ZIMO System

Digital command station, cabs, StEin, software (partners)

ZIMO ELEKTRONIK

Overview of the ZIMO system
July 2018

www.zimo.at

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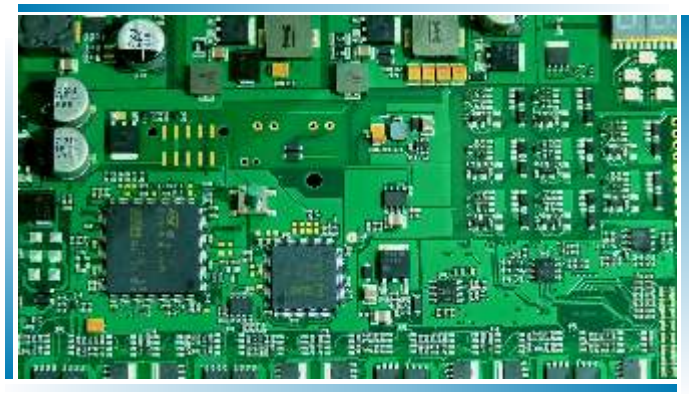
ZIMO System Overview

Decoders are not described in this catalog, they can be found in the Decoder-catalog ("the green one")

Inside the command station MX10: PCB (upper side)



StEin-PCB upper side, without cover

The ZIMO digital system

. . . is produced in Vienna,

as are ZIMO's decoders. The circuit board assembly, the final assembly and commissioning as well as the repair is done here.

The ZIMO digital system . . .

. . . is high-tech for model railways.

Looking at the details of the "interior" (pictures on the left) gives an impression of the very complex technology; the Command station MX10 contains more than 1300 components, 10 of which are highly integrated (processors, memories, etc.). Furthermore 10 clocked voltage transformers for traction current and internal consumption have been mounted.

In spite of the high output power and other impressive technical data of the MX10 (total rail current up to 20A), its dimensions are very small – showing the high technological standard of the integrated power electronics.

Nonetheless, ZIMO takes situations into consideration in which high currents can cause damage (small gauges like N, HOe, TT): If adjusted correctly, it will cause less sparks and burn marks on the wheels than with other central stations that provide 3A.

The ZIMO digital system . . .

. . . not only provides 20 A or 12 A continuous current (per type)

but is also equipped with complex processors, memories and software in MX10 and MX32, which allow high controlling comfort, a high number of trains driven at a time and the typical functional variety of ZIMO.

Looking at the ZIMO production site (see decoder catalog for pictures of the inside)

The ZIMO digital system . . .

. . . is not only Command station (MX10) and Controller (MX32),

but also "stationary-equipment-modules" StEin, which cover controlling and managing switches, signals, etc., and are also responsible for track sections, i.e. occupancy detection, loco number identification and HLU.

The ZIMO digital system . . .

. . . means connectivity:

The central station not only communicates via the ZIMO-proprietary CAN bus, but also via XPressNet and LocoNet (prepared), as well as via USB and LAN. With full circuitry, the control units can be reached via 3 radio systems.

Additionally, there is a USB-socket on every main unit. This makes updates very easy. A USB flash drive is used to load languages, pictures, databases, and configurations. Alternatively, a direct connection via LAN (Ethernet) or USB to the computer can be used.

The ZIMO digital system . . .

. . . is already complete in the smallest configuration.

The first "Booster" is already integrated in the command station (track 2), as is the radio module to communicate with the controllers, the connection to WIFI-networks, a decoder-update-and-sound-loading-device (prepared), a stationary sound generator, etc.

Initial start-up of ZIMO systems

The ZIMO system is usually available as starter set:

1 Command station MX10,
1 Controller MX32 (tethered) or MX32FU (radio and tethered),
1 power supply with 30 V / 240 VA or more,
different plugs, CAN cable, power cable.

The following steps allow a quick start:

- ★ connect the Controller MX32 to the Command station MX10 ("ZIMO CAN" socket) using the CAN bus cable,
- ★ connect the track to the terminal "Schiene 1" (track 1) or "Schiene 2" (track 2) of the MX10. Track 2 may be used as a separate main track but can also be used for "Service mode" programming,
- ★ connect the power supply cable to the terminal "DC in" of the MX10.
- ★ The Command station MX10 starts automatically when power is supplied. Initiating, it first shows a red, then a blue screen;
- ★ the Controller MX32 starts subsequently (15 sec.),
- ★ a new MX32 shows the ***LOCO IN*** screen. An address and (optionally) the name of a loco can be entered now.
- ★ After entering the address, the new loco is activated through the F key: the screen changes to the ***LOCO*** (driving) mode. Usually a speedometer and a panel of function keys are displayed additionally to the address.
- ★ Now the loco can be controlled using the slider, the R key (changes direction) and the function keys.

main products

The ZIMO digital system . . .

consists of the following ***main components . . .***

- ***Command station MX10*** - the digital central: has an internal MiWi radio module by default (wireless communicate with the Controller *MX32FU*) and the highest power output (up to 20 A or 500 Watt on the track outputs) on the market.
- depending on the size of the layout, you can choose between the ***„small" power supply unit NG200*** with 240 Watt (30V, 8A) and the ***„big" power supply unit NG600*** with 640 Watt (30V, 20A) output power. The actual track voltage (adjustable from 12V to 24V) is transformed by highly efficient switching regulators in the MX10 (efficiency >90%) from the 30V supplied by the power supply unit. This means that the available traction current is a lot higher than the current provided by the power supply unit (usually by the factor 1.5, even more, when the track voltage is smaller).
- choose between
  controllers MX32 and/or
  radio controllers MX32FU. Amixed usage is possible. Both types are identical in terms of usage and form; the radio controller can also be tethered (for charging, system registration and updates).

A „big system”

- Currently (second quarter of 2018) two versions of the ***stationary equipment “StEin”*** *are* offered. The fully equipped, “***STEIN88V***” provides all kinds of connections, inter alia, for switches, signals, speakers, and above all, for track sections (for occupancy detection, HLU, RailCom, etc.). More variations of the StEin, which shall specialize on certain tasks (e.g. only track sections), are planned.
- The ***accessory and track section modules MX8, MX9*** (part of ZIMO's older system generation) are continuously supported (and produced on demand).

. . . *and various* ***supplements and accessories****:*

- Easy access to the MX10 sockets is provided by the ***Connection board MX10AVP***, especially if new (MX32, StEin) and “old” peripheral equipment (MX31, MX8, MX9) is used together and two separate CAN busses are therefore needed.
- pre-fitted CAN bus cable, CAN bus DIY connection material, various special cables and plugs, antennas, WiFi router etc. See product and price list!

Notes to the ***overleaf block diagram:***

The configuration on the following pages shows an imaginary connection of components, which in reality may never be set up like that, but helps to illustrate the possibilities.

Most of the currently (July 2018) available products of ZIMO's system and some external products are taken into consider-ation; some products of the “older” system generation are not included, although they can be used in various occasions and are mentioned in the following description.

One of the two Command stations MX10 works as **digital central**, the other (left one) as **booster**. The booster takes on the DCC-signal generated by the central station via 2 additional pins of the CAN bus cable (8-pole instead of 6-pole) and reproduces it on its own track outputs.

A multitude of products can be used as **input devices** (control-ler, …):

- ZIMO controller and radio controlller MX32, MX32FU (current generation - like MX10)
- ZIMO controller and radio controller MX31 (previous generation)
- (limited) ZIMO controller MX2, MX21 (older generations)
- Roco (red) Lokmaus on XPressNet cable
- Roco WiFi (black) Lokmaus via router
- Massoth Dimax Navigator via radio module on the XPressNet cable
- Roco App on the Smartphone or App via router
- computer controller in interlocking programs or decoder-configuration programs

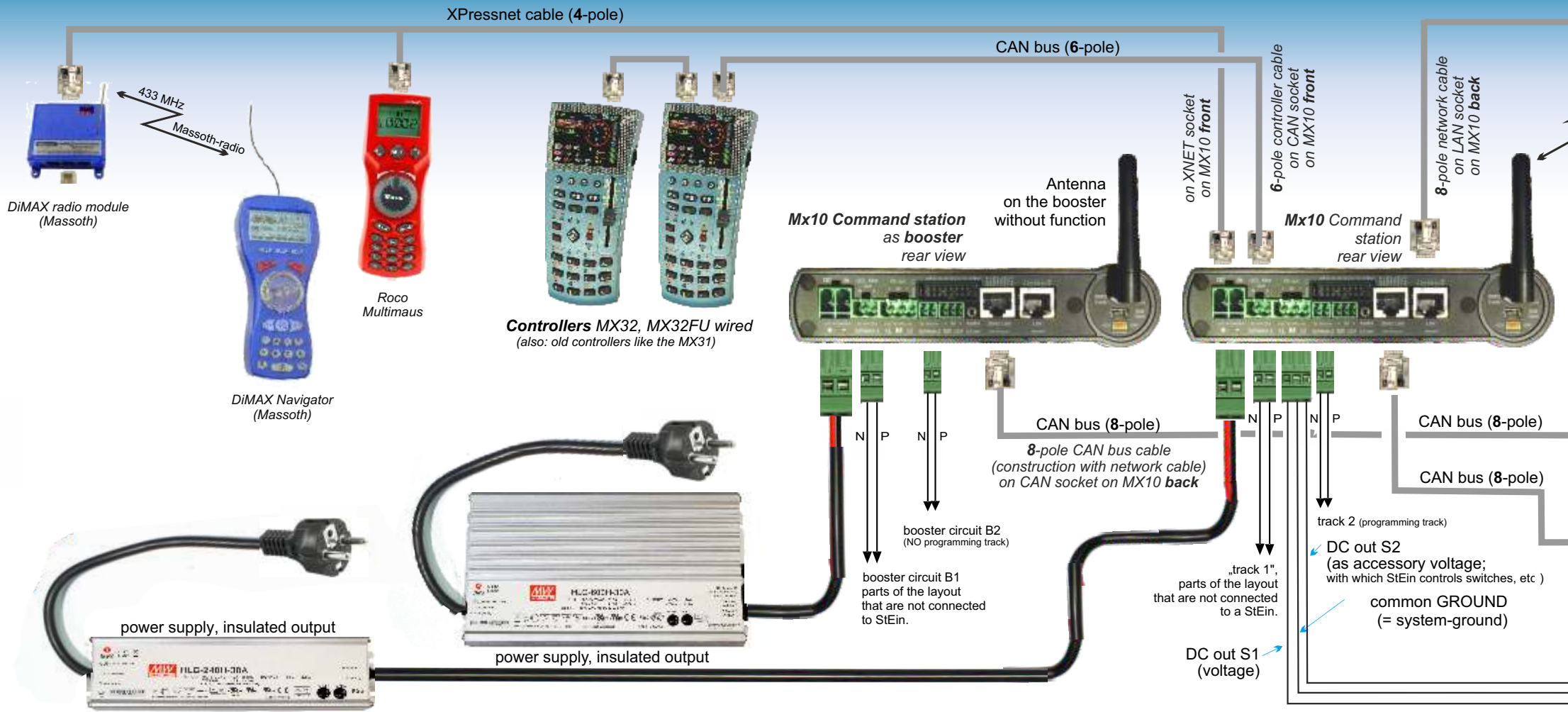
Computer and **WiFi-router** are connected via LAN-socket on the back of the Command station MX10.

The **stationary equipments StEin** communicate with each other (up to 100 components) via the same 8-pole CAN bus as the boosters, although additional power supply is needed above a certain number of device. Additionally, they are supplied by a ring line with the necessary operating voltage (running voltage, accessory voltage, which – if necessary – could also be supplied by separate power supply units).

The most important connections are the 8 outputs for track sections, 16 logic level inputs (for contact tracks, photoelectric sensor, etc.), 16 outputs for (usually) 8 switches and 2 speaker outputs of the integrated sound generator.

Expansion boards enhance the **StEin's** performance even more (e.g. servo-motors) and make it cost-efficient. Especially the planned expansion board “track sections” is to keep in mind: Additionally to the rather complex 8 main outputs on the “front” of the StEin, 8 more outputs for track sections will be offered, which are cost-efficient and useful for the numerous sections in a turnout-area.

Up to 25 **signal PCBs** (for each 16 LEDs, divided into 2 to 8 signals) can be supplied by the IQC bus of the StEin. Controlling the PCB of the main StEin, they are responsible for turning on/off or fading in/out the signal lights, as well as for their flashing effects.


XPressnet cable (4-pole)
CAN bus (6-pole)
433 MHz
Massoth-radio
DiMAX radio module (Massoth)
DiMAX Navigator (Massoth)
Roco Multimaus
Controllers MX32, MX32FU wired
(also: old controllers like the MX31)
Mx10 Command station as booster rear view
Antenna on the booster without function
on XNET socket on MX10 front
6-pole controller cable on CAN socket on MX10 front
Mx10 Command station rear view
8-pole network cable on LAN socket on MX10 back
N P N P
CAN bus (8-pole)
8-pole CAN bus cable (construction with network cable) on CAN socket on MX10 back
N P N P
CAN bus (8-pole)
CAN bus (8-pole)
booster circuit B2 (NO programming track)
booster circuit B1 parts of the layout that are not connected to StEin.
track 2 (programming track)
DC out S2 (as accessory voltage; with which StEin controls switches, etc)
„track 1", parts of the layout that are not connected to a StEin.
common GROUND (= system-ground)
DC out S1 (voltage)
power supply, insulated output
power supply, insulated output

Ethernet (**8**-pole)

Ethernet

Mi-Wi

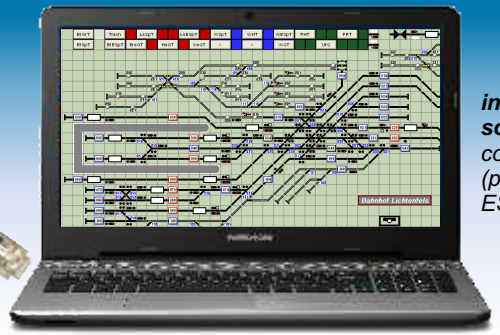
2.4 GHz

WIFI

2.4 GHz

WIFI router

***Apps** on smartphone or tablet (picture: Roco Z21 App)*



***interlocking software** on the computer (picture: ESTWGJ)*

***radio controllers** MX32FU*

outputs for switches 1 ... 8

logic-level inputs 1 ... 16

connections to servo 1 ... 8

logic-level inputs 1 ... 16

planned

planned

*StEin **expansion board** switches or servo-switches*

*StEin **expansion board** for track sections (short sections)*

planned

P1 P2 P3 P4 P5 P6 P7 P8 N

*StEin **STEIN88V***

*StEin **STEIN88V***

CAN bus (**8**-pole)

MX10AVP-PCB as CAN bus router

2 x , speaker

I²C bus for signals

8 signal lights

8 signal lights

8 signal lights

8 signal lights

8 signal lights

Daisy-chaining of the I²C bus as shownwie inhere (NOT in parallel)

outputs for switches 1 ... 8

logic-level inputs 1 ... 16

P N P P N P P N P P N P

All N-clamps on the module are paralleled internally

outputs to tracks 1 ... 8: „N-track" together and single „P-outputs"

insulated track sections: connected to the StEin on the outputs for „P"

Continuous track part „N", CAN (does not have to be) connected to or replaced by the "N"-pole of the MX10.

up to 16 ICA boards on the „StEin"

CAN bus (**8**-pole)

P N P P N P P N P P N P

All N-clamps on the module are paralleled internally

outputs to tracks 1 ... 8: „N-track" together and single „P-outputs"

insulated track sections: connected to the StEin on the outputs for „P"

Continuous track part „N", CAN (does not have to be) connected to or replaced by the "N"-pole of the MX10.

MX10 The big Command station and

- ***12 A + 8 A** permanent traction current on two track outputs, in total 20 A,*
- *voltage / overcurrent thresholds / turn-off times precisely adjustable, spark suppression,*
- *RailCom precision detector with oversampling to measure even attenuated signals,*
- *Updating decoder software and loading sound projects from the command station (planned),*
- *Communication with ZIMO products via CAN bus or networkable "MiWi" radio controllers,*
- *ZIMO controllers connected via CAN socket, XPressNet® controllers via XNET socket,*
- *Apps for smartphone & tablet, as well as connections to the computer via LAN/WiFi.*

Technical Data

External **power supply** with electrically isolated outputs . . . . . 25 - 35 V =
power supply for medium layouts, up to 10 A track voltage . . . . . 240 Watt
power supply for usage with full power, up to 20 A track voltage. . . 600 Watt

Output **track 1** - running voltage . . . . . 10 to 24 V
- track voltage boot-up time . . . . . 1 - 60 sec
- overcurrent threshold . . . . . 1 - **12 A**
- overcurrent turn-off speed . . . . . 0,01 - 5 sec
- tolerated transgression of overcurrent threshold . . 0; 1 - 4 A
for the time of . . . . . 0; 1 - 60 sec
- early turn-off in case of current jumps of . . . . . 1 - 10 A
within (adjustable) . . . . . 0.01 - 0.50 sec

Output **track 2** - running voltage . . . . . 10 - 24 V
(not MX10EC) - overcurrent threshold . . . . . **1 - 8 A**
- other parameters like track 1

DC output 30 V (power supplied to other devices connected to CAN bus) . . 4 A
DC output 12 V (power for XNET and Loconet devices) . . . . . 2 A
LED outputs (6 Pins on 2 x 8-pole plugs) . . . . . 25 mA
ABA inputs (8 Pins on 2 x 8-pole plugs) - switch-threshold . . . . . 3 V
Audio output (2.5 mm socket) . . . . . Line-out

MX10EC The new „EConomy" Command station

The **MX10EC** is based completely on the MX10's hardware and software, but has no „track 2" output.

Nonetheless, the MX10EC is a h**igh-performance digital command station with a maximum of power:** up to **12 A**.

Compared to the „full-featured version" MX10, the **MX10EC also comes without:**

integrated sound-generator, a part of the AOS-pins, USB-client interface (MX10EC has "only" LAN/Ethernet), Loconet interface, outputs for auxiliary voltage.

Those are rarely used features.

- ***12 A** permanent traction current on the (single) track output,*
- *Other characteristics see MX10!*

RailCom detector track 1 - measurable minimum amplitude of RailCom signal	2 mA
- sample rate (3 times oversampling)	750 kHz
detector track 2 - measurable minimum amplitude of RailCom signal	2 mA
- sample rate (3 times oversampling)	750 kHz
ZIMO CAN bus 1 (ZIMO CAN socket, front and back)	125 kBd
prepared for	512 kBd
ZIMO CAN bus 2 (additional Pins on XNET socket)	125 kBd
prepared for	512 kBd
XNET	62.5 kBd
XN2 (second XNET or OPEN DCC bus) not used at the moment	512 kBd
Loconet (only hardware installed at this time)	16.6 kBd
USB device (client) interface	1 Mbit/s
USB 2.0 host interface (for flash drive and future applications)	1 Mbit/s
LAN (ethernet, also for WIFI routers)	10 Mbit/s, 5000 data packages/sec
Mi-Wi network (derivative of ZigBee standard, 2.4 GHz)	aprox. 20 kbit/s
DRAM and SRAM (random access memory)	256 KB
NAND Flash (pictures, databases, switch panels, sound files, etc.)	4 GB

Rotary knob in normal operation (blue display)

turning left/right → enters main setting page for VOLT & AMP

hold 2 sec → broadcast stop BCS and operating state STOP & OFF as further selection possibilities

(press 1 sec) → quit BCS, back to normal operating mode (or to previous active state)

hold 4 sec → SYSTEM OFF, track 1, 2 OFF, cab-power OFF, display OFF, etc.)

(press 1 sec) → SYSTEM ON

USB (Host) socket

Accepts a USB flash drive for MX10 update & sound

Sockets for ZIMO CAN and XNET

CAN bus for the connection with ZIMO controllers and modules

XNET socket for the connection with ROCO's multiMAUS and similar (DiMax. LH, a.o.); additionally: second ZIMO CAN 2.0 bus,

front

The MX10's 3 buttons

button **1** → AOS operating sequences, settings and control display

button **2** → to the main menu

button **3** → to the „BASECAB" (controlling vehicles directly from the MX10)

in STOP & OFF mode:

button **1** → BCS, OFF, ON for track 1

button **2** → BCS, OFF, ON for track 2

if flash drive with appropriate files is connected:

button **1** → starts decoder update

button **2** → starts sound loading

(both actions planned 2018)

SUSI socket

For quick sound uploads via SUSI interface (prepared)

power supply

External power supply
20 - 35 V =
80 - 600 Watt

AOS inputs and LED outputs

8 logic-level inputs for
- external button for emergency STOP and track power OFF,
- rail contacts for internal and external AOS (automated operations)

6 LED outputs for signals and other lights,

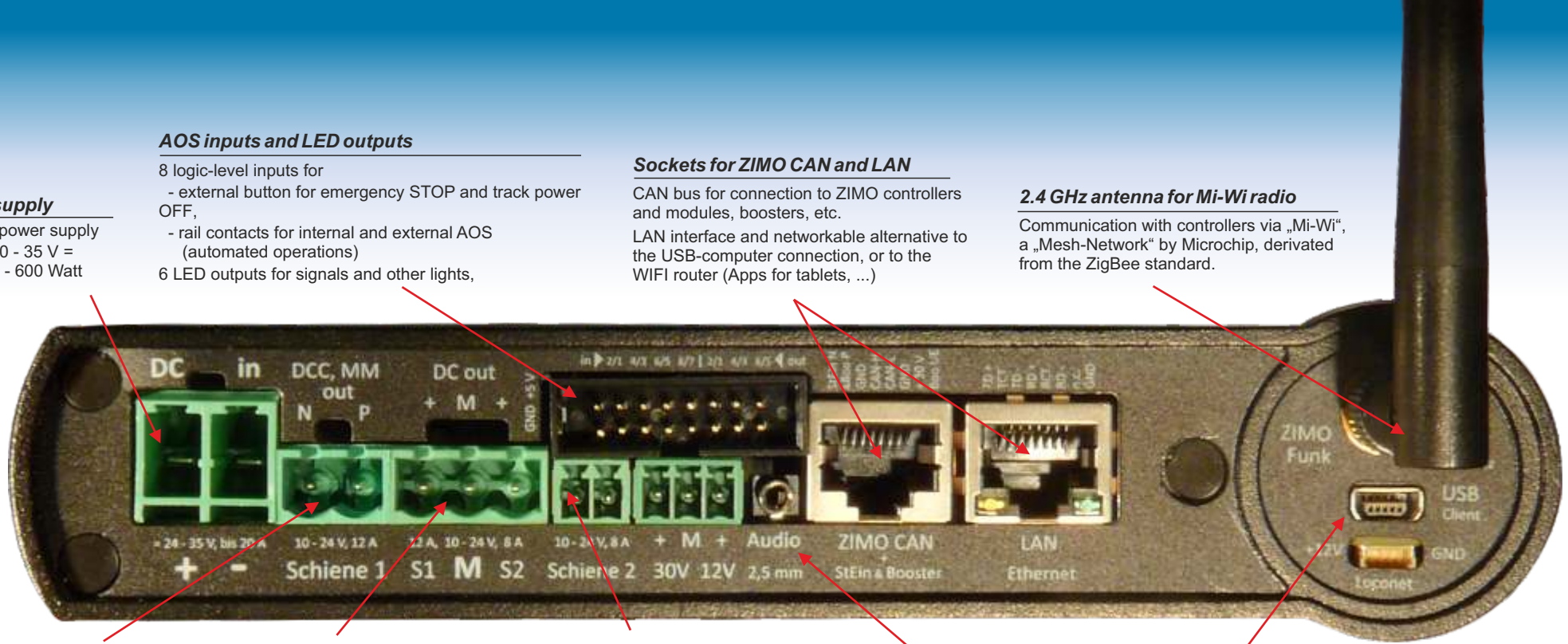
Sockets for ZIMO CAN and LAN

CAN bus for connection to ZIMO controllers and modules, boosters, etc.

LAN interface and networkable alternative to the USB-computer connection, or to the WIFI router (Apps for tablets, ...)

2.4 GHz antenna for Mi-Wi radio

Communication with controllers via „Mi-Wi“, a „Mesh-Network“ by Microchip, derivated from the ZigBee standard.



back

Outputs: track 1 | DC track voltage (DC out) S1, S2 | track 2

2-pin socket for track 1 („Schiene 1“) - usually main track

2-pin socket for track 2 („Schiene 2“) - second power circuit (e.g. second track, accessories) also programming track „digital current“ (DCC, MM, possibly other future formats like mfx, selectrix)

Outputs track 1, track 2 regarding voltage, amp limits, turn off time etc. can be set individually depending on configuration and situation: same or different data signal.

3-pin socket „DC out” - S1 (to track 1), GROUND, S2 (to track 2) to supply stationary equipment modules StEin, track section, terminal loop modules, etc. (within the MX10: DCC power amplifier limits).

Audio socket (Line-out)

For amplified sound-playback primarily through internal speakers.

USB (Client) socket

USB-computer socket for interlocking programs and configuration software.

Menus, settings, system monitoring

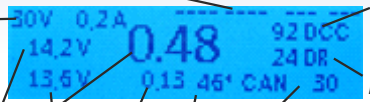
The „normal" operating screen

AOS inputs/outputs, *displays the status of all 14 rear connections.*

Voltage and current *from the power supply unit at the input* **„DC in"**, *which supplies the MX10 and the entire layout ("primary power").*

Voltage and current *at the output* **„Schiene-1"** *("track 1"; includes DC output S1).*

Voltage and current *at the output* **„Schiene-2"** *("track2"; includes DC output S2).*



DCC signal statistics *(number of sent command packets per sec);*
xx DCC = *DCC packets only*
xx MM = *MM packets only.*
xx/yy D/M = *DCC and MM*

RailCom statistics *(number of received messages as feedback to DCC commands).*

CAN bus statistics *(number of CAN packets);*
CAN xxx E = *number of CAN packets per sec*
C xxx E yy% = *as above with percentage error*
XNET *and* ***LAN*** *traffic shown alternatingly*

Temperature measured *on the circuit board.*

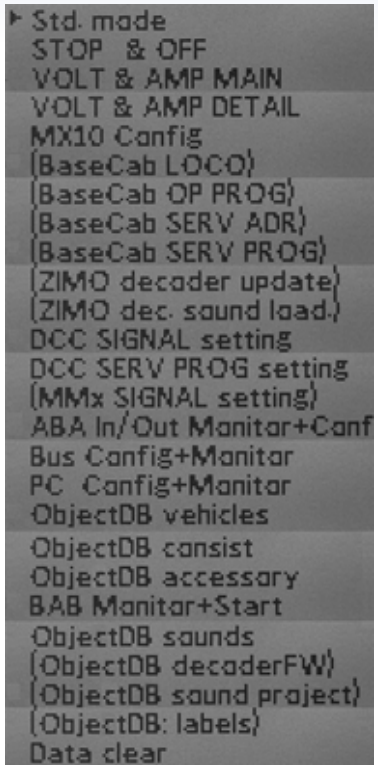
Connecting a flash drive

When a USB flash drive is connected, the MX10 usually updates itself (start by pressing the rotary knob).

Additionally to the operating software that is loaded into the MX10, it also saves a lot of data which is used by the connected devices (mostly controllers), like function symbols, elements for the object database, etc.

To update decoders and load sound projects (planned), the MX10 has a separate memory, which can also be filled by a flash drive (or from the computer via USB or LAN interface).

The MX10's main menu

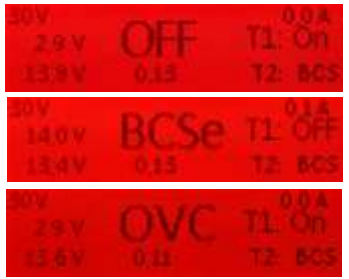


The MX10 is a versatile and complex digital command station, therefore numerous configuration options and monitoring procedures, can be called up in the main menu.

The user, of course, only needs some of them (or none at all), but the device is equipped and ready for all challenges.

„VOLT & AMP" detail

Each parameter of the power supply can be set individually for the two track outputs and for the application as programming track (SERV).



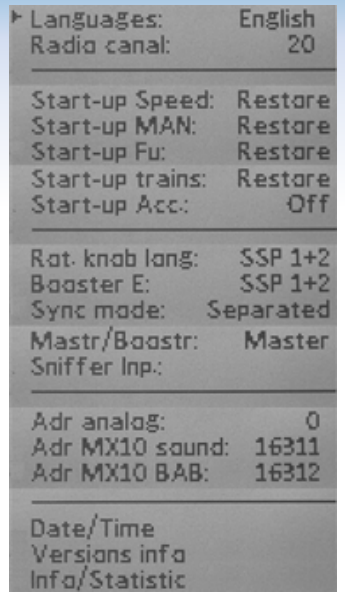
„STOPP & OFF"

This is where the track outputs can be set on BCS or OFF; this screen also shows the OVC-notice (overcurrent).

MX10 Configuration

A high-value digital command station like the MX10 can be operated as „black box“ to a certain extent, so that the user does not need to worry about the system configuration. This is especially recommended at the beginning; sometimes even further on.

However, as the application gets more complex, the user may want to change the settings individually. The MX10 provides almost all necessary possibilities.



By changing the language, the display will immediately be adjusted accordingly. Instead of potentially missing texts, the German texts will be shown.

It can be useful to change the default **MiWi channel number** in the 2.4 GHz “MiWi”-radio communication between MX10 and ZIMO controllers MX32FU and MX33FU (planned), to prevent limitations of the connection quality by external networks (WiFi, wireless mouse, etc.). The engaged channel number is transmitted to the controllers when they are registered in the system (when connected to the MX10 via CAN-bus).

When restarting the system, “**Start-up…**” determines, if all trains (function decoders) and/or switches (accessory decoders) shall be set to the state they were when the system was shut down.

Object database & emission cycle of control signals

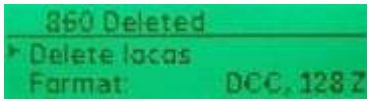
The MX10 allows a comprehensive insight into what can be controlled in which way on your layout; it is useful to have many possibilities to control and intervene, because – contrary to systems of other manufacturers – the number of active addresses is not restricted to 32 or 64, and the data refresh of a complex layout is NOT done in a few minutes.

Up to 1000 vehicle addresses may be active in ZIMO's system; i.e. the corresponding driving data need to be refreshed periodically, despite the DCC-wise limited data rate on the tracks. A complex scheme of priorities has been implemented for this procedure, which additionally has to make sure that changes of speed or functions are carried out without delay, but also that all vehicles have sufficient possibility to give feedback (for example to keep the RailCom-speedometer up to date).

One can choose between “Restore” (this is default) and “Clear” (= speed 0, functions off, etc.), separately for speed (including direction), MAN-Bits, accessories‘ functions and positions (switches, signals).

The **„Booster E”** on the ZIMO CAN socket on the back of the MX10 originally was intended for short-circuit signals of the connected boosters corresponding to the NMRA standard. Nonetheless, it can be used as general input for an external emergency stop.

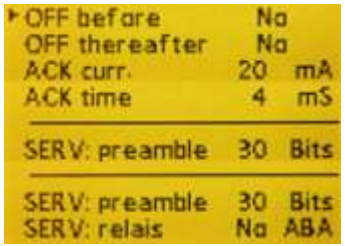
Virtual addresses can be established for the **MX10 sound** (integrated speaker and socket) and the **AOS**‘ (operating procedures; prepared), which enable the user to play the sounds from the connected controllers.



DCC & SERV PROG settings

In most cases, the values shown on the left don’t have to be modified, especially not if only modern decoders are used in vehicles and accessories .

Sometimes it can be useful, though, to adjust values like the Bit-timing. Especially in the area of SERV-PROG (programming on the programming track) there are some requirements, like the method of the voltage interruption performed before/afterwards.



MX32 - The controller

The ZIMO controller . . .

Corresponding to the year-long designing tradition of ZIMO, the casing of the MX32 allows the user to utilize it as tabletop unit or as walk-around controller. It is characterised by a light inclination and a slim, slightly bent, form. The 2.4 inch touch screen combined with “real” buttons and a slider form the basis for the functionality and usability of the device and the whole system.

Numerous depictions on the display of graphical elements (loco pictures, function symbols, speedos, …see following pages) serve the comfortable monitoring and controlling of trains, programming decoders, switching signals and switches, organising the whole system, managing the vehicle fleet (object database, loco recall), etc.

A separate USB (host) interface for flash drives is used for updates, but also to load additional pictures of locos, languages, function symbols, CV sets or completely configured vehicle collections.

The **radio controller MX32FU** contains a MiWi radio module (2.4 GHz, similar to ZigBee) and a battery (for about 5 hours of usage) and can be used for operation via radio or cable. When operating via cable, the controller‘s battery is being charged.

MX32 in typical *LOCO* - operation

„Display header“
Current operating mode ***LOCO***;
Track voltage & current; „Communications dot“ to monitor the data traffic to/from the command station; RailCom Logo when data is received; battery status; clock (real time or model railway time).

Loco picture (if available); changes size when tapping on it

Loco name, address, data format
if available

Function key icons
shown in the numeric key pad arrangement; describe their current function and can also be operated by touch screen. The picture shows the display in „Black style“.

Speedo shows actual speed derived from RailCom feedback; changes to small speedo by touch (shows big loco picture instead)

Softkeys M (= Menu), I, II, II
current significance shown on display.

Speed step indicator
represents the speed slider, shows current speed steps, loco take-over, speed influence and more.

Function and number keypad,
also used for text input

Send/receive-statistics, QoS - symbol

ZIMO „East-West“ indicators:
Since the model railway drives digitally, the driving direction is set referring to the vehicle (not the layout): e.g. “straight ahead” means “chimney ahead” or “driver's cab 1 ahead”. ZIMO designed an operation called “East-West”, which allows the user to move the loco in the right direction without knowing how the loco is set on the tracks; giving information about both directions (East/West, ahead/reversed), without losing the usual handling (changing directions).

Scrolling wheel in ***LOCO*** - mode**:** speed fine tuning (+/- 10 speed steps), or controlling assigned parameters (e.g. volume)
Rocker switch (above the scrolling wheel) an alternative to switch locos or between assigned parameters.
Scrolling wheel in ***LOCO*** with open ***LoR:*** scroll the lines of loco addresses in ***LoR***,
Rocker switch switch between display levels.
Scrolling wheel when programming ***SERV***, ***OP*** scrolling between lines of CV list,
Rocker switch to inc/dec a CV value.

R key: driving direction
S key: Stop, BCS, OFF
MN (manually) active when flashing red
RG (shunting) yellow**:** speed reduced by half till 1/3 of maximum speed
A key: Select, Accept, Enter or OFF; switch from ***LOCO*** to ***LOCO IN***
E key: End, ESCape, E display

F key
U key
TP key
W key
C key

LOCO & „GUI" (Graphical User Interface)

◀ *Display LOCO IN*

Enter a new address and (optionally) a name; or select one of the already registered vehicles from the object database (content listed in the lower half of the screen).

F key → LOCO ▶

◀ *Display LOCO*

Controlling the active vehicle with slider, direction key and function keys (i.e. numeric keys on the controller). Depending on the decoder, the speedo shows a calculated or the „real" velocity (by RailCom feedback)

◀ *Display ADDR SPEEDO*

Fine tuning the GUI ("Graphical User Interface"):

Selection of the speedometer (colours, etc.), assignment of speed to speed steps (if RailCom is not active), details of depiction.

◀ *Display ADR FUSY*

Fine tuning the GUI ("Graphical User Interface"):

Selection of an appropriate function symbol for every function F0 ... F28 as well as continuous / momentary function of each key.

◀ *Display LOCO with RailCom feedback (magenta colored speedo needle):*

The measured „real" speed is fed back from the vehicle; additionally the rate of successfully transmitted DCC packets/ RailCom ACKs is shown.

◀ *Display ADDR PICT*

Fine tuning the GUI ("Graphical User Interface"):

Selecting the proper picture from the internal database for the optional depiction on the LOCO display. Search per scrolling or filter for attributes (below the picture)

The „small" keypad:

→ switch from address input ***LOCO IN*** to driving mode ***LOCO*** or switching between vehicles in ***LOCO***.
→ switch locos within ***LOCO***, or take over of a vehicle from another controller.
→ switch between multiple units or assign locos to MUs or dissolve MUs
→ switch to and from ***SWI***
(Clear) → i.a. clear vehicles from ***LoR*** and other

◀ *Display LOCO with alternate depiction - big loco picture*

The measured „real" speed is confirmed by the vehicle (trough RailCom); additionally the rate of successfully transmitted DCC packets/ RailCom ACKs is shown

◀ *Display LOCO of vehicle in a multi unit (consist) with a selection list:*

Vehicles in consists are selected from a list displayed in the lower half of the screen.

”LoR” & object database, Help, MX32 CONF

◀ *Display LOCO with LoR*

*In „**Lo**co **R**ecall“ (a kind of favourites), previously active addresses are saved and displayed (“in the foreground“).*

Loco recall can be scrolled through to bring locos to the foreground.

◀ *Display LOCO LoR*

LoR in full screen offers a practical alternative to input new addresses in the line >NEW<.

If a vehicle is deleted from the LoR, it stays in the ObjectDB.

◀ *One of the HELP displays*

Softkey 1 always opens the corresponding Help-information. Of course, only a part can be shown on the display, the rest can be read by srolling down.

The „E display“ is shown after pressing the E key (if at this moment it does not have the effect „End“): it is the central point of control to get from the LOCO display to other operation modes or settings.

◀ *Object database, vehicles*

Beyond the entries from LoR (green), addresses saved in the MX10 as well as no longer active addresses are saved in the Object database.

◀ *ObjectDB, vehicles*

The entries are shown with different details in the right column: group, consist, speed, etc. can be activated directly from the ObjectDB (equally from LoR).

◀ *PULT CONF, driving operation*

10 different lists of parameters can be called up in PULT CONF, in order to adjust the handling individually, for example for the operational mode LOCO.

◀ *PULT CONF, handling STOP*

The STOP & OFF system provides various options. The S key, for example, can activate Single Stop or BCS (Broadcast Stop) and the addressed tracks can of course be selected as well.

Stopp & OFF, external control & takeover

◀ *STOP Touch display*

*By shortly pressing the S key, the Single Stop (= „Emergency Stop") for the current vehicle is activated; at the same time the **Touch** areas for BCS are opened.*

Touching the field activates the corresponding state.

◀ *Touch areas BCS (SSP)*

Touching the field or holding the S key activates BCS (SSP) on track 1. Via the touch areas, the track is reactivated or another state is acticvated.

◀ *STOP bar (instead of window)*

The „faded out" version of the touch fields makes further handling of the vehicle possible. It could be driven on track 2; by BCS (SSP) not affected functions may be used.

◀ *OVC display*

In case of an overcurrent on the layout (separately for track 1 and 2) a window similar to STOP is opened. Touching it, the track can be reactivated or set to BCS - or track 2 can be turned OFF.

◀ *„Address assigned"*

this window prevents activation of a vehicle address which is already being used by another cab; it is possible to take it over by pressing the U key: the other cab changes to „external control".

◀ *„External control" bar*

In this state, the vehicle is controlled by another controller, only watching is now possible. This is the consequence after fading out the „address assigned" window or after a forced takeover via U key by another cab.

◀ *„Roco App Z21" bar*

This address is currently being controlled by a tablet or smartphone via WiFi with a Roco Z21 or a driver's cab App. MX32 shows all changes, including the readmission.

◀ *„XPressNet" bar*

An XPressNet device connected to the XNET socket of the MX10 took over control of the vehicle, this could be, for example, the „DiMax Navigator" (itself a radio cab, its receiver is connected to the XNET socket).

◀ *„ESTWGJ" bar*

Interlocking programs as ESTWGJ, STP or WinDigipet take hold of the trains (addresses) if they are connected to the LAN or USB socket on the MX10.

MX32 tethered & radio/ service mode & operational mode

◀ *Tethered cab after disconnecting the cable*

The „Power off - Standby" window gives the user a choice: turn off the controller or switch to „radio cab" (in case of a MX32FU).

A key ▶

◀ *Controller in radio mode (antenna symbol in the header*

Either turn on the radio cab from standby (A+E keys) or switch (practically without interruption) from tethered to radio mode and confirm with the A key.

◀ *Radio controller: unattended for a longer period of time*

The „No operation standby" window asks the user for confirmation; if not confirmed, the device wil turn itself off to save power.

◀ *SERV PROG, identification*

The locomotive (it's decoder) standings on the programming track is „identified", i.e. important CVs are read and shown. The decoder may be programmed or addressed thereafter, but identification may also be skipped.

◀ *SERV PROG, addressing*

The decoders address can be changed on the programming track; regardless whether short (<127) or long (<10239), it is always shown in decimal. The programming track output is used for loco decoders as well as for accessory decoders.

◀ *SERV PROG, programming CVs*

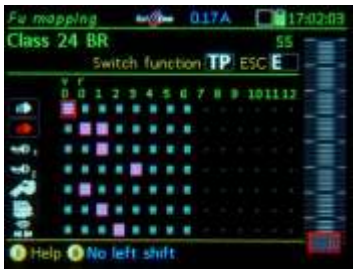
Any desired number of CVs can be programmed (on the programming track) in the decoder (confirmed by ACK), read and listed. It is possible to process them to CV-sets (for other vehicles) further on.

◀ *OP PROG, identification*

On the main track, the identification (i.e. the automatic reading of the corresponding CVs) is done via RailCom, displayed in magenta; very fast feedback, but only possible with RailCom-capable decoders.

◀ *OP PROG, programming CVs*

„Programming in Operational mode" combined with RailCom is a modern method to configure decoders: fast (< 1/10sec per CV) and explicit without the need of a programming track.



◀ *OP PROG, special procedures*

Numerous special procedures make the configuration more manageable: NMRA Function Mapping, ZIMO Input Mapping, ZIMO „Swiss Mapping".

switches, signals, track sections on the MX32

◀ *Display SWI, basic panel*

The upper half corresponds to the LOCO display, the lower part shows a switching panel (or „accessory panel“); it contains up to 30 fields with symbols for switches, signals, etc. (only 9 are visible, scroll to list more)

◀ *Display to define SWI*

In this window, the symbols and attributes are assigned to individual fields, as well as the accessory address(es), which controls the corresponding switch/signal.

◀ *Modified SWI display*

You can create any desired number of „panels“, e.g. some with symbols similar to those of the interlocking programs (the arrangement according to the programs is planned).

◀ *ACCESSORY LIST*

All accessory addresses that correspond to the accessory decoders defined in the panel, are automatically listed; irrespective of that, further addresses can be defined, the keypad does the switching.

◀ *ACCESSORY LIST big*

The full screen shows more addresses at one glance; additionally, the TP key switches directly to „programming in operational mode“ of accessory decoders and MX8 modules.

◀ *MX8 configuration display*

The configuration of MX8's parameters is similar to the one of accessory decoders, although the MX8 communicates via CAN bus (thus not using the tracks).

◀ *MX9 list (track sections)*

In the main list of the track section modules MX9, the occupancy detection and HLU-states are displayed for all of the 16 connected track sections. This is also the way to get to the configuration of the MX9 modules.

◀ *HLU settings*

Starting from the MX9 list, the HLU states can be changed for single track sections. This is especially relevant for testing; usually track sections are controlled by an interlocking program.

◀ *ZIMO loco number identification*

This display shows all addresses (blue), which are identified in the area of the track section module, always with the corresponding number of the track section output (yellow).

Stationary equipment module StEin

Stationary equipment . . .

is part of the model railway layout, as is the rolling stock, switches, signals and transmitters from the track, like occupancy or RailCom detectors. All these elements need to be controlled and read out like the trains themselves.

Before StEin was created, all of this was realized by numerous different electronic modules, usually controlling and reading small entities, typicall accessory decoders for 4 switches, occupancy detectors with 4 or 8 inputs, etc.

ZIMO developed a concept – in the tradition of the MX8 and MX9 modules – which combines **the aspects of ALL those elements**, and calls the product **StEin**. It facilitates the installation and start-up, makes monitoring of the processes comfortable and simplifies troubleshooting.

*A „**StEin**" ist more than a mere synergy of elements.*

„StEin" on the one hand is the name of the ***STEIN88V*** and the partially equipped ***...80G***, but on the other hand also the overall name for all future stationary equipment modules.

Highlights of the „StEin"

HLU „signal controlled speed influence"
is a specialty with 35 years of tradition and experience which has often been mimed but never reached. 6 speed limits (including „stop") slow down every train equipped with the appropriate decoder to the (adjustable) maximum speed of the track section, or stop it.

Tracks without voltage drops, adjustable occupancy detection: the occupancy state of every track section is determined by accurately measuring the current without the usual diodes (which consume part of the operating voltage). The threshold can be adjusted individually in small steps starting with 1mA; additionally, it is possible to switch between operation in normal (dry), moist or wet environment (moist is mostly used for outdoor operation).

Complete RailCom detection (channel 1 & channel 2) –
The complete RailCom messages from the trains are assessed in the StEin (not only the address – Channel 1 – as it usually is the case) and sent to the Command station Mx10 via CAN bus. This improves the reliability of the transmission, because there rarely are disturbances on the single track sections.

Point machines and feedbacks of all kind –
Coils, motor or servo: power units are connected to the StEin and StEin expansion boards; numerous parameters are available for the best settings possible. Position report via limit switch or independent position contacts.

Signal PCBs on the I^2C bus –
Signals of every type are connected to the IQC-PCBs, which best are placed near them. These boards usually have 16 LED-outputs. Production costs and prices are relatively low.

The „object-oriented configuration"

is generally different from the "address-oriented configuration" as it was used before the StEin (the principle of order is formed by the addresses; the entity to be controlled, e.g. a switch, is described by CVs.)

The StEin module, however, puts the focus on the object, i.e. the switch, track section, signal: a proper **object line** (an entry) in a parameter sheet defines every object.

The **parameter sheet** is a table which consists of object lines, is created offline on the computer, and then loaded via USB into the StEin module (or StEin modules on the layout). It is possible to create parameter sheets that complement each other, and to load them into the modules one after the other, if this seems more convenient. In many cases the StEin itself produces a parameter sheet partly automatically and sends it to the computer for further modification.

Each object line contains **parameters** for the corresponding object; the kind depending on the object itself (switch, track section, etc.). Nevertheless, there is always (at least) one connection of the object to the StEin; e.g. in case of a switch the number of the output, which, by the way, does not need to be on the "corresponding" StEin (where the object line is loaded).

A special parameter of an object is the (optional) **system-wide object number**, e.g. a system-wide switch number, via which the interlocking program can control and read out the object (e.g. a switch), without having to know to which StEin it is connected.

Connection (pin connector) for extension PCB 1

Buttons and control LEDs for local operation and adjustment of configuration parameters

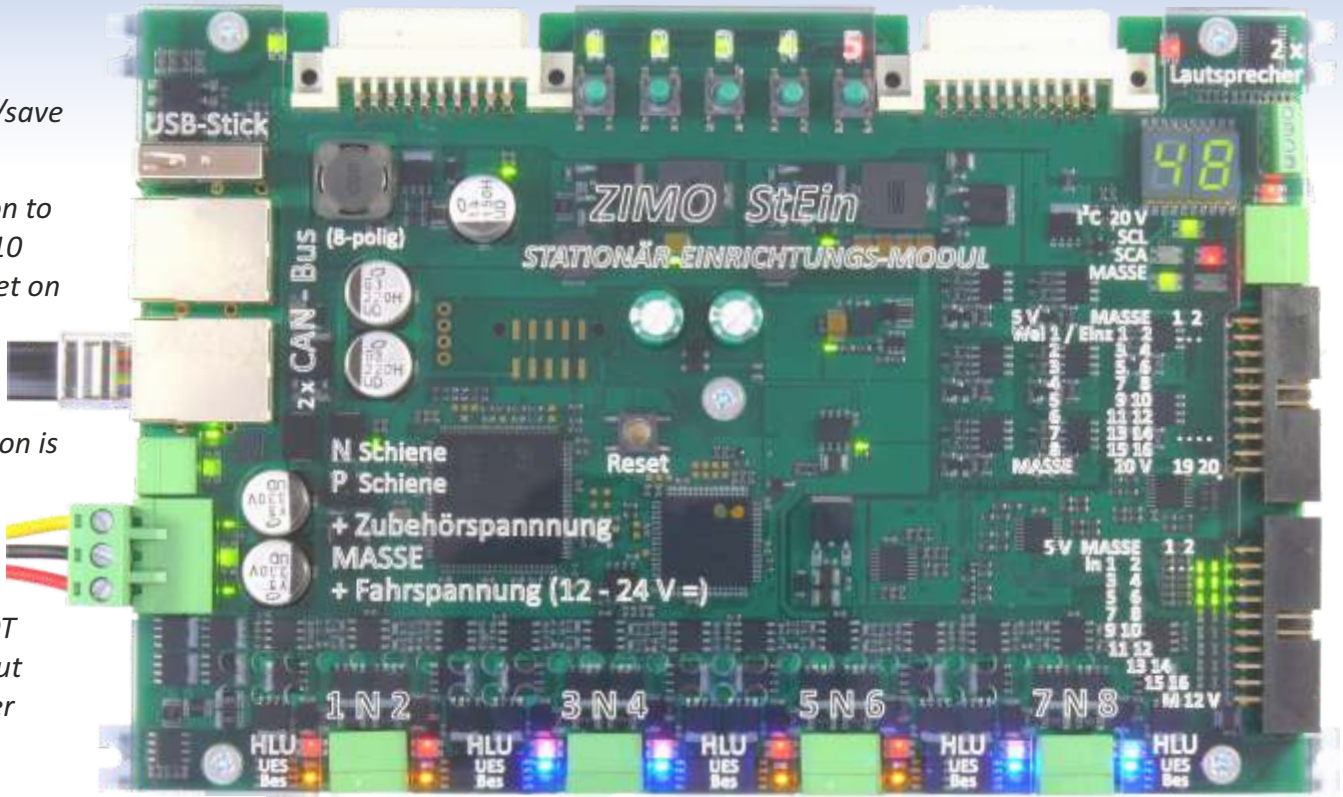
Connection (pin connector) for extension PCB 2

Socket for flash drive: software update and load/save configuration data

2 x CAN sockets: connection to the Command station MX10 (use MX10's CAN bus socket on the back) and a CAN bus socket to the next module.

In case the command station is not an MX10: track for DCC connection

Supply with track voltage and accessory voltage: NOT output "track" of MX10, but outputs "DC out" (or power supply units, max. 24 V)



Outputs for speakers

Display for number of module and operation (buttons)

5V auxiliary voltage for accessories

Outputs for 8 switches (twin coils, motor, EPL) or 16 individual consumers

16 inputs and LED indicators for rail contacts, photoelectric sensors, point position contacts, etc.

Outputs to the 8 track sections, 2 „P-poles" each and one „N-connection" together on one terminal; Per section: HLU indicator (red/yellow nuances/green), occupancy sensor (yellow), short circuit indicator (blue).

HLU

The HLU-technique – also known as “signal controlled speed influence” and “location controlled function influence” – is integrated in every ZIMO decoder*) and ZIMO digital system.

DCC is the communication protocol of the **digital central to all the decoders on the layout**; every command is distributed on all tracks, it obtains a vehicle address, to which only the corresponding decoder (vehicle) reacts.

HLU is a second communication protocol, from an **electronic unit, which is located between the command station and an insulated track section, to the decoder located on the track section;** HLU data can be different from track section to track section (e.g. concerning HLU-limits), does NOT have an address and are read by ZIMO decoders. *)

HLU data usually works like commands to **stop** the trains or to **reduce the speed** to one of the **5 HLU speed limits**; HLU data reaches the decoder virtually without delay, because it is sent about 11 times/sec.

One of the 7 HLU steps is set on the StEin's track section outputs, usually based on the command of an interlocking program (i.e. computer). When the train passes a point contact, the StEin switches the HLU-steps autonomously.

5 Limits		7 Steps
	H Halt	
	UH Interstage	
	U Ultraslow	
	LU Interstage	
	L sLow	
	FL Interstage	
	F Full speed	
	(A voltage OFF)	

RailCom in the StEin

RailCom is a registered trademark of Lenz Elektronik GmbH

Similar to the Command station MX10, the StEin is equipped with **first-class RailCom detectors**, however, 8 times as many (for every one of the 8 track sections).

The evaluation of the feedback from the vehicles allows to show the position (track section) of the loco as well as the layout-related driving direction “East-West” on controllers and the interlocking program, .

„LZB” and „PZB”

The operating principle of HLU in line with the “signal controlled speed influence”, i.e. stopping or limiting the speed on track sections, corresponds to the **“LZB” (Linienzugbeeinflussung** = continuous automatic train control) of the prototypes, where the communication works via wire loops between the rails.

But LZB is not always the best choice, this is why the prototype (as well as the ZIMO controlling technique) additionally or alternatively uses **“PZB” (Punktförmige Zugbeeinflussung** = intermittent automatic train control). The StEin has 16 logic-level inputs, which can be used for point contacts as rail contacts, photoelectric sensors, etc.

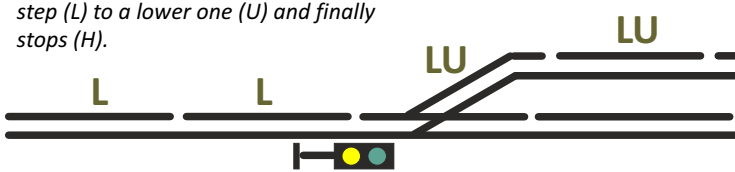
*) All ZIMO decoders and some decoders of other manufacturers understand HLU.

5 buttons ...

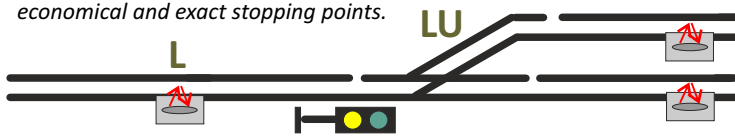
so the StEin also „lives“ without computer.

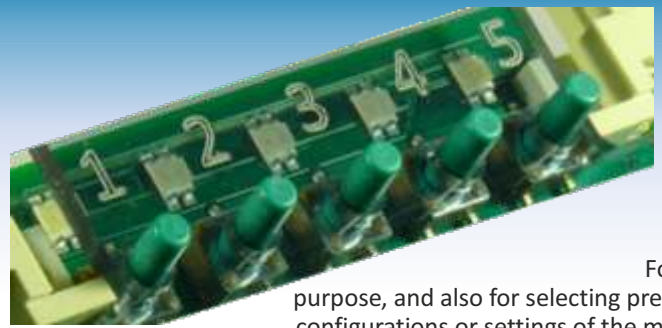
At **start-up** and **troubleshooting**, as many switching operations (switches, signals) and state‘s changes (HLU steps, occupancy thresholds) as possible should be activated directly from the StEin.

„LZB” *monitoring/controlling of track sections:*
Track section arrangement for a two track station and the setting of HLU steps. In this case, one route is activated from the entry signal (left) in the upper station track with halt before the exit signal. So the loco gradually slows down from the medium speed step (L) to a lower one (U) and finally stops (H).



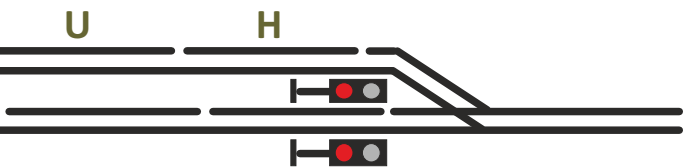
„LZB” *in combination with* ***„PZB”*** *elements:*
Less track sections than above, because some of them are “divided” by photoelectric sensors, which provide economical and exact stopping points.

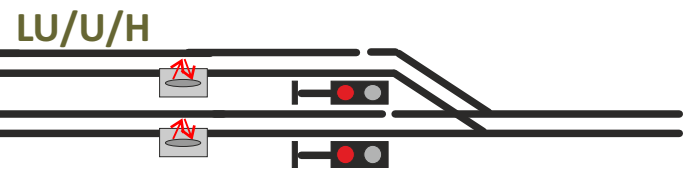




For this purpose, and also for selecting prepared configurations or settings of the module number, the **StEin has 5 buttons**.

The interlocking program also ensures that pushed trains (loco on the back of a push–pull train) brake and stop appropriately, by making sure that the track section ahead of the train is set to the corresponding HLU step as soon as the front of the train is recognized.





7 steps ...
to set up a (simple) „StEin layout":

1- **Planning a layout and connections:** arranging track sections, positioning point contacts, numbering track sections and point contacts, as well as switches and signals (i.e. all "objects"), for the later use as system-wide object numbers, assigning objects to outputs of the StEin modules (corresponding to their module numbers 1-99).

2 - **„Tryout installation":** select and wire part of the layout, i.e. connect objects (switches, signals, …) to the StEin modules of this area and set the StEin's module numbers with the "button-procedure P" (5 buttons and display on the StEin).

3 - **Selecting appropriate prepared configurations** from the assortment (presented in the instruction manual), which generally is available in every StEin module at the time of delivery (e.g. typical HO track sections on every one of the 8 outputs or double-coil motors on the 8 switch outputs). The selection and activation of the desired configuration is done with "button procedure 3".

NOTE: of course, steps 2 and 3 can be carried out in reversed order.

4 - **Local tryout operation:** still without computer and ZIMO cabs to control and read, various LEDs, switches and bulbs can be controlled via "button procedures P and L"; the HLU effect, occupancy detection and RailCom can be tested on the track sections.

This way, it is possible to verify, if the connections are correct and if the object parameters of the prepared configurations suit the needs (thresholds for occupancy detection and overcurrent, switching times, etc.) In addition, this shows if new parameter sheets have to be created (instead of the preinstalled ones).

5 - **Tryout operation via interlocking program (computer):** set up switches, and (at least some) routes of the "tryout area"; to communicate with the StEin objects (switches, track sections, point contacts, signals, …): their connection points at the StEin will be used first. These – together with the respective module number – form the system-wide object numbers.

6 - **Assigning the system wide object numbers (recommended):** This step can be done earlier or later in this list (or not at all, it is not mandatory)
The configuration which is currently programmed in the StEin is read from a flash drive, loaded into an excel sheet on the computer, where the automatically set system-wide object numbers (combination of module and connection number) can be substituted by self-selected numbers (see number 1 – planning layout and connections). The modified configuration is loaded back into the StEin.
Of course, there is also a possibility to change other parameters before loading the parameter sheet into other StEin modules.

7- **Completion of full layout and iterative optimization**

Parameter-sheets ...

as means of configuration of small, big, simple, complex, ... layouts

StEin is different . . .
configuration via parameter-sheets

StEin modules are mostly used with interlocking programs (ESTWGJ, STP, …); at first glance, this is not very different to the wide range of products of feedback devices and accessory modules of other manufacturers.

What is different, is the division of tasks. Due to the **object oriented concept**, the **StEin** is **more intelligent and contains more information** than other devices and so the software on the computer can concentrate on higher-ranking issues:

An example on the basis of switches of a layout: On a conventional layout (NOT with StEin), the address of the accessory decoder and parameters like switching time are defined for each switch in an input mask in the interlocking program. On a StEin-based layout, the connection points, drive type, kind of feedback, switching times, etc. are defined per assigning system-wide switch numbers for single switches in the StEin module itself (more accurately: in the total of all StEins); the interlocking program communicates only based on this system-wide switch‘s address (= object number), but does not need information about the type of drive (coils, motor, servo) or details of the motor control.

The **objects‘ parameters** form **object lines**, which are **gathered offline in a table** (in “**parameter sheets**”, currently as excel sheets; lateron other database programs can be used). This may be unusual for users who are accustomed to input masks, but especially for complex layouts, it provides very clear and comfortable editing, and above all it is easy to modify. Another very big advantage of the table structure is the simple and convenient introduction of new StEin features, without having to cope with CVs in the interlocking program.

Example: if some point machines behave “bitchy”, at some point a new StEin-software is available to solve these problems, it would be fast and easy to adjust (add parameters) and test the corresponding objects (switches) in the table, without having to open numerous input masks.

The **parameter sheet shown below** represents an exemplary (not very realistic) parameter sheet for switches, where every object (=switch) has its own values as object-predefined parameters. Additional to self-evident parameters like drive type and cycle time it contains data concerning position's test pulses, rotation monitoring and contacts for override switches.

OBJKL	OBJTYP	GASYSNR	BEFORM	HLUFIX	PUFFIX	FUNFIX	PU
GA	1	350	0	4	F/H	0	
GA	1	351	3	0	0	0	
GA	1	352	3	0	F/H	0	

The **parameter sheet shown above** refers to track sections: definitions of different occupancy thresholds, values for overcurrent and short circuits, although every object (=track section) can be set distinctly.

In the end, all objects on a layout (switches, track sections, terminal loop modules, signals, etc.) are defined in tables like these (sheets). The interlocking program has access to the objects, preferably per object class and “system-wide object number”, and carries out the operations intended for the corresponding object class.

Example: the switch is set to the right, request switch's position, set track section to L (HLU limit) and command automatic change to H when photoelectric sensor is passed, request occupancy status and train numbers (vehicle addresses) on track section.

OBJKL	OBJTYP	WEISYSNR	ANTRART	POSILOG	SCHIMPZT	SCHIMPPWM	REDAUPWM	SERVPOS1	SERVPOS2	SERVUMLAU	STELLERK	TSTIMPLNG	TSTIMPINV	TSTIMPSPA	ZWAKOREF	HERZPOLPWM	UMLAMINAMP	UMLAMAXAMP	UMLAMINZT	UMLAMAXZT	APUANTR	APUSTEKO	APUZWAKO	ANPUHERZPOL
WEI	1	20	1	1	100 ms	100%	0	0	0	0	1	1 ms	1000 ms	0	0	0	0	0	0	0	35.1	0	35.1	0
WEI	1	21	1	2	200 ms	80%	0	0	0	0	1	0,5 ms	2000 ms	0	1	0	0	0	0	0	35.3	0	35.3	0
WEI	1	22	0	3	400 ms	60%	10%	0	0	0	0	0	0	0	0	30%	85	0	0	0	0	0	0	35.5

OSFIX	GLEINF	BESMNOR	BESMFEU	BESMNAS	GKMINZT	GKPARAM	UESLAMP	UESLAZT	UESLEZT	UESLEAZ	UESSAMP	UESSAZT	UESSEZT	UESSEAZ	ANSPRMX9	APUGA	APUGAV	APUGK1	APUGK2
0	0	1 mA	20 mA	50 mA	50 ms	0	3000 mA	5000 ms	2000 ms	5	5000 mA	3000 ms	5000 ms	20	10,3A	35.1	0	35.12	0
0	0	10 mA	50 mA	100 mA	50 ms	0	1000 mA	500 ms	1000 ms	10	3000 mA	1000 ms	3000 ms	5	10,3B	35.2	0	0	0
0	0	20 mA	100 mA	200 mA	100 ms	0	5000 mA	2000 ms	2000 ms	3	6000 mA	5000 ms	5000 ms	5	0	35.3	0	35.13	0

Better overview per TYP objects

The overall variability (every switch and track section with its own parameters) is not really necessary for the daily use. Therefore, “TYP objects” are commonly used, i.e. templates for “real” objects for typical applications, which are already stored in the StEin by the manufacturer or gathered in parameter sheets.

Example: A layout may contain 100 switches, but only three different drive types (double coil, slow motor, fast motor). Typically, there will be three different WEITYP objects (switch types) (predefined or self-made) with all data concerning the corresponding drive types. The 100 “real” SWI objects (switch objects), of which every single one refers to one of the three TYP objects (i.e. takes over its parameters) now only contain the number of the connection point of the drives, which naturally is different for every switch.

This TYP object method is especially important for signals, but for matters of simplicity, the **parameter sheet shown below** refers to switches.

Quickstart with prepared configurations

For a quick start, a prepared configuration is the best choice: either with one already activated in a new module, or one selected from the StEin‘s memory. A prepared configuration for example contains all parameters (occupancy detection, overcurrent thresholds, etc.) for every one of the 8 track sections in a form, in which it is useful for a layout in O-scale. Prepared configurations for switches with double coil technology, motors, EPL, servos, etc. are also available, as well as configurations for various signalling systems(e.g. HV-signals), which can be activated additionally to the track sections.

Nummer und Name		Inhaltsbeschreibung der Fertig-Konfiguration	Schaltimpuls-/Umlaufzeit
1	**DSA**	8 Doppelspulenweichen mit Endabschaltung	0,2 sec
2	DSN	8 Doppelspulenweichen ohne Endabschaltung	0,2 sec
3	MWA	8 Motorweichen mit Endabschaltung	3 sec
4	MWN	8 Motorweichen (langsam laufend) mit Endabschaltung	5 sec
5	MWD	8 Motorweichen (für Dauerstrom)	0
6	EPN	8 EPL-Weichen ohne Endabschaltung	0,2 sec
7	SWA	8 Servo-Weichen mit Endabschaltung und Anschluss für Relais	3 sec
8	SWM	8 Servo-Weichen ohne Endabschaltung und Anschluss für Relais	3 sec

By using prepared configurations, the first start-up can be done very quickly. Of course, the objects and parameters generated by the prepared configuration can be modified like self-generated ones.

OBJEL	WEITYP	WEISYSNR	ANTRART	POSLOG	SCHIMPZT	SCHIMPPWM	REDAUPWM	SERVPOSI	SERVPOSU	SERWUMLAU	STELLERK	TSTIMPLNG	TSTIMPNW	TSTIMPSPA	ZVAKDREF	HERZPOLPWM	UMLAMMAMP	UMLAMAXAMP	UMLAMNZT	UMLAMAXZT	APUANTR	APUSTEKO	APUZWAKO	APUHERZPOL
WEITYP	WEI-FE-DSE	0	DOSPU	1	100 ms	100%	0	0	0	0	1	1000 µs	1000 ms	0	0	0%	0	0	0	0	0	0	0	0
WEI	WEI-FE-DSE	M-1	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M.1	"	"	"
WEI	WEI-FE-DSE	M-2	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M.2	"	"	"
WEI	WEI-FE-DSE	M-3	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M.3	"	"	"
WEI	WEI-FE-DSE	M-4	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M.4	"	"	"
WEI	WEI-FE-DSE	M-5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M.5	"	"	"

Interlocking systems on the computer

Many interlocking programs in Windows are **ready to operate with ZIMO**, others are still being developed. Three of the first ones are described on the following pages.

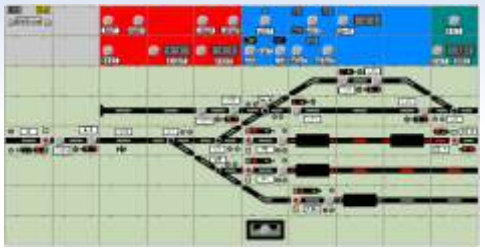
The ZIMO digital system (digital Command station MX10, controllers MX32 and “peripheral” StEin-modules) is equipped with functions which allow testing “stationary equipments”, i.e. switches, signals, track sections, etc. for functionality and correct connection, before the computer is connected and the proper interlocking table is set up.

The connection between computer and MX10 can be established via LAN (or USB).

The Ethernet cable is connected (from the LAN-socket on the MX10's back) either
- directly to the computer, or
- to a WiFi-router, if at the same time a router (e.g. for an app on a smartphone or a tablet) is in use. The router is connected via another Ethernet-cable to the computer.

A **static IP-address** must be set (in “properties” of the internet protocol, TCP/IPv4), which fits the preset IP-address of the MX10: **192.168.1.100** (if “100” is already used by another LAN-device, a different value is possible).

In the interlocking program (e.g. ESTWGJ) the full IP address of the MX10 is entered. In ESTWGJ the MX10's IP is preconfigured with **192.168.1.145.**



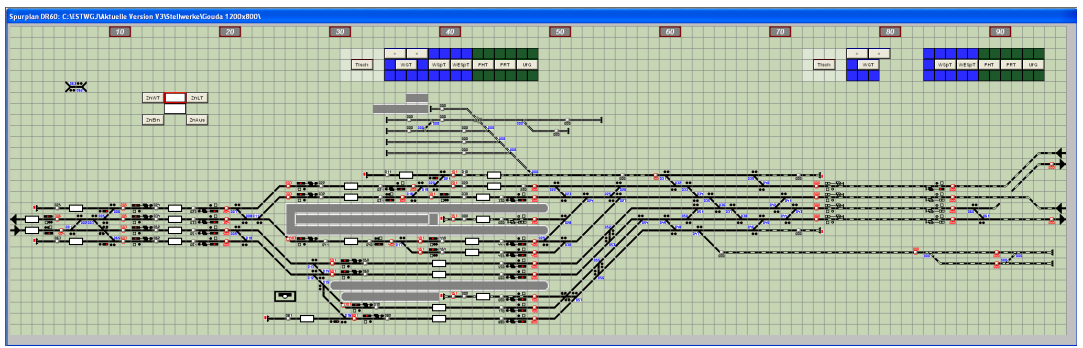
ESTWGJ

ESTWGJ represents a prototypical realization of a route interlocking of the German Bundesbahnen to control digital model railways. Main responsibilities of this program are controlling, monitoring and dissolving operations according to the prototypical safety system, when setting train and shunting routes. ESTWGJ does not require programming experience.

The layout’s data is entered via editors, while the displayed interlocking table on the monitor is a reference for most of the entered information.

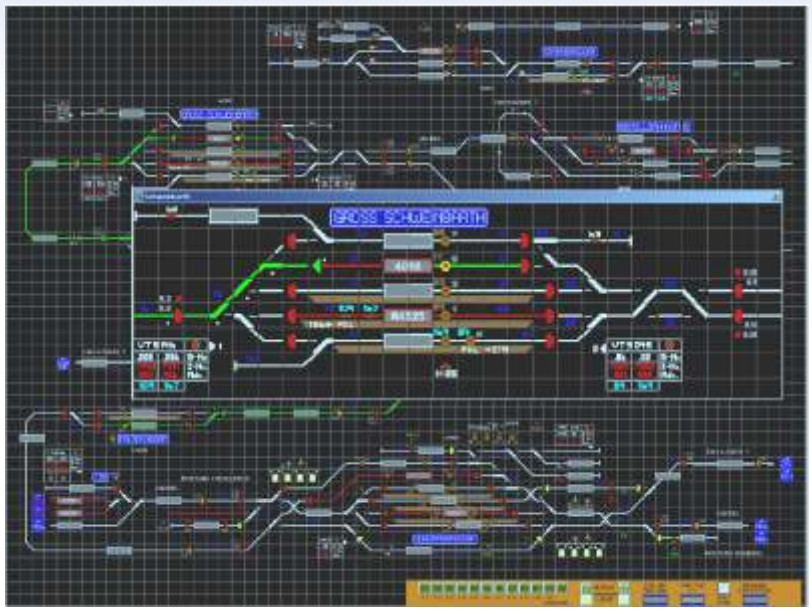
At present, the user can choose between 4 different displays of the German interlocking system; starting with V7 also the Swiss Dmo67 is supported, which is autonomous optically and functionally.

www.ESTWGJ.com



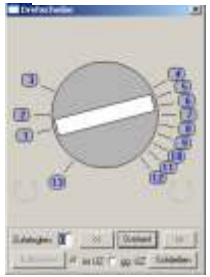
with products of ZIMO's partners

STP – The interlocking software for professional model railroaders



Interlocking on EStW-display

Controller



Turntable control

STP works with components of the ZIMO digital system to control the layout. Therefore, track sections can be controlled individually with „signal controlled speed influence" (HLU). This affects trains controlled by controllers or computer and thus provides a maximum of flexibility and reliability. All this allows a limitless combination of automatic and manual operation.

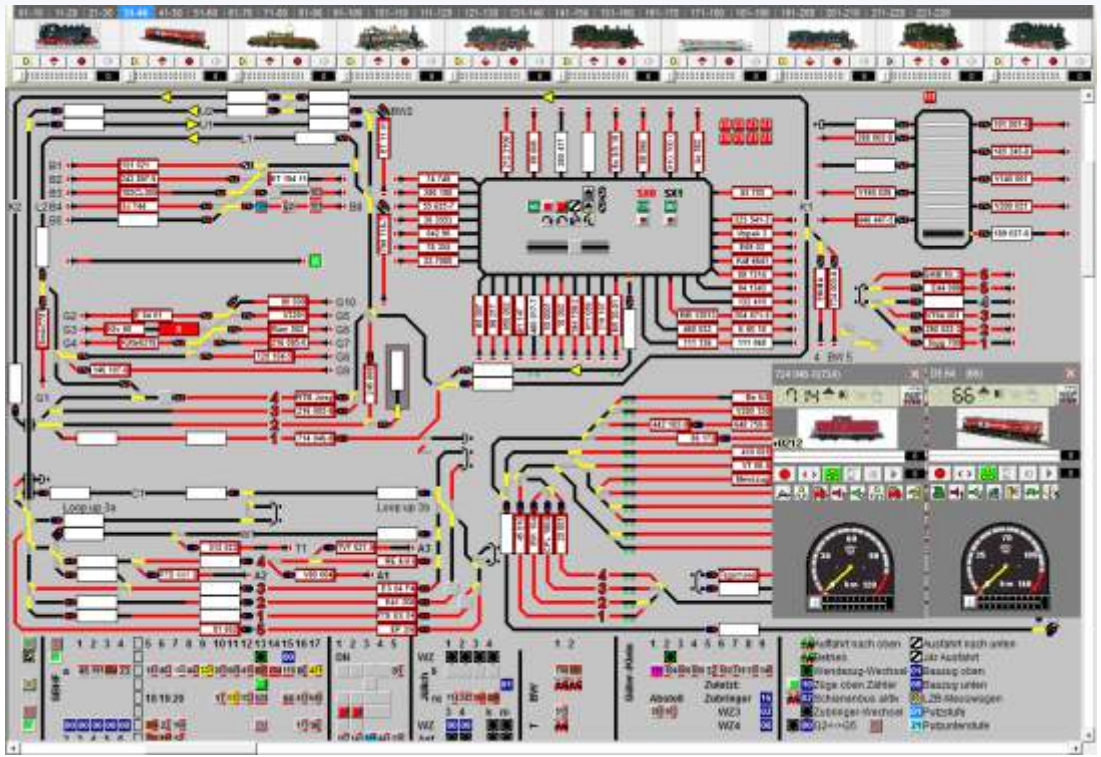
Display and way of operation are similar to the prototype used by real trains. You can use STP also on (Windows-compatible) tablets with touch screen.

www.stp-software.at

WIN-DIGIPET

DAS STEUERUNGSPROGRAMM FÜR DIGITALE MODELLEISENBAHNEN

The professional and user-friendly comprehensive product range, which dissolves all controlling operations on layouts of all sizes. Together with STP and ESTWGJ, WIN-DIGIPET is a program that uses the ZIMO HLU technology.



ZIMO employees


Quang Nguyen


Viktor Obrist-Wilde


Oswald Holub
manager
development


Marijana Lazarevic


Vincent Hamp


Peter Ostatnik


Michael Schwarzer


Stephan Lampert


Stephan Zimmerer


Michael Rubitschka

Development - Testing - Sounddesign


Peter W. Ziegler
managing director


Attila Balog


Selim Adamkaya


Tan Hung Huynh
manager
production


Nada Radulovic


Ferenc Györe


Samuel Pechlahner


Maria Liszka


Selda Telci


Steven Beboso


Renata Gyenge


Mohammad Alrifai

Production - Purchasing


Manoj Abraham


Gotho Griesmeier


Manuel Herlt


Manojela Stanojevic


Thomas Mader


Oi Van Beranek-Che
procurator
management sales


Sven Fuchs


Senad Topcic


Alyssa Girsule


Manfred Brückner


Stephan Hubinger


Alexander Mayer

Sales - Distribution - Administration - Documentation -

Customer Service - Repair - Testware

Imprint

ZIMO ELEKTRONIK GmbH
Schönbrunner Straße 188
1120 Wien (Vienna) AUT
www.zimo.at, office@zimo.at
t/f +43 1 8131007 0/8
Responsible for the content: Peter W. Ziegler
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some features are still developed.

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