defined for every locomotive number in dependency of minimum and maximum driving steps.

Standard speed

low:    middle:    high:

**L** = low                      **M** = middle                      and                      **H** = high speed

These speed entries with above special codes are usable at contact and schedule control for speed selecting. At locomotive control picture there are inserted three small, cyan colored squares at fixed positions. Speed can be fast selected by clicking upon these squares.

The values can be modified between 1 and 14, 28 or 126 depending of the Digital System and the locomotive decoders.

## 11.5 Locomotive definition: Deceleration- / Acceleration values

In 4<sup>th</sup> part of **locomotive definition window** you can define rates of accelerating, deceleration/braking and loco turnaround time (direction switching time) for the locomotive.

Loco turnaround time (msec.): 220

Delay value for acceleration:: 4

Delay value for deceleration:: 4

Default time for switching engine direction is 220 milliseconds, only for special locomotives you have to change this.

Defaults for acceleration/deceleration are 1 in each case; they can be modified between 1 and 15. These values symbolize a pause value between individual speed steps.

When "1" is selected, this value is approx. **0.1 second**. When "15" is selected, this value is approx. 1.5 seconds for every speed step.

### Example:

An engine drives at speed 8 and has the delay value 4.

The engine will take after approx.  $8 \times 4 \times 0.1 = 3.2$  seconds to attain the speed zero.

Obviously, the defined "starting speed" plays into this as well.

## 11.6 Locomotive definition: Pictures of function buttons

In 5<sup>th</sup> part of the **locomotive definition window** you can define number of function keys of loco number depending on Digital System and locomotive decoder.

No. of functions: 8

Parallel function triggering

Serial function triggering

Cover with icon for function key:

in brackets [ ] = internal icon number

2

- without function
- with number
- Whistle [2]
- Bell [3]
- Smoke [4]
- Sound [5]

Also you can replace the function key (F1 to F12) numbers (1 to 12) with small symbols.

First you click on function key number and this number will be displayed. Then you select a function icon name via the scroll bar and the picture will be shown on the button.

Besides "without function" and "with number" there are the following small symbols at present:

= Whistle [2]

= Bell [3]

= Smoke [4]

= Sound [5]

= Horn [6]

= Brake [7]

= Announcement [8]

= Fire [9]

= Coal shoveling [10]

 = Water [11]	 = Air pump [12]	 = Steam blow-off [13]
 = Main switch [14]	 = Pantograph [15]	 = Uncoupler [16]
 = Yellow flash [17]	 = Blue flash [18]	 = Cleaning unit [19]
 = Train ready to start [20]	 = Starter 1 [21]	 = Starter 2 [22]
 = Air blow down [23]	 = Fire fighting [24]	 = Camera [25]
 = Faucet [26]	 = Loading grab [27]	 = Light 1 [28]
 = Light 2 [29]	 = Light 3 [30]	 = Melody [31]
 = Hour-glass [32]	 = Self-unloading [33]	 = Rear lantern 1 [34]
 = Rear lantern 2 [35]	 = Clock [36]	 = X [37]

Numbers in [ ] can be used for triggering functions by numbers (P..).

Alternatives "**Parallel function triggering**" and "**Serial function triggering**" are used to specify the type triggering of this engine. So e.g. some older original LGB locomotives with LGB decoders/sound modules can only be triggered by several clicking of function key F1. This alternative can be selected here (default is parallel).

Function keys that display "without function" can't be triggered.





## 12 Locomotive tracking

### 12.1 General

If you want to report not only the status of a contact during processing but also the locomotive number which triggered the contact, you can do so with loco tracking data.

The principle is based on tracing the path of the loco with contacts. Starting from an initial status, one or several "paths" are described for each track contact.

A special **Locomotive tracking window** can be opened during the construction phase using  Icon in menu bar or menu item "Options / **Loco tracking** definition".

The initial status can be select during processing mode by "Occupy"  icon or by slow two clicks with the right mouse button on the contact symbol and also -if using schedule controlling- by schedule command "Occupy" (B-command).

During processing, the program checks the locomotive path data to determine whether there is a preceding contact for the currently occupied track contact. If this is the case, then locomotive number at the predecessor contact is deleted and transferred to the new track contact.

To achieve this, you have to enter following data:

**Target contact** (to... destination point),

**Start contact** (from... starting point) and (optionally)

up to 9 **alternatives** with respectively

up to 6 **conditions** for every alternative.

Every instruction is like a query. The next instruction for the same contact corresponds to a logical **OR** operation to the last instruction for the same contact number. The conditions of one instruction correspond to logical **AND** operations.

Well, so every target contact can have up to 9 OR-conditions (alternatives), in which up to 6 AND-conditions each are available.

#### Example:

Loco-no. will move from contact (start) to contact (target) if :

Track switch no. x is on "straight" AND signal no. y is on "stop".


OR

signal no. y is on "proceed" AND track switch no. z is on "straight".

These are 2 alternatives with 2 conditions each.

No locomotive tracking is possible for virtual target contacts (=contacts which are not connected at a feedback module).

### 12.2 Locomotive tracking: Definition window

The "Loco tracking definition" window can be opened during the construction phase using  Icon in menu bar or menu item "Options / **Locomotive tracking**".

**Window:** Locomotive tracking definition

**Definitions of locomotive tracking**

Target contact no.: 101      Start contact no.: 100

Home signal straight No.: 14

Conditions available

- Proceed / Hp1
- Stop / Hp0
- Slow down / Hp2

**Defined conditions of alternative no. 1**

1.	Home signal straight No. 14 = Proceed / Hp1	AND
2.	Left switch No. 6 = Diverging (red)	AND
3.	Left switch No. 7 = Straight (green)	AND
4.	Left switch No. 8 = Diverging (red)	AND
5.		AND
6.		

Condition: 1      erase      Condition OK      Ready

Alternative: 1      erase      Alternative OK      Next target contact

Total deleting target contact      Cancel

Fix or delete condition(s) for alternative or select next target contact!

In the window you define or modify:

**Target contact no.** and **Start contact no.**


And for:


1 up to 9 **alternatives**, you can fix or change up to 6 **conditions**. This is done with help of **magnetic articles** (here e.g. home signal, left switch).

Press "**Condition OK**" and "**Alternative OK**" to save the input, or "**erase**" to delete.

With "**Total deleting target contact**" all alternatives with all conditions of the current target contact will be erased.



By triggering "**Next target contact**" all defined or modified records of the current target contact are saved (in the RAM matrix). The data of the next defined target contact number in the track layout are displayed.

Press  to delete the modified data of the current target contact and to close the window. At this point, you cannot undo earlier changes of other target contacts done within the window.

Press  to save the modified data of the current target contact and to close the window. If applicable, the last line shows information's.

### 12.3 Locomotive tracking: Target and start contacts

To select a definition (or alternative) for one "path", input at least following information in the loco tracking window:

Target contact	 Target contact no.: 101	and the
Start contact	 Start contact no.: 100	

The following applies:

If no number is indicated, you can click on a contact symbol in the track layout to select this contact number.

After a valid contact number has been selected, the corresponding symbol is displayed on the left. If there is already a definition, all conditions for the first alternative are displayed.

If there are no further details (for one or for a single alternative), this indicates that the loco number is transferred without conditions from start contact to the target contact, if the target contact is occupied and the start contact contains a locomotive number.


## 12.4 Locomotive tracking: Alternatives


You can define up to 9 **alternatives** for each target contact. Later, these are checked in ascending order. Each alternative can contain **up to 6 conditions**, which can be seen as "AND" operations. The **up to 9 alternatives** are "OR" relationships among each other.

Alternative:	1	<div style="border: 1px solid gray; width: 10px; height: 10px; margin: 0 auto; position: relative;"> <span style="position: absolute; top: -5px; left: 5px;">▲</span> <span style="position: absolute; bottom: -5px; left: 5px;">▼</span> </div>	erase	Alternative OK
--------------	---	--	-------	----------------

All conditions for the selected alternative (e.g., here 1) can be deleted by clicking on "**erase**". However, the definitions of the target and starting contact remain as is. Later, if there is an empty alternative between 1 and 9, the gap is closed when the definitions are saved. Insertions aren't possible.

If "**Alternative OK**" is chosen, defined records are saved and the next possible alternative is shown.

If you select , all modifications for this contact are lost, the last status is valid again and the window is closed.

If you select , the modified data of current target contact are saved and window is closed.

## 12.5 Locomotive tracking: Conditions

There are **up to 6 conditions** for each **alternative**, which can be seen as "AND" operations and will be checked during processing one after the other.

A condition can be defined as follows:

In magnet article window (here for signal no. 14) a number can be given. If no number is indicated then with "click" at a magnetics of the track layout the number input over directly.


Number, group type, symbol and the possible conditions are then displayed as text. "Click" on one of the possible conditions to input it into table on the right.


The screenshot shows a software window with two main panels. The left panel, titled 'Conditions available', contains a list of three options: 'Proceed / Hp1' (highlighted in blue), 'Stop / Hp0', and 'Slow down / Hp2'. Above this list is a field labeled 'Home signal straight No.:' with the value '14'. The right panel, titled 'Defined conditions of alternative no. 1', contains a list of six conditions, each followed by the word 'AND' in blue. The conditions are: 1. Home signal straight No. 14 = Proceed / Hp1, 2. Left switch No. 6 = Diverging (red), 3. Left switch No. 7 = Straight (green), 4. Left switch No. 8 = Diverging (red), 5. (empty), and 6. (empty).

All conditions for the selected alternative (here e.g. 1) can be deleted by clicking on **"erase"**. However, the definitions of target and starting contact remain as is. Later, if there is an empty condition between 1 and 6, the gap is closed when the definitions are saved. Insertions aren't possible.

The screenshot shows a dialog box with the title 'Condition:'. It contains a dropdown menu with the value '1', an 'erase' button, and a 'Condition OK' button.

If **"Condition OK"** is chosen, defined records are saved and next possible condition of the selected alternative is shown.

If you select , all modifications for this contact are lost, last status is valid again and window is closed.

If you select , modified data of current target contact are saved and window is closed.

#### Note:

Later executing of alternatives of a contact is done in sequence of definition for this contact. User has to check that an alternative without conditions must be the last one, because later alternatives for this contact can never be checked in reality.

## 13 Controlling by Timer -Definition-

It is possible to execute time-controlled processing's with the help of a timer. The clock is real time or can run with a speed of up to 600 times faster (time-lapse). At up to 6 times and/or after up to 6 intervals, up to 5 contacts each can be triggered.

Because every contact can trigger multiple functions, e.g. set switch routes, switch magnetic articles, control locomotives, so a lot of controlling is conceivable, especially the mentioned contacts had to not be really available on equipment (but they must defined as symbol with number).

Definitions for timer control can be created and modified during construction mode, but not during active processing.

**Here in the picture you see only 2 of the 6 special times / intervals, which are available)!**

**Window:** Definition controlling by timer

.... up to 6 special times:

A time can be selected under

**at: ... .. o'clock** in hours and minutes. The 24 hour day is used (European/Military time mode).

Under **Contact(s)** up to 5 valid contact numbers can be entered.

.... up to 6 regular intervals:

Under **after: ... min.** or at **and after: ... min.** you can select an interval time of up to 999 minutes.

Under **Contact(s)** up to 5 valid contact numbers can be entered.

Times at "**and after: ... min.**" are added to the previous value.

By the option "**Repeating always?**" you can choose whether above activities are triggered only once or are repeated as a cycle.

At this point, contacts don't have to be defined in the track layout. However, they have to be defined before you start operating in the processing mode.

With "**OK**" all new or modified definitions are accepted, and window is closed. With "**Cancel**" the previous definitions are kept and window is closed.

In the above example contact no. 10 will be triggered at 8:00 o'clock, the contacts 11 and 12 always at 12:30 o'clock; additionally, the contact 20 is triggered every 15 minutes and 5 minutes later contact 30. This triggering repeated every 24 hours of model time clock.

All contacts which are occupied / reserved aren't triggered.

The contact numbers "Max. contact number – 2" and "Max. contact number – 1" on the layout can be used to start the model time clock or to stop it in addition to other activities. If e.g. "Max. contact number" is defined as 64, so at occupation:

contact no. 62 will start and contact 63 will stop the model time clock.

The contacts 255 and 256 on the layout can be used to start the model time clock (contact 255) or to stop it (contact 256) in addition to other activities.

The triggering of these contacts is done by a timer, which is displayed at the right in the processing bar and can be modified during processing mode. Double-click on the clock to display the settings and/or start the timer. A separate window "**Clock settings for timer control**" opens. Next defined control times (time of day respectively intervale time) can be triggered by function key **F10** during processing.

## 14 Schedules

### 14.1 General

Two alternative control types are included in program Stellwerk 2001:

- \* **Contact control:** Here activities for every contact are defined and will be triggered for an automatic control.
- \* **Schedule control:** Here one or several schedules are running and do automatic control.

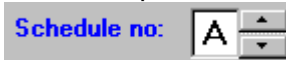
Schedules shall serve to let a predefined project occur specifically. You have a variety of technical wishes on the one hand and on the other hand there are several technical problems possible at processing time, so such a mode may be problematically; therefore you cannot solve all tasks and problems at every time with a PC. Some of these problems are of course:

Crossing streets of turnouts,  
not viewable shadow stations,  
exact locomotive engine numbers queries,  
errors during switching,  
derailments, technical errors and  
real locomotive speeds.

By a combination of manual mode and an automatic process, perhaps an optimal solution has to be received. Therefore a manual control is always authorized during the schedule mode, too.


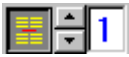
It was tried to make an executable and perhaps also expandable schedule version for medium-sized equipment's. On code characters based there is a number of commands which can be arranged to programs. Many main command lines are largely compatible to the German Märklin program "Fahrplan".

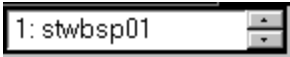
Loading and processing of **up to 9 parallel schedules** are possible. Open with reading schedules

displays a window, in which you can define the  schedule running number. Every schedule has his own address area, his own tables for "GOTO" addresses, an own timer and his own "SET" variable. A SET variable is a global variable for respectively one schedule number. It can be used to save results or submit to other commands. Schedules are executed as a cycle.

If a schedule executes commands with a waiting mode e.g. "time"(Z), "waiting contact status" (K) or "waiting switch route status" (X)or (Y), then the other schedules go on of this independently.

When starting schedule mode you can execute all schedules or a single number also. Schedules will

be started by  icon. With the right display  and the scroll bars it's possible to select the schedule number (between "1" up to "9" or "A" = ALL). A completed schedule can be started again by this way too.

Loaded schedule names are displayed down on the right . Between the schedule numbers can be changed by scrolling, to display the name for this schedule. The information displayed appears in GRAY if process mode is still not activated or no more. The color of the information displayed changes to **BLACK** if schedule can be started or is already completed. The information displayed is **BLUE** if schedule is active. If a schedule is interrupted by e.g. "Stop" then the name is displayed in color **VIOLET**.

Some schedules have the possibility to access results of another schedule, these schedule commands, has directly behind the code a schedule number.

The initialization parameter "Max. number of schedule lines" is valid to all schedules together. E.g. if it is two, then everyone has only the half etc. The total number is restricted on 9999 i. e. at 9 on approx. each 1100 schedule lines.

As addition also manual input can be parallel executed to "automatic" schedule operation, so magnet articles such as turnouts, signals or switch routes are switchable by clicking the corr. symbol. The new status is displayed in the track layout respectively. A manual locomotive control as well is parallel possible for (choice, speed, direction and function). Also contacts can unlocked and occupied or switch routes manually reserved, release or triggered. It has to be respected on this however, that not by wrong input the complete operation lead to malfunctions such as:

Manual switching of a not reserved turnout during a signal is starting to "PROCEED" by schedule and so the train is running into a wrong direction.

Switch routes can serve as help against such false switching. Under the condition that switch routes are defined, it is not possible to switch manually reserved switch routes. Turnouts which are components of a reserved switch route are locked by STW2001 also.

This mixed operation allows the automatic mode on one part of the equipment and manual operating -e.g. shunting operations- on another part. True representations of occupied contacts and the resetting can be solved by running schedules, as well as engine number tracking, too.

Here is pointing out at least, that the new automatic controlling alternative "**Automatic by contact control**" is often easier to manage.

Creating or changing schedule by the program STELLWERK 2001 isn't possible! Schedules can be created and/or changed by Schedule Editor STWEdit easily, which is delivered together with STELLWERK 2001 and described at chapter 14.3. A standard editor e.g. NOTEPAD can be used also, but check right file extension (stw).

Every command has (as a rule) a firm single-digit code character and a various number of parameters (variables, code characters).

**The parameters in a command line are separated from the code by a comma and blank –if not noted differently- , as well as parameters are separated by comma and blank from each other.**

Parameters alternatively are indicated in square brackets [ ]. The variable value "0" (zero) at parameters has a special meaning:

The current value of the SET variable of the corr. schedule number is taken advantage of instead of a given zero at execution time.

SET variables are changeable by H-, V- or Q- commands; they can be queried by F-commands or added in R-commands.

The following table gives a summary of all code characters (listed alphabetically).

Note:

Limits of variables (e.g. locomotive, magnetic article and contact numbers) depend on the used Digital System. Here only absolute limits are described; user must observe their own valid limits



**Table:** Schedule commands[illegible]

Continued next page

## Continuation of Schedule commands

Code	Meaning	Parameter no. variables		Explanation / remarks
L	Locomotive control	3 [5]	n, x, g[, f, l]  n, U[,g]	n = 0 to 9999 (locomotive number) x = S (speed) = B (decelerating(braking/acceleration, slowly) = U (direction changing with slow speed altering, <u>for Lenz</u> also with: g = V -> forward (German: vorwärts) or g = R -> reverse g = 0 to 126 (absolute speed) or = -126 to +126 (stepwise altering speed) if a = B f = F function (alternatively) with following: l = 0 or 1 (off or on)
M	Magnetic article e.g. turnout switching	2	n, b	n = 0 to 1024 (magnetic article number) b = G (green/straight/free) or = R (red/turnout/stop) or b = O (orange) or = S (special status)
N[#]	New loading of a schedule	2	d, n	# = alternatively schedule no. (1 to 9) d = full file name of a SFP-schedule file n = 1 to 9999 (starting point of schedule)
P	Play sound	1	d	d = 1 to 99 (defined sound symbol number) or d = full WAV-file name (with device:\folder)
Q[#]	Queue commands (querying of arrays)	3	x, n, w	# = alternatively schedule number (1 to 9) x = A (start queue) or = E (expand / end queue) or = G (Goto field) or = M (Move SET variable to field) = P (plus/add value w ) or = S (step queue) or = V (takeover variable to actual schedule no.) n = queue number w = value or step
R	Call subroutine (German: Rufe)	2	u [, w]	u = subroutine name (max. 12 digits) w = 0 to 9999 (numeric value =>SET)
S	Signal switching	2	n, b	n = 0 to 1024 (signal number) b = G (green/proceed/free) or = R (red/stop) or = O (orange/slow down)
T	(Model) Time commands	2 [3]	h, m[, c]	h = 0 to 23 (Model hour) m = 0 to 59 (Model minute) c = S (set/start model clock) = H (stop/halt model clock)
U	Subroutine (start) name	1	d	d = subroutine name (max. 12 digits)
V[#]	Set variable	1	n	# = alternatively schedule number (1 to 9) n = 0 to 9999 (numeric value =>SET)
W	Repeat (w-times)	1	z	z = 0 to 999 (numeric value as counter)
X	Switch route command	1 [2] [3]	f[, x, s]	f = 1 to 256 (switch route number) x = S or blank (switch route triggering) or = R (switch route locking/reserving) or = F (switch route unlocking) or = W (waiting of switch route ...) if x=W: s = F (free/unlocked) or = R (reserved/locked)

Continued next page

## Continuation of Schedule commands

Code	Meaning	Parameter no. variables		Explanation / remarks
Y	Switch route command via Marker (indirect activity of a switch route)	1 [2] [3]	m[, x, s]	m = 1 to 99 (marker number) switch route number is stored in marker number! x = S or blank (switch route triggering) or = R (via marker switch route locking/reserving) or = F (via marker switch route unlocking) or = W (via marker waiting of switch route ...) if x=W: s = F (free/unlocked) or = R (reserved/locked)
Z	Delay time (German: Zeit)	1	w	w = 0 to 999 (numeric value / time)
/	Control commands	2	x, t	x = I (output information without answer) = M (output message with answer) t = alphanumeric text (max. 30 digits) or x = T (TRACE switching off or on) t = 0 (switch TRACE off) t = 1 (switch TRACE on)
!	Definition of a GOTO address	1	a	a = address name (max. 12 digits)
*	Remark line	1	text	t ext = alphanumeric text (max. 76 digits)

## 14.2 Schedule commands

In following chapters all commands are listed, under "definition" you find behind the command the parameter list put in { } respectively. If the parameters are alternatively, then they are represented in [ ]. A schedule number can alternatively be indicated at some commands behind the command code directly.

### 14.2.1 All to initial status (A)

**Meaning:** Set everything on initial position (Reset).  
With this command all magnet articles and contacts or only one type are taken to the predefined initial position.

**Use:** At begin of a program normally.

**Definition:** A [ , x ]

**Parameters:** none or optionally one  
x = M (only magnetic articles)  
C or K (only Contacts)  
R or F (only Switch Routes)

**Notes:** All magnetic articles and contacts or otherwise only all magnetic articles or only all contacts are reset to their pre-defined initial status (GrSt) by this command. This corresponds (if no parameter) to the function at drive of the icon "GrSt" at manual processing. No consideration is taken on the present conditions at the contact resetting at this, they are if necessary updated at the next query of the corr. contact or by the feedback modules.

**Example:** A = Reset all to initial status

### 14.2.2 Occupy contact (B)

Meaning: "Occupy" contact no. n as...  
With this command contacts get specific as defined "occupied" and/or "free".  
.A locomotive number can be added at "occupied" by an engine number.

Use: e.g. at begin of a program to occupy contacts with loco numbers and during processing to occupy contacts.

Definition: B, n, b[, l]  
b={F;B}

Parameters: two or three alternatively (n, b and alternatively l)

**n** numeric contact number  
limits: numeric 0 to 1024  
**b** F (free) or B (occupied)  
**l** numeric loco number (alternatively)  
limits: numeric 0 to 9999

Notes: With this command you can work so as if a contact track got "free" or "occupied". The representation of the desired condition is displayed on the track layout. Only after a direct query of this contact by F- or K-commands (and if using the Initialization/contact parameter "Contact free automatically ?" = "YES") the true status is updated again. If the initialization/contact parameter "Contact free automatically ?" = NO is used, so e.g. a specific reset of contacts to free is possible with the help of this command. If needed a given locomotive number appears to the place of the contact number (but then please use the initialization parameter: "Display contact number ?" = NO). So a loco number "move" with the help of the locomotive tracking parameter. Is n=0 selected for variable n (contact no.) or variable l=0 for variable l (loco no.), and then the current value of the SET variable is used.

Examples: B, 11, B, 20 = Occupy contact no. 11 as "occupied" with loco no. 20  
B, 12, B, 0 = Occupy contact no. 12 as "occupied" with the value of the SET variable.

### 14.2.3 Function module (C)

Meaning: Trigger function module n with...  
For Märklin central processing units 6020 or 6021 and for Lenz DIGITAL plus System only! You may trigger function modules with this command.  
This isn't possible at the Arnold.

Use: e.g. for additional parts like "Märklin dancing car" or for switching smoke and/or sound on/off using the corr. locomotive decoders.

Definition: C, n, f, w

Parameters: three (a, f and w)

**n** address of function module  
limits: numeric 0 up to 9999  
**f** function number  
limits: numeric 1 up to 12 (corresponding F1 up to F12) or  
area: P2 up to P37 (funktion picture number P2 up to P37)  
**w** value of special function F..  
0, OFF or AUS = set function off  
1, ON or EIN = set function on

Notes: A function module can be triggered by this command (**only for Märklin central processing units 6020 and 6021 or at the Lenz Digital plus System!**). One command line must be written for every function. At the Arnold DIGITAL System the command can lead to abort, therefore it is at definition of the initialization parameter "Digital System= "Arnold with Märklin (6050, 6051" skipped. The older possibility to insert several function within one command is cancelled. Please change to several commands.

If a locomotive is using serial function triggering the last parameter is ignored.

Examples: C, 10, 3, 1 = trigger for function module 10 the function F3  
(This is for Märklin: panorama car 4999 table light ON)

C, 30, 1, 0 = triggering function module 30 the F1=ON

#### 14.2.4 Define marker (D)

Meaning: Define a marker with a value (or also erase marker)

Use: To storage a value for later specific analysis (by F- or Y-commands).

Definition: D, n, w

Parameter: two (n and w)  
**n** Marker number with limits: 1 to 99  
**w** Marker value with limits: 0 to 9999  
 Value 0 is deleting a marker.

Notes: Up to 99 different storage locations (so called marker) can be defined to the given value with this command. They can used for several problems, especially temporary storage of values, positions, loco numbers and other.

Example: D, 1, 22 = define (store) in marker number 1 value 22  
 D, 2, 0 = erase marker number 2

#### 14.2.5 End (E)

Meaning: End of...  
 With this command are different end functions defined as:  
 end of the main program, end a subroutine and  
 end of a repeating loop.

Use: In the complete schedule, on every case at the end of a program.

Definition: E [ , x ]  
 x={U;W}

Parameter: one (x)  
**x** U = (subroutine)  
 W = (repeating loop)  
 = (blank = main program)

Notes: Use this command as:  
 E = the end of a main program (parameter is empty) as well as  
 E, U = the end of a subroutine  
 E, W = the end of a repeating loop.

Examples: E, W = end of a loop lying in front of this  
 E = end of the main program

### 14.2.6 If (F)

- Meaning: If command for:
- contacts query: if no. n is occupied/free, then:
  - magnetics query: if no. n is red/green/orange, then
  - model time query: if model time is b, c, then:
  - SET variable: if SET variable = w, then:
  - marker query: if no. n is = w, then
  - all-purpose counter query: if no. n is = w, then

You can define several queries of status conditions e.g. for:  
Contact status, signal- and turnout positions, reserving of switch routes,  
model time, content of SET variable and/or marker- and all-purpose  
counter-values.

It is possible to query several conditions of the equipment by these commands. The "IF" (F-) commands can be joined by AND and OR. The signs > ("greater") and < (lower) are allowed using queries at the commands "if model time", "if set variable", "if All-purpose counter" and "if marker" also.

Use: Querying contacts is one of the basic tasks in schedule operations, but the other query possibilities are also essential constituents for schedules.

Definition:  $F, x, n, b[, d]$   
 $x = \{D;K;M;S;X;T;V;Z\}$   
 $b = \{B;F;R;G;O;w\}$   
 $d = \{AND;OR\}$

Parameters: three (x, n, b) or optionally four (x, n, b, d)

- x**
- |   |                     |
|---|---------------------|
| D | Marker or           |
| K | Contact or          |
| M | Magnetic article or |
| S | Signal or           |
| T | Model time or       |
| V | SET variable or     |
| X | Switch route or     |
| Z | All-purpose counter |
- n**
- number marker (**D**)  
limits: numeric 1 up to 99
  - number contact (**K**)  
limits: numeric 0 up to 1024
  - number magnetics(**M**) or signal (**S**)  
limits: numeric 0 to 1024
  - number switch route (**X**)  
limits: numeric 0 up to 512
  - Time (**T**) (hour)  
limits: numeric 0 up to 23  
using of >n or <n is possible.
  - Value (w) of SET Variable  
Limits: numeric 0 to up 9999 for x=V  
using of >w or <w is possible.

number all-purpose counter (**Z**)  
limits: numeric 0 up to 1024

**b**

<u>at x=D</u>	numeric value (w) 0 up to 9999 using of >w or <w is possible.
<u>at x=K</u>	two possibilities: B (occupied) or F (free)
<u>at x=M or S</u>	four possibilities: R (red/turnout/stop) or G (green/straight/proceed) or O (orange) or S (special status)
<u>at x=X</u>	two possibilities R (reserved) or F (free)
<u>at x=T</u>	numeric 0 up to 59 (minute)
<u>at x=Z</u>	numeric value (w) -99999 up to 99999 using of >w or <w is possible.

3. parameter b not applied (with comma) at  $x=V$

**d** at all variants two possibilities:  
 AND = combining with next IF command by AND.  
 OR = combining with next IF command by OR.  
 Brackets aren't authorized.

Notes:

With this command a contact status, the position of a magnet article (turnout/signal), the status of a switch route, the time, value of SET variable or values of all-purpose counter or marker can be queried specifically, and in dependence of the result the next instruction is executed or not executed. At contact query this contact is subsequently "free" (in dependence of initialization parameters).

If using the additional detail > (greater) or < (smaller) at the alternative query "of a model time", there is:

if the time is isn't still reached, the next command passed over.

(same query as: if greater and equal!)

For alternatives "D", "X", "Z": if the asked value -at query "IF SET variable" or "IF Marker" or "IF all-purpose counter" without the additional characters > or < - is not identically with the present contents of referenced variable, the next command is skipped (query: if equal!).

Queries with AND or OR can be connected logically over several immediately following lines as one query. There isn't a limitation in number, all possible IF commands can be used mixed, AND plus OR also. No brackets are authorized, always the real status of the previous line query is checked (true/false), and then in corr. of the AND/OR connection the next line is further checked.

If n=0 (at x=K or =S or =M or =X or =Z) is selected, then the current value of the SET variable is used.

<u>Examples:</u>	F, K, 20, B	= If contact no. 20 is OCCUPIED, then execute next command, otherwise not.
	F, S, 1, G	= If signal no. 1 is GREEN, then execute next command, otherwise not.
	F, T, >13, 10	= If model time is greater then 13:10 h (1:10pm), then execute next command, otherwise not.
	F, D, 2, 5	= If contents of marker number 2 is 5, then execute next command. otherwise not.

F, Z, 40, <10	= If actual value of All-purpose no. 40 is lower than 10, then execute next command, otherwise not.
F, V, <80	= If SET variable is lower 80, then execute next command, otherwise not.
F, K, 1, B, AND F, M, 2, O, AND F, V, 12, OR F, T, 10, 00	= If contact no. 1 is OCCUPIED <b>AND</b> if magnetics no. 2 has ORANGE status <b>AND</b> if SET variable is 12 <b>OR</b> if model time is >= 10:00 h, then execute next command, otherwise not.

Well, in the last example the following command is executed only, if the contact no.1 is occupied and magnet article no. 2 stands on orange and the SET variable has the value 12 or however if the model time is already 10 o'clock or later.

#### 14.2.7 Goto address (G)

Meaning: Goto an address (jumping point)  
With this command a direct skip to an address is defined within the schedule.

Use: e.g. to return to the beginning again in an "endless loop" of queries and commands.

Definition: G, a

Parameter: one (a)

**a** address: 1 to 12 digits alphanumeric (capital) letter and/or numbers, mixed also, but no blanks.

Notes: With this command you can jump in the schedule to a defined (or will be defined) address by the "!" code. The initialization parameter "Max addresses of schedule lines" defines the total number of the possible names (subroutines and ! addresses).

Examples: G, START = Goto address START  
G, A1234 = Goto address A1234

#### 14.2.8 Pick up loco number (H)

Meaning: Fetch a locomotive number from a contact and save the engine number into the SET variable.

With this command and the help of a loco tracking values the current locomotive number can be picked up from an occupied contact under condition loco tracking parameters are defined.

The locomotive number is saved into SET variable of current schedule or to a given schedule number and can be used further.

Use: To recognize locomotive numbers on a contact and control specifically.

Definition: H, n, [ f ]

Parameters: one (n) or two (n, f)  
**n** contact number  
limits: numeric 1 to 1024  
**f** SET variable of schedule no. f  
limits: numeric 1 to 9



**Notes:** With this command the locomotive number is picked up from a contact. If n=0 selected, the current value of the SET variable is used. A special locomotive number could also be assigned to a contact before by the B-command. So a specific locomotive control e.g. decelerating (braking) is possible, see example. A schedule number can alternatively be given by the second variable, it is then saved into the SET variable of this schedule.

**Example:** If contact no. 22 (e.g. before station signal no. 30) is occupied with a loco number, then the following commands can reduce the loco speed:

H, 22	=	pick up loco number xx from contact no. 22
F, V, 0	=	if SET variable=0, then:
G, AHEAD	=	Goto address AHEAD
F, S, 30, O	=	if signal no. 30 is orange, then:
L, 0, B, -3	=	reduce loco (no xx) speed by 3
!, AHEAD	=	jump to AHEAD

#### 14.2.9 Generate a random number (I or I[#])

**Meaning:** Generate a random number as positive integer value between two named limits and store it into the SET variable of the actual schedule or into the SET variable of another parallel running schedule. Every schedule number has its own SET variable.

**Use:** For random controlled processing's, e.g. driving starts from several shaded railroad tracks.

**Definition:** I[#], n, m  
# optional schedule number (1 to 9)

**Parameter:** two (n, m)  
**n** start limit with numeric range from 0 up to 9999  
**m** end limit with numeric range from 0 up to 9999

**Notes:** Several numbers can be generated and afterwards used in a schedule by this command. E.g. you can use the stored value (SET variable) in your own subroutine later.

**Examples:** I, 1, 4 = Generate a random number between 1 and 4, store the value into the SET variable of the actual schedule.  
I2, 24, 29 = Generate a random number between 24 and 29, store the value into the SET variable of the schedule number 2.

#### 14.2.10 Waiting for Contact status (K)

**Meaning:** Wait till a contact is free/occupied. With this command a definite status a contact can be waited for. If the given status is not reached (yet) then the respective schedule waits till the condition is entered. Other parallel active schedules go on.


**Use:** To determine and make use of dependencies of other moving of trains.

**Definition:** K, n, b[, d]  
b = {B;F}  
d = {AND;OR}

**Parameters:** two (n and b) or optionally three (n, b and d)  
**n** contact number  
limits: numeric 0 to 1024  
**b** status, 2 possibilities:  
B = occupied or F = free

**d** AND or OR (optionally)

Notes: It's waiting for a given condition for this contact command. The processing of the concerning schedule goes on only if this condition has entered. Is n=0 selected, the current value of the SET variable is used.

Remark: Later, if during automatic processing a wanted event did not happen, the status can be ignored by  icon manually.

Examples: K, 10, B = wait until contact no. 10 is occupied  
K, 11, B, OR wait until contact no. 11 or contact no. 12 is occupied.

**14.2.11 Locomotives (L)**

Meaning: Locomotive control.  
Engines can get controlled with this command i. e. locomotive decoders are mentioned. At this it is possible to indicate a direct speed step or to accelerate or to decelerate (brake) around a definite number of steps. After a "braking on zero" you can accelerate on the "old" speed value. Light (function F0) can get turned on/off. As well it is possible to change the direction after slow braking and accelerating afterwards subsequently.

Use: For whole control of locomotives or respectively loco decoders.

Definition:  $L, n, x, g[, f, l]$   
 $x = \{U; B; S\}$   
 $g = \{ALT; L; M; H; V; R\}$

Parameter: three (n, a, g) or alternatively five (n, a, g, f, l)  
**n** locomotive (decoder) address  
 limits: numeric 0 to 9999  
**x** type, 3 possibilities:  
**U** = change direction with slow speed changing  
 (U from German: Umschalten)  
 (direction changing for Lenz with U, V or U, R also)  
 or  
**B** = decelerating(braking) / accelerating (slowly) or  
**S** = direct speed step  
**g** absolute speed (at a = **S**)  
 limits: numeric 0 to 14 (or up to 126) \*)  
 or elevation / reduction of the speed (at a = **B**)  
 limits: numeric -14 (or -126) to +14 (or +126)  
 or (only in connection with a=**B**)  
**g=OLD** speed before braking to zero (German code word „ALT“ is possible also)  
**g=L** to low, **g=M** to middle, **g=H** to high speed  
 or only at Lenz:  
 in connection with a=**U** (change direction)  
**g=V** change to forward  
**g=R** change to reverse  
**f** function F0 e.g. light (alternatively)  
**F** = function following with next parameter:  
**l** functions value  
**0** = off or **1** = on

\*) *values between 15 and 28 are used for Lenz and if using Lenz SW-version 2.x or later, values >28 are possible by Lenz SW-version 3.x only, otherwise only up to 14.*

Notes: With this command the locomotive control is executed. At the parameter a=U (turning back) the next parameters at Märklin and Arnold are dropped (with comma),

since there isn't any specific changing of the direction at these DIGITAL systems (yet).

If you use the "L, xx U" command, the engine is going slowly to zero changes direction and accelerates to the old speed slowly again. The function status remains unchanged.

If 2<sup>nd</sup> parameter "B" is used then a sign "+" or "-" must be given for the 3<sup>rd</sup> parameter. At processing time the speed -present stored in the computer- is taken into account to accelerate (+g) or reduce (-g) the given step number.

The breaks depend on default value of the "accelerate" and/or "decelerate" parameters" in the locomotive definition for the corr. locomotive number.

No query on the function F0 is possible for conventional/analogue locomotives.

**Examples:**

L, 10, S, 3, F, 1	= loco no. 10 will run with speed 3 and light ON.
L, 10, B, +3	= loco no. 10 accelerate speed at 3 steps without changing light.
L, 11, B, -14	= loco no. 11 braking to zero slowly (using 14 speed steps).
L, 12, U	= loco no. 12 braking to zero slowly, changing direction and accelerate to the old speed, without changing of light.

and for Lenz:

L, 11, B, -28	= loco no 11 is braking to zero (using 14 speed steps)..
L, 12, U, V	= loco no. 12 is braking to zero slowly, changing direction to <u>forward</u> and accelerate to the old speed, without no changing of light.

If engine is running forward, no commands are sent.

#### 14.2.12 Magnetic articles (M)

**Meaning:** Switch magnetic articles (e.g. turnout) or trigger singles magnetics. With this command the magnetic articles (like turnouts, signals, general magnetic articles) can be switched. If it is a one-drive magnetic article, then RED or GREEN determines only the decoder output address since there is only one position. Magnetic articles which are locked by a switch route command, they are switched nevertheless under schedule operation. You can query on e.g. "reservation" of a switch route before, though.

**Use:** Switching magnetic articles are basic tasks in the schedule operation.

**Definition:** M, n, b  

$$b = \{G;R;O;S\}$$

**Parameters:** two (n and b)

<b>n</b>	Magnetic article number, single magnetics number. limits: numeric 0 to 1024
<b>b</b>	Switching, 4 possibilities: <b>G</b> (green/straight/free) or <b>R</b> (red/turnout/stop/occupied) or <b>O</b> (orange) or S (special status) Single magnetics: <b>b</b> is the decoder output address (only red or green)

**Notes:** With this command switching magnetic articles such as turnouts or singles magnetics such as uncoupler is possible. There is an own command for signals but signals can be switched also by this. Is n=0 selected, the current value of the SET variable is used.

**Examples:** M, 1, G = switch magnetic article (turnout/signal) no. 1 to green.

M, 5, R = trigger magnetics (e.g. uncoupler) by red part of no **5r**.  
(only if no. 5 is a one-drive magnetic article, type ME)

#### 14.2.13 New loading of a schedule (N or N[#])

Meaning: New loading/reloading a schedule from the disk drive.  
A (new) schedule can (after) be loaded by this command on the same schedule number or on another. The variable after the name shows on the first line number for starting.

Use: For loading new schedules under special conditions or at the end of a program as well as for starting several schedules automatically by an only one.

Definition: N[ # ], d, n  
# alternatively schedule no. (1 to 9)

Parameter: one (d) or alternatively two (d and n)  
**d** full file name (device:\folder\file\_name) of a **sfp**-schedule file.  
**n** starting line of the schedule  
limits: 1 to 9999

Notes: With this command reloading of a new schedule is done automatically. If the invoking schedule no. is identical with the new schedule no.(command N without no.), then the old schedule is removed from the working memory fully and the new schedule starts at the line given number **n**. With the function N# parallel new schedules can be loaded with a special given number; the invoking schedule goes on.

Examples: N, C:\Program File\STW2001\STW\_001.sfp  
= the actual schedule will be replaced by STW\_001 and started at line 1.  
N3, PROGC.sfp, 10  
= the actual schedule loads a new schedule with name PROGC.sfp on schedule no. 3 and starting point is at line 10.

#### 14.2.14 Play sound (P)

Meaning: Starting a defined sound number or a given WAV file.  
With this command a sound can be started. Sounds are WAV files which must be just as available on the PC as a sound board, though. It has to be considered, that large WAV files may need a longer load time. If a WAV file is loaded and a previous is not fully played yet, then the first is interrupted abruptly.

Use: For acoustic support of definite situations.

Definition: P, d

Parameter: one (d)  
**d** defined sound symbol number.  
limits: numeric 1 to 99  
or  
full WAV file name (with device:\folder)

Notes: The existence of a sound board is necessary to this. The given WAV file is opened and played (further notes see chapter 8.5).

Examples: P, 1 = load and play the defined sound no. 1  
P, C:\Program Files\STW2001\WAV\STW\_001.WAV

= load and play the named WAV file

#### 14.2.15 Queue commands (Q or Q[#])

**Meaning:** Processing of queues  
With this command queues can be worked on. Variables can be stored in up to 9 fields for every schedule number, meaningful for a processing. You can imagine such queues as a grid: every queue represents a column and the (up to 9) single entry values are rows.

**Use:** For complex tasks e.g. to the appointment of a succession of trains, for storage of definite (locomotive) speeds or to the allocation of definite processing values, lap counters to e.g. contacts to e.g. contacts. There are more possibilities by access to other queues or to the SET variables of other parallel running schedules.

**Definition:** Q[#], x, n, w  
x = {A;E;G;M;P;S;V}  
# alternatively schedule no. (1 to 9)

**Parameters:** three (x, n and w)

**x** type, 7 possibilities:

**A** start-point of a queue  
**E** expand- / end-point of a queue  
**G** go to field no.  
**P** plus/add Value w  
**M** Move SET-Variable to the actual field of a queue  
**S** step queue forward/backward  
**V** takeover queue value into SET variable

**n** queue number

limits 1 to 9

**w** value, field no. or step

limits: for value at "A" and "E": 1 to 9999

for value at "P": -9999 up to 9999

for step (at "S") or field no. (at "G"): -9 to +9

This parameter is dropped at "V" (with comma)

You can define and use for every schedule up to 9 queues by **n**. Every queue of **n** consists of up to 9 fields which can contain a numeric value **w** from 0 up to 9999. Using P parameter and the sum of value w is out of limits, the definite limit will be used.

**Notes:** There are seven variants of the queue command:

1. Q, A, n, w first value of queue no. n is w
2. Q, E, n, w next or last value of queue no. n is w
3. Q, G, n, w go to field w of queue no. n
4. Q, M, n move SET variable to actual field of queue no. n
5. Q, P, n, w Add value w to actual field of queue no. n
6. Q, S, n, w step forward/backward in queue no. n at w fields
7. Q, V, n takeover actual value of queue no. n into SET variable.

With P, w (5th possibility) you can construct e.g. lap counters. Actual values can be displayed as "loco number" (by H-command) at a virtual contact.

With **w** steps (6th possibility) a queue is working forward (value = positively to +9) and backward (value = negatively to -9). Every queue looks like a "wrap around ring".

Metering at contacts and e.g. subsequent choice of the right engine in a block operation can be reached by this way. The command "Q, M, n" is the opposite of the command "Q, V, n" in praxis.

Examples: These are example lines of queue no. 1 working code:

Q, A, 1, 20	1st queue: 1.(loco) no. = 20
Q, E, 1, 30	1st queue: 2.(loco) no. = 30
Q, E, 1, 40	1st Queue: 3.(loco) no. = 40
Q, V, 1	takeover actual value 1. queue to SET variable (it is = 20)
Q, S, 1, -1	step 1st queue backward 1 field, so the actual value of queue no. 1 is = 40 (wrap around).
Q, S, 1, 2	step 1st queue forward 2 fields, so the actual value of queue no. 1 is now = 30.
Q, G, 1, 3	go to 3. field of queue no. 1, so the actual value of queue no. 1 is = 40
Q2, V, 1	the SET variable of schedule no. 2 gets now the actual value =40.

A lap counter is better to realize with all-purpose counter.

#### 14.2.16 Call subroutine (R)

Meaning: Call a subroutine with the name d.  
With this command a subroutine can be invoked within a schedule. You can submit a variable which is stored to the SET variable automatically. Recursive skips or jumps into another subroutine are not allowed.

Use: To the simplification of a program at frequent, same routines.

Definition: R, d[ , w]

Parameters: one (d) or alternatively two (d and w)

<b>d</b>	subprogram name (1 to 12 digits) alphanumeric/capital letter (mixed also)
<b>w</b>	numeric value -> SET variable (alternatively) limits: 0 to 9999

Notes: With this command a subroutine is invoked. The numeric variable can alternatively be given to the call. This value is then used as new "global SET variable" of the corresponding schedule number, and a possible variable 0 (zero) is replaced by the SET variable in the next (subroutine) commands. There is one "global SET variable" only for every schedule.

The total number of names (subroutines and !-addresses) are defined by the initialization parameter "Max addresses per schedule". A variable check doesn't take place.

Every subroutine must be terminated by command "E, U", since otherwise an not foreseeable processing enters. Subroutine calls in subroutines (recursive calls) are not allowed.

Example: R, PULL\_UP, 20= call subroutine "PULL\_UP" with variable 20, which now will be the SET variable.  
So e.g. you can realize a starting of a special locomotive (no. 20) in this global subroutine.

#### 14.2.17 Signals (S)

Meaning: Switch signal no. n to b.  
With this command the signals can be switched. Signals can be switched by the M-command (switch magnetics) also. Signals which are locked by a switch route command, they are switched nevertheless under schedule operation.: You can query on e.g. "reservation" of a switch route before, though.

Use: Switching signals are basic tasks in the schedule operation.

Definition:  $S, \{n, b\}$   
 $b = G; R; O; S$

Parameters: two (n and b)  
**n** signal number  
 limits: numeric 0 to 1024  
**b** status, 4 possibilities:  
 G (green/proceed) or  
 R (red/stop) or  
 O (orange/slow down) or S (special status)

Notes: There is a general command for magnetic articles, but all magnetics can be switched also by this. If n=0 is selected, the current value of the SET variable is used.

If using signals with more than 2 inputs switching differs for types of magnetic article types. See chapter 8.7

Example: S, 18, O = switch signal no. 18 to SLOW DOWN.

#### 14.2.18 Model time set and/or waiting (T)


Meaning: Wait until the given model time (h:m) is reached, switch or stop the clock:  
 With this command the model time is switched on a certain value or the clock can be stopped. A definite time value can as well be waited for. When waiting until a definite model time has to be reached, the respective schedule is stopped; other parallel running schedules go on. The model time clock can be switched also manually.

Use: Break control in the program and departures at model time.

Definition:  $T, h, m[, c]$   
 $c = \{S; H\}$

Parameters: two (h, m) or alternatively three (h, m, c)  
**h** model hour  
 limits: numeric 0 to 23  
**m** model minute  
 limits: numeric 0 to 59  
**c** code sign  
**S** = set model time clock to the given time and start  
**H** = stop model time clock

Notes: With this command the corr. schedule number can be queried a particular model time, the processing then runs only far, if the model time corresponds to the comparison. The comparison is done by "greater or equal than" ( $\geq$ ). With the 3rd parameter the watch is changed to a special value or the clock is stopped.

Remarks: You can specifically start or change the model time during the automatic processing later by double click on digital clock, too. It's possible to skip the clock command by  icon also.

Examples: T, 13, 15 = Wait until model time is 13:15h.  
 T, 0, 0, S = Switch model time to 00:00h.

T, 0, 0, H = stop model time clock.

#### 14.2.19 Subroutine (start) name (U)

**Meaning:** Starting point of the subroutine with the name d.  
A begin of a subroutine is defined with this command within a schedule. Every subroutine must be terminated with an end command (E, U = end of subroutine). Recursive skips or skips into another subroutine are not allowed in a subroutine..

**Use:** To the simplification of a program at frequent, same routines.

**Definition:** U, {d}

**Parameter:** one (d)  
**d** subroutine name  
1 to 12 signs alphanumeric (capital letter and digits, mixed also)

**Notes:** With this command the one starting point of a subroutine is defined. The total number of the names (subroutines and !-addresses) are defined by the initialization parameter "Max. addresses per schedule". A variable check doesn't take place.

Every subroutine must be terminated by the command "E, U", since otherwise an not foreseeable processing enters. Subroutine calls in subroutines (recursive calls) are not allowed. You can't jump to a subroutine of another schedule number.

**Example:** U, RUN\_LOCO = Starting point of subroutine RUN\_LOCO

#### 14.2.20 Set variable (V or V[#])

**Meaning:** Set the "global SET variable to value w.  
With this command the SET variable can specifically to a certain value. It is possibly to submit a value to the SET variable of another parallel ongoing schedule. Every schedule no. has its own SET variable.

**Use:** To the inter-storage or handing over of variables.

**Definition:** V[ # ], n  
**#** alternatively schedule no. (1 to 9)

**Parameter:** one (n)  
**n** value with limits: 0 to 9999

**Notes:** With this command the global SET variable of a schedule can be defined to the given value. You then can access e.g. in the own subroutines on this variable.

**Example:** V, 12 = give SET variable the value 12  
V2, 29 = give SET variable of schedule no. 2 the value 29

#### 14.2.21 Repeat x-times (W)

**Meaning:** Repeat the following commands z times.  
With this command a repeating loop is initialized. The end command must be at the end of every repeating loop (E, W = end repeating loop). All commands within this loop are executed as many times as in the corr. defined value.



<u>Use:</u>	For routines used repeatedly or long timing loops.		
<u>Definition:</u>	W, z		
<u>Parameter:</u>	one (x)		
	<b>z</b>	repeating counter with limits: 0 to 999	
<u>Notes:</u>	Is x=0 selected, the current value of the SET variable is used. With this command a repeating loop is initialized. The end command must be at the end of every repeating loop (E, W = end repeating loop).		
<u>Example:</u>	W, 10	=	repeat 10 times the next following commands (until E, U)

#### 14.2.22 Switch route commands (X)

<u>Meaning:</u>	Trigger, lock/reserve, unlock or wait for a special status of switch route f. Switch routes can be switched, reserved (locked) and unlocked with this command. It is hereby possible furthermore to wait for a reservation of a switch route or the release. With the IF-command you can query the status of a switch route. You are not able to switch <u>manually</u> a magnetic article defined in a locked switch route. Switching of a reserved switch route <u>manually</u> isn't possible also. Switch routes must be defined within the switch route definition window.		
<u>Use:</u>	Reserving tracks e.g. in a railroad station as well as for the control of a shaded railroad station or switching a larger number of turnouts etc.		
<u>Definition:</u>	X, f[, x s] x = {S;R;F;W}		
<u>Parameters:</u>	one (f), two (f, x) or three (f, x, s)		
	<b>f</b>	switch route number limits: numeric 0 to 512	
	<b>x</b>	type	
	<b>S</b>	= switch route if using only 1 <sup>st</sup> variable (f) it's identical with "switch route"	
	or		
	<b>R</b>	= reserve (lock) and set switch route or	
	<b>F</b>	= release switch route or	
	<b>W</b>	= waiting until switch route is...	
	<b>s</b>	<b>F</b> = free or <b>R</b> = reserved	
<u>Notes:</u>	Is f=0 selected, the current value of the SET variable is used. With this command switch routes can be mentioned, which ones were defined and loaded with the help of switch route definition window. The command executes practically the same (with only a parameter f) like a click on the switch route start- and target-symbols with the left mouse button or the equivalent function key combination. Free switch routes symbols are drawn with yellow background and elements with white subdivision. Reserved switch routes symbols and elements are displayed with red subdivisions. Is f=0 selected, the current value of the SET variable is used.		
<u>Examples:</u>	X, 1	=	set switch route no. 1, same as manually <Ctrl> <F1>.
	X, 1, S	=	set switch route no. 1, same as manually: <Ctrl> <F1>
	X, 2, R	=	reserve and switch route no. 2
	X, 3, F	=	release switch route no. 3
	X, 4, W, F	=	wait until switch route no. 4 is free.

## 14.2.23 Switch route commands via Marker (Y)

**Meaning:** Get a value from marker number n and trigger, lock/reserve, unlock or wait for a special status of switch route by using this value as switch route number. This command has same possibilities as switch route command X, but here switch route is not called directly. At first its number is fetched from a marker number.

Switch routes can be switched, reserved (locked) and unlocked with this command also. It is hereby possible furthermore to wait for a reservation of a switch route or the release. With the IF-command you can query the value of a marker. You are not able to switch manually a magnetic article defined in a locked switch route. Switching of a reserved switch route manually isn't possible also. Switch routes must be defined within the switch route definition window.

**Use:** Indirect reserving tracks e.g. in a railroad station as well as for the control of a shaded railroad station or switching a larger number of turnouts etc via a stored value of a switch route number.

**Definition:**  $Y, n[, x s]$   
 $x = \{S;F;R;W\}$

**Parameters:** one (n), two (n, x) or three (n, x, s)

**n** marker number  
 limits: numeric 1 to 99

**x** type

**S** = set switch route  
 if using only 1<sup>st</sup> variable (f) it's identical with "switch route via marker"

or

**F** = release switch route via marker or

**R** = reserve (lock) and set switch route via marker or

**W** = waiting until switch route via marker is...

**s** **F** = free or  
**R** = reserved

**Notes:** With this command switch routes can be called via a marker number for switch routes defined and loaded with the help of switch route definition window. Free switch routes symbols are drawn with yellow background and elements with white subdivision. Reserved switch routes symbols and elements are displayed with red subdivisions.

**Examples:**

Y, 1	=	via marker-no. 1 set switch route. If marker value is e.g. 4, so switch route no. 4 is set.
Y, 1, S	=	via marker-no. 1 set switch route (see above)
Y, 2, R	=	via marker no. 2 reserve and switch route.
Y, 3, F	=	via marker no. 3 release switch route
Y, 4, W, F	=	via marker no. 4 wait until switch route is free.

## 14.2.24 Time delay (Z)

**Meaning:** Provide time delay of W (1/10 seconds)  
 With this command a time delay can be installed in the processing of a schedule. If other schedules run parallel, then the processing of this is untouched. The detail is defined in 1/10 seconds.

**Use:** For the control of breaks, stays.

**Definition:**  $Z, t$

Parameter: one (t)  
**t** time (in 1/10 seconds)  
 limits: numeric 0 to 999

Notes: With this command time delays can get until approx. 100 seconds scheduled. Longer times are conceivable in connection with loops. The time is defined in 1/10 seconds, well, e.g. 15 = 1.5 seconds. The time delay is controlled in the computer by timer function. Every schedule no. has its own timer.

Example: Z, 20 = wait 2.0 seconds

#### 14.2.25 Control commands (/ = slash)

Meaning: Activities during the schedule processing.  
 By this command different processing activities can be executed. It is possible, to display an information (without reply), to show a message (with reply) or to run a TRACE specifically in definite sections. Information is displayed in color CYAN on the field of the magnet article names. At messages the issue is displayed in a window in the color CYAN. At this message you can answer only with "OK"; the complete processing also could be terminated by the "Exit" icon, though.

Use: For processing supervision (operator messages) and as a test help.

Definition: /, {x, t}  
 $x = \{ I; M; T \}$

Parameter: two (x, t)  
**x** type  
**I** = display an information without answer or  
**M** = show message with answer or  
**T** = switch TRACE on or off  
**t** for a=I or a=M:  
 alphanumeric text (max. 30 digits)  
 for x=T:  
**t=0** switch TRACE OFF  
**t=1** switch TRACE ON

Notes: The first two types of the command are planned as operator communication. The last form serves testing purposes, special to supervise parts of a schedule. Trace files are stored to a disc file directly, so it may extend to a very large file, particularly if using endless loops (CAUTION!). At information has to be taken into account that this is issued on the field of the magnetic article names so that it isn't typed over by other schedule commands in the display; but information can be deleted by manual switching of a magnetic article. Information of another schedule number destroys information also. The window of a message appears in the straightly current range of the track layout. The value of the actual SET variable can be moved into output information/message by code word **&SETVAR&**.

Examples: /, I, Train is now in line no. 2 = information (no answer)  
 /, I, Loco no. &SETVAR& is in shadow station!  
 ( e.g. at actual &SETVAR& of 20, following is displayed:  
 Loco no. 20 is in shadow station! )  
 /, M, A new run? = message to answer  
 /, T, 1 = switch TRACE on

### 14.2.26 Definition of a (GOTO) address (!)

Meaning: To this address you can jump  
With this command a GOTO address is defined within a schedule.  
G-Commands are able to jump to this address.

Use: Absolutely required to the realization of a schedule.

Definition: !, a

Parameter: one (a)  
**a** name of a GOTO address  
(1 to 12 signs alphanumeric (capital letter or digits, mixed also))

Notes: With this command (! = exclamation mark) a specific GOTO address can be defined.  
The total number of the names (for subroutines and !) are defined by the initialization parameter "Max. Addresses per schedule".

Example: !, START = jumping address with the name START

### 14.2.27 Remark line (\*)

Meaning: Line with remarks  
With this command remarks can be installed in a schedule. They serve for program overview. Remarks are loaded but no true activity is done. Remark lines should get so built-in however, that these don't occur in loops frequently used, otherwise processing may slow down uselessly.

Use: To the better readability of schedules.

Definition: \*, text or \* text

Parameter: one (text)  
Arbitrary text up to max. 76 signs

Notes: The remark line doesn't have any influence on the processing, it serves only the documentation. They also are held up in the working memory table and mentioned during the processing briefly, so remark lines should -if possible- therefore be hardly created in loops frequently passing.

Example: \*, Here starts the subroutine Run\_LOCO

## 14.3 Schedule Editor STWEdit

### 14.3.1 Schedule Editor General

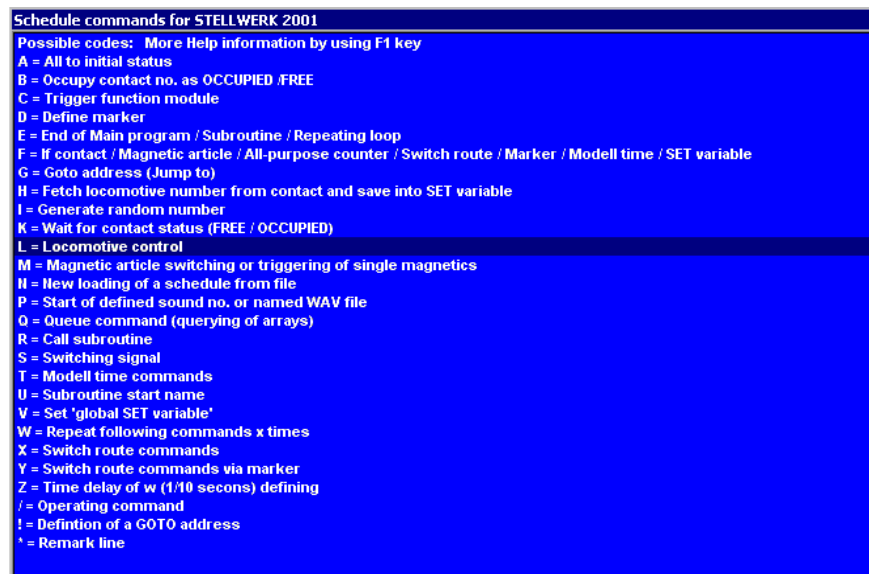
To create or change schedules for STELLWERK 2001 you can use every Windows Editor (e.g. Notepad). But you have to check for type (extension). STW2001 is using **sfp**<sup>\*</sup>) and some editors create files often with txt, maybe your file has to be renamed.

You can create or change schedules by this **STELLWERK SCHEDULE EDITOR** as a Stellwerk 2001 version 10 specific program and it is offered free (e.g. via Internet).

Program "STELLWERK Editor" (**STWEdit**) is a graphic oriented utility for STW2001 model railroad control program.

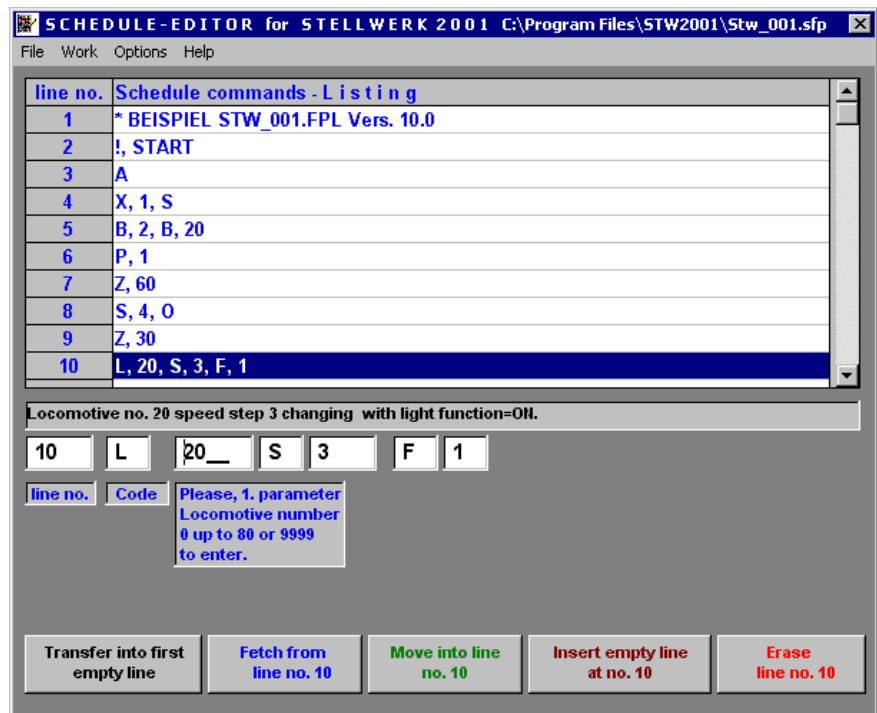
It is developed with Windows XP and processing is also possible with Windows'98, Windows ME and Windows 2000, but running with Windows 3.1 and WfW 3.11 is not possible.

Program exists of two parts:



1. left:  
Command list  
with all usable  
commands.

2. right:  
Real Editor with  
input area and  
control elements.



<sup>\*)</sup> **Note:** Schedule data (sfp) = Schedule File Program

Single parameters of schedule commands are shown and explained for every command code.

All available commands of STELLWERK 2001 are described exactly at chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** "Schedule commands". Furthermore you find command descriptions within help file of STWEdit

There are following **Menu items:**

**File**  
**Work**  
**Options**  
**Help**

### 14.3.2 Schedule Editor Menu items

#### File

In this part of menu you'll find following details:

**New schedule file, Open schedule file, Save schedule file and Program end.**

##### At **New schedule file**

You can create schedule data. An available schedule with its data will be erased after a safety question.

##### At **Open schedule file**

An available schedule file can be read in from disk and changed or expanded. File type (extension) is sfp.

##### At **Save schedule file**

A created schedule can be saved at disk. File type (extension) is sfp.

##### At **Program End**

It's the normal program termination. A safety indication for saving the track layout appears, if the schedule data are changed or new created.

If windows icon x or key combination <Alt> F4 is used, so program will be terminated also.

**Furthermore the last four schedule names are displayed. They can be loaded directly.**

#### Work

This part of menu includes following details:

##### **Search digits and Replace digits**

##### At **Search digits**

It's possible to search for single digits or words.

##### At **Replace digits**

It's possible to search for a single digit or words and replace with new parts

#### Options

This part is shown in menu as text

##### **"Language German" or "Sprache Englisch"**

Using "Language German"

all text of the program will be changed to German language. If you want the permanent use of the German version, it's better to install German version, because at program start the menu will be displayed in German directly.

If menu item "Sprache Englisch" (German version active) is displayed, you can change by toggle mode to "English/US" language.

Other language alternatives will not be delivered.

#### Help

A context obtained **help** is a significant essential of Schedule Editor that is to give a detailed support as narrow as possible to the indicated processing situation.

Base is Windows Help System which was used for the integration. Help can be invoked as follows:

1. Via menu "Help": At the begin the contents directory is displayed or else the current help text.
2. With <F1> button the current help text is always displayed.

In context of Help System you can access further points, jump to special sections or search for index names.

### 14.3.3 Editor command buttons and change possibilities

Program exists of a **main window right** and a **tool window left**.

All existing schedule commands are listed in the left tool window. The schedule command type is moved into the main window by clicking the special line. All inputs will be done in the

main window. 99 empty lines are displayed at start, but line numbers will increase by 10 lines if there is an input on last line. Greater areas can be attached after input of values by e.g. button "Move to line xx" (up to maximum size).

The **separate parameters** will be entered and checked in the **lower part of main window**. Number of possible inputs depends on schedule command type. Notes are given below input fields.

A **grid** is displayed in the **upper part of main window**, here commands can be entered directly but they are not checked.

Erasing of digits in a line is possible by using "backspace" key. "Enter" key turns to next line.

Double clicking of line number is moving all variables into the lower part of the main window for changing and/or checking. Line numbers can not be changed directly.

You can use 5 command buttons for transfer data from upper to lower part or reverse:

**Transfer to next empty line**

The whole schedule command will be built together from lower fields to the next empty line number.

**Fetch from line no. xx**

Schedule command of actual, displayed line number will be transferred into the separate lower fields for further working.

**Move to line no. xx**

The whole schedule command will be built together from lower fields to actual, displayed line number.

**Insert empty line at no. xx**

An empty line will be inserted at active, displayed line number. All next lines will be moved down.

**Erase line no. xx**


All parts of active, displayed line number will be erased.





## 15 Control and drive

### 15.1 General -Processing bar-

Real processing of the model railroad operation is started by  icon or via the menu item "Processing / **First start**". There is the possibility of "Processing / **Continue**" in addition after a first run or after "Processing / Stop". Condition for the processing is loading a track layout previously or defining at least one symbol. Other icons are displayed at processing mode than at construction time.

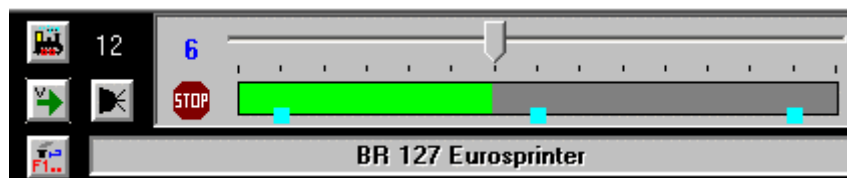
Selecting a locomotive, engine control (speed, direction changing, light) and switching/triggering of magnetic articles/switch routes, starting of schedules and model time clock are possible.

A processing bar is played now in lowest part of screen with two areas

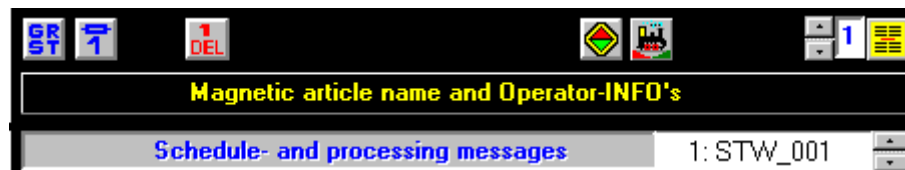
left:: **Locomotive Control** for selecting engines and a/o.

right: **Display- and switching** for magnetic articles and schedule info.

**Graphics:** Processing bar: Locomotive control part



**Graphics:** Processing bar: Display and switching part










Both parts will be explained in next chapters in detail.

### 15.2 Drive and control of locomotives

The left part of the processing bar contains components for locomotive control, as engine selection with wanted direction, speed as well as light.


From the left to the right there are following icons:

- |                         |  |
|-------------------------|--|
| <b>Loco symbol</b>      |  Select an engine by this loco icon. Details see chapter 15.2.1 "Locomotive selection".   |
| <b>Function symbol</b>  |  Parameters for function modules but <u>not for Arnold with Märklin Interface</u> can be defined with this function icon and the corr. functions can be triggered. Details see chapter 15.3 "Function modules".   |
| <b>Loco number</b>      | Number of the selected engine is displayed next to the locomotive symbol.  |
| <b>Light symbol</b>     | Light icon reports (at toggle mode) the function F0 for light "ON"  and light "OFF"  . The function changes from "ON" to "OFF" by every click for the selected engine. |
| <b>Direction change</b> | Arrow icon  triggers a direction changing for engines (with display   |

<b>symbol</b>	to the "right / forward / F" or to the "left / reverse / R"). Details see chapter 15.2.2 "Changing of engine direction".
<b>Speed</b>	Current speed as value is displayed under the "Direction change" symbol.
<b>Stop icon</b>	By pressing Stop icon  the selected engine is stopped abruptly.
<b>Horizontal slide with thump</b>	Locomotive speed can be controlled via mouse with the thump  at a horizontal slide.
<b>Standard speed</b>	Three small cyan colored squares (fixed positions) are marking standard speed points (L=low, M=middle, H=high) for locomotives. Speed can change directly by clicking upon these three squares.
<b>Bar display</b>	Bar display (green) shows graphic speed value. Details are explained at chapter 15.2.1 "Locomotive selection" and the following.
<b>Locomotive name</b>	The user defined long name of selected locomotive is displayed below the horizontal slide.

### 15.2.1 Locomotive selection

A selection of engine is done by:

- stepwise with  loco icon or
- input of an engine number (up to 4 digits) via keyboard or
- using an engine of the loco bar.

Input of locomotive numbers via keyboard with less then possible digits for max. locomotive number must be terminated by the <Enter> button. (e.g. if input less than 4 digits and max. loco-no. is higher than 999, or if input less than 2 digits and max. loco-no. is between 10 and 99). Furthermore the locomotive must be defined by locomotive definition window.

By click on the loco icon an engine is selected from the current matrix, but please, note:



1. If there is no defined locomotive, so switching starts with no. 1 and in steps of 1 with every click, in which the right mouse button is switching forwards and the left mouse button backward.
2. If one or more locomotives are defined, then only the defined locomotives are displayed with every click, other numbers aren't responsive. The right mouse button is used to step forward and the left one to step backward also here.
3. You define the largest DIGITAL engine number committed in the counting chain by initialization parameter "Highest locomotive number". The conventional/analogue engine no. 0 is always available.
4. If a long name is available for current locomotive, then it's displayed on lower text display.

Further control input can be executed via mouse and/or keyboard; speed and direction can also be controlled by the keyboard.


A locomotive number which was entered at Märklin/Arnold by the speed control unit or remote control directly is not obtainable for the PC as long as this one is shown there. At the Lenz DIGITAL plus System a note is displayed (at locomotive name) and the engine can subsequently be controlled by the PC.

**Locomotive numbers higher than 80 for Märklin/Arnold can't be controlled by Märklin Interface, also e.g. the Control 80f can use these (Hardware Interface limitation!).**

### 15.2.2 Changing of engine direction


Changing direction of selected engine is executed with arrow icon  or  as well as via button combination <Ctrl><Arrow to left> or <Ctrl><Arrow to right>. The engine gets the speed 0 slowly and gradually; after direction turning back it accelerates slowly to the old speed again. The direction is clarified by the blue arrow on the icon at the right. Function F0 (light on/off) remains unchanged. An aimed switching to forward with right mouse button or backward with left one is possible only, if using Lenz DIGITAL plus System.

### 15.2.3 Stop locomotive

The red symbol "STOP"  serves for locomotive control. The selected or still active engine is stopped with speed zero immediately, i. e. it is an abrupt brake possibly. (Lenz: at first internal transmission of speed 1). The icon has a bright red color at speed zero. At the keyboard: two ways can be used to brake an engine:

**<Pos1>** key stops **immediately** and  
**<End>** key stops by steps **slowly**.

### 15.2.4 Speed input

The first type of speed control is executed by a thump  and displayed in a horizontal slider with green color. The single steps correspond to driving steps of min. (e.g. 1) to max. (e.g. 14). By "drag" of the "thump knob" over the range of slide the speed is selected and immediately transferred to the engine.


Also speed change for a selected engine is possible by the keys:

**<Arrow right>** key to **accelerate speed** and  
**<Arrow left>** key to **decelerate speed**.

The processing bar must be active (according to Windows® 98/ME/XP/2000), i.e. it has to be selected and a locomotive number must be shown here.

Current speed is represented as a bright green bar and current speed value is displayed next to the light icon on the right.

### 15.2.5 Loco function (F0/light)


The topic "locomotive function F0=light" is controlled by light icon  at toggle mode and the actual status is shown.

Remark:

*Only the basic function F0 "light on/off" is supported here, other functions are supported by the function icon, see next chapter.*

## 15.3 Function modules

Controlling of function modules is integrated completely for the Lenz DIGITAL plus system. Using function modules at Märklin DIGITAL systems it's only possible in connection with central units 6020 or 6021 for alternating current system; you can't use it with central units 6027 or 6030 as well as at Arnold with Märklin Interface, as said by company Märklin.

Function icon  is visible if using the possible Interface types. So it's sensible for Märklin direct current systems to use the initialization parameter:

Digital System/Interface type" = "Arnold with Märklin Interface (6050;6051)", because here are the same restriction as using Arnold.

**Remark:** Function triggering may be possible now for newer Arnold Central Units. If you are using such a unit, run program with entry "Digital System/Interface-Type" = "Märklin (6050,6051)"

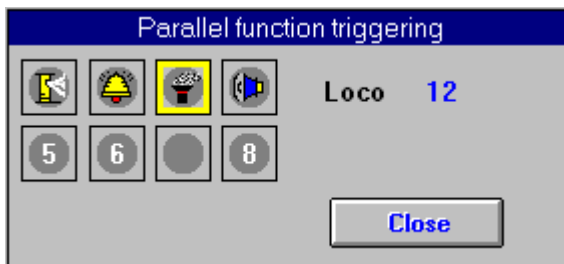
A special window is invoked. It depends on type of triggering the function keys. In this window you input wanted function e.g. F1 sound or F3 smoke on/off etc.

At **parallel function triggering** the used function is executed as button input directly.

At **serial function triggering** (especially for LGB locomotives with Lenz Digital-System) the F1-function is triggered in series corresponding to the button number automatically.

At Lenz DIGITAL plus System locomotive function status is read-out for selected engine automatically.

**Window:** Function module parallel and serial triggering



**Function address:**

Input of the address of desired function module address (1 to 99 or up to defined max. loco no, for Lenz and Märklin)

**parallel triggering:**

Function keys F1 up to max. F12 or to defined maximum value (in loco definition window) can be set or reset by "Control buttons". If one function is set, a yellow frame is drawn (here at smoke F3).

**serial triggering:**

Function keys F1 up to max. F12 or to defined maximum value (in loco definition window) can be set or reset by "Control buttons". Triggering follows (e.g. at 5 the F1 function is sent 5times). The init status of F1 is set by starting/reset the central unit. The status of single functions can't recognized.

**Window can be moved to any position within track layout and if locomotive number is changing the new functions will be displayed.**

**Continue:**

By this button only window is closed with no triggering.

If you are using the Märklin- or the Lenz DIGITAL System a special schedule command (C) to trigger functions is available also.








## 15.4 Switching and triggering

The right part of processing bar includes icons and display fields for switching magnetic articles, for reserving and releasing of contacts and for starting of schedules. There are the following icons from left to right:

**Initial status (GrSt)**



(GrSt=general reset status) to reset all magnetics and contacts to their initial status (see chapter 15.4.2).

<b>Chain symbol</b>	 You can decide between single- and chain-  switching via toggle mode by this icon (see chapter 15.4.3).
<b>Trigger chain</b>	 Icon to start a chain to switch (more described at chapter 15.4.4).
<b>Delete symbol</b>	 To erase one step of a chain and/or skip one schedule command by the icon in a schedule (see chapter 15.4.5).
<b>Contact reserving</b>	 By this icon a contact can be occupied or released manually (see chapter 15.4.6).
<b>Loco definition</b>	 Definition/changing/deleting one special locomotive number with transferring or erasing from loco bar (see chapter 15.4.7).
<b>Start of a schedule</b>	 Start of one or all loaded schedules (see chapter 15.4.8)

### 15.4.1 Switching magnetic articles

All magnet articles are switched by click (on middle of the graphic character) to the left, right or middle mouse button. In principle, hold always for this:

- **Left mouse button signals the switching wish: "Turn to red".**
- **Right mouse button signals the switching wish: "Turn to green".**
- **Middle mouse button signals the switching wish: "Turn to orange".**


Remark:

A three-buttons mouse is recommended.

At the single magnetics (e.g. uncoupler) you can trigger with both buttons (right or left); it will change to defined initial status (GrSt) always.

After clicking, the magnetic article number appears at the processing board in the right part (color like switching wish RED/GREEN/ORANGE); a remark is displayed if defined to this magnet article.


The switching is done now in dependence of selected switching type (defined by chain symbol):

1. Direct triggering is the standard with displaying the new switching position.
2. If you use chain switching, then real triggering of all "pre-set" magnetics is done later by click on icon  ("trigger chain" see chapter 15.4.4); the last selection can be ignored by "deleting" icon (see chapter 15.4.5).




You find the description of switchover from single to chain switching and reverse in chapter 15.4.3 and the following.

**At Lenz System the current magnet article status can be updated by the <F5> key during processing time, e.g. if alterations executed by the remote control.**



### 15.4.2 Initial status (GrSt)

This icon  serves to set all magnet articles and contact tracks (of the loaded track layout) to their defined "initial position" (general reset status). All magnet articles (but no single magnetics) get ascending switched behind each other. Contact tracks as well are set to their "theoretical" initial position.


### 15.4.3 Single- / chain switching



You can change as "toggle mode" between default single switching and chain switching (series) by symbol  "single member of a chain". If you change to chain switching, then another icon picture  appears (chain) and an additional icon  to trigger the chain is visible (see chapter 15.4.4). As long as you are using chain switching, no direct switching are executed at click on the track symbols (exception: the maximum value=20 was reached), The respectively last click can be ignored by delete icon (see chapter 15.4.5). When changing to single switching all existing requests still are deleted.

### 15.4.4 Trigger chain switching


If this icon  (symbol of a chain) is available, i.e. you changed from single to chain switching, then all "selected" magnet articles of the track layout can be switched behind each other as a series by triggering with this other  icon. At triggering time only the detail appears in the text display as many switching were part of the series.

### 15.4.5 Delete order (1 DEL)


This icon  has a double function:

1. During processing time -and chain switching is activated- this icon serves to forget the order of a magnet article selected last, i. e. a wish of a switching is ignored.
2. If the schedule selection  with the shown number  is active, then the current command will be skipped without further information. E.g. this function is very useful, if waiting for a contact position (free or occupied) or a particular model time, however, this don't occur on account of special conditions, and so corr. schedule can be continued.

### 15.4.6 Occupy / unlock contact tracks

A contact track known by number can be occupied specifically with a locomotive number or -if necessary- be defined as free again by this special icon . A new window appears.

**Window:** Occupy / unlock contact track



#### Contact number:

Input of valid contact number.

#### Occupied by loco no:


Input of a valid engine number;  
If the field is empty, contact no. will be set to "FREE".

The loco remark/name of selected engine will be displayed, if a remark is available.

Normal end by **OK**, the order will be started.  
Using **Cancel** button, nothing is done after closing window.

This window will be opened by **two slow clicks with right mouse button** (no double click!) on the specific contact track no. also.

### 15.4.7 Selecting a loco no. for changing

This is an icon  to define, change or delete a special locomotive number and -if wanted- to transfer or delete in the loco bar. With the help of the locomotive icons in the loco bar a faster control of the locomotive speed is possible for these different locomotives.

The loco definition window is opened and further details are requested. Please, remind that both checkbox options must be selected:



Details see chapter 11.

The locomotive speed then can be varied as follows with the mouse button at the loco bar:


right button	=	1 step higher immediately
left button	=	1 step lower immediately
middle button	=	slow stop and change direction.


All locomotive items are taken into active display of the processing bar simultaneously. Icons of loco bar are without function during direction change or "slow stop".

Remark:

At loading STELLWERK 2001 file (\*.stw) all defined locomotives with right entries are moved to the loco bar automatically.

### 15.4.8 Start schedules

This icon  has to be pressed only if alternative "**Schedule control**" was selected. Schedules can be started by selecting a special schedule number. If all schedules shall be started then "A" has to be selected by the scroll bar. If one schedule at least is active, then

icon  is displayed "as pushed". All running schedules will be terminated abruptly by new pushing this icon. The schedules should normally be stopped respectively by a "schedule end command". Another method is the query of a not direct used contact or the model time by "IF"- and a following "END"-command. A schedule can be interrupted via the menu "Processing / Stop" at his straightly active command furthermore.

## 15.5 Controlling by menu bar

In menu bar you find several icons to control during processing as well as menu items. These are from left to right:

### Doubleheading



Assembling or dissolving of a doubleheading  
(Details see chapter 17.1)

### Programming loco decoder (only Lenz)



Programming of locomotive decoders using  
Lenz Digital plus System (see chapter 17.2).

### Com/Reset symbol



Triggering Reset/GO-function (see chapter 15.5.1)

### Emergency stop symbol



All locomotives can be immediately stopped to speed zero (emergency stop!) by this STOP-icon; magnetic articles can be switched still subsequently. This special feature will explained in the chapter 15.5.1 "Go and emergency brakes (STOP and ALL OFF)" more detailed




**ALL OFF symbol**

The whole equipment operation is interrupted by this "ALL OFF" icon immediately. No further input can be executed (apart from GO and <F4> icon). This special feature will be explained in the chapter 15.5.1 "Go and emergency brakes (STOP and ALL OFF)" more detailed.


**Digital clock display**

Display and set, start or stop of a model time clock (see chapter 15.5.2)


**15.5.1 Go and emergency brakes (STOP and ALL OFF)**

Icon  corresponds e.g. to green GO button of the Märklin control unit or the F1 function key at the Lenz remote control. This icon is used for a RESET of interface processing. With this button emergency brake ("STOP") is resolved again and locomotives get their old speed slowly.



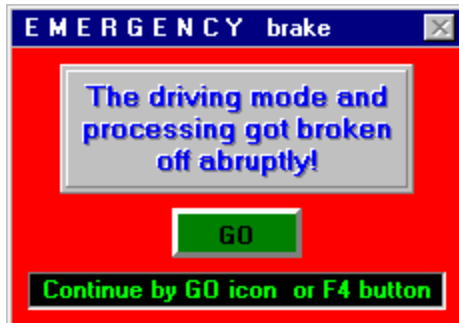
By pushing the 1<sup>st</sup> "emergency brake"  all locomotives immediately get the speed zero (are abrupt braked!). You are able to execute other inputs such as magnet articles switching.



The 2<sup>nd</sup> emergency brake (all off)  corresponds e.g. to red STOP button of the Märklin control unit or to the F0 function key at Lenz remote control.

With pushing the "ALL OFF" icon all activities are frozen. This means for the program STW2001, that no input is possible, there is no power on tracks. A special (flicker) window is opened and only by **-in this window available- GO button or the <F4> button of the keyboard** processing will be continued.

**Window: ALL OFF**



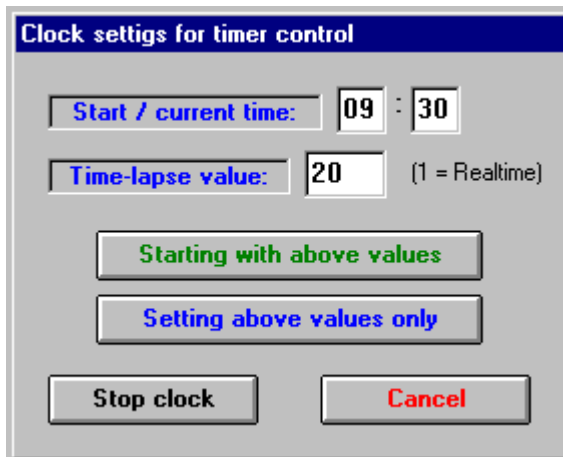
The following function keys can be used also:

for "ALL OFF" icon <F9>  
for "STOP" icon <F8> and  
for "COM" icon <F4>.

**15.5.2 Set / start model time clock**

An own window is created with a double click on the clock display , in which model time can be adjusted and started with new time.



**Window: Set model time clock****Start / current time:**

The settings can be indicated as values between 00:00 and 23:59h.

**Time-lapse value:**

Input of value between:


1 = Real time and

600 = Maximum limit

is possible.

The time-lapse value is defined to show speed of clock running (possibilities between 1 and 600). At value 20 this means: with clock pulse of 60:20 every model minute is displayed (every 3 seconds it is one minute later for model time clock). The digital clock can be used by timer control (see chapter 13) or by schedule commands.

## 15.6 Sound triggering



Different sounds (as standard WAV files) can be triggered by up to 99 different definable sound symbols (circles e.g. ) by mouse click. Furthermore sounds can be triggered by "Contact control" (see chapter 10.3) and by a schedule command (see chapter 14.2.14). Condition to this is the existence of a sound board. The following points should be considered at a triggering:

1. WAV files can have considerable file sizes and the loading process correspondingly lasts a "longer" time. This has to be taken into account at the schedule operation and/or at triggering of the corr. schedule command especially.
2. A WAV file used before is ended abruptly and closed at a new sound triggering. The old file is unloaded from memory.
3. Processing of the WAV file executes in background after loading.
4. Respectively only one symbol (circle) may be available with the same number at the definition of the sound symbols (see chapter 8.5), and numbers from 1 up to 99 are possible, against this no number restriction is available at "contact control" or schedule call (with full file name).


## 15.7 Switch route triggering

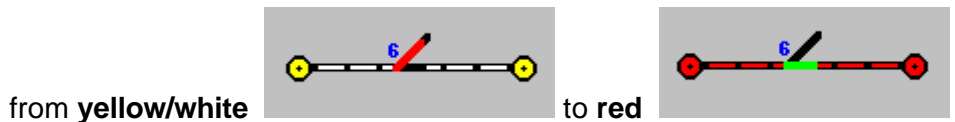
### 15.7.1 General

To set, reserve, release switch routes by triggering switch route symbols via mouse click:

- a switch must be built with help of switch route definition window and
- a start symbol (e.g. ) and a target symbol (e.g. ) must be available.

For defining a switch route you click with the left mouse button on the start symbol during construction mode.

Switch routes change their display together with route elements (e.g. ) as **SET / RELEASE**, e.g.:



**Reserved switch routes can't triggered manually via PC . If a switch route is reserved, the included, defined magnetic articles can't switched manually via PC!**

### **Attention!**

A manual switching by e.g. Märklin keyboard or remote control of magnetic articles defined in switch routes is possible at every moment, because a PC can't get or send any information about „locking“ from/to these hardware components (e.g. Märklin switch board).

### **Notes:**

There was only one, special switch route symbol (e.g. 1 =free 1 =reserved) in the older STWWIN version 9.0 without displaying route elements. The switch route was triggered by clicking on this single symbol. Therefore in STELLWERK 2001 it's possible to click twice (slowly) on the same switch route symbol, if it is defined as start and target symbol. This definition is executed automatically during conversion STWWIN version 9.0 files by program STW\_CONV.EXE.

## 15.7.2 Manual set

First you click the start symbol (from) and then the target symbol (to) in the track layout, here it means:

**Click with left mouse button** (red) is used for switch route

**SET / RESERVE**

**Click with right mouse button** (green) is used for switch route

**FREE / RELEASE**

At **SET** the activities follow:

- Check: Is a switch route defined for start→target?
- Check: Is the switch track found "FREE"?  
If not: Searching for next switch route with start/target with same start and starting points.  
If free:
- Check all route elements to "FREE".  
If not: Searching for next switch route with same start and target points.  
If free:
- "RESERVE" switch route.
- Drawing switch route with all route elements as "RESERVED".
- Switch contained switch elements to wanted status with condition of special wait times.

At **RELEASE** the activities follow:

- Check: Is a switch route defined for start→target?
- Check: Is "RESERVED" found for switch track?  
If not: Searching for next switch route with same start and target points.  
If found one as "RESERVED":
- Check all route elements, if "RESERVED" by other switch tracks.  
If yes: Searching for next switch route with same start and target points (see above).

- If route elements of found switch route are not "RESERVED" by other:
- Drawing switch route with all route elements as "FREE".
- Set contained switch elements to init status without condition of special wait times.
- Release switch route.

With button combinations the special switch routes can be triggered only. Button combinations are only possible for the first 20 switch routes:

<Ctrl><F1> to <Ctrl><F10> = Switch route number 1 to 10  
 <Shift><F1> to <Shift><F10> = Switch route number 11 to 20

Manual Triggering is possible during "contact-control" and "schedule-control" also. In newer Windows® versions the functions <Ctrl> <F4> and <Ctrl> <F6> are not usable; but you can trigger the above functions if you click the <Alt> button additionally.

### 15.7.3 Switch routes and contact control

Using "contact control" for automatic processing, switch route definition and additional activities within the contact definition window must be fixed. Up to two different switch routes for every contact can be set or released directly.

3.) First Switch route no.: 4 ☒ release ☐ set

4.) Second Switch route no.: 5 ☐ release ☒ set

Wanted activities are triggered with conditions described at "manual triggering".

Furthermore you can set/release a third switch route indirectly by marker.

5.) Marker

Marker-Nr. 8 füllen mit Wert: 19 = Fahrstraßen-Nr.

☒ Fahrstraße via Marker-Nr. 7 ☒ freigeben ☐ stellen

Marker-Nr. 6 Wert löschen

### 15.7.4 Switch routes and schedule control

Alternatives are possible in schedule operations together with switch routes. The following activities are available:

- Queries of "reserved" or "free" with help of the "IF"(F)-command.
- Reservation or release of a switch route with "locking/unlocking for manual switching" of the defined magnet articles with the X-command.
- Wait for reservation or release of a switch route with the X command.
- Furthermore it's possible to control switch route indirectly by marker.

For triggering (set) a switch route the simple X command is used as:

**X, no** or **X, no, S** (no = switch route number)

Special **Y-commands** for using indirect switch route activities are available.

Not switching of a reserved switch route can be just as wrong as a switching or only switching partially in a schedule. Therefore it was planned consciously, to switch locked magnetics during schedule processing also. It seems meaningful to query first the switch

route within a schedule on reservation, because you know the magnet articles defined by this switch route normally. Then you can provide other alternatives for the schedule at reservation or wait (with the **X**, **no**, **W**, **F** command) until the switch route is free again.

The following commands may be written for testing switch route no. 1:

F, X, 1, R	if switch route no. 1 reserved
G, NEXT_ROUTE	goto next route check.

## 15.8 Automatic processing


### 15.8.1 General


The automatic processing requires:

Contact control is used and activities are defined within contact definition window.

or:

Schedule control is used and a track layout and at least one schedule was loaded.

Schedules can run up to max. parallel 9. The start of schedules is done via the  icon in processing bar (see chapter 15.4.8). Every command is displayed on the last line and executed step by step. If you use initialization parameter "Display schedule commands ?" = Yes the displaying is only very short-timely, therefore you'll use parameter mentioned above with "No" in most cases and so only wait instructions are displayed.

If a single schedule command doesn't run (it's standing), so you can skip this command by click at  icon. Manual operations like "ALL OFF" or <F9>, "STOP" or <F8> as well as "Go" or <F4> and "Exit" also can be used at any time.

Please, take into account that all schedules numbers are executed cyclically and at wait instructions or termination of a single schedule the other schedules goes on independently.

Schedules can influence each other. Because aimed information can be replaced with the N-, Q- or V-command, so it has to be respected on unintentional influencing. Single schedules can be intended for special, perhaps independent tasks. For examples: the control of a cable car parallel to the other train operations or checking of arrivals and departures for a shaded railroad station.

At the choice in the menu "Processing / Continue" schedules are started at the last command broken off (e.g. after using checkpoint restart!). It is assumed, that on the equipment interim no manual change is executed (such as locomotive move).

Manual input for all magnet articles and engine control functions can be done parallel to the schedule processing, and just like the possibilities listed in the chapter 15.7 "Switch route triggering". But attention, mutual influencing is possible! Operational data can be shown or printed always parallel to the processing.

For "fully automatic" operations a variety of specific factors of your own equipment is authoritative surely, therefore consider that only an aid but no miracle was given to you with STELLWERK 2001.

### 15.8.2 Automatic loading and starting

By different possibilities you can unite acceleration of starting and/or reach an automatic system.

#### 15.8.2.1 Initial setting of a file group in the loading command.

A file group name can be indicated in the command line for the call of STW2001. At "Windows program properties" you have to supply the **file group name as a load command option** behind the program name and a blank, e.g. this example:

**C:\Program Files\STW2001\STW2001.EXE MYMODEL**

For every possible file type of STW2001 whether this file name exists is checked and at existence loaded automatically. These would be in the above-mentioned example:

MYMODEL.BMP = Graphic file,

MYMODEL.STW = Stellwerk 2001 track layout file

And additional if alternative "**schedule control**" is defined, the schedules with all names:

MYMODEL.SFP, MYMODEL1.SFP, .... and/or up to MYMODEL9.SFP

will be loaded automatically. Schedule names with "...1", "...9" will run at the corresponding schedule numbers "1", "...9".

After automatic loading of all files the processing operations can be started via menu "Processing".

#### 15.8.2.2 Starting by checkpoint

There is the possibility of an initial setting of **CHKP in the loading command**. Therefore a code word is given in the command line for the call of STW2001. At "Windows program properties" you have to supply the code word **CHKP as a load command option** behind the program name after a blank, e.g. this example:

**C:\Program Files\STW2001\STW2001.EXE CHKP**

Processing is started with the latest checkpoint file automatically so.

A **checkpoint restart** can be loaded via the menu item "File / Checkpoint / Checkpoint reading" furthermore. At this a checkpoint written before is loaded and started again at first. The topic "checkpoint" is explained in detail at chapter 17.3 (Processing with checkpoint).

#### 15.8.2.3 Loading schedules automatically by F11- and/or F12-keys

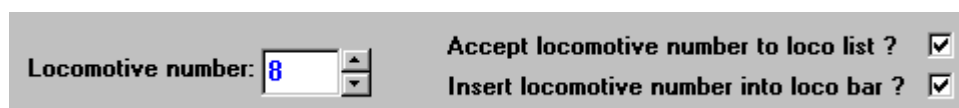
If you want always to load (fast) definite schedules, then you can indicate up to two names in special parameters "Loading schedule by F11" or/and "Loading schedule by F12" with the Initialization window. Please, insert the full name, e.g.

C:\Program Files\STW2001\filenameX.SFP.

They will run always with schedule number 1.

#### 15.8.2.4 Moving locomotive numbers into loco bar automatically

It still shall be mentioned here, that you are able to move all locomotives numbers into the loco bar automatically. Therefore you must fix both items in the locomotive definition window:



All so defined locomotives as far as space is available will be included into loco bar.

#### Remark:

Up to 27 locomotive numbers fits in loco bar at a graphic resolution of 800x600 and at a resolution of 1024x768 up to 35 locomotive numbers.



## 16 Data

### 16.1 General

Data are actual operational information showing the layout status of working storage memory for:

- Magnetic articles (e.g. tournouts, signals, all-purpose counter)
- Contacts,
- Tracks, route elements, special signs and text,
- Switch routes,
- Sound,
- Locomotives,
- Locomotive tracking,
- Marker,
- Initialization data,
- Schedules
- and at [Lenz System](#): Lenz system data.

These can be read as sorted detailed **Display** in an own window or it's possible to **Print** with a Windows® standard printer.

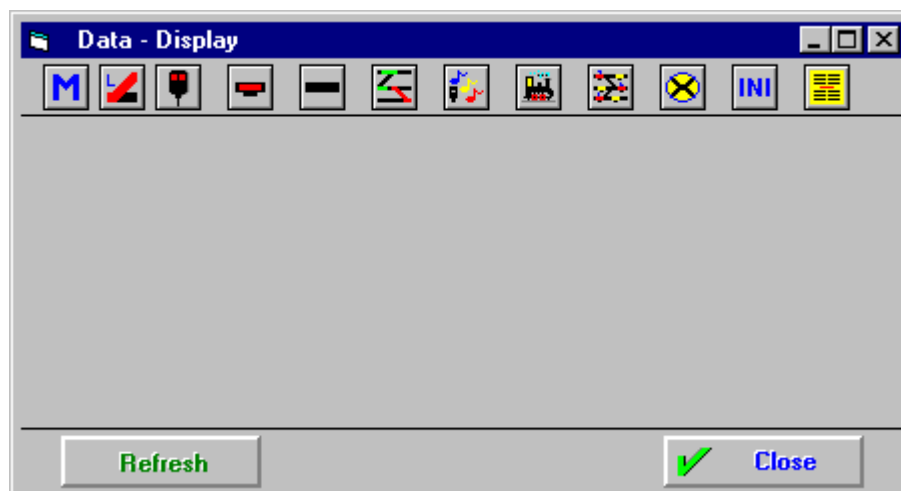
Note:

It's not possible to change information in the "Data" window. Changes of defined parts can be done in special windows of symbols -but not for schedules.






### 16.2 Display









At this menu item an own window is opened:

**Window:** Data Information



You can select one of the following items:

	<b>Magnetic articles</b>	Display status and definition of all magnetics
	<b>...only track switches</b>	or tournouts
	<b>...only signals</b>	or signals.
	<b>Contacts</b>	Display status and definition of all contacts.
	<b>Tracks/special signs...</b>	Information about normal track symbols, route elements and special signs.


	<b>Switch routes</b>	Information about switch routes with switching elements.
	<b>Sound</b>	Display of defined WAV files.
	<b>Locomotives</b>	Display of actual locomotive data.
	<b>Locomotive tracking</b>	Description of defined dependencies.
	<b>Marker</b>	Value display of used markers
	<b>Initialization parameter</b>	Information of actual used settings and colors.
	<b>Schedules</b>	Display of schedules (also parts by no.) as plain text and definition.  You can select all schedules by the option "A" or  a special one by input of a definite schedule number via scroll bar.


The information is displayed as a grid, in which width of columns is variable by "mouse drag". Scrolling is possible by scroll bars to show the next or last lines and also horizontal scrolling is possible. As window heading the respectively current full STELLWERK 2001 file name appears. If the complete text isn't represented in a column, then the column width must be maximized.


At "**Continue**" the information window is closed, but the window disappears by a click at the track layout into background too.

By "**Refresh**" a new built up of the grids is possible, e.g. if status information changed and by "**Close**" the routine will end.

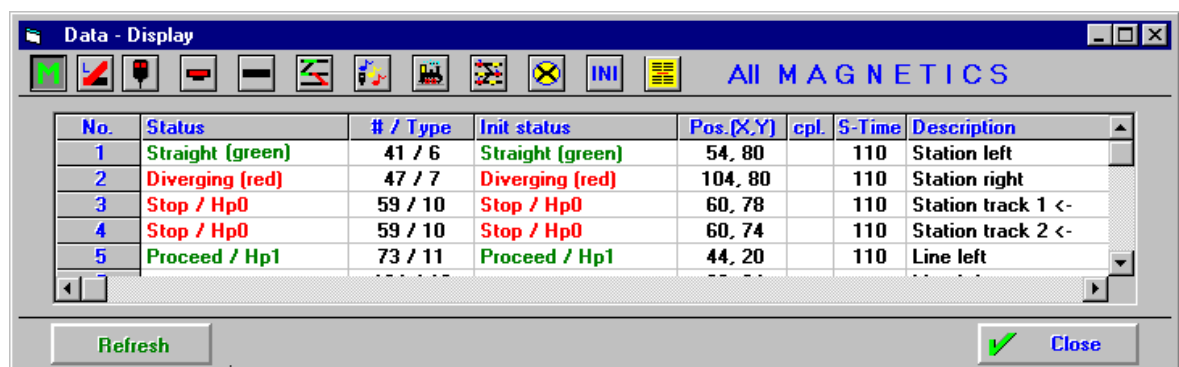
### 16.2.1 Display Magnetic articles

Selecting  a list of all defined magnetic articles is displayed.

Selecting  a list of the defined track switches (turnouts) only is displayed.

Selecting  a list of the defined signals only is displayed.  
The items in each list are sorted by their numbers:

**Window:** Display Magnetic articles



Counter value is displayed at status and init status for all all-purpose counters

200	Count forward (16)	153 / 27	Count forward (1)	118, 40		110	No. 200: All-purpose Counter
-----	--------------------	----------	-------------------	---------	--	-----	------------------------------

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders.



<b>No.</b>	= magnetic article number
<b>Status</b>	= current status
<b># / Type</b>	= internal symbol number and symbol type
<b>Init status</b>	= defined initial status
<b>Pos.(X,Y)</b>	= X- and Y-position (column, row) of the symbol
<b>cpl.</b>	= if coupled with another magnetic article, the other number is shown (maybe with sign of * if "Changed switching" was defined).
<b>S-Time</b>	= switch time in milliseconds
<b>Description</b>	= user-defined remark or standard information

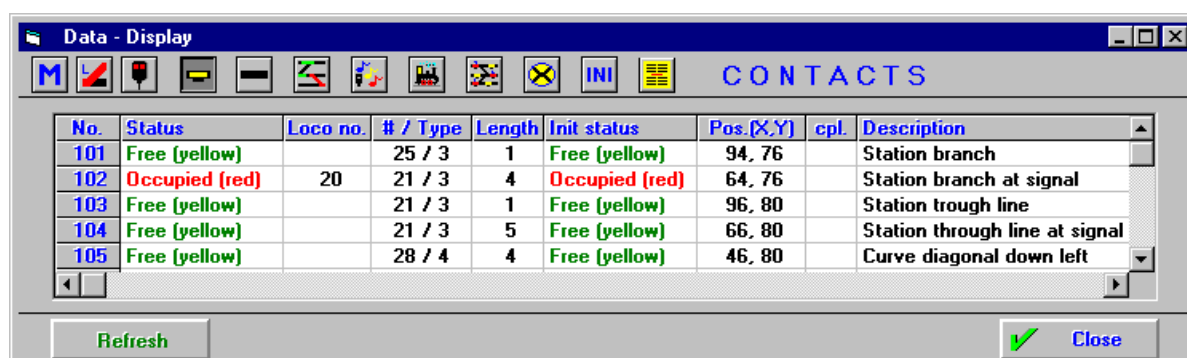
Single magnetics (1 input) are displayed with added **r** or **g** (defined decoder output)

Display of "only track switches" or "only signals" are identical in columns.

### 16.2.2 Display: Contact tracks

Selecting  a list of all defined contacts sorted by their numbers is displayed:

**Window:** Display Contacts tracks




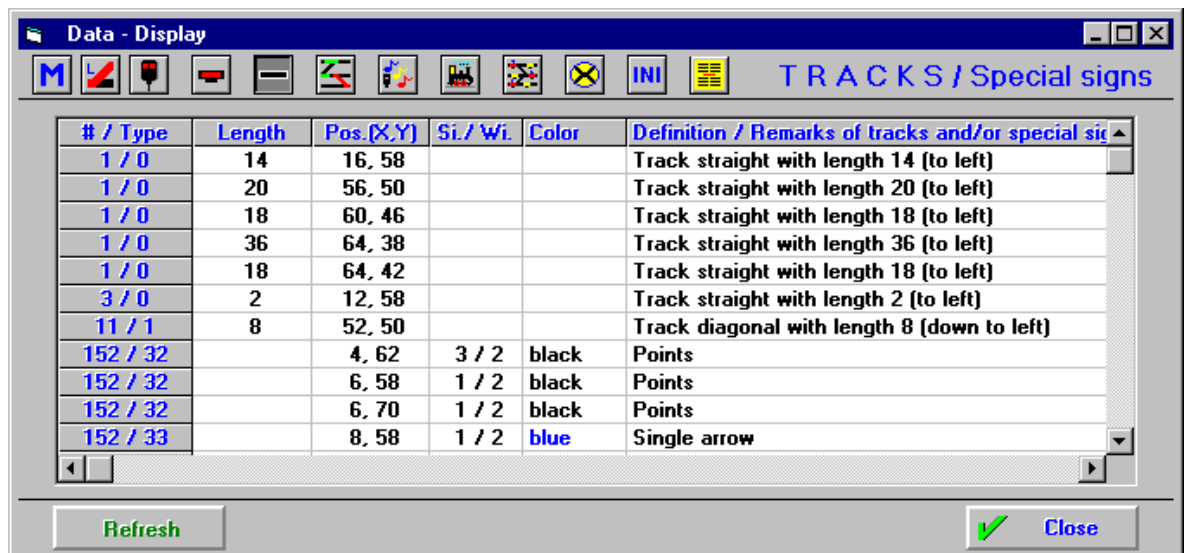
No.	Status	Loco no.	# / Type	Length	Init status	Pos.(X,Y)	cpl.	Description
101	Free (yellow)	20	25 / 3	1	Free (yellow)	94, 76		Station branch
102	Occupied (red)	20	21 / 3	4	Occupied (red)	64, 76		Station branch at signal
103	Free (yellow)	21	21 / 3	1	Free (yellow)	96, 80		Station trough line
104	Free (yellow)	21	21 / 3	5	Free (yellow)	66, 80		Station through line at signal
105	Free (yellow)	28	28 / 4	4	Free (yellow)	46, 80		Curve diagonal down left

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders

<b>No.</b>	= contact number
<b>Status</b>	= current status
<b>Loco no.</b>	= if occupied, the loco number is shown
<b># / Type</b>	= internal symbol number and symbol type
<b>Length</b>	= length of contact track
<b>Init status</b>	= defined initial status
<b>Pos.(X,Y)</b>	= X- and Y-position (column,row) of the symbol
<b>cpl.</b>	= if coupled with another contact track, the other number is shown
<b>Description</b>	= user-defined remark or standard information

### 16.2.3 Display Tracks/special signs

Selecting  a list of all defined tracks, route element, special signs and text sorted by their internal type and storage addresses is displayed:

**Window:** Display Tracks/special signs/text


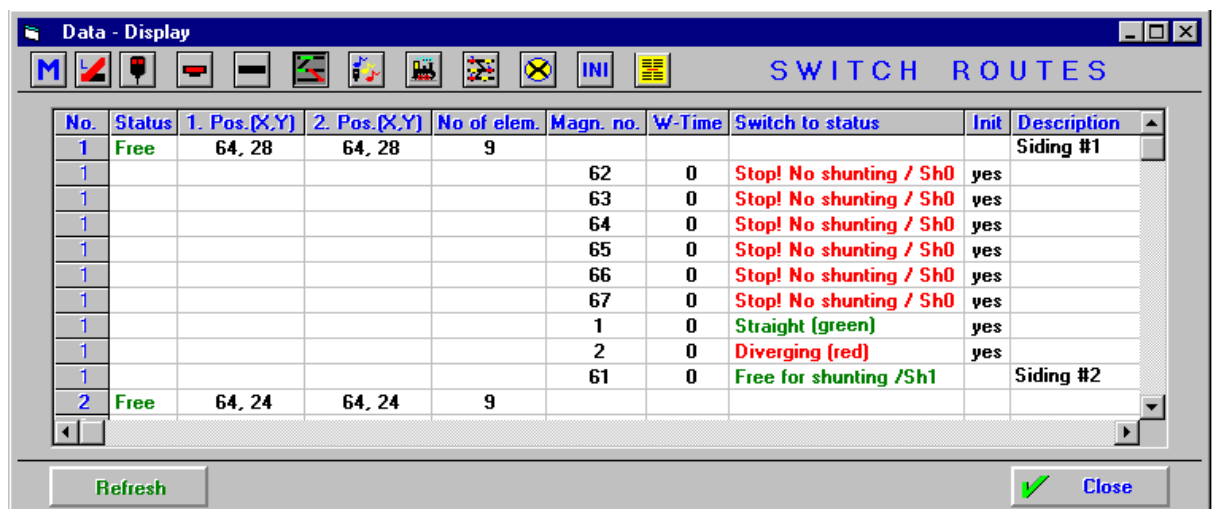
# / Type	Length	Pos.(X,Y)	Si. / Wi.	Color	Definition / Remarks of tracks and/or special signs
1 / 0	14	16, 58			Track straight with length 14 (to left)
1 / 0	20	56, 50			Track straight with length 20 (to left)
1 / 0	18	60, 46			Track straight with length 18 (to left)
1 / 0	36	64, 38			Track straight with length 36 (to left)
1 / 0	18	64, 42			Track straight with length 18 (to left)
3 / 0	2	12, 58			Track straight with length 2 (to left)
11 / 1	8	52, 50			Track diagonal with length 8 (down to left)
152 / 32		4, 62	3 / 2	black	Points
152 / 32		6, 58	1 / 2	black	Points
152 / 32		6, 70	1 / 2	black	Points
152 / 33		8, 58	1 / 2	blue	Single arrow

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders

# / Type	= internal symbol number and symbol type
Length	= track length for tracks, route elements
Pos.(X,Y)	= X- and Y-position (column, row) of symbol
Si. / Wi.	= size and width for special signs and text
Color	= color name for special signs and Text
Definition	= user-defined remark or standard information

## 16.2.4 Display Switch routes

Selecting  a list of all defined switch routes sorted by their numbers is displayed:

**Window:** Display Switch routes


No.	Status	1. Pos.(X,Y)	2. Pos.(X,Y)	No of elem.	Magn. no.	W-Time	Switch to status	Init	Description
1	Free	64, 28	64, 28	9					Siding #1
1					62	0	Stop! No shunting / Sh0	yes	
1					63	0	Stop! No shunting / Sh0	yes	
1					64	0	Stop! No shunting / Sh0	yes	
1					65	0	Stop! No shunting / Sh0	yes	
1					66	0	Stop! No shunting / Sh0	yes	
1					67	0	Stop! No shunting / Sh0	yes	
1					1	0	Straight (green)	yes	
1					2	0	Diverging (red)	yes	
1					61	0	Free for shunting /Sh1		
2	Free	64, 24	64, 24	9					Siding #2


The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders


No.	= switch route number
Status	= current status
1. Pos.(X,Y)	= X- and Y-position (column,row) of switch route starting point
2. Pos.(X,Y)	= X- and Y-position (column,row) of switch route destination point
No. of elem.	= number of defined switching elements in switch route
Magn. no.	= magnetic article number
W-Time	= wait time in seconds before switching

<b>Switch to status</b>	= wanted switching position at triggering time
<b>Init</b>	= switch to initial status when releasing switch route
<b>Description</b>	= user-defined remark or standard information


To see more information like type of the individual elements of a switch route, change to construction mode. There you can click with the right mouse button on the starting point of a switch route while the **definition window of the switch route** is open to display this information.

### 16.2.5 Display Sound

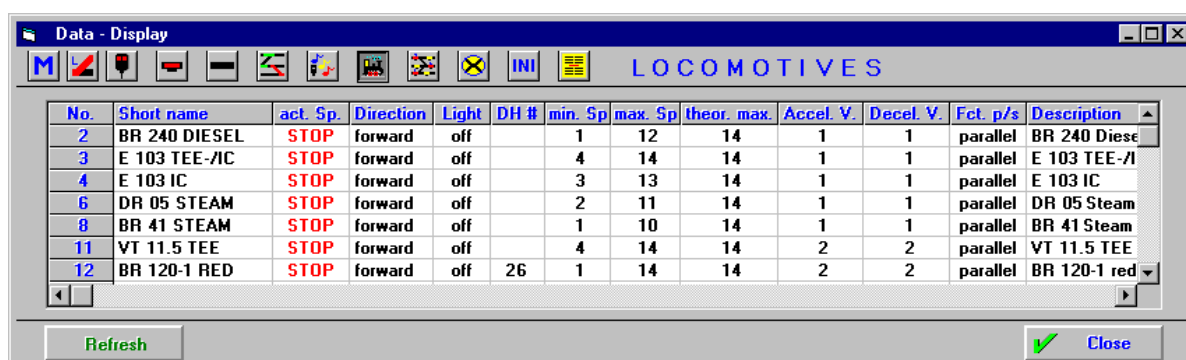
Selecting  ascending to the sound number are displayed:

<b>No.</b>	= the defined number of symbols (in a circle, e.g.  ),
<b>Pos.(X,Y)</b>	= X- Y-position in the track layout (Row, Col),.
<b>WAV-file name</b>	= the full WAV file name.

### 16.2.6 Display Locomotives

Selecting  a list of all locomotives sorted by their numbers is displayed.

**Window:** Locomotive details




No.	Short name	act. Sp.	Direction	Light	DH #	min. Sp	max. Sp	theor. max.	Accel. V.	Decel. V.	Fct. p/s	Description
2	BR 240 DIESEL	STOP	forward	off		1	12	14	1	1	parallel	BR 240 Diese
3	E 103 TEE-/IC	STOP	forward	off		4	14	14	1	1	parallel	E 103 TEE-/I
4	E 103 IC	STOP	forward	off		3	13	14	1	1	parallel	E 103 IC
6	DR 05 STEAM	STOP	forward	off		2	11	14	1	1	parallel	DR 05 Steam
8	BR 41 STEAM	STOP	forward	off		1	10	14	1	1	parallel	BR 41 Steam
11	VT 11.5 TEE	STOP	forward	off		4	14	14	2	2	parallel	VT 11.5 TEE
12	BR 120-1 RED	STOP	forward	off	26	1	14	14	2	2	parallel	BR 120-1 red

Buttons: Refresh, Close

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders.

<b>No.</b>	= locomotive number
<b>Short name</b>	= short loco name
<b>act. Sp.</b>	= current speed
<b>Direction</b>	= direction displayed as forward or backward
<b>Light</b>	= lights on or off
<b>DH #</b>	= number of 2. loco, if doubleheading is active
<b>theor. max.</b>	= theoretical maximum speed (e.g. 14, 28,126)
<b>min. Sp</b>	= minimum speed to start
<b>max. Sp</b>	= maximum speed
<b>Accel. V.</b>	= rate of acceleration
<b>Decel. V.</b>	= rate of deceleration/braking
<b>Fct. p/s</b>	= type of function triggering, parallel or serial (e.g. for LGB locomotives)
<b>Description</b>	= user-defined long loco remark

### 16.2.7 Display Locomotive tracking

Selecting  a list of all defined loco tracking records sorted by their target (destination) numbers is displayed:

**Window:** Display Locomotive tracking

Target	Start	Condition # 1	Condition # 2	Condition # 3	Condition # 4	Condition # 5
131	154	MG# 14 RED	MG# 6 GREEN	MG# 7 GREEN	MG# 8 GREEN	
131	155	MG# 14 RED	MG# 6 GREEN	MG# 7 GREEN	MG# 8 RED	
131	156	MG# 14 RED	MG# 6 GREEN	MG# 7 RED		
131	156	MG# 14 RED	MG# 6 RED			
131	158	MG# 14 GREEN	MG# 15 GREEN			
132	131					

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders.

**Target** = destination number (to ..)  
**Start** = starting number (from ...)  
**Condition #1** = **first** condition up to a maximum of  
**Condition #6** = **sixth** condition

All conditions within one line are connected via logical "AND".

If there are more than one alternative (max up to 9), these are logical "OR" connections to the last, same target (destination) number.

Example of **target no. 131**:

The locomotive is coming from contact no. **154**, if:

magnetic article no. **14 is RED** **AND**  
the magnetic article no's. **6 , 7 and no. 8 are GREEN**


**OR** however

the loco is coming from contact no. **155**, if:

magnetic article no. **14 is RED** **AND**  
the magnetic article no. **6 and no. 7 are GREEN** **AND**  
magnetic no. **8 is RED**.

**OR** ... etc. (2 more possible OR conditions)

**16.2.8 Display Marker**

Selecting  a list of all used markers is displayed.


**Window:** Display Marker

Marker no.	Actual value	at Contact no.	will be filled with value	Marker-Switch route	will be erased
6	13	10			yes
7		10		set	
8		10	19		

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders.

<b>Marker no.</b>	= Marker number
<b>Actual value</b>	= Value at this moment
<b>At Contact no.</b>	= At this contact no. one of following three activities will be executed.
<b>will be filled with value</b>	= Display of value will be filled by this contact no.
<b>Marker-Switch route</b>	= Activity at contact no.: <b>set</b> or <b>relase</b>
<b>will be erased</b>	= Display: <b>yes</b> if value will be erased

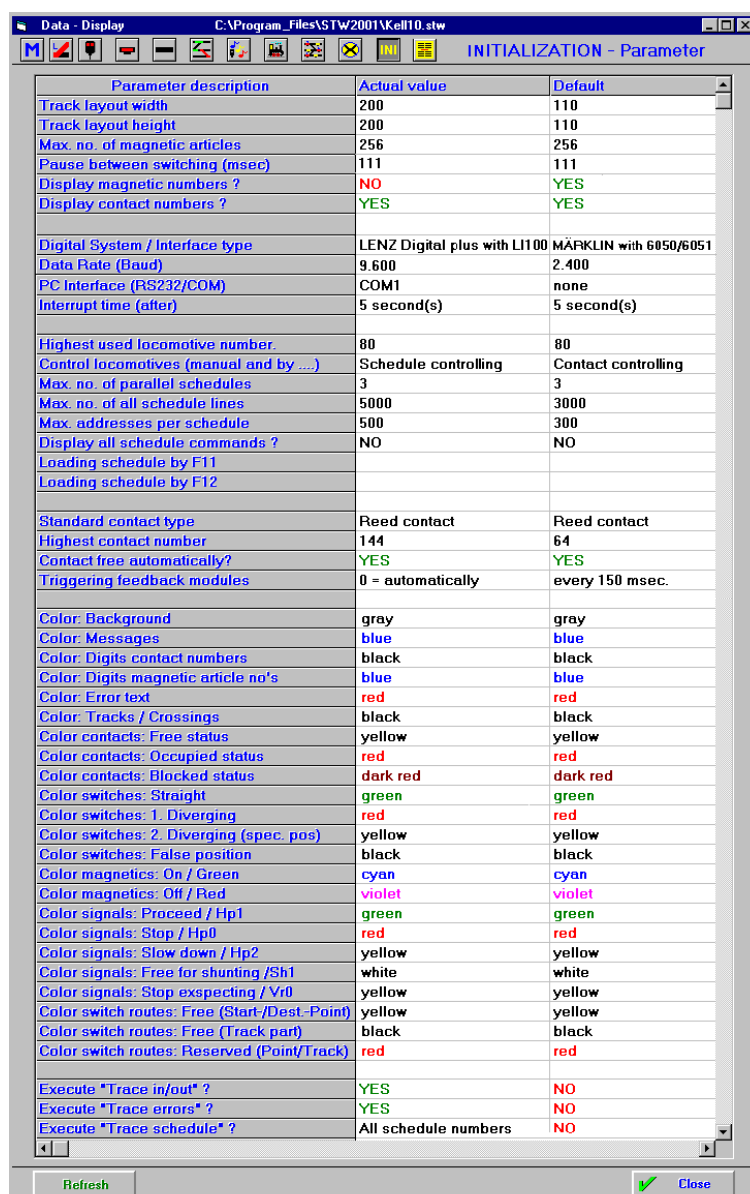
### 16.2.9 Display Initialization parameters

Selecting  icon names of all initialization parameters with their actual and the default status is displayed. Name of the actual STELLWERK 2001 file -if available- is shown in the main line of the window.

Sorted by a standard it's displayed:


**Parameter description**  
**Actual value and**  
**Default**

**Window:** Display Initialization parameter

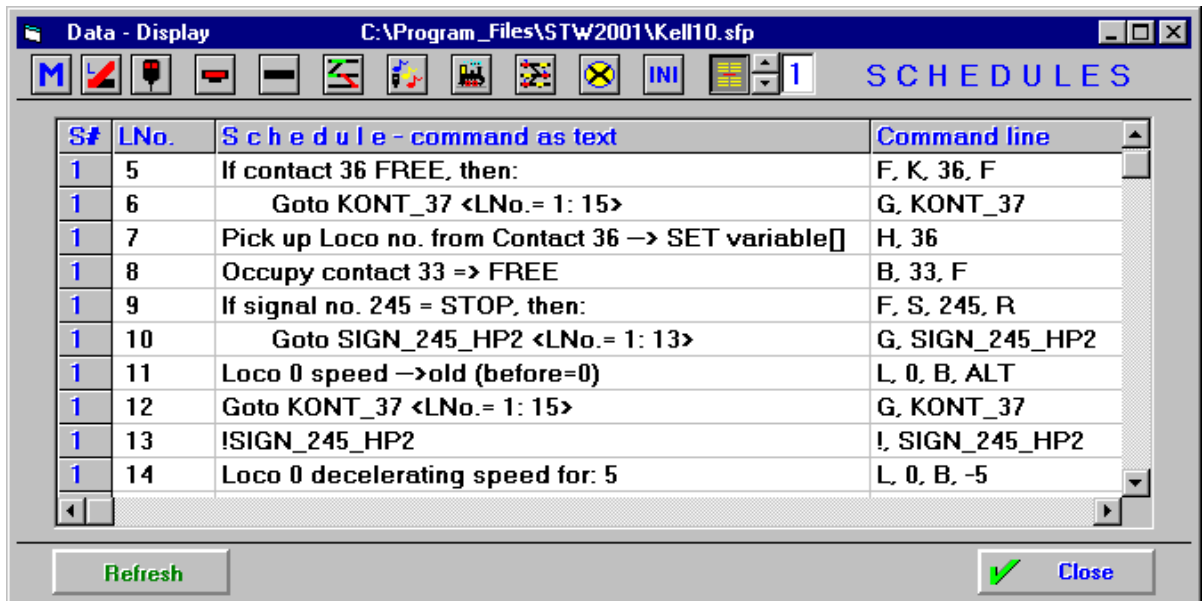


Parameter description	Actual value	Default
Track layout width	200	110
Track layout height	200	110
Max. no. of magnetic articles	256	256
Pause between switching (msec)	111	111
Display magnetic numbers ?	NO	YES
Display contact numbers ?	YES	YES
Digital System / Interface type	LENZ Digital plus with LI100	MÄRKLIN with 6050/6051
Data Rate (Baud)	9.600	2.400
PC Interface (RS232/COM)	COM1	none
Interrupt time (after)	5 second(s)	5 second(s)
Highest used locomotive number	80	80
Control locomotives (manual and by ...)	Schedule controlling	Contact controlling
Max. no. of parallel schedules	3	3
Max. no. of all schedule lines	5000	3000
Max. addresses per schedule	500	300
Display all schedule commands ?	NO	NO
Loading schedule by F11		
Loading schedule by F12		
Standard contact type	Reed contact	Reed contact
Highest contact number	144	64
Contact free automatically?	YES	YES
Triggering feedback modules	0 = automatically	every 150 msec.
Color: Background	gray	gray
Color: Messages	blue	blue
Color: Digits contact numbers	black	black
Color: Digits magnetic article no's	blue	blue
Color: Error text	red	red
Color: Tracks / Crossings	black	black
Color contacts: Free status	yellow	yellow
Color contacts: Occupied status	red	red
Color contacts: Blocked status	dark red	dark red
Color switches: Straight	green	green
Color switches: 1. Diverging	red	red
Color switches: 2. Diverging (spec. pos)	yellow	yellow
Color switches: False position	black	black
Color magnetics: On / Green	cyan	cyan
Color magnetics: Off / Red	violet	violet
Color signals: Proceed / Hp1	green	green
Color signals: Stop / Hp0	red	red
Color signals: Slow down / Hp2	yellow	yellow
Color signals: Free for shunting / Sh1	white	white
Color signals: Stop exspecting / Vr0	yellow	yellow
Color switch routes: Free (Start-/Dest.-Point)	yellow	yellow
Color switch routes: Free (Track part)	black	black
Color switch routes: Reserved (Point/Track)	red	red
Execute "Trace in/out" ?	YES	NO
Execute "Trace errors" ?	YES	NO
Execute "Trace schedule" ?	All schedule numbers	NO

### 16.2.10 Display Schedules

Selecting  a list of all loaded schedule records sorted by their schedule and line numbers is displayed:

**Window:** Display Schedules



S#	LNo.	Schedule - command as text	Command line
1	5	If contact 36 FREE, then:	F, K, 36, F
1	6	Goto KONT_37 <LNo.= 1: 15>	G, KONT_37
1	7	Pick up Loco no. from Contact 36 → SET variable[]	H, 36
1	8	Occupy contact 33 => FREE	B, 33, F
1	9	If signal no. 245 = STOP, then:	F, S, 245, R
1	10	Goto SIGN_245_HP2 <LNo.= 1: 13>	G, SIGN_245_HP2
1	11	Loco 0 speed →old (before=0)	L, 0, B, ALT
1	12	Goto KONT_37 <LNo.= 1: 15>	G, KONT_37
1	13	!SIGN_245_HP2	!, SIGN_245_HP2
1	14	Loco 0 decelerating speed for: 5	L, 0, B, -5

The information is displayed in a grid, in which width of columns can be changed via "mouse drag" at the borders.

**S#** = schedule number  
**LNr.** = line number within a schedule number  
**command as text** = text line of the command generated of Stellwerk 2001  
**Command line** = the user (with help of editor) defined original command line

## 16.3 Print

For print control of operational data an own window is opened.

It contains the same components as described at "Data / Display":

- Magnetic articles (or only turnouts, signals),
- Contact tracks,
- Tracks / special signs / text,
- Switch routes,
- Sound,
- Locomotive details,
- Locomotive tracking,
- Marker,
- Initialization parameter,
- Schedules.

A standard window is opened by control button "**Font**", in which font type and size (available in your Windows® System) can be changed. As default "Arial" is suggested with font size 10. A changed font is reset automatically at the end to old standard.



- Loco = locomotive number to control. If a “?” and loco-no. from other contact, then: contact no for loco,
- Sp = engine speed with given direction (<> = reverse, => = forwards and <= = backward),
- L = switch light (0=off, 1=on),
- F = function no. to trigger (ST=emergency stop),
- blT = contact block time in seconds,
- Only for loco-no's = only these engine numbers active control,
- WAV file = full sound file name to trigger.

Connections are shown in a third list, i.e. which magnetic articles activate contact triggering or which magnetic articles are blocking contacts numbers. Meaning of abbreviations is displayed at the end of list by examples.

### 16.3.3 Print Tracks / special signs /text

Ascending on internal symbol number and stored address are printed:

- # / Type = internal symbol number and symbol type,
- Length = length of track,
- Pos.(X,Y) = position (row, column) in the track layout,
- Si./ Wi = size and width special sign, text,
- Color = color of special sign, text,
- Description = self written or default remark.


### 16.3.4 Print Switch routes with route elements

Ascending to switch route number are printed:

- No. = switch route number,
- Status = actual status of switch route,
- 1.Pos.(X,Y) = position (column, row) of start symbol in the track layout,
- 2.Pos.(X,Y) = position (column, row) of target symbol in the track layout,
- No. of elem. = number route elements,
- Magn. No. = magnetic article number(s) to switch,
- W-Time = wait time before switching,
- Switch to status = defined switch position for SET,
- Switch to initial status when releasing switch route
- Rem = self written or default remark.

### 16.3.5 Print Sounds

Ascending to sound number are printed:

- No. = defined number of the symbols (in a circle, e.g. ) ,
- Pos.(X,Y) = position (row, column) in the track layout,
- WAV filename = full sound file name.

### 16.3.6 Print Locomotive Details

Ascending to locomotive number are printed:

- No. = locomotive number,
- Dir = engine direction (displayed as ==> forwards or <== backward),
- Light = actual Function F0=Light (OFF/ON),
- DH = 2<sup>nd</sup> engine number if a doubleheading exists,
- SP = actual speed,
- min/max/theor. = start/end and theoretical max. speed (in brackets),
- Acc = acceleration value,
- Dec = deceleration/braking value,
- F-p/s = type of function triggering (par=parallel, ser =serial),



- <=> pause between changing direction in milliseconds,
- Description = self written or default remark.

### 16.3.7 Print Locomotive tracking

Ascending to target contact number are printed:

- Target = destination contact track number (to),
- Start = contact number as start point (from),
- for up to (max. 6) c o n d i t i o n s:

you see up to 6 conditions in long text, e.g.:

No. 46 = Diverging (red) **AND** No. 47 = Straight (green)

In every line there are up to two conditions limited by **AND**, so up to 3 lines can be printed for every alternative. New alternatives start at new line with naming start and target number.

### 16.3.8 Print Marker

Ascending to used marker number, are printed:

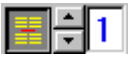
- Marker no. = Marker number,
- Actual value = Value at this moment,
- At contact no. = At this contact no. one of following three activities will be executed.
- will be filled with value = Display of value will be filled by this contact no.,
- Marker-Switch route = Activity at contact no.: set or relase,
- will be erased = Display: yes if value will be erased,

### 16.3.9 Print Initialization parameter

Ascending to a given standard following parameters are printed:

- the parameter name,
- the actual defined value and
- the default value .

### 16.3.10 Print All schedules

You can select all schedules by the option "A" = all or  a special one by input of a definite schedule number via scroll bar.

Ascending to schedule number and the command line number (LNo.) are represented:

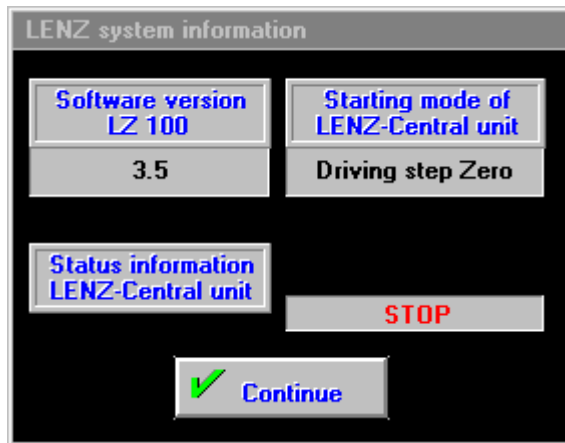
- LNo. = serial line number as point of reference,
- S c h e d u l e – command as text = in full, clear text,  
at GOTO's the skip address is display in acute brackets (< >),
- Command line = the original command

Note:

Between single schedules new page is executed.

## 16.4 System data - Lenz system only -

This information is called during processing part by the menu, but only in connection of DIGITAL plus System of company Lenz. An own window is opened:

**Window: Data / Lenz System information****Software version**

Display of actual SW-version e.g. 3.5

**Starting mode of Lenz central unit**

Display: "Manual" or "Driving step Zero".

**Status information LENZ-Central unit**

Display of actual status of the Lenz central unit with following variants:

Programming mode, Emergency break or STOP

**Continue**


The window will be closed.

## 17 Special topics and Options

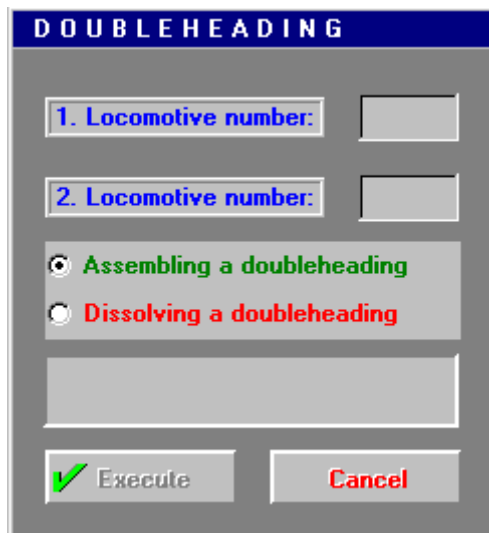
### 17.1 Doubleheading (coupling of engines)

Doubleheading or double traction means: the common control of two locomotives -that is coupling of engines- whether first or second loco number is used to control. Both locomotives get same speed and function. Using Lenz DIGITAL plus System, this function is executed by special commands to central unit; there aren't such special commands at Märklin Interface.

For Märklin/Arnold two necessary locomotive commands are sent behind each other directly to the interface. Respectively, direction must be chosen that locomotives don't work against each other. All engines (always two) can be coupled together as well as several doubleheading can be defined generally. However, make sure both locos have similar gearing to ensure that they run at similar speeds for each speed setting. Otherwise, gearboxes can be damaged (e.g. same values for the deceleration (braking) and acceleration type for this locomotive). In addition, it has to be taken into account, that perhaps at isolated tracks a front engine is braking to zero and the back one is still pushing, because of e.g. signal on red and no power on the isolated track. Both engines should get a drive command before coupling (e.g. speed = 0) at the Lenz system.

For defining doubleheading a special window is invoked by  icon in menu bar or via menu "Options / Doubleheading".

**Window:** Doubleheading



#### 1. Locomotive number and 2. Locomotive number:

Input of respectively valid locomotive numbers. It is condition that both locomotives must have the speed zero.

#### Selection by toggle mode:

Assemble or dissolve of a doubleheading.

Furthermore processing remarks and notes are displayed in a small field below.

#### Execute

The wanted doubleheading is assembled or dissolved and the window will be closed.

#### Cancel

No action is done and window will be closed.

The detail "DH with ##" is appended at executed doubleheading at the end of the locomotive name (in left part of the processing board), in which ## is the respectively other engine number. It is no matter whether engine no. 1 or engine no. 2 is used at the locomotive selection by loco icon, keyboard or loco bar icon. A doubleheading is valid as long as it is dissolved again or program is terminated.

The function F0 "light" is changed only at active engine (displayed at the processing board) respectively, so e.g. only the front engine can get light. Other functions F1...F12 are triggered by the active locomotive only.

**At the Lenz system a coupling isn't possible with the conventional/analogue engine (0).**


### 17.2 Programming locomotive decoders - Lenz system only -

You can program the locomotive decoders via interface and PC under condition, that the "Lenz DIGITAL plus System" is used.

The engine to be programmed must stand alone on a **complete (own) programming section**. All other locomotive receivers then mustn't be obtainable by central unit / interface.

**Please, read exactly all parts in the the documentation of decoder supplier for built in decoder type and use only the allowed CV's and the allowed values for each single CV, otherwise not comprehensible errors may occur.**

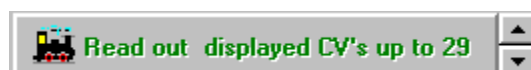
\*) **Remark:** CV = Configuration variable (naming by American standardization).

A separate window "program locomotive receivers" will be opened by clicking  icon in menu bar or by calling menu item "Options / Programming loco decoders" during processing mode or if COM=0.

**Window:** Locomotive decoder data

The following features are available:

**Read out locomotive decoders with 6 different alternatives** (selection by scroll bar):



- Read out displayed CV's up to 29
- Read out Speed curve
- Read out all displayed CV's
- Read out all CV's up to CV29

Read out up to CV66

Read out all CV's up to CV128

### Programming of lokomotive decoders with 7 different alternatives (selection by scroll bar)



Programming Reg1 up to Reg4

Programming displayed CV's up to 29

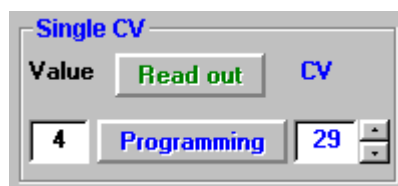
Programming Speed curve

Programming all displayed CV's

Programming all CV's up to Cv29

Programming all CV's up to CV66

Programming all CV's up to CV128



Furthermore every single CV between CV1 and CV128 can be "Read out" and "Programming", if decoder type allows this.



Determined values can be saved as a \*.dec file on a disc and read in and so used for later activities.

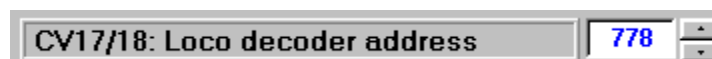


Window can be closed by after execution or you can terminate the process without writing at any time by this icon.



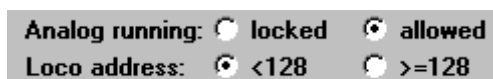
Data of CV numbers **CV1** up to **CV5** and **CV9** are displayed as own parts, because they have same meaning for different suppliers.

You can input locomotive numbers >127 at CV1, notes are changing to "high loco number" saved -as standard- in CV17 and CV18.



The not changeable data of **CV7** and **CV8** are displayed beyond a fictitious picture.

Data of **CV29** are displayed in option fields and can be fixed by these, e.g:



CV29 values are (NMRA):

**Bit 1:** Direction of locomotive (normal or inverse)

**Bit 2:** Speed steps (14 or 28 steps)

Speed steps 128 (126) are defined also by 28 speed steps

**Bit 3:** Analog running (locked or allowed)

Bit 4: not used

**Bit 5:** Speed curve (internal or programmed)

Attention! Lenz decoders have data value=0 for programmable speed curve, this means with values=0 and set Bit 5 locomotive will not run.

**Bit 6:** Loco address (<128 or >=128)

Using high addresses (>=128) value is calculated from CV17 (MSB) and CV18 (LSB) or stored there.

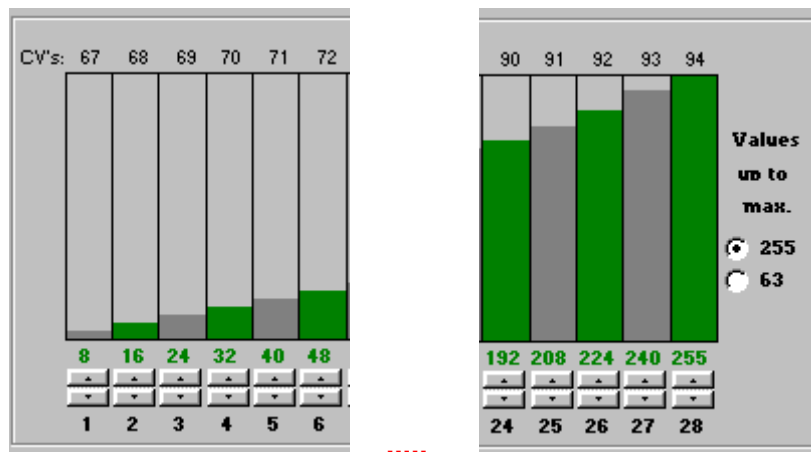
Whole address of high loco address = ((MSB-192) x 256) + LSB

Bit 7: not used

Bit 8: not used

#### Notes for Lenz 27/28/126 driving steps:

Because engine data are read (at first operating of the special locomotive by STELLWERK 2001) from the Lenz central unit automatically, you must specify the mode (27 or 28) via "+" button of the remote control at first. This is independent of a loco decoder programming done before. For locos with 126 acceleration steps do the same as for 28 steps.



The standard programmable speed curve is using CV67 up to CV94, either with 14 or 28 entries, some decoders must not have values <=63.

## 17.3 Processing with checkpoint

By the checkpoint function it's possible to make a checkpoint restart of your model railroad equipment at a special time, specially using schedule control. So you hold the status of one situation in place and produce this after switching off the complete system at a later time again.

At this later time all locomotive speeds as well as all turnouts, signals and contacts will get their last status (stored) again. But engines cannot be brought from a new location to the old one stored automatically, therefore schedules shouldn't be interrupted at a checkpoint output during a time command (Z) is executed and trains if possible shouldn't run.

The choice "Checkpoint" contains two parts:

### Checkpoint reading and Checkpoint writing

**"Checkpoint reading"** is possible only as first function directly after loading STW2001, since through this all checkpoint variables (of an earlier processing) modify the program process. The file STW2001.CHK must be saved in the current folder.

At **"Checkpoint writing"** the present situation of STW2001 is written in a file (STW2001.CHK in the current folder); a file created perhaps earlier is typed over. The following items are stored:

- Used, loaded data,
- position and actual status of all magnetic articles, contact tracks, switch routes and sound definitions,
- locomotive details like speed, function and doubleheading status,
- contents of menu and loco bar and other parts.
- situation of all schedules,

For using following features and steps have to be taken into account:

1. If the status of equipment shall get stored, all trains should stop e.g. in front of signals, within isolated tracks or should have the speed zero.
2. Then you should write a checkpoint via menu item:


**"File / Checkpoint / Checkpoint writing".**

Program STW2001 should being terminated normally by menu item "File / Program End" subsequently.

3. Isolated tracks must be bridged (this is a remark of DIGITAL System manufacturers) through a resistance 1.5 kOhm - 1/4 watts parallel to the driving electrical power according. Otherwise the locomotive receiver (decoder) may lose information out of his memory since the last command, if interruptions are longer than about 2 minutes. Therefore an update of the locomotive speed is only possible within isolated tracks after "power on" if this condition is given.
4. Conventional/analogue engines can't speed up within isolated tracks by this method. STW2001 shows the speed last taken advantage in processing board (as value and green bar) only; however, it must be "clicked" e.g. if signal was switched to "green" again.
5. You start a restart by selecting menu item:

**"File / Checkpoint / Checkpoint reading"**

This is available only at begin of the program start as long as no other activities were started.


6. Magnetic article positions, status values of contact tracks and locomotive speeds are produced again, after loading checkpoint.
7. Then it is jumped to "ALL OFF" for more safety. Until this time you should execute no mouse or keyboard entries.
8. Continuation is possible by "Go" button in the window and after this "Go" the further processing can execute.
9. Schedules can be continued by the icon , they start - if interrupted - at the last current command.
10. Changes in files between output and again reading of a checkpoint are ineffective, because special internal program tables are stored by a checkpoint command.
11. The checkpoint file always has the extension "CHK". Checkpoint files are compatible only within the same STW2001 update version.

## 17.4 Loco bar

During processing mode a locomotive bar is displayed, in which all usable engines can be seen as icons. Locomotive are inserted or deleted by defining in a checkbox option "Insert locomotive number into loco bar ?" within locomotive definition window

Locomotive number: <input type="text" value="8"/>	Accept locomotive number to loco list ? <input checked="" type="checkbox"/>
	Insert locomotive number into loco bar ? <input checked="" type="checkbox"/>



Loco definition window can be invoked by  icon during processing mode also. The number of icons in the loco bar depends on the graphic resolution and window width (at resolution 800x600 up to 27 and at resolution 1024x768 up to 35 locomotives numbers are visible). The loco bar can be removed / inserted by <Alt> F7.

Further locomotives are always inserted in ascending order from left to right. There are no gaps deleting one engine. Loading a STELLWERK file locomotives with so defined option are inserted in loco bar automatically.

By these locomotive icons is a fast change of locomotive numbers and a comfortable speed control possibly. A so-called **ToolTip** with locomotive name, loco speed and direction of the corr. locomotive number is shown when moving mouse pointer over these icons. If no locomotives are defined a standard text appears. Mouse pointer changes to "↔" to clarify the possibilities of control. Display "V200 /Sp=3→" means locomotive V200 drives forward with speed 3.

A click on the icons indicates:

- **left** mouse button = **Reduce speed** (respectively in step of one).
- **right** mouse button = **Change to higher speed** (respectively in step of one).
- **middle** mouse button = **Slow down to speed zero and change direction**

In addition most of the locomotive details are represented in processing board below.

## 17.5 Display ToolTip

The remarks displayed during construction and processing can be hidden or shown again by selecting the menu item "Display ToolTip".

**ToolTips** are short information which is shown for some symbols, icons to help identify them; e.g., the names of graphic symbols, present status of magnet articles or start and end-points of switch route definitions. The display is activated when mouse pointer is located a while on symbol. If ToolTip display is set to active, a check sign can be seen at the menu item.

### Examples of ToolTips during:

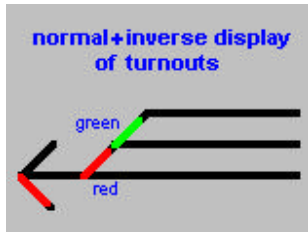
<u>Construction mode</u>	<u>Processing mode</u>	<u>Remarks to Processing mode</u>
Track diagonal length 8 (up to right)		no display
Right switch no.1 (to right)	No. 1 GREEN	No. and status of switch
Reed contact no. 2 (to right)	No. 2 FREE	No. and occupied status of contact
Switch route no. 1 ->(118,42)	1->(118,42)	No. and destination position of switch route.

## 17.6 Inverse display of turnouts

To install turnouts with their straight part in the 45° angle (e.g. several turnout as one straight line), so you can define turnouts as so-called "inverse".

At this definition is as follows:





If you want to paint a left and a right turnout in direction "3" direct after another, where the 2<sup>nd</sup> turnout must have its straight part in 45°, so you have to define both as left turnouts, but the second one as INVERSE.

At definition of turnouts you can select a special init status "Straight in diagonal" or "inverted diverging". Furthermore right/left diverging is changeable of three-way switches by similar inverted init status definitions.

Example STW\_004.stw contains normal switches no. 1 and no. 2 at the left and the switches no. 3 and 4 in the middle; here the turnout no. 4 is represented as an inverse one. You find a normal three-way switch as no. 11 (+12) and an inverse three-way switch as no. 21 (+22) in this file also

## 17.7 Coupling of magnetic articles and coupled distant signals

If it is necessary to switch two magnetic articles by one click and independently whether the first or second magnetic article is pressed, so it is to reach with the following activities:

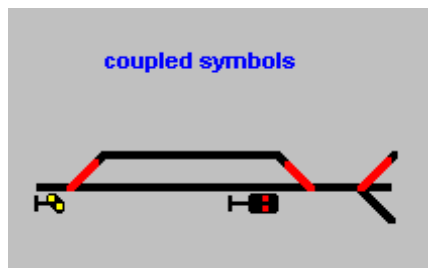
You define this at first construction of magnetic articles by a checkbox option in definition window

**Coupled with one magnetic article no.:** ☒ **44** **Changed switching ?** ☒ directly. If you define "Changed switching" for 2<sup>nd</sup> number, so 2<sup>nd</sup> number is switched with changed status of the 1<sup>st</sup> number; so switching first number to "GREEN" then second number is switched to "RED" (opposite also). It's not possible for "ORANGE".

### Example:

If turnout no. 14 has to be coupled with switch no. 44, so the upper definition is necessary for turnout no. 14. If reverse coupling is used additional, so the definition of switch 44 must have the entry 14 also. Here "Changed switching" is active.

In the mentioned example STW\_004.stw exists as 3<sup>rd</sup> part a small figure at which two turnouts 5(+6) are coupled mutually.



Both magnet articles are switched and the current status drawn. If at two numbers the cross-reference is available, then both numbers can be "clicked"; if the cross-reference is missing at one, no coupling can execute by this one.

If a magnetic article shall not be switched really, then it must have a valid number (lower than max. magnetic article no.), but the corr. decoder doesn't need to be available. It then executes:

No switching, no error message, only display.

Furthermore there is the possibility to couple a distant signal with a home signal tightly (represented in the 3<sup>rd</sup> part of this example) also. In this case the distant signal has to be defined with option "**Connected with same Home signal no.**". Only home signal can be switched, the distant signal gets only "same" display of home signal.

## 17.8 Coupling of contact tracks

It's possible to couple two contacts generally. For coupling you have input the second number into the field "coupled with another contact no."

Sometimes it's necessary:

- \* to generate second activities using **contact control** or
- \* to combine display of two contact tracks e.g. one straight and one diagonal contact track symbol as one contact.

The second contact number will be triggered after blocking time of the first one and the display changed.

If you want to handle a coupled straight and diagonal contact only as one, so set blocking time of the first one to zero.

Second contact need not be available. (But the number must be reachable with the entry "Highest contact number" defined in initialization window of STW2001.

## 17.9 Graphic parts

There is a difference between single graphic symbols and a complete graphic file at graphic parts. Single graphic symbols can be defined as special signs described in chapter 8.6. They are loaded like other track symbols as components of a track layout. A graphic file (described as graphic folio also) should always have same resolution and size as the track layout.

### 17.9.1 Loading a graphic (folio)

An available graphic file (as BMP file) can be displayed before loading a track layout as a "graphic folio". A graphic folio is loaded by "Graphic folio (bmp)" as sub-menu item of "File / Open"; it's only possible before a track layout is loaded. A track layout loaded subsequently puts itself over the graphic loaded before.

If you have already stored a track layout as graphic, you can "beautify" the track layout with own ideas and skill, e.g. painting of landscapes and others or build up only the variable (switchable) elements in the track layout definition and create other parts graphically before.

### 17.9.2 Saving a graphic

A loaded track layout can be saved as a graphic file. In the sub-menu of menu "File / Save as.." you'll find "**Graphic picture output** (bmp)". The graphic (only the real track layout) is written to the selected device as BMP file and it can be changed and/or printed out with Windows®98/ME/XP/2000 programs such as Paint (PAINT.EXE).

Graphic files don't contain any details on track symbols; therefore a Stellwerk file (stw) always must be loaded in addition for processing by STW2001.

## 17.10 Schedule TRACE

For better checking a schedule if necessary, a small TRACE help is integrated in program STELLWERK 2001.

By activating the checkbox option "TRACE schedule ?" = YES within initialization definition window (or a definite schedule number) it's possible to write a protocol of automatic operation processing in a special file (STWTRACE.DAT). This file is created in the actual folder; an old one (with same name) is typed over without warning. By special schedule commands (**/, T, 0** or **/, T, 1**) you can stop or start a TRACE within a schedule.

It should be considered, that perhaps processing can be slowed down by the TRACE output and the same time conditions aren't thus reached like without TRACE function. Furthermore schedule running could grow and fill disc file size by a false command enormously (e.g. by an endless-loop).

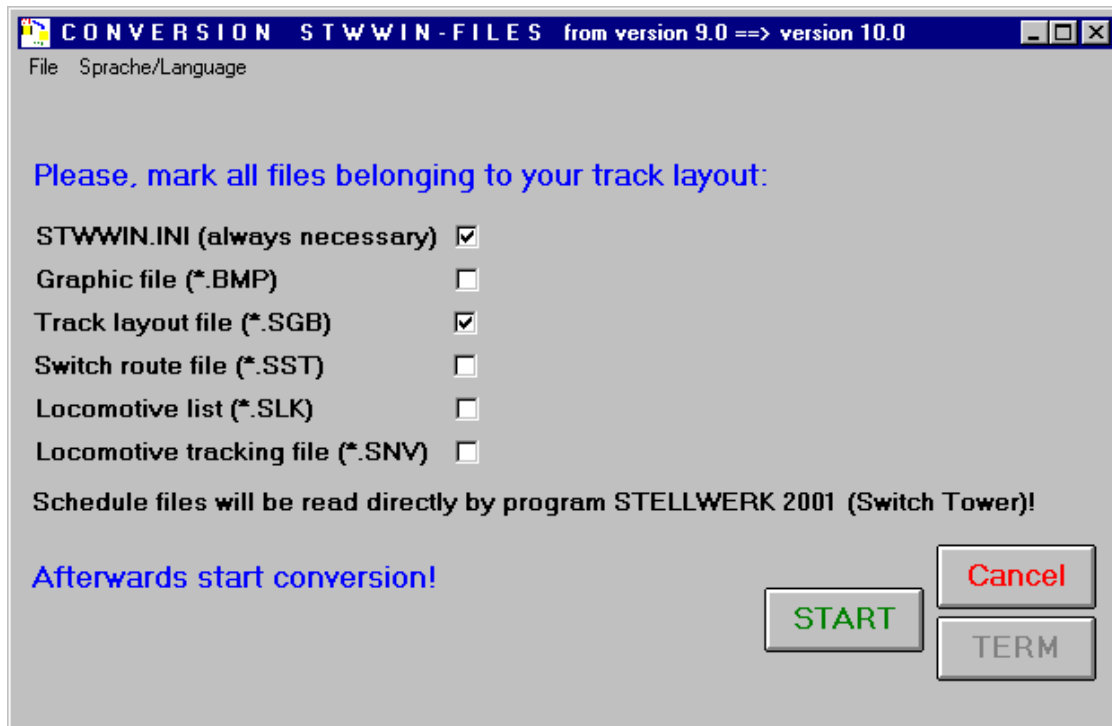
The created TRACE file can be displayed and/or printed with every editor (e.g. notebook / NOTEPAD).

## 17.11 Converting notes

Files of older STWWIN version 9.0 can't loaded -excluded schedules- directly. A conversion routine is available, by which files of version 9.0 are combined to a new STELLWERK 2001 (stw) file.

This program "STW\_CONV.EXE" shows following window after loading.

**Window:** Conversion program file v.9.0 --> v.10



The possible file types:

- Initialization file (STWWIN.INI)
- Graphic folio file (\*.bmp)
- Track layout file (\*.sgb)
- Switch route file (\*.sst)
- Locomotive list (\*.slk)
- Locomotive tracking file (\*.snv)

can be selected by checkboxes. At every selection the standard window is opened for easy finding and selecting wanted files. STWWIN.INI file and a track layout file must be read, the other are optional files.

By "Start" converting is executed. To define the output file name the Windows®98/ME/XP/2000 standard window is opened also and you can fix the new name (\*.stw).

At end of every conversion a note is displayed.

The program can be canceled by "Cancel" at every time and normal terminated by "End".

You can change the language between "German" and "English".

File of older STWWIN versions 7.0 or 8.0 are to convert only with reservation of expected errors, because some INI parameters have changed. Files of the DOS-version 5.0 are not to convert!

There is no compatibility from STELLWERK 2001 version 10 backward to STWWIN version 9.0. or older.

### Old (German) INI parameter are converted as following:

<u>Type / Name</u>	<u>Description</u>	<u>Solving in version 10.5</u>
<b>MaxSymbolZahl</b>	Max. number of track symbols	now general value 9999
<b>MaxRModulZahl</b>	Max. number of feedback modules	defined by max. contact number
<b>FahrplanZahl</b>	Max. number parallel schedules	defined as initialization parameter
<b>MaxFahrplanZeilen</b>	Max. number all lines of schedules	defined as initialization parameter
<b>MaxFahrplanNamen</b>	Max. number addresses of every schedule	defined as initialization parameter
<b>MaxFahrstrZahl</b>	Max. number of switch routes	now general value 512
<b>MaxWegHinweise</b>	Max. number tracking lines	now 9 for every target contact
<b>MaxSchaltZusammen</b>	Max. number combined switches	now general value 20
<b>MaxDigitalLokNr</b>	Max. Digital loco no.	defined as initialization parameter
<b>DigitalSystem</b>	used DIGITAL-System of company	defined as initialization parameter
<b>SerialInterface</b>	serial Interface at COM	defined as initialization parameter
<b>AnalogLokNr</b>	Loco number conventional loco	no more, practically as digital no.
<b>InterruptTime</b>	Interrupt-time in milliseconds	defined as initialization parameter
<b>MagnetSchaltzeit</b>	Switching time of magnetics in msec.	defined at magnet-articles
<b>RMAbrageZeit</b>	Feedback module triggering cycle in msec.	defined as initialization parameter
<b>BremsBeschlZeit</b>	Acceleration/braking time locos	defined at loco definition window
<b>ModellZeitFaktor</b>	Time-lapse value	defined at digital clock window
<b>MomentKontakte</b>	Used contact type	defined at contact definition
<b>KontaktAutoFrei</b>	Draw contact free automatically	defined at contact definition
<b>Lokverfolgung</b>	Activating locomotive tracking	now standard if using data
<b>AnzeigeFahrplan</b>	Display schedule commands	defined as initialization parameter
<b>DecAdrTausch</b>	Changing red/green of all decoders	defined at magnetic article definition
<b>FahrplanF11</b>	Loading schedule by F11-button	defined as initialization parameter
<b>FahrplanF12</b>	Loading schedule by F11-button	defined as initialization parameter
<b>KontaktPause</b>	Time limit at OCCUPIED queries	defined at contact definition
<b>LokUmschaltZeit</b>	Direction changing time -Märklin-	defined at locomotive definition
<b>ALL Color names</b>	Defining all color parameter	defined as color parameter
<b>TraceFahrplan</b>	Schedule Trace	defined as initialization parameter
<b>TraceInout</b>	In-/Out-Trace	defined as initialization parameter
<b>TraceErrors</b>	Error-Trace	defined as initialization parameter

## 18 File examples

### 18.1 Example group no. 1

The example group of no. 1 contains following files:

STW_001.stw =	Track layout oval with 2 turnouts, 5 signals, 12 contact tracks as well as one sound symbol, switch routes for 2 lines, 4 locomotives
STW_001.sfp =	Locomotive tracking data, schedule, train simulation (locomotive 21) with status display.

Both files have to be regarded as a whole to show the control and display possibilities of the program STELLWERK 2001; it's a simulated test without interface only and looks like a demo. The T- (time) and B (Occupy contact...) commands in the schedule program "STW\_001.sfp" are added for a longer illustration and not a true processing. Even if only one engine drives in this example, you can control several locomotives in the schedules respectively, too.

### 18.2 Some more track layout examples

The 2<sup>nd</sup> example shows an extensive track layout file:

STW_002.stw=	Large track layout with turnouts, different signal types and double-slip switch as well as contact tracks.
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This picture shows the variety and size of a track layout only; it doesn't represent good model railroad equipment, however.

In 3<sup>rd</sup> example all symbols for a track layout are shown:

STW_003.stw	=	Test track layout with all symbols
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All available symbols are represented in four different directions respectively and the meaningful initial positions.

In 4<sup>th</sup> example part three different track descriptions are shown as:

STW_004.stw	=	Test picture for inverse and coupled definitions
* left:		2 normal turnouts on the left and 1 normal three way turnout
* middle:		1 normal and 1 inverse left turnout as well as an inverted three way turnout
* right:		Different coupled magnet articles, with: two coupled turnouts, a distant signal with coupling to home signal and an inverted three-way switch with 2 <sup>nd</sup> number smaller then the first one.

Furthermore you find several test files; these track layouts are running via contact control. You have only to change Digital System type and Interface data. It's easy to check used magnetic articles and/or contacts. There are following files:

Test programs magnetic articles:

All_Magnetics_001_256.stw	signal symbols of no. 1 up to 256 are switchable.
All_Magnetics_257_512.stw	signal symbols of no. 257 up to 512 are switchable.

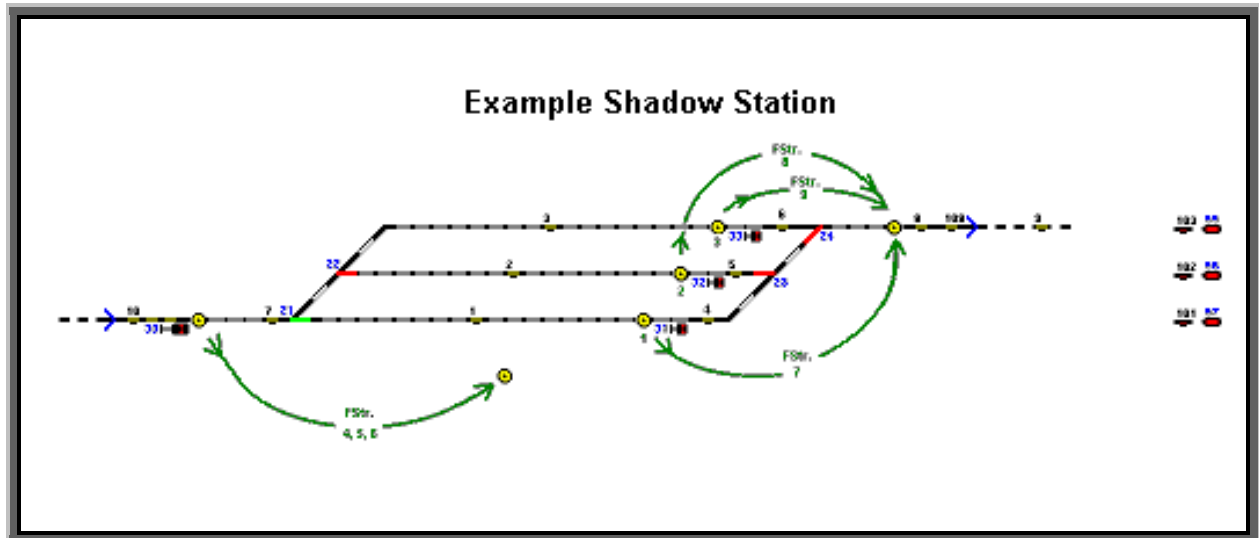
Test programs contacts:

All_Contacts_001_256.stw	contacts of no. 1 up to 256 can be triggered.
All_Contacts_257_512.stw	contacts of no. 257 up to 512 can be triggered.
All_Contacts_513_768.stw	contacts of no. 513 up to 768 can be triggered.

### 18.3 Examples of a (shaded) railroad station

Small shaded railroad station control is introduced in principle -as two different represented in graphics- in 5<sup>th</sup> example group.

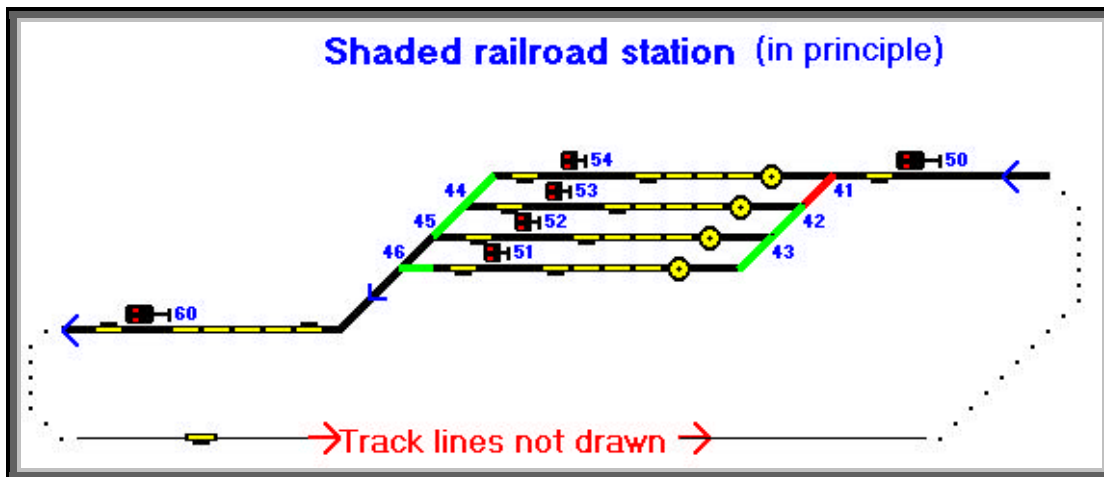
**Graphics:** Example of a (shaded) railroad station for contact control



The following files are included:

STW\_005C.stw and nearer explanations in text file STW\_005C.txt which -when required- can be displayed by an editor or a text program.

**Graphics:** Example of a (shaded) railroad station for schedule control



The following files are included:

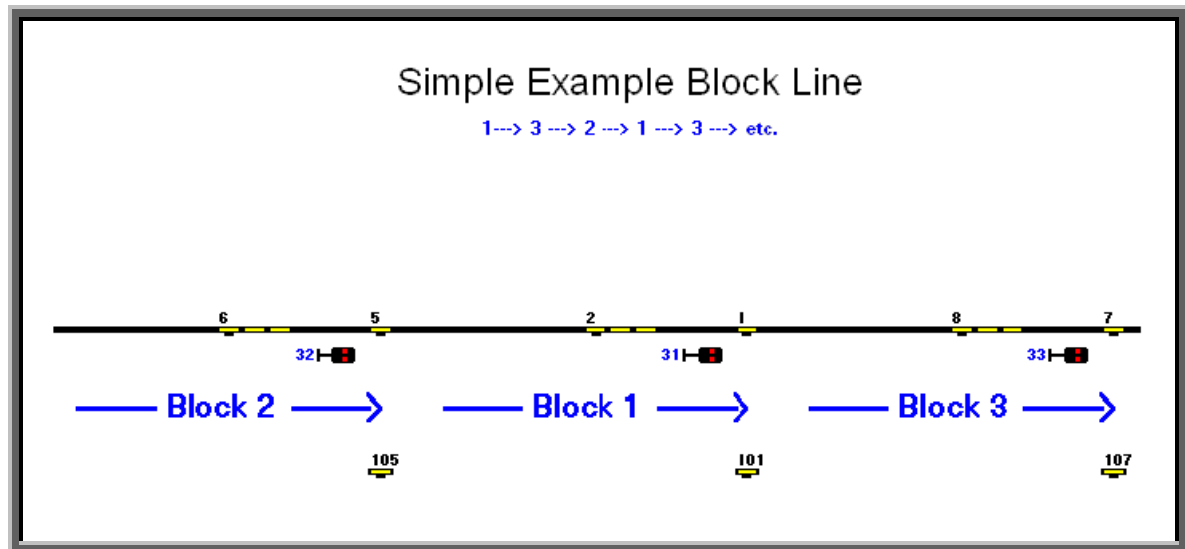
STW\_005S.stw, STW\_005S.sfp and nearer explanations in text file STW\_005S.txt which -when required- can be displayed by an editor or a text program.

These examples may be used for construction of an own shaded railroad station control. Of course there are better solutions.

## 18.4 Examples with block signals

In the 6<sup>th</sup> example group two small lines with block signals –see two graphics- are represented in principle.

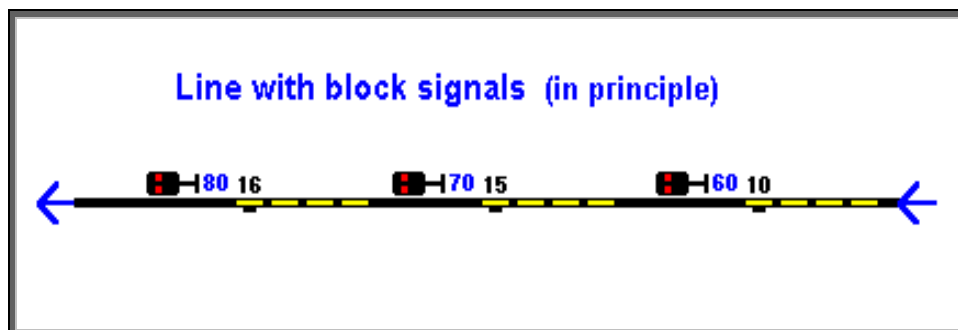
**Graphics:** Line with block signals for contact control



The following files are included:

STW\_006C.stw and nearer explanations in the text file STW\_006.txt which -when required- can be displayed by an editor or a text program.

**Graphics:** Line with block signals for schedule control



Locomotives on block line shall be controlled according to the respective block signal position. E.g. Block signal 60 shall go to "FREE" if contact 16 is reserved (and therefore contact 15 =free).

The following files are included:

STW\_006S.stw, STW\_006S.sfp and nearer explanations in the text file STW\_006S.txt which -when required- can be displayed by an editor or a text program.

These examples may be used as an idea to construct a line with block signal control for your equipment. Of course there are better solutions.





## 19 Error messages and notes

### 19.1 Introduction

Error messages can occur under Windows® from three areas:

1. Wrong application using of the Windows® surface and Windows® standards:

These reports have to be found most in Windows® description or they are self-explained.

2. Messages from input/output activities or program errors:

There are standard error numbers also; if this appear they are displayed -if possible- in an own STW2001 error window with number and text.

3. Processing errors of STW2001 by technical errors, not foreseeable events and other:

Such errors are tried to handle by normal icon surface procedures, to display messages - without an own windows- in the processing board and allow repeating if possible.

STELLWERK 2001 uses own error numbers which start at number 26001 for errors message display in the program, they are displayed mostly by only the last one or two digits (e.g. 1 or 21). Error messages are listed the following tables; sometimes an own error message window is displayed or error text is represented (in red) at processing board usually.

**Caution:** If a general error no. **420 or 480** is displayed, you must minimize the Initialization parameters of width and height of track layout, because these parameters respond to the storage working area (RAM) directly.

### 19.2 Interface error handling

There exists the possibility by many influences, that the interface doesn't work as requested and a "data transmission error" happens. Therefore several program error routines try to control a "abnormal termination" and initialize a "retry" for the user in most cases.

At error messages 26021 to 26027 appear an internal OCX error code behind the error number and if necessary notes like:

As example: Errors 26026 (1002) Query FB-modules (CTS)

As a rule, the notes (1002) and/or CTS indicate, that the interface is inactive (signal 'clear to send' missing), in several cases it is: short-circuit on the equipment (red light off). You can continue if no short-circuit any longer by the "COM" icon or the F4 button.

In most error situations one (red) error message is displayed as described under chapter 19.4; there you find details of type and status. A manual intervention is also often necessary (e.g. search for short-circuit cause and push Go-/Reset button) in addition.

### 19.3 General and input/output messages

**Table:** General messages (26001 - 26009)

No.	Message text	Remarks
26001	General error STELLWERK	Error is defined more exactly by Windows <sup>®</sup> error code.
26002	Error of CHECKPOINT DATA	During reading restart / checkpoint file an error occurred. It seems, that the data changed since last processing or the version is not compatible to the actual STW2001 version. Start program new with checkpoint restart.
26003	Track symbol out of supported area	Start program again after checking / extending of following values of the initialization parameters Track layout width and Track layout height.
26004	Runtime error STELLWERK 2001	During program running an error occurred, which is defined more exactly by the Windows <sup>®</sup> error code. Contact to author with details.
26005	STELLWERK 2001 message	A specific message is displayed with more details to describe the situation.
26006	Undefined error code=	An unexpected error occurred. You find under „code=“ the Windows/DOS error message. As a rule 3 possibilities in the error windows are offered to continue: 1. Ignore Try to start with the next routine. 2. Retry Useful only for input/output procedures 3. Cancel Procedure or program will be terminated.  If this occurred several times, contact to author with details of files, used parameter definitions and your hard-/software.
26007	Schedule to large	Number of schedule commands (lines) is to large. 1. Reduce schedule lines or 2. Maximize initialization parameter "Max. number of the schedule lines" or 3. Reduce number of the parallel running schedules.
26008	RAM to small	PC working memory is to small for this track layout and/or the used initialization parameters. Try to use smaller variables e.g. width, height of track layout.  Use lower screen resolution with (only) 256 colors. Contact to author.
26009		No more available.

**Table:** Input/output messages (26011 – 26013)

No.	Input- / Output messages	Remarks
26011	Erase used track layout?	A new track layout shall be built up, however, a track layout exists in the system. The old graphic is removed from the working memory at "Yes".
26012	File is existing, overwrite?	A file shall get saved and is already on the device:\folder available. Overwriting at "Yes" or a new choice must execute at "No".
26013	Incorrect input data	A wrong value or wrong format was used in read data. If necessary a nearer note is displayed to the set. Next set is read at "OK", new choice must execute at "Cancel".

## 19.4 Interface / RS232-messages

**Table:** Interface messages (26021 – 26027)

No.	Message text	Remarks
26021	Error Interface at INIT (and COM):	Check cable, and interface (DIPs, address). Is it the right serial no. of to the interface?
26022	Error Interface at FREE	Manually interface reset is necessary by Go-icon or F4-key.
26023	Error Interface at STOP	Manually interface reset is necessary by Go-icon or F4-key.
26024	Error Loco (LG, LN, LF) =	Locomotive error occurred (wanted command not executed) at: LG = locomotive speed LN = locomotive number LF = locomotive function
26025	Error Magnetics (MN, MS) =	Magnetic article error occurred (wanted command not executed) at: MN = magnetic article number MS = magnetic article status
26026	Error Query FB-modules	During feedback modules querying an error occurred, check the interface, cables and the modules. Does the number of contacts agree with possible feedback modules? Max. number of contacts too small? (Operation can get continued by "COM" usually).
26027	Error Interface not active – SHORT-CIRCUIT?	Check Interface, modules. Eliminate short-circuit. (Operation can get continued by "COM" usually).
26029	Not allowed locomotive number LN	Used locomotive number LN for selected Digital System can't be addressed. (e.g. loco numbers >99 for Lenz-System with Lenz hardware versions <3.0).

## 19.5 Function keys and key combinations

Several function keys are used::

- F1** = Access **Help file** (see chapter 20.7)
- F2** = Access menu item **Change track layout** (see chapter 7.3)
- F4** = Access **Reset** icon, reset interface (see chapter 15.5.1)
- F5** = Updating magnetic articles status -only if using Lenz System- (see chapter 15.4.1)
- F6** = Access menu item **First start** (see chapter 5.4.1)
- F7** = Access menu item **Continue** (see chapter 5.4.2)
- F8** = **Immediate Stop** (see chapter 15.5.1)
- F9** = **Emergency brake** (see chapter 15.5.1)
- F10** = **Trigger next timer -controlled event** (see chapter 13)
- F11** = **Loading a special schedule** named by Initialization parameter field "F11"
- F12** = **Loading a special schedule** named by Initialization parameter field "F12"

For some menu items special key combinations (shortcuts) are used:

- <Ctrl> + D** = **Display** (see chapter 16.2)
- <Ctrl> + E** = **Program end** (see chapter 5.3.7)
- <Ctrl> + I** = **Initialization parameter** (see chapter 6)
- <Ctrl> + L** = **Define/modify locomotive list** (see chapter 11)
- <Ctrl> + N** = **New**, create track layout (see chapter 5.3.1)
- <Ctrl> + P** = **Print** (see chapter 16.3)

**<Ctrl> + S** = **Save** STW file (see chapter 5.3.5)  
**<Ctrl> + T** = Display **ToolTip** (see chapter 17.5)

The following keys / key combinations of the keyboard are used for different activities:

**<Space key>** = Clicking the space key **once** will trigger **Immediate Stop F8** (see chapter 15.5.1).

**<Alt> +<F4>** = **Program end**

**<Esc>** button = Same as **Cancel** for most windows (instead of clicking on "Cancel").

**<Enter>** button = For normal **Confirmation** of input or OK command button.

**<Tab>** button = Press to move to **next input field** or to next command button.

**<Arrow>** buttons = Use for speed control of the currently active locomotive:  
Right Arrow or Up Arrow = faster one step.  
Left Arrow or Down Arrow = slower one step.

**<Ctrl>+<Arrow>**  
buttons = Use for direction changing of the currently active locomotive:  
All arrow keys together with "Ctrl" button reduce speed slowly to zero, change direction and speed increase to old speed.

**<PgUp>, <PgDn>**  
buttons = "Page Up" and "Page Down" buttons are used to alternate speed in greater steps:

**PgUp** = faster **5** steps (for all used driving steps).

**PgDn** = slower **5** steps (for all used driving steps).

**<Home>** = **Immediate** speed reducing of active locomotive to **speed zero**.

**<End>** = **Slow** speed reducing of active locomotive to **speed zero**.

## 20 Appendix

### 20.1 Feedback module addresses - Contact numbers

Following table is showing connection between hardware setting of feedback modules (FB) and their contact numbers. You can see corresponding eight contact numbers for every FB with single address. Feedback modules with 16 inputs (e.g. Lenz LR101) need two FB hardware addresses.

**Table:** Connection between feedback module addresses and contact numbers

FB address	Contact numbers			FB address	Contact numbers		
1	1	up to	8	65	513	up to	520
2	9	up to	16	66	521	up to	528
3	17	up to	24	67	529	up to	536
4	25	up to	32	68	537	up to	544
5	33	up to	40	69	545	up to	552
6	41	up to	48	70	553	up to	560
7	49	up to	56	71	561	up to	568
8	57	up to	64	72	569	up to	576
9	65	up to	72	73	577	up to	584
10	73	up to	80	74	585	up to	592
11	81	up to	88	75	593	up to	600
12	89	up to	96	76	601	up to	608
13	97	up to	104	77	609	up to	616
14	105	up to	112	78	617	up to	624
15	113	up to	120	79	625	up to	632
16	121	up to	128	80	633	up to	640
17	129	up to	136	81	641	up to	648
18	137	up to	144	82	649	up to	656
19	145	up to	152	83	657	up to	664
20	153	up to	160	84	665	up to	672
21	161	up to	168	85	673	up to	680
22	169	up to	176	86	681	up to	688
23	177	up to	184	87	689	up to	696
24	185	up to	192	88	697	up to	704
25	193	up to	200	89	705	up to	712
26	201	up to	208	90	713	up to	720
27	209	up to	216	91	721	up to	728
28	217	up to	224	92	729	up to	736
29	225	up to	232	93	737	up to	744
30	233	up to	240	94	745	up to	752
31	241	up to	248	95	753	up to	760
32	249	up to	256	96	761	up to	768
33	257	up to	264	97	769	up to	776
34	265	up to	272	98	777	up to	784
35	273	up to	280	99	785	up to	792
36	281	up to	288	100	793	up to	800
37	289	up to	296	101	801	up to	808
38	297	up to	304	102	809	up to	816
39	305	up to	312	103	817	up to	824
40	313	up to	320	104	825	up to	832
41	321	up to	328	105	833	up to	840
42	329	up to	336	106	841	up to	848
43	337	up to	344	107	849	up to	856
44	345	up to	352	108	857	up to	864
45	353	up to	360	109	865	up to	872
46	361	up to	368	110	873	up to	880
47	369	up to	376	111	881	up to	888
48	377	up to	384	112	889	up to	896
49	385	up to	392	113	897	up to	904
50	393	up to	400	114	905	up to	912
51	401	up to	408	115	913	up to	920
52	409	up to	416	116	921	up to	928
53	417	up to	424	117	929	up to	936
54	425	up to	432	118	937	up to	944
55	433	up to	440	119	945	up to	952
56	441	up to	448	120	953	up to	960
57	449	up to	456	121	961	up to	968
58	457	up to	464	122	969	up to	976
59	465	up to	472	123	977	up to	984
60	473	up to	480	124	985	up to	992
61	481	up to	488	125	993	up to	1000
62	489	up to	496	126	1001	up to	1008
63	497	up to	504	127	1009	up to	1016
64	505	up to	512	(128)	1017	up to	1024

## 20.2 Switch decoder addresses - Magnetic article numbers

Up to four magnetic articles can be connected for every switch decoder address (e.g. Lenz LS100) normally. Following table is showing magnetic article numbers and corresponding decoder address. Decoder addresses for Märklin/Arnold are allowed up to 64 only.

You have to notice common used address area for Lenz addresses eg. of LS100/110/120 and LR100/LR101 (see chapter 20.3).

**Table:** Connection between switch decoder address and magnetic article numbers

Dec address	Magnetic article numbers			Dec address	Magnetic article numbers		
1	1	up to	4	65	257	up to	260
2	5	up to	8	66	261	up to	264
3	9	up to	12	67	265	up to	268
4	13	up to	16	68	269	up to	272
5	17	up to	20	69	273	up to	276
6	21	up to	24	70	277	up to	280
7	25	up to	28	71	281	up to	284
8	29	up to	32	72	285	up to	288
9	33	up to	36	73	289	up to	292
10	37	up to	40	74	293	up to	296
11	41	up to	44	75	297	up to	300
12	45	up to	48	76	301	up to	304
13	49	up to	52	77	305	up to	308
14	53	up to	56	78	309	up to	312
15	57	up to	60	79	313	up to	316
16	61	up to	64	80	317	up to	320
17	65	up to	68	81	321	up to	324
18	69	up to	72	82	325	up to	328
19	73	up to	76	83	329	up to	332
20	77	up to	80	84	333	up to	336
21	81	up to	84	85	337	up to	340
22	85	up to	88	86	341	up to	344
23	89	up to	92	87	345	up to	348
24	93	up to	96	88	349	up to	352
25	97	up to	100	89	353	up to	356
26	101	up to	104	90	357	up to	360
27	105	up to	108	91	361	up to	364
28	109	up to	112	92	365	up to	368
29	113	up to	116	93	369	up to	372
30	117	up to	120	94	373	up to	376
31	121	up to	124	95	377	up to	380
32	125	up to	128	96	381	up to	384
33	129	up to	132	97	385	up to	388
34	133	up to	136	98	389	up to	392
35	137	up to	140	99	393	up to	396
36	141	up to	144	100	397	up to	400
37	145	up to	148	101	401	up to	404
38	149	up to	152	102	405	up to	408
39	153	up to	156	103	409	up to	412
40	157	up to	160	104	413	up to	416
41	161	up to	164	105	417	up to	420
42	165	up to	168	106	421	up to	424
43	169	up to	172	107	425	up to	428
44	173	up to	176	108	429	up to	432
45	177	up to	180	109	433	up to	436
46	181	up to	184	110	437	up to	440
47	185	up to	188	111	441	up to	444
48	189	up to	192	112	445	up to	448
49	193	up to	196	113	449	up to	452
50	197	up to	200	114	453	up to	456
51	201	up to	204	115	457	up to	460
52	205	up to	208	116	461	up to	464
53	209	up to	212	117	465	up to	468
54	213	up to	216	118	469	up to	472
55	217	up to	220	119	473	up to	476
56	221	up to	224	120	477	up to	480
57	225	up to	228	121	481	up to	484
58	229	up to	232	122	485	up to	488
59	233	up to	236	123	489	up to	492
60	237	up to	240	124	493	up to	496
61	241	up to	244	125	497	up to	500
62	245	up to	248	126	501	up to	504
63	249	up to	252	127	505	up to	508
64	253	up to	256	(128)	509	up to	512

## 20.3 Common used address area of Lenz Digital plus System

Feedback modules and switch decoders share address area if using Lenz Digital plus System (eg. LS100/110/120 and LR100/101).

This area of central unit is occupied up to 512, if 256 magnetic articles are connected (= 64 switch decoder addresses); therefore company Lenz recommend area from 65 and higher for feedback addresses.

Following table is showing overlaps of FB addresses 1 up to 64 and switch decoder addresses 1 up to 256.

**Table:** Address overlaps of feedback modules and switch decoders for Lenz

FB address	I	no.	M address
1	1	1	1 +
1	2	2	1 -
1	3	3	2 +
1	4	4	2 -
1	5	5	3 +
1	6	6	3 -
1	7	7	4 +
1	8	8	4 -
2	33	9	5 +
2	37	10	5 -
2	41	11	6 +
2	45	12	6 -
2	49	13	7 +
2	53	14	7 -
2	57	15	8 +
2	61	16	8 -

FB address	I	no.	M address
63	257	1	249 +
63	261	2	249 -
63	265	3	250 +
63	269	4	250 -
63	273	5	251 +
63	277	6	251 -
63	281	7	252 +
63	285	8	252 -
64	289	9	253 +
64	293	10	253 -
64	297	11	254 +
64	301	12	254 -
64	305	13	255 +
64	309	14	255 -
64	313	15	256 +
64	317	16	256 -

.....    ...    ...    ...

etc. up to end  
(see right!)

### Meaning of table headings:

**FB address** = Feedback module address  
**I** = Input of feedback module  
**no.** = Number of feedback module information for central unit  
**M address** = Magnetic article address

## 20.4 File format Stellwerk 2001

STELLWERK 2001 data to be stored are saved in a sequential text file. Generally, the user doesn't need to have access to this file. The fundamental structure of this file is listed here.

The file consists of several sections, starting with an entry in the form ###.....### and ending usually with one or several entries 9999. Between the ... (points) is text (a range name, in effect):

"### xxxxxxxx ###"                      xxxxxxxx = actual internal version of STELLWERK 2001 and then file saving date / time.

Several single sections are following always of:

"### INITIALIZATION ###"    Initialize definitions  
 "### GRAPHIC FILE ###"    Graphic folio definition  
 "### SYMBOLS ###"    Symbol definitions  
 "### MAGNETICS ###"    Magnetic article definitions  
 "### CONTACTS ###"    Contact definitions  
 "### SOUNDS ###"    Sound definitions  
 "### ROUTES ###"    Switch route definitions

"### ROUTE-ELEMENTS ###"	<u>Route element</u> definitions
"### MARKER ###"	<u>Marker</u> definitions
"### LOCOMOTIVES ###"	<u>Locomotive</u> definitions
"### TRACKING ###"	<u>Locomotive tracking</u> definitions
"### TIMER CONTROL ###"	<u>Controlling by timer</u>

The data created during program running (or defaults) are stored within a section as characters/values/switches and separated by comma. It is a text information if entries are framed in " ", otherwise numeric values or "yes/no"-switches framed in # #.

#### 20.4.1 Initialization record definitions

At first there are 3 records with together 25 entries

**Internal Digital system no., Baud value, Actual COM-Interface, Track layout width, Track layout height, number of contacts, Standard contact type no., Highest locomotive no., Triggering cycle time feedback modules, Interrupt time COM (in msec.), Type of control, Max. number schedules, Max. number schedule lines, Max. number schedule addresses, "Schedule filename F11", "Schedule file name F12", #Display schedule commands#, #Display contact numbers#, #Display magnetic article numbers#, #Trace schedule#, #Trace Inout#, #Trace Errors#, Internal wait state, #Contact free autom. ?#.**

23 records are following for all symbol types, everyone with 6 color values:

**Background/Erase-color, Main/Track color, GREEN status, RED status, ORANGE status, False status.**

#### 20.4.2 Graphic folio record definition

There is one record with 2 entries:

**1, "File name for BMP file"**

#### 20.4.3 Symbol record definitions

For every normal symbol (track, crossing, route elements, special signs, text) one record, everyone with 10 entries:

**Internal symbol number, X-Position, Y-Position, Direction, Length, Internal symbol type, Width (SoZ), Color(SoZ), "Symbol name", "Description"**

X-Position and Y-Position defining column, row and the internal symbol type the type of symbols.

#### 20.4.4 Magnetic articles record definitions

At first one record with two entries: **Highest magnetic article number, value for pause between switchings.**

There are records with 25 entries for every defined magnetic article:

**Magnetic article no., X-Position, Y-Position, Internal symbol number, internal symbol type, Direction, Init status, Status, Switching time, #Changing inputs#, 2. Magnetic article no., Coupled magnetic article no. , #Changed switching#, #Reserved switching#, Loco no. of direction arrows, 4 entries for all-purpose counters: (actual value, maximum value, minimum value, start value), 4 entries of triggering contact numbers if changing status to: any, green, red and orange, "Symbol name", "Magnetic article description".**



"Initial status" can have the value 2=green, 3=red, 4=orange, 5=inverse green or 6=inverse red. The "Status" can have the same values as "Init status" or a status higher by 6, if the magnet article is reserved. The "2. Magnet article no." is used for certain track switches, "Reserved switching" is an information e.g. #TRUE # = switch even if reserved.

If "Single magnetic" types are defined, so after the last magnetic article and record 9999 these will be written with their entries as above.:

If contact blocking entries of magnetic articles are defined, so after record 9999 these are listed:

**Magnetic article no., 10 entries: Blocking contact no's. at "ON", 10 entries: Blocking contacts at "OFF"**

If an entry is zero no next contact entry exists.

If distant signals which are coupled with the home signal respectively were defined, then these records follow (after record with value 9999) with each 13 entries:

**Home signal no., X-Position distant signal, Y-Position distant signal, Internal symbol number, Internal symbol type, Direction, Init status, Status, Switch time, #Changing inputs#, #Reserved switching#, "Symbol name", "Distant signal description".**

The entry "**Loco no. For direction arrows**" is used for arrow symbols only (others=0) and contains locomotive number, which switches at direction changing.

Four entries "**Values for all-purpose counters: (....)**" are filled with values for all-purpose counters only (other=0).

#### 20.4.5 Contact record definitions

There are records with 43 entries for every defined contact:

**Contact no., X-Position, Y-Position, internal symbol number, internal contact type, Direction, Length, Init status, Status, #blocked?#, Blocking time, Contac type, #Contact free autom. ?#, Number loco checking's, 5 entries of the Checking loco numbers, Occupied by loco no.,**

Desired triggering details for switching with wanted status are following with:

**First switch route, Wanted status, Second switch route, Wanted status,**

**5 Values for Marker: (fill marker no., trigger switch route via marker, erase marker no., marker no. with triggering switch route no., status for triggering), Magnetic article, Wanted status,**

then triggering details for locomotive with:

**Locomotive number, Locomotive speed, Locomotive direction, Loco light change, Loco function,**

then further details for::

**Blocking time, Coupled contact no., Contact no. to fetch loco no., Block time until..., #Internal time delay#, "Triggering sound", "Contact name", "Contact description"**

"Number of engine checks" is possible between 0 and 5, the following "to checking loco numbers" with values between 0 and maximum value or -1=none. If the above-mentioned "triggering wishes" have the value -1 respectively, then there isn't a corresponding wish and the "Switching wish" is then 0, otherwise the "Switching wish" has the value 2, 3 or 4. Either the "Loco number" is -2=still unknown or 0 up to maximum value. Either the "Loco speed" has the value -1=no change or 0 up to maximum value. The values 991, 992, 993 or 997 are stored for speed of L, M, H and OLD. The "Loco direction" is defined as 0=no change, 9=change, 1=forward or -1= backward, the "Loco light change" is defined as

1=on, 0=off, -1=no change or 2=change. The "Loco function" is defined as -1=none, 0=none or 1 to 8. The "Blocking time" is indicated in seconds (standard = 2).

#### 20.4.6 Sound record definitions

There are 5 entries for every defined sound symbol

**Sound no., X-Position, Y-Position, "Sound/WAV file name", "Sound description"**

#### 20.4.7 Switch route record definitions

There are records with 18 entries for every defined switch route

**Switch route no., X-Position 1. symbol, Y-Position 1. symbol, X-Position 2. symbol, Y-Position 2. symbol, Length 1. symbol, Length 2. symbol, Direction 1. symbol, Direction 2. symbol, Internal 1. symbol type, Internal 2. symbol type, Internal 1. symbol number, Internal 2. symbol number, Number of elements, Switched symbols, Last start point, Status, "Switch route description".**

"Number of elements" is the defined number of singles symbols containing in the switch route. The last symbol during switching sequence is fixed at "Switched symbols", "Last starting point" is only for internal use (1 or 2), "Status" is the actual status (2=free or 8=reserved).

#### 20.4.8 Route elements record definitions

There are records with 11 entries for every defined element in a switch route:

**Switch route no., Element no., Magnetic-no., Symbol type, Wanted status, Status, Wait time, Init-value, X-Position element, Y-Position element, Direction, Length.**

The elements are counted serially within a switch route. Under "Switching wish" you find the desired switching status of the symbol. "Wait time" is the value before switching begin of the next element. Init-value for reset magnetic article to initial status when releasing switch route (1=yes, 0=no). X, Y, direction and length are relevant for route track elements only.

#### 20.4.9 Marker definitions

There are records with 2 values for every active used marker at execution time.

**Marker no., Marker value.**

#### 20.4.10 Locomotive record definitions

There are 2 records for every defined locomotive; the first record contains 19 entries:

**Locomotive number, #Internal used?#, Speed, Direction, #Light#, Starting speed, End speed, Acceleration value, Deceleration value, Last speed, Last direction, Doubleheading, Switchover time, Theor. max. speed, Actual driving step type, #Loco in loco bar?#, "Short name", "Long name".**

Every second record has up to 18 entries:

**#Function triggering serial#, Low speed, Middle speed, High speed, Number of functions, up to 12 entries for function key occupation, Internal value.**

"Direction" has the value 1 = forward, -1 = backward. "Light" has the value #TRUE# = on or #FALSE# =off. The values "Last speed", "Last direction", "Switch over time", "internal value" have a meaning only when the program is running. The "Doubleheading number" can have a value from -9999 up to 9999 or -10000 (=not used). Negative number represents "different directions of the locomotives". The up to 12 entries of "function key occupation" point to the selected image (0 = without function, 1 = digit etc.).

The end of records is not fixed as 9999 but as 10999 at end of this group.

### 20.4.11 Locomotive record definitions

There are records with 9 entries for every path description of a defined target contact:

**Target contact no., Condition no., Start contact no. and 6 Target/condition values**

The value are stored ascending to "Target contact no.", the contact numbers are stored as described at chapter 12.4. The "Condition no." always starts at a new target contact no. with 0. Respectively the 6 "Target/condition values" can have the entries:

0	= no condition
2000 + magnetics no.	= if this one is green
3000 + magnetics no.	= if this one is red or
4000 + magnetics no.	= if this one is orange

### 20.4.12 Controlling by timer record definitions

At first there is one record with 4 entries::

**Last time in sec., "Last time in hh:mm", Time-lapse value, Repeating**

Then 6 records each with 9 entries are following (contact triggering at special times):

**Status of triggering, Time hour, Time Min., Next trigger time, Contact no. 1, Contact no. 2, Contact no. 3, Contact no. 4, Contact no. 5.**

After this, 6 records each with 8 entries are stored (contact triggering for regular intervals):

Time intervals:

**Status of triggering, Interval time in minutes., Next trigger time , Contact no. 1, Contact no. 2, Contact no. 3, Contact no. 4, Contact no. 5.**

The status of triggering has the following meaning for both trigger parts: 0=no triggering, 1=triggering is possible, -1 =triggering is done.

## 20.5 Märklin Interface parameter (DIP switches)

The interface of the company Märklin must prepared for operation by the 4 DIP switches position as following:

**Table:** DIP switches of the Märklin interface

Switch	for	Position	Meaning
1	RD	ON	Data line negative logic
2	TD	ON	Data line negative logic
3	RTS	OFF	Control line positive logic
4	GND	OFF	RS 232 – voltage +/- 5 V

## 20.6 Märklin / (Arnold) Interface cable

A protected minimum 4-wire cable is needed with plug and coupling for the respective computer type. At the Märklin Interface side a 5-pin stereo DIN standard connector is necessary; at the computer side you find either a 25-pin or today mostly 9-pin Sub D plug for the RS232 Interface. The following table shows the connection structure. At the newer Interface type the right cable is contained in the delivery.


**Table:** Interface cable for Märklin / (Arnold)

Märklin interface			PC side		
Name	Contact	Direction	25-pin	9-pin	Name
Read data RD	1	<==	2	3	TXD
Not used	2				
GROUND	3		7	5	GND
Transmit data TD	4	==>	3	2	RXD
Ready to send RTS	5	==>	5	8	CTS
The contacts -described at the right- must in addition be connected together at the computer side.			25-pin	9-pin	Meaning
			6 and 20	6 and 4	DSR and DTR
			8 and 20	1 and 4	DCD and DTR

## 20.7 Help system

A context obtained help is a significant essential of STW2001, which is to give a detailed support as narrow as possible to the indicated processing situation.

Base is the Windows® Help System which was used for integration. Help can be invoked as follows:

1. If the structure or processing board is active by the icon  .  
This always opens the most nearly possible lying topic.
2. Via menu "Help": At the begin the contents directory is displayed or else the current help text.
3. With < F1 > button the current help text is always displayed.

In the context of Help System you can access further points, jump to special sections or search after index names. Following graphic term shows 1<sup>st</sup> part of the contents directory.

Besides search possibilities listed above and an extensive index the following concepts can be accessed directly, too:

Accelerate / decelerate (brake)	All-purpose Counter	Area Move / Copy / Erase
Automatic loading and processing	Changing track layout size	Clock / timer definitions
OM / RS232 fixing	Control and drive	Contact definition
Coupling of contacts	Control by contacts limitations	Coupling of locomotives
Coupling of magnetic articles	Direction arrows	EPROM reading / programming
Error messages	Example track layout	Graphics
Hardware, necessary	Icons during processing	Icons during track layout construction
Icons / symbols general	Installation	Initial Setup
Interface error handling	Inverse turnouts	Loco bar
Locomotive control	Locomotive definition	Locomotive tracking
Magnetic article definition	Marker	Occupy contact with loco number
Options	Positioning of track symbols	Sound definition
Sound triggering	Switch route definition	Switch route triggering
Schedules	Schedule commands	Select track symbols
Special signs	Software, necessary	Switching and triggering
Switching time	Symbol bar	Text definitions
Triggering of contacts	Trace	Track layout construction / changing
USB-Interface		

## Screen: Help system of STELLWERK 2001



**Own notes:**

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